

TDK-Lambda Power Supplies



2012 Online Product Catalog

The choice and application of the power supply is an important one. Working with TDK-Lambda can help you save time and money, from design concept to years after your system or product is first installed.

Why TDK-Lambda?

- ◆ Over the last 60 years, TDK-Lambda has developed a worldwide reputation and heritage for high quality, robust power products.
- ◆ We at TDK-Lambda stand behind our products with industry leading warranties of up to a lifetime (limited).
- ◆ Our research and development budget is one of the largest in the industry, helping you design-in reliable, cutting edge technology, ahead of your competition.

- ◆ A broad range of product enables our customers to choose the right model for the application, and assists with their vendor reduction programs.
- ◆ Multiple manufacturing and design facilities across the globe. We can provide crucial local support when programs move between Asia, North America, and Europe. With those multiple factories we also have proven risk mitigation against natural disasters. Plus, our products are RoHS compliant and our sites are ISO9001 and ISO14001 certified.
- ◆ Our technical support can get your product to market faster. Please see overleaf for more details.

Thank you for your interest in TDK-Lambda products.

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TDK-Lambda Website, Blog and Social Media

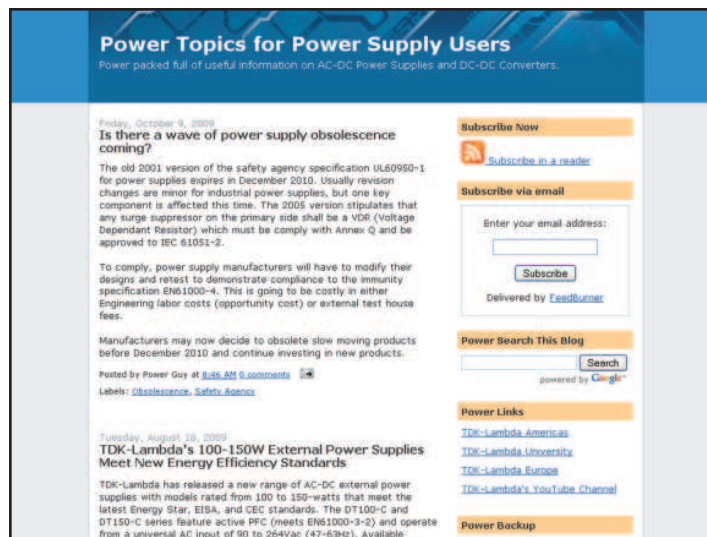
At TDK-Lambda Americas, we value your time and privacy as much as we value ours. No one likes receiving unsolicited emails. That's why we let you choose how, when and in what format we contact you with valuable updates. We also don't force you to pick which social networking site to stay connected to us. You choose.

Web <http://www.us.tdk-lambda.com/lp>

Get the latest product, program and company information including datasheets, technical information and white papers, from TDK-Lambda America's main Internet site. See 360° rotating view of key products, find models using our parametric search engine and research specifications for legacy products.

Blog <http://power-topics.blogspot.com>

Learn about "Power Supply Considerations for Industrial Applications" or determine what size fan you need by reading articles, definitions and design tips on our main blog. Search through educational articles on various elements of power supply design engineering for the beginner to the seasoned expert. This is an interactive site so feel free to post comments including clarifications, additional questions and other helpful links.



Video <http://www.youtube.com/user/TDKLambda>

TDK-Lambda Americas' main video channel is hosted on YouTube. Our videos focus on education, innovative design strategies and product showcases. We also make these videos available in standard video formats at TDK-Lambda University on our website.



Twitter <http://www.Twitter.com/tdklambda>

Follow us on Twitter and find out the latest information on TDK-Lambda in 140 characters or less. Ideal for mobile phone users and online engineers, who need information immediately, this micro-blogging site keeps loyal fans and partners updated on changes to our Web site, blog, or video channel.



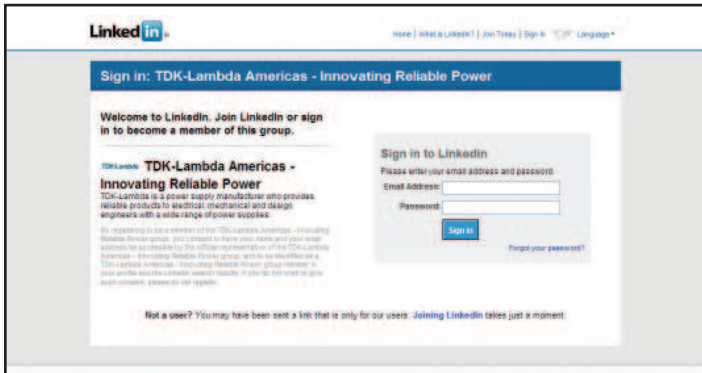
Facebook <http://www.facebook.com/pages/TDK-Lambda-Americas-Inc/109780051681?ref=mf>

Become a fan of TDK-Lambda Americas on Facebook. Periodically, we post product highlights, press releases, web site changes and other information on the wall. Many of the videos can also be found here.

TDK-Lambda Website, Blog and Social Media

LinkedIn.com <http://www.linkedin.com/e/vgh/2298571/>

A professional networking site for building relationships, we have a group for keeping apprised of TDK-Lambda Americas' news, discussions and tips. Join us there and get linked in.



Mobile Web App

TDK-Lambda has a mobile web app for iPhone and Android smart phone owners. This app is user friendly and provides easy access to the company's full line of power supplies via smart phones. The app can be downloaded to iPhones and Android (2.0 or higher) cell phones at this mobile web link: <http://wbxapp.com/tdk-lambda>

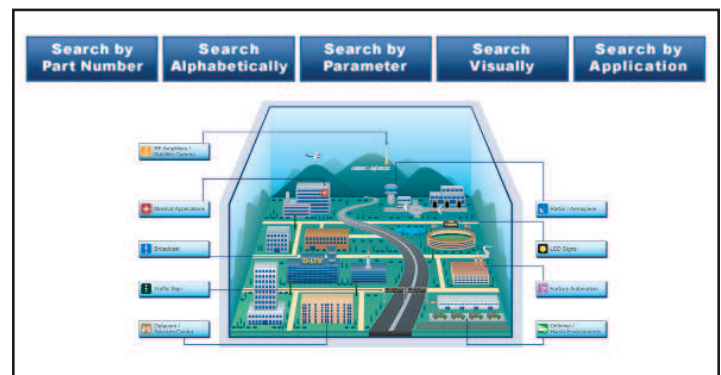
This innovative mobile web app allows the user to select power supplies based on their specific application, for example, Industrial, Medical, Communications, LED, Military, etc. In addition, the user can select the output power level they require and will be given a selection of models that meet their criterion. Thereafter the selection process proceeds intuitively via new screen views that show product descriptions and detailed specifications for the recommended power supplies.



In addition, links to the company's YouTube instructional videos and other related sites are available through this app. TDK-Lambda Americas is very pleased to provide our customers with the most comprehensive mobile phone app available today for selecting power supplies. This represents another step in our commitment to provide the latest high tech tools to our clients. This mobile app complements our company's website, which together now provides the easiest to use power supply selection tools, application notes and educational content, bar none.

Products by Application: Power City

Our online power-products search engine includes an easy to use Search-by-Application called "Power City". When selected, you see a pictorial of a typical town with hot links to places where power supplies and DC-DC converters are used. For example, within Power City there is a hospital (medical applications), a factory (industrial/automation), a radio tower (RF amplifiers/satellite communications) and a military base (Mil/COTS applications), to name a few. When you click on a hot spot, all of the power products that are designed for that application appear as photos with a brief description. To get more detailed information (i.e., data-sheet, instruction manual); just click on the product photo that comes closest to your needs.



If we are not where you like to hang out on the Internet, let us know and we'll investigate getting involved. Our goal is to be where it's most convenient for you, our valued customer, and not the other way around. When you are designing for power, think TDK-Lambda Americas.

The TDK-Lambda website (<http://us.tdk-lambda.com/lp>) has a huge library of data:

- ◆ Installation manuals
- ◆ Detailed specifications
- ◆ Evaluation data
- ◆ Outline drawings
- ◆ MTBF predictions
- ◆ Reliability data
- ◆ Application Notes



Want Engineering Support?

- ◆ Please call 1-800-LAMBDA-4 to speak to our inside technical support team, or email lambda.techsupport@us.tdk-lambda.com
- ◆ TDK-Lambda's Field Application Engineers are available for in-depth advice at your facility. Please contact your local TDK-Lambda Salesperson to schedule a visit.

Date

Sales Person

Phone #

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Product Family	Notes	Pg#

Notes:

Let TDK-Lambda help you specify your power supply

Input Voltage Range:

VAC

VDC

Power Factor Correction?

☐

Yes

☐

No

RoHS Compliant?

☐

Yes

☐

No

Operating Temperature Range

°C

Output

Volts (V)

Amps (A)

Peak Current (A)

Regulation (+/-%)

#1

#2

#3

#4

#5

#6

Agency/Safety Approvals:

Construction

☐

Enclosed (Covered)

☐

Open-Frame

☐

PCB Mount

☐

DIN Rail

☐

Surface Mount

Cooling

☐

Integral Fan

☐

System Fan

☐

Convection Cooled

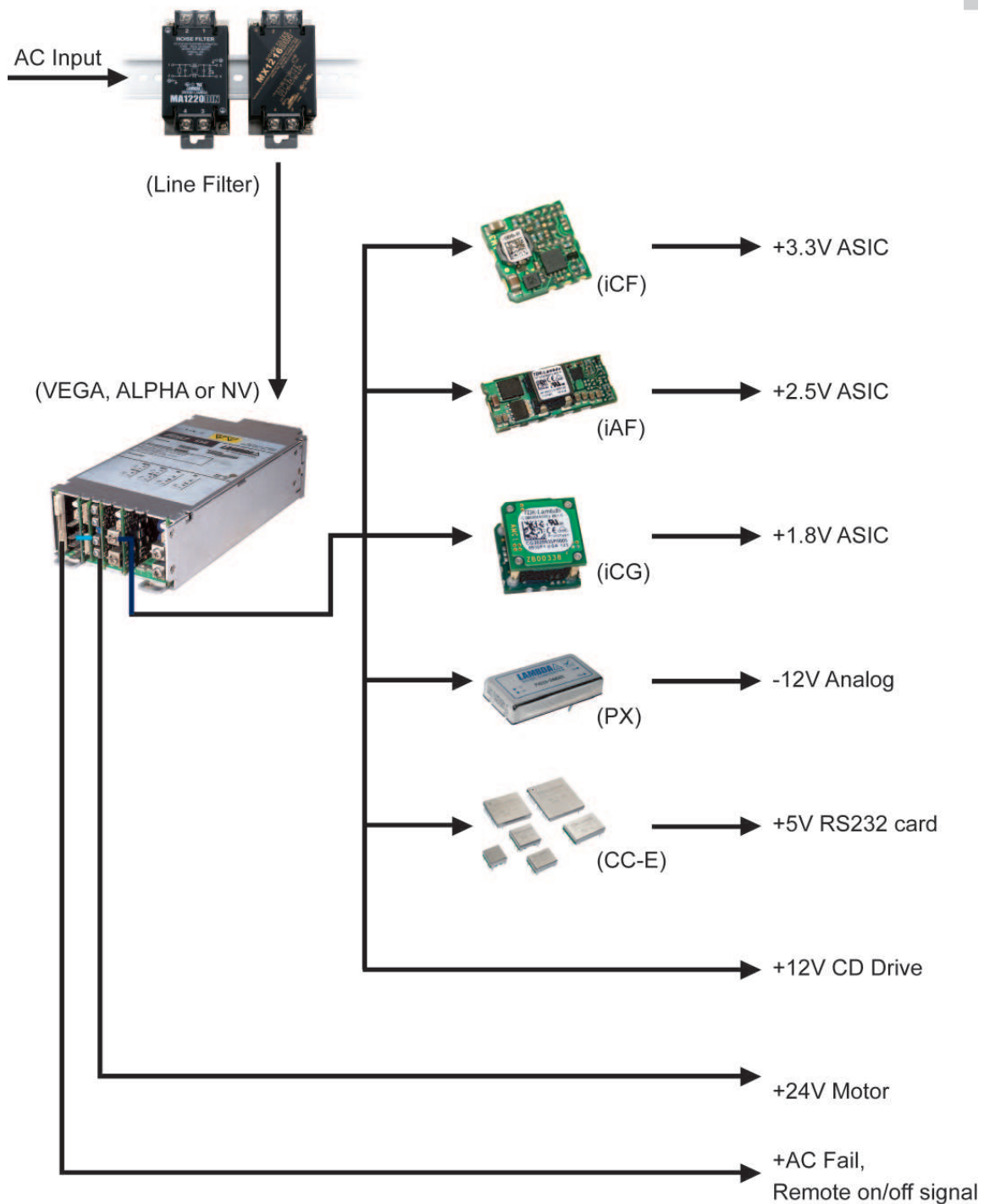
Price Target \$

Estimated Annual Usage

Notes:

TDK-Lambda **The Complete Power Solution**

Configurable AC-DC Supply + DC-DC converters (isolated & non isolated)

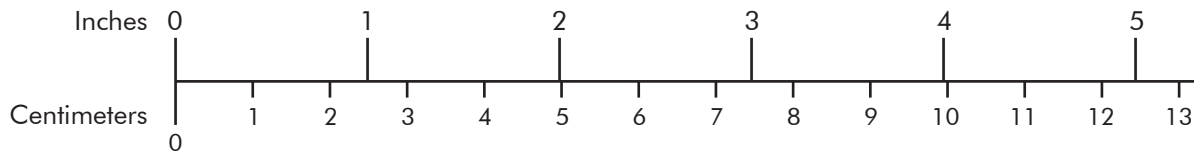


- ✓ Flexible
- ✓ Off the shelf
- ✓ No minimum loads
- ✓ No cross regulation

TDK-Lambda Conversion Factors & Equations

English & Metric Conversions	
English to Metric	Multiply English Unit by:
inch to millimeter (mm)	25.4
inch to centimeter (cm)	2.54
foot to meter (m)	0.3048
ounce (oz) to gram (gm)	28
pound (lb) to kilogram (kg)	0.45
Metric to English	Multiply Metric Unit by:
millimeter (mm) to inch	0.03937
centimeter (cm) to inch	0.3937
Meter (m) to foot (ft)	3.2808
gram (gm) to ounce (oz)	0.036
kilogram (kg) to pound (lb)	2.2

Inches to Centimeters (cm) to Millimeters (mm) Conversions



Air Flow Conversions

1m/s (meters per second)= 3.28 feet per second = 196.85 LFM (linear feet per minute)

Weight Conversions

453.6 grams = 12 ounces = 1 pound

Rack Height Units

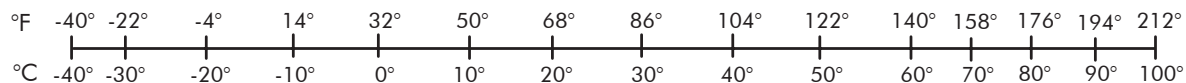
1U = 1.75 inch = 44.45mm

2U = 3.50 inch = 88.90mm

Fahrenheit - Celsius Temperature Conversions

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32^{\circ}}{1.8} \quad ^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32^{\circ}$$

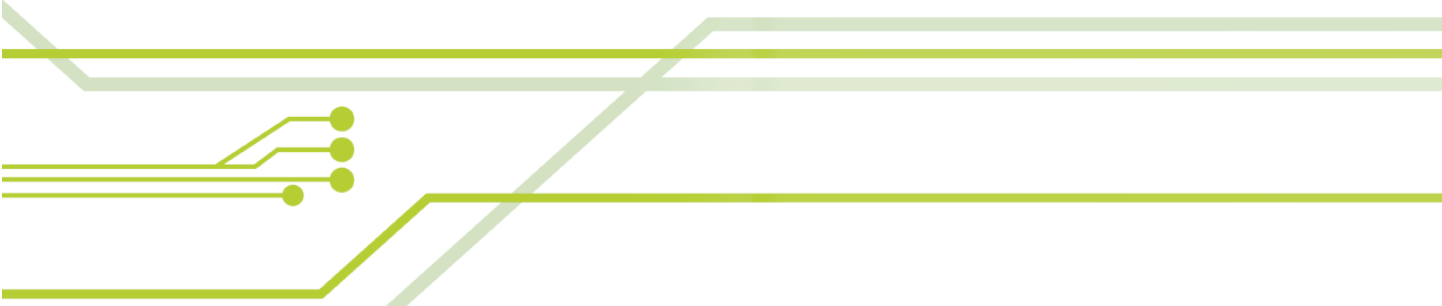
Conversion Formulas



DC Circuit Equations

$$E = IR \quad I = \frac{E}{R} \quad R = \frac{E}{I} \quad P = IE \quad P = \frac{E^2}{R} \quad P = I^2 R$$

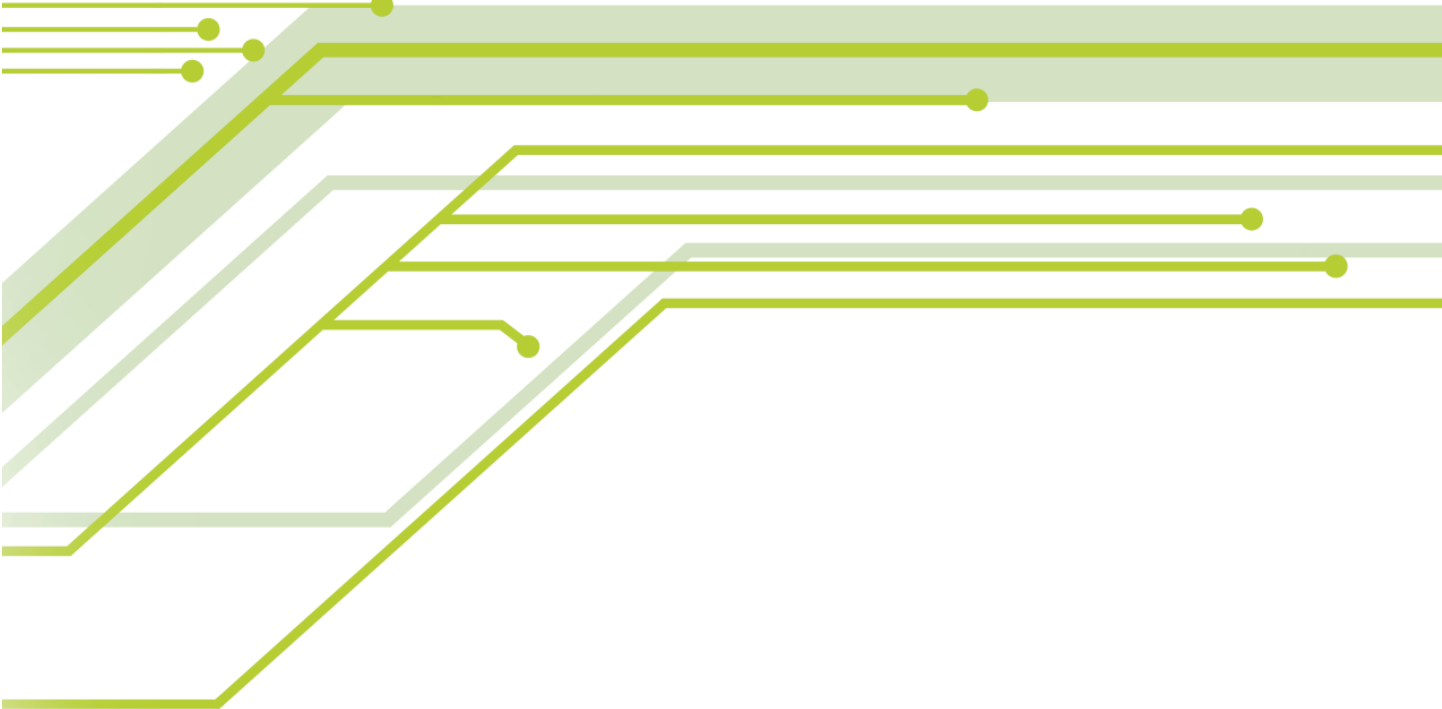
E = Voltage (in volts) R = Resistance (in ohms)
I = Current (in amperes) P = Power (in watts)



AC-DC Products

DC-DC Products

Filters



Linear	Enclosed or L Bracket	PCB Mount	Desktop
Open Frame	Rack Mount Hot Swap		

Applications	# of Outputs	Output Power (W)													
		5	10	15	30	50	100	300	500	1000	1500	2500			
High Reliability Industrial (Five Year Warranty) (HWS Limited Lifetime Warranty)	Single				NNS										
								GWS							
								EFE							
								CFE							
					HWS										
											LZSA				
	Dual				NND										
	Triple						JWT*								
Industrial (Three - Five Year Warranty)	Single & Multiple							NV							
					MTW*										
								MWS							
					AL (LED)										
											Vega				
													Alpha		
					LS										
Datacom Commercial (One - Two Year Warranty)	Single			KPS, KM											
				ZWS, ZWSBAF, ZWSPAF											
								DT							
						SC, SC120, ZP									
									SWS						
											PFE				
											CPFE				
												FPS/RFE			
								CS							
														HFE	
		Multiple			KM										
					SC, ZP										
							ZWX*,ZWQ								
Programmable	Single									Z+					
DIN Rail Mount	Single	DSP, DPP, DLP-PU (Din Rail)													
								DLP							

* See website

12W IP66 Power Supplies

Features

- ◆ Small Size
- ◆ 115VAC or 230VAC input
- ◆ Constant Current or Constant Voltage Versions
- ◆ Splash proof
- ◆ Conservative component ratings for long life



Key Market Segments & Applications



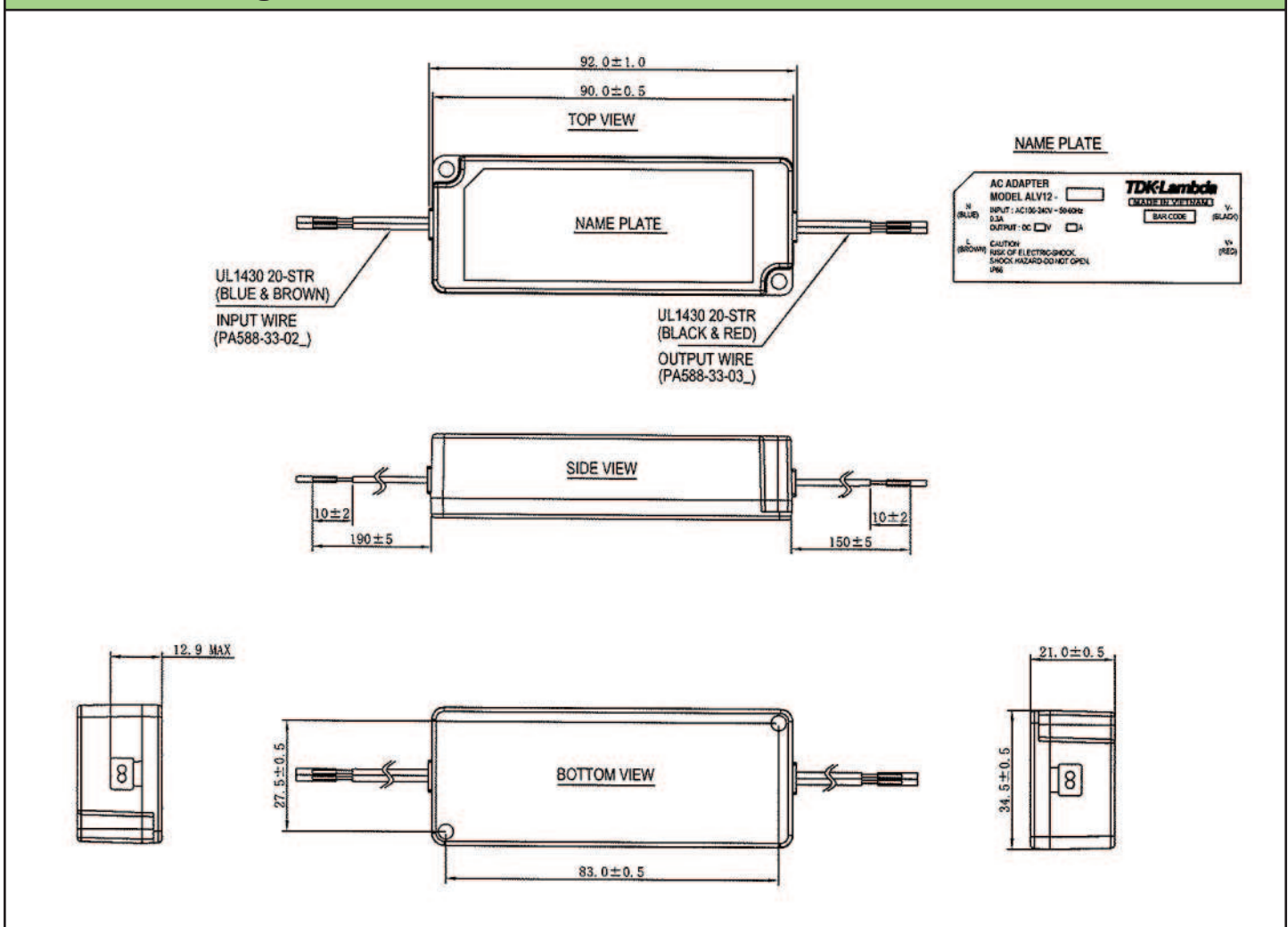
Specifications		
Model		ALC12 ALV12
AC Input	VAC/Hz	90 - 264VAC, 47 - 63Hz
Inrush Current (100/200VAC)	A	25 / 50A, 25°C ambient, cold start
Input Current (110/200VAC)	A	0.28 / 0.18A
Temperature Coefficient	-	<0.02%/°C (0 - 50°C)
Overcurrent Protection	-	Automatic Recovery
Overvoltage Protection	%	> 110% > 105% of rated power
Turn on time	ms	< 200ms
Hold Up Time (115/230V input)	ms	5ms typical
Leakage Current (265VAC 60Hz)	mA	0.25mA
Efficiency	%	82% typical at full load
Operating Temperature	-	-10 to +60°C (Guaranteed start up at -20°C)
Storage Temperature	-	-30 to +85°C
Operating Humidity (1)	-	15 - 90% RH
Storage Humidity (1)	-	15 - 90% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Output 3kVAC
Isolation Resistance	-	>100M at 25°C & 70%RH, Input to Output at 500VDC
Vibration (non operating)	-	0 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 30 mins
Shock	-	< 196.1 m/s ² (20G)
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11
Safety Agency Approvals	-	UL1310 (Class 2), CAN/CSA-C22.2 No 223-M91, IEC61347-1, IEC61347-2-13, CE Mark, PSE
Conducted & Radiated EMI	-	EN55015, EN55022, FCC Class B
IP Class	-	IP66
Weight (Typ)	g	84
Size (LxWxH)	in(mm)	3.45 x 1.36 x 0.83" (90 x 34.5 x 21mm)
Warranty	yrs	Three Years

(1) Non condensing

Model Selector

Model	Output CV/CC	Output Voltage (V)	Min. Output Accuracy	Output Current (A)	Maximum Current (A)	Average Power	Ripple & Noise
ALC12-36-R35	CC	3 - 36V	0.33 - 0.37A	-	0.35A	12.6W	-
ALC12-18-R70	CC	3 - 18V	0.66 - 0.735A	-	0.7A	12.6W	-
ALV12-12-1R0	CV	12	11.4 - 12.6V	0.1A	1A	12W	100mV
ALV12-15-R80	CV	15	14.25 - 15.75V	0.08A	0.8A	12W	100mV
ALV12-24-R50	CV	24	22.8 - 25.2V	0.05A	0.5A	12W	150mV

Outline Drawings



For Additional Information, please visit
us.tdk-lambda.com/lp/products/al-series.htm



60 to 100W IP66 Power Supplies

Features

- ◆ Small Size
- ◆ 90-305VAC input range
- ◆ Constant Current or Constant Voltage Versions
- ◆ Splash proof plastic case (non-rust)
- ◆ -40°C start up
- ◆ Conservative component ratings for long life



Key Market Segments & Applications



Specifications			
Model		ALC	ALV
AC Input	VAC/Hz	90 - 305VAC, 47 - 63Hz	
Inrush Current (100/200VAC)	A	25 / 50A, 25°C ambient, cold start	
Input Current (110/200VAC)	A	Model dependant	
Power Factor (1)	-	IEC61000-3-2 Class C, (50% - 100% loading) 0.99/0.95 at 115/230VAC ⁽¹⁾	
Output Accuracy	%	±5%	±3%
Total Regulation	%	±5%	±3%
Overcurrent Protection	-	Automatic Recovery	> 105% of rated power
Overvoltage Protection	%	> 110% (Cycle AC to reset)	
Turn on time	ms	< 1000ms	
Leakage Current (240VAC 60Hz)	uA	< 250uA	
Operating Temperature	°C	-30 to +70°C, (Guaranteed start up at -40°C). AL60; derate linearly to 70% load from 50 to 70°C, AL80; derate linearly to 60% load from 50 to 70°C, AL100; derate linearly to 50% load from 50 to 70°C	
Storage Temperature	°C	-30 to +85°C	
Operating Humidity	-	15 - 90% RH (non condensing)	
Storage Humidity	-	15 - 90% RH (non condensing)	
Cooling	-	Convection	
Withstand Voltage	-	Input to Output 3kVAC (Class II, no ground connection needed)	
Isolation Resistance	-	>100M at 25°C & 70%RH, Input to Output at 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 30 mins	
Shock	-	< 196.1 m/s ² (20G)	
Immunity	-	IEC61000-4-2 (lv 3), -3 (lv 3), -4 (lv 3), -5 (lv 4), -6 (lv 3), -8 (lv 4), -11	
Safety Agency Approvals	-	UL8750 (Class 2) ⁽²⁾ , EN61347-1, EN61347-2-13, CSA C22.2 No. 60950-1, CE Mark	
Conducted & Radiated EMI	-	EN55015-B, EN55022-B, CISPR 22-B, FCC-B	
IP Class	-	IP66	
Weight (Typ)	g	ALx60: 380g, ALx80, 100: 500g	
Size (LxWxH)	in(mm)	9.49 x 1.7 x 1.36" (241 x 43.1 x 35mm)	
Warranty	yrs	Three Years	

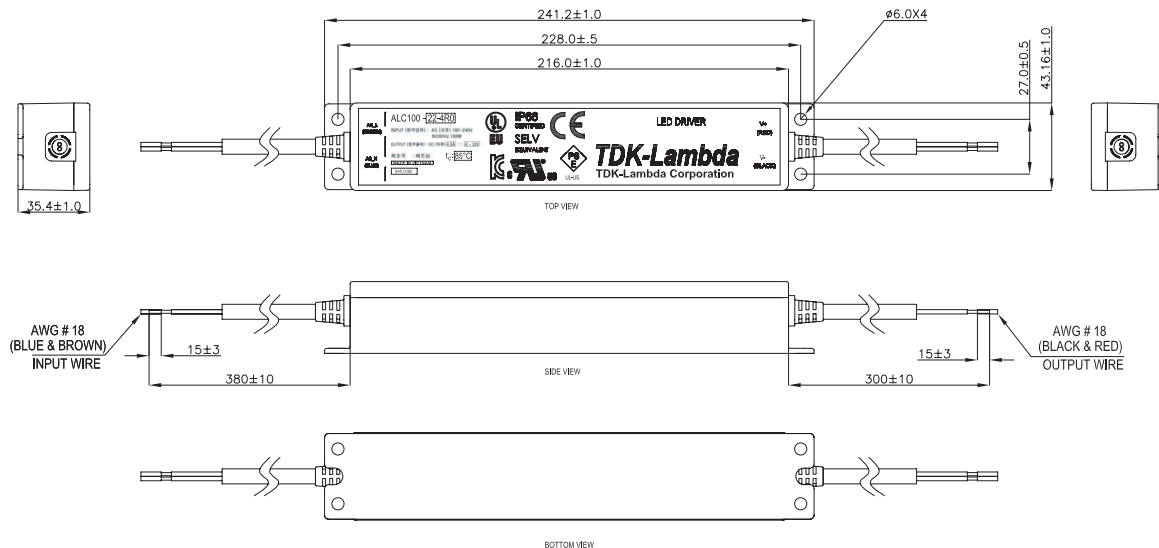
(1) 0.98/0.93 for ALx60 models

(2) See model selector for applicable units

Model Selector

Model	CV/CC	Output Voltage (V)	Output Current (A)	Efficiency	Maximum Average Power	Ripple & Noise	Class 2
ALC60-48-1R05	CC	6 - 48V	1.05A	85%	50.4W	-	Yes
ALC60-42-1R4	CC	6 - 42V	1.4A	86%	58.8W	-	Yes
ALC80-48-1R7	CC	6 - 48V	1.7A	87%	81.6W	-	No
ALC80-24-3R3	CC	6 - 24V	3.3A	86%	79.2W	-	No
ALC100-22-4R0	CC	6 - 22V	4A	86%	88W	-	No
ALV60-12-5R0	CV	12V	5A	85%	60W	180mV	Yes
ALV60-24-2R5	CV	24V	2.5A	88%	60W	240mV	Yes
ALV60-36-1R7	CV	36V	1.7A	87%	61W	360mV	Yes
ALV80-12-6R5	CV	12V	6.5A	86%	78W	180mV	No
ALV100-24-3R8	CV	24V	3.8A	89%	91.2W	240mV	Yes
ALV100-36-2R5	CV	36V	2.5A	88%	90W	360mV	Yes

Outline Drawings



NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. DRAWINGS ARE NOT SCALE.
3. FOUR MOUNTING SLOTS FOR M4 SCREWS.
4. CASE MATERIAL IS LEXAN 920.
5. MODEL NAME, INPUT VOLTAGE RANGE, MAX INPUT POWER, NOMINAL OUTPUT CURRENT AND OUTPUT VOLTAGE RANGE ARE SHOWN ON THE NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS.

Options

Suffix	Description
Blank	Standard Cables
/W	UV Protected Cables

For Additional Information, please visit
us.tdk-lambda.com/lp/products/al-series.htm



1000W Multiple Output Modular Power Supply

Features

- ◆ Universal AC Input
- ◆ Power factor Corrected
- ◆ Capable of up to 14 fully regulated and independent outputs
- ◆ Output Voltages from 1.8V - 48V
- ◆ Low Leakage Options
- ◆ International Safety Agency Certification
- ◆ Fast-on Tab Connections
- ◆ No Minimum Load
- ◆ Wide Range Output Modules



Key Market Segments & Applications



Specifications

Model		
AC Input Volt. range & Freq.	-	85-264VAC, 47-63Hz
DC Input Voltage Range	-	120 - 360VDC (800W maximum output to 45°C)
Input Current	A	16A maximum
Inrush Current	A	Less than 50A
Leakage Current	-	1.1mA @ 264VAC, 63Hz (see input filter options in detailed product datasheet)
Efficiency	%	75% typical (configuration and input dependent)
Power Factor Correction	-	Compliant to EN61000-3-2 (> 0.99 typical, reduced PFC > 255VAC)
Conducted EMI	-	EN55022 level A
Output Power	W	800W@85VAC (50°C max); 1000W@100VAC (50°C max); 1000W@90VAC (45°C max); 1000W for 30 seconds maximum @ 85VAC followed by 800W for 60 seconds minimum.
Output Load Regulation	-	0.2% maximum.
Output Line Regulation	-	0.5% maximum.
Ripple & Noise	-	2% pk-pk or 100mV (Whichever is greater)
No Load Operation	-	No preload is required on any output module.
Hold Up Time	ms	>15ms
Remote Sense	-	Available on single output modules only, refer to the module table.
Options (see option codes)	-	AC Fail, Global Inhibit, Module Inhibit, 5V@50mA aux., Parallel, Low Leakage.
Operating Temperature	°C	-20°C to +50°C full load, derate each output at 2.5% /°C from 50°C to 65°C.
Thermal Protection	-	Converter protected against over-temperature conditions. Recycle I/P power to restore output.
Storage Temperature	°C	-40°C to +85°C
Temperature Coefficient	-	0.02% per °C
Humidity	% RH	5% - 95% Non-condensing
Altitude	-	3,000m operating
Cooling	-	Internal fan provides forced-air cooling. Airflow intake on I/P end, exhaust on O/P end of unit.
Isolation	-	Input - Output 4.3kVDC, Input - Ground 2.3kVDC, Output - Ground 500VDC
Switching Frequency	-	100kHz on PFC, 200kHz on forward converter.
Vibration	-	1.5G, 10 - 200Hz
Shock	-	3,000 bumps, 10G, 16ms half-sine pulses.
Safety Agency Certification	-	UL, EN/IEC60950-1, UL, EN/IEC60601-1*, IEC, EN61010-1, CE Mark
Size (WxHxD)	in	7" x 2.5" x 11"
Warranty	yrs	Three Years

Notes: Consult datasheet for additional specifications

* Low leakage filter options only.

1 Case Codes

Choose the converter which best fits your total power needs:

Code	Wattage	Max Slots	Size (H x W x L)	Input Voltage
CA1000	1000*	7	2.5" x 7" x 11"	85 - 265VAC

* Note: CA1000 derates to 800W for 85-100VAC input with a peak of 1000W for 30 seconds max.

2 Output Module Codes

Code	V1 Adjust	V1 Amps	V2 Adjust	V2 Amps	Slot(s) ⁽¹⁾
L	1.8 - 3.2	25	-	-	1
T	1.8 - 3.2	60	-	-	2
Q	2.7 - 3.9	25	-	-	1
R	2.7 - 3.9	60	-	-	2
B	4.5 - 5.5	25	-	-	1
A	4.5 - 5.5	60	-	-	2
BB	4.5 - 6.5	25	-	-	1
AA	4.5 - 6.5	60	-	-	2
S	2.5 - 5.7	85	-	-	2
M	5.0 - 16.0	8	-	-	1
C	5.0 - 16.0	16(3)	-	-	1
F	9.0 - 16.0	33	-	-	2
U	10.0 - 21.0	16	-	-	1
N	18.0 - 29.0	5	-	-	1
D	18.0 - 29.0	8	-	-	1
K	18.0 - 29.0	15	-	-	2
G	17.5 - 29.0	25(3)	-	-	2
J	30.0 - 48.0	10(3)	-	-	2
E	5.0 - 16.0	8(3)	5.0 - 16.0	8(3)	1
P	18.0 - 29.0	5	5.0 - 16.0	8(3)	1
H	18.0 - 32.0	5(3)	18.0 - 32.0	5(3)	1

Notes: 1) The total # of slots must not exceed 7 for CA1000.
 2) Slot position may change upon order placement.
 3) Module Deratings: C derates linearly to 12A from 12.1V-15V
 E & P 8A rating derates to 6A in slots 4 & 5
 H derates from 5A to 4A in slots 4 & 5
 G derates to 21A above 24.5V
 J derates 0.25A/V above 40V

Sample Configurations

	Output 1		Output 2		Output 3		Output 4		Output 5	
	V	A	V	A	V	A	V	A	V	A
CA1000-24G	24	16.5	-	-	-	-	-	-	-	-
CA1000-5APP-5APP *	5	120	-	-	-	-	-	-	-	-
CA1000-5A-12.7C	5	60	12.7	16	-	-	-	-	-	-
CA1000-24G-5/12E	24	25	5	8	12	8	-	-	-	-
CA1000-5A-24G-12C-12C	5	60	24	25	12	16	12	16	-	-
CA1000-5BMF-24D-6/12E	5	25	24	8	6	8	12	8	-	-
CA1000-5B-5CIN-12C-12/12E	5	25	5	16	12	16	12	8	12	8
CA1000-5S-12F-12C-5/24P	5	85	12	33	12	16	5	8	24	5

Notes: Total output power must not exceed 1000W converter limits.
 * Modules in parallel.

Other Modular Products

NV	350W to 700W up to 8 outputs
Vega	450W to 900W up to 10 outputs
Alpha1500	1500W up to 16 outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/alpha-series.htm



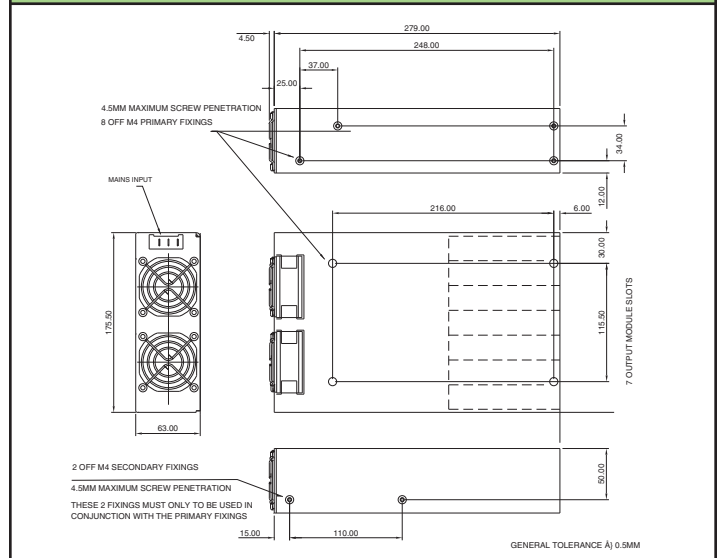
3 Option Codes

If required the following options may be added to the configuration by placing the code after the module.
 (i.e. Inhibiting a 5V @ 25A = 5B + Inhibit code = "5BIN")

Code	Description	Available On
MF ²	Mains Fail This option provides an AC fail signal, power supply inhibit, and 5V@50mA auxiliary supply. This is only placed in the first module slot. (TTL compatible reference to 0 volts of Aux. Supply)	All modules except Dual output (E, H, P)
PP	Parallel for Power This option allows 2 adjacent modules to be paralleled together for increased output power. Bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R
PA	Parallel for Redundancy This option allows modules to be connected for N+1 redundancy. A DC good signal is also offered (electrically similar to AC fail.) No bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R, S
IN3	Inhibit Module inhibit and DC good signal. (TTL compatible referenced to (-V) of the module)	Modules A, B, C, D, F, G, J, M, N, Q, R
Low Leakage Options (Max values stated)		
	120VAC, 60Hz	240VAC, 60Hz
		264VAC, 63Hz ⁽⁴⁾
LL	88 µA	197 µA
RL	50 µA	112 µA
TL	24 µA	53 µA
		63 µA
		Conducted EMI
		Curve A
		>Curve A
		>Curve A

Notes: 1) Only one option per module may be used.
 2) Mains Fail: AC Fail "AC On" = ≤ 0.8V, 50mA max.
 "AC Off" = open circuit, 50V abs max.
 PS Inhibit "PS On" = ≥ 2.0V or open circuit.
 "PS Off" = ≤ 0.8V @ 5mA.
 (TTL compatible, Referenced to 0 volts of Aux. Supply.)
 3) Inhibit: DC Good Electrically similar to AC fail module.
 Inhibit Electrically similar to PS inhibit.
 4) Type testing result

Outline Drawing



1500W Multiple Output Modular Power Supply

Features

- ◆ Power factor Corrected
- ◆ Capable of up to 16 fully regulated and independent outputs
- ◆ Output Voltages from 1.8V - 48V
- ◆ Low Leakage Options
- ◆ Low Profile Package
- ◆ International Safety Agency Certification
- ◆ Fast-on Tab Connections
- ◆ No Minimum Load
- ◆ Wide Range Output Modules



Key Market Segments & Applications



Specifications

Model		
AC Input Volt. Range & Freq.	-	150 - 264VAC, 47 - 63Hz (1500W). See power limitations for lower input ranges.
Input Current	A	16A maximum
Inrush Current	A	Less than 50A
Leakage Current	-	1.1mA @ 264VAC, 63Hz (low leakage current options available)
Efficiency	%	75% typical (configuration and input dependent)
Power Factor Correction	-	Compliant to EN61000-3-2 (> 0.99 typical, reduced PFC > 255VAC)
Conducted EMI	-	EN55022 level A
Output Power	W	800W@85VAC (50°C max); 1000W@100VAC (50°C max); 1000W@90VAC (45°C max); 1500W @ 150VAC (50°C max)
Output Load Regulation	-	2% max. without remote sensing. 0.5% max. remote sense connected
Output Line Regulation	-	0.5% maximum
Ripple & Noise	-	2% pk-pk or 100mV (Whichever is greater)
No Load Operation	-	No preload is required on any output module
Hold Up Time	ms	>15ms
Remote Sense	-	Available on single output modules only
Options (see option codes)	-	AC Fail, Global Inhibit, Module Inhibit, 5V@50mA aux., Parallel, Low Leakage
Operating Temperature	°C	0°C to +50°C full load, derate each output at 2.5% /°C from 50°C to 65°C
Thermal Protection	-	Converter protected against over-temperature conditions. Recycle I/P power to restore output
Storage Temperature	°C	-40°C to +85°C
Temperature Coefficient	-	0.02% per °C
Humidity	% RH	5% - 95% Non-condensing
Altitude	-	3000m Operating
Cooling	-	Internal fan provides forced-air cooling. Airflow intake on I/P end, exhaust on O/P end of unit.
Isolation	-	Input - Output 4.3kVDC, Input - Ground 2.3kVDC, Output - Ground 500VDC
Switching Frequency	-	100kHz on PFC, 200kHz on forward converter.
Vibration	-	1.5G, 10 - 200Hz
Shock	-	3,000 bumps, 10G, 16ms half-sine pulses.
Safety Agency Certification	-	UL60950-1, IEC60950-1, CSA22.2 No.60950-1, EN60950-1, IEC61010-1, EN61010-1, CE Mark
Size (WxHxD)	in	8" x 2.5" x 11"
Weight	lbs.	8 (3.6kg) typical dependent on configuration
Warranty	yrs	Three Years

1 Case Codes

Code	Wattage	Max Slots	Size (H x W x L)	Input Voltage
CA1500	1500	8	2.5" x 8" x 11"	150 - 264VAC

* Input Voltage/Power Limitations

Input Voltage Power Rating	Intermittent Output Power Rating	Continuous Output Temperature	Max. Ambient
85 - 99.9VAC	-	800W	50°C
100 - 149.9VAC	-	1000W	50°C
150 - 164.9VAC	-	1500W	50°C
165 - 179.9VAC	-	1595W	50°C
180 - 264VAC	-	1690W	50°C
90 - 264VAC	-	1000W	45°C
85 - 264VAC	1000W*	-	50°C

* - 1000W for 30 seconds maximum followed by 800W for 60 seconds min.
Note: Ratings are not affected by the use of input or output connector housings

2 Output Module Codes

Code	V1 Adjust	V1 Amps	V2 Adjust	V2 Amps	Slot(s) ⁽¹⁾
L	1.8 - 3.2	25	-	-	1
T	1.8 - 3.2	60	-	-	2
Q	2.7 - 3.9	25	-	-	1
R	2.7 - 3.9	60	-	-	2
B	4.5 - 5.5	25	-	-	1
A	4.5 - 5.5	60	-	-	2
BB	4.5 - 6.5	25	-	-	1
AA	4.5 - 6.5	60	-	-	2
S	2.5 - 5.7	85	-	-	2
M	5.0 - 16.0	8	-	-	1
C	5.0 - 16.0	16	-	-	1
F	9.0 - 16.0	33	-	-	2
U	10.0 - 21.0	16	-	-	1
N	18.0 - 29.0	5	-	-	1
D	18.0 - 29.0	8	-	-	1
K	18.0 - 29.0	15	-	-	2
G	17.5 - 29.0	25	-	-	2
J	30.0 - 48.0	10	-	-	2
E	5.0 - 16.0	8	5.0 - 16.0	8	1
P	18.0 - 29.0	5	5.0 - 16.0	8	1
H	18.0 - 32.0	5	18.0 - 32.0	5	1

Notes: 1) The total # of slots must not exceed 8 for CA1500.
2) Slot position may change upon order placement.

Max. Output Current Limitations

All modules can be used at their full rated current in all slot positions unless otherwise stated below

A module:	Limited to 51A in slot 7/8
B module:	Limited to 20A in slot 8
C module:	Limited to 12A if output exceeds 12V
L module:	Limited to 20A in slot 8
Q module:	Limited to 20A in slot 8
R module:	Limited to 51A in slot 7/8
S module:	Limited to 65A in slot 7/8, 66A in slot 6/7, 80A in slot 5/6, 85A in slot 4/5, 66A in slot 3/4, 68A in slot 2/3, 73A in slot 1/2
T module:	Limited to 51A in slot 7/8

Other Modular Products

NV	350W to 700W up to 8 outputs
Vega	450W to 900W up to 10 outputs
Alpha1000	1000W up to 14 outputs

Sample Configurations

Description	O/P 1	O/P 2	O/P 3	O/P 4	O/P 5
CA1500 24G_PP* 24G_PP*	24V 50A	-	-	-	-
CA1500 5S_MF 12F_PP* 12F_PP*	5V 80A	12V 60A	-	-	-
CA1500 LL 5A 28G 36J_IN	5V 60A	28V 25A	36V 10A	-	-
CA1500 5A_PP* 5A_PP* 3.3R 12C 12C	5V 120A	3.3V 60A	12V 16A	12V 16A	-
CA1500 24G_PP* 24D_PP* 3.3S 5S 12/12E	24V 33A	3.3V 85A	5V 66A	12V 8A	12V 8A

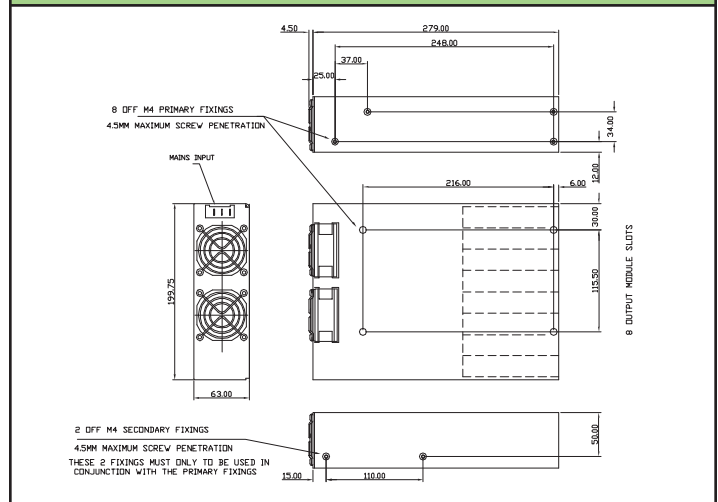
3 Option Codes

If required the following options may be added to the configuration by placing the code after the module.
(i.e. Inhibiting a 5V @ 25A = 5B + Inhibit code = "5BIN")

Code	Description	Available On
MF ²	Mains Fail This option provides an AC fail signal, power supply inhibit, and 5V@50mA auxiliary supply. This is only placed in the first module slot. (TTL compatible reference to 0 volts of Aux. Supply)	All modules except Dual output (E, H, P)
PP	Parallel for Power This option allows 2 adjacent modules to be paralleled together for increased output power. Bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R
PA	Parallel for Redundancy This option allows modules to be connected for N+1 redundancy. A DC good signal is also offered (electrically similar to AC fail.) No bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R, S
IN3	Inhibit Module inhibit and DC good signal. (TTL compatible referenced to (-V) of the module)	Modules A, B, C, D, F, G, J, M, N, Q, R
Low Leakage Options (Max values stated)		
	120VAC, 60Hz	240VAC, 60Hz
		264VAC, 63Hz ⁽⁴⁾
LL	88 µA	197 µA
RL	50 µA	112 µA
TL	24 µA	53 µA
		63 µA
		Conducted EMI
		Curve A
		>Curve A
		>Curve A

Notes: 1) Only one option per module may be used.
2) Mains Fail: AC Fail "AC On" = ≤ 0.8V, 50mA max.
"AC Off" = open circuit, 50V abs max.
PS Inhibit "PS On" = ≥ 2.0V or open circuit.
"PS Off" = ≤ 0.8V @ 5mA.
(TTL compatible, Referenced to 0 volts of Aux. Supply.)
3) Inhibit: DC Good Electrically similar to AC fail module.
Inhibit Electrically similar to PS inhibit.
4) Type testing result

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/alpha-series.htm



Actual part number (format CA1500Hxxxxx) assigned on quotation.
* Outputs paralleled via bus bars. (O/P = Output)

300W Convection / 400W Fan Cooled Medical Power Supplies

Features

- ◆ Medical & ITE Safety Certifications (BF Rated)
- ◆ 94% Efficient
- ◆ 0.5W Standby Power
- ◆ Meets ERP/Eco-Design (2009/125/EC)
- ◆ Meets Climate Savers Gold Level
- ◆ 450W Peak Loading (10s)
- ◆ High Power Density (7" x 4" x 1.6")
- ◆ Suitable for 1U applications
- ◆ Five Year Warranty



Key Market Segments & Applications



Specifications

Model		CFE400M
Input Voltage range	VAC	85 - 264VAC
Input Frequency	Hz	47 - 63Hz, 440Hz with reduced PFC
Inrush Current	A	<20A at 25°C and 230VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant. Class A (Class C >100W output power)
Voltage Setting Accuracy	%	±1% at 50% Load
Regulation	%	Line: 0.25%; Load: 1%; Thermal Coefficient: 0.02%/°C
Ripple & Noise	mV	1% peak-peak
Efficiency (230VAC, 80% load)	%	94% typical (48V & 24V), 91% (12V), 0.5W power draw in standby mode
Overcurrent Protection	-	Automatic recovery upon overload removal
Overvoltage Protection	V	Cycle AC line to reset
Overtemperature Protection	-	Yes
Hold Up Time (Typ)	ms	15ms at full load
Leakage Current (max)	µA	140µA 120VAC 60Hz, 280µA 240VAC 60Hz, <300µA 240VAC 63Hz (Type Test results)
Fan Supply	-	12V 0.25A (Not available if the top fan option is selected)
Standby Voltage	-	5V 80mA or 5V 2A (chosen at time of ordering)
Remote Sense	-	None
Signals & Features	-	Remote on/off - Inhibit or Enable operation (chosen at time of ordering) Power Good - High indicates DC output & AC input is good. ORing FET - (Option)
Operating Temperature (1)	°C	Convection cooled: 0 to +60°C. Derate linearly to 50% load from 40°C to 60°C Forced air cooled: 0 to +70°C. Derate linearly to 50% load from 50°C to 70°C
Storage Temperature	°C	-40 to +70°C
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection, internal fan or external 1.5m/s forced air, approx. 12 CFM (see oper. temp.)
Isolation	-	Input to Ground 1500VAC, Input to Output 4kVAC (Reinforced), Output to Ground 1500VAC
Vibration (non operating)	-	2G, 10-500Hz in all 3 planes. MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9
Shock	-	30G per IEC68-2-27, MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Safety Agency Certifications (2)	-	IEC/UL/EN/CSA22.2 60601-1, IEC/UL/EN 61010-1, IEC/UL/EN/CSA22.2 No 60950-1, CE for LVD
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)
Weight (open frame)	kg	U Channel: 0.71kg, Top fan: 0.86kg
Size	in	U channel: 7 x 3.94 x 1.6, With cover: 7 x 3.94 x 2, Top Fan: 7 x 3.94 x 2.8
Warranty	yrs	Five Years

(1) -20°C cold start

(2) Designed to meet IEC/EN/UL/CSA 61010-1 Edition 2

Model Selector (Standard Models*)

Product Code	Part Description	Style	Output Voltage	Current (Convection)	Current (Forced Air or Fan)	Peak Output Current ⁽²⁾
U7Y0010	CFE400M-12-5H-N1-UML-NT	U Chassis	12V	25A	33.3A	37.5A
U7Y0043	CFE400M-12-5H-TF-CML-NT	Cover & Top Fan	12V	-	33.3A	37.5A
U7Y0269	CFE400M-24-5H-N1-UML-NT	U Chassis	24V	12.5A	16.67A	18.75A
U7Y028C	CFE400M-24-5H-TF-CML-NT	Cover & Top Fan	24V	-	16.67A	18.75A
U7Y027B	CFE400M-48-5H-N1-UML-NT	U Chassis	48V	6.25A	8.33A	9.375A
U7Y029D	CFE400M-48-5H-TF-CML-NT	Cover & Top Fan	48V	-	8.33A	9.375A

Notes:

(*) Additional variants available, see Option Selection below.

(2) For up to 10s without exceeding Average Output Power rating (300W convection, 400W with forced air or fan)

Option Selection

Output Adjustment Range
 12 10.8 - 14.4V
 24 21.6 - 28.8V
 48 43.2 - 50V

*Adjustable by potentiometer

NN = None
 5C = 5V 80mA
 5H = 5V 2A

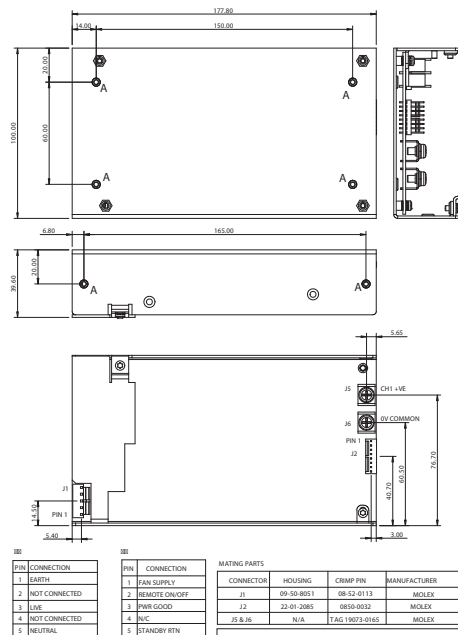
N = None
 E = Enable
 T = Inhibit

CFE400M Output V - Standby Voltage - Fan & Cover Option ORing FET Remote On/Off

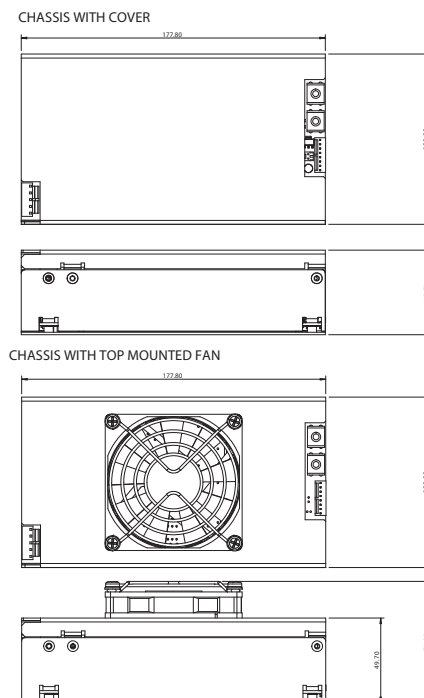
N1-U = 12V fan supply, no cover
 N1-C = 12V fan supply, cover
 TF-C = Top fan & cover

ML-Y = FET fitted
 ML-N = No FET fitted

Outline Drawing



NOTE:
 A 6 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.0mm,
 MAXIMUM TORQUE 0.9Nm.
 ALL TOLERANCES +/-0.5mm.



Other TDK-Lambda Products

EFE Series 300 to 400W 1U single output power supply
 CSS Series 65 to 500W 1U single output power supply
 NV Series 175 to 900W 1U power supply 1-8 outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cfe-series.htm



500W Conduction Cooled Power Supplies

Features

- ◆ Base plate cooled, no fan required
- ◆ High efficiency
- ◆ Protective coating option
- ◆ MIL STD 461/462D CE102 Conducted EMC



Key Market Segments & Applications



Specifications		
Model		
AC Input	VAC/Hz	90 to 265VAC, 47-440Hz (Reduced PFC above 63Hz)
Input Current Model dependant (1)	A	6.8 / 3.4
Inrush Current (115 / 230VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical)	%	85% at 75% loading (Non ORing diode versions)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Total Regulation	%	< 4%. (ORing diode option, adds 1V to load regulation)
Ripple and Noise (20MHz BW)	-	1% (1.5% below -10°C)
Over Current Protection	%	105 - 140% (Automatic Recovery)
Over Voltage Protection	-	125 - 145% (Cycle AC to reset)
Series Operation	-	Yes
Parallel Operation	-	Yes (Single wire, up to 6 units)
ORing Diodes/FETs	-	Yes (option)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	-	<0.01%/°C
Overtemperature	°C	Shuts down between 90 - 130°C (Cycle AC to reset)
Hold Up Time (230VAC)	ms	10ms
Leakage Curr. (at 230VAC, 50Hz)	uA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
Operating Temp. (Base plate)	°C	-40 to +85°C (2)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 95%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled through 6mm base plate
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810E, Method 514.4, Proc 1, Category 1, 9
Shock	-	MIL-STD-810E, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted EMI	-	EN55011, EN55022 (as per CISPR, 11/22) Class B, FCC47 part 15 subpart B) MIL STD 461E/461E/462D CE102, 115V and 220V
Radiated EMI	-	EN55011, EN55022 (as per CISPR, 11/22) Class B, FCC47 part 15 subpart B) see app. note for details
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 4), -6 (Lvl 3), -8 (Lvl 4), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	with cover 1400g, without cover 1200g
Size (L x W x D)	mm	270 x 126 x 55mm
Warranty	yrs	2 years

(1) 100/200VAC

(2) CPFE500F-12: -40 to 80°C. See instruction manuals for derating curves

Model Selector

Model	Output Volt (V)	Adjust Range (V)	Max Curr (A)	Max Watt (W)
CPFE500F-12-NLC	12	9.6 - 14.4	42	504
CPFE500F-24-NLC	24	22.4 - 33.6	18	504
CPFE500F-28-NLC	28	22.4 - 33.6	18	504
CPFE500F-48-NLC	48	38.4 - 57.6	10.5	504

Options

Part Number	Desc.	Suffix	ORing Diode (3)	Cover	Protective Coating
-DLC			Y	Y	Y
-NLC			N	Y	Y

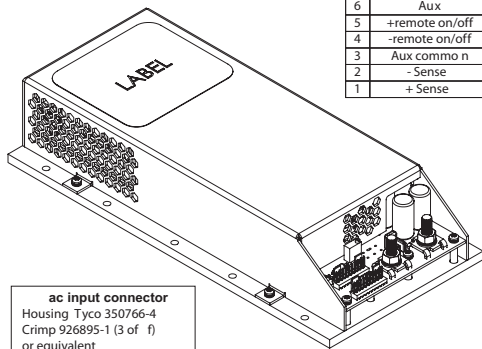
3) Reduces maximum output adjustment range by 1V
Preferred stocking part highlighted in green.

Outline Drawing

CPFE500F

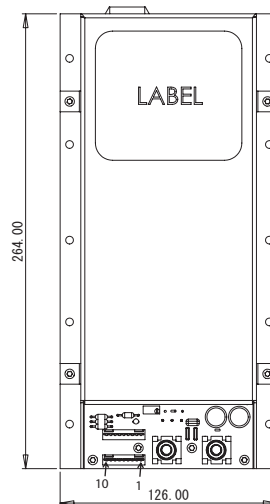
Signals Connections
Housing - Molex 22-01-1 102
Crimp - Molex 50802 series
(or equivalents)

Pin	Function
10	Do not connect
9	Output good - ENA
8	Trim
7	Current share
6	Aux
5	+remote on/off
4	-remote on/off
3	Aux common
2	- Sense
1	+ Sense

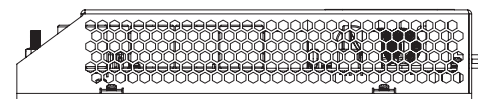
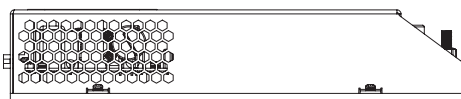
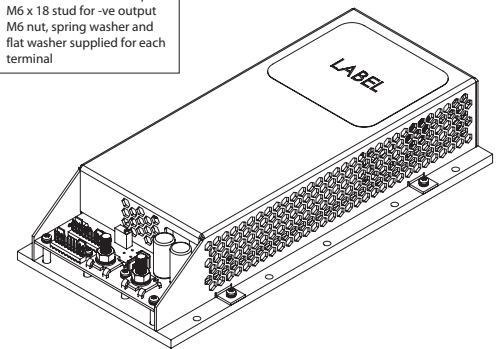


ac input connector
Housing Tyco 350766-4
Crimp 926895-1 (3 of 4)
or equivalent

Live Earth Neutral



dc output
M6 x 18 stud for +ve output
M6 x 18 stud for -ve output
M6 nut, spring washer and
flat washer supplied for each
terminal



Notes 1. All customer fixings 10 x M4 clearance holes 2. All tolerances +/-0.5mm

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cpfe-series.htm



720 to 1000W Conduction Cooled Power Supplies

Features

- ◆ Base plate cooled, no fan required
- ◆ High efficiency
- ◆ Protective coating
- ◆ MIL STD 461/462D CE102 EMC
- ◆ I²C Interface
- ◆ Wide range AC Input



Key Market Segments & Applications



Specifications

Model		
AC Input	-	90 to 265VAC, 47-440Hz (Reduced PFC above 63Hz)
Input Current (1)	A	13.6 / 6.6 (Model dependant)
Inrush Current (115 / 230VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical)	%	79 to 86% (Model dependant)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Line Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Load Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Ripple and Noise (20MHz BW)	-	1% (2% below 0°C)
Over Current Protection	%	105 - 140% (Automatic recovery)
Over Voltage Protection	-	125 - 145% (Automatic recovery)
Parallel Operation	-	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	-	<0.02%/°C
Overtemperature	-	Shuts down between 90 - 115°C (Auto recovery)
Hold Up Time (230VAC)	ms	25ms
Leakage Current (@230VAC,50Hz)	uA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
I ² C Interface	-	Provides manufacturing location, date, serial number, part number, unit revision, output voltage & current read back, base plate temperature, remote on/off, IOG, DC good and over temperature warning
Operating Temperature (Base plate)	-	12V: -40 to +85°C, 28V & 48V: -40 to +70 / 85°C (See reverse side for derating)(2)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 90%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled through 6mm base plate
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810E, Method 514.4, Proc 1, Category 1, 9
Shock	-	MIL-STD-810E, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted & Radiated EMI	-	EN55022/EN55011 Class B, MIL STD 461/462D CE102
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 4), -6 (Lvl 3), -8 (Lvl 4), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	2,400
Size (L x W x H)	mm	270 x 190 x 61mm
Warranty	yrs	2 years

(1) 100/200VAC

(2) CPFE1000F-28, -48: -40 to +70°C below 170VAC input voltage

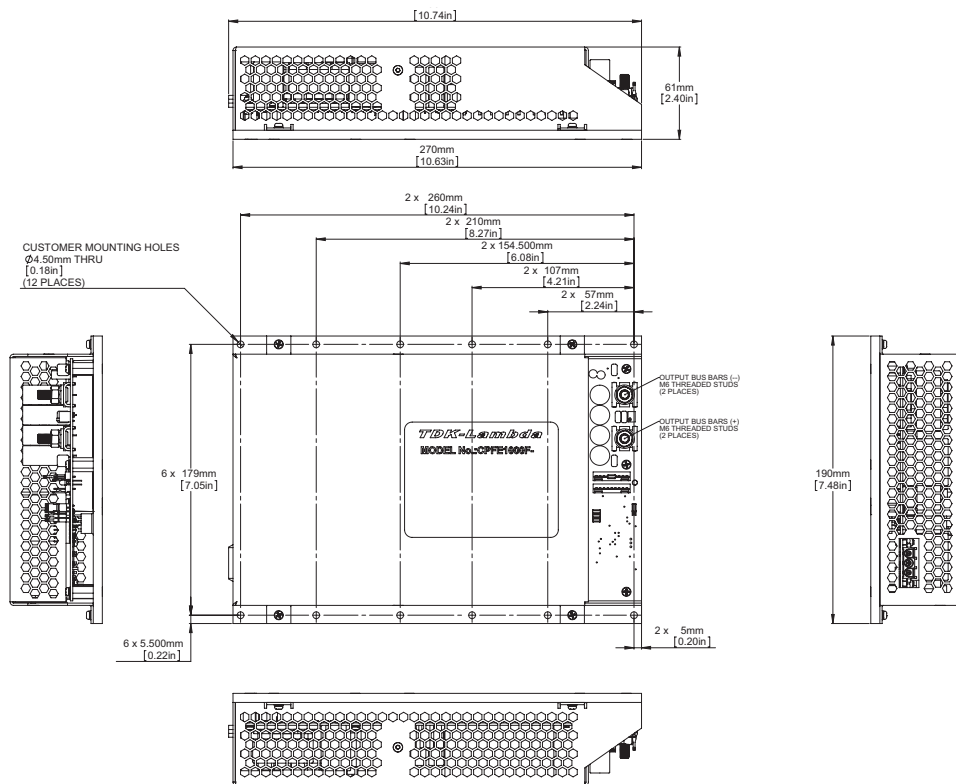
Model Selector

Model	Output Voltage (V)	Adjust Range (V)	Maximum Current	Efficiency (%) (110/220VAC)
CPFE1000F-12	12	9.6 - 14.4	60	79 / 81
CPFE1000F-28	28	22.4 - 33.6	36	83 / 86
CPFE1000F-48	48	38.4 - 57.6	21	83 / 86

Derating (Ambient Temperature)

Model	Input Voltage	50°C	60°C	70°C	85°C
CPFE1000F-12	85VAC to 170VAC	720	720	576	360
	170VAC to 265VAC	720	720	670	595
CPFE1000F-28	85VAC to 170VAC	1008	864	720	-
	170VAC to 265VAC	1008	1008	958	883
CPFE1000F-48	85VAC to 170VAC	1008	864	720	-
	170VAC to 265VAC	1008	1008	958	883

Outline Drawings



For Additional Information, please visit
us.tdk-lambda.com/lp/products/cpfe-series.htm



2 x 4" 40 to 65W AC-DC Medical Power Supplies

Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Remote Sense
- ◆ Dual input fuses



Key Market Segments & Applications



Medical

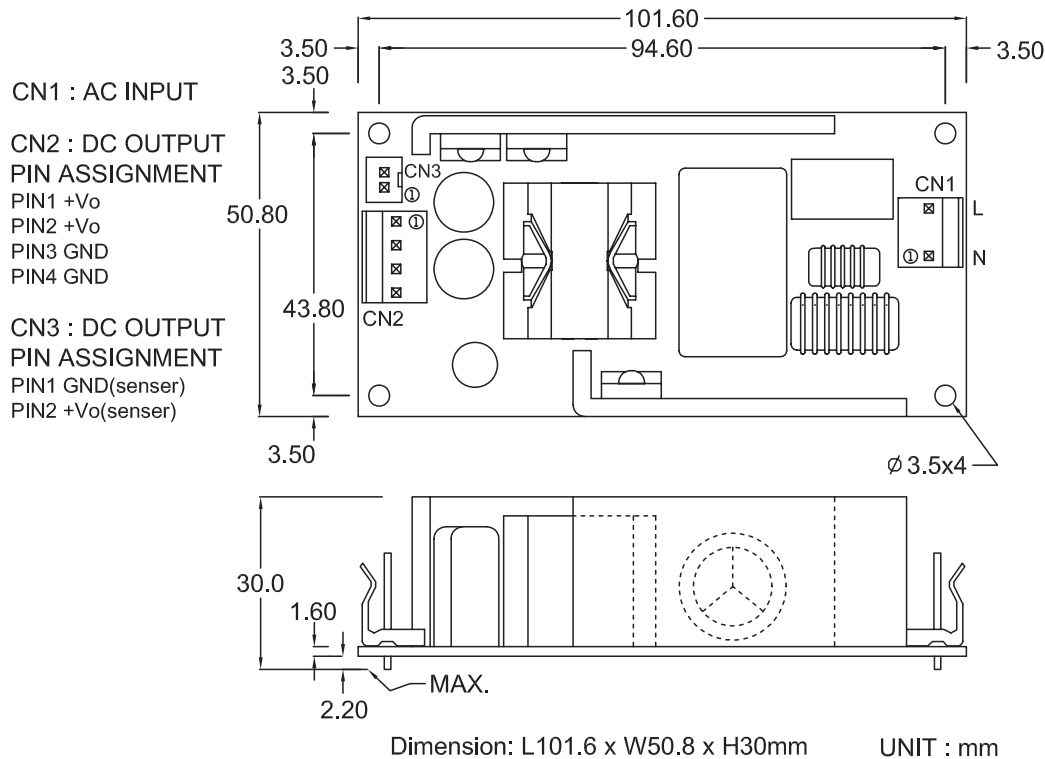


RoHS

Specifications

Model		CSS65
Input Voltage range	V	90 - 264VAC (47 - 63Hz) or 120 - 370VDC
Inrush Current	A	<40A maximum at 115VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	2 / 1
Leakage Current	uA	<250uA 264VAC 63Hz
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	°C	±0.05%/°C
Adjustment Range	-	None
Remote Sense	-	Yes
Minimum Load	A	None
Regulation	%	5V: ±5%, 12-24V: ±3%, 36-48V: ±2% (10 - 100% load change, 100-240VAC line change)
Ripple & Noise	%	1%
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Automatic Reset)
Efficiency	%	86% typical (115VAC Input)
Operating Temperature	°C	0 to +70°C derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	-	20 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC, Output to Ground 500VDC for 1 min.
Isolation Resistance	-	>20M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1
Conducted & Radiated EMI	-	EN55011-B, FCC Class B
Immunity	-	EN60601-1-2
Weight (Typ)	g	200g
Size (WxLxH)	in	2 x 4 x 1.18" (including underside components)
Warranty	yrs	Two Years

Outline Drawing



Model Selector

Model	Output (V)	Maximum Output (A)	Maximum Power (W)
CSS65-5	5	8.0	40
CSS65-12	12	5.0	60
CSS65-15	15	4.0	60
CSS65-19	19	3.43	65
CSS65-24	24	2.71	65
CSS65-36	36	1.81	65
CSS65-48	48	1.36	65

Other Medical Products

CSS150, 500	150 - 500W 1 output
KM	15 - 40W pcb mount medical
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs
EFE300M	300W 3x6" 1 output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/css-series.htm



- ◆ Input Connector mates with Molex Housing 09-50-3031 or equivalent
- ◆ Output Connector mates with Molex Housing 09-50-3041 or equivalent
- ◆ Sense connector (CN3) mates with J.S.T. XHP-2

3 x 5" 150W AC-DC Medical Power Supplies

Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Dual input fuses



Key Market Segments & Applications

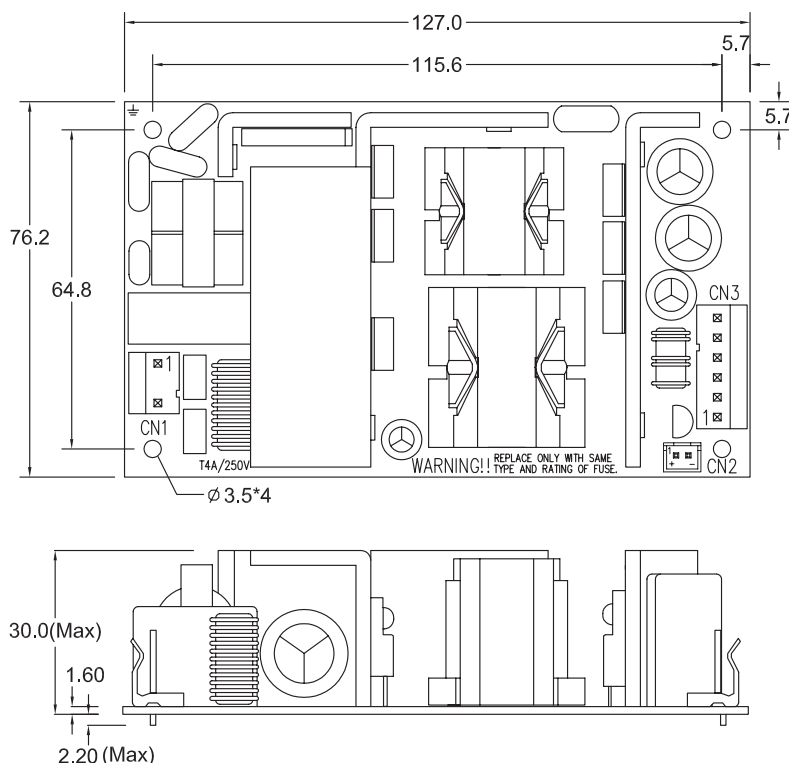


Specifications

Model		CSS150
Input Voltage range	V	90 - 264VAC (47 - 400Hz)(1) or 120 - 180VDC
Inrush Current	A	<60A maximum at 264VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	1.7 / 0.85
Power Factor Correction	-	Meets EN61000-3-2, >0.9
Leakage Current	μA	<250μA 264VAC 63Hz
Hold Up Time (Typ)	ms	16ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Minimum Load	A	None
Total Regulation	%	±3%
Ripple & Noise	%	2% peak to peak
Overcurrent Protection	-	110 - 150%
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Remote On/Off	-	Unit on: Floating or low <1.2V, Unit off: Apply 5V with respect to 0V
Efficiency	%	89% typical
Off load power draw	W	<0.5W
Operating Temperature	°C	0 to +70°C derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	-	20 - 95% RH
Cooling	-	Convection or forced air (2.5m/s)
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC, Output to Ground 500VDC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s ² (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1, CE Mark, UL60950-1, EN60950-1
Conducted & Radiated EMI	-	EN55011-B, FCC Class B
Immunity	-	EN60601-1-2
MTBF	-	180,000 (MIL-217F-HDBK)
Weight (Typ)	g	340g
Size (WxLxH)	mm	3 x 5 x 1.3" (including underside components)
Warranty	yrs	Two Years

(1) Derate linearly to 90W convection rating from 90 to 100VAC input.

Outline Drawing



Dimension :
L127(5") x W76.2(3") x H30.0(1.18")mm

Pin Assignments :

CN1 P3.96 (3PN2) Molex P/N:09652038 OR Equivalent	PIN1	N
	PIN2	L
CN2 P2.5-2P Molex P/N:481520210 OR Equivalent	PIN1	PS-ON +
	PIN2	PS-ON -
CN3 P3.96-6P Molex P/N:09652068 OR Equivalent	PIN1	+V
	PIN2	+V
	PIN3	+V
	PIN4	GND
	PIN5	GND
	PIN6	GND

Model Selector

			Maximum	Maximum	Maximum	Maximum
	Output	Voltage	Current	Power	Current	Power
Model	Voltage (V)	Adjust (V)	Convection (A)	Convection (W)	Forced Air	Forced Air
CSS150-12	12V	11.64 - 12.36V	8.3A	100W	12.5A	150W
CSS150-15	15V	14.55 - 15.45V	6.7A	100W	10A	150W
CSS150-24	24V	23.28 - 24.72V	4.2A	100W	6.3A	150W
CSS150-36	36V	34.92 - 37.08V	2.8A	100W	4.2A	150W
CSS150-48	48V	46.60 - 49.44V	2.1A	100W	3.1A	150W

Other Medical Products

KM	15 - 40W pcb mount medical
CSS	40 - 500W medical
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/css-series.htm

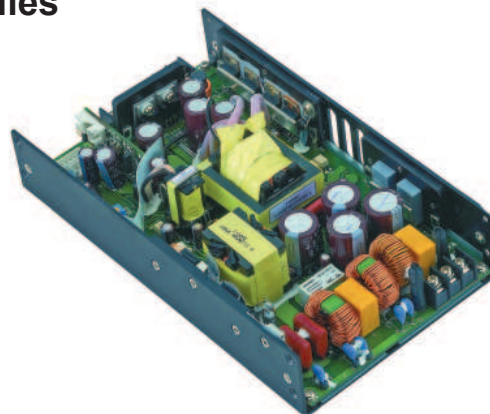


- ◆ Input Connector mates with Molex Housing 09-50-3031 or equivalent
- ◆ Output Connector mates with Molex Housing 09-50-3061 or equivalent
- ◆ Remote On/Off (CN2) mates with J.S.T. XHP-2

500W AC-DC Medical or Industrial Power Supplies

Features

- ◆ 360W Convection rating
- ◆ High Efficiency
- ◆ IEC60601-1 or IEC60950-1 certifications
- ◆ ORing FET & Current Share
- ◆ Dual input fuses



Key Market Segments & Applications



Specifications

Model		CSS500
Input Voltage range	-	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<50A maximum at 230VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	6 / 3A
Power Factor Correction	-	Meets EN61000-3-2, >0.9
Leakage Current	µA	<300µA 264VAC 63Hz
Hold Up Time (Typ)	ms	20ms at 115VAC input, 360W loading
Temperature Coefficient	-	±0.04%/°C
Voltage Accuracy	%	±1% at 60% load
Adjustment Range	%	None
Regulation	-	Load Regulation ±1%, Line Regulation ±0.5%
Ripple & Noise	%	1% peak to peak (5Vsb also)
Overcurrent Protection	-	110 - 150%
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power or use remote on/off to reset)
Overtemperature Protection	-	Yes (Cycle input power or use remote on/off to reset)
Remote On/Off	-	Unit on: Floating or high 3.5 - 5.25V, Unit off: Low or <0 - 0.5V
Efficiency	%	87% to 92%, model & input dependant
Standby Voltage	-	5V 1A (5V 0.25A when convection cooled or when inhibit is activated)
Fan Output	-	12V 1A
Current Share	-	Single wire, up to 4 units can be shared within 10% accuracy at full load
DC Good & Fan Fail Signals	-	Both Low on Fail
ORing FET	-	Yes, for redundant operation
Operating Temperature	°C	Convection (U channel): 0 to +70°C, derate linearly to 35% load from 40 to 70°C Forced air (or internal fan): 0 to +70°C, derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-10 to +85°C
Humidity (non condensing)	%	10 - 95% RH
Cooling	-	Convection or forced air (30CFM or 3.1m/s). Internal fan is temperature controlled
Withstand Voltage (1)	-	Input to Ground 1.5kVAC, Input to Output 4kVAC(1), Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s ² (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	Medical Version: UL60601-1, IEC60601-1, Industrial Version: UL60950-1, EN60601-1, CE Mark
Conducted & Radiated EMI	-	Medical Version: EN55011-B, FCC Class B, Industrial: EN55022, FCC Class B
Immunity	-	Medical Version: EN60601-1-2, Industrial: EN55024
MTBF	-	>68,695 (MIL-217F-HDBK)
Weight (Typ)	g	860g (U channel), 980g (End Fan)
Size (WxLxH)	in	U Channel: 8 x 4.7 x 1.51", End Fan (/S) 9 x 4.7 x 1.63", Top Fan (/T) 8 x 4.7 x 2.85"
Warranty	yrs	Two Years

(1) Industrial version (I suffix): 3kVAC

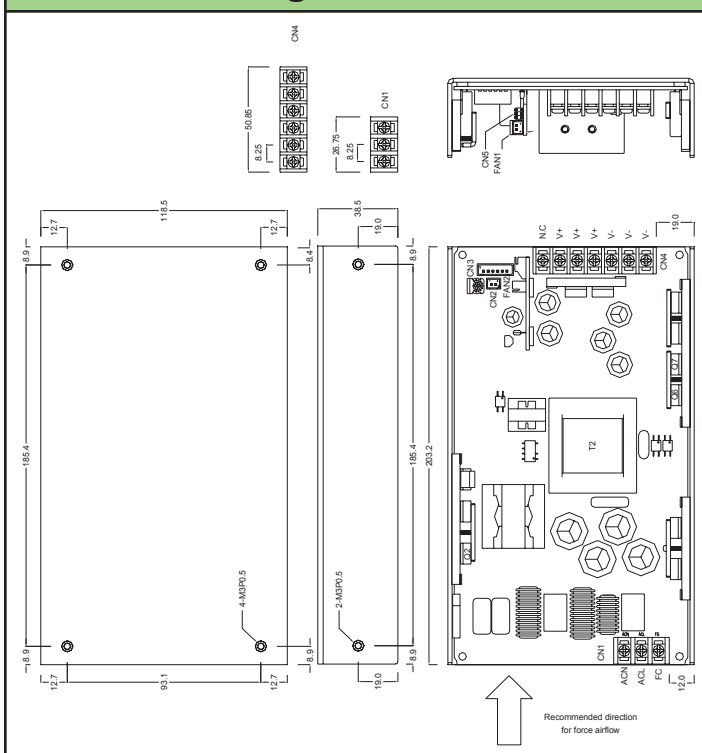
Model Selector

Model	Output Voltage (V)	Maximum Curr. Conv. (A)	Maximum Power Conv. (W)	Maximum Curr. Forced Air	Maximum Pwr Forced Air
CSS500-12	12V	30A	360W	41.67A	500W
CSS500-24	24V	15A	360W	20.84A	500W
CSS500-30	30V	12A	360W	16.67A	500W
CSS500-36	36V	10A	360W	13.89A	500W
CSS500-48	48V	7.5A	360W	10.42A	500W
CSS500-54	54V	6.67A	360W	9.26A	500W
CSS500-57	57V	6.32A	360W	8.78A	500W

Options

Suffix	Mechanical			Safety Certifications	
	U channel	End Fan	Top Fan	Medical	Industrial
Blank	Yes	-	-	Yes	-
/S	-	Yes	-	Yes	-
/T	-	-	Yes	Yes	-
I	Yes	-	-	-	Yes
/SI	-	Yes	-	-	Yes
/TI	-	-	Yes	-	Yes

Outline Drawing



Other Medical Products

KM	15 - 40W pcb mount medical
CSS65, 150	40 - 150W open frame
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/css-series.htm



75 to 240W, 24V Output DIN Rail Mount Power Supplies

Features

- ◆ UL508 Listed, NEC NFPA70 Class 2(1) (/C2 Models)
- ◆ Conducted and Radiated EMI, Class B
- ◆ Input Transient Protection, IEC61000-4
- ◆ Semi F47 Compliant (DLP180 & 240 only)



Key Market Segments & Applications



Industrial



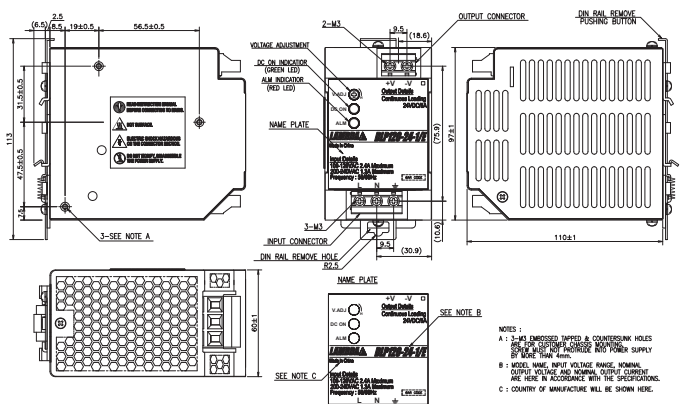
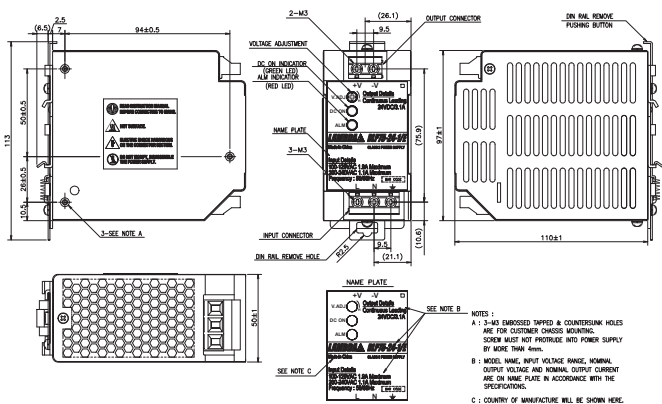
Specifications						
Model		DLP75-24-1/E DLP75-24-1/C2EJ	DLP100-24-1/E DLP100-24-1/C2EJ	DLP120-24-1/E	DLP180-24-1/E	DLP240-24-1/E
Output Voltage	V	24	24	24	24	24
Output Current (/C2 models)	A	3.1 (2.5)	4.1 (3.7)	5.0	7.5	10
Output Power (/C2 models)	W	75 (60)	98.4 (88.8)	120	180	240
Output Voltage Adjustment	V	21.6 - 28 (fixed for /C2 models)				
Load Regulation	-	192mV				
Line Regulation	-	120mV				
Ripple/Noise (0-600C)	mV	240				
AC Input Voltage & Frequency	-	85-132/170-265VAC, 47-63Hz Auto select			85-265VAC (47-63Hz) or 120-370VDC ⁽²⁾	
Input Current 100/230VAC /C2	A	1.7/0.8	2.3/1.2	2.4/1.3	2.3/1.0	3.0/1.3
	A	1.4/0.7	2.0/1.0	-		
Efficiency 100/230VAC	%	81/83	82/85	83/85	84/87	82/86
Power Factor	-	Meets EN61000-3-2 (DLP180, 240: >0.95)				
Inrush Current (Typ) 100/230VAC	A	20/45				
Leakage Current	mA	Less than 0.75mA				
Hold-up Time 100/230VAC	ms	20/30 (Semi F47 Compliance, DLP 180 & 240 only)				
Overcurrent Protection /C2	-	>105%,Fold Back	>105%, Constant Current			
	-	~2.6A	~3.75A	-		
Overvoltage Protection	-	30-35V, latching, cycle AC line to reset (26-30V DLP75-24-1/C2EJ)				
LED Indicators	-	Green LED = DC ok Red LED = overcurrent				
Operating Temperature (3)	°C	Convection cooled, -10°C to 60°C, derate linearly to 60% load from 50 to 60°C				
Storage Temperature	°C	-30°C~+85°C				
Humidity (Non-Condensing)	%RH	30-90% operating 10-95% non operating				
Withstand Voltage	-	Input - Ground 2kVAC, Input to Output 3kVAC, Output - Ground 500VAC				
Vibration	-	9.8m/s ² (1.0G) at DIN rail; (10-55Hz: 9.8m/s ² Constant, X,Y, Z each 1 hour)				
Shock	-	196m/s ² (20G)				
Safety Agency Approvals	-	UL508, NEC Class 2 ⁽¹⁾ (/C2 models), UL60950-1, CSA60950-1, EN60950-1, CE, EN50178 Cat III (Pri)				
Conducted EMI	-	FCC-B, EN55011/EN55022-B, VCCI-B; Meets IEC61000-4-1				
Radiated EMI	-	EN55011/EN55022-B, FCC-Class B, VCCI-B				
ESD	-	IEC61000-4-2 ±10kV (Air), ±5kV (Contact)				
Radiated RFI	-	IEC61000-4-3 80-1000MHz, 12V/m 80% AM 1kHz				
Fast Transient Burst	-	IEC61000-4-4 2.4kV 5kHz				
Lightning Surge	-	IEC61000-4-5 4.4kV, 1.2x50µs (Common Mode) 2.4kV 1.2x50µs (Normal)				
Conducted RFI	-	IEC61000-4-6 150kHz-80MHz, 12V, 80% AM 1kHz				
Magnetic Field	-	IEC61000-4-8 36A/m				
Voltage Dips	-	IEC61000-4-11 70% 10ms, 40% 100ms, 0% 5s				
Size	mm	50 x 97 x 110	60 x 97 x 110	60 x 97 x 110	80 x 97 x 110	120 x 97 x 110
Weight	g	470	540	540	780	1000
Warranty	yrs	3 Years				

(1) Evaluated to NEC NFPA70 Class 2 output per UL1310

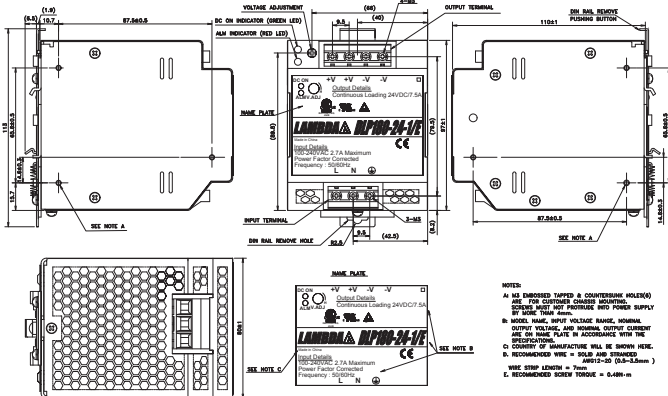
(2) DC input is not safety approved

(3) DLP240-24-1/E, 170-265VAC: -10°C~+70°C, derated linearly to 60% load from 50° to 70°C. DLP75-24-1/C2EJ: -10°C~+70°C, derated linearly to 75% load from 50° to 60°C. DLP100-24-1/C2EJ: -10°C~+70°C, derated linearly to 80% load from 50° to 60°C.

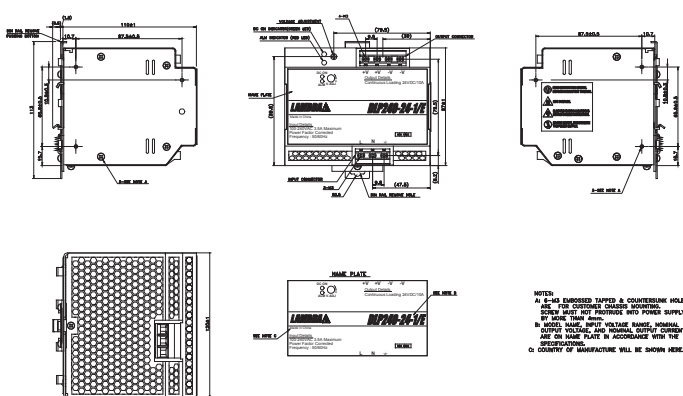
DLP100/120 Outline



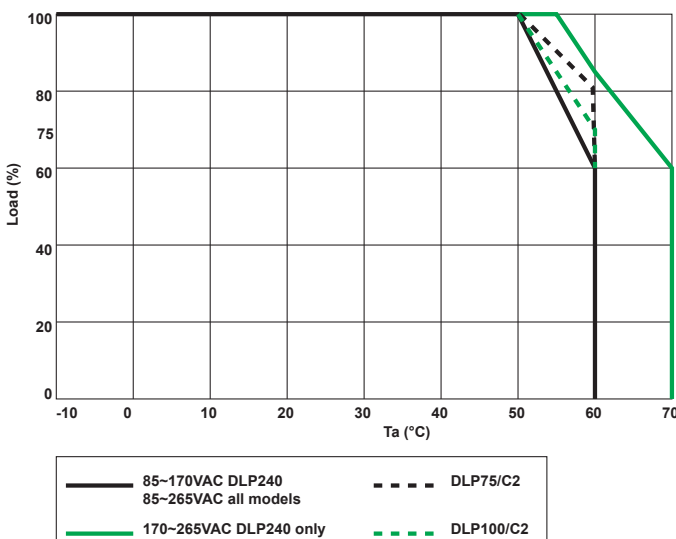
DLP180 Outline



DLP240 Outline



Derating Curve



Other Industrial Products

DPP/DSP	10W to 480W Single Output DIN Rail
HWS	15W to 1800W Single Output

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dlp-series.htm



Power Supply Parallel or Redundancy Module

Features

- ◆ OR-ing Diodes Included
- ◆ Alarm Signals
- ◆ LED Indicators
- ◆ DIN Rail Mounting
- ◆ Can connect two units in parallel
- ◆ Output voltage monitoring (via relays)

Key Market Segments & Applications

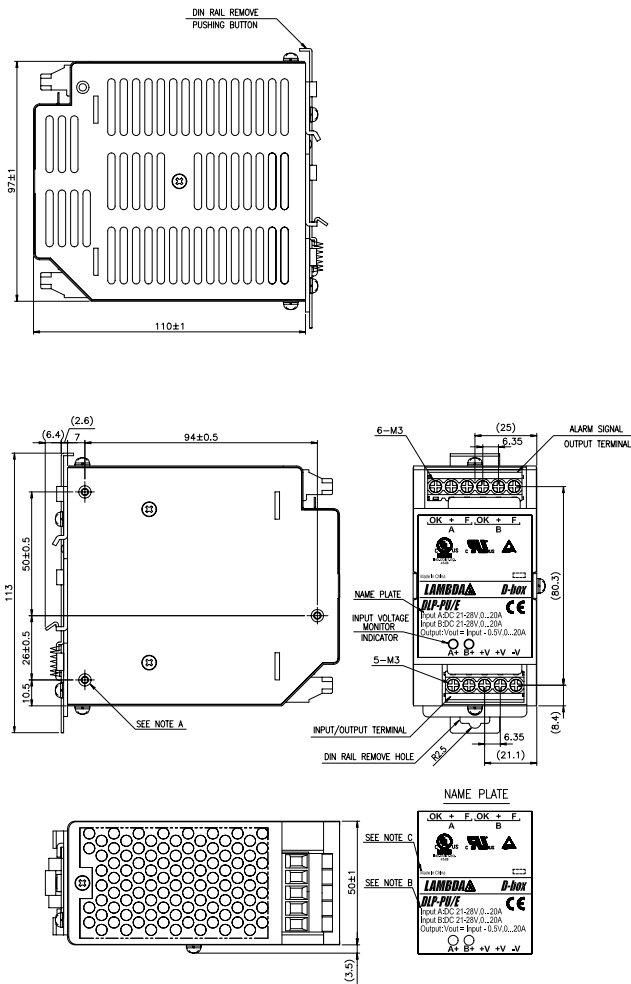


Specifications

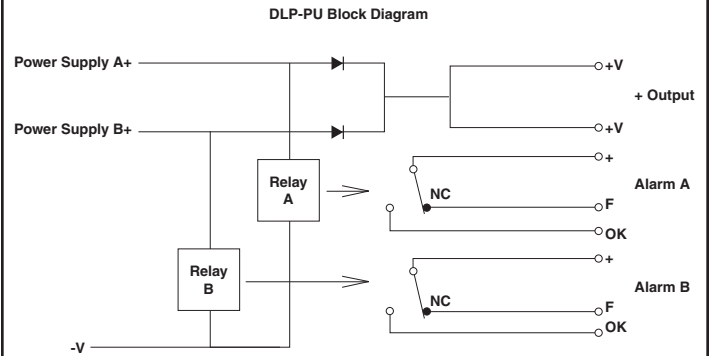
Model		DLP-PU/E
Input Voltage Range	VDC	21 - 28VDC
Number of inputs	-	Two
Maximum Input Current	A	20A per input
Maximum Output Current	A	20A
Overcurrent protection	-	None
Voltage Drop	VDC	0.5V
Maximum Reverse Voltage	VDC	35VDC
LED Indicators	-	Two green LEDs indicating each input is "good"
Input Voltage Alarm	-	Relay off when input is <19.2V (±1%) or > 30V (±5%). NO and NC contacts
Relay contact rating (max)	-	28VDC, 1A or 120VAC, 0.5A (5mA minimum recommended)
Cooling	-	Convection
Operating Temperature	-	-10 to +70°C, derate linearly to 60% from 60 to 70°C
Storage Temperature	-	-30 to +90°C
Humidity	-	Operating: 30 - 90%RH, Storage: 10 - 95%RH (non condensing)
Withstand Voltage	-	Input or Output - Chassis, Input or Output - Relay Contacts, Relay Contacts to Chassis; 500VAC for 1 min.
Isolation Resistance	-	Input or Output - Chassis, Input or Output - Relay Contacts, Relay Contacts to Chassis; >10M Ohms at 25°C, 70%RH and 500VDC
Vibration	-	Non operating, mounted on DIN Rail, 10-55Hz (sweep for 1 min), 9.8m/s ² constant X, Y, Z each for 1 hour
Shock	-	196m/s ²
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1, UL508, CSA22.2 No.14, EN60529 IP20, EN50178 Cat 1
Size	mm/in	50 x 97 x 110mm, 1.97x 3.81 x 4.33"
Weight	g	470g
Warranty	yrs	Three Years

Note: See Installation Manual for full details, test methods of parameters and application notes

Outline Drawings



Block Diagram



Other Industrial Products

DLP	75W to 240W power supplies
DPP/DSP	10W to 480W low cost power supplies
R Series	3A to 30A single & three phase EMI Filters

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dlp-series.htm



15-100W, 5-48V Output DIN Rail Mount Power Supplies

Features

- ◆ Low Cost
- ◆ Universal Input
- ◆ NEC NFPA70 Class 2⁽²⁾
- ◆ UL508 Listed
- ◆ Class 1, Division 2 (ISA 12.12)⁽³⁾
- ◆ -10 to +71°C Operation



Key Market Segments & Applications



Industrial



RoHS

Specifications

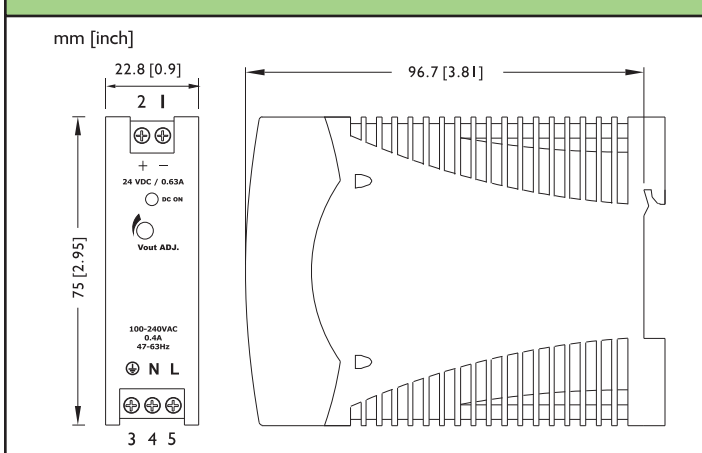
Model		DPP15	DPP25/30	DPP50	DPP100
AC Input Voltage range	VAC	85 - 264VAC			85 - 132VAC 176 - 264VAC
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	-	90 - 375VDC			210 - 375VDC
Inrush Current (115 / 230VAC)	A	<35A	35 / 45A	35 / 50A	35 / 55A
Power Factor	-	Meets EN61000-3-2 Class A			
Input Current (230VAC)	A	0.4	0.72	1.35	1.2
Leakage Current	mA	<0.75mA, 265VAC, 63Hz			
Output Voltage Accuracy	%	±1% (24V outputs preset at 24.5V)			
Line Regulation	%	< 0.5%			
Load Regulation	%	< 0.5%			
Ripple and Noise	mV	50mV			
Overcurrent Protection (Typ)	-	>110% (fold forward type)			
Overvoltage Protection	V	120 - 137.5%, Cycle AC line to reset			
Hold Up Time (115VAC input)	ms	> 20ms			
Parallel switch	-	No			Yes
LED Indicator	-	Green LED = On			
Operating Temperature	°C	-10* to +71°C (Derate linearly 5%/°C from 61 to 71°C) * -25°C start up, DPP25-50 only			
Storage Temperature	°C	-25 to +85°C			
Operating Humidity	-	20 - 90% RH (non condensing)			
Cooling (1)	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Shock	-	Half sine wave, 4G, 22ms, 3 times per face, X, Y, Z			
Vibration	-	10-500Hz (20 min sweep) 0.002G ² /Hz, 1 Grms acceleration X, Y, Z, 1 hour			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Safety Agency Approvals	-	UL60950-1, UL508, NEC Class 2 ⁽²⁾ , EN60950-1, CE Mark, ISA 12.12 ⁽³⁾			
Emissions	-	EN55011, EN55022 class B Radiated & Conducted, EN61000-6-3			
Immunity	-	EN61000-6-2, EN61000-4-2 Level 4, EN61000-4-3, EN61000-4-6 Level 3, EN61000-4-4 Level 4 (I/P) Level 3 (O/P), EN61000-4-5 Level 4, EN61000-4-8, EN61000-4-11			
Weight (Typ)	g	130	260	390	
Size (WxHxD)	in	0.9x2.95x3.81"	1.77x2.95x3.58"	2.86x2.95x3.81"	
Case material	-	Plastic			
MTBF (MIL-HDBK-217F, GF25)	Hours	287,000	>288,000	269,000	239,000
Warranty	Yrs	Two years			

- (1) Recommend 1" clearance on all sides.
 (2) See model selector. Evaluated to NEC NFPA70 Class 2 output per UL1310.
 (3) See model selector.

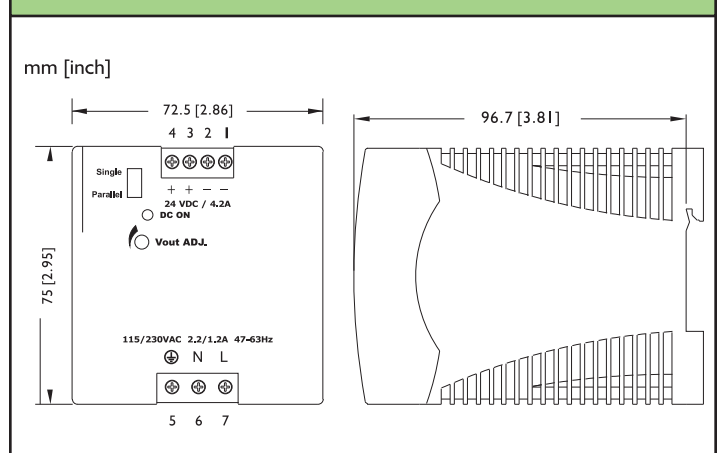
Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Effic. (typ) %	UL1310 Class 2	ISA12.12 Class 1 Div 2
DPP25-5	5	5-6	5.0	25	78	-	Yes
DPP30-12	12	9.9-12.1	2.5	30	83	Yes	Yes
DPP50-15	15	11.9-15.1	3.4	50	85	Yes	Yes
DPP15-24	24	22.5-28.5	0.63	15	81	Yes	-
DPP30-24	24	22.5-28.5	1.3	30	84	Yes	Yes
DPP50-24	24	22.5-28.5	2.1	50	86	Yes	Yes
DPP100-24	24	22.5-28.5	4.2	100	87	-	-
DPP50-48	48	48-56	1.05	50	87	Yes	Yes

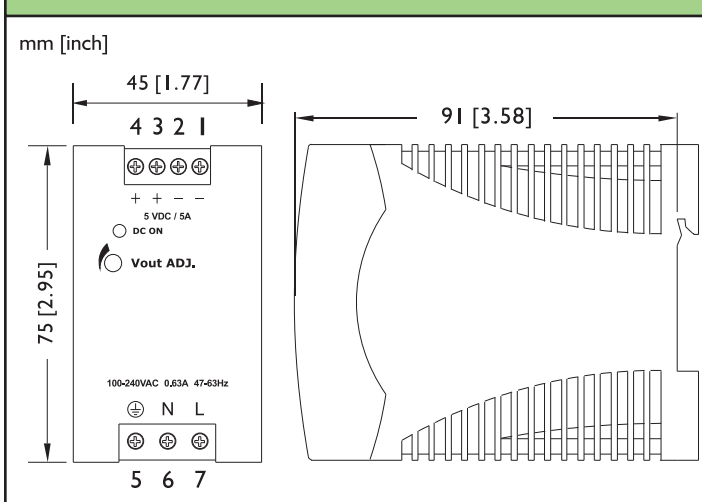
DPP15 Outline



DPP100 Outline



DPP25-DPP50 Outline



Installation:

Snap-on Mounting - snap onto DIN Rail TS35/7.5 or TS35/15. (No tools required)

Cooling - Normal Convection

Clearance - 25mm all sides

Connection - Use copper wire 0.5-2.5mm² (AWG24-12)

Other DIN Rail Products

DSP/DPP	10W to 480W power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	3A to 30A single & three phase EMI Filters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpp-series.htm



120W & 240W DIN Rail Mount Power Supplies

Features

- ◆ Low Cost
- ◆ 12V, 24V or 48V Outputs
- ◆ Auto-ranging input (no manual switching)
- ◆ Parallel Function Switch
- ◆ -40⁽²⁾ to +71°C Operation

Key Market Segments & Applications



Industrial



RoHS

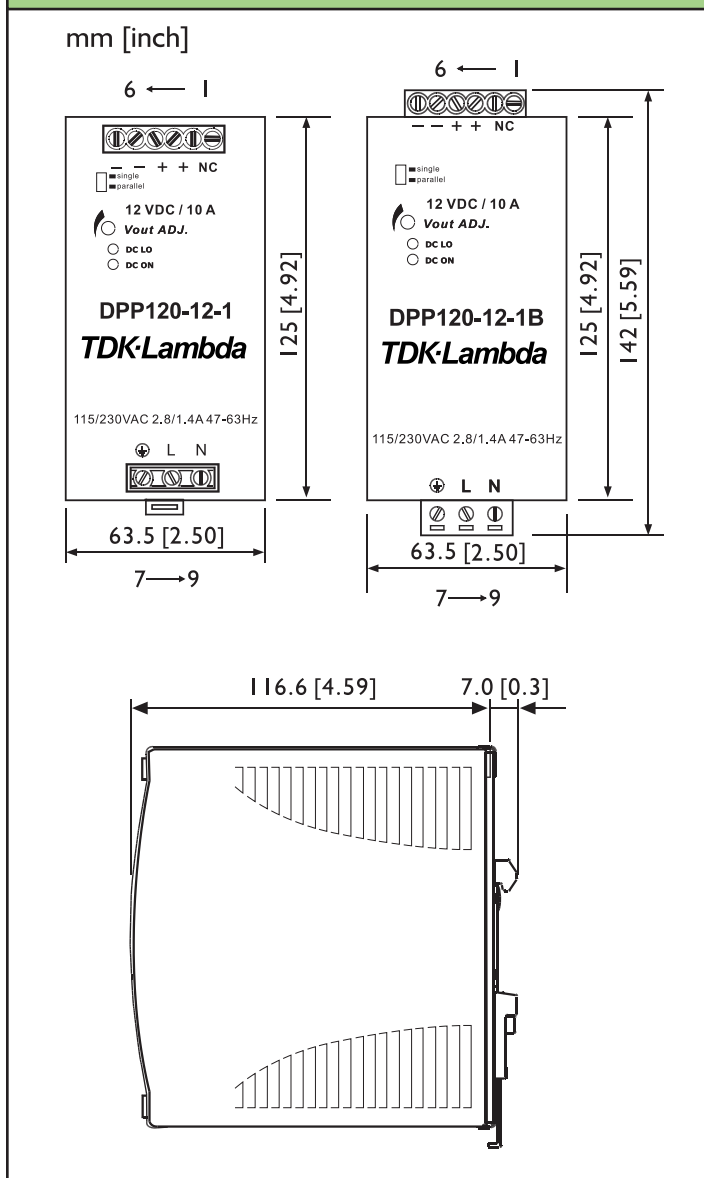
Specifications

Model		DPP120-xx-1	DPP240-xx-1
AC Input Voltage range	VAC	93 - 132 / 186 - 264VAC, single phase. Auto select	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage range	VDC	210 - 370VDC	
Inrush Current (115 / 230VAC)	A	24 / 48A	30 / 60A
Power Factor	-	Meets EN61000-3-2	
Input Current (115 / 230VAC)	A	2.8 / 1.4A	5.4 / 2.2A
Output Voltage Accuracy	%	-0, +1% of Nominal	
Line Regulation	%	±0.5%	
Load Regulation	%	±1% (±5% when set in parallel mode)	
Ripple and Noise (20MHz BW)	mV	50mV	100mV
Overcurrent Protection (Typ)	-	110 - 145%	
Overvoltage Protection	V	See model selector	
Overtemperature Protection	-	-	
Hold Up Time (230VAC input)	ms	> 30ms	
Parallel operation	-	Set in parallel (droop) mode - maximum of 3 units	
LED Indicators	-	Green LED = On, Red LED = DC Output Low	
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V	
Operating Temperature	°C	-40 ⁽²⁾ to +71°C (Derate linearly 2.5%/°C from 61 to 71°C)	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity	-	20 - 95% RH (non condensing)	
Cooling (1)	-	Convection	
Withstand Voltage	-	Input to Output 3kVAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)	
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)	
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE	
Conducted & Radiated EMI	-	EN55022 class B	EN55022 class A
Weight (Typ)	g	920	1000
Size (WxHxD) (1)	in	2.5 x 4.92 x 4.59"	3.27 x 4.92 x 4.57"
Case material	-	Metal	
Warranty	yrs	Two years	

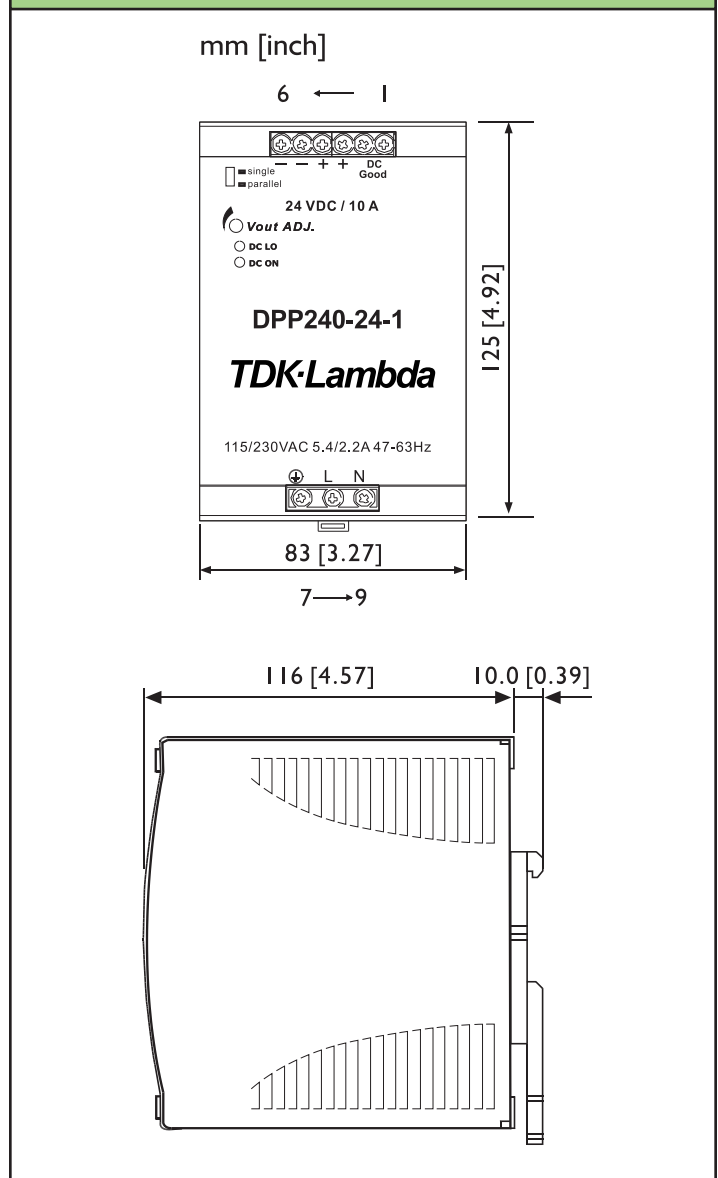
(1) Recommend 1" clearance on all sides

(2) DPP120 -35°C

Outline Drawing (DPP120)



Outline Drawing (DPP240)



Model Selector

Model	Voltage	Adjust. Range	Output Curr.	Over-voltage	Eff.
DPP120-12-1	12V	11.4 - 14.5V	10A	15 - 17.4V	84%
DPP120-24-1	24V	22.5 - 28.5V	5A	30 - 34.8V	86%
DPP120-48-1	48V	45 - 55V	2.5A	60 - 69.6V	87%
DPP240-24-1	24V	22.5 - 28.5V	10A	30 - 34.8V	89%
DPP240-48-1	48V	47 - 56V	5A	60 - 69.6V	90%

Other DIN Rail Products

DPP	15W to 100W
DPP480	480W single and three phase
DSP	10W to 100W low profile
DLP	75W to 240W single phase

Terminal Assignments

#	Function
1	DC Good relay
2	DC Good relay
3	+V
4	+V
5	-V
6	-V
7	Chassis ground
8	L
9	N

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

Options

Suffix	Description
Blank	Non detachable connectors
B	Detachable input and output connectors

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpp-series.htm



120W, 240W, 480W & 960W 3 Phase DIN Rail Mount Power Supplies

Features

- ◆ Low Cost
- ◆ 12V, 24V or 48V Outputs
- ◆ Wide Range 340 to 575VAC Input
- ◆ Parallel Function Switch (240 & 480W)
- ◆ Current Share (960W)
- ◆ -40⁽³⁾ to +71°C Operation



Key Market Segments & Applications



Specifications

Model		DPP120-xx-3	DPP240-xx-3	DPP480-xx-3	DPP960-xx-3
AC Input Voltage range (1)	VAC	340 - 575VAC, three phase			
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	VDC	480 - 820VDC			
Inrush Current (380-480VAC)	A	10A	20A	20A	30A
Power Factor (2)	-	0.55	0.55	0.65	0.8
Input Current (400VAC) (typ)	A	0.36A	0.65A	1.1A	1.72A
Output Voltage Accuracy	%	-0, +1% of Nominal			
Line Regulation	%	±1%			
Load Regulation	%	±1% (±5% when set in parallel mode)			
Ripple and Noise (20MHz BW)	mV	100mV	100mV	100mV	80mV
Overcurrent Protection (Typ)	-	115 - 135%	120 - 140%	110 - 135%	110 - 130%
Overvoltage Protection	V	See model selector			
Overtemperature Protection	-	Yes, auto recovery			
Hold Up Time (380-480VAC)	ms	> 20ms	> 20ms	> 20ms	> 15ms
Parallel operation (up to 90% load)	-	Set in parallel (droop) mode - up to 2 units			
LED Indicators	-	Green LED = On, Red LED = DC Output Low			
DC Good Relay (24V models only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V			
Operating Temperature	-	-40 ⁽³⁾ to +71°C (Derate linearly 2.5%/°C from 61 to 71°C, 3.5%/°C for DPP960)"			
Storage Temperature	-	-40 to +85°C			
Operating Humidity (non condensing)	-	20 - 95% RH			
Cooling	-	Convection. Recommend 1" clearance on all sides			
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 1.5kVAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration	-	IEC 60068-2-6. 10- 500Hz, 2G on X, Y & Z axes			
Shock	-	IEC 60068-2-27. Half sinewave, 4G, 22ms, 3 times each face			
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)			
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)			
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE			
Conducted & Radiated EMI	-	EN55022 class B			
Immunity	-	IEC 61000-4-2, -3, 4, -5, -6, -8, -11			
Weight (Typ)	g	800g	1100g	1720g	3400g
Size (WxHxD)	in	2.92 x 4.88 x 4.68"	3.5 x 4.88 x 4.68"	5.91 x 4.88 x 4.68"	10.86 x 4.97 x 4.68"
Switching Frequency	kHz	70kHz	25kHz	80kHz	52kHz
MTBF (Bellcore Issue 6 @40°C, GB)	Hours	527,000	488,000	411,000	352,000
Case material	-	Metal			
Warranty	yrs	Two years			

(1) Bi-phase input is permissible, but output load must be derated to 75% load

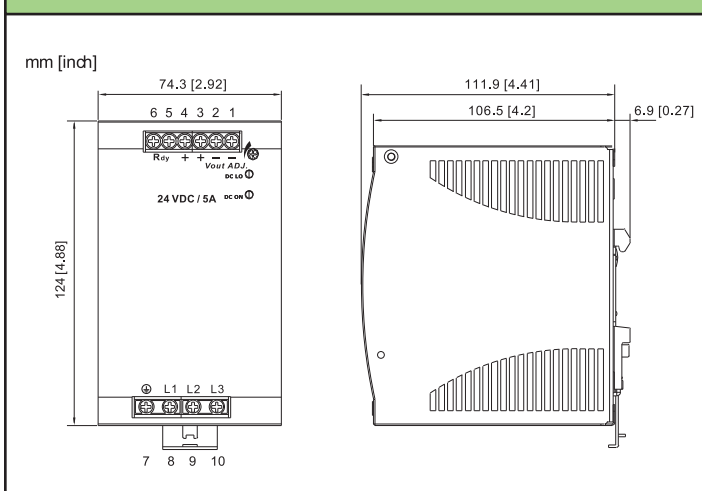
(2) Passive, meets EN61000-3-2

(3) DPP480 -30°C

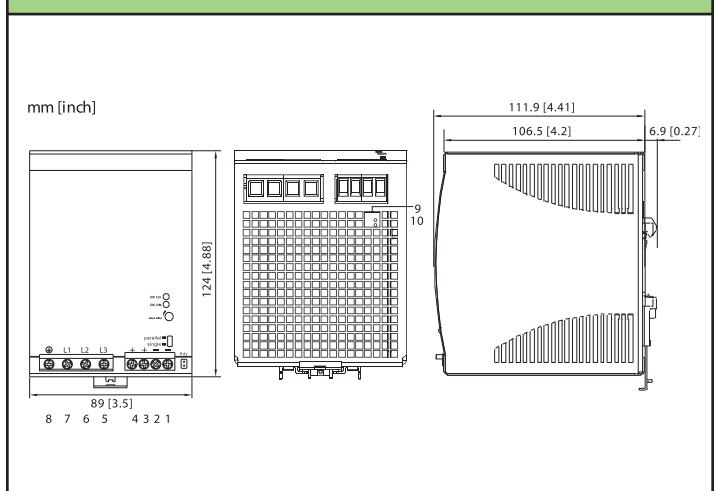
Model Selector

Model	Voltage (V)	Adjust Range (V)	Output Current (A)	Overvoltage (V)	Efficiency (%)
DPP120-12-3	12V	11.4 - 14.5V	10A	14.5 - 17.4V	87%
DPP120-24-3	24V	22.5 - 28.5V	5A	30 - 33V	89%
DPP240-24-3	24V	22.5 - 28.5V	10A	30 - 33V	90%
DPP480-24-3	24V	22.5 - 28.5V	20A	30 - 33V	90%
DPP960-24-3	24V	22.5 - 28.5V	40A	30 - 33V	92%
DPP240-48-3	48V	47 - 56V	5A	60 - 68V	91%
DPP480-48-3	48V	47 - 56V	10A	60 - 68V	91%
DPP960-48-3	48V	47 - 56V	20A	60 - 68V	93%

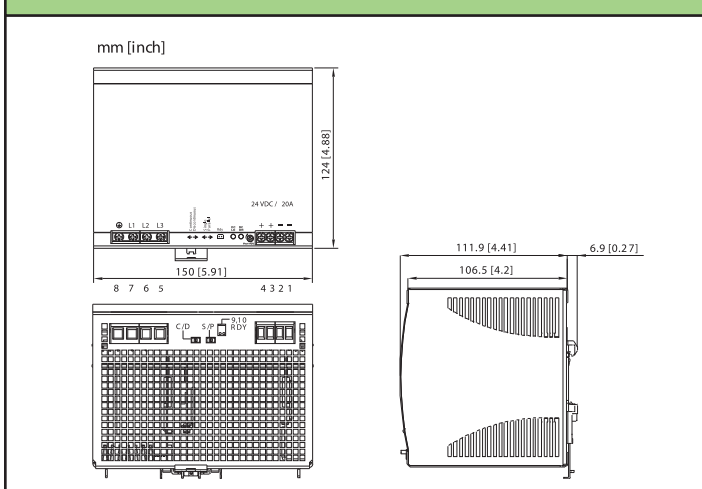
DPP120 Outline



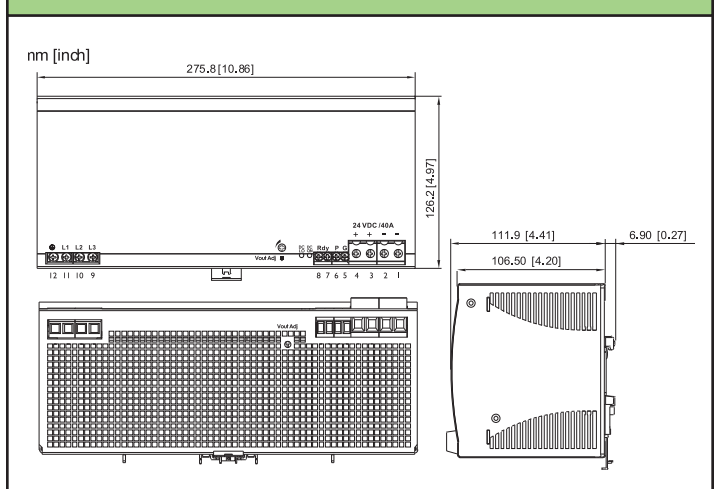
DPP240 Outline



DPP480 Outline



DPP960 Outline



Other DIN Rail Products

DPP	15W to 480W
DSP	10W to 100W low profile
DLP	75W to 240W single phase

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpp-series.htm



480W Single Output DIN Rail Mount Power Supplies

Features

- ◆ Low Cost
- ◆ 24V or 48V Outputs
- ◆ Wide Range AC Input
- ◆ Active PFC
- ◆ Parallel Function Switch
- ◆ -40 to +71°C Operation
- ◆ Convection Cooled



Key Market Segments & Applications



Industrial



RoHS

Specifications

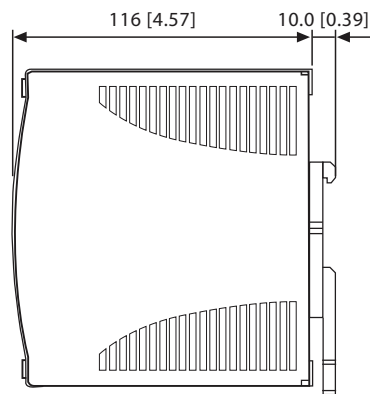
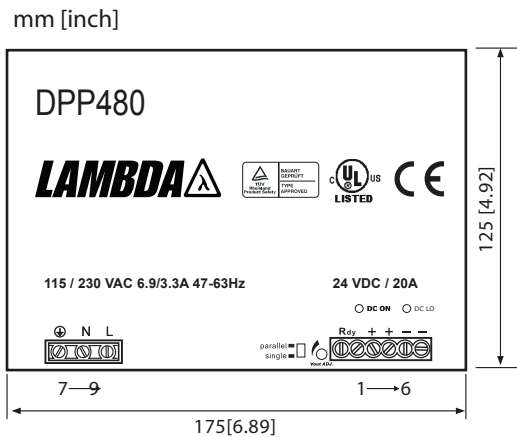
Model		DPP480-xx-1
AC Input Voltage range	VAC	90 - 264VAC, single phase
Input Frequency	Hz	47 - 63Hz
DC Input Voltage range	VDC	120 - 370VDC
Inrush Current	A	25 / 50A (115 / 230VAC)
Power Factor	-	Meets EN61000-3-2 Class A
Input Current	A	6.9 / 3.3A (115 / 230VAC)
Output Voltage Accuracy	%	-0, +1% of Nominal
Line Regulation	%	±0.5%
Load Regulation	%	±1% (±5% when set in parallel mode)
Ripple and Noise (20MHz BW)	mV	100mV
Overcurrent Protection (Typ)	-	110 - 140%
Overvoltage Protection	V	See model selector
Overtemperature Protection	-	-
Hold Up Time (115VAC input)	ms	> 35ms
Parallel operation	-	Set in parallel (droop) mode - maximum of 3
LED Indicators	-	Green LED = On, Red LED = DC Output Low
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V
Operating Temperature	°C	-40 to +71°C (Derate linearly 2.5%/°C from 56 to 71°C)
Storage Temperature	°C	-40 to +85°C
Operating Humidity	-	20 - 95% RH (non condensing)
Cooling (1)	-	Convection
Withstand Voltage	-	Input to Output 3kVAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE
Conducted & Radiated EMI	-	EN55022 class B
Weight (Typ)	g	1800g
Size (WxHxD)	in	6.89 x 4.92 x 4.57
Case material	-	Metal
Warranty	yrs	Two years

(1) Recommend 1" clearance on all sides

Model Selector

Model	Voltage	Adjust. Range	Output Curr.	Over-voltage	Eff.
DPP480-24-1	24V	22.5 - 28.5V	20A	30 - 33V	89%
DPP480-48-1	48V	47 - 56V	10A	57 - 63V	90%

Outline Drawing (DPP480-24-1)



Accepts TS35/7.5 or TS35/15 DIN Rails

Terminal Assignments

#	DPP480-xx-1
1	DC Good relay
2	DC Good relay
3	+V
4	+V
5	-V
6	-V
7	Chassis ground
8	N
9	L
10	No connection

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

Options

Suffix	Description
Blank	Non detachable connectors
B	Detachable input and output connectors

Other Industrial Products

DPP/DSP	10W to 960W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	6A to 1000A single & three phase EMI Filters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpp-series.htm



7.5W to 100W Low Profile DIN Rail Mount Power Supplies

Features

- ◆ Low Profile for Building Automation
- ◆ 5V to 24V Outputs
- ◆ Wide Range AC Input
- ◆ UL1310 Class 2⁽¹⁾
- ◆ Class II Double Insulation
- ◆ -25 to +71°C Operation



Key Market Segments & Applications



Industrial



RoHS

Specifications

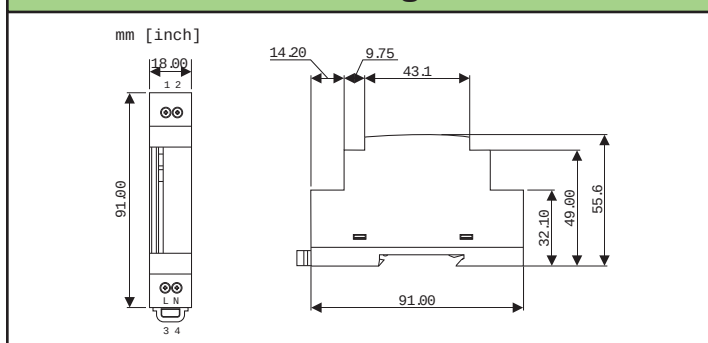
Model		DSP10	DSP30	DSP60	DSP100
AC Input Voltage range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)			
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	VDC	120 - 370VDC			
Inrush Current (115 / 230VAC)	A	15 / 30A	25 / 50A	30 / 60A	30 / 60A
Power Factor & Flicker	-	Meets EN61000-3-2, EN61000-3-3			
Output Voltage Accuracy	%	±1% of Nominal			
Line Regulation	%	1%			
Load Regulation	%	1%			
Ripple and Noise (20MHz BW)	mV	50mV			
Overcurrent Protection (Typ)	-	110 - 160%, fold forward under short circuit (DSP100-24/C2 102-108%)			
Overvoltage Protection	V	120 - 145%			
Hold Up Time (115VAC input)	ms	See Model Selector			
LED Indicators	-	Green LED = On, Red LED = DC Output Low			
Operating Temperature	°C	-25 to +71°C (Derate linearly 2.5%/°C from 55 to 71°C)			
Temperature Coefficient	%/°C	±0.02%/°C			
Storage Temperature	°C	-25 to +85°C			
Operating Humidity	-	20 - 95% RH (non condensing)			
Cooling	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Input to Output 500VDC			
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)			
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)			
Safety Agency Approvals	-	UL1310 Class 2 ⁽¹⁾ , UL508 Listed, UL60950-1, EN60950-1, CE			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 & -11			
Conducted & Radiated EMI	-	DSP10: EN55022 Class B; DSP30-100: EN55022 Class A			
Weight (Typ)	g	60	200	250	320
Size (WxHxD)	in	0.71 x 3.58 x 2.19"	2.09 x 3.58 x 2.19"	2.8 x 3.58 x 2.19"	3.54 x 3.58 x 2.19"
Case material	-	Plastic			
Warranty	yrs	Three years			

(1) See model selector on page 2.

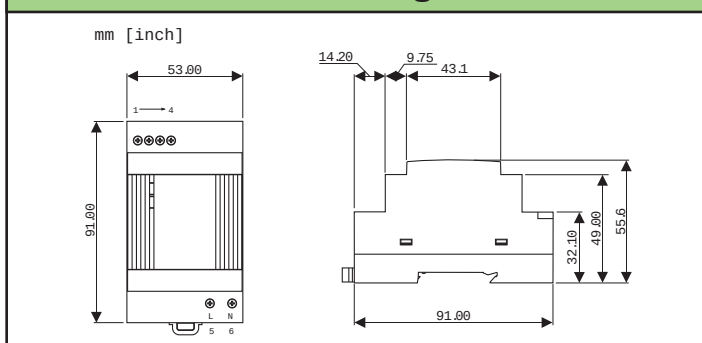
Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Efficiency (Typ %)	Hold Up Time 115VAC in (ms)	UL1310 Class 2
DSP10-5	5	None	1.50	7.5	74	10	Yes
DSP30-5	5	5 - 5.5	3.00	15.0	74	25	Yes
DSP60-5	5	5 - 5.5	7.00	35.0	80	16	-
DSP10-12	12	None	0.83	10.0	78	10	Yes
DSP30-12	12	12 - 14	2.10	25.2	82	25	Yes
DSP60-12	12	12 - 14	4.50	54.0	84	16	Yes
DSP100-12	12	12 - 14	6.00	72.0	82	16	-
DSP10-15	15	None	0.67	10.1	78	60	Yes
DSP30-15	15	13.5 - 16.5	2.00	30.0	83	25	Yes
DSP60-15	15	13.5 - 16.5	4.00	60.0	85	12	Yes
DSP100-15	15	13.5 - 16.5	5.00	75.0	85	16	-
DSP10-24	24	None	0.42	10.1	80	60	Yes
DSP30-24	24	24 - 28	1.30	31.2	83	25	Yes
DSP60-24	24	24 - 28	2.50	60.0	86	12	Yes
DSP100-24/C2	24	20 - 24.2	3.80	91.2	89	10	Yes
DSP100-24	24	24 - 28	4.20	100.8	85	10	-

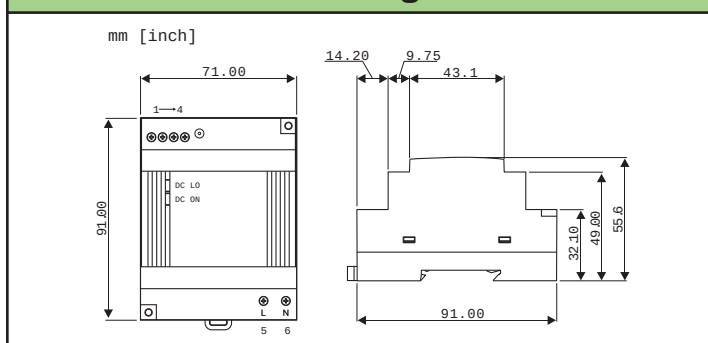
DSP10 Outline Drawing



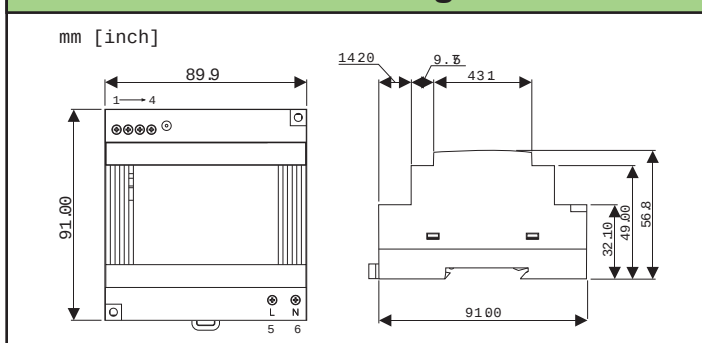
DSP30 Outline Drawing



DSP60 Outline Drawing



DSP100 Outline Drawing



Other DIN Rail Products

DSP/DPP	10W to 480W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	3A to 30A single & three phase EMI Filters

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15.
(no tools required)

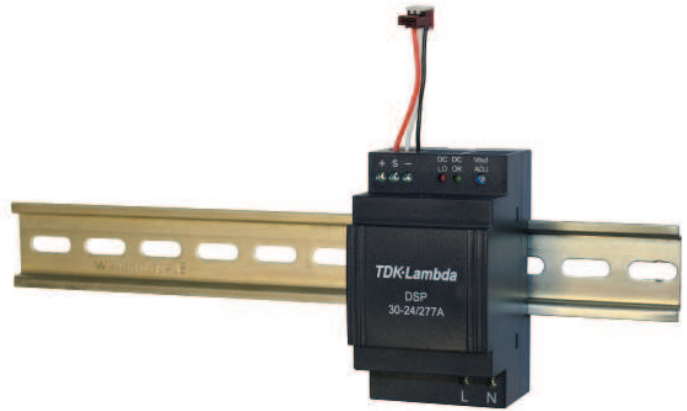
For Additional Information, please visit
us.tdk-lambda.com/lp/products/dsp-series.htm



30W 100-277VAC Input DIN Rail Power Supply

Features

- ◆ Low Profile for Building Automation
- ◆ 24V Output
- ◆ Wide Range AC Input (100-277VAC)
- ◆ Evaluated to NEC NFPA70 Class 2 Output
- ◆ Class II Double Insulation
- ◆ AC Line Frequency Sync Signal
- ◆ -25 to +71°C Operation
- ◆ DIN Rail Mount



Key Market Segments & Applications



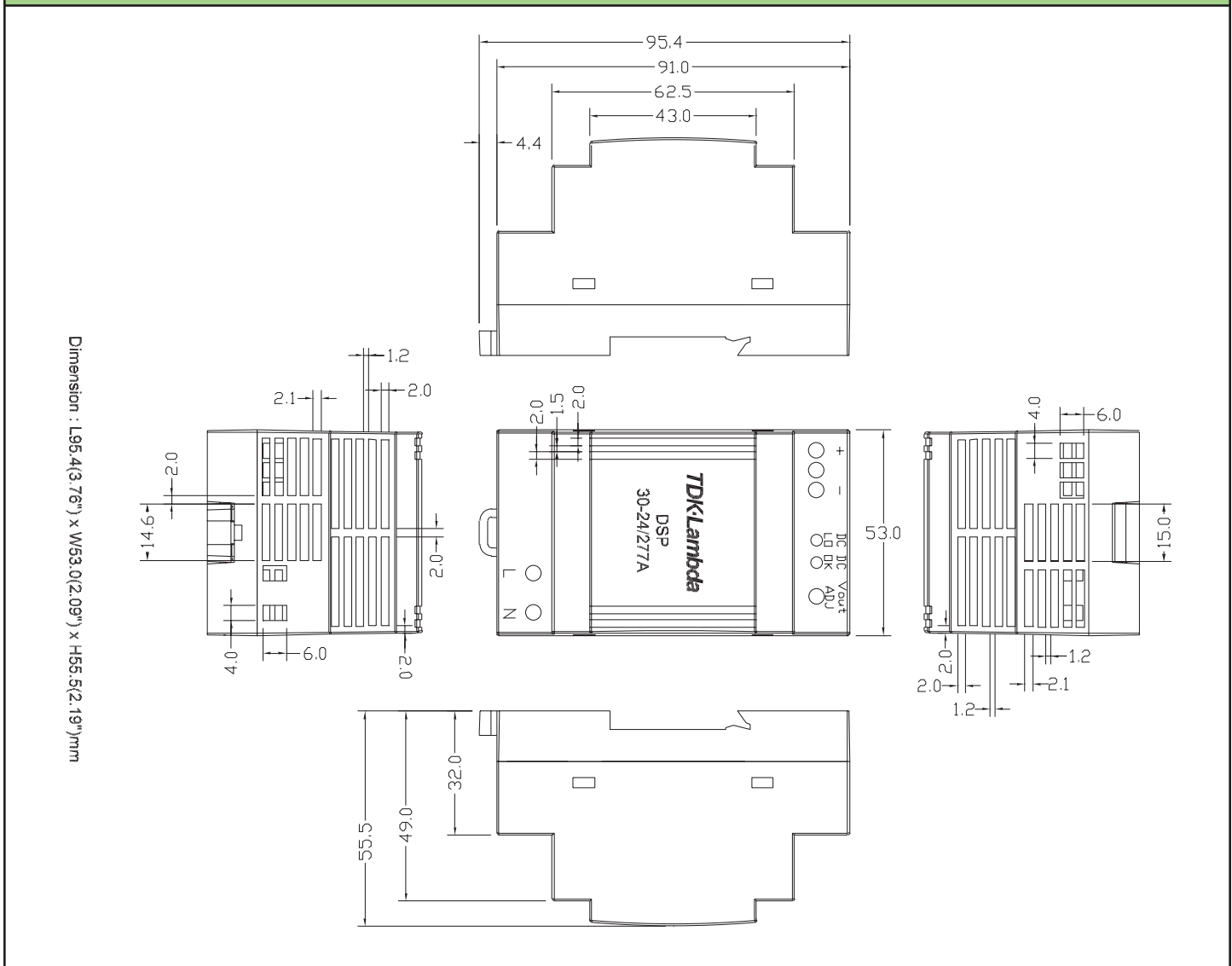
Specifications

Model		DSP30-24/277A
AC Input Voltage range	VAC	90 - 304VAC, Class II double insulated (No ground connection required)
Input Frequency	Hz	47 - 63Hz
DC Input Voltage range	VDC	120 - 370VDC
Input Current	A	1.5A at 90VAC input
Inrush Current	A	65A at 230VAC, Cold start, 25°C ambient
Power Factor & Flicker	-	Meets EN61000-3-2, EN61000-3-3
Output Voltage Accuracy	%	±1% of Nominal
Line Regulation	mV	240mV
Load Regulation	mV	240mV
Ripple and Noise (20MHz BW)	mV	120mV
Overcurrent Protection (Typ)	-	<160%
Overvoltage Protection	V	30 - 36VDC
Hold Up Time (115VAC input)	ms	25ms
LED Indicators	-	Green LED = On, Red LED = DC Output Low
Operating Temperature	-	-25 to +71°C (Derate linearly 2.5%/°C from 61 to 71°C)
Temperature Coefficient	%/°C	±0.05%/°C
Storage Temperature	°C	-10 to +85°C
Operating Humidity	%RH	20 - 90% RH (non condensing)
Cooling	-	Convection
Withstand Voltage	-	Input to Output 3kVAC for 1 min.
Isolation Resistance	-	>20M at 25°C, 70%RH & 500VDC
Safety Agency Approvals	-	UL60950-1, EN60950-1, Evaluated to NEC NFPA70 Class 2 output per UL1310, CE
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 & -11
Conducted & Radiated EMI	-	EN55022 class A
MTBF	Hours	> 100,000 Hours
Weight (Typ)	g	200
Size (WxHxD)	in	2.09 x 3.76 x 2.19"
Case material	-	Plastic
Line sync signal (secondary)	-	24V peak to peak square wave, synchronized to input line frequency
Warranty	yrs	Two years

Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Eff. (Typ %)
DSP30-24/277A	24V	24 - 28V	1.25A	30W	87%

Outline Drawing



Other DIN Rail Products

DPP	10 to 960W single & three phase
DSP	15 to 100W low profile
DLP	75 to 240W

Output Cable Harness

Connector: AMP 3-640427-3
 Cable length 50mm
 Red = +24V, Black = 0V, White = Sync Signal

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dsp-series.htm



62W to 80W AC-DC External Power Supplies

Features

- ◆ CEC, EISA⁽¹⁾ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Power Factor Correction (DT80)
- ◆ Low Profile & Lightweight
- ◆ 85% Efficient

Key Market Segments & Applications



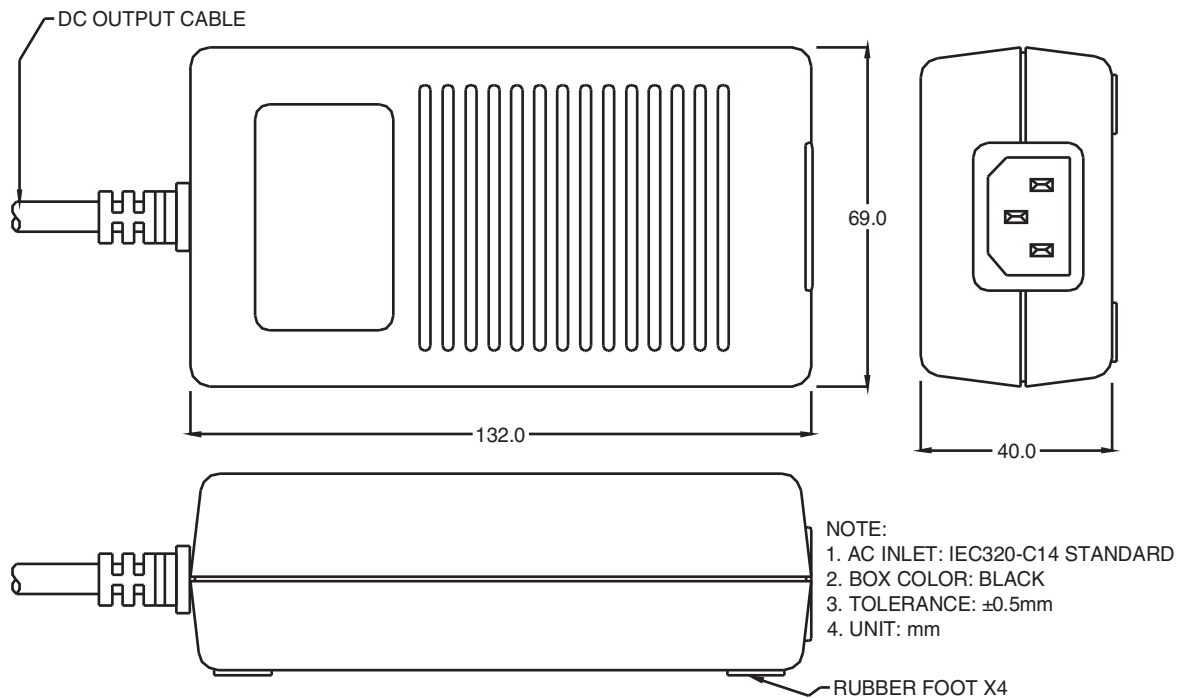
Specifications			
Model		DT62PWxxx-C	DT80PWxxx-C
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)	
Inrush Current	A	<50A at 230VAC input, 25°C ambient cold start	
Input Current (Maximum)	A	2.5A	
Power Factor	-	None	Typically 0.9 at full load(Meets EN61000-3-2)
Leakage Current (typ, 264VAC 63Hz)	mA	0.7mA	
Hold Up Time (Typ)	ms	16ms at 115VAC input	
Temperature Coefficient	°C	±0.05%/°C	
Voltage Accuracy	%	±1%	
Adjustment Range	-	None	
Minimum Load	-	None	
Total Regulation	-	±5%	
Ripple & Noise	%	1%	
Short Circuit Protection	-	Continuous - hiccup mode (110-160%)	
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power to reset)	
Efficiency	%	>85% typical	
Operating Temperature	°C	0 to +40°C Full load, derate linearly to 50% load at 60°C	
Storage Temperature	°C	-10 to +70°C	
Humidity (non condensing)	-	10 - 90% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC (Output is connected to Ground)	
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s ² (20G)	
Safety Agency Approvals	-	UL60950-1, EN609501-1, IEC60950-1	
California Energy Commission (CEC)	-	See model selector	
EISA (1)	-	See model selector	
Offload Power Consumption	W	< 0.5W	
Conducted & Radiated EMI	-	EN55022-B, FCC Class B	
Immunity	-	EN55024	
Weight (Typ)	g	410g	
Size (WxLxH)	in	2.71 x 5.2 x 1.57	
Cable Length and Thickness	mm	1050mm	
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)	
Output Connector	-	Kycon KPPx-4P or equivalent. Pins 1 & 2: -Vout, Pins 3 & 4: +Vout	
MTBF (MIL-HNBK), 100% load, 25C	hours	223,933 Hours	203,109 Hours
Warranty	yrs	One Year	

(1) EISA - Energy Independence and Security Act of 2007.

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC		EISA Level IV	EISA Level V
				IV	V		
DT62PW090C	9	5.56	50	-	-	-	-
DT62PW120C	12	5.17	62	Y	-	Y	-
DT62PW150C	15	4.14	62	-	Y	-	Y
DT62PW180C	18	3.54	64	-	Y	-	Y
DT62PW240C	24	2.59	62	-	Y	-	Y
DT80PW090C	9	8.00	72	-	-	-	-
DT80PW120C	12	6.67	80	Y	-	Y	-
DT80PW150C	15	5.33	80	Y	-	Y	-
DT80PW180C	18	4.45	80	-	Y	-	Y
DT80PW240C	24	3.34	80	-	Y	-	Y

Outline Drawing



Other AC-DC Products

DTM65-C	65W CEC Compliant Medical Adapters
DT100/150-C	100W to 150W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dt-c-series.htm



100W to 150W AC-DC External Power Supplies

Features

- ◆ CEC, EISA¹ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Power Factor Correction
- ◆ Low Profile & Lightweight
- ◆ 87% Avg. Active Efficiency



Key Market Segments & Applications



Specifications

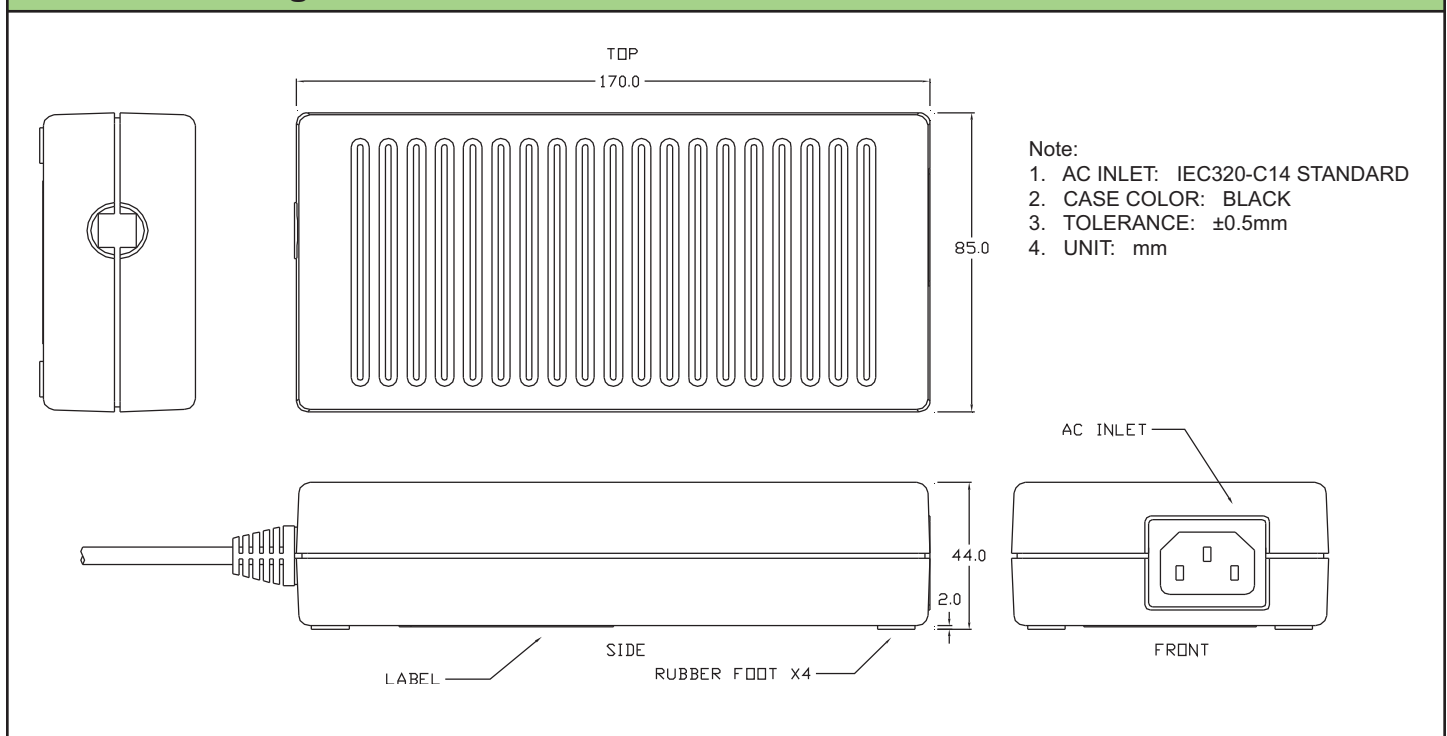
Model		DT100PWxxx-C	DT150PWxxx-C
Input Voltage range	-	90 - 264VAC (47 - 63Hz)	
Inrush Current	A	<60A at 230VAC input, 25°C ambient cold start	
Input Current (Maximum)	A	2.5A	
Power Factor	-	Typically 0.9 at full load (Meets EN61000-3-2)	
Leakage Current	µA	<600uA at 264VAC 60Hz	
Hold Up Time (Typ)	ms	16ms at 115VAC input	
Temperature Coefficient	-	±0.05%/°C	
Voltage Accuracy	%	±1%	
Adjustment Range	-	None	
Minimum Load	A	None	
Total Regulation	-	+5% / -2%	
Ripple & Noise	%	See model selector	
Short Circuit Protection	-	Continuous - hiccup mode	
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power to reset)	
Efficiency	%	≥87% Avg. Active Efficiency	
Operating Temperature	°C	0 to +40°C	
Storage Temperature	°C	-10 to +70°C	
Humidity (non condensing)	-	20 - 90% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC for 1 min. (Output is connected to Ground internally)	
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s ² (20G)	
Safety Agency Approvals	-	UL60950-1, EN609501-1, IEC60950-1	
California Energy Commission (CEC)	-	Efficiency Mark V	
EISA	-	Efficiency Mark V	
Offload Power Consumption	-	< 0.5W	
Conducted & Radiated EMI	-	EN55022-B, FCC Class B	
Immunity	-	EN55024	
Weight (Typ)	g	730g	780g
Size (WxLxH)	in	3.35 x 6.7 x 1.73"	
Cable Length & Thickness	mm	1050mm; 12 to 24V Models: #14 AWG, 36 to 48V Models: #16 AWG	
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)	
Output Connector	-	Kycon KPPx-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout	
MTBF	-	140,000 hours, 100% load, 25°C ambient, MIL-HNBK	
Warranty	yr	One Year	

(1) EISA - Energy Independence and Security Act of 2007

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Ripple & Noise (mV)	CEC V	EISA Efficiency Level V
DT100PW120C	12	8.34	100	240	Y	Y
DT100PW160C	16	6.25	100	320	Y	Y
DT100PW190C	19	5.27	100	380	Y	Y
DT100PW240C	24	4.17	100	480	Y	Y
DT100PW360C	36	2.78	100	480	Y	Y
DT100PW480C	48	2.09	100	480	Y	Y
DT150PW120C	12	11.67	140	240	Y	Y
DT150PW160C	16	9.38	150	320	Y	Y
DT150PW190C	19	7.90	150	380	Y	Y
DT150PW240C	24	6.25	150	480	Y	Y
DT150PW360C	36	4.17	150	480	Y	Y
DT150PW480C	48	3.13	150	480	Y	Y

Outline Drawing



Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DTM65-C	65W CEC Compliant Medical Adapters
DT80-C	80W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dt-series.htm



40W to 65W Medical AC-DC External Power Supplies

Features

- ◆ CEC, EISA⁽¹⁾ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Medical Certifications
- ◆ 85% Efficient, >87% average (12V models & above)

Key Market Segments & Applications



Specifications

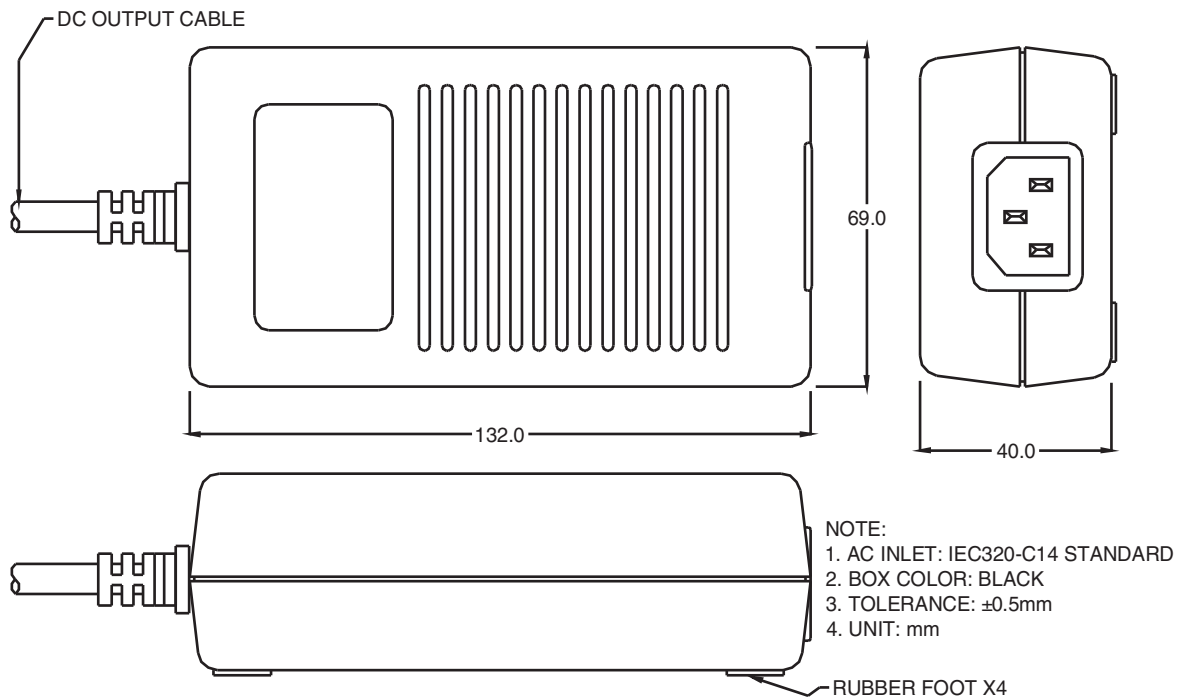
Model		
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	None
Leakage Current (264VAC 63Hz)	μA	<300uA
Hold Up Time (Typ)	ms	16ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	-	5V to 15V Models: ±5%, >15V models ±3%
Ripple & Noise	%	1% or 100mV whichever is the greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Efficiency	%	>87%, average efficiency for 12V and greater models, >75% <15V models
Operating Temperature	-	0 to +50°C
Storage Temperature	-	-10 to +70°C
Humidity (non condensing)	-	10 - 90% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC (Output is connected to Ground)
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1
California Energy Commission (CEC)	-	See model selector
EISA	-	See model selector
Offload Power Consumption	-	< 0.5W
Conducted & Radiated EMI	-	EN55011, EN60601-1-2 Class B
Immunity	-	EN55011: 2007 +A2: 2007
Weight (Typ)	g	460g
Size (WxLxH)	in	2.72 x 5.2 x 1.57
Cable Length	mm	1050mm
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)
Output Connector	-	Kycon KPPx-4P or equivalent, Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	yrs	Two Years

(1) EISA - Energy Independence and Security Act of 2007

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC	EISA Efficiency Level
DTM65PW050C	5	8.0	40	-	-
DTM65PW120C	12	5.0	60	V	V
DTM65PW150C	15	4.0	60	V	V
DTM65PW180C	18	3.6	65	V	V
DTM65PW240C	24	2.7	65	V	V
DTM65PW360C	36	1.8	65	V	V
DTM65PW480C	48	1.35	65	V	V

Outline Drawing



Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 150W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dt-c-series.htm



90W to 110W Medical AC-DC External Power Supplies

Features

- ◆ CEC, EISA⁽¹⁾ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Medical Certifications
- ◆ > 87% Average Efficiency



Key Market Segments & Applications



Specifications

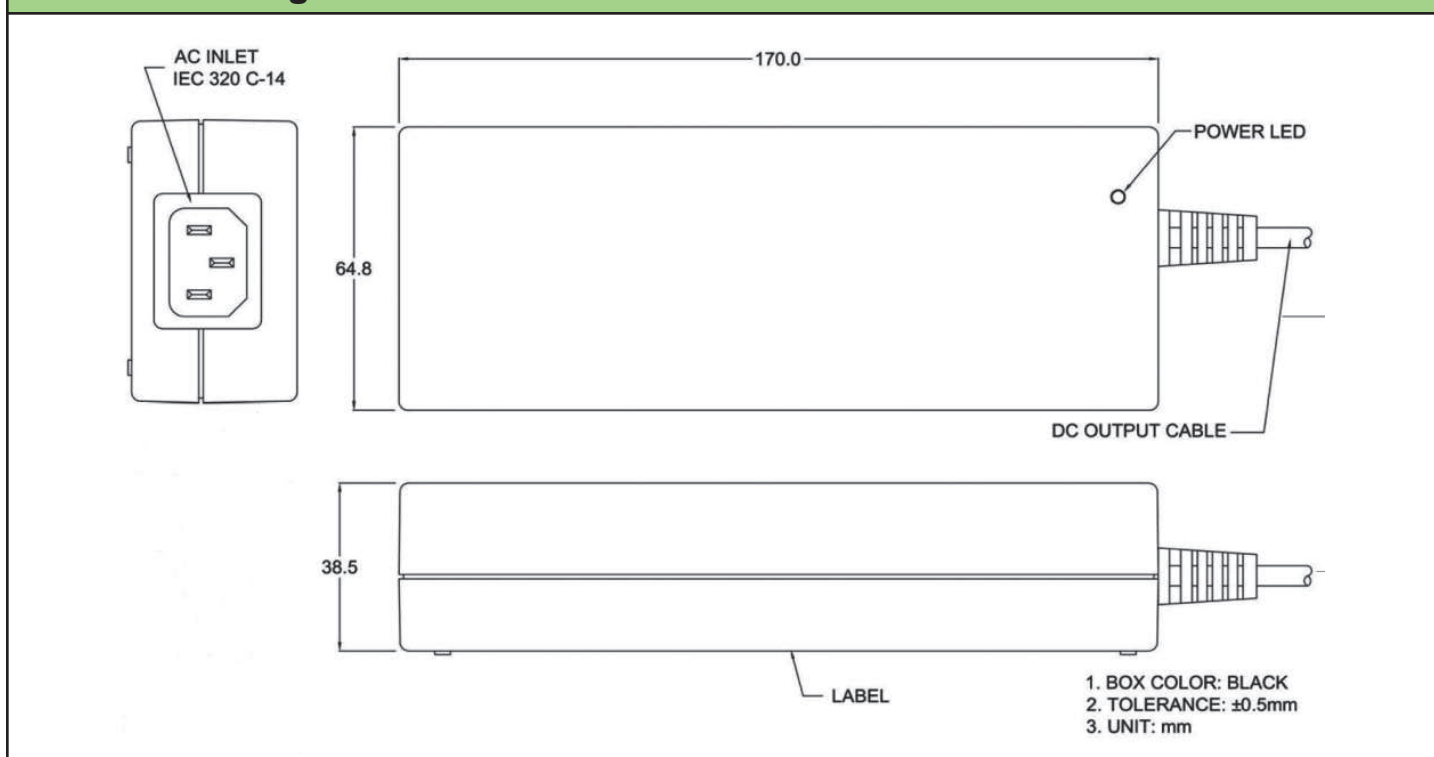
Model		DTM110PWxxx-C
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	Meets EN61000-3-2. >0.9 PF
Leakage Current (264VAC 60Hz)	μA	<300μA
Hold Up Time (Typ)	ms	>10ms
Temperature Coefficient	%/°C	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	V	None
Minimum Load	A	None
Total Regulation	%	12V to 15V Models:±5%, >15V models ±3%
Ripple & Noise	%	1%
Short Circuit Protection	-	<160% - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Efficiency	%	>87% average efficiency
Operating Temperature	°C	0 to +40°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 4kVAC (Output is connected to Ground)
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1
California Energy Commission (CEC)	-	See model selector
EISA	-	See model selector
Offload Power Consumption	W	< 0.5W
Conducted & Radiated EMI	-	EN60601-1-1-2, FCC Part 18 Class B
Immunity	-	EN55011:2007+A2:2007
Weight (Typ)	g	605g
Size (WxLxH)	Inches	2.55 x 6.7 x 1.51"
Cable Length	mm	1050mm
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)
Output Connector	-	Kycon KPPx-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	yrs	Two Years

(1) EISA - Energy Independence and Security Act of 2007

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC	EISA Efficiency Level
DTM110PW120C	12	7.5	90	V	V
DTM110PW135C	13.5	6.67	90	V	V
DTM110PW150C	15	6.67	100	V	V
DTM110PW190C	19	5.8	110	V	V
DTM110PW200C	20	5.5	110	V	V
DTM110PW240C	24	4.6	110	V	V

Outline Drawing



Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DTM65-C	40W to 65W Medical Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 150W CEC Compliant Adapters

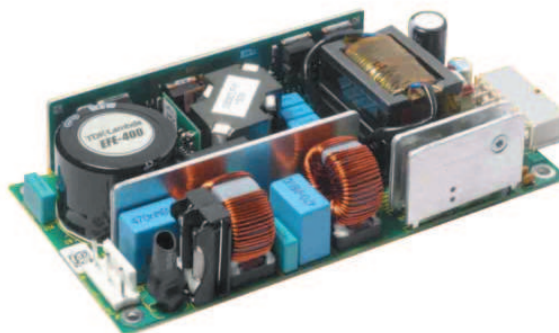
For Additional Information, please visit
us.tdk-lambda.com/lp/products/dt-c-series.htm



300W / 400W, 3 x 5" / 3 x 6" Power Supplies

Features

- ◆ High Efficiency
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ High peak loading capability
- ◆ Suitable for 1U applications
- ◆ Full Digital Control
- ◆ Low Profile



Key Market Segments & Applications



Specifications

Model		EFE300	EFE400
Input Voltage range	-	90 - 264VAC, 120 - 350VDC	
Input Frequency	-	47 - 63Hz, 440Hz with reduced PFC	
Inrush Current (3)	A	<20A	<30A
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)	
Voltage Setting Range	-	-5% to +10% (Chosen at time of ordering)	
Voltage Setting Accuracy	-	±1% at 50% load	
Total Regulation	-	< 4% with 90 - 264VAC input change and 0-100% load change	
Ripple & Noise	mV	<1.5% pk-pk	
Efficiency	-	90% typical	
Minimum Load	A	None	
Overcurrent Protection	-	Automatic recovery upon overload removal	
Overvoltage Protection	V	Cycle AC line to reset	
Overtemperature Protection	-	Yes	
Hold Up Time (Typ)	ms	>16ms at 90VAC input, 75% load	
Leakage Current (max)	mA	1.5mA at 264VAC, 63Hz	
Fan Supply	-	12V 0.25A (Available if no fan option selected)	
Remote Sense	-	None	
Operating Temperature (2)	°C	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	-	5 - 95% RH	
Cooling	-	Forced air, 2m/s from input to output (approximately 10CFM)	
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes. MIL-STD-810E, Method 516.5, Pro I, IV, V	
Shock	-	30G per IEC68-2-27, MIL-STD-810E, Method 514.4, Pro 1, Cat 1, 9.	
Safety Agency Approvals*	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, EN61010-1, IEC61010-1, CE for LVD	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14	
Conducted Emissions & Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)	
Weight (open frame or enclosed)	g	310g or 550g	430g or 650g
Size (Open frame style) (1)	in	3 x 5 x 1.34"	3 x 6 x 1.34"
Warranty	yrs	Five Years (4)	

(1) Including underside component leads

(2) -20°C cold start

(3) At 25°C, 230VAC and cold start

(4) Three years for products built before Aug 1, 2011

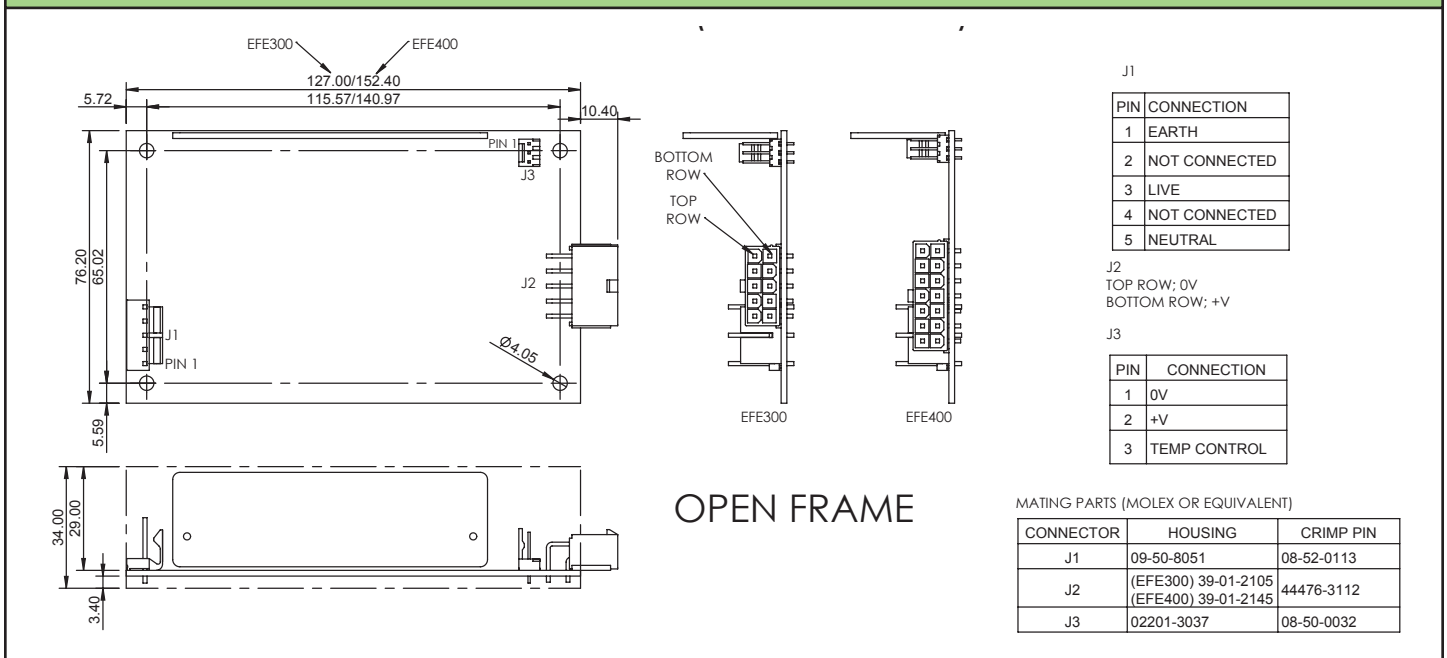
Model Selector

Product Code	Part Description	Style	Output Voltage (V)	Output Current (A)	Average Output Power (W)	Peak Output Current (A) ⁽⁵⁾	Peak Output Power (W) ⁽⁵⁾
U2Y002G	EFE300-12-CNMDs	Open Frame	12	25.0	300	33.30	400
U2Y003H	EFE300-12-ECMDS	With Fan	12	25.0	300	33.30	400
U4Y002H	EFE400-12-CNMDs	Open Frame	12	33.3	400	44.17	530
U4Y003J	EFE400-12-ECMDS	With Fan	12	33.3	400	44.17	530
U2Y005K	EFE300-24-CNMDs	Open Frame	24	12.5	300	16.70	400
U2Y006L	EFE300-24-ECMDS	With Fan	24	12.5	300	16.70	400
U4Y005L	EFE400-24-CNMDs	Open Frame	24	16.7	400	22.08	530
U4Y006M	EFE400-24-ECMDS	With Fan	24	16.7	400	22.08	530

(5) For up to 10s without exceeding Average Output Power rating

Note: The EFE300M is also available with 28V, 36V and 50V

Outline Drawing



Options

Part Description Suffix	U Chassis	Cover	Internal Fan
-CNMDS	N	N	N
-CUMDS	Y	N	N
-CCMDS	Y	Y	N
-ECMDS	Y	Y	Y

Other Industrial Products

NV Series	175 to 900W 1U power supply 1-8 outputs
ZPSA	40 to 60W 2 x 4" single output power supplies
ZWS/ZWSPAF	5 to 240W single output power supplies

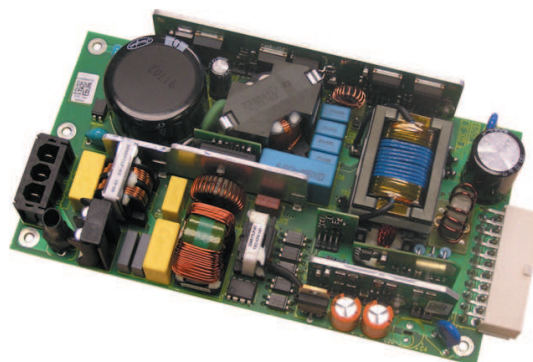
For Additional Information, please visit
us.tdk-lambda.com/lp/products/efe-series.htm



300W to 400W Medical Power Supplies

Features

- ◆ Medical Safety Certifications (BF Rated)
- ◆ Fully Featured - including ORing FET
- ◆ Universal Input (90 - 264VAC)
- ◆ Peak Loading (10s)
- ◆ Suitable for 1U applications
- ◆ Full Digital Control
- ◆ High Efficiency
- ◆ Low Profile
- ◆ Reinforced Isolation (4kVAC input to output)



Key Market Segments & Applications



Medical

Industrial

Test

COMM

Broadcast



RoHS

Specifications

Model		EFE300M	EFE400M
Input Voltage range	-	90 - 264VAC, 120 - 350VDC	
Input Frequency	-	45 - 63Hz, 440Hz with reduced PFC	
Inrush Current	A	<40A at 25°C and 230VAC input, Cold Start	
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)	
Voltage Setting	-	Setting: -5% to +10% (Chosen at time of ordering), Accuracy: +/-1% at 50% Load	
Total Regulation	-	< 4% with 90 - 264VAC input change and 0-100% load change	
Ripple & Noise	mV	< 1.5% peak-peak	
Efficiency	-	90% typical. EFE400M: 1W power draw in standby mode	
Overcurrent Protection	-	Automatic recovery upon overload removal	
Overvoltage Protection	V	Cycle AC line to reset	
Overtemperature Protection	-	Yes	
Hold Up Time (Typ)	ms	>16ms at 90VAC input, 75% load	
Leakage Current (max)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)	
Fan Supply	-	12V 1A (Available if no fan option selected)	
Standby Voltage	-	5V 2A or 12V 1A (chosen at time of ordering)	
Remote Sense	-	None	
Signals & Features	-	Remote on/off - Inhibit or Enable operation (chosen at time of ordering) Power Good - High indicates supply is good. ORing FET - Allows redundant connection of supplies	
Operating Temperature (2)	°C	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	%RH	5 - 95% RH	
Cooling	-	Forced air, 2m/s from input to output (approximately 10CFM)	
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4kVAC, Output to Ground 1500VAC	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes. MIL-STD-810E, Method 51.4, Pro I, Cat 1, 9	
Shock	-	30G per IEC68-2-27, MIL-STD-810E/F, Method 516.5, Pro I, IV, VI	
Safety Agency Approvals	-	IEC/UL/EN/CSA22.2 60601-1, IEC/EN 61010-1, IEC/UL/EN/CSA22.2 No 60950-1, CE for LVD	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)	
Weight (open frame or enclosed)	g	350g or 600g	450g or 700g
Size (Open frame style) (1)	in	3 x 6 x 1.34"	3.5 x 6.5 x 1.34"
Warranty	yrs	Five Years	

(1) Including underside component leads (2) -20°C cold start.

Model Selector

Product Code	Part Description	Style	Output Voltage (V)	Output Current (A)	Average Output Power (W)	Peak Output Current (A) ⁽³⁾	Peak Output Power (W) ⁽³⁾
U5Y0031	EFE300M12-5-ECMDL-YT	With Fan	12	25.0	300	33.30	400
U5Y0020	EFE300M12-5-HNMDL-YT	Open Frame	12	25.0	300	33.30	400
U6Y007P	EFE400M-12-5-ECMDL-YT	With Fan	12	33.3	400	44.17	475
U6Y001H	EFE400M-12-5-HNMDL-YT	Open Frame	12	33.3	400	44.17	475
U5Y0064	EFE300M24-5-ECMDL-YT	With Fan	24	12.5	300	16.70	400
U5Y0053	EFE300M24-5-HNMDL-YT	Open Frame	24	12.5	300	16.70	400
U6Y008Q	EFE400M-24-5-ECMDL-YT	With Fan	24	16.67	400	20.80	475
U6Y002J	EFE400M-24-5-HNMDL-YT	Open Frame	24	16.67	400	20.80	475
U5Y0166	EFE300M-48-5-ECMDL-YT	With Fan	48	6.25	300	8.33	350
U5Y0201	EFE300M-48-5-HNMDL-YT	Open Frame	48	6.25	300	8.33	350
U6Y009R	EFE400M-48-5-ECMDL-YT	With Fan	48	8.33	400	10.40	475
U6Y003K	EFE400M-48-5-HNMDL-YT	Open Frame	48	8.33	400	10.40	475

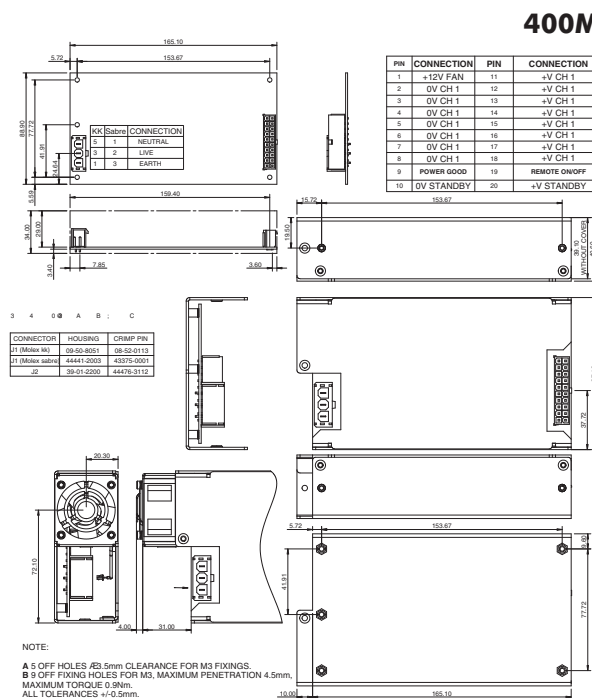
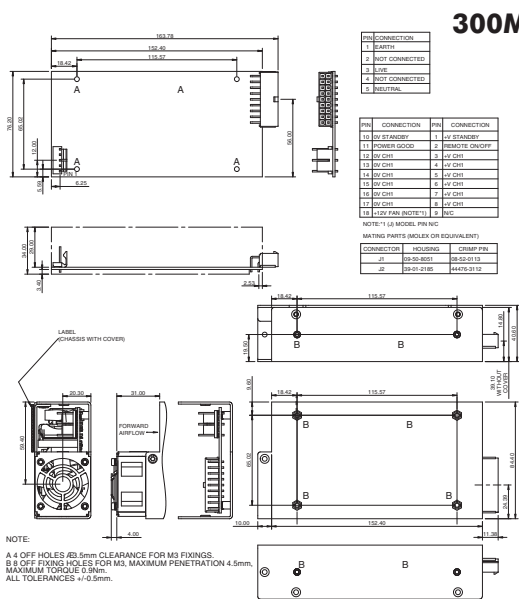
(3) For up to 10s without exceeding Average Output Power rating

Options

Additional options available. Reference detailed product data sheet on downloadable files section of web page.

Part Description Suffix	Standby “5” or “12”	U Chassis	Cover	Internal Fan	Enable or Inhibit “E” or “T”
-5-ECMDL-YT	5V 2A	Y	Y	Y	Inhibit
-5-HNMDL-YT	5V 2A	N	N	N	Inhibit

Outline Drawing



Other Medical Products

Vega Series	450 to 900W up to 10 outputs
CSS	40 to 500W Single Output
NV Series	175 to 900W 1U Power Supply 1-8 Outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/efe-series.htm



1000W Front End Power Supplies

Features

- ◆ 1U high
- ◆ Up to 3000W (3 units) in 19" rack
- ◆ Hotswap capable (ORing diodes built in)
- ◆ Low Cost
- ◆ PoE Option
- ◆ High efficiency
- ◆ Full array of signals



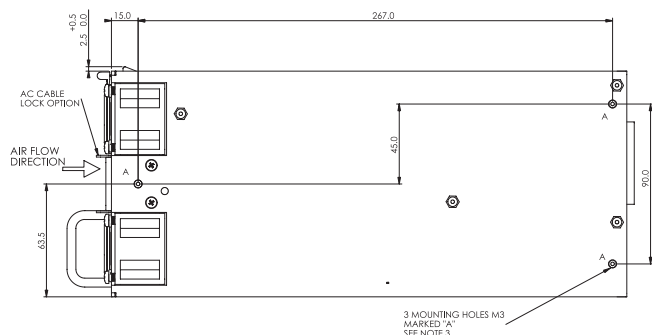
Key Market Segments & Applications



Specifications					
Model		12V Nominal	24V Nominal	32V Nominal	48V Nominal
Output Voltage Range	(1) V	10.5 - 13.2V	21.5 - 29V	28.8 - 38.4V	43 - 58V
Output Current	A	72A	40A	31A	21A
Line Regulation	%	<0.4%			
Load Regulation	%	<0.8%			
Output Noise	mV	150mV	200mV	250mV	300mV
Overvoltage Protection	V	14.3 to 15.7V	31 to 34V	41.5V to 45.5V	62 to 66V
Overcurrent Protection	-	105 - 125%, Constant Current type			
Load Sharing	-	Single wire current sharing, up to 8 units			
Remote Sense	-	Compensates for 1V on each output lead			
I2C Monitoring	-	Optional (Specify /S)			
Signals (opto isolated)	-	DC OK, AC Fail, and Overtemperature warning, high on fail			
Remote On/Off	-	On: 0 - 0.6V or short, Off: 2- 15V or open			
Auxiliary Output	A	11.2-12.5VDC 0.25A			
AC Input	-	85 - 265VAC, 47 - 63Hz ² , 120-360VDC. (Derate 10% < 100VAC)			
Leakage Current	mA	<1.1mA at 230VAC input			
Inrush Current	A	<40A			
Hold up time (100VAC input)	-	20ms typical (800W loading)			
Efficiency (typ) 100/200VAC	-	80 / 83%	83 / 86%	84 / 87%	85 / 88%
Power Factor Correction	-	EN61000-3-2 class A (20-100% load), >0.98 at full load			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -11			
EMC (conducted and radiated)	-	EN55022, level B, FCC Class B			
Operating Temperature	°C	0 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C			
Storage Temperature	°C	-30 to +85°C			
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 2kVAC, Output to Ground 500VAC for 1 min.			
Cooling	-	Two internal fans, airflow from front to back (variable speed)			
Humidity	-	Operating: 10 - 90% RH, Storage: 10 - 95% RH (non condensing)			
Shock & Vibration	-	Meets ETS 300 019			
Safety Agency	-	UL60950-1, EN60950-1 (Ed 2), CE Mark			
Input / Output Connector	-	Positronic PCIB24W9M400A1 (Mating #PCIB24W9F400A1)			
Front panel indicators	-	AC OK, DC OK, DC Fail			
Size (LxWxH)	in	Stand alone: 1.61 x 5 x 11.4"; Rack: 1.72 x 19 x 13.8"			
Weight	g	2,000			
Warranty	yrs	Two Years			

(1) Via Trim pin on output connector

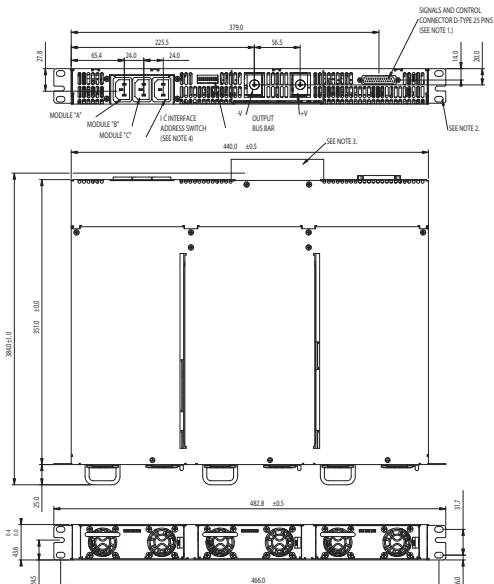
(2) 47-440Hz with reduced PFC (100-265VAC input)



Part No.	Description
FPS/Z0008511	Module Mating Connector (Positronic PCIB24W9F400A1/AA-S1031)

Suffix	Description
/POE*	1500VAC Output to Ground Isolation (Output noise 400mV)
* FPS100048 only.	

PX, CC-E, PAQ, PAH, PAF	DC-DC Converters
HFE	1U 1600-2500W Front End AC-DC



Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I ² C Interface
FPS100012/P	12V	72A	864W	No
FPS100012/PS	12V	72A	864W	Yes
FPS100024/P	24V	40A	960W	No
FPS100024/PS	24V	40A	960W	Yes
FPS100032/P	32V	31A	992W	No
FPS100032/PS	32V	31A	992W	Yes
FPS100048/P	48V	21A	1008W	No
FPS100048/PS	48V	21A	1008W	Yes
FPSS1U/P	Rack (3 slot), contains two blanking panels			
FPST1U/P	Rack with 3 individual outputs (floating)			

Rear AC Input Configuration	Output Voltage	Output Current	Maximum Power	I ² C Interface
FPS100012	12V	72A	864W	No
FPS100012/S	12V	72A	864W	Yes
FPS100024	24V	40A	960W	No
FPS100024/S	24V	40A	960W	Yes
FPS100032	32V	31A	992W	No
FPS100032/S	32V	31A	992W	Yes
FPS100048	48V	21A	1008W	No
FPS100048/S	48V	21A	1008W	Yes
FPSS1U	Rack (3 slot), contains two blanking panels			
FPST1U	Rack with 3 individual outputs (floating)			

Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I ² C Interface
FPS300024/P	24V	120A	2880W	No
FPS300024/PS	24V	120A	2880W	Yes
FPS300048/P	48V	63A	3000W	No
FPS300048/PS	48V	63A	3000W	Yes

Front AC Input configuration. Remove /P suffix for Rear AC configuration.

For Additional Information, please visit
us.tdk-lambda.com/lp/products/fps-series.htm



Single Output 250 & 500W Power Supplies

Features

- ◆ High Efficiency, up to 93%
- ◆ 1.6" high (For 1U racking)
- ◆ Wide Range AC Input
- ◆ 250W Convection Cooled
- ◆ Five year warranty



Key Market Segments & Applications



GWS500 Shown



Specifications			
Model		GWS250	GWS500
AC Input Voltage (300VAC for 5s)	VAC	85 - 264VAC	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage	VDC	120 - 373VDC	
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC	
Power Factor (1)	-	Meets EN61000-3-2 (Typical PF 0.98/0.95)	
Input Current (115/230VAC)	A	3.0 / 1.4	5.5 / 2.7 (4.5 / 2.3 for 5V model)
Temperature Coefficient	°C	<0.02%/°C (0 - 50°C)	
Overcurrent Protection	-	>105% of nominal or >101% of peak. 5V-12V hiccup style, 24V-48V Constant current style	
Overvoltage Protection (2)	V	5V: 5.75 - 6.75V, 7.5V: 8.6 - 10.1V, 12V: 13.8 - 16.2V/24V: 30.3 - 35.5V, 36V: 41.4 - 48.6V, 48V: 60 - 69.6V	
Overtemperature Protection (2)	-	Yes	
Hold Up Time (115 / 230V input)	ms	16ms (12ms for GWS500-5, -7.5)	
Leakage Current (230VAC 60Hz)	mA	<0.75mA	
Remote Sense	-	No	Yes
Remote On/Off	-	Active Low	
Standby Input Power Draw	W	<0.5W	
5V Standby (always on)	-	5V 0.3A	
DC Good	-	DC Good, open collector signal, High on Fail	
LED Indicator	-	Green LED = On	
Output Remote Programming	-	See installation manual for details	
Operating Temperature	°C	-25 to +70°C. Derate linearly to 50% load from +50 to +70°C	-25 ⁽³⁾ to +70°C. Derate linearly to 50% load from +50 to +70°C
Storage Temperature	°C	-30 to +85°C	
Operating Humidity	-	30 - 90% RH (non condensing)	
Storage Humidity	-	10 - 95% RH (non condensing)	
Cooling	-	Convection	Internal fan
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC ⁽⁴⁾ for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s ² (20G)	
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv 3), -6 (lv 3), -8 (lv 4), -11	
Safety Agency Approvals	-	UL60950-1, CSA C22.2 No 60950-1-07 (cUL), EN60950-1 2nd Edition, IEC60950-1, CE Mark	
Conducted & Radiated EMI	-	EN55022-B, FCC-B	
Weight (Typ)	g	850	1020
Size (LxWxH)	in	7.8 x 4.1 x 1.61"	8.6 x 4.1 x 1.61"
Warranty	yrs	Five Years	

(1) 115 / 230VAC input

(2) Recycle AC, or use remote on/off to reset

(3) Guaranteed start up at -40°C

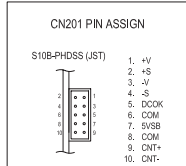
(4) 500VDC for GWS500

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max Current (A)	Peak Curr. <10s, <35% DC (A)	Load Reg. (mV)	Line Reg. (mV)	Ripple Noise (mV)	Efficiency (typ) % (230VAC)
GWS500-5	5V	4.5 - 5.5	80	-	50	25	150	84
GWS500-7.5	7.5V	6.75 - 8.25	67.2	-	70	35	150	87
GWS250-12	12V	10.8 - 13.2	21	-	96	48	150	92
GWS500-12	12V	10.8 - 13.2	42	-	96	48	150	89
GWS250-24	24V	22 - 28.8	10.5	12.5	192	96	240	92
GWS500-24	24V	22 - 28.8	21	25.0	192	96	150	90
GWS250-36	36V	32 - 40	7	8.4	288	144	360	93
GWS500-36	36V	32 - 40	14	16.7	288	144	200	90
GWS250-48	48V	42 - 57.6	5.3	-	384	192	480	93
GWS500-48	48V	42 - 57.6	10.5	-	384	192	300	90

GWS500 Outline Drawing

SIGNAL CONNECTOR INFORMATION



SIGNAL CONNECTOR USED

PART DESCRIPTION	PART NAME	MANUFACT
PIN HEADER	S10B-PHDSS(LF)(SN) (CN201)	JST

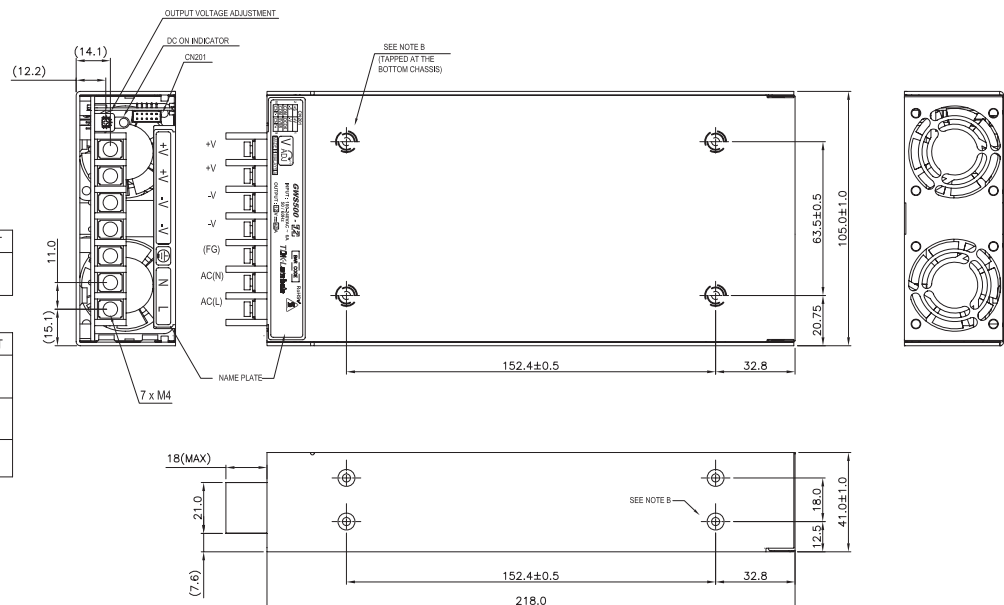
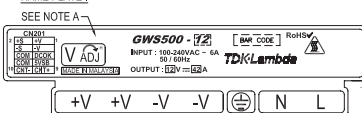
MATCHING HOUSINGS, PIN & TOOL

PART DESCRIPTION	PART NAME	MANUFACT
SOCKET HOUSING	PHDR-10VS (CN201)	JST
TERMINAL PINS	SPHD-002T-P05(AWG28-24) SPHD-001T-P05(AWG26-22)	JST
HAND CRIMPING TOOL	YRS-620(SPHD-002T-P0.5) YC-610R(SPHD-001T-P0.5)	JST

==ACCESSORIES==

* SHORT PIECE -----1
SHORTING +V ---+S, -V ---S, CNT+ ---CNT-
(ATTACHED ON CN201 AT SHIPMENT)

NAME PLATE :



NOTES

A. MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT & COUNTRY OF MANUFACTURE ARE SHOWN IN ACCORDANCE WITH THE SPECIFICATION.
B. M4 TAPPED, EMBOSSED & COUNTERSUNK HOLES (8) FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 5mm.

Other Industrial Products

LS25 - 200	25W to 200W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300W to 1000W single output
CSS500	360W to 500W medical

For Additional Information, please visit
us.tdk-lambda.com/lp/products/gws-series.htm



1600W 1U Front End Power Supplies

Features

- ◆ 1U rackmount containing up to 5 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 7600W in 1U rack
- ◆ Full array of signals available



Key Market Segments & Applications



Specifications

Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 100/230VAC	A	14.2 / 8.1A
Inrush Current	A	<35A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 120%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold up time	ms	>10ms, 100/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA 100/230VAC, 60Hz
Remote Sense Compensation	-	HFE1600-12: 0.5V/wire, HFE1600-24, -48: 1V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, 90% accuracy, up to 10 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I2C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temp. (-TB Rack)	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Operating Temp. (-IEC320 Rack)	°C	-10 to +60°C, derate 2%/°C from 50 to 60°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE1600-12,-24V 500VAC, HFE1600-48 1.5kVAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1 (Listed), EN60950-1, CE Mark
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 3.35 x 1.61 x 11.8", Rack: 17.5 x 1.72 x 14.4"
Weight	g	Power Supply: 1550g, Rack: 4800g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods

(2) Derate output power linearly 1%/V from 100VAC to 85VAC input

Model	Output Voltage	Adjust Range ⁽¹⁾	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) ⁽²⁾	Max Power (100<Vin<170VAC) ⁽²⁾
HFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-24/S	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-48	48V	38.4 - 58V	33A	1584W	25A	1200W
HFE1600-48/S	48V	38.4 - 58V	33A	1584W	25A	1200W
Model	Load Reg	Line Reg	Ripple & Noise ⁽¹⁾	Efficiency (%) ⁽³⁾	I ² C	
HFE1600-12	60mV	30mV	240mV	87 / 90%	-	
HFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes	
HFE1600-24	120mV	60mV	240mV	88 / 90%	-	
HFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes	
HFE1600-48	240mV	120mV	480mV	89 / 92%	-	
HFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes	

Accessories		
Model	Description	Maximum Rack Current
HFE1600-S1U	Five slot 19" rack, IEC320-C16 input connectors (5)	200A each side (400A total)
HFE1600-S1U-TB	Five slot 19" rack, Terminal Block input connectors (5)	200A each side (400A total)
HFE1600/BP	One slot blanking panel, three provided with each rack	-
HFE/C15U	AC Power cord, 2.0m long, one per power supply required	

FRONT VIEW

Dimensions: 85.0 ± 0.5 , 211.6, 42.2, 20.4, 40.0 ± 0.2 , 22.2 ± 0.2 , 86.2 ± 0.5 .

Callouts: SEE NOTE 2, POWER SUPPLY LOCKING.

REAR VIEW

Dimensions: 121, 43.0.

Callout: IN/OUT CONNECTOR SEE NOTE 1.

SIDE VIEW

Dimensions: 320.4 ± 1.0 , 311.0 ± 1.0 , 300.0 ± 0.5 , 9.4, 28.2 ± 0.5 , 43.0, 252.0 ± 0.5 .

Callouts: MOUNTING HOLES M4 MARKED "M", 7 MOUNTING HOLES EACH SIDE.

The drawing consists of two main views: a front elevation and a side elevation. The front elevation shows a rack with six vertical bays, each containing a horizontal chassis. The side elevation shows the depth of the rack and the internal components of the chassis. Dimensions are provided in inches and millimeters. Callouts include 'KEY HOLES FOR MOUNTING BRACKETS', 'PUBLIC ADDRESS (P.A.) SYSTEM', 'OUTPUT BUS BAR', 'MICRO KEY FOR DIFFERENT OUTPUT VOLTAGE MODELS', and 'HOLE FOR BLANK PANEL MOUNTING'. Notes 1 through 6 provide additional instructions for installation and use.

FRONT VIEW DIMENSIONS:

- Overall width: 48.0" ±0.0
- Overall height: 17.0" ±0.0
- Bay width: 8.0" ±0.0
- Bay spacing: 0.5" ±0.0
- Chassis height: 16.0" ±0.0
- Chassis spacing: 0.5" ±0.0
- Chassis width: 46.0" ±0.0

SIDE VIEW DIMENSIONS:

- Overall depth: 18.0" ±0.0
- Chassis depth: 16.0" ±0.0
- Chassis spacing: 0.5" ±0.0
- Chassis width: 46.0" ±0.0

NOTES:

1. MEASURING HOLES FOR BRACKETS OF RACK USE HOLE LOCATIONS TO FIT THE UNIT TO A RACK.
2. USE INSULATED WIREBAND AND SPRING WASHER FOR LOAD WIRE FROM UNIT TO RACK.
3. USE INSULATED WIREBAND AND SPRING WASHER FOR LOAD WIRE FROM UNIT TO RACK.
4. HOLE FOR BLANK PANEL MOUNTING.
5. HOLE FOR BLANK PANEL MOUNTING.
6. THE USE OF THE RACK IS SHOWN WITH A PREFERRED UNIT INSTALLED.



2500W 1U Front End Power Supplies

Features

- ◆ 1U rackmount containing up to 4 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 9,500W in 1U rack



Key Market Segments & Applications



(HFE2500-48 model)

Specifications

Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 100/230VAC	A	15 / 12A
Inrush Current	A	<50A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 115%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold-up time	ms	>10ms, 115/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA, 100 / 230VAC, 60Hz
Remote Sense Compensation	-	HFE2500-12: 0.25V / Wire, HFE2500-24: 0.5V / Wire, HFE2500-48: 1V / Wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, 95% accuracy, up to 8 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I2C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE2500-12, -24V 500VAC, HFE2500-48 1.5kVAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1 (Listed), EN60950-1, CE Mark
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv 2), -5 (lv 3,4), -6 (lv 2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 4.21 x 1.61 x 12.8", Rack: 17.5 x 1.72 x 15.8"
Weight	g	Power Supply: 2100g, Rack: 5000g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods

(2) Derate linearly 1.3%/V from 100VAC to 85VAC input

Model Selector

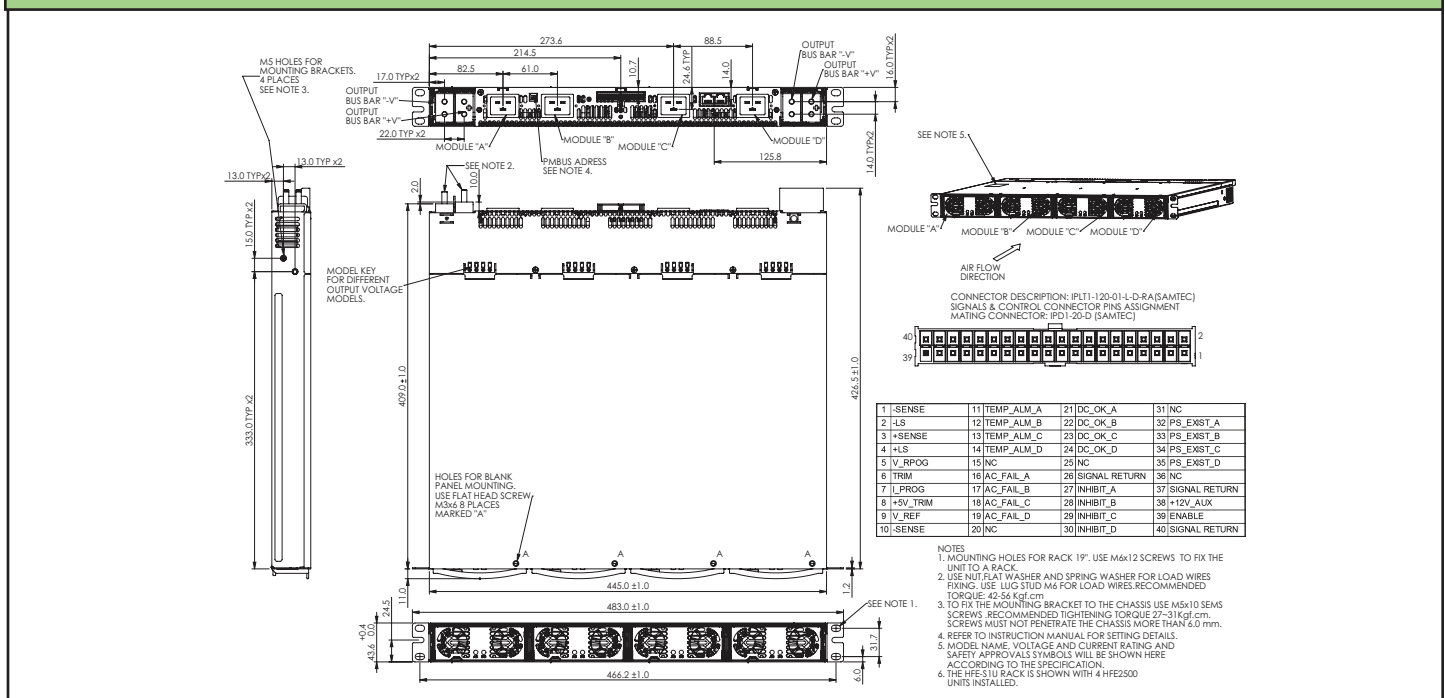
Model	Output Voltage	Adjust Range ⁽¹⁾	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) ⁽²⁾	Max Power (100<Vin<170VAC) ⁽²⁾
HFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-24	24V	19.2 - 29V	104A	2496W	62A	1488W
HFE2500-24/S	24V	19.2 - 29V	104A	2496W	62A	1488W
HFE2500-48	48V	38.4 - 58V	52A	2496W	31A	1488W
HFE2500-48/S	48V	38.4 - 58V	52A	2496W	31A	1488W
Model	Load Reg	Line Reg	Ripple & Noise ⁽¹⁾	Efficiency (%) ⁽³⁾	I ² C	
HFE2500-12	60mV	30mV	240mV	90 / 92%	-	
HFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes	
HFE2500-24	120mV	60mV	240mV	90 / 92%	-	
HFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes	
HFE2500-48	240mV	120mV	480mV	91 / 93%	-	
HFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes	

(3) At 75% load, 100 / 230VAC input

Accessories

Model	Description	Maximum Rack Current
HFE2500-S1U	Four slot 19" rack, IEC320-C20 input connector	320A each side (640A total)
HFE2500-S1U-TB	Four slot 19" rack, Terminal Block input connector	320A each side (640A total)
HFE2500/BP	One slot blanking panel, two provided with each rack	-

Outline HFE2500S1U



For Additional Information, please visit
us.tdk-lambda.com/lp/products/hfe-series.htm



Single Output 115VAC Input Industrial Power Supplies

Features

- ◆ 3 Year Warranty
- ◆ Small size
- ◆ Approved to UL & CSA (cUL)
- ◆ 85 - 132VAC Input, 47-440Hz
- ◆ $\pm 10\%$ output adjustment
- ◆ Adjustment potentiometer
- ◆ Low profile

Key Market Segments & Applications



Specifications								
Model		HK10A		HK15A	HK25A	HK50A	HK100A	HK150A
Input Voltage range	-	85 - 132VAC (47 - 440Hz) or 110 - 175VDC						
Inrush Current (100VAC)	A	20	30	15	30	15	15	
Temperature Coefficient (Typ)	-	1% (over operating temperature range)						
Overcurrent Protection	-	>105%						
Overvoltage Protection	%	>115% (Zener clamp)			115 to 135%			
Hold Up Time (Typ at 100VAC)	ms	20						
Remote Sense	-	No				Yes		
LED Indicator	-	Green LED = On						
Operating Temp (no cover) (1)	-	0°C to +60°C, derate linearly to 50% load from 50°C to 60°C						
Operating Temp (w/ cover) (1)	-	0°C to +50°C, derate linearly to 50% load from 40°C to 50°C						
Storage Temperature	-	-30 to +85°C						
Operating Humidity	-	30 - 90% RH (non condensing)						
Storage Humidity	-	10 - 95% RH (non condensing)						
Cooling	-	Convection cooled						
Withstand Voltage	-	I/P to Grnd, I/P to O/P 2kVAC (20mA), O/P to Grnd 500VAC (100mA) for 1 min.						
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC						
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour						
Shock	-	< 196.1 m/s ²						
Safety Agency Approvals	-	UL60950-1, CSA C22.2 No. 60950-1 (cUL)						
Conducted & Radiated EMI	-	FCC Class B, VCCI-B						
Recommended EMI Filter	-	RSEL-20R5W	RSEL-2001W		RSEL-2002W	RSEN-2006		
Weight (Typ)	g	150	170	230	280	540	650	
Size (WxHxD)	in	2.83x2.83x1.02	2.83x3.31x1.08	2.83x3.9x1.26	2.83x4.69x1.38	3.66x5.91x1.52	3.66x6.69x1.85	
Warranty	-	Three Years						

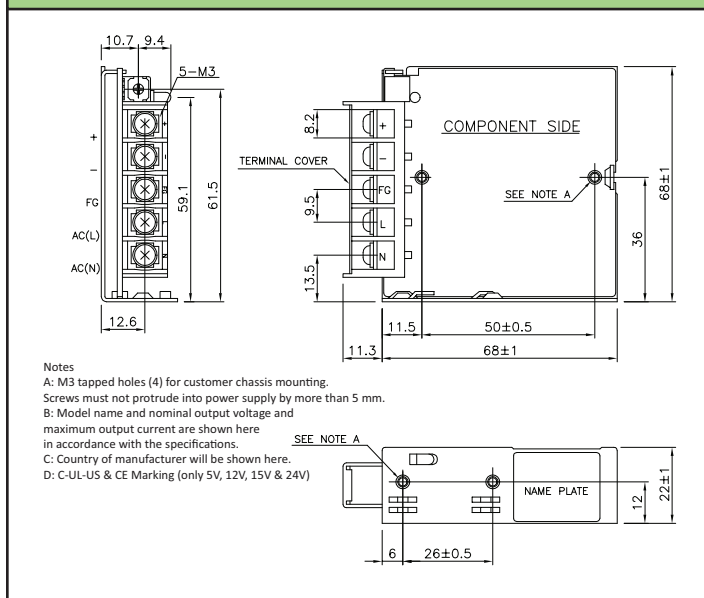
(1) Vertical mount as photo, HK100A & HK150A models operate to -10°C

See installation manual for full details, test methods of parameters and application notes

Model Selector

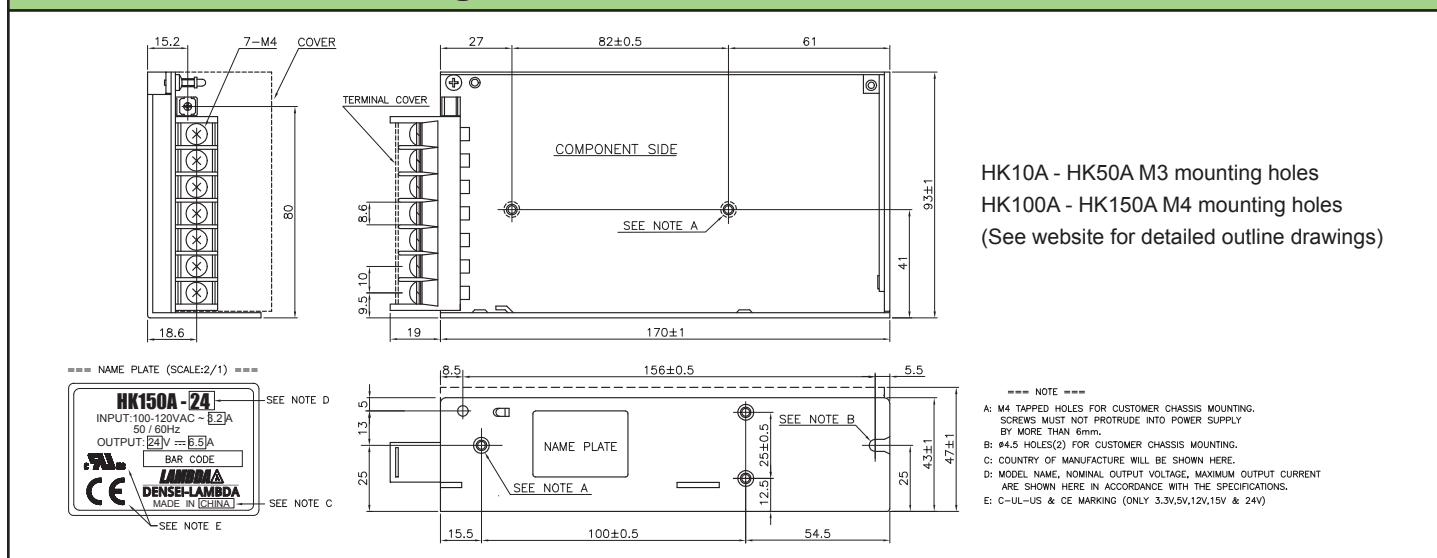
Model	Voltage	Adjust Range	Max Curr.	Load Reg mV	Line Reg mV	Ripple Noise	Eff. (typ)%
HK10A-5/A	5	4.5 - 5.5	2.0	40	20	120	71
HK15A-5/A	5	4.5 - 5.5	3.0	40	20	120	69
HK25A-5/A	5	4.5 - 5.5	5.0	40	20	120	72
HK50A-5/A	5	4.5 - 5.5	10.0	40	20	120	79
HK100A-5/A	5	4.5 - 5.5	20.0	40	20	120	80
HK150A-5/A	5	4.5 - 5.5	30.0	40	20	120	80
HK10A-12/A	12	10.8 - 13.2	0.9	96	48	150	73
HK15A-12/A	12	10.8 - 13.2	1.3	96	48	150	74
HK25A-12/A	12	10.8 - 13.2	2.1	96	48	150	76
HK50A-12/A	12	10.8 - 13.2	4.2	96	48	150	81
HK100A-12/A	12	10.8 - 13.2	8.5	96	48	150	81
HK150A-12/A	12	10.8 - 13.2	12.5	96	48	150	81
HK10A-15/A	15	13.5 - 16.5	0.7	120	60	150	74
HK15A-15/A	15	13.5 - 16.5	1.0	120	60	150	75
HK25A-15/A	15	13.5 - 16.5	1.7	120	60	150	77
HK50A-15/A	15	13.5 - 16.5	3.4	120	60	150	82
HK100A-15/A	15	13.5 - 16.5	7.0	120	60	150	81
HK150A-15/A	15	13.5 - 16.5	10.0	120	60	150	81
HK10A-24/A	24	21.6 - 26.4	0.5	150	96	150	78
HK15A-24/A	24	21.6 - 26.4	0.7	150	96	150	77
HK25A-24/A	24	21.6 - 26.4	1.1	150	96	150	80
HK50A-24/A	24	21.6 - 26.4	2.2	150	96	150	84
HK100A-24/A	24	21.6 - 26.4	4.5	150	96	150	82
HK150A-24/A	24	21.6 - 26.4	6.5	150	96	150	82

HK-10A Outline Drawing



Derate to 80% load from 0 to -10°C

HK-150A Outline Drawing



Sample Configurations

Suffix	Description
Blank	No cover (Special order)
/A	With cover (Standard US stock)
LDIN30	DIN Rail Mounting Bracket (Sold Separately)

Other Industrial Products

HWS	15W to 1500W Single output 85-265VAC
DLP/DPP/DSP	10W to 480W DIN rail mount 85-265VAC
ZWS	5W to 150W pcb style single output 85-265VAC
VSBI/VSC	10W to 150W pcb style single output 85-132VAC

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hka-series.htm



Single Output Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Wide Range AC Input



Key Market Segments & Applications



Specifications							
Model		HWS15		HWS30	HWS50	HWS100	HWS150
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC					
Input Current (Typ)	(1) A	0.4 / 0.2	0.8 / 0.4	0.7 / 0.35	1.3 / 0.65	1.9 / 0.95	
Inrush Current	(1) A	14 / 28					
Power Factor	-	Meets EN61000-3-2					
Temperature Coefficient	-	<0.02%/°C					
Overcurrent Protection	-	>104%					
Overvoltage Protection	V	Yes (See page 2)					
Hold Up Time (Typ)	ms	20					
Leakage Current (max)	mA	<0.5mA (Typ 0.3mA at 100VAC, 0.5mA at 230VAC)					
Remote Sense	-	No			Yes		
Indicator	-	Green LED = ON					
Operating Temperature (no cover)	°C	-10°C to +70°C, derate linearly to 20% load from 50°C to 70°C ⁽²⁾					
Storage Temperature	°C	-30 to +85°C					
Humidity (non condensing)	-	Operating: 30 - 90%RH, Non operating 10 - 95%RH					
Cooling	-	Convection					
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.					
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC					
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour					
Shock	-	< 196.1m/s ²					
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark ⁽³⁾					
Line Dip	-	Complies with SEMI F47 (200VAC line only)					
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B					
Recommended EMI Filter	-	RSEL-2001W			RSEL-2002W	RSEL-2003W	
Immunity	-	IEC61000-4-2 (Level 3,2), -3, -4, -5, -6 (Level 3), -8, -11 (Level 4)					
Weight (Typ)	g	180	220	280	450	500	
Size (WxHxD)	in	1.04x3.23x3.15	1.04x3.23x3.74	1.04x3.23x4.72	1.1x3.23x6.3	1.46x3.23x6.3	
Size (WxHxD) /A version		1.24x3.23x3.15	1.24x3.23x3.74	1.24x3.23x4.72	1.3x3.23x6.3	1.65x3.23x6.3	
Warranty	-	Limited lifetime warranty (See Lambda's terms & conditions)					

(1) 100/200VAC

(2) -40°C Start up, see options table

(3) UL60601-1, EN60601-1, see options table

Output Ratings

Model	Voltage	Adjust Range	Max Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Over voltage V	Eff. typ % (1)
HWS15-3/A	3.3V	2.97 - 3.96	3	40	20	120	4.13-4.95	68/71
HWS30-3/A	3.3V	2.97 - 3.96	6	40	20	120	4.13-4.95	70/73
HWS50-3/A	3.3V	2.97 - 3.96	10	40	20	120	4.13-4.95	76/78
HWS100-3/A	3.3V	2.97 - 3.96	20	40	20	120	4.13-4.95	78/81
HWS150-3/A	3.3V	2.97 - 3.96	30	40	20	120	4.13-4.95	78/81
HWS15-5/A	5V	4.0 - 6.0	3	40	20	120	6.25-7.25	77/79
HWS30-5/A	5V	4.0 - 6.0	6	40	20	120	6.25-7.25	77/80
HWS50-5/A	5V	4.0 - 6.0	10	40	20	120	6.25-7.25	82/84
HWS100-5/A	5V	4.0 - 6.0	20	40	20	120	6.25-7.25	83/86
HWS150-5/A	5V	4.0 - 6.0	30	40	20	120	6.25-7.25	83/86
HWS15-12/A	12V	9.6 - 14.4	1.3	96	48	150	15-17.4	80/81
HWS30-12/A	12V	9.6 - 14.4	2.5	96	48	150	15-17.4	81/83
HWS50-12/A	12V	9.6 - 14.4	4.3	96	48	150	15-17.4	81/83
HWS100-12/A	12V	9.6 - 14.4	8.5	96	48	150	15-17.4	83/86
HWS150-12/A	12V	9.6 - 14.4	13	96	48	150	15-17.4	83/86
HWS15-15/A	15V	12.0 - 18.0	1	120	60	150	18.8-21.8	80/81
HWS30-15/A	15V	12.0 - 18.0	2	120	60	150	18.8-21.8	81/83
HWS50-15/A	15V	12.0 - 18.0	3.5	120	60	150	18.8-21.8	81/83
HWS100-15/A	15V	12.0 - 18.0	7	120	60	150	18.8-21.8	83/86
HWS150-15/A	15V	12.0 - 18.0	10	120	60	150	18.8-21.8	83/86
HWS15-24/A	24V	19.2 - 28.8	0.65	192	96	200	30-34.8	82/83
HWS30-24/A	24V	19.2 - 28.8	1.3	192	96	200	30-34.8	83/86
HWS50-24/A	24V	19.2 - 28.8	2.2	192	96	150	30-34.8	82/84
HWS100-24/A	24V	19.2 - 28.8	4.5	192	96	150	30-34.8	84/87
HWS150-24/A	24V	19.2 - 28.8	6.5	192	96	150	30-34.8	85/88
HWS15-48/A	48V	38.4 - 52.8	0.33	384	192	200	55.2-64.8	80/80
HWS30-48/A	48V	38.4 - 52.8	0.65	384	192	200	55.2-64.8	82/83
HWS50-48/A	48V	38.4 - 52.8	1.1	384	192	200	55.2-64.8	83/85
HWS100-48/A	48V	38.4 - 52.8	2.1	384	192	200	55.2-64.8	84/87
HWS150-48/A	48V	38.4 - 52.8	3.3	384	192	200	55.2-64.8	85/88

Options

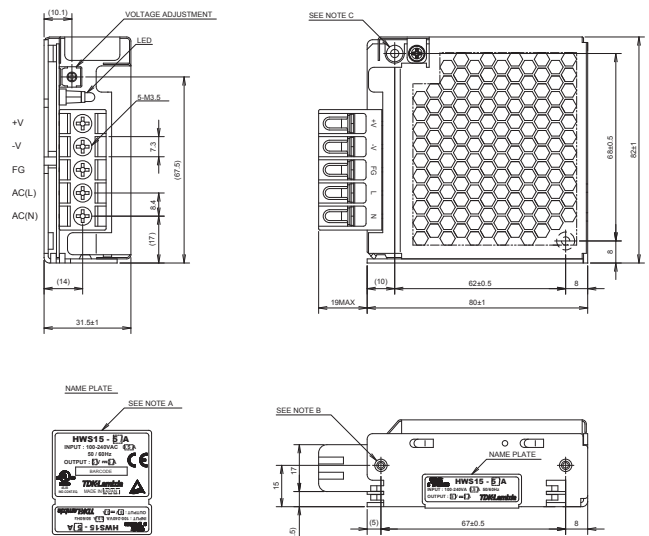
Suffix	Description
Blank	Screw terminals, no cover
/A	Screw terminals, cover
/R	Remote on/off (50-150W only)
/HD	See HWS50-1500/HD Datasheet for details. -40 to +71(74)°C operation, conformally coated PCBs
/ME	See HWS30-1500/ME Datasheet for details. UL60601-1, EN60601-1 medical approvals

Example: HWS50-24/RA

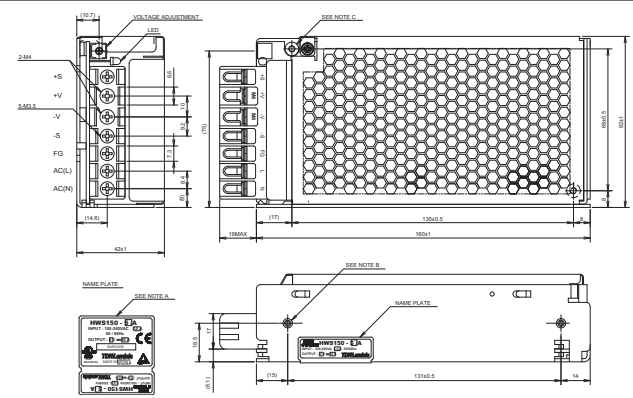
Other Industrial Products

HWS300-1800	300 to 1800W
LZSA	500W to 1500W Single output
DPP, DLP & DSP	10W to 480W DIN Rail Mount

HWS15 Outline Drawing



HWS150 Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



Single Output Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Class 1 Div 2 option (/RY suffix)
- ◆ Wide Range AC Input



Key Market Segments & Applications



Specifications					
Model		HWS300	HWS600	HWS1000	HWS1500
Input Voltage range (47-63Hz)	-	85 - 265VAC or 120 - 330VDC (6)			
Input Current (Typ) (1)	A	5V: 3.8/1.9; 12-48V: 4.2/2.1	5V: 7.5/3.6; 12-48V: 8.1/3.9	3.3V: 9.6/5.0; 5-60V: 13.5/7.0	3.3V: 15.0/8.0; 5-60V: 19.5/10.0
Inrush Current (1)	A	20 / 40			
Power Factor	-	Meets EN61000-3-2			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection	-	>105% (>101% of peak current for peak current capable models)			
Overvoltage Protection	V	See table on page 2 (Recycle AC or remote on/off to reset)			
Hold Up Time (Typ)	ms	20			
Leakage Curr. (at 240VAC, 60Hz)	mA	<0.75mA		<1.2mA	<1.5mA
Remote Sense	-	Yes			
Indicator	-	Green LED = ON			
Remote on/off	-	Yes (Isolated from output)			
Parallel operation	-	Single wire connection (up to 5 units)			
DC Good	-	Yes			
Remote Adjust (PV)	-	External voltage adjusts output, see options table			
Operating Temperature	-	-10°C to +70°C, derate linearly to 50% load from 50C to 70C (2, 3)			
Storage Temperature	°C	-30 to +85°C			
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH			
Cooling	-	Internal fan			
Withstand Voltage (4)	-	Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s ²			
Safety Agency Certifications (5)	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark			
Line Dip	-	Complies with SEMI F47 (200VAC line only)			
Conducted & Radiated EMI	-	EN55011 / EN55022, FCC VCCI (HWS300, 600 & 1000: Class B, HWS1500: Class A)			
Immunity	-	IEC61000-4-2, -3, -4, -6 (Level 3), -5, -8 (Level 4), -11			
Weight (Typ)	g	1,000	1,600	3,200	3.3-7.5V: 4000; 12V+: 3800
Size (WxHxD)	in	2.4 x 3.23 x 6.5"	3.94 x 3.23 x 6.5"	5 x 3.25 x 9.45"	5 x 3.25 x 11"
Warranty	yrs	Limited lifetime warranty (See TDK-Lambda's terms and conditions)			

(1) 100/200VAC

(2) HWS start up -20°C. (-40°C see options table)

(3) HWS1000/1500 with 85VAC input: See installation manual

(4) 2kVAC HWS1000/1500 Input to ground

HWS1000: -10 to +71°C. HWS1000-5, HWS1500-3, -5 derate linearly above 40°C

(5) UL60601-1, EN60601-1, see options.

UL508; HWS300/600 5V, 12V, 24V & 48V models

(6) Not on HWS1500/ME, /HD or /RY versions

(*) Class 1 Div 2 option (/RY suffix)

Output Ratings

Model	Voltage V	Adjust Range V(3)	Max Curr. A	Peak Curr. A(2)	Max. Pwr. W	Load Reg mV	Line Reg mV	Ripple Noise mV	Over- voltage V	Eff. typ % (1)
HWS300-3	3.3V	2.64 - 3.96	60	-	198	30	20	120	4.13 - 4.95	74/77
HWS600-3	3.3V	2.64 - 3.96	120	-	396	30	20	120	4.13 - 4.95	75/78
HWS1000-3	3.3V	2.64 - 3.96	200	-	660	40	20	120	4.13 - 4.62	71/73
HWS1500-3	3.3V	2.64 - 3.96	300	-	990	60	36	150	4.12 - 4.62	72/75
HWS300-5	5V	4 - 6	60	-	300	30	20	120	6.25 - 7.25	79/82
HWS600-5	5V	4 - 6	120	-	600	30	20	120	6.25 - 7.25	80/83
HWS1000-5	5V	4 - 6	200	-	1000	40	20	120	6.25 - 7.0	76/78
HWS1500-5	5V	4 - 6	300	-	1500	60	36	150	6.25 - 7.0	77/81
HWS1000-6	6V	4.8 - 7.2	167	-	1002	60	36	150	7.5 - 8.4	79/81
HWS1500-6	6V	4.8 - 7.2	250	300	1500	60	36	150	7.5 - 8.4	79/82
HWS1000-7	7.5V	6 - 9V	134	160	1005	60	36	150	9.38 - 10.5	80/82
HWS1500-7	7.5V	6 - 9V	200	240	1500	60	40	150	9.37 - 10.5	81/83
HWS300-12	12V	9.6 - 14.4	27	-	324	96	48	120	15 - 17.4	80/83
HWS600-12	12V	9.6 - 14.4	53	-	648	96	48	120	15 - 17.4	80/83
HWS1000-12	12V	9.6 - 14.4	88	100	1056	100	48	150	15 - 17.4	83/85
HWS1500-12	12V	9.6 - 14.4	125	-	1500	72	48	150	15 - 17.4	82/85
HWS300-15	15V	12 - 18	22	-	330	120	60	150	18.8 - 21.8	82/85
HWS600-15	15V	12 - 18	43	-	645	120	60	150	18.8 - 21.8	82/85
HWS1000-15	15V	12 - 18	70	80	1050	120	60	150	18.8 - 21.8	83/85
HWS1500-15	15V	12 - 18	100	-	1500	90	60	150	18.7 - 21.8	83/87
HWS300-24	24V	19.2 - 28.8	14	16.5	336	192	96	150	30 - 34.8	82/85
HWS600-24	24V	19.2 - 28.8	27	31	648	192	96	150	30 - 34.8	82/85
HWS1000-24	24V	19.2 - 28.8	44	50	1056	150	96	150	30 - 34.8	85/87
HWS1500-24	24V	19.2 - 28.8	65/70 (1)	105	1560	144	96	200	30 - 34.8	84/88
HWS1000-36	36V	28.8 - 43.2	29.3	33.3	1055	150	144	200	45 - 49.7	85/88
HWS1500-36	36V	28.8 - 43.2	42/46.5 (1)	70	1512	150	144	200	45 - 49.7	84/88
HWS300-48	48V	38.4 - 52.8	7	-	336	384	192	200	55.2 - 64.8	82/85
HWS600-48	48V	38.4 - 52.8	13	-	624	384	192	200	55.2 - 64.8	82/85
HWS1000-48	48V	38.4 - 52.8	22	25	1056	300	192	200	55.2 - 64.8	86/88
HWS1500-48	48V	38.4 - 52.8	32	-	1536	288	192	200	55.2 - 64.8	86/90
HWS1000-60	60V	48 - 66	17.6	20	1056	360	240	400	69 - 75	85/88
HWS1500-60	60V	48 - 66	25.6/28 (1)	42	1536	360	240	400	69 - 75	86/90

Notes

(1) 100/200VAC

(2) 200-265VAC Input, 10s maximum on time with 35% duty cycle

(3) Use program input (PV) to adjust from 20-120% of nominal (20-110% for 48V models)

Options

Suffix	Description
Blank	HWS300-1500 the cover is fitted as standard
/A	Not Applicable
/PV	HWS300-1500 the cover is fitted as standard HWS300, 600 (Standard on HWS1000 & 1500): 1-6V program voltage input to adjust output 20-120% of nominal (20-110% for 48V) (12V-48V models only)
/HD	See HWS50-1500/HD Datasheet for details. -40 to +71(74)°C operation, conformally coated PCBs
/ME	See HWS30-1500/ME Datasheet for details. UL60601-1, EN60950-1 medical certification
/RY	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no UL508 certification, no remote on/off function.)

Other Industrial Products

HWS	15W to 150W single output
LZSA	500W to 1500W Single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 480W DIN Rail Mount

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



Single Output Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ -10 to +71°C Operation (-40°C start up)
- ◆ Universal Input (85 - 265VAC)
- ◆ Conformally coated pcbs
- ◆ Class 1 Div 2 option (/RYHD suffix)
- ◆ Wide range AC Input



Key Market Segments & Applications



Specifications

Model		HWS50	HWS100	HWS150	HWS300	HWS600	HWS1000	HWS1500
Input Voltage range (47-63Hz)	-	85-265VAC or 120-370VDC			85-265VAC or 120-330VDC (No DC input for HWS1500)			
Input Current (Typ) (1)	A	0.7 / 0.35	1.3 / 0.65	1.9 / 0.95	4.1 / 2.1	8.1 / 3.9	13.5 / 7	19 / 10
Inrush Current (1)	A	14 / 2			20 / 4			
Power Factor	-	Meets EN61000-3-2						
Temperature Coefficient	-	<0.02%/°C						
Overcurrent Protection	-	>104%						
Overvoltage Protection	V	Yes (See table on page 2)						
Hold Up Time (Typ)	ms	20						
Leakage Current (60Hz)	mA	<0.5mA			<0.75mA		<1.2mA	≤1.5mA
Remote Sense	-	No	Yes					
Indicator	-	Green LED = ON						
Remote On/Off	-	No			Yes (Isolated from output)			
Parallel operation	-	No			Single wire connection (5 units max)			
DC Good	-	No			Yes			
Remote Adjust (PV)	-	No						Yes (3)
Operating Temperature and Derating (operation to +74°C - contact factory)	°C	HWS50-150: -10°C to +71°C, (-10 ~+50°C: 100%, +60°C: 60%, +71°C: 20%) HWS300-1500: -10°C to +71°C, (-10 ~+50°C: 100%, derate linearly to 50% load from +50 to +71°C) Guaranteed start up at -40°C (see specification sheets on website for details and derating)						
Storage Temperature	°C	-40 to +85°C						
Humidity (non condensing)	-	Operating: 30 - 90%RH (10 -90% on HWS300-1500), Non operating 10 - 95%RH						
Cooling	-	Convection			Internal fan			
Withstand Voltage (2)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.						
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC, >10M Output to remote on/off 100VDC						
Vibration (non operating)	-	MIL-STD-810F 514.5 Category 4, 10 (HWS1500 Cat 4, figure 514.5C-1)						
Shock (in packaging)	-	MIL-STD-810F 516.5 Category I, VI (HWS1500 <196.1m/s²)						
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark						
Line Dip	-	Complies with SEMI F47 (200VAC line only)						
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B (HWS1500 Class A)						
Immunity	-	IEC61000-4-2 (Level 2,3), -3, -4, -6, (Level 3), -5, -8 (Level 4), -11						
Weight (Typ)	g	280	450	500	1000	1600	3200	3800
Size (WxHxD)	in	1.04x3.23x4.72	1.1x3.23x6.3	1.46x3.23x6.3	2.4x3.23x6.5	3.94x3.23x6.5	5x3.2x9.5	5x3.25x11
Warranty	yrs	Limited lifetime warranty (See TDK-Lambda's terms & conditions)						

(1) 100/200VAC input

(2) HWS300-600 2.5kVAC Input to ground

(3) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(*) Class 1 Div 2 option (/RYHD suffix)

Output Ratings

Model	Voltage	Adjust Range	Max Curr(A)	Peak Curr(A) ⁴	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overvoltage (V)	Efficiency (typ)% ¹
HWS50-3/HD	3.3V	2.97 - 3.96	10	-	33	40	20	120	4.13-4.95	76/78
HWS100-3/HD	3.3V	2.97 - 3.96	20	-	66	40	20	120	4.13-4.95	78/81
HWS150-3/HD	3.3V	2.97 - 3.96	30	-	99	40	20	120	4.13-4.95	78/81
HWS300-3/HD	3.3V	2.64 - 3.96	60	-	198	30	20	120	4.13-4.95	74/77
HWS600-3/HD	3.3V	2.64 - 3.96	120	-	396	30	20	120	4.13-4.95	75/78
HWS1000-3/HD	3.3V	2.64 - 3.96	200	-	660	40	20	120	4.12-4.62	71/73
HWS1500-3/HD	3.3V	2.64 - 3.96	300	-	990	60	36	150	4.12-4.62	72/75
HWS50-5/HD	5V	4.0 - 6.0	10	-	50	40	20	120	6.25-7.25	82/84
HWS100-5/HD	5V	4.0 - 6.0	20	-	100	40	20	120	6.25-7.25	83/86
HWS150-5/HD	5V	4.0 - 6.0	30	-	150	40	20	120	6.25-7.25	83/86
HWS300-5/HD	5V	4.0 - 6.0	60	-	300	30	20	120	6.25-7.25	79/82
HWS600-5/HD	5V	4.0 - 6.0	120	-	600	30	20	120	6.25-7.25	80/83
HWS1000-5/HD	5V	4.0 - 6.0	200	-	1000	40	20	120	6.25-7	76/78
HWS1500-5/HD	5V	4.0 - 6.0	300	-	1500	60	36	150	6.25-7	77/81
HWS1000-6/HD	6V	4.8 - 7.2	167	-	1002	60	36	150	7.5-8.4	79/81
HWS1000-7/HD	7.5V	6.0 - 9.0	134	160	1005	60	36	150	9.37-10.5	80/82
HWS50-12/HD	12V	9.6 - 14.4	4.3	-	51.6	96	48	150	15-17.4	81/83
HWS100-12/HD	12V	9.6 - 14.4	8.5	-	102	96	48	150	15-17.4	83/86
HWS150-12/HD	12V	9.6 - 14.4	13	-	156	96	48	150	15-17.4	83/86
HWS300-12/HD	12V	9.6 - 14.4	27	-	324	72	48	150	15-17.4	80/83
HWS600-12/HD	12V	9.6 - 14.4	53	-	636	72	48	150	15-17.4	80/83
HWS1000-12/HD	12V	9.6 - 14.4	88	100	1056	100	48	150	15-17.4	82/85
HWS1500-12/HD	12V	9.6 - 14.4	125	-	1500	72	48	150	15-17.4	82/85
HWS50-15/HD	15V	12.0 - 18.0	3.5	-	52.5	120	60	150	18.8-21.8	81/83
HWS100-15/HD	15V	12.0 - 18.0	7	-	105	120	60	150	18.8-21.8	83/86
HWS150-15/HD	15V	12.0 - 18.0	10	-	150	120	60	150	18.8-21.8	83/86
HWS300-15/HD	15V	12.0 - 18.0	22	-	330	90	60	150	18.8-21.8	80/83
HWS600-15/HD	15V	12.0 - 18.0	43	-	645	90	60	150	18.8-21.8	81/84
HWS1000-15/HD	15V	12.0 - 18.0	70	80	1500	120	60	150	18.7-21.8	83/85
HWS1500-15/HD	15V	12.0 - 18.0	100	-	1500	90	60	150	18.7-21.8	83/87
HWS50-24/HD	24V	19.2 - 28.8	2.2	-	52.8	192	96	150	30-34.8	82/84
HWS100-24/HD	24V	19.2 - 28.8	4.5	-	108	192	96	150	30-34.8	84/87
HWS150-24/HD	24V	19.2 - 28.8	6.5	-	156	192	96	150	30-34.8	85/88
HWS300-24/HD	24V	19.2 - 28.8	14	16.5	336	144	96	150	30-34.8	82/85
HWS600-24/HD	24V	19.2 - 28.8	27	31	648	144	96	150	30-34.8	82/85
HWS1000-24/HD	24V	19.2 - 28.8	46	58.5	1104	150	96	150	30-34.8	85/87
HWS1500-24/HD	24V	19.2 - 28.8	65/70 (1)	105	1560	144	96	200	30-34.8	84/88
HWS1000-36/HD	36V	28.8 - 43.2	30.7	39	1104	150	144	200	45-49.7	85/88
HWS1500-36/HD	36V	28.8 - 43.2	42/46.5(2)	70	1512	150	144	200	45-49.7	84/88
HWS50-48/HD	48V	38.4 - 52.8	1.1	-	52.8	384	192	200	55.2-64.8	83/85
HWS100-48/HD	48V	38.4 - 52.8	2.1	-	100.8	384	192	200	55.2-64.8	84/87
HWS150-48/HD	48V	38.4 - 52.8	3.3	-	158.4	384	192	200	55.2-64.8	85/88
HWS300-48/HD	48V	38.4 - 52.8	7	-	336	288	192	350	55.2-64.8	82/85
HWS600-48/HD	48V	38.4 - 52.8	13	-	624	288	192	350	55.2-64.8	83/86
HWS1000-48/HD	48V	38.4 - 52.8	28	29.2	1104	300	192	200	55.2-60	86/88
HWS1500-48/HD	48V	38.4 - 52.8	32	-	1536	288	192	200	55.2-64.8	86/90
HWS1000-60/HD	60V	48.0 - 66.0	18.4	23.4	1104	360	240	400	69-75	85/88

(4) 200-265VAC Input, 10s maximum on time, 35% duty cycle

Options

Suffix	Description
Blank	No Cover (HWS50-150 Only) HWS300-1500 the cover is fitted as standard
/HDA	The cover option for HWS50-150 is special order only HWS300-1500 the cover is fitted as standard
/RYHD	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no remote on/off function.)

Other Industrial Products

LZSA	500W to 1500W Single output
DPP, DLP, DSP	10W to 960W DIN Rail Mount
PFE	300 to 1000W AC-DC Power Models

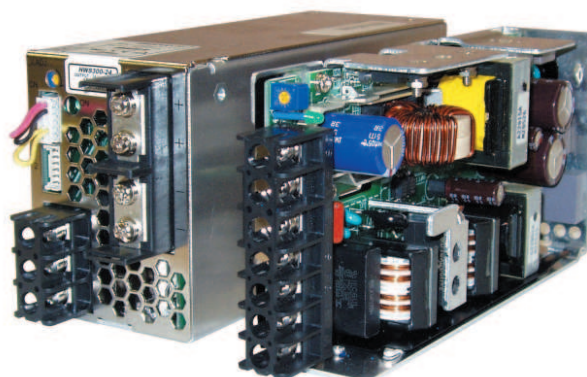
For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



Single Output Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ Medical Approvals²
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Broad 30W to 1500W product range
- ◆ Wide range AC Input



Key Market Segments & Applications



Medical



RoHS

Specifications

Model		HWS30 HWS50	HWS100 HWS150	HWS300	HWS600	HWS1500
Input Voltage range (47-63Hz) (2)	-	85 - 265VAC or 120 - 370VDC		85 - 265VAC or 120 - 330VDC		85 - 265VAC
Input Current (Typ) (1)	A	0.8 / 0.4 0.7 / 0.35	1.3 / 0.65 1.9 / 0.95	4.1 / 2.1	8.1 / 3.9	19 / 10
Inrush Current (1)	A	14 / 28		20 / 40		
Power Factor / Flicker	-	Meets EN61000-3-2, EN61000-3-3				
Temperature Coefficient	-	<0.02%/°C				
Overcurrent Protection	-	>104%				
Overvoltage Protection	V	Yes (See table on page 2)				
Hold Up Time (Typ)	ms	20				
Leakage Current (60Hz)	mA	<0.5mA				
Remote Sense	-	No	Yes			
Indicator	-			Green LED = ON		
Remote On/Off	-	No	Yes (Isolated from output)			
Parallel operation	-	No	Single wire connection (5 units max)			
DC Good	-	No	Yes			
Voltage Programming	-	No				Yes
Operating Temperature & Derating	°C	HWS30-150: -10°C to +70°C, (-10 - +50°C: 100%, +60°C: 60%, +70°C: 20%) HWS300-1500: -10°C to +70°C, (-10 - +50°C: 100%, derate linearly to 50% load from +50 to +70°C)				
Storage Temperature	°C	-30 to +85°C				
Humidity (non condensing)	-	Operating: 30 - 90%RH (10 -90% on HWS300-1500), Non operating 10 - 95%RH				
Cooling	-	Convection		Internal fan		
Withstand Voltage (3)	-	I/P to Gmd 2kVAC, I/P to O/P 3kVAC, O/P to Gmd 500VAC, O/P to Remote On/Off 100VAC for 1 min.				
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC, >10M Output to remote on/off 100VDC				
Vibration (non operating)	-	10 - 55Hz (1 min sweep), 19.6m/s ² constant, X, Y, Z axis, one hour each				
Shock (in packaging)	-	< 196.1m/s ²				
Safety Agency Approvals (2)	-	UL60601-1, EN60601, CSA-C22.2 No601.1-M90 (C-UL) (basic insulation), CE Mark				
Line Dip	-	Complies with SEMI F47 (200VAC line only)				
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B (HWS600 & 1500 Class A)				
Immunity	-	IEC61000-4-2 (Level 2,3), -3, -4, -6, (Level 3), -5 (Level 3,4), -8 (Level 4), -11				
Weight (Typ)	g	220 280	450 500	1000	1600	3800
Size (WxHxD)	in	1.04x3.23x3.74 1.04x3.23x4.72	1.1x3.23x6.3 1.46x3.23x6.3	2.4x3.23x6.5	3.94x3.23x6.5	4.98x3.23x11.02
Warranty	yrs	Limited lifetime warranty (See TDK-Lambda's terms & conditions)				

(1) 100/200VAC input

(2) See conditions of acceptability and clause 19.5DV.2 of UL60601 for equipment in proximity of patient

(3) HWS300-600 2.5kVAC Input to ground

Output Ratings

Model	Voltage	Adjust Range	Max Curr(A) ⁴	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overvoltage (V)	Efficiency (typ)% ¹
HWS30-5/ME	5V	4.0 - 6.0	6	30	40	20	120	6.25-7.25	77/80
HWS50-5/ME	5V	4.0 - 6.0	10	50	40	20	120	6.25-7.25	82/84
HWS100-5/ME	5V	4.0 - 6.0	20	100	40	20	120	6.25-7.25	83/86
HWS150-5/ME	5V	4.0 - 6.0	30	150	40	20	120	6.25-7.25	83/86
HWS30-12/ME	12V	9.6 - 14.4	2.5	30	96	48	150	15-17.4	81/83
HWS50-12/ME	12V	9.6 - 14.4	4.3	51.6	96	48	150	15-17.4	81/83
HWS100-12/ME	12V	9.6 - 14.4	8.5	102	96	48	150	15-17.4	83/86
HWS150-12/ME	12V	9.6 - 14.4	13	156	96	48	150	15-17.4	83/86
HWS300-12/ME	12V	9.6 - 14.4	27	324	72	48	150	15-17.4	80/83
HWS30-15/ME	15V	12.0 - 18.0	2	30	120	60	150	18.8-21.8	81/83
HWS50-15/ME	15V	12.0 - 18.0	3.5	52.5	120	60	150	18.8-21.8	81/83
HWS100-15/ME	15V	12.0 - 18.0	7	105	120	60	150	18.8-21.8	83/86
HWS150-15/ME	15V	12.0 - 18.0	10	150	120	60	150	18.8-21.8	83/86
HWS300-15/ME ⁽⁵⁾	15V	12.0 - 18.0	22	330	90	60	150	18.8-21.8	82/85
HWS30-24/ME	24V	19.2 - 28.8	1.3	31.2	192	96	200	30-34.8	83/86
HWS50-24/ME	24V	19.2 - 28.8	2.2	52.8	192	96	150	30-34.8	82/84
HWS100-24/ME	24V	19.2 - 28.8	4.5	108	192	96	150	30-34.8	84/87
HWS150-24/ME	24V	19.2 - 28.8	6.5	156	192	96	150	30-34.8	85/88
HWS300-24/ME	24V	19.2 - 28.8	14 (16.5 pk)	336	144	96	150	30-34.8	82/85
HWS600-24/ME	24V	19.2 - 28.8	27 (31 pk)	648	144	96	150	30-34.8	82/85
HWS1500-24/ME	24V	19.2 - 28.8, 4.8 - 28.8 ⁽⁷⁾	65 (105 pk) ⁽⁶⁾	1560(2520 pk) ⁽⁶⁾	144	96	200	30-34.8	84/88
HWS1500-36/ME	36V	28.8 - 43.2, 7.2 - 43.2 ⁽⁷⁾	42 (70 pk) ⁽⁶⁾	1512(2520 pk) ⁽⁶⁾	150	144	200	34-49.7	84/88
HWS30-48/ME	48V	38.4 - 52.8	0.65	31.2	384	192	200	55.2-64.8	82/83
HWS50-48/ME	48V	38.4 - 52.8	1.1	52.8	384	192	200	55.2-64.8	83/85
HWS100-48/ME	48V	38.4 - 52.8	2.1	100.8	384	192	200	55.2-64.8	84/87
HWS150-48/ME	48V	38.4 - 52.8	3.3	158.4	384	192	200	55.2-64.8	85/88
HWS300-48/ME ⁽⁵⁾	48V	38.4 - 52.8	7	336	288	192	350	55.2-64.8	82/85
HWS1500-48/ME	48V	38.4 - 52.8, 9.6 - 52.8 ⁽⁷⁾	32	1536	288	192	200	55.2-64.8	86/90

(4) Peak load for 10s maximum on time, 35% duty cycle

(5) Safety agency in progress - contact factory for status.

(6) 200-265AC Input

(7) Using voltage programming input - see installation manual for details

Options

Suffix	Description
Blank	No Cover (HWS30-150/ME Only) HWS300-1500/ME the cover is always fitted
/MEA	The cover option for the HWS30-150/ME is special order only. HWS300-1500/ME the cover is always fitted

Other Medical Products

KM Series	15 to 40W, PCB mount
CS Series	40 to 500W
NV Series	175 to 700W single & multiple output
Vega Series	450 to 900W single & multiple output
Alpha Series	1000W single and multiple output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



Peak Power Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ 300% Peak Power Capability
- ◆ Small package Size
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency



Key Market Segments & Applications



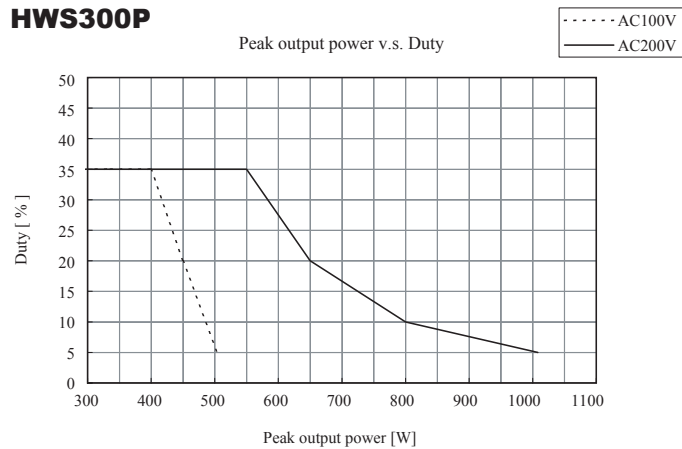
Specifications				
Model		HWS300P		HWS600P
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC		
Input Current (Typ)	(1) A	3.6/1.9		7.2/3.7
Inrush Current	(1) A	20 / 40		
Power Factor	-	Meets EN61000-3-2		
Temperature Coefficient	-	<0.02%/°C		
Overcurrent Protection	-	See table on page 2 (Recycle AC or remote on/off to reset)		
Overvoltage Protection	V	See table on page 2 (Recycle AC or remote on/off to reset)		
Hold Up Time (Typ)	ms	20		
Efficiency	(1) %	84 / 87		
Leakage Curr. (@240VAC, 60Hz)	mA	<0.75mA (Typically 0.2mA at 100VAC)		
Remote Sense	-	No		
Indicator	-	Green LED = ON		
Remote on/off	-	Yes		
Line Regulation	mV	24V: 96mV, 36V: 144mV, 48V: 192mV		
Load Regulation	mV	24V: 144mV, 36V: 216mV, 48V: 288mV		
Ripple & Noise	mV	24V: 150mV, 36V: 200mV, 48V: 350mV		
Parallel operation	-	No	Yes, up to 2 units	
DC Good	-	Yes		
Operating Temperature	-	-10°C to +70°C, derate linearly to 50% load from 50°C to 70°C		
Storage Temperature	-	-30 to +85°C		
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.		
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour		
Shock	-	< 196.1 m/s²		
Safety Agency Certification	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark		
Line Dip	-	Complies with SEMI F47 (200VAC line only)		
Conducted & Radiated EMI	-	EN55011 / EN55022, FCC VCCI Class B		
Immunity	-	IEC61000-4-2, -3, -4, -6 (Level 3), -5, -8 (Level 4), -11		
Weight (Typ)	g	1,000		1,600
Size (WxHxD)	in	2.4 x 3.23 x 6.5"		3.94 x 3.23 x 6.5"
Warranty	-	Limited Lifetime		

(1) 100/200VAC

Peak Output Power vs. Duty Cycle

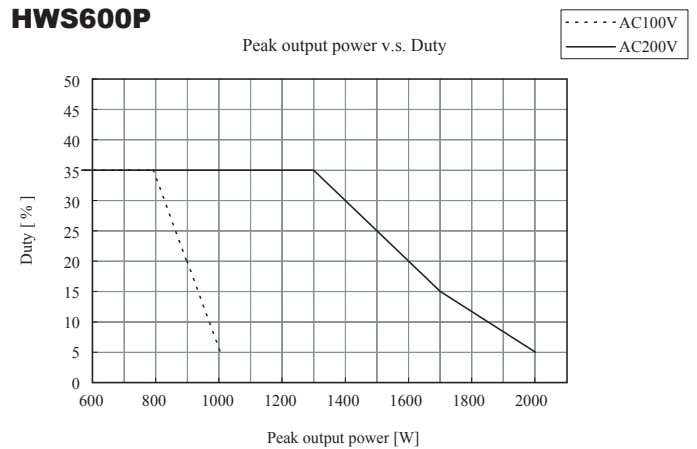
HWS300P

Peak output power v.s. Duty



HWS600P

Peak output power v.s. Duty



Output Ratings

Model	Voltage V	Adjust Range V	Max Avg. Current A	Max Avg. Power W	Peak Current A ^(1,2)	Max Peak Power W ⁽¹⁾	Overcurrent Minimum A	Overvoltage V
HWS300P-24	24V	19.2 - 26.4	12.5	300	21 / 42	504 / 1008	21.4 / 42.8	27.6 - 32.4
HWS600P-24	24V	19.2 - 26.4	25	600	40.5 / 83	972 / 1992	41.3 / 84.6	27.6 - 32.4
HWS300P-36	36V	28.8 - 39.6	8.4	302.4	14 / 28	504 / 1008	14.3 / 28.6	41.4 - 48.6
HWS600P-36	36V	28.8 - 39.6	16.7	601.2	27 / 55.5	972 / 1998	27.5 / 56.6	41.4 - 48.6
HWS300P-48	48V	38.4 - 52.8	6.3	302.4	10.5 / 21	504 / 1008	10.7 / 21.4	55.2 - 64.8
HWS600P-48	48V	38.4 - 52.8	12.5	600	20 / 41.5	960 / 1992	20.4 / 42.3	55.2 - 64.8

Notes

(1) 100/200VAC

(2) 200-265VAC Input, 5s maximum on time up to 35% duty cycle (see instruction manual)

Other Industrial Products

HWS	15W to 1800W single output
LZSa	500W to 1500W Single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 480W DIN Rail Mount

Options

Suffix	Description
Blank	HWS300-1500 cover is fitted as standard
/A	Not applicable

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



1800W 3ph Industrial Power Supplies

Features

- ◆ Limited Lifetime Warranty
- ◆ 208VAC Three Phase Input
- ◆ High Efficiency
- ◆ SEMI F47 Compliant
- ◆ Compact Size



Key Market Segments & Applications



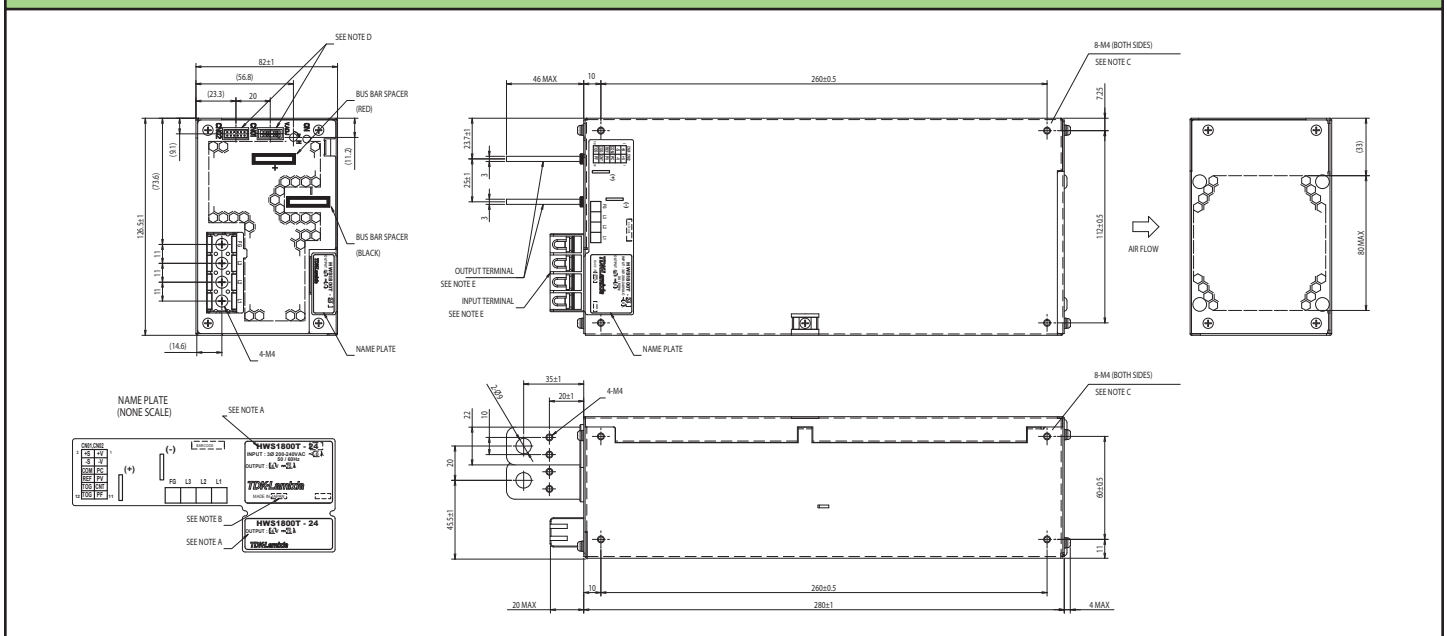
Specifications

Model		HWS1800
Input Voltage Range	-	208VAC, Three phase 170 - 265VAC (47 - 63Hz)
Input Current (Typical)	A	3.3V: 4.5A, 5V to 15V: 6A, 24 to 60V: 7A
Inrush Current (200VAC)	A	40A
Power Factor	-	Typically 0.94
Temperature Coefficient	-	<0.02%/°C
Overcurrent Protection	-	>105% of maximum / peak current rating
Overvoltage Protection	V	See table on page 2. Cycle input to reset or use remote on/off function
Hold Up Time (Typ)	ms	3.3V to 15V: 20ms, 24 to 60V: 18ms at 200VAC
Leakage Current (max)	mA	<2.6mA at 240VAC 60Hz
Remote Sense	-	Yes
Indicator	-	Green LED = ON
Remote on/off	-	Yes
Parallel operation	-	Single wire connection
DC Good	-	Yes
Remote Adjust (PV)	-	External voltage adjusts output voltage. See Instruction Manual
Operating Temperature	°C	-10°C to +71°C, see output derating curves, -20°C start up
Storage Temperature	°C	-30 to +85°C
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH
Cooling	-	Internal fan
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC (1), O/P to CNT 100VAC for 1 min
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour
Shock (In package)	-	< 196.1 m/s ²
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178
Line Dip	-	Complies with SEMI F47
Conducted & Radiated EMI	-	EN55011 / EN55022-A, FCC-A, VCCI-A
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8
Weight (Typ)	g	3800
Size (WxHxD)	in	4.98 x 3.23 x 11"
Warranty	yrs	Limited lifetime warranty (See Lambda's terms & conditions)

Notes:

(1) HWS1800T-60V: 651VAC

Outline Drawing



Output Ratings

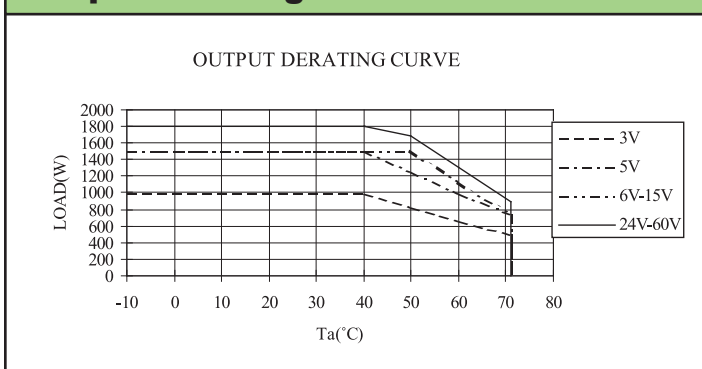
Model	Voltage V	Adjust Range V	Max Curr. A	Peak Curr. A(2)	Max Power W	Peak Power W2	Load Reg mV	Line Reg mV(3)	Ripple Noise mV	Overvoltage V	Efficiency (typ) %
HWS1800T-3	3.3	2.64 - 3.96	300	-	990	-	60	36	120	4.12 - 4.62	75
HWS1800T-5	5	4 - 6	300	-	1500	-	60	36	120	6.25 - 7.0	81
HWS1800T-6	6	4.8 - 7.2	250	300	1500	1800	60	40	150	7.5 - 8.4	82
HWS1800T-7	7.5	6 - 9	200	240	1500	1800	60	40	150	9.37 - 10.5	84
HWS1800T-12	12	9.6 - 14.4	125	150	1500	1800	72	48	200	15 - 17.4	84
HWS1800T-15	15	12 - 18	100	120	1500	1800	90	60	200	18.7 - 21.8	84
HWS1800T-24	24	19.2 - 28.8	75	105	1800	2520	144	96	250	30 - 34.8	88
HWS1800T-36	36	28.8 - 43.2	50	70	1800	2520	216	144	250	45 - 49.7	88
HWS1800T-48	48	38.4 - 52.8	37.5	52.5	1800	2520	288	192	300	55.2 - 60	90
HWS1800T-60	60	48 - 66	30	42	1800	2520	360	240	400	69 - 75	90

Notes

(2) 10s maximum on time with 35% duty cycle

(3) 180 - 265VAC

Output Derating Curves



Other Industrial Products

HWS	15W to 1500W single output, single phase
LZSA	500W to 1500W single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 960W DIN Rail mount

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm



15-40W Medical AC-DC PCB-Mount Power Supplies

Features

- ◆ Small size and lightweight
- ◆ PC Board Mountable
- ◆ Wide Range Input
- ◆ Medical Safety Certifications (4kVAC Input - Output)
- ◆ Class II (No ground needed)
- ◆ High efficiency



Key Market Segments & Applications



Specifications

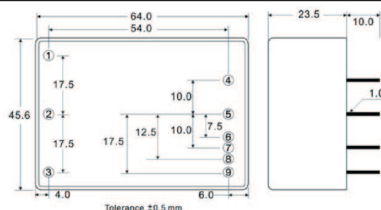
Model		KMS15	KMD15	KMT15	KMS40	KMD40	KMT40
Input Voltage Range	-	90-264VAC 47-440Hz or 100-375VDC					
Inrush Current Limiting	A	10 / 20A, cold start, 25°C ambient (115 / 230VAC)					
Input Current (115 / 230VAC)	mA	220 / 118mA			860 / 460mA		
Recommended External Fuse	-	2A slow blow type			3.15A slow blow type		
Temperature Coefficient	-	±0.01%/°C					
Ripple and Noise (pk-pk)	mV	50mV or 1%, whichever is greater					
Overcurrent Protection	-	> 105%, hiccup mode, automatic recovery					
Overvoltage Protection	%	Yes, Zener diode clamp					
Hold-up Time (typical)	ms	20ms			18ms		
Enclosure Leakage (240VAC 63Hz) (264VAC 63Hz)	mA	0.055 max 0.06 max			0.08 max 0.085 max		
Operating Temperature	°C	-25°C to 70°C, derate linearly to 50%(1) load from 50°C to 70°C. Max case temperature 95°C					
Storage Temperature	°C						
Humidity	%RH	20% to 95% RH (non-condensing)					
Cooling	-	Convection, over temperature protected ~100°C case temperature					
Withstand Voltage	VAC	Input to output: 4kVAC					
Immunity	-	EN60601-1-2					
Safety Agency Certification	-	UL60601-1, IEC60601-1, CE Mark, EN60950-1					
Conducted EMI	-	EN55011, EN55022 Class B			EN55011, EN55022 Class A		
Switching Frequency	kHz	132kHz					
Weight	g	120			280		
Size (LxWxH)	in	2.52 x 1.79 x 0.92"			3.5 x 2.5 x 1.06"		
Mounting & Case	-	PC board mountable. Plastic resin fiberglass case (UL 94V-0)					
MTBF	hrs	200,000 to 400,000 hours, model dependent					
Warranty	yrs	2 years					

(1) KM15 derates linearly to 40% load

Output Ratings

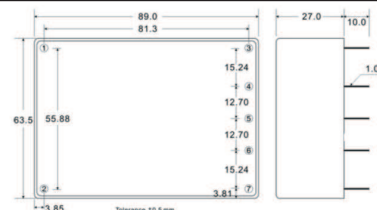
		Output	Minimum	Maximum		Output Set	Line	Load		
Model		Voltage	Current	Current	Power	Accuracy	Regulation	Regulation (1)	Cross	Efficiency
		(V)	(A)	(A)	(W)	(%)	(%)	(%)	Regulation	(%)
Single Output										
KMS15-3P3	V1	3.3V	0A	3.00A	9.9W	±2%	0.5%	1%	-	74%
KMS40-3P3	V1	3.3V	80mA	8.00A	26.4W	±2%	0.5%	1%	-	75%
KMS15-5	V1	5V	0A	3.00A	15W	±2%	0.5%	1%	-	78%
KMS40-5	V1	5V	80mA	8.00A	40W	±2%	0.5%	1%	-	79%
KMS15-9	V1	9V	0A	1.67A	15W	±2%	0.5%	1%	-	79%
KMS40-9	V1	9V	44mA	4.44A	40W	±2%	0.5%	1%	-	82%
KMS15-12	V1	12V	0A	1.25A	15W	±2%	0.5%	1%	-	81%
KMS40-12	V1	12V	33mA	3.33A	40W	±2%	0.5%	1%	-	83%
KMS15-15	V1	15V	0A	1.00A	15W	±2%	0.5%	1%	-	81%
KMS40-15	V1	15V	26.7mA	2.67A	40W	±2%	0.5%	1%	-	83%
KMS15-24	V1	24V	0A	0.62A	15W	±2%	0.5%	1%	-	83%
KMS40-24	V1	24V	16.7mA	1.67A	40W	±2%	0.5%	1%	-	83%
Dual Output										
KMD15-55	V1	+5V	150mA	1.5A	15W	±2%	0.5%	1%	5%	78%
	V2	-5V	150mA	1.5A		±2%	0.5%	1%	5%	
KMD40-55	V1	+5V	400mA	4A	40W	±2%	0.5%	1%	5%	79%
	V2	-5V	400mA	4A		±2%	0.5%	1%	5%	
KMD40-512	V1	5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2	12V(2)	312mA	1.25A		±5%	5.0%	6%	7%	
KMD40-524	V1	5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2	24V(2)	156mA	0.625A		±5%	5.0%	6%	7%	
KMD15-1212	V1	+12V	62.5mA	0.625A	15W	±2%	0.5%	1%	3%	80%
	V2	-12V	62.5mA	0.625A		±2%	0.5%	1%	3%	
KMD40-1212	V1	+12V	166mA	1.66A	40W	±2%	0.5%	1%	5%	83%
	V2	-12V	166mA	1.66A		±2%	0.5%	1%	5%	
KMD15-1515	V1	+15V	50mA	0.5A	15W	±2%	0.5%	1%	3%	81%
	V2	-15V	50mA	0.5A		±2%	0.5%	1%	3%	
KMD40-1515	V1	+15V	133mA	1.33A	40W	±2%	0.5%	1%	5%	81%
	V2	-15V	133mA	1.33A		±2%	0.5%	1%	5%	
Triple Output										
KMT15-51212	V1	5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2	+12V	50mA	0.2A		±3%	2.0%	5%	5%	
	V3	-12V	50mA	0.2A		±3%	2.0%	5%	5%	
KMT40-51212	V1	5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2	+12V	150mA	0.6A		±5%	5.0%	7%	7%	
	V3	-12V	150mA	0.6A		±5%	5.0%	7%	7%	
KMT15-51515	V1	5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2	+15V	37.5mA	0.15A		±3%	2.0%	5%	5%	
	V3	-15V	37.5mA	0.15A		±3%	2.0%	5%	5%	
KMT40-51515	V1	5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2	+15V	125mA	0.5A		±5%	5.0%	7%	7%	
	V3	-15V	125mA	0.5A		±5%	5.0%	7%	7%	

KM15 Outline Drawings



- (1) Symmetrical loading, from minimum to maximum load
- (2) Output V1 is isolated from output V2
- (3) Output V1 is isolated from outputs V2 & V3

KM40 Outline Drawings



For Additional Information, please visit
us.tdk-lambda.com/lp/products/km-series.htm



4 to 15W AC-DC Board Mount Power Supplies

Features

- ◆ Low profile
- ◆ Smaller footprint
- ◆ PC board Mountable
- ◆ Low Cost
- ◆ UL Class II Approved
- ◆ Wide input range
- ◆ No external components needed



Key Market Segments & Applications



Specifications				
Model		KPS-5	KPS-10	KPS-15
Input Voltage range	-	85 - 264VAC (47 - 440Hz) or 110 - 370VDC		
Inrush Current	A	30A at 240VAC, cold start at 25°C		
Input Current (115/230VAC)	A	0.13 / 0.07	0.27 / 0.13	0.4 / 0.2
Leakage Current	mA	0.25mA maximum		
Temperature Coefficient	-	±0.05%/°C		
Voltage Accuracy	-	±1%		
Minimum Load	A	None		
Load Regulation	-	±1% (10% to 100% load)		
Line Regulation	-	±0.5% (100-240VAC line change)		
Ripple & Noise (1)	mV	1% or 50mV whichever is greater		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	130-150%, Zener clamp		
Efficiency (typical)	%	72%	75%	75%
Hold Up Time (Typ@115VAC input)	ms	8ms at full load		
LED Indicator	-	Green LED = OK		
Operating Temperature (2)	°C	Convection cooling: 0 to +70°C, derating linearly to 25% load from 40 to 70°C		
Storage Temperature	°C	-20 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection or forced air		
Withstand Voltage	-	Input to Output 3kVAC		
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s ² (20G)		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, Class II, CE Mark		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B		
Immunity	-	EN61000-4 -2, -3, -4, -5, -6		
Weight (Typ)	g(oz)	29g (1oz)	60g (2oz)	80g (2.8oz)
Size (WxLxH; H above pcb)	in.	1.28 x 2.17 x 0.83	1.55 x 2.40 x 0.9	1.77 x 2.75 x 0.79
Warranty	yr	One Year		

Notes:

- (1) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW
- (2) 20CFM forced air ratings:
 KPSA5: 0 - 70°C full load
 KPSA10: 0 - 70°C full load (3.3V & 5V models derate linearly to 80% load from 50 to 70°C)
 KPSA15: 0 - 70°C derate linearly to 80% load from 50 to 70°C

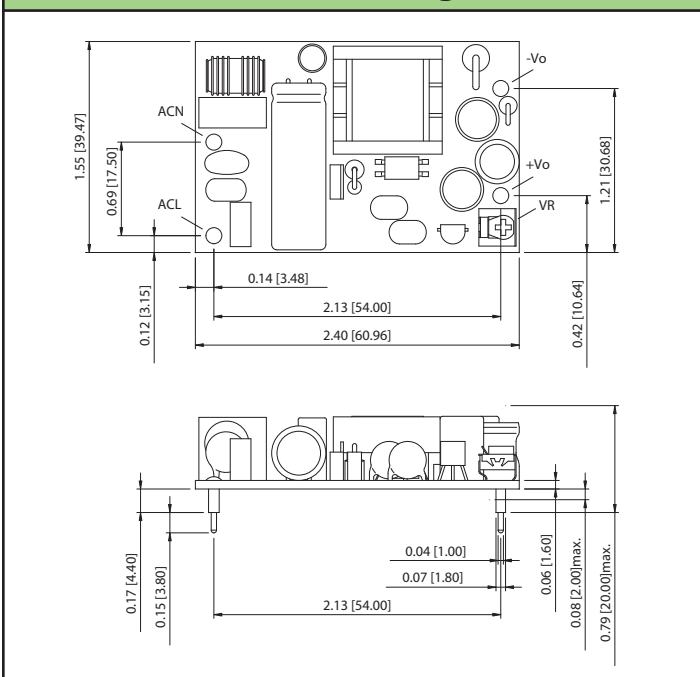
Model Selector (other voltages available)

Model	Output Voltage (V)	Maximum Output (A)	Peak Load (A)(3)	Output Pwr (W)
KPSA5-3R3	3.3	1.25	-	4.1
KPSA5-5	5	1.0	-	5.0
KPSA5-12	12	0.42	-	5.0
KPSA5-15	15	0.33	-	5.0
KPSA5-24	24	0.23	-	5.5
KPSA10-3R3	3.3	2.5	3.8	8.3
KPSA10-5	5	2.0	2.8	10.0
KPSA10-12	12	0.84	1.2	10.1
KPSA10-15	15	0.67	1.0	10.1
KPSA10-24	24	0.42	0.65	10.1
KPSA15-3R3	3.3	3.0	4.5	9.9
KPSA15-5	5	3.0	4.5	15.0
KPSA15-12	12	1.25	1.8	15.0
KPSA15-15	15	1.0	1.5	15.0
KPSA15-24	24	0.63	0.95	15.1

Notes

(3) Average not to exceed max power, <30s, 10% duty cycle

KPSA10 Outline Drawing



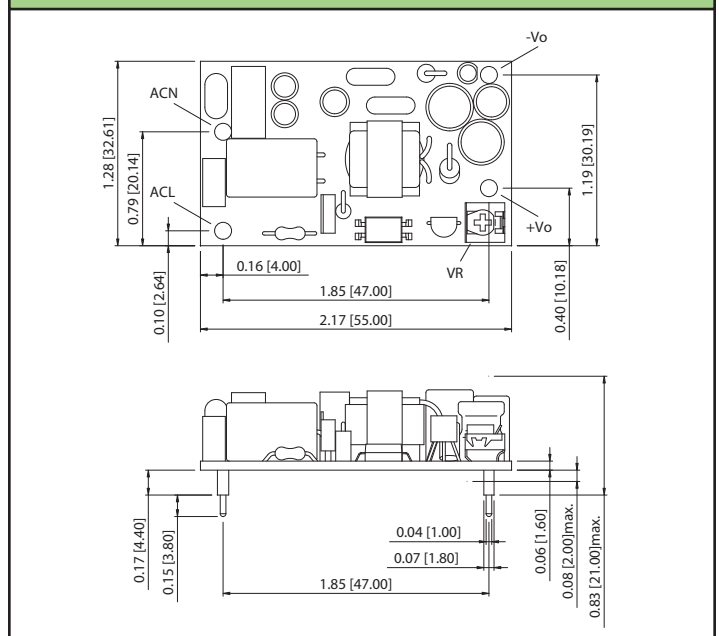
Other Industrial Products

ZPSA	20W to 60W
KM	15 to 40W pcb mount medical
ZWS	5 to 240W, single output

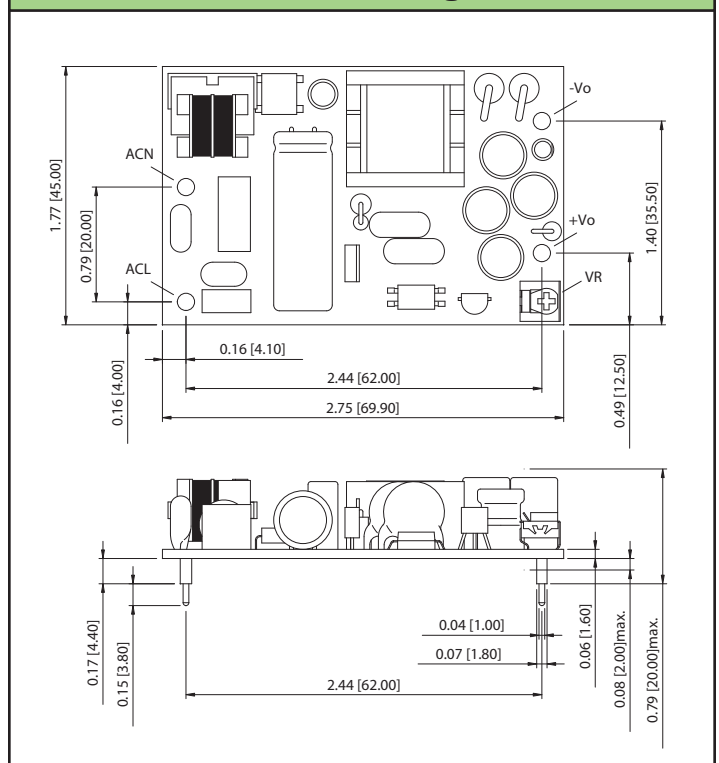
For Additional Information, please visit
us.tdk-lambda.com/lp/products/kps-series.htm



KPSA5 Outline Drawing



KPSA15 Outline Drawing



Single Output General Purpose Power Supplies

Features

- ◆ Very low cost
- ◆ 25W to 150W
- ◆ Small size
- ◆ 115VAC or 230VAC input
- ◆ Withstands 300VAC surges (5s)
- ◆ Three year warranty



Key Market Segments & Applications



Specifications

Model		LS25	LS35	LS50	LS75	LS100	LS150
AC Input Voltage (300VAC for 5s)	VAC	88 - 264VAC (See note (2) for LS100)					88-132/176-264VAC(1)
Input Frequency	Hz	47 - 63Hz					
DC Input Voltage	VDC	125 - 373VDC					248 - 273VDC
Inrush Current (230VAC, cold start)	A	30	40	40	40	60	40
Power Factor	-	Meets EN61000-3-2, -3					
Input Current (115/230VAC)	A	0.7 / 0.4	0.8 / 0.55	1.3 / 0.8	1.6 / 1.0	2.2 / 1.2	3.5 / 2
Temperature Coefficient	-	<0.02%/°C					
Overcurrent Protection	-	> 110%					
Overvoltage Protection	V	3.3V: 3.8-4.45V, 5V: 5.75-6.75V, 12V: 13.8-16.2V, 15V: 17.25-20.25V, 24V: 27.6-32.4V, 36V: 41.4-48.6V, 48V: 55.2-64.8V					
Hold Up Time (115 / 230V input)	ms	14 / 80	12 / 80	14 / 60	14 / 60	25 / 150	20 / 28
Leakage Current (230VAC 60Hz)	mA	<1mA					
Remote Sense	-	No					
LED Indicator	-	Green LED = On					
Operating Temperature	°C	-25 to +70°C. Derate linearly to 50% load from +50 to +70°C (2)					
Storage Temperature	°C	-40 to +85°C					
Operating Humidity	-	20 - 90% RH (non condensing)					
Storage Humidity	-	10 - 95% RH (non condensing)					
Cooling	-	Convection					
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.					
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC					
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour					
Shock	-	< 196.1 m/s ² (20G)					
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11					
Safety Agency Approvals	-	UL60950-1, EN60950-1, IEC60950-1, CE Mark					
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B					
MTBF (MIL-HDBK-217F)	hrs	906,997	706,464	712,890	648,786	545,375	505,393
Weight (Typ)	g	170	270	350	410	600	700
Size (LxWxH)	in	3.1 x 2.0 x 1.1	3.9 x 3.2 x 1.4	3.9 x 3.8 x 1.4	5.1 x 3.8 x 1.5	6.3 x 3.8 x 1.5	7.8 x 3.9 x 1.5
Warranty	yrs	Three Years					

Notes:

- (1) Switch selectable for 115 or 230VAC
- (2) LS25-3
 LS50, LS75-3 & -5
 LS25-5 to 48, LS75-12 to 48
 LS100-3 & -5
 LS100-12, -15, -24, -36, -48
 LS150-3 & -5,
 LS150-12, -15, -24, -36, -48

Derate linearly to 60% load from +40 to +70°C.
 Derate linearly to 70% load from +50 to +70°C.
 Derate linearly to 60% load from +50 to +70°C.
 Derate linearly to 60% load from +45 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
 Derate linearly to 60% load from +50 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
 Derate linearly to 50% load from +40 to +70°C.
 Derate linearly to 70% load from +50 to +70°C.

Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) %
LS25-3.3	3.3V	2.85 - 3.6	6.0	40	20	80	75
LS25-5	5V	4.5 - 5.5	5.0	40	20	80	79
LS25-12	12V	10.8 - 13.2	2.1	96	48	120	83
LS25-15	15V	13.5 - 16.5	1.7	120	60	120	83
LS25-24	24V	22 - 27.6	1.1	192	96	120	84
LS25-36	36V	32 - 40	0.75	288	144	150	84
LS25-48	48V	42 - 54	0.57	384	192	200	85
LS35-3.3	3.3V	2.85 - 3.6	7.0	40	20	80	75
LS35-5	5V	4.5 - 5.5	7.0	40	20	80	78
LS35-12	12V	10.8 - 13.2	3.0	96	48	120	82
LS35-15	15V	13.5 - 16.5	2.4	120	60	120	83
LS35-24	24V	22 - 27.6	1.5	192	96	120	84
LS35-36	36V	32 - 40	1.0	288	144	150	84
LS35-48	48V	42 - 54	0.8	384	192	200	84
LS50-3.3	3.3V	3.0 - 3.6	10.0	40	20	80	75
LS50-5	5V	4.75 - 5.5	10.0	40	20	80	80
LS50-12	12V	10.8 - 13.2	4.2	96	48	120	84
LS50-15	15V	13.5 - 16.5	3.4	120	60	120	85
LS50-24	24V	22 - 27.2	2.2	192	96	120	86
LS50-36	36V	32 - 40	1.4	288	144	150	86
LS50-48	48V	42 - 54	1.1	384	192	200	86
LS75-3.3	3.3V	3.0 - 3.6	15.0	40	20	80	75
LS75-5	5V	4.75 - 5.5	12.0	40	20	80	79
LS75-12	12V	10.8 - 13.2	6.0	96	48	120	84
LS75-15	15V	13.5 - 16.5	5.0	120	60	120	85
LS75-24	24V	22 - 27.2	3.2	192	96	120	86
LS75-36	36V	32 - 40	2.1	288	144	150	86
LS75-48	48V	42 - 54	1.6	384	192	200	87
LS100-3.3	3.3V	3.0 - 3.6	20.0	40	20	80	75
LS100-5	5V	4.75 - 5.5	16.0	40	25	80	79
LS100-12	12V	10.8 - 13.2	8.5	96	48	120	82
LS100-15	15V	13.5 - 16.5	7.0	120	60	120	84
LS100-24	24V	22 - 27.2	4.5	192	96	120	86
LS100-36	36V	32 - 40	3.0	288	144	150	86
LS100-48	48V	42 - 54	2.3	384	192	200	86
LS150-3.3	3.3V	3.0 - 3.6	30.0	40	20	80	75
LS150-5	5V	4.75 - 5.5	26.0	40	20	80	79
LS150-12	12V	10.8 - 13.2	12.5	96	48	120	83
LS150-15	15V	13.5 - 16.5	10.0	120	60	120	85
LS150-24	24V	22 - 27.2	6.5	192	96	120	86
LS150-36	36V	32 - 40	4.3	288	144	150	87
LS150-48	48V	42 - 54	3.3	384	192	200	87

For Additional Information, please visit
us.tdk-lambda.com/lp/products/ls-series.htm



Single Output 150 - 200W General Purpose Power Supplies

Features

- ◆ Very low cost
- ◆ Small Size
- ◆ Wide Range AC Input
- ◆ Convection or Fan Cooled
- ◆ Three year warranty
- ◆ 1.6" high (For 1U racking)



Key Market Segments & Applications



Specifications

Model		LS200 (Enclosed style with internal fan)	LS200/L (U channel style - no internal fan)
AC Input Voltage (300VAC for 5s)	VAC	85 - 264VAC	85 - 264VAC (3)
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage	VDC	120 - 373VDC	
Inrush Current (230VAC, cold start)	A	60	
Power Factor	-	Meets EN61000-3-2, -3 (Typical PF 0.98/0.95)(1)	
Input Current (115/230VAC)	A	3.5 / 1.7 (typical)	
Temperature Coefficient	-	<0.02%/°C (0 - 50°C)	
Overcurrent Protection	-	>105% of nominal or peak. Constant current style	
Overvoltage Protection (2)	V	3.3V: 3.8 - 4.45V, 5V: 5.75 - 6.75V, 7.5V: 8.6 - 10.1V, 12V: 15.1 - 17.75V 15V: 17.25 - 20.25V, 24V: 30.25 - 35.5V, 36V: 41.4 - 48.6V, 48V: 60 - 69.6V	
Overtemperature Protection (2)	-	Yes	
Hold Up Time (115/230V input)	ms	20ms	
Leakage Current (230VAC 60Hz)	mA	<1mA	
Remote Sense	-	Yes	
Remote On/Off	-	On: 0 - 0.8V; Off: 3 - 12V	
LED Indicator	-	Green LED = On	
Operating Temperature	°C	Fan or forced air rating: -25 to +70°C. Derate linearly to 60% load from +50 to +70°C	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity	-	20 - 90% RH (non condensing)	
Storage Humidity	-	10 - 95% RH (non condensing)	
Cooling	-	Internal Fan (air exhausts from fan end)	Convection or customer supplied airflow
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s ² (20G)	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL60950-1, CSA60950-1 (cUL), IEC60950-1 2nd Edition, CE Mark	
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B	
Weight (Typ)	g	700	600
Size (LxWxH)	in	7.8 x 3.9 x 1.61"	
Warranty	yrs	Three Years	

Notes:

- (1) 115 / 230VAC input
- (2) Recycle AC to reset
- (3) (Derate linearly to 65% load from 115VAC to 85VAC)

Output Ratings

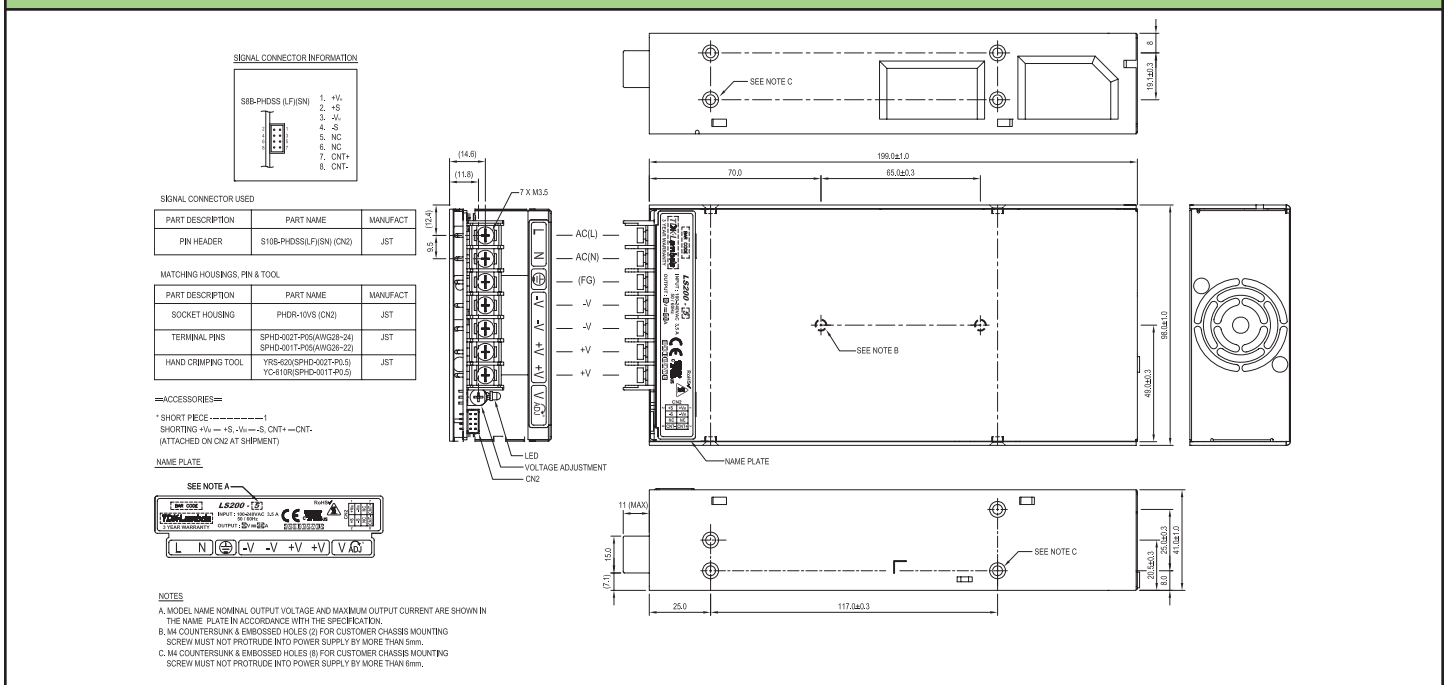
Model	Voltage	Adjust Range (V)	Max Current Forced Air(A) ⁽⁴⁾	Max Current Convect.(A) ⁽⁵⁾	Peak Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % ⁽¹⁾
LS200-3.3	3.3V	3.0 - 3.6	40.0	N/A	-	40	16	80	67 / 68
LS200-5	5V	4.75 - 5.5	40.0	N/A	-	40	20	80	72 / 75
LS200-7.5	7.5V	6.8 - 8.2	26.7	N/A	-	40	20	80	74 / 77
LS200-12	12V	10.8 - 14.4	16.7	N/A	-	96	48	120	76 / 79
LS200-15	15V	13.5 - 16.5	13.4	N/A	-	120	60	120	80 / 83
LS200-24	24V	22 - 28.8	8.4	N/A	10.4	192	96	120	82 / 84
LS200-36	36V	32 - 40	5.6	N/A	6.9	288	144	150	82 / 85
LS200-48	48V	42 - 57.6	4.2	N/A	-	384	192	200	82 / 85
LS200-3.3/L	3.3V	3.0 - 3.6	40.0	26	-	40	16	80	67 / 68
LS200-5/L	5V	4.75 - 5.5	40.0	26	-	40	20	80	72 / 75
LS200-7.5/L	7.5V	6.8 - 8.2	26.7	17.3	-	40	20	80	74 / 77
LS200-12/L	12V	10.8 - 14.4	16.7	11.6	-	96	48	120	76 / 79
LS200-15/L	15V	13.5 - 16.5	13.4	9.3	-	120	60	120	80 / 83
LS200-24/L	24V	22 - 28.8	8.4	5.8	10.4	192	96	120	82 / 84
LS200-36/L	36V	32 - 40	5.6	3.9	6.9	288	144	150	82 / 85
LS200-48/L	48V	42 - 57.6	4.2	2.9	-	384	192	200	82 / 85

Notes

(4) With internal fan version LS200-xx or LS200-xx/L version with external airflow.

(5) See Installation manual for derating curve.

Outline Drawing



Other Related Products

LS25 - 150	25W to 150W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300 to 1000W single output

Options

Suffix	Description
/L	No cover or fan (U channel)
Blank	Cover and fan

For Additional Information, please visit
us.tdk-lambda.com/lp/products/lis-series.htm



Low Profile Dual & Triple Output

Features

- ◆ 26mm height
- ◆ Outputs 2 and 3 isolated from output 1
- ◆ Universal Input (85 - 265VAC)
- ◆ Low Profile
- ◆ Wattbox design on LWT



Key Market Segments & Applications



Specifications

Model		LWD15	LWD30	LWT15H	LWT30H	LWT50H
Max Output Power (typ)	W	15	30	17	30	50
Efficiency (Typ)	%	64	70	72	73	72
AC Input Voltage range	-	85 - 265VAC (47 - 440Hz)				
DC Input Voltage range	-	110 - 350VDC			110 - 330VDC	
Input Current Typ (100/200VAC)	A	0.4/0.2	0.72/0.36	0.4/0.22	0.7/0.42	1.2/0/7
Inrush Current (110/200VAC)	A	17/34	14/28	14/28	16/32	16/32
Output 1 Voltage Adjustment	-	5V: 5 to 5.25V, 12V: 12 to 12.6V, 15V: 15V to 15.75V				
Output Voltage Accuracy	-	Output 2 ±5%		Output 2 & 3 ±5%		
Temperature Coefficient	-	Output 1 < 1%, Output 2 or 3, <2% at 0 - 60°C				
Line Regulation	-	1%				
Load Regulation	-	2%				
Ripple & Noise	-	5V:100mV, 12V & 15V: 150mV, 24V: 200mV			Output 1: 100mV, Outputs 2 & 3: 150mV	
Overcurrent Protection	-	>105%				
Overvoltage Protection	V	Main output only: 5.75 - 6.75V, manual reset				
Hold Up Time (Typ at 100VAC)	ms	20				
Series Operation	-	Possible				
Operating Temperature	-	LWD: 0°C to +60°C, derate as follows: 40°C: 100%, 50°C: 60%, 60°C: 40% LWT: 0°C to +60°C, derate as follows: 40°C: 100%, 50°C: 80%, 60°C: 60%				
Storage Temperature	°C	-30 to +85°C				
Operating Humidity	-	30 - 90% RH (Non condensing)				
Storage Humidity	-	10 - 95% RH (Non condensing)				
Cooling	-	Convection				
Withstand Voltage	-	Input to Gnd, Input to Output 2kVAC (20mA)		Input to Gnd 2kVAC Input to Output 3kVAC (20mA)		
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC				
Vibration (non operating)	-	19.6m/s²		10-55Hz(1 min) <19.6m/s² (1 hr)		
Shock	-	196.1m/s²				
Safety Agency Approvals	-	-		UL60950-1, CSA60950-1, EN60950-1, CE LVD		
Conducted EMI	-	FCC Class A		VDE Class B, FCC Class B		
Weight (Typ)	g	180	250	220	300	400
Size (WxHxD)	mm	Please refer to outline drawings				
Warranty	-	One Year				

* LWT models only

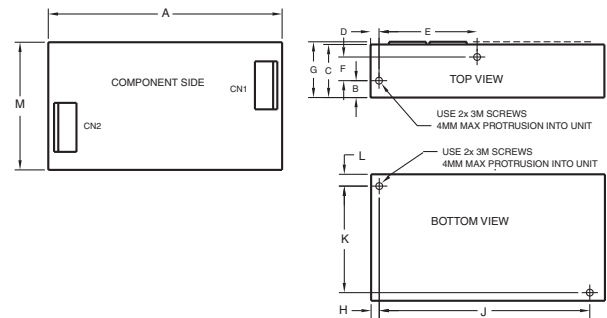
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Note: See Installation Manual for full details, test methods of parameters and application notes

Options

Model	Output	Voltage	Min Current	Max Current
LWD15-0512 ⁽¹⁾	V1	5V	0.0	1.5
	V2	12V	0.0	0.6
LWD15-0524 ⁽¹⁾	V1	5V	0.0	1.5
	V2	24V	0.0	0.3
LWD15-1212 ⁽¹⁾	V1	12V	0.0	0.6
	V2	12V	0.0	0.6
LWD15-1224 ⁽¹⁾	V1	12V	0.0	0.6
	V2	24V	0.0	0.3
LWD15-1515 ⁽¹⁾	V1	15V	0.0	0.5
	V2	15V	0.0	0.5
LWD30-0512 ⁽¹⁾	V1	5V	0.0	3.0
	V2	12V	0.0	1.2
LWD30-0524 ⁽¹⁾	V1	5V	0.0	3.0
	V2	24V	0.0	0.6
LWD30-1212 ⁽¹⁾	V1	12V	0.0	1.2
	V2	12V	0.0	1.2
LWD30-1224 ⁽¹⁾	V1	12V	0.0	1.2
	V2	24V	0.0	0.6
LWD30-1515 ⁽¹⁾	V1	15V	0.0	1.0
	V2	15V	0.0	1.0
LWT15H-522	V1	5V	0.5	3.0
	V2	+12V	0.0	0.6
	V3	-12V	0.0	0.4
LWT15H-5FF	V1	5V	0.5	3.0
	V2	+15V	0.0	0.6
	V3	-15V	0.0	0.4
LWT15H-525	V1	5V	0.5	3.0
	V2	+12V	0.0	0.6
	V3	-5V	0.0	0.4
LWT30H-522	V1	5V	0.7	5.0
	V2	+12V	0.0	1.2
	V3	-12V	0.0	0.6
LWT30H-5FF	V1	5V	0.7	5.0
	V2	+15V	0.0	1.2
	V3	-15V	0.0	0.6
LWT30H-525	V1	5V	0.7	5.0
	V2	+12V	0.0	1.2
	V3	-5V	0.0	0.6
LWT50H-522	V1	5V	1.0	8.0
	V2	+12V	0.0	1.5
	V3	-12V	0.0	1.0
LWT50H-5FF	V1	5V	1.0	8.0
	V2	+15V	0.0	1.5
	V3	-15V	0.0	1.0
LWT50H-525	V1	5V	1.0	8.0
	V2	+12V	0.0	1.5
	V3	-5V	0.0	1.0

LW Outline Drawing



DIMENSIONS:

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	MODEL	LBS
LWT-15	5.03 (128.0)	.31 (7.9)	.98 (25.0)	.15 (3.8)	1.811 (46.0)	.433 (11.0)	1.02 (26.0)	.15 (3.8)	3.897 (99.0)	1.988 (50.5)	.21 (5.3)	2.36 (59.9)	LWT-15	.50
LWT-30	6.29 (160.0)	.47 (12.0)	.98 (25.0)	1.77 (45.0)	3.937 (99.9)	.314 (8.0)	1.02 (26.0)	.66 (17.0)	5.433 (138.0)	.905 (23.0)	1.69 (43.0)	2.75 (70.0)	LWT-30	.70
LWT-50	6.29 (159.7)	.35 (8.8)	1.02 (26.0)	.39 (10.0)	4.625 (117.5)	.433 (11.0)	-	1.67 (42.4)	3.602 (91.5)	3.228 (82.0)	.31 (7.8)	3.82 (97.0)	LWT-50	1.00
LWD-15	4.32 (109.7)	.31 (7.9)	.98 (25.0)	.15 (3.8)	1.812 (46.0)	.437 (11.0)	1.03 (26.1)	.15 (3.8)	3.890 (98.8)	1.988 (50.5)	.21 (5.3)	2.36 (59.9)	LWD-15	.50
LWD-30	5.75 (146.0)	.48 (12.1)	.98 (25.0)	1.37 (34.9)	3.937 (99.9)	.312 (7.9)	1.03 (26.1)	.28 (7.1)	5.437 (138.0)	.906 (23.0)	1.29 (32.7)	2.36 (59.9)	LWD-30	.70
LWD-50	6.29 (159.7)	.35 (8.8)	.98 (25.0)	.39 (9.9)	4.625 (117.4)	.437 (11.0)	1.03 (26.1)	1.67 (42.4)	5.437 (138.0)	3.234 (82.1)	.31 (7.8)	3.81 (96.7)	LWD-50	1.00

1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS IN () ARE IN MM.
2. 4x M3 TAPPED HOLES FOR CUSTOMER MFG.

SCREWS MUST NOT PROTRUDE INTO P.S. BY MORE THAN .15 (4) MAX.

Other Industrial Products

HWS	15W-1500W Single output
ZWQ	80W-170W Quad output
ZP	20W-60W Single, dual & triple output
LS	25-150W Single output, low cost

For Additional Information, please visit
us.tdk-lambda.com/lp/products/lw-series.htm



Single Output Industrial Power Supplies

Features

- ◆ 5 Year Warranty
- ◆ -40°C to +71°C Operation
- ◆ MIL-STD-810E Vibration / Shock
- ◆ Input transient protected
- ◆ UL508, SEMIF47, Factory Mutual (Class 1, Division 2)
- ◆ Rugged mechanical design with coating on pcbs
- ◆ Superior thermal design
- ◆ Wide range adjustment of output



Key Market Segments & Applications

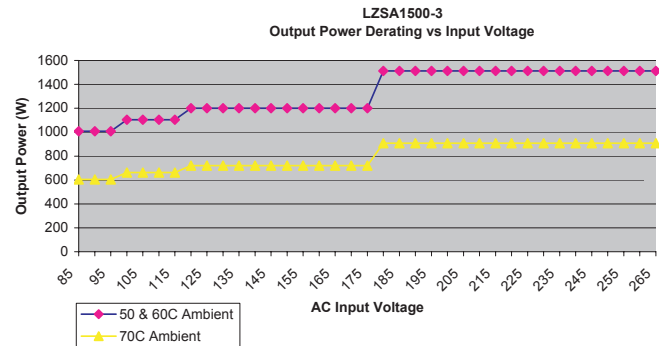
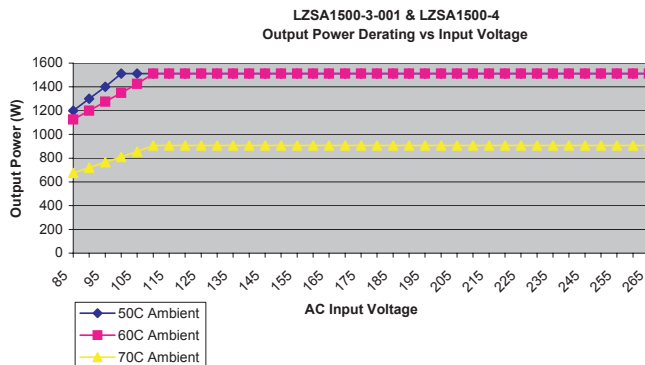


Specifications				
Model		LZSA500	LZSA1000	LZSA1500
Input Voltage (47-440Hz) (*)	-	85 - 265VAC (LZSA1500 - see output derating graphs on page 2), 100-380VDC (1)		
Inrush Current (110 / 220VAC)	A	25 / 45A	30 / 40A	
Power Factor	-	EN61000-3-2 Class A		
Efficiency (typical)	%	84%		
Ripple & Noise (Pk-Pk)(max)	-	75mV	75mV	24V: 75mV; 48V: 150mV
Line Regulation	%	0.1%		
Load Regulation	%	0.1%		
Transient Response	-	±1% deviation, recovering to ±0.2% in <1.25ms (25% load change)		
Overcurrent Protection	-	110 - 130%		
Overvoltage Protection	V	User adjustable from front panel		
Thermal Protection	-	Internal thermostat. Recycle AC to reset		
Hold Up Time at 110VAC	ms	20ms Hold Up, 20ms Ride Through		
Remote Sense	-	Compensates for a total of 1V cable drop		
Remote Adjust	-	Using front panel potentiometer, Resistance (1k/V), or Voltage (1V/V)		
Remote On / Off	-	TTL compatible, active high		
Signals	-	Optocoupled transistor for AC Fail, DC Good, Inverter OK. 200kHz sync signal (Ref-sense)		
Indicators	-	Green LED indicates output good, red LED indicates overvoltage or over temperature		
Parallel Connection	-	Single wire current share		
Operating Temperature	°C	-40° to +71°C, derate linearly to 60% load from 60°C~71°C (20 min warm up period needed for <-30°C)		
Storage Temperature	°C	-40° to +85°C		
Temperature Coefficient	-	0.01%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input - Ground 2,121VDC, Input - Output 4,242VDC, Output - Ground 500VDC		
Vibration	-	MIL-STD-810E, Method 514.4, Category 1, 9		
Shock	-	MIL-STD-810E, Method 516.4 Proc. I, II, IV, VI		
Safety Agency Certifications	-	UL60950-1, UL508, EN60950-1, FM 3600, 3611, 3810, & CE Mark. SEMIF47(>100VAC)		
Leakage current	uA	<500uA at 265VAC, 60Hz		
Emissions	-	EN55022/EN55011 Class B, EN61000-3-3, MIL STD 461/462D CE102		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11. IEEE C62.41 (6kV/30 Ohm, Criteria A)		
Altitude	m	3,000m operating, 12,000m non operating		
Weight	lbs	6.5	8.1	
Size (WxHxD)(w/o bus bars)	ins	4.25 x 4.75 x 10.25	5.62 x 4.75 x 10.5	
Warranty	yrs	Five Years		

(1) Startup > 110VDC

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes) (*) Reduced power factor above 63Hz

Derating Charts



Options

Model	Nominal Voltage (V)	Adjustment Range (V)	Maximum Current (A)	Maximum Power (W)
LZSA1000-2	12	10 - 15.75	84	1008
LZSA500-3	24	18 - 29.4	21	504
LZSA1000-3	24	18 - 29.4	42	1008
LZSA1500-3	24	18 - 29.4	63	1512
LZSA1500-3-001	24	18 - 29.4	63	1512
LZSA1500-4	48	36 - 56	31.5	1512

*Model highlighted in green is not recommended for new designs.

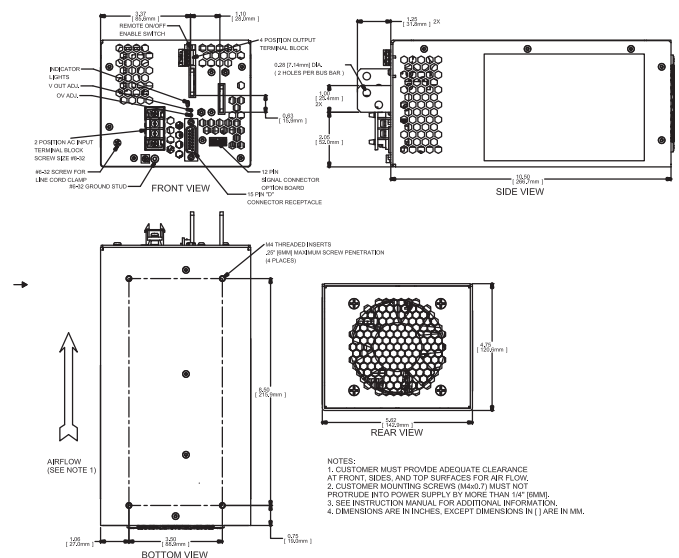
Other Industrial Products

HWS	15W to 1800W Single Output
DLP, DPP, DSP	15W to 960W DIN Rail
PFE	300W to 1000W Power Modules

For Additional Information, please visit
us.tdk-lambda.com/lp/products/lzsa-series.htm



Outline Drawing (LZSA1500)



15W to 60W Low Profile Triple Output Power Supplies

Features

- ◆ 26mm height
- ◆ 3 year Warranty
- ◆ Peak Load capable
- ◆ Light weight
- ◆ Output 1 isolated from outputs 2 & 3
- ◆ No minimum load



Key Market Segments & Applications



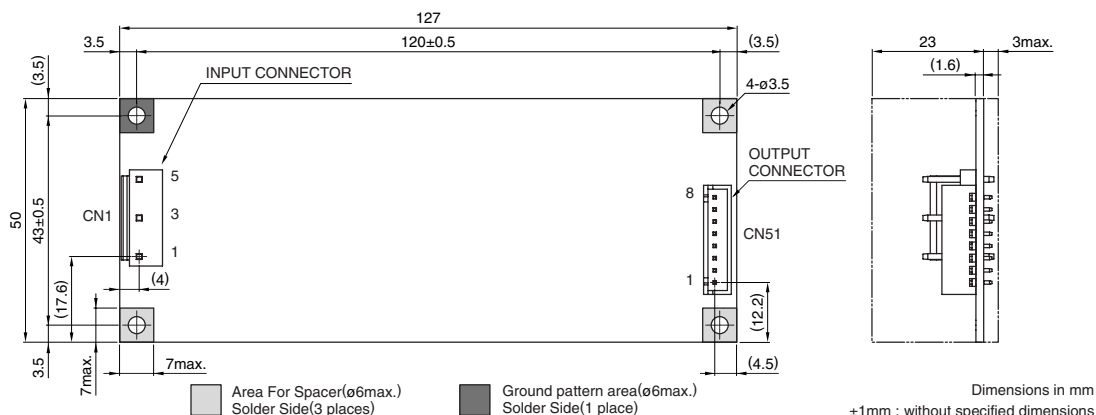
Specifications

Model		MTW15-51212 MTW15-51515	MTW30-51212 MTW30-51515	MTW60-51212 MTW60-51515
Input Voltage Range	V	85 - 265VAC (47 - 440Hz)		
Input Current Typ (1)	A	0.42 / 0.25	0.8 / 0.4	1.4 / 0.8
Inrush Current (1)	A	25 / 50	20 / 40	20 / 40
Leakage Current (240VAC, 60Hz)	mA	0.75mA Max		
Max Output Power	W	16 17.5	30 33	60 62.5
Efficiency (Typ)	%	71	76	76
Hold Up Time (1)	ms	20 / 150	20 / 140	10 / 20
Output Voltage Adjustment (3)	-	V1: 5 to 5.25V	V1: 5 to 5.2V	V1: 4.5 to 5.5V
Overcurrent Protection	-	Yes, automatic recovery. Hiccup style on MTW30 & 60		
Overvoltage Protection	V	V1: Zener Clamp	V1: Zener Clamp	V1 & V2: Zener Clamp
Operating Temperature	-	-20°C start up. -10 to +60°C, derating linearly to 70% load above 50°C		
Storage Temperature	-	-30 to +75°C		
Humidity (Non condensing)	-	10 - 90%RH (Operating & storage) at 35°C		
Cooling	-	Convection		
Withstand Voltage	-	Input to ground 2kVAC, Input to output 3kVAC, Output to ground 500VAC		
Vibration (non operating)	-	5 - 10Hz: 10mm amplitude, 10 - 200Hz: 2G (19.6m/s ²) 10m sweep time, 3 axis, 1 hour each		
Shock	-	Acceleration: 60G (588m/s ²) Half sine wave, 6 - 16ms pulse duration, 3x each direction		
Safety Agency Approvals	-	UL60950-1, CSA C22.2 No 60950-1 (C-UL), EN60950-1		
Immunity	-	EN61000-4-2 (Lv 4), -3, -4 (Lv 3), -5 (Lv 4), -6 (Lv 3), -8 (Lv 4), -11		
Conducted EMI	-	FCC-Class B, EN55011-B, EN55022-B		
Weight (Typ)	g	150	210	330
Size (WxHxL)	mm	50 x 26 x 127	65 x 26 x 140	83 x 26 x 185
Warranty	yrs	Three Years		

Notes:

- (1) 100/240VAC
- (2) Output V1 is isolated from outputs V2 & V3
- (3) Option /V suffix

Outline Drawing (MTW15)



Output Ratings

		Voltage		Minimum	Maximum	Peak Current	Ripple &
Model	Output	(V)	Regulation	Current (A)	Current (A)	(A)	Noise (mV)
MTW15-51212	V1	5V	4.75 - 5.25V	0	2.0	3.0	120
	V2	12V	11.4 - 12.6V	0	0.3	0.6	150
	V3	-12V	11.4 - 12.6V	0	0.2	0.3	150
MTW15-51515	V1	5V	4.75 - 5.25V	0	2.0	3.0	120
	V2	15V	14.4 - 15.6V	0	0.3	0.6	150
	V3	-15V	14.4 - 15.6V	0	0.2	0.3	150
MTW30-51212	V1	5V	4.9 - 5.3V	0	3	4.5	120
	V2	12V	11.4 - 12.6V	0	1.2	2.0	150
	V3	-12V	11.4 - 12.6V	0	0.3	0.45	150
MTW30-51515	V1	5V	4.9 - 5.3V	0	3	4.5	120
	V2	15V	14.25 - 15.75V	0	0.8	2.0	150
	V3	-15V	14.25 - 15.75V	0	0.3	0.45	150
MTW60-51212	V1	5V	4.9 - 5.3V	0	5.0	7.0	120
	V2	12V	11.4 - 12.6V	0	2.5	3.5	150
	V3	-12V	11.4 - 12.6V	0	0.5	0.7	150
MTW60-51515	V1	5V	4.9 - 5.3V	0	5.0	7.0	120
	V2	15V	14.25 - 15.75V	0	2.0	3.5	150
	V3	-15V	14.25 - 15.75V	0	0.5	0.7	150

Mating Connectors

	Model	Input	Output
Connectors	MTW15	VHR-5N	XHP-8
JST	MTW30	VHR-5N	VHR-6N
	MTW60	VHR-5N	VHR-8N

Options

Suffix	Description
Blank	No V1 Adjustment
/V	Potentiometer for V1 Adjustment

Other Industrial Products

ZWS	5 to 240W Single output
SC40 & SC60	50 to 80W 3x5" footprint
ZP	40 to 60W, 2x4" footprint

For Additional Information, please visit
us.tdk-lambda.com/lp/products/mtw-series.htm



2 x 4" 55W to 67W AC-DC Power Supplies

Features

- ◆ Medical & ITE Certifications
- ◆ BF Rated
- ◆ Very Low 1" profile
- ◆ Industry Standard Footprint
- ◆ Up to 89% Efficient
- ◆ <0.3W Off-load Power Draw



Key Market Segments & Applications



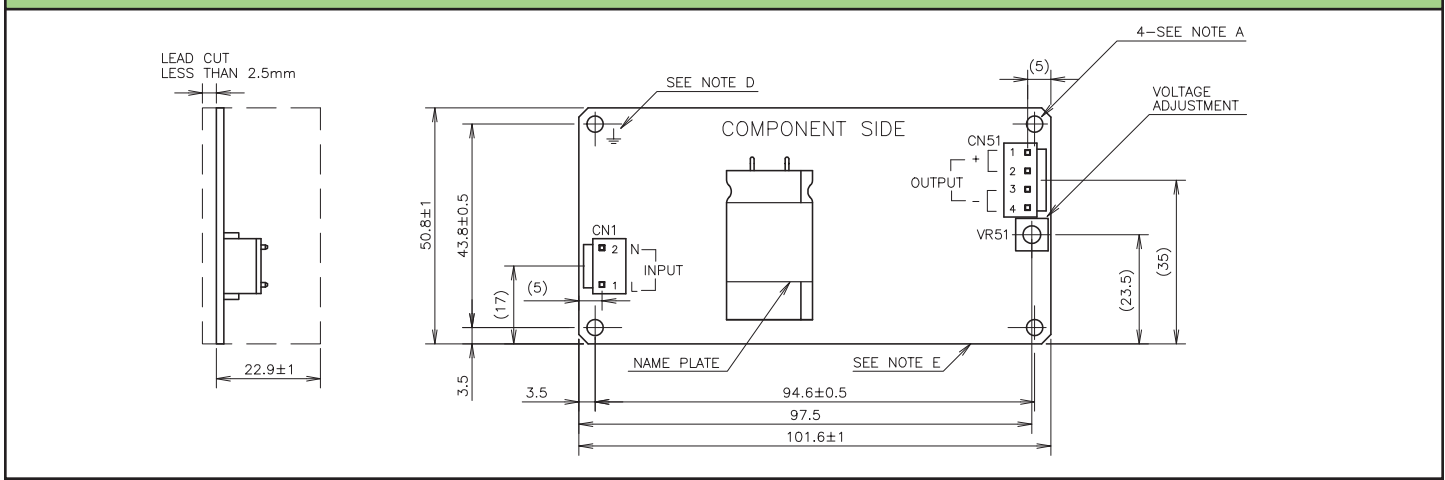
Specifications

Model		MWS65
AC Input Voltage Range	-	85 - 265VAC (47 - 440Hz)
DC Input Voltage Range	-	120 - 370VDC
Input Current (115 / 230VAC)	A	1.25 / 0.62A (Cold Start)
Inrush Current (115 / 230VAC)	A	30 / 60A
Temperature Coefficient	-	±0.02%/°C
Minimum Load	-	None
Off-load Power Draw	W	<0.3W at 230VAC
Overcurrent Protection	%	> 105%
Overvoltage Protection	%	115 - 135%
Load Regulation	%	0.8%
Line Regulation	%	0.4%
Hold Up Time (Typ)	ms	10ms / 20ms (115VAC / 230VAC input)
Leakage Current	mA	<0.25mA at 265VAC, 63Hz
Operating Temperature	°C	-20 to +70°C, derate linearly to 50% load from 50 to 70°C, Guaranteed start up at -25°C
Cooling	-	Convection
Operating Humidity (non condensing)	%RH	10 - 90% RH
Storage Temperature	°C	-40 to +85°C
Storage Humidity (non condensing)	%RH	10 - 95% RH
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC, Output to Ground 1.5kVAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s ² (10 - 500Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G), MIL-STD810-F
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark UL60601-1, EN60601-1 (2nd & 3rd edition)
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC Class B, VCCI-B
Immunity	-	EN61000-4-2 (lv 2,3), -3 (lv 3), -4 (lv 3), -5 (lv 2,3), -6 (lv3), -8 (lv4), -11
Weight (Typ)	g	150
Size (WxLxH)	in	2 x 4 x 1" (including underside components)
Warranty	yrs	Three Years

Model Selector

Model	Output Voltage (V)	Adjustment Range (V)	Maximum Output (A)	Output Power (W)	Ripple/Noise (mV)	Efficiency (115/230VAC) (%)
MWS65-5	5V	4.5 - 5.5V	11A	55	120mV	80 / 82
MWS65-12	12V	10.8 - 13.2V	5A	60	150mV	84 / 86
MWS65-15	15V	13.5 - 16.5V	4.4A	66	150mV	85 / 87
MWS65-24	24V	21.6 - 26.4V	2.8A	67.2	150mV	86 / 88
MWS65-48	48V	43.2 - 52.8V	1.4A	67.2	200mV	87 / 89

Outline Drawings



Other Medical AC-DC Products

KM	15 - 40W, 1 - 3 Outputs, Encapsulated
NV175, NV300	175 - 300W, 1 - 5 Outputs
EFE-M	300 - 400W, 1 Output
NV350, NV700	350 - 900W, 1 - 8 Outputs, Modular
Vega	450 - 900W, 1 - 11 Outputs, Modular
Alpha	1000W, 1 - 14 Outputs, Modular
SWS1000L	1000W, 1 Output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/mws-series.htm



High Reliability 15 to 90W Linear Power Supplies

Features

- ◆ Single and Dual Outputs
- ◆ Excellent Line & Load Regulation
- ◆ Remote Programming and Current Share (NNS)
- ◆ Front Panel Voltage Taps
- ◆ Thermal Protection
- ◆ Five Year Warranty
- ◆ Low Output Ripple
- ◆ Fully Featured
- ◆ Operation from -20 to +71°C Ambient



Key Market Segments & Applications



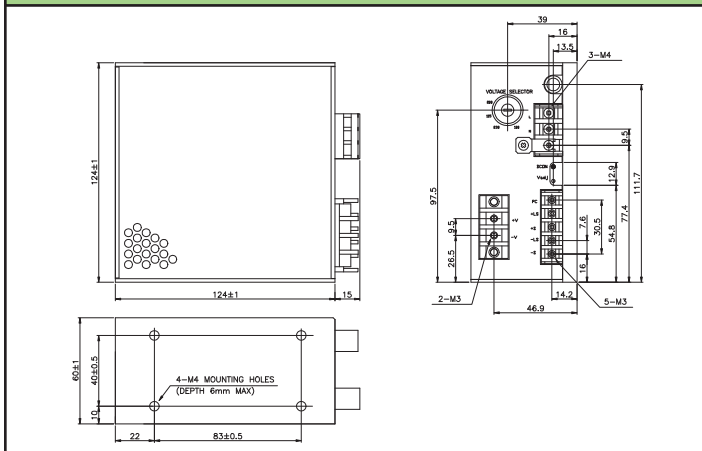
Specifications						
Model		NNS15	NNS30	NNS50	NND15	NND30
AC Input	VAC	85~115, 98~132, 170~230, 195~265VAC (Front panel selectable)				
Input Frequency	Hz	47~440Hz				
EMI	-	FCC Class B, VDE0871 Level B				
Output Adjustment	-	±10%				
Remote Sense	-	Yes	Yes	Yes	None	
Remote Programming	-	1000 Ohm/Volt			None	
Parallel Operation	-	Via PC Terminal			None	
Output Indicator	-	LED = On				
Line Regulation	%	0.01%				
Load Regulation	%	0.03%				
Cross Regulation	%	Not applicable			0.03%	
Ripple and Noise	mV	1mV rms, 3mV peak to peak				
Overcurrent Protection	%	105 to 130%				
Overvoltage Protection	VDC	5V: 6 ~ 7.2V, 12V: 14.5 ~ 17.2V, 15V: 18.1 ~ 21.5V, 24V: 29 ~ 34.3V				
Cooling	-	Convection				
Operating Temp. Range	°C	-20°C: 60%, 0 to 50°C: 100%, 60°C: 60%, 71°C: 40%				
Storage Temperature	°C	-40 to +85°C				
Temperature coefficient	%	±0.02% per °C				
Humidity (non condensing)	%RH	Operating: 20 - 95% RH, Non operating: 10 - 95% RH				
Vibration	-	10-55Hz Amplitude (sweep for 1 min), <2G X, Y, Z 1 hour each				
Shock (in package)	-	<20G				
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark				
Withstand Voltage	-	Input to Output: 3.75kVAC, Input to Chassis: 2.5kVAC for 1 minute				
Isolation Resistance	-	>100M at 500VDC @ 25C & 70%RH for 1 minute				
Weight	g	1750	2930	4200	1750	2750
Size WxHxD	mm	60x124x124	80x124x178	97x113x200	60x113.5x150	80x113.5x164
Warranty	yrs	Five years				

Note: See Installation Manual for full details, test methods of parameters and application notes

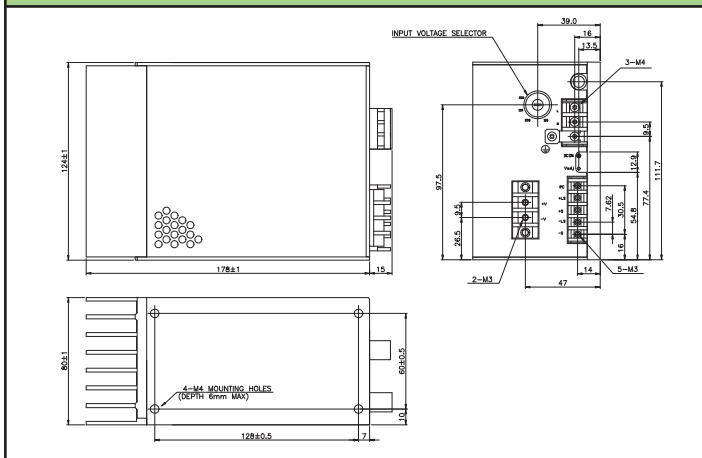
Model Selector

	Model	O/P	O/P(V)	Max Cur.(A)	Max Pwr(W)	Eff. (%)
Single Output	NNS155	V1	5	3.0	15.0	35
	NNS305	V1	5	6.0	30.0	35
	NNS505	V1	5	10.0	50.0	42
	NNS1512	V1	12	1.7	20.4	45
	NNS3012	V1	12	4.0	48.0	45
	NNS5012	V1	12	6.5	78.0	51
	NNS1515	V1	15	1.4	21.0	46
	NNS3015	V1	15	3.4	51.0	46
	NNS5015	V1	15	5.5	82.5	53
	NNS1524	V1	24	0.9	21.6	50
Dual Output	NNS3024	V1	24	2.3	55.2	50
	NNS5024	V1	24	3.8	91.2	56
	NND15-1212	V1	+12	0.75	18.0	45
		V2	-12	0.75		
	NND30-1212	V1	+12	1.6	38.4	45
		V2	-12	1.6		
	NND15-1515	V1	+15	0.6	18.0	45
		V2	-15	0.6		
	NND30-1515	V1	+15	1.3	39.0	45
		V2	-15	1.3		

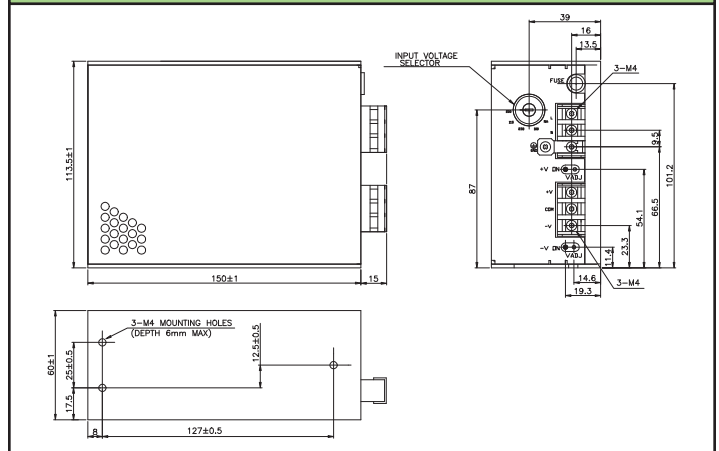
NNS15 Outline Drawing



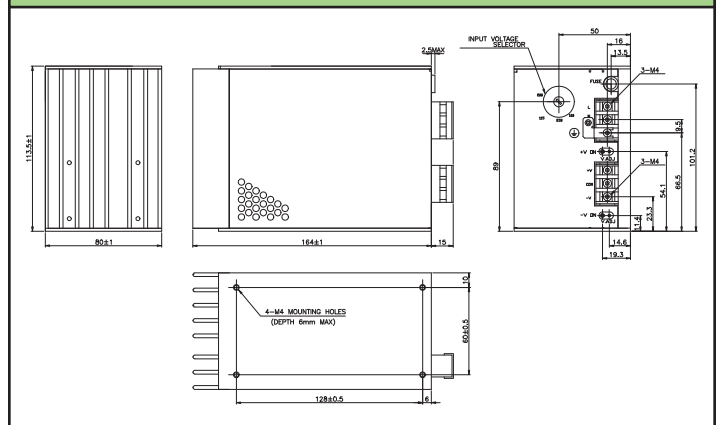
NNS30 Outline Drawing



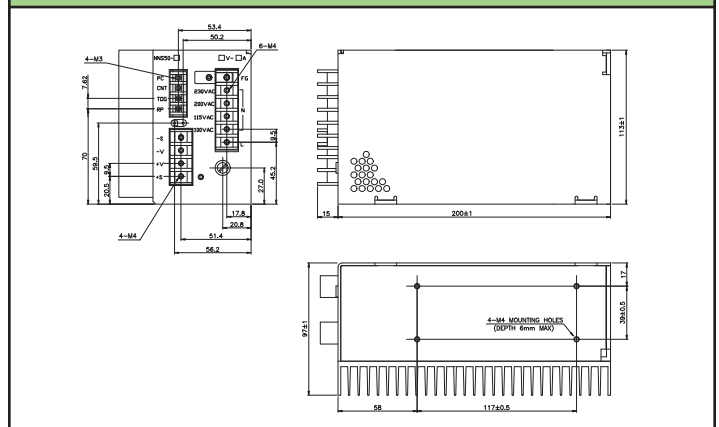
NND15 Outline Drawing



NND30 Outline Drawing



NNS50 Outline Drawing



Other Industrial Products

HWS	15 to 1500W Single output, universal input switching
ZWS	5 to 150W single output, universal input (switching)
VS & VSC	10 to 150W single output, 115VAC input (switching)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nn-series.htm



3" x 5" 175-200W Power Supplies

Features

- ◆ 1-5 Outputs
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ No Minimum Loads
- ◆ Medical Approvals (Basic Insulation Input-Output)



Key Market Segments & Applications



Specifications

Model	NV175	
Input Voltage range	-	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)
Inrush Current	A	<40A at 25°C and 264VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)
Regulation Total	-	1%; Including Line (for 90-264VAC input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation
Ripple & Noise	mV	1% or 50mV (Which ever is greater)
Efficiency	-	Up to 90%, configuration dependant
Minimum Load	A	None
Overcurrent Protection	-	>105%
Overvoltage Protection	V	CH1 & CH2, 120-130%, Cycle AC line to reset
Overtemperature Protection	-	Yes
Hold Up Time (Typ)	ms	>16ms at 90VAC Input
Leakage Current (max)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)
Remote Sense	-	On Outputs CH1 & CH2, 0.5V compensation maximum
DC Good	-	CH1 Only, High on Fail (90% of nominal ±5%)
Remote On/Off (Specify N option)	-	-N1 or -N2 option: TTL level high = Off, -N3 or -N4 option: open circuit = Off (except standby)
Operating Temperature (1)(7)	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C
Storage Temperature	-	-40 to +85°C
Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Forced air, 2m/s from input to output (Approx 10 CFM)
Isolation (4)	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC
Vibration (non operating)	-	Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI; EN60068-2-6, IEC68-2-6
Shock	-	Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9; EN60068-2-27, EN60068-2-47, IEC68-2-47, IEC68-2-47, JIS C0041-1987
Safety Agency Approvals	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, IEC60950-1, CE for LVD, UL, EN, IEC60601-1, EN61010-1, IEC61010-1
Immunity	-	EN61000-6-2:2001, EN61000-4-2, -3, -4, -5, -6, -8, -11
Conducted Emissions and Flicker	-	EN55022 Class B (per CISPR.22), EN61000-3-3
Radiated Emissions (2)	-	EN55022 Class A (per CISPR.22)
Weight (Typ)	g	250g
Size (without cover) (3)	in	3" x 5" x 1.25"; N option version 3.7" x 5" x 1.25"
Warranty	yrs	Three Years

(1) -20°C cold start

(2) See application note for Class B

(3) Including underside component leads

(4) Input-Output: Reinforced IEC60950-1, Basic IEC 60601-1. See NV175-M for reinforced medical insulation

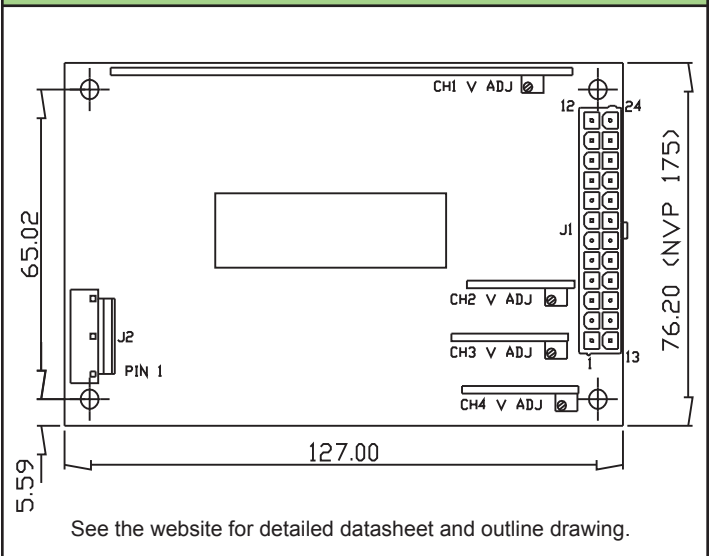
Stocked Models Quick Selector

Model	CH1 (5)	CH2 (5)	CH3	CH4	CH5 Stand By (6)	Global Option Type
NV1-1T000	12V/15A	-	-	-	-	-
NV1-1G000	24V/7.5A	-	-	-	-	-
NV1-453TT	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	-	-
NV1-453FF	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	-	-
NV1-4G5TT	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	-	-
NV1-4G5FF	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	-	-
NV1-453TT-N3	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	5V/2A	N3 (ATX)
NV1-453FF-N3	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	5V/2A	N3 (ATX)
NV1-4G5TT-N3	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	5V/2A	N3 (ATX)
NV1-4G5FF-N3	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	5V/2A	N3 (ATX)

Notes:

- (5) Maximum combined current from CH1 + CH2 = 25A
5V CH1 models are limited to 175W max. All others 180W, 200Wpk 5 mins
- (6) CH5 is always on regardless of inhibit status. Peak rated at 2.5A, floating output
- (7) Convection cooled maximum ratings: CH1: 55W, CH2: 8.25W, CH3: 9W,
CH4: 3W, 75.25W total. 0°C - 40°C temperature range
- (8) 12 - 12.5V if 24V CH3 is fitted.
- (9) 14.5 - 15.5V if 24V CH3 is fitted.
- (10) 24 - 24.5V if 5V CH2 is fitted.
24 - 26V if 24V CH3 is fitted

Outline Drawing



Built to Order Model Selector

CH1	CH1(5)	Adjust.		CH2	Adjust.		CH3	Adjust.		CH4	Adjust.			
	Code	Range	CH2(5)	Code	Range		Code	Range		Code	Range			
+5V / 25A	5	5 - 5.5V	+1.8V / 15A	1	0.9 - 3.3V	+12V / 5A +15V / 5A +24V / 2.5A No output	T F G 0	12 - 15V 12 - 15V 18 - 24V -	-12V / 1A	T	Fixed			
			+2.7V / 15A	2	2.5 - 3.3V				-15V / 1A	F	Fixed			
			+3.3V / 15A	3	2.5 - 3.3V				-3.3V / 2A	3H	Fixed			
			No output	0	-				-5V / 2A	5H	Fixed			
												-12V / 2A	TH	Fixed
												-15V / 2A	FH	Fixed
+12V / 15A	T	12 - 15V (8)	+5V / 10A	5	3.3 - 5.5V							Fan Supply only	0H	Fixed
+15V / 12A	F	12 - 15V (9)	No output	0	-							No output	0	
+24V / 7.5A	G	24 - 28V (10)	+5V / 8A	5	3.3 - 5.5V							Add "P" to code for positive polarity output	Add "P" to code for positive polarity output	

How to Create a Model Number

NV1-	Enter number of outputs	CH1 Code	CH2 Code	CH3 Code	CH4 Code	Global Option	Case Option
------	-------------------------	-------------	-------------	-------------	-------------	------------------	----------------

No Option
AC Fail, Remote On/Off, 5V/2A Standby, CH1 DC Good
AC Fail, Remote On/Off, 13.5V/1A Standby, CH1 DC Good
ATX AC Fail+Remote On/Off, 5V/2A Standby, CH1 DC Good
ATX AC Fail+Remote On/Off, 12V/1A Standby, CH1 DC Good

* A high output CH4 (3H, 5H, TH, FH) or fan supply 0H must be selected to provide fan option.

Blank N
N2
N3
N4

Blank U
C
F
I

No Case
U Chassis
U Chassis with Cover
U Chassis, Cover and Fan*
U Chassis, Cover and Fan* and IEC inlet

Example

NV1 3 G 5 0 3HP N C

Description: Triple output, 24V/7.5A, 5V/8A, 3.3V/2A, Global option N, U Chassis with cover.

Mating Parts (Molex)

CONN	Housing	Pins
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113

Other Industrial Products

NV	300 to 700W Medical, 1-6 outputs
SC40/60	40 to 80W single, dual & triple 3x5 footprint
ZWS/ZWSPAF	5 to 240W single output power supplies

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv-series.htm



3" x 5" 180-200W Medical Power Supplies

Features

- ◆ 1-3 Outputs
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ No Minimum Loads
- ◆ Reinforced Insulation Input-Output (4kVAC)



Key Market Segments & Applications



Specifications

Model		NV175-M
Input Voltage range	-	90 - 264VAC (45 - 63Hz)
Inrush Current	A	<40A at 25°C and 264VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)
Regulation Total	-	1%; Including Line, Load and Cross regulation
Ripple & Noise	mV	1% or 50mV (Which ever is greater)
Efficiency	-	Up to 90%, configuration dependant
Minimum Load	A	None
Overcurrent Protection	-	>105%
Overvoltage Protection	V	CH1, 120-130%, Cycle AC line to reset
Overtemperature Protection	- Yes	
Hold Up Time (Typ)	ms	>16ms at 90VAC Input
Leakage Current (max) (*)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)
Remote Sense	-	On Output CH1, 0.5V compensation maximum
DC Good	-	CH1 Only, High on Fail (90% of nominal ±5%)
Peak Power (Single output units)	-	200W (<5 mins. Average power not to exceed 180W)
Operating Temperature (1)	-	0 to +65°C. Derate linearly to 62.5% load from 50°C to 65°C
Storage Temperature	-	-40 to +85°C
Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Forced air, 2m/s from input to output or use -F option
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4kVAC, Output to Ground 200VDC
Vibration (non operating)	-	Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI; EN60068-2-6, IEC68-2-6
Shock	-	Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9; EN60068-2-27, EN60068-2-47, IEC68-2-47, IEC68-2-47, JIS C0041-1987
Safety Agency Approvals	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, IEC60950-1, CE for LVD, UL60601-1, IEC60601-1, EN60601-1, EN61010-1, IEC61010-1
Immunity	-	EN61000-6-2:2001, EN61000-4-2, -3, -4, -5, -6, -8, -11
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.22), EN61000-3-3
Radiated Emissions (2)	-	EN55011, EN55022 Class B (per CISPR.22)
Weight (Typ)	g	250g
Size (without cover) (3)	in	3" x 5" x 1.3"
Warranty	yrs	Three Years

(1) -20°C cold start

(2) See application note for Class B

(3) Including underside component leads

(*) Lower leakage versions available - contact factory

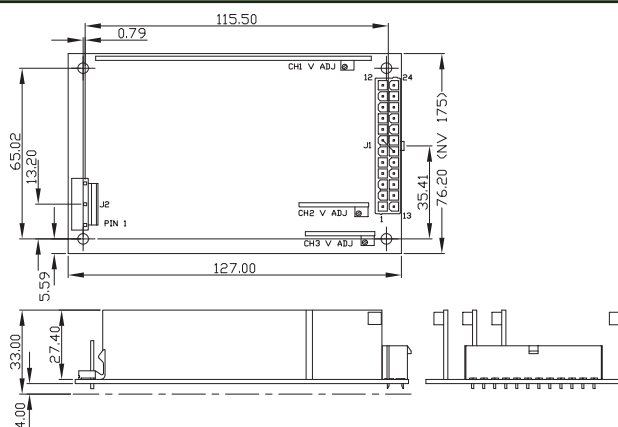
Stocked Models Quick Selector

Model	CH1 (4)	CH2 (4)	CH3
NV1-1T000-M	12V/15A	-	-
NV1-1G000-M	24V/7.5A	-	-
NV1-3G0TT-M	24V/7.5A	12V/5A	-12V/1A
NV1-3G0FF-M	24V/7.5A	15V/5A	-15V/1A

Notes:

- (4) 12 - 12.5V if 24V CH3 is fitted.
(5) 14.5 - 15V if 24V CH3 is fitted.
(6) 24 - 26V if 24V CH3 is fitted.
(7) 1.5A max if -F is specified.

Outline Drawing



See the website for detailed datasheet and outline drawing.

Built to Order Model Selector

CH1	CH1 Code	Adjust. Range	CH2	CH3	CH3 Code	Adjust. Range	CH4	CH4 Code	Adjust. Range
+12V / 15A	T	12 - 15V (4)	Not available	+12V / 5A	T	12 - 15V	-12V / 1A	T	Fixed
+15V / 12A	F	12 - 15V (5)		+15V / 5A	F	12 - 15V	-15V / 1A	F	Fixed
+24V / 7.5A	G	24 - 28V (6)		+24V / 2.5A	G	18 - 24V	+3.3V / 2A (7)	3HP	Fixed
			No output	0	-	+5V / 2A (7)	5HP	Fixed	
						-12V / 2A (7)	TH	Fixed	
						-15V / 2A (7)	FH	Fixed	
						Fan Supply only	0H	Fixed	
						No output	0		
				Add "Y" to code for negative polarity output	Add "Y" to code for negative polarity output		Add "P" to code for positive polarity output	Add "P" to code for positive polarity output	

How to Create a Model Number

[illegible]

Example

NV1 3 G 0 TY 5HP C -M -R

Description: Triple output, 24V/7.5A, -12V/5A, +5V/2A, U Chassis with cover, Horizontal Connector

Mating Parts (Molex)

CONN	Housing	Pins
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113

Other Medical Products

NV350, 700	350-968W 1U Modular Power Supply 1-6 outputs
Vega	450-900W Modular Power Supply
HWS/ME	30-1500W Single Output Power Supply

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv-series.htm



3.75" x 7.25" 300W Power Supplies

Features

- ◆ Medical Safety Certifications
- ◆ Universal Input (90 - 264VAC)
- ◆ Up to 5 Outputs (including standby)
- ◆ No Minimum Loads
- ◆ High Efficiency
- ◆ Low Profile



Key Market Segments & Applications



Specifications

Model		NV300 (300W Output Power)	
Input Voltage range	-	90 - 264VAC (45-63Hz, 440Hz with reduced PFC) 120 - 350VDC	
Inrush Current	A	<15A at 25C and 264VAC input, Cold Start	
Power Factor Harmonics	-	EN61000-3-2 Class A Compliant, 0.97 typical	
Total Regulation	-	CH1-3: 1.5%, CH4: 2.5%	
Ripple & Noise	mV	1% or 50mV (whichever is the greater)	
Efficiency	-	Up to 90%, configuration dependant	
Minimum Load	A	None	
Overcurrent Protection	-	Yes	
Overvoltage Protection	V	Yes, see application notes for details	
Overtemperature Protection	-	Yes	
Hold Up Time (Typ)	ms	>16ms at 90VAC Input	
Leakage Current (max)	µA	123µA 120VAC, 60Hz; 257µA 240VAC 60Hz, <300µA 264VAC, 63Hz (Type Test result)	
Remote Sense	-	On Outputs CH1 & CH2, 0.5V Maximum compensation	
DC Good	-	Logic low signal indicates CH1 is within regulation	
Remote On//Off	-	TTL logic level high (or open) will inhibit all outputs (except standby)	
Operating Temperature (1)	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	5 - 95% RH	
Cooling	-	Forced air 2m/s from input to output, unless internal temperature controlled fan is specified	
Isolation	-	Input to Ground 2.25kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC	
Vibration (non operating)	-	Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI; EN60068-2-6; IEC68-2-6	
Shock	-	Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9; EN60068-2-27, -2-47, IEC68-2-27, -2-47, JIS C0041-1987	
Safety Agency Certifications	-	UL, CSA, EN and IEC60950-1; EN and IEC61010-1; UL, EN and IEC60601-1; CE for LVD (Contact factory for agency status)	
Immunity	-	EN50082-2: EN61000-4-2, -3, -4, -5, -6, -8, -11, -14	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)	
Weight (Typ)	g	470	
Size (pcb version) (2)	in	3.75 x 7.25 x 1.34 (4.72 x 7.25 x 1.34 for N option version)	
Warranty	yr	Three Years	

Notes:

(1) -20°C cold start

(2) Including underside component leads

Stocked Models Quick Selector

Part Number	Description	CH1 (4)	CH2 (4)	CH3	CH4	CH5 Stand By (3)	Global Option Type
NVA30152P	NVA3-350TTH	+5V/40A	-	+12/5A	-12V/2A	-	-
NVA30166W	NVA3-350FFH	+5V/40A	-	+15V/5A	-15V/2A	-	-
NVA30042H	NVA3-453TTH	+5V/40A	3.3V/15A	+12/5A	-12V/2A	-	-
NVA30135N	NVA3-453FFH	+5V/40A	3.3V/15A	+15V/5A	-15V/2A	-	-
NVA30168Y	NVA3-350TTH-N3	+5V/40A	-	+12/5A	-12V/2A	+5V/2A	ATX (-N3)
NVA30167X	NVA3-350FFH-N3	+5V/40A	-	+15V/5A	-15V/2A	+5V/2A	ATX (-N3)
NVA30103D	NVA3-453TTH-N3	+5V/40A	3.3V/15A	+12/5A	-12V/2A	+5V/2A	ATX (-N3)
NVA30170R	NVA3-453FFH-N3	+5V/40A	3.3V/15A	+15V/5A	-15V/2A	+5V/2A	ATX (-N3)

Notes:

(3) CH5 is a standby voltage (always on)

Built to Order Model Selector

CH1	CH1 Code	Adjust. Range ⁽⁵⁾	CH2	CH2 Code	Adjust. Range	CH3	CH3 Code	Adjust. Range	CH4 ⁽²⁾	CH4 Code ⁽²⁾	Adjust. Range
+5V / 40A ⁽¹⁾	5	5 - 5.5V	+1.8V / 15A +2.7V / 15A +3.3V / 15A +2.7V / 24A +3.3V / 24A Omit	1 2 3 2H 3H 0	0.9 - 2.5V 2.5 - 3.8V 2.5 - 3.8V 2.5 - 3.8V 2.5 - 3.8V -	+12V/5A ⁽⁴⁾ +12V/8A ⁽⁶⁾ +15V/4A ⁽⁴⁾ +15V/6.4A ⁽⁶⁾ +24V/2.5A Omit	T TH F FH G 0	12 - 15V 12 - 15V 12 - 15V 12 - 15V 18 - 24V -	-3.3V / 2A ⁽³⁾ -5V / 2A ⁽³⁾ -12V / 2A ⁽³⁾ -15V / 2A ⁽³⁾ Fan supply only Omit	3H 5H TH FH 0H 0	Fixed Fixed Fixed Fixed Fixed Fixed
+12V / 25A	T	12 - 13V	+5V / 10A +5V / 16A Omit	5 5H 0	3.3 - 5.5V 3.3 - 5.5V -						
24V / 12.5A	G	24 - 28V ⁽⁸⁾	+5V / 8A +5V 12.5A +12V 10A +15V 10A Omit	5 5H T F 0	5 - 5.5V 5 - 5.5V 12 - 15.5V 12 - 15.5V -						

How to Create a Model Number

NVA3-	Enter number of outputs	CH1 Code	CH2 Code	CH3 Code	CH4 Code	Global Option	Case Option	Other output voltages are available, contact factory.
						Blank -N3 -N4	Blank U C F I	No case U Chassis U Chassis with Cover End fan, U chassis & cover ⁽⁷⁾ IEC input, end fan, U chassis & cover ⁽⁷⁾

Note:

- (1) Maximum combined current from CHs 1 & 2 = 40A
 (2) Add 'P' suffix to code for positive output (ex. 3HP)
 (3) 1.5A maximum if used with "-F" option
 (4) 60W maximum output power

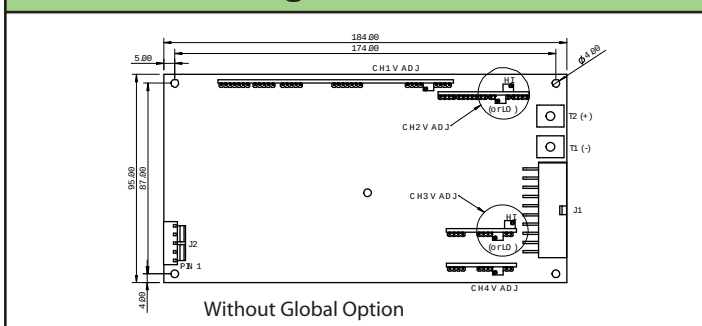
- (5) Maximum output voltage (includes remote sense)
 (6) 96W maximum output power
 (7) CH4 code of 3H, 5H, TH, FH or 0H must be used
 (8) 24 - 24.5V if CH2 = 5V, 24 - 26V if CH3 = 24V

Example

NVA3-353G0H-N3F

Description: Triple output, 5V/40A, 3.3V/15A, 24V/2.5A, Global Option (N3), cover & fan (F).

Outline Drawing



Other Industrial Products

NV175, 350, 700	175W to 700W 1U power supplies
HWS	15 to 1500W single output power supplies

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv-series.htm



350W to 1150W Modular Power Supplies

Features

- ◆ 1U Form Factor
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ Up to 8 Outputs (6 for the NV350)
- ◆ No Minimum Loads
- ◆ Medical Certifications
- ◆ Peak power rating of up to 1450W

Key Market Segments & Applications



Specifications

Model		NV3	NV7
Output Power	W	350W (660W >180VAC input)	700W (1150W >150VAC input)
Peak Power (Up to 10s)	W	520W (740W >180VAC input)	850W (1450W >150VAC input)
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)	
Inrush Current (25°C, Cold Start)	A	<15	<40
Power Factor Harmonics	-	EN61000-3-2 Compliant	
Line Regulation	-	< 0.1% for 90-264VAC input change	
Load Regulation (0-100% change)	-	B, BH Modules: < 1%, DB modules output 2: <2%, DA Modules: <3%	
Cross Regulation	-	< 0.1% for 100% load change on any output, (DA module CH1<0.2%, CH2<3%)	
Ripple & Noise	mV	1% or 50mV, whichever is greater	
Efficiency	-	Up to 90%, configuration dependant	
Minimum Load	A	None	
Overcurrent Protection	-	110 - 150%, hiccup mode (Primary limited)	
Overvoltage Protection	V	Yes	
Overtemperature Protection	-	Yes, recycle AC to reset	
Hold Up Time (Typ at 90VAC Input)	ms	>16ms (12ms for NV700 with >700W output power)	
Leakage Current (1)	µA	130µA 120VAC, 60Hz, 260µA 240VAC 60Hz	
Remote Sense	-	Standard on single output modules and output 1 on DB module only	
Module Good	-	Open collector, on indicates output is good (N/A on DA modules)	
Module Inhibit	-	TTL logic level high inhibits the module (both outputs on DB outputs) ⁽²⁾	
AC Fail (Specify as option)	-	High on fail	
Operating Temperature	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C ⁽³⁾	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	5 - 95% RH	
Cooling	-	Internal fan or 1m/s with system supplied air (NV3 only)	
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC ⁽⁵⁾ , Output to ground 200VDC	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes	
Shock	-	30G per IEC68-2-27	
Safety Agency Certifications	-	UL, CSA, EN, IEC60950-1, CE for LVD, EN, IEC60601-1, UL, EN, IEC 61010-1	
Immunity	-	EN50082-2: EN61000-4-2, -3, -4, -5, -6, -8, -11	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.22) ⁽⁴⁾	
Weight (Typ)	g	800	1160
Size	in	1.6 x 3.75 x 10.8"	1.6 x 4.92 x 10.8
Warranty	yrs	Three Years	

(1) Worse case: <300µA 264VAC, 63Hz (normal condition, <500µA single fault condition)

(2) Output 2 remote on/off inhibits just Output 2 of DB module

(3) -20°C cold start, derate from 45C for NV7 when input voltage < 100VAC

(4) See application note for Class B

(5) C & CC Module 4kVAC

1. Configuration Guide

You can create your own NV350 or NV700 configuration online at www.nv-power.com. This method checks your configuration and offers the optimum solution. Alternatively, you can do this manually by using the guide below. Calculate total output power to ensure power requirements within 350W or 1150W, then select required Cooling, Connection and Controls/Signals from the following tables:

Output Power	NV3 NV7	250W with reverse air	NV3	S	S	S	EN5V
Cooling	S R C V	Standard air - forward Reverse air ⁴ Customer air - no fan ¹ Variable speed fan (Std on NV700)					
Input Connection	S I	Screw IEC320 ²					
Primary Option2	ES5V ES12V IS5V IS12V EN5V EN12V IN5V IN12V	AC good, PSU enable, 5V/2A standby AC good, PSU enable, 12V/1A standby AC good, PSU inhibit, 5V/2A standby AC good, PSU inhibit, 12V/1A standby AC good, PSU enable, 5V/2A standby, global module good AC good, PSU enable, 12V/1A standby, global module good AC good, PSU inhibit, 5V/2A standby, global module good AC good, PSU inhibit, 12V/1A standby, global module good					

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales
2 - Not with customer air cooling

3 - The Primary Option uses 1 slot
4 - Not with NV7

2. Output Section

Select Output Modules from the Module Tables below ensuring that no more that 6 slots (NV-350) or 8 slots (NV-700) in total are used.

Example - if you require 5.2V 40A :-

- Select B as closest match for voltage & current and prefix with voltage eg 5.2B
- Repeat for other outputs.

This will create a complete product description eg **NV3SSSES5V 5.2B 12/15DB** which represents a three output NV350 with

Forward air cooling, Screw input terminals, 300µA Leakage, ac good, PSU enable and 5V/2A aux supply

Output 1 = 5.2V / 40A
Output 2 = 12V / 13A with screw terminals
Output 3 = 15V / 4A with screw terminals
Max 350W continuous output power

Contact Lambda to validate configuration or visit the NV webpage to validate part number. (www.nv-power.com)

Single Output Modules

Voltage Range	Curr.	Peak Curr.	#/slots	Mod. Code
3.6V	40A	-	2	B
4.75 - 5.5V	40A ⁽¹⁾	-	2	B
7 - 9V	22.5A ⁽⁶⁾	-	2	B
12 - 15.5V	20A ⁽²⁾	-	2	BH
24 - 28V	10A ⁽³⁾	-	2	BH
12 - 13.2V	37.5A ⁽⁷⁾	50A ⁽⁷⁾	3	C
15 - 16.5V	30A ⁽⁷⁾	37.5A ⁽⁷⁾	3	C
24 - 26.4V	18.75A ⁽⁷⁾	25A ⁽⁷⁾	3	C
24 - 26.4V	37.5A ⁽⁹⁾	50A ⁽⁹⁾	6	CC
30 - 33V	30A ⁽⁹⁾	37.5A ⁽⁹⁾	6	CC
48 - 52.8V	18.75A ⁽⁹⁾	25A ⁽⁹⁾	6	CC

- (1) NV3: 5.2-5.5V, derate linearly from 40A to 36A
NV7: 5-5.5V, derate linearly from 40A to 36A
- (2) NV3: 13.2-15.5V, derate linearly from 20A to 16.5A
NV7: 12.5-15.5V, derate linearly from 20A to 15.5A
- (3) NV3: 25.7-28V, derate linearly from 10A to 8.5A
NV7: 24-28V, derate linearly from 10A to 8.5A
- (4) 12.5-15V, derate linearly from 13A to 10A
- (5) 25-28V, derate linearly from 7A to 6A
- (6) 8-9V derate linearly from 22.5A to 20A
- (7) NV3: 400W max (to be confirmed)
NV7: 450W average, 600W peak for 10s
- (8) One DA module per power supply
- (9) NV700 only

Dual Output Module (Common 0V)(1 Slot)⁽⁸⁾

Output 1	Output 2	Module Code
+12V 3A	-12V 1A	DA

Dual Output Modules (2 Slots each)

Module Code = DB				
Output 1		Output 2		
Voltage Range	Current	Voltage Range	Current	Max Power
3.2 - 3.6V	25A	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
4.75 - 5.5V	25A	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
12 - 15V	13A ⁽⁴⁾	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
24 - 28V	7A ⁽⁵⁾	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv-series.htm



350W Front End Power Supplies

Features

- ◆ 1U Form Factor
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ Designed for Distributed Power
- ◆ Medical Approvals



Key Market Segments & Applications



Specifications

Model		NV350-FEP
Input Voltage range	-	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)
Inrush Current	A	<15A at 25°C and 264VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant
Line Regulation	-	< 0.1% for 90-264VAC input change
Load Regulation (max)	-	For 0-100% load change, Ch1: 1%; Ch2: 2%
Ripple & Noise	mV	<1%
Efficiency (typical)	-	90%
Minimum Load	A	None
Overcurrent Protection	-	110 - 150%, hiccup mode (Primary limited)
Overvoltage Protection	V	15-16V Cycle AC line to reset (Output 1 only)
Overtemperature Protection	-	Yes, recycle AC to reset
Hold Up Time (Typ)	ms	>16ms at 90VAC Input
Leakage Current (max)	mA	300µA max at 264VAC, 63Hz
Remote Sense	-	Ch1 only. Compensates for 0.5V total line drop
AC Good (Specify as option)	-	High on fail
Operating Temperature	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C ¹
Storage Temperature	-	-40° to +85°C
Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Internal fan or 1m/s from input to output with system supplied air
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes
Shock	-	30G per IEC68-2-27
Safety Agency Approvals	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, IEC60950-1, CE for LVD, EN60601-1, IEC60601-1, EN61010-1, IEC61010-1
Immunity	-	EN50082-2: EN61000-4-2, -3, -4, -5, -6, -8, -11
Conducted Emissions and Flicker	-	EN55022 Class B (per CISPR.22), EN61000-3-3
Radiated Emissions	-	EN55022 Class B (per CISPR.22) ²
Weight (Typ)	g	800g (configuration dependent)
Size	in.	1.6 x 3.75 x 9.15" (includes fan)
Warranty	yrs	Three Years

Notes:

(1) -20°C cold start

(2) See application note for Class B

1. Configuration Guide

Chose your options for boxes A through D.

			A	B	C	D
Output Power	NF3	350W	NV3	S	S	ES5V
Cooling	S R C	Forward air Reverse air Customer air - no fan ¹				
Input Connection	S I	Screw IEC320 ²				
Leakage Current	S	Standard 0.3mA	(max leakage current at) 264VAC, 63Hz)			
Primary Option	ES5V ES12V IS5V AC good, PSU inhibit, 5V/2A standby IS12V	AC good, PSU enable, 5V/2A standby AC good, PSU enable, 12V/1A standby AC good, PSU inhibit, 12V/1A standby				

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales

2 - Not with customer air cooling

2. Output Section

Select Output Module from the table below.

Example: If you require 12V/29A with enable option and 5V standby, select FE module and prefix with output voltage (e.g. 12FE), and primary option ES5V.

This will create a complete product description (e.g. NF3SSSES5V 12FE) which represents a three output NV350-FEP with: Forward Air, Screw Input Terminals, 0.3mA Leakage, AC Good, PSU Enable and 5V Standby.

Output 1 = 12V/29.2A

Output 2 = 12V/0.5A

Output 3 = 5V/2A (Standby)

Maximum 350W continuous output power.

2. Output Section

Module Code = FE

Channel 1			Channel 2			Maximum
Voltage Range	Maximum Current	Maximum Power	Output Voltage	Maximum Current	Maximum Power	Output Power
11.5-13.2V	29.2A	350W	12V ³	0.5A	6W	350W

(3) Output set accuracy: ±5%

Other Products

NV175, 350	1U Power Supply 1-5 outputs
Vega 450, 650, 900	450 to 900W Modular Power Supply 1-10 outputs
Alpha 1000, 1500	1000W to 1500W Modular Power Supply 1-16 outputs

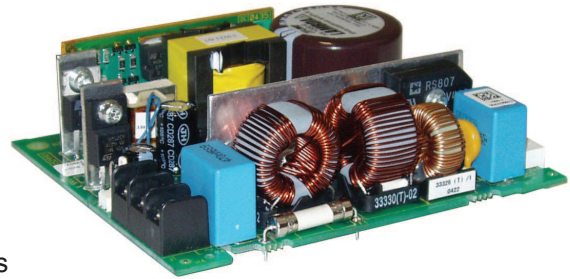
For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv-series.htm



350W Front End Power Supply

Features

- ◆ < 1U Profile
- ◆ 95% Efficient
- ◆ Active Power Factor Correction
- ◆ Integral Class B EMI Filtering
- ◆ Suitable for use in Custom Power Supplies
- ◆ Provides high voltage DC to Lambda's PH Series Power Modules
- ◆ Low Leakage current

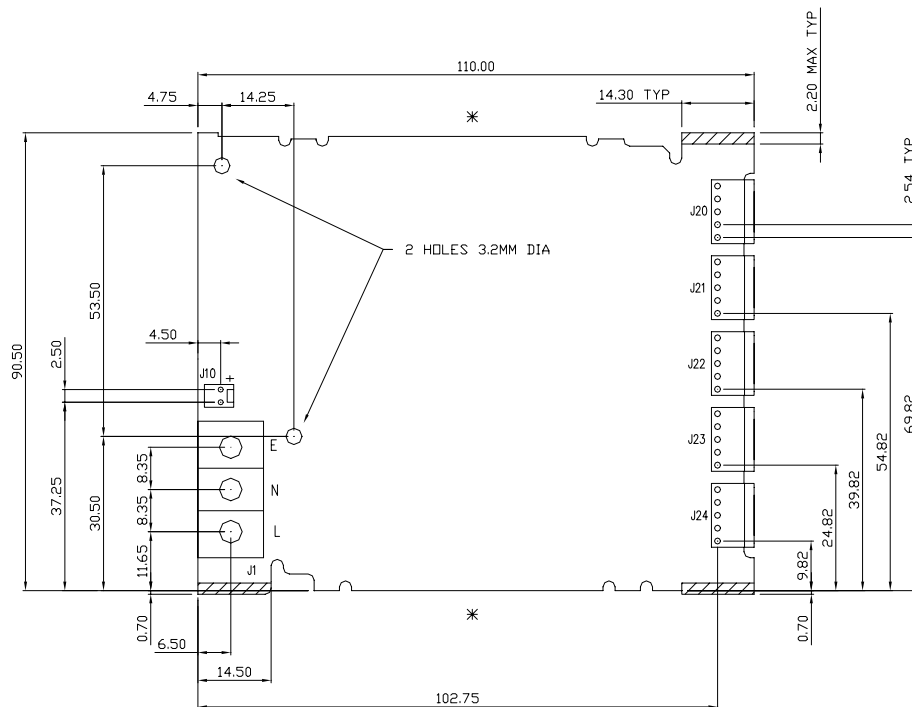


Specifications

Model		K30010
Input Voltage	VAC	90 - 264VAC (47-440Hz)
Input Harmonics & Flicker	-	EN61000-3-2 & EN61000-3-3Compliant
Input Current	A	5.7A max
Inrush Current	A	< 15A
Leakage current	µA	300µA max at 264VAC & 63Hz
Fuse	-	Internal fuse 6.3A/250V fast acting HBC, 5 x 20mm
Output Voltage	VDC	375V +/- 20V
Auxiliary Output Voltage	VDC	13.5V +/-5% @ 250mA
Fan Output	VDC	12V nominal, 0.25A max
Output Power at 100/200VAC	W	350W for ambient temperature up to 50°C
Efficiency (typ)	-	95% typical
Overcurrent Protection	A	20A typical
Thermal Shutdown	°C	120°C on the IMS circuit board
AC Fail Signal	-	Yes
Operating Temperature	°C	0°C to +65°C (derating 2.5% / °C above 50°C), -20°C startup
Storage Temperature	°C	-40°C to +85°C
Humidity	-	5 to 95% RH, non-condensing
Altitude	m	-200m to 3000m operational, 15,000m non operational
Cooling	m/s	1 m/s airflow from input to output required
Shock	G	+/- 3 x 30G shocks in each plane, total 18 shocks. 30G shocks are 11ms (+/- 0.5ms), half sine. Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987
Vibration	G	2G, Single axis 10 - 500Hz (sweep and endurance) in all 3 planes
Withstand Voltage	kVDC	I/P~Grnd 2.35kVDC, I/P to fan output (J10) 4.35kVDC
Conducted & Radiated Emissions	-	EN55022 Class B (as per CISPR.22)
Safety Agency Approvals (Pending)	-	UL60950-1, CSA22.2 No. 60950-1, IEC/EN60950-1, CE Mark
Size (L x W x H)	in	4.33" x 3.56" x 1.38"
Weight	lbs/g	0.6 / 280 NET 0.65 / 300 SHIP
MTBF	Hours	> 1.2 million hrs (per Belcore)
Warranty	yrs	Three Years

OBSOLETE

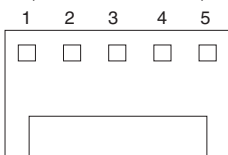
Outline Drawing



MAINS INPUT CONNECTOR :
BULGIN BEAU TX70503-C-V-54
AMP 1437667-7

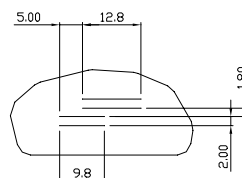
OUTPUT CONNECTORS :
MOLEX 38-00-1335

Output connector pin out
(J20, J21, J22, J23, J24)



Pin 1	+ 375V DC
Pin 2	N/C
Pin 3	V aux
Pin 4	Power good
Pin 5	0V DC

AREAS FOR PCB SUPPORT
SEE SCRAP VIEWS BELOW



* INSULATION MAY BE REQUIRED
BETWEEN THESE EDGES AND
ADJACENT METALWORK

CLEARANCE FROM UNDERSIDE
OF PCB TO METALWORK
SHOULD BE 6.35MM MINIMUM.

SCRAP VIEWS SHOWING
SUGGESTED PCB SUPPORTS
FOR 1.5MM MATERIAL

Mating Parts

J20, J21, J22, J23, J24	Molex 445 series 5 way socket
J10	Molex 5045 series 2 way header
Input Connections	6-32 screws with 8.25mm spacing between screw head centres. Screw head diameter is 6.6mm.

Other Products

PF Series	500 to 1000W Power Factor Correction Modules
PH F Series	50 to 300W Full Function power modules
PH S Series	50 to 600W Simple Function power modules

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nv350pfc-series.htm



OBSOLETE

300 to 1008W AC-DC Power Module

Features

- ◆ Low profile, small size
- ◆ 100°C baseplate temperature
- ◆ High power density
- ◆ High Efficiency
- ◆ Suitable for conduction cooling
- ◆ Power Factor Corrected (PFC)



Key Market Segments & Applications



Specifications

Model		PFE300S PFE500S	PFE700S	PFE500F	PFE1000F
AC Input	VAC	85 to 265VAC, 47-440Hz (Reduced PFC above 63Hz) (4)			
Input Current (100 / 220VAC)	A	4.0 / 2.0	8.8 / 4.4	6.8 / 3.4	13.6 / 6.6
Model dependant		6.2 / 3.2			
Inrush Current (100 /200VAC) (1)	A	20 / 40 peak			
Power Factor	-	0.95 minimum, meets EN61000-3-2			
Output Voltage Setpoint Accuracy	-	±2%	±1V	±2%	±2%
Ripple and Noise (1)	-	1%	4V	1%	1%
Over Current Protection	%	105 - 140% (Automatic Recovery)			105 - 140% Manual reset
Over Voltage Protection	-	125 - 145%	60 - 69.6V	125 - 145%	125 - 145%
Series Operation	-	Yes			
Parallel Operation	-	No	Yes (Droop mode)	Yes (Single wire)	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present			
Auxiliary Supply	-	None	None	10 - 14V, 20mA	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	None	None	High = On	High = On
Overtemperature Protection	-	Yes			
Operating Baseplate Temp.	°C	-40 to +100°C (2)			
Storage Temperature	°C	-40 to +100°C			
Humidity (non condensing)	-	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH			
Cooling	-	Conduction			
Withstand Voltage (1 min) (3)	-	Input to Output 3kVAC, Input to Baseplate 2.5kVAC, Output to Baseplate 1.5kVDC			
Isolation Resistance	-	Output to baseplate: 100M Ohm at 500VDC, 25°C ambient, 70%RH			
Vibration (non operating)	-	10-55Hz (1 min sweep), constant amplitude 0.825mm (max 49m/s ²), X, Y, Z 1 hour each			
Shock	-	196.1m/s ²			
Safety Certifications	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE mark (LVD)			
Weight	g	250	250	300	500
Size (WxHxL)	mm	61 x 12.7 x 116.8mm		70 x 12.7 x 122mm	100 x 13.4 x 160mm
	in	2.4 x 0.5 x 4.6"		2.76 x 0.5 x 4.8"	3.94 x 0.53 x 6.3"
Warranty	yrs	2 years			

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

- 1) External components are required, consult Application Notes
- 2) PFE500S-12, PFE500F-12: -40 to 85°C. See instruction manuals for derating curves
PFE1000F28 & PFE1000F48: -40 to 85°C below 170VAC input voltage.
See instruction manuals for derating curves
- 3) PFE500F, PFE1000F: 500VDC Output to baseplate
- 4) Contact technical support for 440Hz operation.

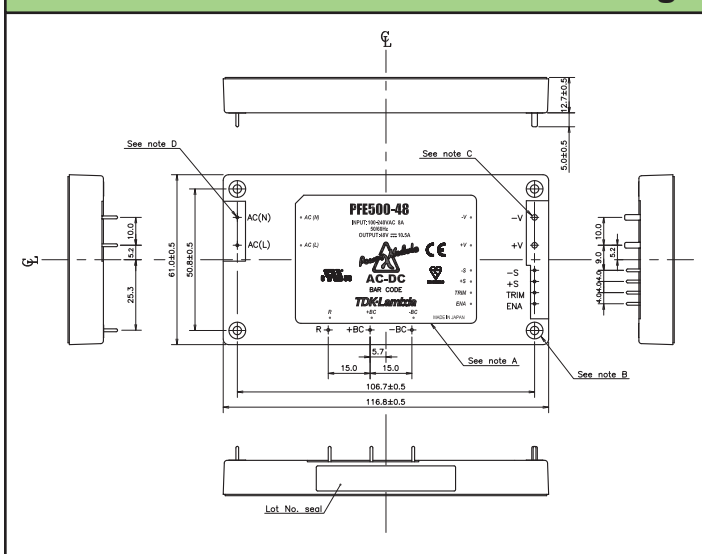
Specifications

Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Load Reg. (mV)	Line Reg. (mV)	Efficiency typ (4)
PFE300S-12	12	9.6 - 14.4	25	300	48	48	81 / 83
PFE500S-12	12	9.6 - 14.4	33	396	48	48	82 / 83
PFE500F-12	12	9.6 - 14.4	42	504	48	48	81 / 83
PFE1000F-12	12	9.6 - 14.4	60	720	48	48	80 / 82
PFE300S-28	28	22.4 - 33.6	10.8	302	56	56	83 / 85
PFE500S-28	28	22.4 - 33.6	18	504	56	56	84 / 86
PFE500F-28	28	22.4 - 33.6	18	504	56	56	84 / 86
PFE1000F-28	28	22.4 - 33.6	36	1008	56	56	84 / 86
PFE300S-48	48	38.4 - 57.6	6.3	302	96	96	84 / 86
PFE500S-48	48	38.4 - 57.6	10.5	504	96	96	84 / 86
PFE500F-48	48	38.4 - 57.6	10.5	504	96	96	84 / 86
PFE1000F-48	48	38.4 - 57.6	21	1008	96	96	84 / 86
PFE700S-48	51	None	14	714	50 - 57V (5)		86 / 89

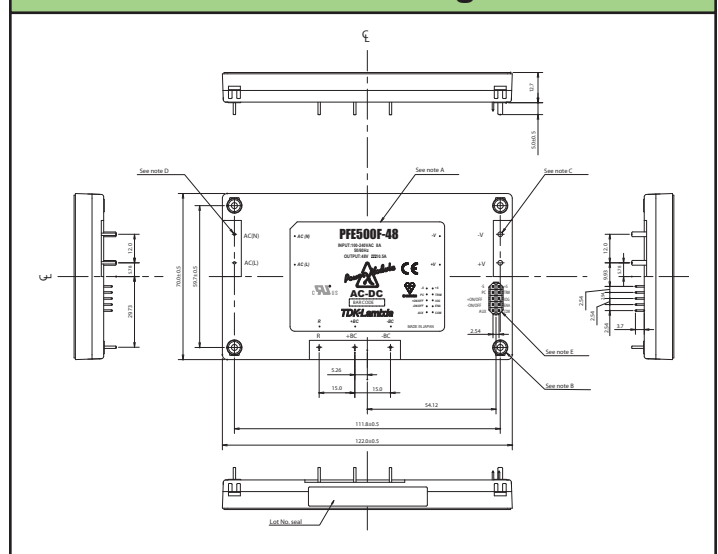
(4) 100 / 200VAC

(5) Total regulation range

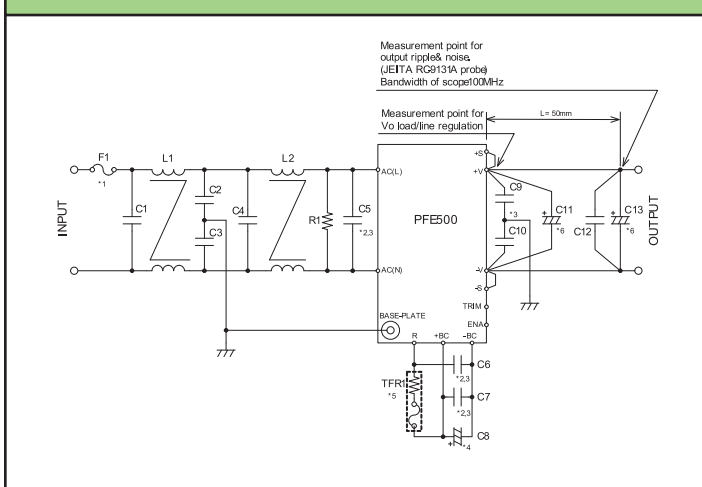
PFE500S & PFE700S Outline Drawing



PFE500F Outline Drawing



PFE500S Basic connection



Heatsink Table (PFE-S Models only)

Heatsink	Size (mm)	PFE Module
HAF-10L	116.8 x 25.4 x 61	PFE300/500S
HAF-15L	116.8 x 38.1 x 61	PFE300/500S
HAF-15T	116.8 x 38.1 x 61	PFE300/500S
HAL-F12T	122 x 35 x 69.9	PFE500F
HAL-F10T	160 x 33.4 x 100	PFE1000F

Options

Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pfe-series.htm



Rectifier & Power factor Correction Modules

Features

- ◆ Suitable for use in Custom Power Supplies
- ◆ Provides high voltage DC to
- ◆ Lambda's PH and PAF Power Modules
- ◆ Parallel operation on PF Series
- ◆ 0.5" profile
- ◆ Power Factor Corrected (PF)
- ◆ Operation up to 85°C



Key Market Segments & Applications



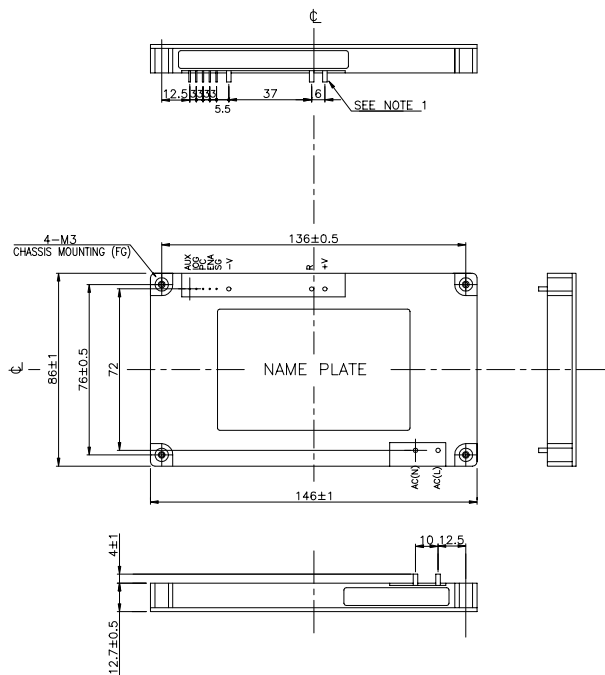
Specifications				
Model		PR500-280	PF500A-360	PF1000A-360
AC Input Voltage range & Frequency	VAC	85-132/170-265 selectable	85-265 wide range	
Input Frequency	-	47 - 440Hz	47 - 63Hz	
Output Voltage	VDC	230 - 370	360	
Output Power at 100/200VAC	W	500/750W	504/756W	1008/1512W
Load Regulation	-	Unregulated	10V	
Line Regulation	-	Unregulated	5V typical	
Inrush Current	-	External pins provided connection for in rush resistor		
Efficiency (typ) at full load	%	95% (200VAC)	90% (100VAC), 95% (200VAC)	
Power Factor	-	-	Meets EN61000-3-2 (0.95 typical)	
Overcurrent Protection	-	-	Converter shutdown	
Overvoltage Protection	V	-	390 - 400VDC, manual reset	
Thermal Shutdown	-	-	Shuts down Inverter, manual reset	
AC Fail Signal	-	Yes	-	
Inverter Good Signal	-	-	Yes, when inverter is operating correctly	
Enable Signal	-	Signal provided to enable "PH" DC-DC converters		
Parallel Connection	-	-	Single wire current share	
Auxiliary Output Voltage	-	-	Yes - see installation manual	
Operating Baseplate Temperature	°C	-20 to +85°C (no derating)		
Storage Temperature	°C	-40 to +85		
Cooling	-	Conduction (see installation manuals for heatsinks)		
Withstand Voltage	-	Input - Ground 3kVAC for 1 min		
Safety Agency Approvals	-	UL60950-1, CSA22.2 No.60950-1, EN60950-1, & CE Mark		
Weight	g	140	130	200
Size (WxHxD)	mm	See output line drawings		
Warranty	yrs	Two Years		

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

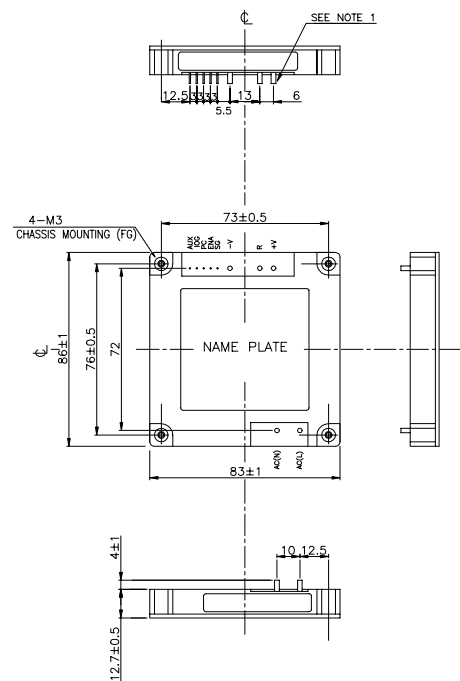
* PF Modules only. Doesn't include PR500

Highlighted in green, obsolete September 2010.

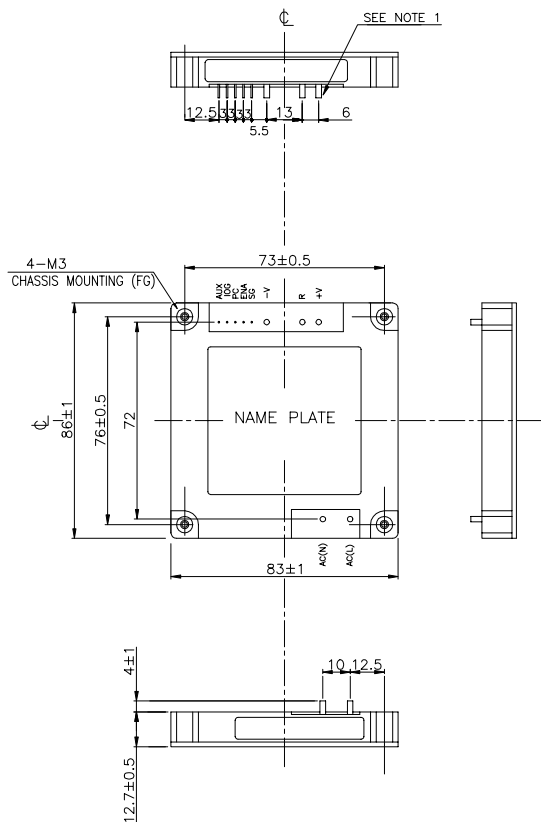
Outline Drawing PF1000A



Outline Drawing PF500A



Outline Drawing PR500



Other Industrial Products

PFE	400 to 1000W Full brick AC-DC power module
PH F	50 to 300W Full function power modules
PH S	50 to 600W Simple function power modules
PAF	400 to 600W Full brick power module

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pr-pf-series.htm



1000W 1U Front End Power Supplies

Features

- ◆ 1U high
- ◆ Internal ORing Diodes
- ◆ Current Share



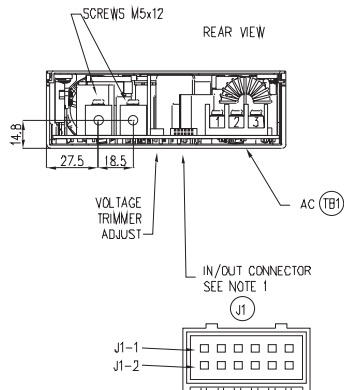
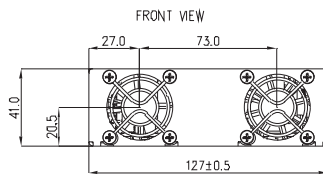
Key Market Segments & Applications



Specifications

Model		RFE1000-24-Y	RFE1000-32-Y	RFE1000-48-Y
Nominal Output Voltage	V	24V	32V	48V
Output Voltage Range	V	21.5 - 29V	28.8 - 38.4V	43 - 58V
Output Current	A	40A	31A	21A
Output Power	W	960W	992W	1008W
Line Regulation	mV	96mV	128mV	192mV
Load Regulation	mV	192mV	256mV	384mV
Output Noise	mV	200mV	250mV	300mV
Overvoltage Protection (Latching)	V	31 to 34V	41.5 to 45.5V	62 to 66V
Overcurrent Protection	%	105 - 125%, Non foldback type		
Overtemperature	-	Yes, automatic reset		
Series Operation	-	Up to 3 units may be connected in series		
Current share	-	Single wire current sharing, up to 8 units		
Remote Sense	-	Compensates for up to 1V on each load wire		
Signals (opto isolated)	-	DC OK, AC Fail, and Overtemperature warning, high on fail		
Remote On/Off	-	On: 0 - 0.6V or short, Off: 2- 15V or open		
Auxiliary Output	-	12V 0.25A bias voltage, (11.2 to 12.5V). Built in ORing diode		
AC Input Range	VAC,Hz	85 - 265VAC, 47 - 63Hz		
AC Input Current (100/200VAC)	A	12 / 6A		
Leakage Current	mA	<1.1mA at 230VAC input		
Inrush Current	A	<40A		
Hold up time (100VAC input)	ms	20ms typical		
Efficiency (typical) 100/200VAC	%	84 / 86%	84 / 86%	85 / 88%
Power factor Correction	-	EN61000-3-2 class A (20-100% load), >0.98 at full load		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -11		
EMC (conducted and radiated)	-	EN55022, level B, FCC part 15J-B		
Operating Temperature	°C	0 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C		
Storage Temperature	°C	-30 to +85°C		
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 2kVAC, Output to Ground 500VAC for 1 min.		
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Cooling	-	Two variable speed internal fans, airflow exits across input/output		
Humidity	-	Operating: 10 - 90% RH, Storage: 10 - 95% RH (non condensing)		
Shock & Vibration	-	Meets ETS 300 019		
Safety Agency	-	UL60950-1, EN60950-1 (Ed 2), CE Mark		
Input / Output Connector	-	Input: Screw terminals, Output: M5x12 screws, Signals: Mating connector JST PHDR-12VS		
Output indicator	-	Green LED DC OK		
Size (L x W x H)	in(mm)	12 x 5 x 1.61" (305 x 127 x 41mm)		
Weight	g	2000		
Warranty	yrs	Two Years		

Outline Drawing



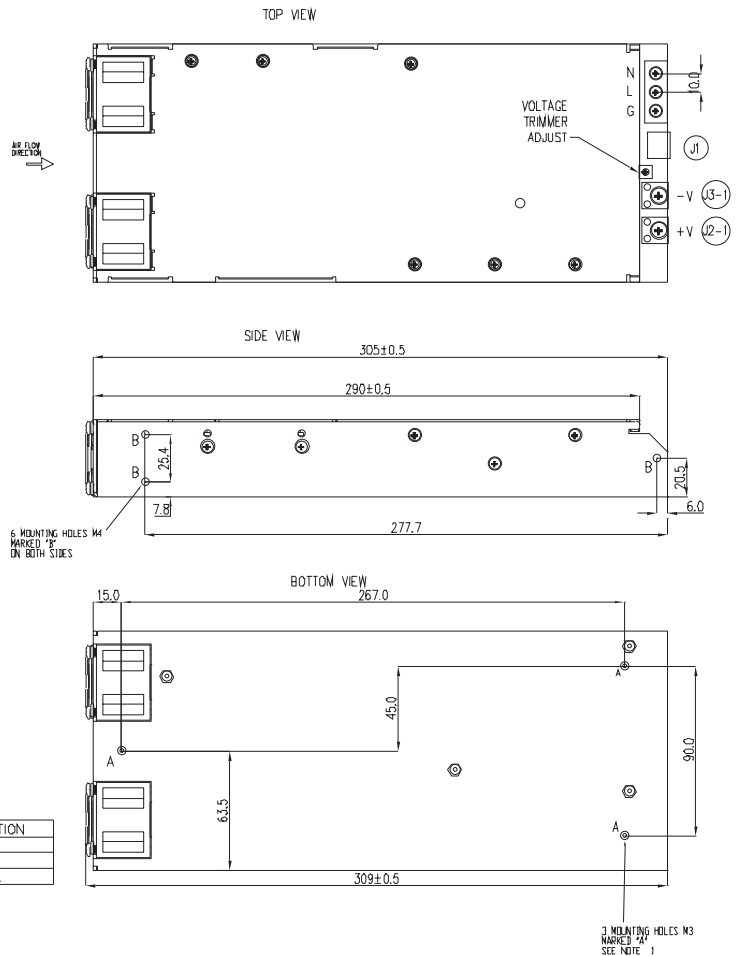
NOTES

- CONNECTOR TYPE: S12B-PHDSS (JST)
FEMALE CONNECTOR TYPE: PHDR-12VS (JST)
- LED INDICATORS REFER TO INSTRUCTION MANUAL.
- MOUNTING SCREWS MUST NOT PENETRATE MORE THAN 3mm INTO THE UNIT.
- MODEL NAME, INPUT AND OUTPUT RATING AND SAFETY APPROVALS SYMBOLS ARE DESCRIBED ON TOP SURFACE LABEL.
- ALLOW MINIMUM 50 mm OF UNRESTRICTED AIR SPACE AT THE REAR OF UNIT.
DO NOT OBSTRUCT AIR FLOW TO THE UNIT FRONT PANEL.
- IN OUT CONNECTOR BACK VIEW AND PINS ASSIGNMENT:

PIN.No.	FUNCTION
J1-3	+V
J1-10	-V
J1-6	ON/OFF
J1-1	+SENSE
J1-7	CURRENT SHARE
J1-9	CURRENT SHARE

PIN.No.	FUNCTION
J1-5	DC_OK
J1-11	SIGNAL_RTN
J1-12	AC_FAIL
J1-8	TEMP_ALARM
J1-2	-SENSE
J1-4	+12V_AUX

PIN.No.	FUNCTION
TB1-1	AC GROUND
TB1-2	AC LINE
TB1-3	AC NEUTRAL



Other Related Products

FPS1000	1U Hotswap 1000W Rack mount
HWS	15 - 1800W Power Supplies
SWS-L	600 - 1000W Power supplies

For Additional Information, please visit
us.tdk-lambda.com/lp/products/rfe-series.htm



Single Output Industrial Power Supplies

Features

- ◆ 5 Year Warranty
- ◆ Ultra Thin Package
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Wide range AC Input



Key Market Segments & Applications



Specifications					
Model		50W	100W	150W	300W
Input Voltage range (1)		85 - 265VAC (47 - 440Hz), 120-370VDC			
Input Current (100/200VAC) (Typ)	A	0.7 / 0.4	1.5 / 0.75	1.9 / 1.0	2.0 / 4.0
Inrush Current (100/200VAC)	A	14 / 28			15 / 30
Power Factor	-	Meets EN61000-3-2			
Overcurrent Protection	-	Yes, typically 105 - 125% (100 & 150W hiccup style)			
Overvoltage Protection	V	Yes, typically 120-140%. Cycle input to reset			
Hold Up Time (100/200VAC)	ms	>20			
Leakage Current (max at 240VAC)	mA	0.6	0.45	0.65	0.75
Load Regulation	%	0.4% (0-100% load change)			
Line Regulation	%	0.2% (85-132 or 170-265VAC line change)			
Remote Sense	-	Yes			
Current Share	-	No			Yes
Remote On/Off	-	Yes, see instruction manual on website			
DC Fail Signal	-	No			Yes
Indicator	-	Green LED = ON			
Operating Temperature	-	-10°C to +71°C, -20°C start up. See derating curves on website technical downloads			
Storage Temperature	°C	-30 to +75°C			
Humidity (non condensing)	-	10 - 95%RH			
Cooling	-	Convection			
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	5 - 200Hz (10 min sweep), 19.6m/s ² , 1 hour (Amplitude 10mm)			
Shock (Vertical mounting) (3)	-	196m/s ²		588m/s ²	
Safety Agency Approvals	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE Mark			
Line Dip	-	Complies with SEMI F47 (200VAC line only)			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B			
Immunity	-	IEC61000-4-2 (Level 4), -3, -4 (Level 3), -5 (Level 4)			
Weight (Typ)	g	290	450	600	1300
Size (WxHxD)	in	0.87x3.23x4.88	0.98x3.23x6.3	1.18x3.62x7.09	1.57x4.72x9.84
Warranty	yr	Five Years			

(1) Safety approvals do not cover DC input

(2) 100/200VAC

(3) Non operating, 11 ±5ms, 3 directions, 3 times each.

See website technical downloads for detailed information

Output Ratings

Model	Voltage	Adj. Range	Max Curr. (A)	Max Pwr (W)	Ripple/Noise (mV)	Eff (typ)% ²	Pack. Size
RTW03-12R	3.3V	2.6 - 4.0	12.5	41.2	120	75 / 77	50W
RTW03-25R	3.3V	2.6 - 4.0	25	82.5	120	79 / 81	100W
RTW03-35R	3.3V	2.6 - 4.0	35	115.5	120	80 / 83	150W
RTW03-70RL	3.3V	1.8 - 3.6	70	231	120	83 / 86	300W
RTW05-10R	5V	4.0 - 5.8	10	50	120	80 / 82	50W
RTW05-20R	5V	4.0 - 5.8	20	100	120	83 / 85	100W
RTW05-30R	5V	4.0 - 5.8	30	150	120	83 / 86	150W
RTW05-60RL	5V	3.5 - 5.6	60	300	120	84 / 87	300W
RTW12-4R3	12V	9.6 - 13.2	4.3	51.6	150	81 / 83	50W
RTW12-8R4	12V	9.6 - 13.2	8.4	100.8	150	84 / 86	100W
RTW12-12R	12V	9.6 - 13.2	12.5	150	150	84 / 87	150W
RTW12-25RL	12V	7.2 - 14.4	25	300	150	83 / 86	300W
RTW15-3R5	15V	12.0 - 16.5	3.5	52.5	150	82 / 85	50W
RTW15-6R7	15V	12.0 - 16.5	6.7	100.5	150	85 / 87	100W
RTW15-10R	15V	12.0 - 16.5	10	150	150	84 / 87	150W
RTW15-20RL	15V	10.5 - 18.0	20	300	150	83 / 86	300W
RTW24-2R2	24V	19.2 - 26.4	2.2	52.8	200	82 / 85	50W
RTW24-4R2	24V	19.2 - 26.4	4.2	100.8	200	85 / 87	100W
RTW24-6R3	24V	19.2 - 26.4	6.3	151.2	150	86 / 88	150W
RTW24-13RL	24V	16.8 - 26.4	13	312	200	85 / 88	300W
RTW28-1R8	28V	22.4 - 30.8	1.8	50.4	200	82 / 85	50W
RTW28-3R6	28V	22.4 - 30.8	3.6	100.8	200	85 / 87	100W
RTW28-5R4	28V	22.4 - 30.8	5.4	151.2	200	86 / 88	150W
RTW28-11RL	28V	19.6 - 33.6	11	308	200	85 / 88	300W
RTW48-1R1	48V	38.4 - 52.8	1.1	52.8	300	82 / 85	50W
RTW48-2R1	48V	38.4 - 52.8	2.1	100.8	300	85 / 88	100W
RTW48-3R2	48V	38.4 - 52.8	3.2	153.6	200	86 / 89	150W
RTW48-6R5L	48V	33.6 - 55.0	6.5	312	300	86 / 89	300W

Options

Suffix	Description
Blank	No cover
L	Vertical terminal block (50-100W models only)
C	Cover (50W, 100W & 150W models)
H	Cover (300W models), Remove 'L' suffix when specifying

Other Industrial Products

HWS	15W to 1500W Single Output
LZSA	500W to 1500W Single output
DPP, DLP & DHP	15W to 960W DIN Rail Mount
SWS	50W to 1000W Single Output (Light industrial)

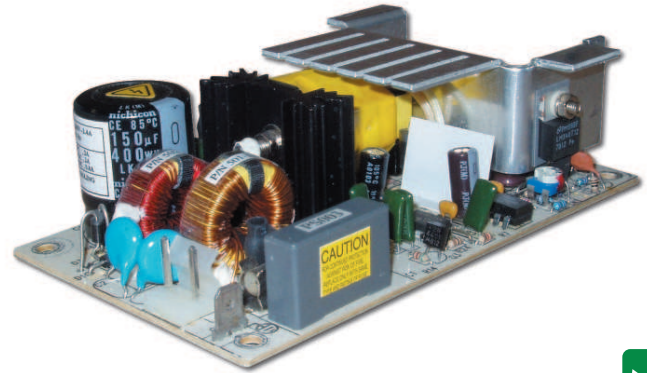
For Additional Information, please visit
us.tdk-lambda.com/lp/products/rtw-series.htm



3 x 5" 40W to 60W AC-DC Power Supplies

Features

- ◆ Low Cost
- ◆ Single and Multiple Outputs
- ◆ Wide Range AC Input
- ◆ Low profile
- ◆ Global Safety Agency Compliance
- ◆ Meets EN61000-4 (-2 to -6)
- ◆ Industry standard footprint



Key Market Segments & Applications



Specifications		
Model		SCS40 SCT4x SCS60 SCD60 SCT6x
Output Power Convection	W	40
Output Power Forced Air	W	55
Main Output Adjustment	V	-5, +10% O/P 1 only
Line and Load Regulation	%	Output 1: $\pm 2\%$, Output 2: $\pm 5\%$ ($\pm 7\%$ on 24V models), Output 3: $\pm 5\%$
Hold Up Time (typical)	ms	20
Size (1)	in	3 x 5 x 1"
AC Input	-	85-265 VAC, 47-63 Hz
Efficiency	%	Typically 70% full load at nominal AC Line
Inrush Current Limiting	A	36A typical @230VAC cold start
Surge Immunity	-	EN61000-4 (-2 through -6) level 3
EMI	-	FCC Class B, EN55022 B
Cross Regulation	%	$\pm 2\%$ on output 1, $\pm 5\%$ on outputs 2 & 3 (multiple outputs only)
Ripple and Noise	%	1% peak to peak
Overcurrent Protection	-	Short circuit protection, automatic recovery
Overvoltage Protection	-	Output 1 only, $<135\%$
Cooling	-	When specified with forced air cooling, flow is 300 LFM (1.5m/s)
Operating Temp. Range (2)	-	0 to $+70^{\circ}\text{C}$ (Derate linearly to 50% load from $50-70^{\circ}\text{C}$)
Storage Temperature	$^{\circ}\text{C}$	-20 to $+85^{\circ}\text{C}$
Safety Agency Approval	-	UL60950-1, CSA60950-1, IEC/EN60950-1, CE Mark
Warranty	yr	1 year

(1) Height is specified as maximum component height

Note: See Installation Manual for full details, test methods of parameters and application notes

(2) -40°C startup, contact factory for details.

Options

	Model	O/P (V)	Min Load(A)	Convec. (A)	Forced Air(A)	Peak Load(A)**
Single Output	SCS4024	V1 24.0	-	1.6	2.3	2.5
	SCS4048	V1 48.0	-	0.9	1.2	1.3
	SCS6012	V1 12.0	-	5.0	6.7	7.5
	SCS6024	V1 24.0	-	2.5	3.3	3.8
	SCS6028	V1 28.0	-	2.1	2.9	3.2
	SCS6048	V1 48.0	-	1.3	1.7	1.9
Dual Output	SCD601515	V1 15.0	0.2	2.2	2.9	-
		V2 -15.0	0.2	1.8	2.4	-
Triple Output	SCT42	V1 5.0	0.4	4.0	5.0	7.0
		V2 12.0	0.2	2.0	2.5	4.0
		V3 -12.0	-	0.5	0.7	1.0
	SCT45	V1 5.0	0.4	4.0	5.0	7.0
		V2 15.0	0.2	2.0	2.5	3.0
		V3 -15.0	-	0.5	0.7	1.0
	SCT48/R*	V1 5.0	0.4	4.0	5.0	6.0
		V2 24.0	0.1	1.0	1.5	2.0
		V3 -5.0	-	0.5	0.7	1.0
	SCT62	V1 5.0	0.7	7.0	-	10.0
		V2 12.0	0.3	3.0	-	6.0
		V3 -12.0	-	0.7	-	1.5
Triple Output	SCT63	V1 5.0	0.7	7.0	-	10.0
		V2 15.0	0.3	2.8	-	4.0
		V3 -15.0	-	0.7	-	1.5
	SCT65	V1 5.0	0.7	7.0	-	10.0
		V2 24.0	0.1	1.5	-	3.0
		V3 12.0	-	0.7	-	1.5

Model Selector Notes:

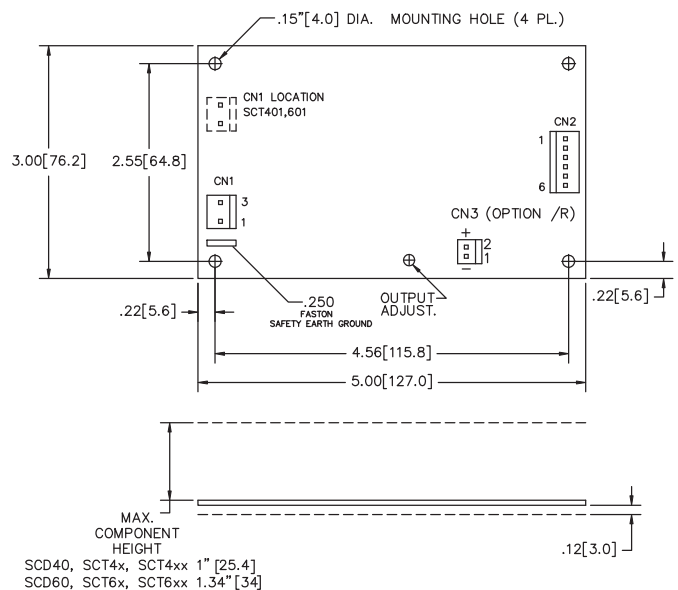
* /R = Remote Sense. Leave unconnected when not used.

** <30s, 10% duty cycle, average power must not exceed maximum ratings.

Other AC-DC Products

ZP	20 to 60W 2" x 4", 1-3 outputs
NV175	175W 3" x 5", 1-5 outputs
ZWS	5 to 240W single output, universal input
VSU, VSC, VSP	10 to 150W single output, 115VAC input
SCS120PW	120W 3" x 5" single output
CSS150	150W 3" x 5" single output

Outline Drawing



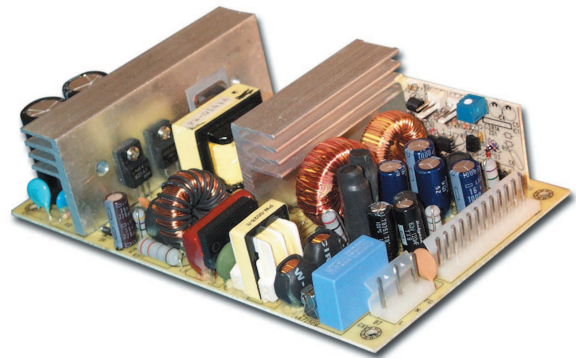
For Additional Information, please visit
us.tdk-lambda.com/lp/products/sc-series.htm



4 x 7" Low Cost PFC Power Supplies

Features

- ◆ Low Cost
- ◆ Single and Multiple Outputs
- ◆ Wide Range AC Input with PFC
- ◆ Global Safety Agency Compliance
- ◆ Industry standard footprint
- ◆ Meets EN61000-4 immunity



Specifications

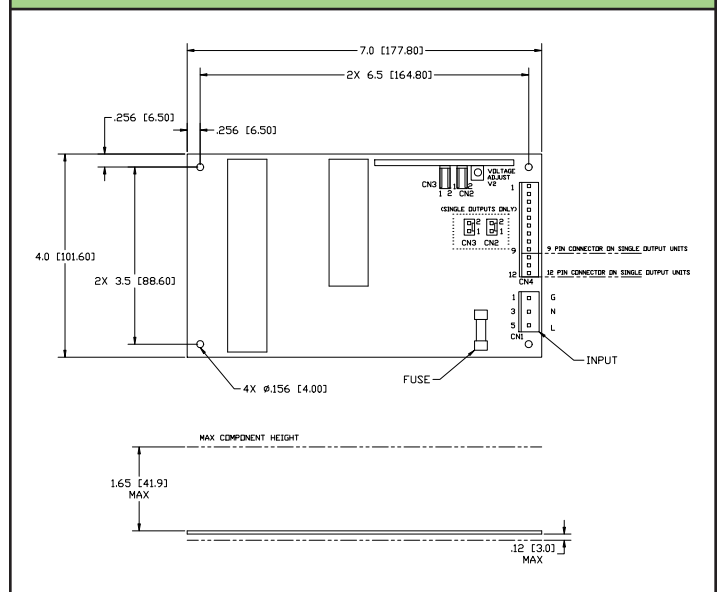
Model		SC120
Output Power	W	80W Convection, 110W Forced Air, 120W Peak (<30s, 10% duty cycle)
Main Output Adjustment	V	V1 only $\pm 5\%$ (except SCS120: $\pm 5\%$, SCQ12003051212: V2 only $\pm 5\%$,)
Line Regulation	-	Typically 0.1%
Load Regulation	-	V1: $\pm 2\%$ V2: $< 5V \pm 3\%$, 6-15V $\pm 5\%$, $> 15V +10 -5\%$ V3: $\pm 5\%$, V4: $\pm 5\%$
Ripple and Noise	-	1% or 50mV minimum, peak to peak
Transient Response	-	$< 10\%$ deviation, recovery $< 1ms$ for a 25% load change over 20-100% load
Remote Sensing	-	V1 only compensates for 0.25V drop per lead (SCQ120P03051212 V1 & V2 outputs)
Overcurrent Protection	-	Short circuit protected
Overvoltage Protection	-	V1 only (SCQ12003051212 V1 & V2)
Size (W x L x H)	In.	4 x 7 x 1.65" (Maximum component height)
AC Input	-	90-264 VAC, 47-63 Hz
Harmonic Correction (PFC)	-	Meets EN61000-3-2
Efficiency	%	Typically 70% full load at nominal AC Line
Inrush Current Limiting	A	36A typical @ 230VAC cold start @ 25°C
Hold Up Time (typical)	ms	16mS
Surge Immunity	-	EN61000-4 (-2 through -5) level 3, Class A
EMI	-	FCC Class B, EN55022 B, EN55011, EN50081-1, -2
Cooling	-	Convection or Forced (30CFM)
Operating Temp. Range	-	0 to +50°C
Storage Temperature	-	-20 to +85°C
Shock	-	$< 20G$
Vibration	-	10Hz-55Hz amplitude (sweep 1 min), $< 2G$ X, Y, Z axis for 1 hour each
Safety Agency Approval	-	UL1950, CSA950, EN60950, CE Mark
Warranty	-	1 year

OBSOLETE

Options

Model		Output (V)	Min Load (A)	Conv. (A)	Forced Air (A)	Peak Load (A)
Single Output						
SCS120P03	V1	3.3	-	16.0	22.0	25.0
SCS120P05	V1	5	-	16.0	22.0	25.0
SCS120P12	V1	12	-	6.7	9.2	10.4
SCS120P15	V1	15	-	5.3	7.3	8.3
SCS120P24	V1	24	-	3.3	4.6	5.2
SCS120P48	V1	48	-	1.7	2.3	2.6
Dual Output						
SCD120P0524	V1	5	2.0	9.0	11.0	15.0
	V2	24	0.5	3.5	4.5	5.0
Triple Output						
SCT120P030512	V1	3	-	8.0	16.0	28.0
	V2	5	1.0	10.0	20.0	28.0
	V3	12	0.2	2.0	3.0	4.0
Quad Output						
SCQ120P05241212R	V1	5	2.0	9.0	11.0	15.0
	V2	24	0.3	3.0	3.0	5.0
	V3	12	-	0.7	1.0	1.5
	V4	-12	-	0.7	1.0	1.5
SCQ120P05241515R	V1	5	2.0	9.0	11.0	15.0
	V2	24	-	3.0	3.0	5.0
	V3	15	-	0.7	1.0	1.5
	V4	-15	-	0.7	1.0	1.5
SCQ120P05121205	V1	5	2.0	9.0	11.0	15.0
	V2	12	-	4.5	5.0	9.0
	V3	-12	-	0.7	1.0	1.5
	V4	-5	-	0.7	1.0	1.5
SCQ120P05121205R	V1	5	2.0	9.0	11.0	15.0
	V2	12	-	4.5	5.0	9.0
	V3	12	-	0.7	1.0	1.5
	V4	-5	-	0.7	1.0	1.5
SCQ120P03051212	V1	3.3	-	8.0	16.0	28.0
	V2	5	1.0	10.0	20.0	28.0
	V3	12	0.2	2.0	3.0	4.0
	V4	-12	-	0.5	1.0	1.0

DHP480-3 Drawing



Other Industrial Products

SC40 & SC60	3" x 5" Single, Dual, and Triple output
ZWS	5 to 150W single output, universal input
VSB & VSC	10 to 150W single output, 115VAC input
NV175	175W Triple & Quad 3" x 5"

For Additional Information, please visit
us.tdk-lambda.com/lp/products/sc-120.htm

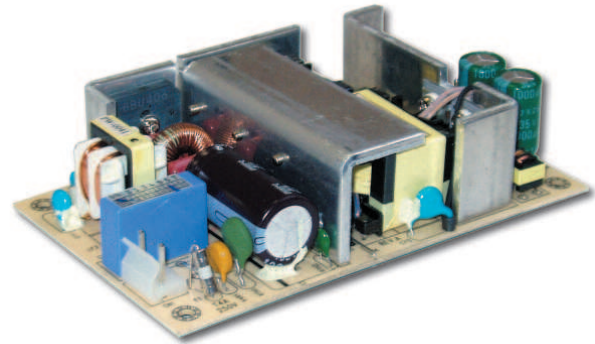


OBSOLETE

3 x 5" 120W Single Output Power Supplies

Features

- ◆ Low Profile
- ◆ Convection cooled
- ◆ Wide Range AC Input with PFC
- ◆ Global Safety Agency Compliance
- ◆ Industry standard footprint



Key Market Segments & Applications



Specifications

Model		
Output Power	W	120W
Line & Load Regulation	%	See model selector
Ripple & Noise	%	1%
Hold Up Time (typical)	ms	16ms (Full load at 115VAC input)
Overcurrent Protection	%	105 - 120%
Overvoltage Protection	%	110 - 130%, cycle AC line to reset
Input Voltage Range	-	90-264 VAC, 47-63 Hz (440Hz with reduced PFC)
AC Input Current	A	2.5A Max
Harmonic Correction (PFC)	-	Meets EN61000-3-2 (typically >0.9)
Efficiency	%	Typically 85% full load at nominal AC Line
Inrush Current Limiting	A	<50A peak @ 230VAC cold start
Leakage Current	mA	<0.75mA (264VAC, 60Hz)
Surge Immunity	-	EN61000-4 (-2 through -5)
EMI	-	FCC Class B, EN55022 B
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VDC
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC
Operating Temperature	°C	0 to +40°C, derate linearly to 50% load from 40°C to 60°C
Temperature Coefficient	%/°C	±0.05%/°C
Storage Temperature	°C	-10 to +70°C
Humidity (non-condensing)	-	20-90%RH operating, 20-95%RH non-operating
Shock	-	< 196.1m/s ² (20G)
Vibration	-	10Hz-55Hz amplitude (sweep 1 min), <2G X, Y, Z axis for 1 hour each
Altitude	m	3000m operating, 5000m storage
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1, CCC, CE Mark (LVD)
Size W x L x H	in	3 x 5 x 1.27"
Weight	g	300
Warranty	yrs	1 year

Model Selector

Models	Output Voltage	Output Load	Output Regulation)
SCS120PW12	12V	10A	3%
SCS120PW15	15V	8A	2%
SCS120PW18	18V	6.67A	2%
SCS120PW19	19V	6.32A	2%
SCS120PW24	24V	5A	2%
SCS120PW30	30V	4A	2%
SCS120PW32	32V	3.75A	2%
SCS120PW36	36V	3.34A	2%
SCS120PW48	48V	2.5A	2%

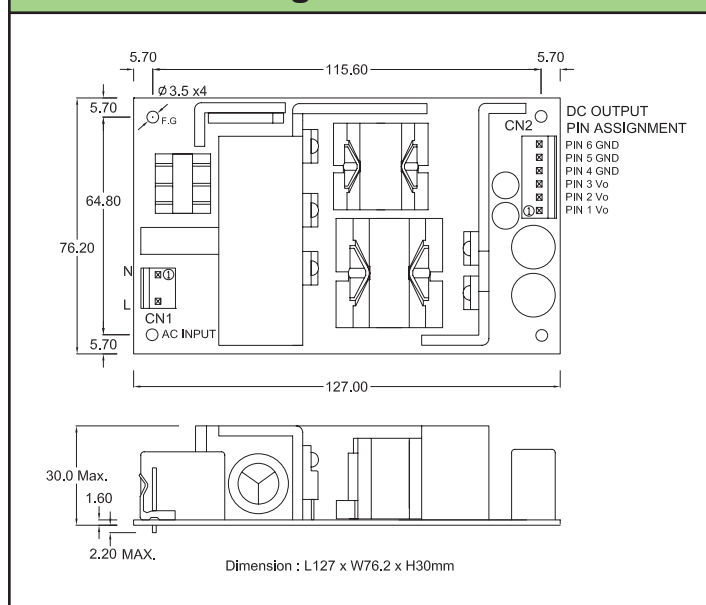
Mating Connectors

Mating	Molex Connector	Molex Pins
CN1	09-50-8031	08-52-0113
CN2	09-50-8061	08-52-0113

Other Industrial Products

EFE300	3" x 5" 300W single output
CSS150	3" x 5" 150W single output (Medical)
NV175	3" x 5" 175W single to quad outputs
SC40/60	3" x 5" 40 - 80W single to quad outputs
ZPSA/ZPT	2" X 4" 40 - 60W single to triple outputs
ZWS	5 to 240W single output

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/scs120-series.htm



Single Output General Purpose Power Supplies

Features

- ◆ Low Cost
- ◆ Power Factor Correction to EN61000-3-2
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Enclosed
- ◆ Global safety Approvals
- ◆ Level B EMI



Key Market Segments & Applications



Specifications

Model		SWS50	SWS75	SWS100	SWS150
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC			
Inrush Current (115/230VAC)	A	20/40		16/32	
Power Factor	-	Meets EN61000-3-2			
Input Current (115/230VAC)	A	1.2/0.6	1.6/0.8	1.2/0.6	1.8/0.9
Temperature Coefficient	-	<0.02%/°C			
Total Regulation	-	<5%			
Overcurrent Protection	-	>105%, Constant Current Style			
Overvoltage Protection	V	115 -135%, Cycle AC line to reset			
Hold Up Time (Typ)	ms	20ms at 115VAC			
Leakage Current Max.	mA	1mA (0.6mA typ@230VAC)		0.75mA (0.5mA typ@230VAC)	
Remote Sense	-	Not Available			
LED Indicator	-	Green LED = On			
Operating Temperature	-	-10 to +70°C (See table for derating - model specific)			
Storage Temperature	-	-30 to +85°C			
Operating Humidity (2)	°C	30 - 90% RH			
Storage Humidity (2)	°C	10 - 95% RH			
Cooling	-	Convection			
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	19.6m/s² (10 - 55Hz (constant sweep 1 min) X, Y, Z for 1 hour)			
Shock	-	< 196.1 m/s² (20G)			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark, EN50178			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B			
Recommended EMI Filter	-	RSEL-2002W	RSEL-2003W	RSEL-2002W	RSEL-2003W
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11			
Weight (Typ)	g	400	480	600	750
Size (WxHxD)	in	3.62 x 1.46 x 6.26	3.7 x 1.69 x 6.69	3.78 x 1.77 x 7.4	3.9 x 2 x 7.8
Warranty	yrs	Two Years			

(1) Derate to 85% load below 100VAC input (2) non condensing

Model Selector

Model	Voltage	Adjust Range	Max Curr.	Load Reg mV	Line Reg mV	Ripple Noise	Eff. (typ)%
SWS50-3	3.3V	3-3.6V	10	40	20	80	73/70
SWS75-3	3.3V	3-3.6V	15	40	20	80	72/68
SWS100-3	3.3V	3-3.6V	20	40	20	100	69/70
SWS150-3	3.3V	3-3.6V	30	40	20	100	70/72
SWS50-5	5V	4.5-5.5V	10	50	20	80	77/75
SWS75-5	5V	4.5-5.5V	15	50	20	80	77/74
SWS100-5	5V	4.5-5.5V	20	40	20	100	75/77
SWS150-5	5V	4.5-5.5V	30	40	20	100	76/78
SWS50-12	12V	10.8-13.2V	4.3	96	48	80	82/79
SWS75-12	12V	10.8-13.2V	6.3	96	48	80	83/81
SWS100-12	12V	10.8-13.2V	8.5	96	48	100	79/81
SWS150-12	12V	10.8-13.2V	12.5	96	48	100	79/82
SWS50-15	15V	13.5-16.5V	3.5	120	60	100	84/80
SWS75-15	15V	13.5-16.5V	5	120	60	100	85/82
SWS100-15	15V	13.5-16.5V	6.7	120	60	100	81/83
SWS150-15	15V	13.5-16.5V	10	120	60	100	81/83
SWS150-18	18V	16.2-19.8V	8.4	144	72	120	82/84
SWS50-24	24V	21.6-26.4V	2.1	144	96	100	84/80
SWS75-24	24V	21.6-26.4V	3.2	144	96	100	85/82
SWS100-24	24V	21.6-26.4V	4.3	144	96	150	82/84
SWS150-24	24V	21.6-26.4V	6.3	144	96	150	82/85

Vertical Mount

Convection	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
SWS50	100%	100%	100%	100%	100%	100%	93%	85%
SWS75 (3.3-5V)	100%	100%	100%	100%	93%	85%	73%	60%
SWS75 (12V-24V)	100%	100%	100%	100%	100%	93%	85%	60%
SWS100	100%	100%	100%	100%	100%	87%	73%	60%
SWS150 (3.3-5V)	100%	95%	90%	85%	73%	60%	-	-
SWS150 (12V-24V)	100%	100%	100%	100%	100%	100%	80%	60%
1.2m/s Forced Air	50°C	55°C	60°C	65°C	70°C			
SWS75	100%	100%	90%	80%	70%			
SWS100	100%	100%	90%	80%	70%			
SWS150	100%	100%	90%	80%	70%			

Derate to 80% load from 0 to -10°C

Other Industrial Products

HWS	15W to 1500W Single Output
LS	25W to 200W Low Cost
SWS300/600/1000	300W to 1000W (Higher Power)

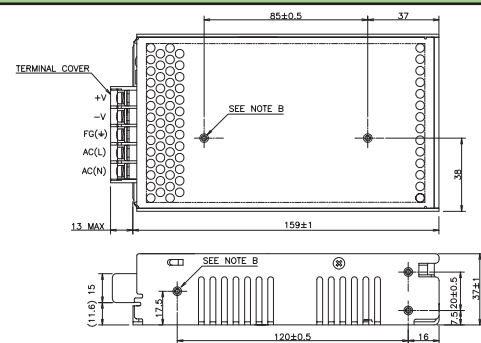
Options

Suffix	Descriptor
/CO2	Double sided conformal coating

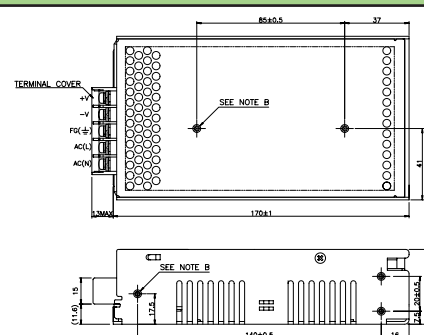
For Additional Information, please visit
us.tdk-lambda.com/lp/products/sws-series.htm



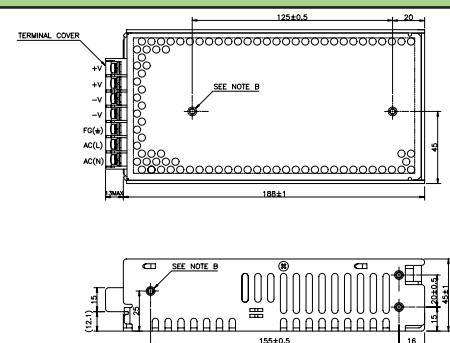
SWS50 Outline Drawing



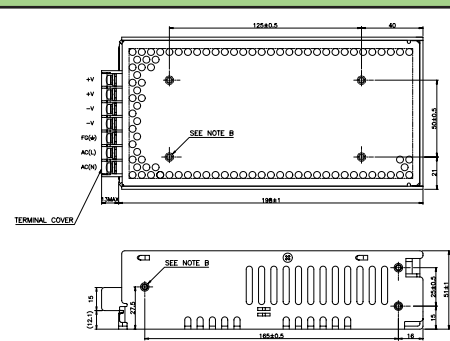
SWS75 Outline Drawing



SWS100 Outline Drawing



SWS150 Outline Drawing



Single Output General Purpose Power Supplies

Features

- ◆ Lower Cost
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Enclosed
- ◆ Global safety Approvals
- ◆ Level B EMI



Key Market Segments & Applications



Specifications			
Model		SWS300A	SWS600
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2	
Input Current (100/200VAC)	A	3.6 / 1.8A	7.2 / 3.6A
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	Yes, cycle AC to reset	
Overtemperature Protection	-	Yes, cycle AC to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	SWS300: 0.75mA , SWS600: 1.5mA	
Remote Sense	-	None	Yes
Parallel Connection	-	None	Yes
Remote On/Off	-	None	Yes
AC Fail Signal	-	None	Yes, open collector output
LED Indicator	-	Green LED = On	
Operating Temperature	°C	-10 to +65°C (See table for derating - model specific)	
Storage Temperature	°C	-30 to +85°C	
Humidity (non condensing)	-	30 - 90% RH operating, 10 - 95%RH non operating	
Storage Humidity (non condensing)	-	10 - 95% RH	
Cooling	-	Internal fan	
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC, O/P to CNT 100VAC for 1 min	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (sweep for 1 min)19.6m/s ² constant X, Y, Z 1 hour each plane)	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL60950, CSA60950, EN60950, EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Recommended EMI Filter	-	RSAL2006	RSAN2010
Weight (Typ)	g	950	2000
Size (WxHxD)	in	2.05 x 4.01 x 7.8"	3.62 x 4.72 x 7.48"
Warranty	yrs	Two Years	

(1) Derate linearly to 85% load from 115VAC to 85VAC input (derate to 90% load for SWS600-3 & -5)

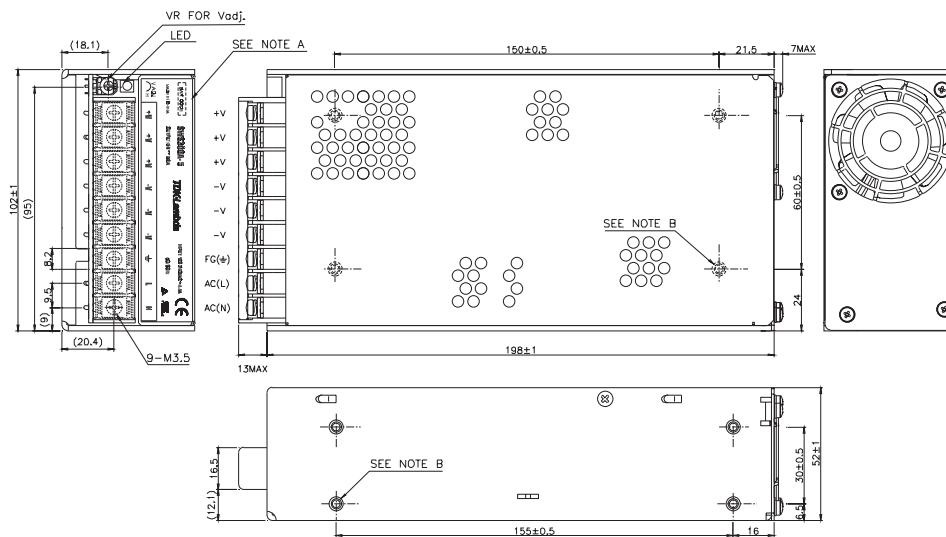
Model Selector

Model	Voltage	Adjust Range	Max Curr. (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Eff. (typ)%(1)
SWS300A-3	3.3V	2.97 - 3.96V	55A	40	20	120	69 / 72
SWS300A-4	4V	3.6 - 4.8V	55A	40	20	120	72 / 75
SWS300A-5	5V	4.5 - 6V	55A	40	20	120	75 / 78
SWS300A-7R5	7.5V	6 - 9V	40A	60	30	120	77 / 80
SWS300A-12	12V	9.6 - 13.2V	26A	96	48	120	79 / 83
SWS300A-15	15	13.2 - 18.6V	21A	120	48	120	80 / 84
SWS300A-24	24V	20 - 28.8V	13A	120	48	150	82 / 85
SWS300A-28	28V	22.4 - 33.6V	11A	140	56	150	83 / 86
SWS300A-36	36V	28.8 - 40V	8.8A	180	72	200	83 / 87
SWS300A-48	48V	40 - 57.6	6.7A	240	96	240	83 / 86
SWS600-3	3.3V	2.97-3.96V	100 (2)	40	20	100	69/71
SWS600-5	5V	4.5-6V	100 (2)	40	20	100	74/77
SWS600-12	12V	9.6-13.2	50	96	48	120	78/81
SWS600-15	15V	13.2-18V	40	120	48	120	80/83
SWS600-24	24V	20-28.8	25	120	48	150	81/84
SWS600-36	36V	28.8-40V	16.7	180	72	200	81/85
SWS600-48	48V	40-57.6	12.5	240	96	240	82/85

(2) Peak rating of 120A for 10s

(3) 115/230VAC

Outline Drawing (SWS300A)



NOTES

A: MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT AND COUNTRY OF MANUFACTURE ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.

B: M4 EMBOSSED, TAPPED AND COUNTERSUNK HOLES (8) FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 6mm/m.

Options

Suffix	Descriptor
/CO2	Double sided conformal coating

Other Industrial Products

HWS	15W to 1500W Single output, high reliability
SWS	50 - 1000W Single Output
ZWS	5 - 240W pcb style single, output

Derating

Model	50°C	55°C	60°C	65°C
SWS300A	100%	91.6%	83.3%	50%
SWS600	100%	85%	70%	55%

For Additional Information, please visit
us.tdk-lambda.com/lp/products/sws-series.htm



Single Output Low Profile Power Supplies

Features

- ◆ Low Cost
- ◆ Low Profile
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Low Acoustical noise
- ◆ Medical Certifications (SWS1000L)
- ◆ Global safety Approvals
- ◆ Variable speed fan



Key Market Segments & Applications



Specifications

Model		SWS600L	SWS1000L
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 350VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2 Class A	
Input Current (100/200VAC)	A	7.1 / 3.6 (3.3V: 5 / 2.5)	12 / 6
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	125% -145%	
Overtemperature Protection	-	Yes, cycle AC or Remote On/Off to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	<0.75mA	100µA at 115VAC 60Hz(2)
Remote Sense	-	Yes	
Parallel Connection	-	Yes	
Remote On/Off (CNT)	-	Yes	
Voltage Programming (1)	-	Yes	
DC Good & Fan Fail Signal	-	Yes, open collector output	
Auxiliary Output	-	12V 0.1A	
LED Indicator	-	Green LED = On	
Operating Temperature	°C	-40°C start up. -20 to 74°C, derating linearly to 50% load above 50°C	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	-	20 - 90% RH operating, 10 - 95%RH non operating	
Cooling	-	Variable speed internal fan	
Withstand Voltage(One minute)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, Output to CNT 100VAC	Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 500VAC, Output to CNT 100VAC
Isolation Resistance	-	>50M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	MIL-STD-810F 514.5 Cat. 4, 10	
Shock (in packaging)	-	MIL-STD-810F 516.5 Procedure I, VI	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Certification	-	UL, CSA, EN60950-1, UL60601-1 (1000W only), IEC61010-1 (600W only), EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	1600	2300
Size (WxHxD)	in	2.4 x 4.72 x 7.48"	2.4 x 5.91 x 9.45"
Warranty	yrs	Three Years	

(1) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(2) Worst case: <300µA at 264VAC, 63Hz (Normal Condition); <500µA (Single Fault Condition).

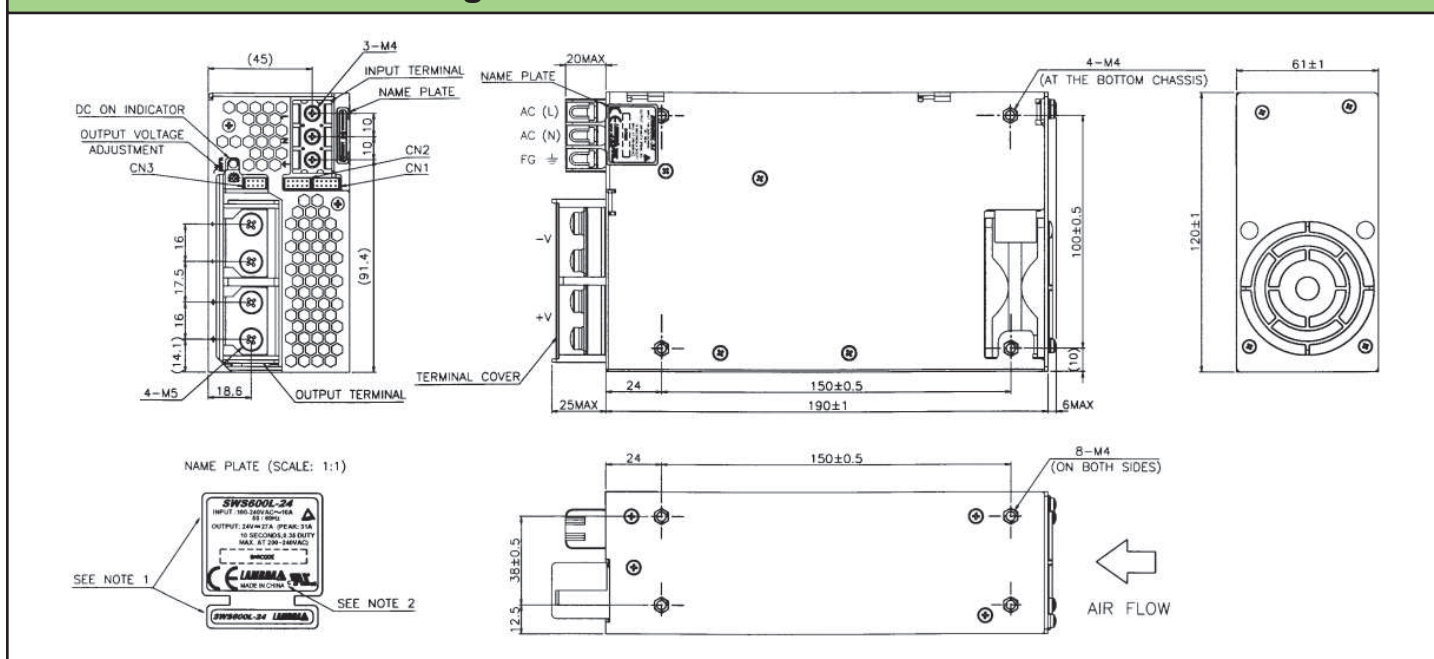
Model Selector

Model	Voltage	Adjust Range	Curr. (A)	Max Pwr (W)	Max Reg (mV)	Load Reg (mV)	Line Noise (mV)	Ripple Eff. (3) (typ)%
SWS600L-3	3.3V	2.64 - 3.96V	120A	396W	30	20	120	70 / 72
SWS1000L-3	3.3V	2.64 - 3.96V	200A	660W	30	20	120	74 / 76
SWS600L-5	5V	4 - 6V	120A	600W	30	20	120	75 / 77
SWS1000L-5	5V	4 - 6V	200A	1000W	30	20	120	79 / 81
SWS600L-12	12V	9.6 - 14.4V	53A	636W	72	48	150	79 / 82
SWS1000L-12	12V	9.6 - 14.4V	88A	1056W	72	48	150	82 / 84
SWS600L-15	15V	12 - 19.5V	43A	645W	90	60	150	79 / 82
SWS1000L-15	15V	12 - 19.5V	70A	1050W	90	60	150	82 / 84
SWS600L-24	24V	19.2 - 28.8V	27A (31A) ⁴	648W(744W)	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A (51A) ⁴	1056W(1224W)	144	96	150	84 / 86
SWS600L-36	36V	28.8 - 43.2V	18A	648W	216	144	200	82 / 84
SWS1000L-36	36V	28.8 - 43.2V	29A	1044W	216	144	200	84 / 86
SWS600L-48	48V	38.4 - 56V	13A (15A) ⁴	624W(720W)	288	192	200	82 / 84
SWS1000L-48	48V	38.4 - 56V	22A (25A) ⁴	1056W(1200W)	288	192	200	84 / 86
SWS600L-60	60V	48 - 66V	10A	600W	360	240	200	82 / 84
SWS1000L-60	60V	48 - 66V	17A	1020W	360	240	200	84 / 86

Notes: (3) 115 / 230VAC

(4) Peak current and power possible at 170-265VAC input, 10s max, 35% duty cycle

SWS600L Outline Drawing



Other Industrial Products

SWS	50 - 300W Single Output
HWS	15 - 1800W Single output, high reliability
ZWS	5 - 240W pcb style single, output
DLP, DPP, DSP	10 - 480W DIN Rail mount
LS	25 - 200W Single output, low cost

For Additional Information, please visit
us.tdk-lambda.com/lp/products/sws-series.htm



1200 to 2500W Front End Power Supplies

Features

- ◆ 1U High
- ◆ Up to 10,000W in 19" Rack
- ◆ Hot Swap Capable
- ◆ High Efficiency
- ◆ Full array of signals



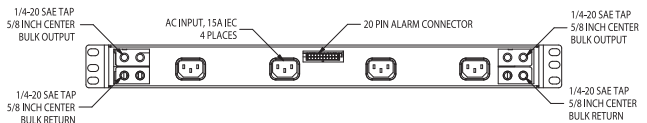
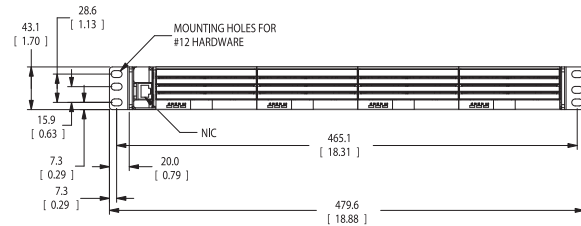
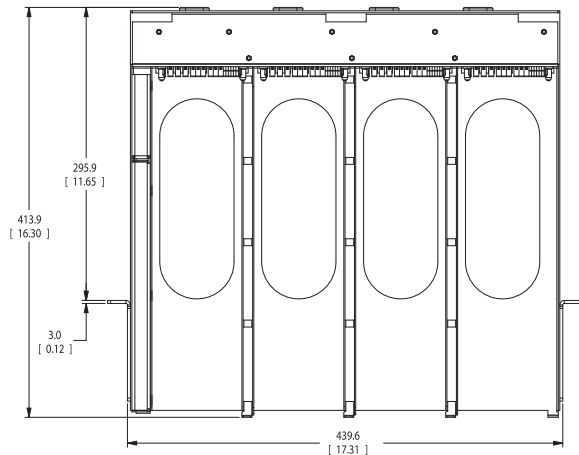
Key Market Segments & Applications



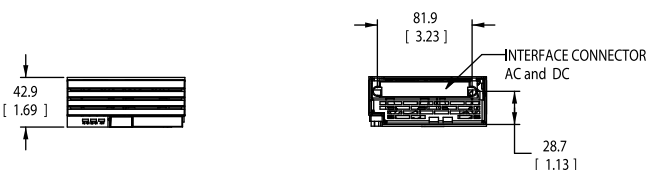
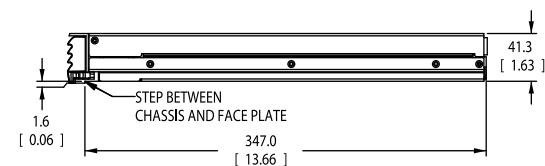
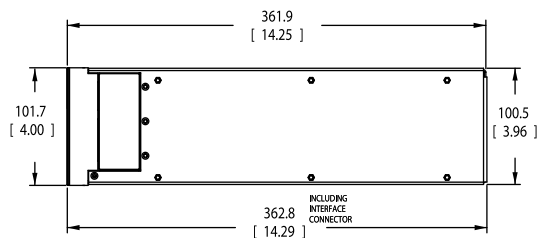
Specifications					
Model		TH120012 ⁽⁵⁾	TH120024	TH120048	TH250048 ⁽⁵⁾
Nominal Voltage	V	12	24	48	48
Output Voltage Range	VDC	10.5-14	21-28	42-56	42-56
Total Regulation	%	±1%			
Output Current	A(max)	100	50	25	50
Current limit	(1) A	120	60	30	60
Short Circuit Current	%	150	75	37	75
Output Noise	mV	250mV peak to peak (10kHz to 20MHz)			
Output Rise Time	ms	100-400 ms			
Dynamic Response	%	3% in 10ms for a 10-100% load change			
Overvoltage Protection	(1) VDC	13-15	27-30	50-60	50-60
Load Sharing	%	±5%			
I2C Programming	-	Set output Volt, Monitors AC present, Converter OK, Thermal Profile, Fan fail			
Signals (opto isolated)	(4) -	AC Fail, Module Alarm, Temp Alarm			
Remote On/Off	V	Shuts down outputs by applying 3.3 to 5V			
Auxiliary Output	(3) -	12V@100mA			
AC Input	VAC	90-264	90-264	90-264	180-264
Input Frequency	Hz	47-63			
Power Factor	-	0.99 typ. @ 230VAC, full load, meets EN61000-3-2			
Inrush Current	(2) A	30 Amps peak			
Efficiency (at full load)	%	88	90	92	93
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11			
EMC (conducted and radiated)	-	EN55022, Level B, FCC Class B			
Operating Temperature	°C	-40 to 70, derate linearly to 60% load above 50°C			
Storage Temperature	°C	-40 to 85			
Humidity	%	5 to 95 (non-condensing)			
Altitude	ft	-200 to 8000			
Shock	G	IEC68-2-27, Mil-STD-810E, 20G			
Vibration	Hz	IEC68-2-64 (random) 20-2000Hz, 30 minutes			
Safety Agency	-	UL60950, CSA 22.2 No. 60950-00, EN60950, CE Mark			
Size (L x W x H)	in.	14.25 x 4.00 x 1.69 (stand alone), 16.30 x 17.31 x 1.7 (THR4 Rack)			
Weight	lbs	Power Module 6lbs, Rack 9lbs			
Warranty	yrs	Two Years			

- 1 Adjustable via i2C or through Lambda Network Interface Card
- 2 Excludes Xcaps in the EMC input filter
- 3 Output operates independent of main DC output and is referenced to (-)Vout
- 4 All three signals share a common return - logic ground
- 5 Use rack model THR400

THR4 Rack Outline Drawing



TH Module Outline Drawing



Models

Model	Output Voltage	Output Current	Maximum Power
TH120012 ⁽⁵⁾	12V	100A	1200W
TH120024	24V	50A	1250W
TH120048	48V	25A	1250W
TH250048 ⁽⁵⁾	48V	50A	2500W
THR4	19" Rack holds up to 4 TH Modules; 200A maximum output current.		
THR400	19" Rack holds up to 4 TH modules; 400A maximum output current. Screw terminal input connection.		
THRBP	Blanking panel for one module slot.		
THR4NIC	Network interface card for 48V systems.		
THR4NIC12	Network interface card for 12V systems.		
THR4NIC24	Network interface card for 24V systems.		
TLCK232	RS232 Communications kit.		
TLRC01	Signal cable		

Alarm Connector

Mating Housing	Molex MicroFit 43025-2000
Mating Terminal	Molex MicroFit 43030-0002

Other Industrial Products

PX, CC-E, PAQ, PAH, PAF	DC-DC Converters
FPS1000	1U 1kW to 3kW Low Cost Front End

For Additional Information, please visit
us.tdk-lambda.com/lp/products/th-series.htm



3750 to 7500W Front End Power Supplies

Features

- ◆ 2U High
- ◆ Up to 22,500W in 19" Rack
- ◆ Hot Swappable
- ◆ High Efficiency



Key Market Segments & Applications



Specifications

Model		TX375024 24V Nominal	TX500048 48V Nominal	TX7500W48 48V Nominal
Output Voltage Range	(1) VDC	21-28	42-56	42-56
Total Regulation	%		±1%	
Output Current	A(max)	150	100	150
Current limit	(1) A	155	110	155
Short Circuit Current	rms A	50	35	50
Output Noise	mV	250mV peak to peak (10kHz to 20MHz)		
Output Rise Time	ms	100-400 ms		
Dynamic Response	%	3% in 10ms for a 10-100% load change		
Overvoltage Protection	(1) VDC	27-30	54-60	
Load Sharing	%	±5% of full load		
Remote On/Off	V	Shuts down outputs by applying 3.3 to 5V		
Auxiliary Output	(4) -	12V@200mA		
AC Input	VAC	180-264 (Individual Inputs)		180-305
Input Frequency	Hz	47-63		
Power Factor	-	0.99 typ. @ 230VAC, full load, meets EN61000-3-2		
Inrush Current	(2) A	30 amps peak		
Efficiency (at 230VAC)	%	90	92	92
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11		
EMC (conducted and radiated)	-	EN55022, Level B, FCC Class B		
Operating Temperature	°C	-40 to 65 (full power)		
Storage Temperature	°C	-40 to 85		
Humidity	%	5 to 95 (non-condensing)		
Altitude	ft	-200 to 8000		
Shock	G	IEC68-2-27, Mil-STD-810E, 20G		
Vibration	Hz	IEC68-2-64 (random) 20-2000Hz, 30 minutes		
Safety Agency	-	UL60950-1, EN60950-1, CE Mark		
Size (L x W x H)	in.	15.94 x 5.18 x 3.20 (Power Module), 21.00(D) x 16.12(W) x 3.49(H) (Rack)		
Weight	lbs	Power Module 15lbs, Rack 12lbs		
Warranty	yrs	Two Years		

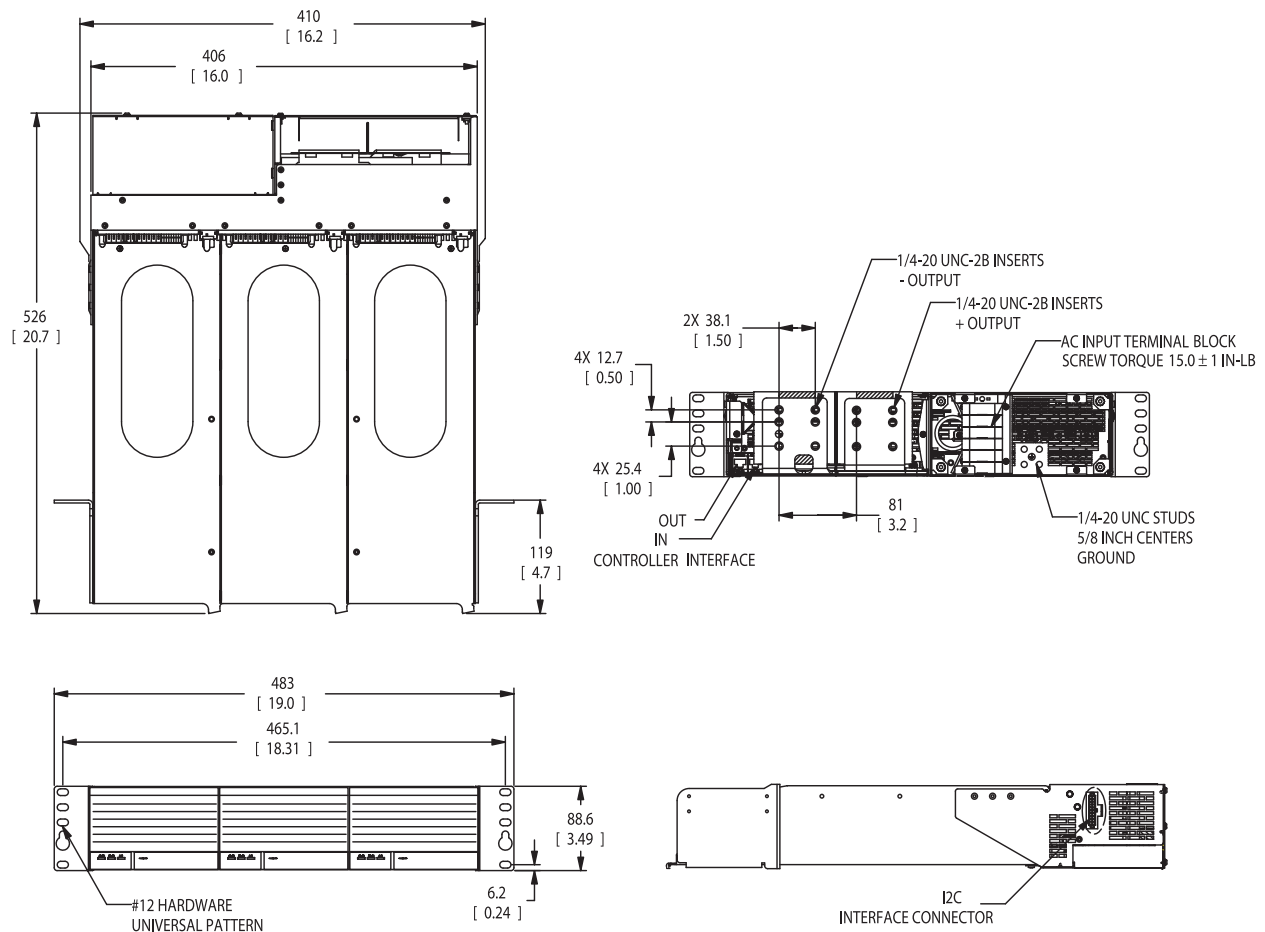
1 Adjustable via i²C

2 Excludes Xcaps in the EMC input filter

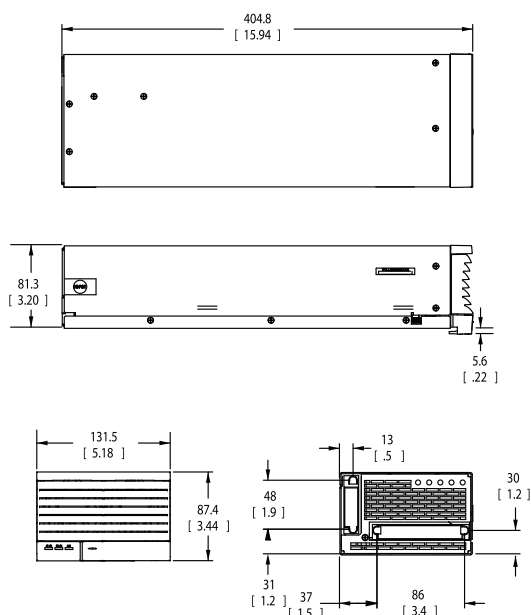
3 TX7500W48 derate 2%/°C above 50°C to 65°C

4 Operates independent of main DC output and is referenced to (-)Vout

TX Rack Outline Drawing



TX Module Outline Drawing



Models

Model	Output Voltage	Output Current	Maximum Power
TX375024	24V	150A	3600W
TX500048	48V	100A	4800W
TX7500W48	48V	150A	7200W
TXR3	19" Rack holds upto 3 TX Modules (Individual AC Feed)		
TXR3025	19" Rack with 3 Phase Delta Input		
TXR3026	19" Rack with 3 Phase WYE Input		
TXRBP	Blanking panel for one module slot		

Mating Connector

Mating Housing	Molex Micro-Fit 43025-2000
Mating Terminal	Molex Micro-Fit 43030-0002

Other Hotswap Products

HFE	1U 1600-2500W Front End
FPS1000	1U 1000W Low Cost Front End

For Additional Information, please visit
us.tdk-lambda.com/lp/products/tx-series.htm



450 to 900W Multiple Output Modular Power Supply

Features

- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Forward/Reverse/Low Noise/System Air Cooling
- ◆ Output Voltages From 0.5V - 62V
- ◆ 48VDC Input Option
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



Key Market Segments & Applications



Specifications

Model		VEGA 450	VEGA 650	VEGA 900
Input Voltage Range (47-440Hz with reduced PFC)	-	90 - 264VAC 47-63Hz ⁽¹⁾ or 34-75VDC	90-264VAC 47-63Hz ⁽¹⁾	150-264VAC 47-63Hz
Input Current (Typ. at 90VAC)	A	7.7A	11A	9.2A at 150VAC
Efficiency (Typ.)	%	75% at 230VAC (or 48VDC) and full load, configuration dependent		
Nominal Output Voltages	VDC	0.5 - 62 (See configuration guide)		
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent		
Minimum Load	A	0A		
Max Output Power	W	450 ⁽²⁾	650	900
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth		
Regulation (load, line, cross)	%	Less than 0.5%		
Hold Up Time	ms	16ms min at 90VAC (150VAC for 900W, 10ms for 450WDC input)		
Over Voltage Protection	%	120 - 150% (See website for more details)		
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current.		
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)		
Remote Sense	V	Compensates for total of 0.75V total line drop (optional on dual output modules)		
Isolation (3)	-	Input-Output 4.3kVDC ⁽³⁾ ; Input-Ground 2.3kVDC; Output-Ground 200VDC		
Conducted EMI	-	EN55022 Class B, (as per CISPR .22), Class A for 48V input		
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)		
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. ⁽⁴⁾ Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.		
Cooling	-	Forced Air Cooled		
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 µs		
Regulatory Agency Compliance (601-1 not available on 48V input)	-	UL, CSA, EN, IEC60950-1, EN61010-1, UL, EN, IEC60601-1, CE Mark for LVD		
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64		
Shock	G	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27		
Switching Frequency	kHz	200		
Weight (Typ.)	lbs	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5		
Size (L×W×H)	in(mm)	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)		
Warranty	yrs	3 Years		

Consult datasheet and application notes for detailed specifications and test methods.

(1) Will operate with 130-330VDC

(2) DC Input <44V input 370W

(3) 4kVAC Type tested (non-production test) Refer to CB Report

(4) 450WDC 1.5%/°C

Configuring Guide

Choose your options for boxes A through E. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.

V

Choose the following power supply options.

Primary Options
(Leave empty if not required)

F AC Fail, Global/fan Inhibit, 5V/100mA standby
FV AC Fail, Global/fan Inhibit, 5V/300mA standby
xFW^(5,7) AC Fail, Global/fan Inhibit, 5-15V/1A standby
E AC Fail, Global/fan Enable, 5V/100mA standby
EV AC Fail, Global/fan Enable, 5V/300mA standby
xEW^(5,7) AC Fail, Global/fan Enable, 5-15V/1A standby
(5) Specify value of x from 5-15V.
(Increase leakage current by 90µA.).

Input Filter Choice*

	120VAC, 60Hz	240VAC, 60Hz	264VAC, 63Hz (9)
S	564µA	1270µA	1.5mA
M	244µA	550µA	650µA
L	109µA	246µA	290µA
R	66µA	148µA	175µA
T	23µA	51µA	60µA

Input Connection

F Fast on terminals (7)
S Screw terminals
I Switched IEC 320 Connector (7)

Cooling

F Standard forward air fan
Q Quiet fan, forward air (7)
R Standard reverse air fan (6)
P Quiet fan, reverse air (6) (7)
C** Customer air (30 CFM req'd)

Output Power

0 450W DC Input
4 450W
6 650W
9 900W

* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance.
** Thermocoupled evaluation unit recommended. Consult sales office.
(6) Not available on 900W Model (7) Not available on 450WDC Model
(8) Only available on 900W Model (9) Type testing result

Model Selector

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
Single Output							
B1L	1.8-3.8V	20A	1	E4	14-19.9V	30A	2
C1	1.8-4.1V	35A	1	E3H	14-15V	36A	2
C1Y	1.8-4.1V	40A	1	C4	16.2-21.5V	14A	1
D1L	1.8-3.8V	50A	1.5	CC3	18.2-32.4V	18A	2
E1	1.8-3.8V	60A	2	E5L	20-24V	27A	2
F1 ⁽⁶⁾	1.8-3.8V	80A	2	B5	21.6-31V	6A	1
Z2	1.8-3.8V	95A	3	C5	21.6-31V	10A	1
Z3	1.8-3.8V	114A	4	D5	21-28V	15A	1.5
B1H	3.9-5.5V	20A	1	E5H	24-28V	25A	2
L1	4.2-5.5V	35A	1	Z19 ⁽⁸⁾	24-28V	36A	3.5
D2	3.8-9V	45A	1.5	HH5/3	25.3-44.2V	5A	1
D1H	3.9-5.5V	50A	1.5	DD4	28-43V	18A	3
E2	3.8-8V	60A	2	EE4 ⁽⁸⁾	28-38	22.5	4
Z18	4.2-5.5V	66A	2	HH5/4	32.5-53V	4.5A	1
F2 ⁽⁶⁾	3.8-8V	75A	2	BB4	32.6-43V	10A	2
Z4	3.9-5.5V	95A	3	EE5L ⁽⁸⁾	40-48	18	4
Z6	3.9-5.5V	104A	3.5	C5B4	43-48V	10A	2
B2	5-9V	25A	1	EE5H ⁽⁸⁾	48-56	18	4
B3	9.1-16.2V	12A	1	CC5	48.1-62V	10A	2
C3	9.1-16.2V	18A	1	DD5	42-56V	15A	3
D3	8-16.5V	24A	1.5	Wide Range Programmable*			
E3L	8-13.9V	40A	2	W2 ⁽⁶⁾	1-7.5V	30A	1
Z7	8-16.5V	45A	3	W5	0.5-32V	8.5A	1
EE2	7.6-16V	45A	4	* Refer to Vega Datasheet			
D4	14-21.5V	18A	1.5				

Single Output Module Selection †

Output Options

(Leave empty if not required)

Inhibit, module good,
and current share

Output Connection

Fast on terminals
Screw terminals

N

F

S

Vout

Module

Conn.

Opt.

Example

12B3SN: 12V @ 12A single output module, screw terminal outputs, inhibit option

† Remote sense is standard on single output modules, optional on duals.

Dual Output Module Selection

V1

V2

Module

Conn.

Opt.

Output Connection

Fast on terminals

Screw terminals

Output Options

Inhibit, module good,
and remote sense

Remote sense

(Leave empty if not required)

F

S

N

R

Example

3.3/12H1L/3FR: 3.3V @ 12A and 12V @ 6A output, fast on output terminals and remote sense option.

Full Description Example:

V4FSSFV 5L1S 3.3E1SN 15/15H3/3SR

450W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 300mA aux. supply option with the following outputs:

5V @ 35A Screw terminal connections with remote sense standard
3.3V @ 60A Screw terminal connection with output inhibit, module good, and current share options, remote sense standard
15V @ 10A Screw terminal connection with remote sense option (1st half of dual)
15V @ 6A Screw terminal connection with remote sense option (2nd half of dual)

Note the module descriptions are to be used as listed in the module tables.

Model Selector

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
Dual Output					
H1L/1L	1.8V - 3.8V	12A	1.8V - 3.8V	8A	1
H1L/1H	1.8V - 3.8V	12A	3.9V - 5.5V	8A	1
H1L/2	1.8V - 3.8V	12A	5.6V - 9V	6A	1
H1L/3	1.8V - 3.8V	12A	9.1V - 16.2V	6A	1
H1L/4	1.8V - 3.8V	12A	16.3V - 25V	4.5A	1
H1H/1L	3.9V - 5.5V	12A	1.8V - 3.8V	8A	1
H1H/1H	3.9V - 5.5V	12A	3.9V - 5.5V	8A	1
H1H/2	3.9V - 5.5V	12A	5.6V - 9V	6A	1
H1H/3	3.9V - 5.5V	12A	9.1V - 16.2V	6A	1
H1H/4	3.9V - 5.5V	12A	16.3V - 25V	4.5A	1
H2/1L	5.6V - 9V	10A	1.8V - 3.8V	8A	1
H2/1H	5.6V - 9V	10A	3.9V - 5.5V	8A	1
H2/2	5.6V - 9V	10A	5.6V - 9V	6A	1
H2/3	5.6V - 9V	10A	9.1V - 16.2V	6A	1
H2/4	5.6V - 9V	10A	16.3V - 25V	4.5A	1
H3/1L	9.1V - 16.2V	10A	1.8V - 3.8V	8A	1
H3/1H	9.1V - 16.2V	10A	3.9V - 5.5V	8A	1
H3/2	9.1V - 16.2V	10A	5.6V - 9V	6A	1
H3/3	9.1V - 16.2V	10A	9.1V - 16.2V	6A	1
H3/4	9.1V - 16.2V	10A	16.3V - 25V	4.5A	1
H5/1L	16.2V - 28V	5A	1.8V - 3.8V	8A	1
H5/1H	16.2V - 28V	5A	3.9V - 5.5V	8A	1
H5/2	16.2V - 28V	5A	5.6V - 9V	6A	1
H5/3	16.2V - 28V	5A	9.1V - 16.2V	6A	1
H5/4	16.2V - 28V	5A	16.3V - 25V	4.5A	1

For Additional Information, please visit
us.tdk-lambda.com/lp/products/vega-series.htm



550 to 900W Multiple Output Modular Power Supply

Features

- ◆ Suitable for higher volume applications
- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Output Voltages From 1.8 - 56V
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



Key Market Segments & Applications



Specifications

Model		VEGA Lite 550	VEGA Lite 750
Input Voltage Range	(1) -	85-264VAC 47-63Hz(2)	85-264VAC 47-63Hz(2)
Efficiency (Typ.)	%	75% at 230VAC and full load, configuration dependent	
Nominal Output Voltages	VDC	1.8 - 56V (See page 2)	
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent	
Minimum Load	A	0A	
Max Output Power	(3) W	700 ⁽³⁾	900 ⁽³⁾
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth	
Regulation (load, line, cross)	%	Less than 0.5%	
Hold Up Time	ms	16ms min at 100VAC and full load	
Over Voltage Protection	%	120% - 150% (See website for more details)	
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current	
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)	
Remote Sense	V	Compensates for total of 0.75 volts total line drop (optional on dual output modules)	
Isolation	(4) -	Input-Output 4.3kVDC ⁽⁴⁾ ; Input-Ground 2.3kVDC; Output-Ground 200VDC	
Conducted EMI	-	EN55022 Class B, (as per CISPR .22)	
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)	
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.	
Cooling	-	Internal fan	
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 microseconds.	
Regulatory Agency Compliance	-	UL, CSA, EN, IEC 60950-1, EN61010-1, UL2601-1, EN, IEC6060-1, CE Mark for LVD	
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9	
Shock	G	2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64	
Switching Frequency	kHz	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27	
Weight (Typ.)	lbs	200	
Size (L×W×H)	in(mm)	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5	
Warranty	yrs	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)	
		3 Years	

Consult datasheet and application notes for detailed specifications and test methods.

- (1) 440Hz with reduced PFC, consult factory
- (2) Will operate with 130-330VDC
- (3) See input derating curves
- (4) 4kVAC type tested (non-production test). Refer to CB report

Choose your options for boxes A through C. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.

* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance.
(5) Type testing result

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
Single Output							
C1S	1.8-3.4V	35A	1	D4S	14-18V	18A	1.5
D1LS	1.8-3.4V	50A	1.5	E4S	14-19V	30A	2
E1S	1.8-3.4V	60A	2	C4S	16.3-18V	14A	1
L1S	4.2-5.1V	35A	1	C5S	21.6-30V	10A	1
D2S	3.8-7.5V	45A	1.5	D5S	21-28V	15A	1.5
D1HS	3.9-5.1V	50A	1.5	E5HS	24-28V	25A	2
E2S	3.8-7.5V	60A	2	HH5/4S	32.5-48V	4.5A	1
B2S	5-8V	25A	1	BB4S	32.6-40V	10A	2
C3S	9.1-15V	18A	1	C5B4S	43-48V	10A	2
D3S	8-15V	24A	1.5	DD5S	42-56V	15A	3
F3LS	8-12.5V	40A	2				

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
Dual Output					
H1H/1LS	3.9V - 5.1V	12A	1.8V - 3.4V	8A	1
H1H/3S	3.9V - 5.1V	12A	9.1V - 15.5V	6A	1
H3/1HS	9.1V - 15.5V	10A	3.9V - 5.1V	8A	1
H3/3S	9.1V - 15.5V	10A	9.1V - 15.5V	6A	1
H5/1HS	16.2V - 28V	5A	3.9V - 5.1V	8A	1
H5/3S	16.2V - 28V	5A	9.1V - 15.5V	6A	1
H5/4S	16.2V - 28V	5A	16.3V - 24V	4.5A	1



Output Options
(Leave empty if not required)
Inhibit, module good,
and current share N

† Remote sense is standard on single output modules, optional on duals.

V1 V2 Module S Opt.

[] / [] [] [] [S] []

Output Options
 Inhibit, module good,
 and remote sense

N

(Leave empty if not required)

Full Description Example:
V5ESSF 5L1SN 12/12H3/3S 24C5S

550W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 100mA aux. supply option with the following outputs:

With O/P inhibit, module good & current share options

Note the module descriptions are to be used as listed in the module tables.

Maximum Continuous Output Power

ac Input Voltage (V)	Vega Lite 550 Output Power (W)	Vega Lite 750 Output Power (W)
85	400	600
110	550	750
150	550	750
260	550	750
265	0	0

10W to 150W Single Output, 115VAC Input

Features

- ◆ Input transient protected
- ◆ 2 year warranty
- ◆ High quality design
- ◆ 200% Peak Power Version (VSP)
- ◆ Broad product range



Key Market Segments & Applications



Specifications

		VS10C		VS15C	VS30C	VS50B VS50P	VS75B VS75P	VS100B VS100P	VS150B VS150P
Model									
AC Input Voltage range	-	85-132VAC (47-440Hz)							
DC Input Voltage range	VDC	110 - 175VDC							
Inrush Current (100VAC) (1)	A	25	30	25	30	30	20	20	
Temperature Coefficient	-	<0.02%/°C							
Overcurrent Protection (2)	-	~105%				VSB:~125%; VSP: >102% of Peak			
Overvoltage Protection	V	~115% Diode Clamp				~115 - 135% Manual Reset			
Hold Up Time (Typ) at 100VAC	ms	20				17			
Remote Sense	-	None							
Operating Temperature (3)	-	-10°C to +60°C, derate linearly to 70% load from 50°C to 60°C							
Storage Temperature	-	-30 to +85°C							
Humidity (non condensing)	-	Storage 10-95% RH, Operating 30-90% RH							
Cooling (4)	-	Convection							Forced
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 2kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.							
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC							
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour							
Shock	-	< 196.1 m/s ²							
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1							
Conducted & Radiated EMI	-	FCC Class B, VCCI-B							
Recommended EMI Filter	-	RSEL-20R5W	RSEL-2001W		RSEL-2002W/RSEL-2003W		RSEL-2006W		
Weight (Typ) (VSP)	g	65	80	150	200	350 (280)	420 (350)	550 (480)	
Size (WxHxD)	mm	See Outline Drawings							
Warranty	yrs	Two Years							

Notes:

(1) 25°C ambient (cold start)

(2) Avoid prolonged operation in overload

(3) VS50B24 -10°C to +60°C, derate linearly to 62% load from 40°C to 60°C, VS50P derate to 60% at 60°C

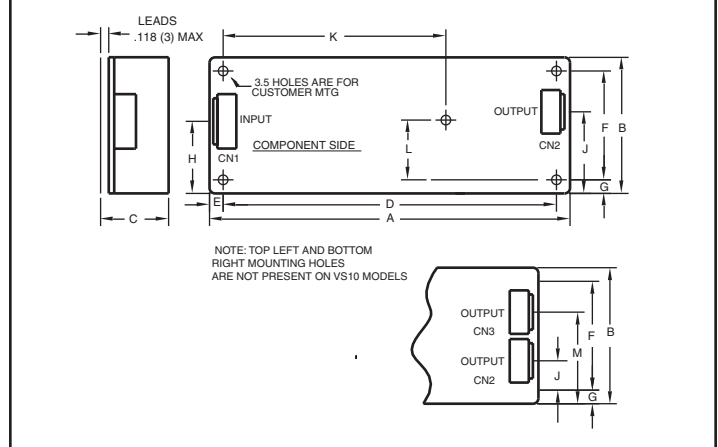
(4) 0.7m/s forced air required, consult installation manual for derating with convection cooling

Model Selector

Model	Voltage V	Adjust Range V	Max Curr. A	Peak Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. %
VS10C-3	3.3	2.97-3.63	2	-	40	20	120	62
VS15C-3	3.3	2.97-3.63	3	-	40	20	120	62
VS30C-3	3.3	2.97-3.63	6	-	40	20	120	69
VS50B-3	3.3	2.97-3.63	10	12	40	20	120	73
VS75B-3	3.3	2.97-3.63	15	18	40	20	120	72
VS100B-3	3.3	2.97-3.63	20	24	40	20	120	72
VS150B-3	3.3	2.97-3.63	30	36	40	20	120	72
VS10C-5	5	4.5-5.5	2	-	40	20	120	71
VS15C-5	5	4.5-5.5	3	-	40	20	120	72
VS30C-5	5	4.5-5.5	6	-	40	20	120	75
VS50B-5	5	4.5-5.5	10	12	40	20	120	78
VS75B-5	5	4.5-5.5	15	18	40	20	120	79
VS100B-5	5	4.5-5.5	20	24	40	20	120	79
VS150B-5	5	4.5-5.5	30	36	40	20	120	78
VS10C-12	12	10.8-13.2	0.9	-	96	48	150	75
VS15C-12	12	10.8-13.2	1.3	-	96	48	150	75
VS30C-12	12	10.8-13.2	2.5	-	96	48	150	80
VS50B-12	12	10.8-13.2	4.3	5.16	96	48	150	79
VS75B-12	12	10.8-13.2	6.3	7.56	96	48	150	80
VS100B-12	12	10.8-13.2	8.5	10.2	96	48	150	80
VS150B-12	12	10.8-13.2	12.5	15	96	48	150	80
VS10C-15	15	13.5-16.5	0.7	-	120	60	150	75
VS15C-15	15	13.5-16.5	1	-	120	60	150	75
VS30C-15	15	13.5-16.5	2	-	120	60	150	81
VS50B-15	15	13.5-16.5	3.5	4.2	120	60	150	80
VS75B-15	15	13.5-16.5	5	6.0	120	60	150	80
VS100B-15	15	13.5-16.5	7	8.4	120	60	150	80
VS150B-15	15	13.5-16.5	10	12	120	60	150	80
VS10C-24	24	21.6-26.4	0.5	-	240	96	200	78
VS15C-24	24	21.6-26.4	0.7	-	240	96	200	78
VS30C-24	24	21.6-26.4	1.3	-	150	96	200	82
VS50B-24	24	21.6-26.4	2.5	3.0	150	96	200	80
VS50P-24	24	21.6-26.4	2.5	4.2	150	96	180	83
VS75B-24	24	21.6-26.4	3.2	3.84	150	96	200	81
VS75P-24	24	21.6-26.4	3.2	7.0	150	96	180	83
VS100B-24	24	21.6-26.4	4.3	5.16	150	96	200	81
VS100P-24	24	21.6-26.4	4.3	10	150	96	180	85
VS150B-24	24	21.6-26.4	6.3	7.56	150	96	200	80
VS150P-24	24	21.6-26.4	6.3	12	150	96	180	86
VS30C-36	36	32.4-39.6	0.9	-	240	144	300	80
VS75B-36	36	32.4-39.6	2.1	2.52	240	144	300	81
VS100B-36	36	32.4-39.6	3	3.6	240	144	300	81
VS150B-36	36	32.4-39.6	4.2	5.04	240	144	300	80
VS30C-48	48	43.2-52.8	0.7	-	480	192	400	80
VS75B-48	48	43.2-52.8	1.6	1.92	300	192	400	81
VS100B-48	48	43.2-52.8	2.2	2.64	200	192	400	81
VS150B-48	48	43.2-52.8	3.2	3.84	300	192	400	81

Peak Current Note: For 10s maximum, 35% duty cycle, average power not to exceed maximum ratings. See installation manual.

VSB/VSC Outline Drawing



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	WEIGHT:
VS10	3.70 (94)	1.93 (49)	.67 (17)	3.425 (87)	.138 (3.5)	1.654 (42)	.138 (3.5)	1.02 (26)	.85 (21.5)	-	-	-	.17 LBS
VS15	4.53 (115)	1.97 (50)	.67 (17)	4.252 (108)	.138 (3.5)	1.693 (43)	.138 (3.5)	1.22 (31)	1.39 (35.25)	-	-	-	.22 LBS
VS30	5.22 (132.5)	1.97 (50)	.98 (25)	4.823 (122.5)	.197 (5)	1.576 (40)	.197 (5)	1.02 (26)	1.18 (30)	-	-	-	.29 LBS
VS50	7.68 (195)	1.97 (50)	.98 (25)	7.283 (185)	.197 (5)	1.576 (40)	.197 (5)	1.10 (28)	.67 (17)	-	-	-	.44 LBS
VS75	8.74 (222.0)	1.97 (50)	1.26 (32)	8.346 (212)	.197 (5)	1.576 (40)	.197 (5)	.85 (21.5)	1.06 (27)	5.335 (135.5)	1.280 (32.5)	-	.77 LBS
VS100	8.74 (222.0)	2.44 (62)	1.26 (32)	8.346 (212)	.197 (5)	2.047 (52)	.197 (5)	.98 (25)	1.22 (31)	4.705 (119.5)	1.673 (42.5)	-	.92 LBS
VS150	8.74 (222.0)	2.95 (75)	1.42 (36)	8.346 (212)	.197 (5)	2.560 (65)	.197 (5)	1.81 (46)	.85 (21.7)	4.961 (126)	2.165 (55)	1.91 (48.5)	1.21 LBS

NOTE:
1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.

Other Industrial Products

HWS	15W to 1500W Single output
ZWS, ZWD, ZWQ	5W to 240W Universal input
SC, SCS120	30W to 120W Single, dual & triple output
ZP	40W to 60W Single & multiple output

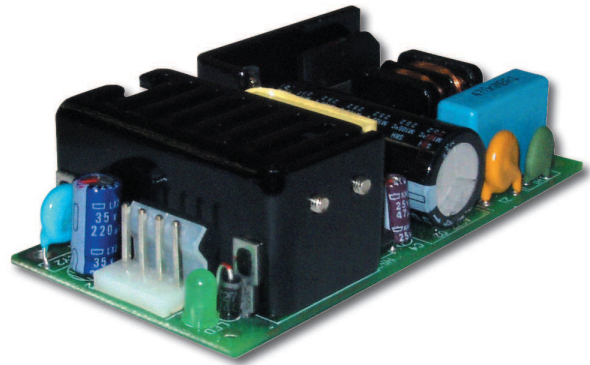
For Additional Information, please visit
us.tdk-lambda.com/lp/products/vsb-series.htm



2 x 4" 40W to 60W AC-DC Power Supplies

Features

- ◆ Single and Multiple Outputs
- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ EN61000-4 Immunity
- ◆ Up to 88% efficiency



Key Market Segments & Applications



Specifications				
Model		ZPS40	ZPS60	ZPD40 ZPT40
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC		
Inrush Current (132/265VAC)	A	25 / 50 (cold start)		
Input Current (115/230VAC)	A	1.6 / 1.0		
Temperature Coefficient	-	±0.05%/°C		
Voltage Accuracy	%	±1%		V1: ±3%, V2: ±4%, V3: ±3%
Minimum Load	A	None		V1: 0.4A, V2: 0.2A
Load Regulation (1)	%	±1%		V1: ±3%, V2: ±5%, V3: ±1%
Line Regulation (2)	%	±0.5%		V1: ±1%, V2: ±2%, V3: ±1%
Ripple & Noise (3)(4)	mV	1% or 50mV whichever is greater		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	Typically 110-130% of nominal		
Hold Up Time (Typ)	ms	8ms at 115VAC input		
LED Indicator	-	Green LED = OK		None
Operating Temperature (5)	-	0 to +70°C, derate linearly to 50% load from 50°C to 70°C		
Storage Temperature	-	-20 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection		
Withstand Voltage		Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.		
Isolation Resistance		>100M at 25C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)		23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s ² (20G)		
Safety Agency Approvals	-	UL60950, CSA60950, EN60950, CE Mark (LVD)		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B		
Immunity	-	EN61000-4-2,-3,-4,-6,-8		
Weight (Typ)	g (oz)	170g (6oz)		
Size (WxLxH)	in	2 x 4 x 1.2 (including underside components)		
Warranty	yrs	One Year		

Notes:

- (1) ZPD, ZPT for a 60% to 100% or 100% to 60% change in load
- (2) ZPT40-3512N V2: ±3%, ZPS/ZPD40: 100-240VAC
- (3) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW
- (4) ZPT40-3512N, V1 & V2 100mV
- (5) ZPS40 (3.3V to 9V models), ZPS60 (3.3V to 12V models) derate linearly to 25% load from 40°C to 70°C

**ZPS40, 60 Not Recommended
For New Designs - See ZPSA Series**

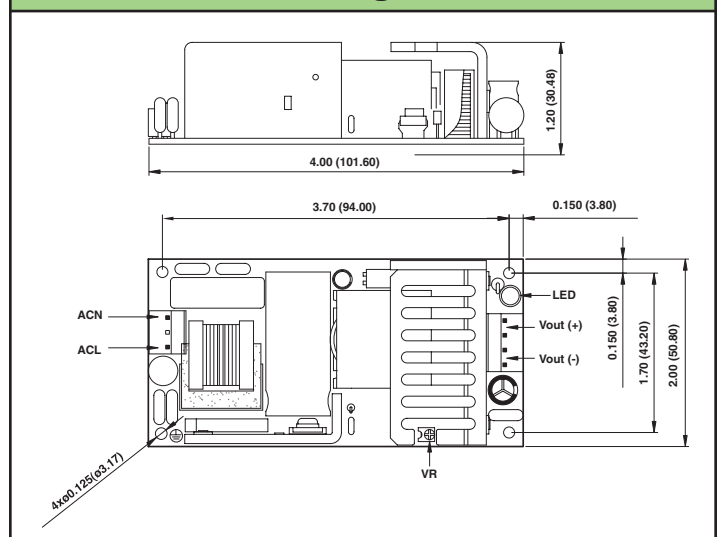
2 Output Module Codes

Model		O/P(V)	Max. O/P(A)	Peak (A)(6)	Output Pwr(W)	Eff. (%)
Single Output						
ZPS40-3R3	V1	3.3	6.0	7.2	20.0	74
ZPS60-3R3	V1	3.3	8.0	8.5	26.0	74
ZPS40-5	V1	5.0	6.0	7.2	30.0	78
ZPS60-5	V1	5.0	8.0	9.0	40.0	78
ZPS40-9	V1	9.0	4.45	5.34	40.0	82
ZPS60-9	V1	9.0	6.67	8.0	60.0	82
ZPS40-12	V1	12.0	3.34	4.0	40.0	84
ZPS60-12	V1	12.0	5.0	6.0	60.0	84
ZPS40-15	V1	15.0	2.67	3.2	40.0	85
ZPS60-15	V1	15.0	4.0	4.8	60.0	85
ZPS40-24	V1	24.0	1.67	2.0	40.0	86
ZPS60-24	V1	24.0	2.5	3.0	60.0	86
ZPS40-30	V1	30.0	1.33	1.6	40.0	86
ZPS60-30	V1	30.0	2.0	2.4	60.0	86
ZPS40-36	V1	36.0	1.11	1.33	40.0	87
ZPS60-36	V1	36.0	1.67	2.0	60.0	87
ZPS40-48	V1	48.0	0.834	1.0	40.0	88
ZPS60-48	V1	48.0	1.25	1.5	60.0	88
Dual Outputs						
ZPD40-512	V1	+5.0	3.2	5.0	40.0 (7)	77
	V2	+12.0	2.0	2.5		
ZPD40-524	V1	+5.0	3.2	5.0	40.0 (7)	78
	V2	+24.0	1.0	1.5		
Triple Outputs						
ZPT40-5125N	V1	+5.0	3.2	5.0	40.5 (7)	75
	V2	+12.0	2.0	2.5		
	V3	-5.0	0.3	0.5		
ZPT40-51212N	V1	+5.0	3.2	5.0	42.6 (7)	75
	V2	+12.0	2.0	2.5		
	V3	-12.0	0.3	0.5		
ZPT40-51515N	V1	+5.0	3.2	5.0	42.0 (7)	75
	V2	+15.0	1.5	2.3		
	V3	-15.0	0.3	0.5		
ZPT40-52412N	V1	+5.0	3.2	5.0	42.6 (7)	75
	V2	+24.0	1.0	1.5		
	V3	-12.0	0.3	0.5		
ZPT40-5245N	V1	+5.0	3.2	5.0	40.5 (7)	75
	V2	+24.0	1.0	1.5		
	V3	-5.0	0.3	0.5		
ZPT40-52412P	V1	+5.0	3.2	5.0	42.6 (7)	75
	V2	+24.0	1.0	1.5		
	V3	+12.0	0.3	0.5		
ZPT40-3512N	V1	+3.3	5.0	7.0	30.0	70
	V2	+5.0	2.0	3.5		
	V3	-12.0	0.3	0.5		

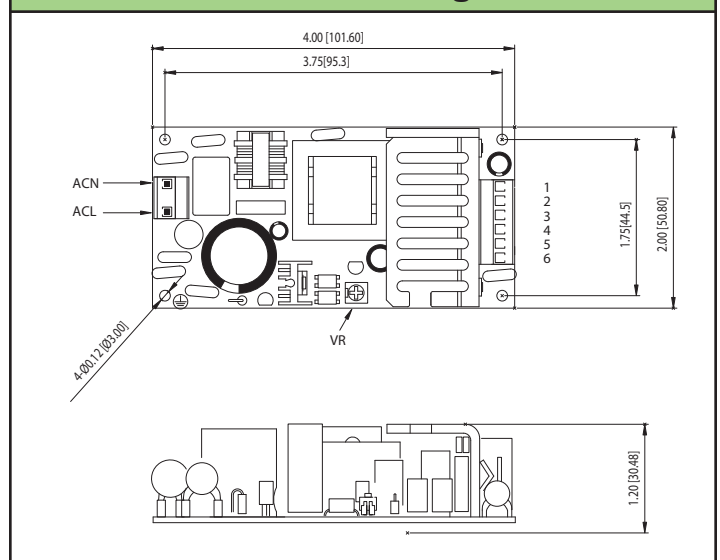
Other Industrial Products

SC40/60	40 to 80W, 3x5", 1 - 3 outputs
NV175	175W, 3x5", 1-5 outputs
ZWS	5 to 240W, single output

ZPS Outline Drawing



ZPD/ZPT Outline Drawing



Pin Connection (ZPD/ZPT)

PIN	Function
1	V2
2	V1
3	V1
4	COM
5	COM
6	V3

Note: (6) Average not to exceed max power, <30s, 10% duty cycle
(7) 50W with 30CFM forced air cooling, derate linearly to 35W from 50°C to 70°C

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zp-series.htm



2 x 3.5" 14-22W AC-DC Power Supplies

Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Class B conducted EMI



Key Market Segments & Applications



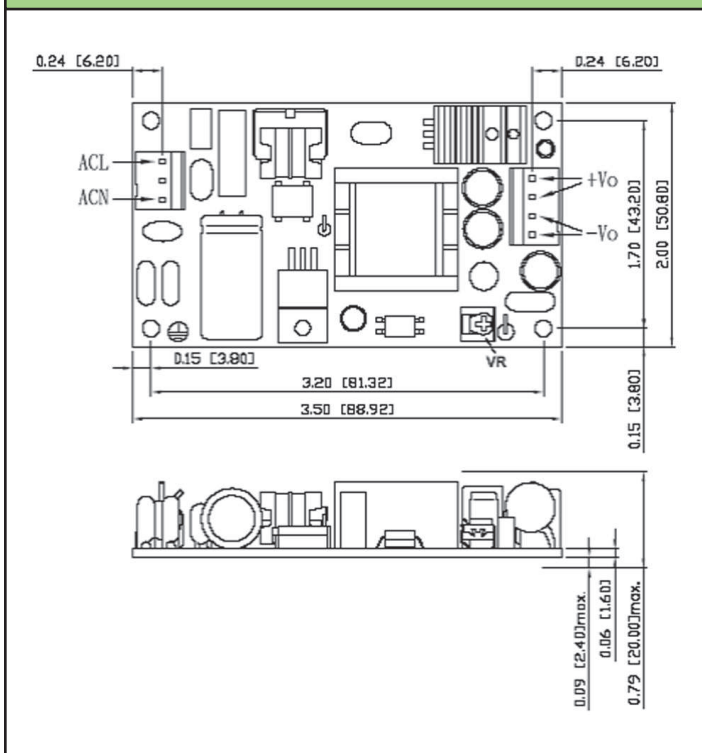
Specifications

Model		ZPSA20
Input Voltage range (1)	-	85 - 264VAC (47 - 440Hz) or 120 - 370VDC
Inrush Current	A	40A maximum at 240VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	0.25 / 0.12
Leakage Current	mA	0.6mA maximum (264VAC, 60Hz)
Hold Up Time (Typ)	ms	8ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	-	±1%
Adjustment Range	-	None
Minimum Load	A	None
Load Regulation	-	±1% (10 - 100% load change)
Line Regulation	-	±0.5% (100 - 240VAC line change)
Ripple & Noise (2)	mV	1% or 50mV whichever is greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 130% of nominal (Zener clamp)
Efficiency	%	82% typical
LED Indicator	-	Green LED = OK
Operating Temperature	°C	0 to +70°C derate linearly to 37.5% load from 45 to 70°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Certification	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE Mark
Conducted & Radiated EMI	-	EN55022-B, FCC Class B
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8
Weight (Typ)	g	100g
Size (WxLxH)	mm	2 x 3.5 x 0.79 (including underside components)
Warranty	yr	One Year

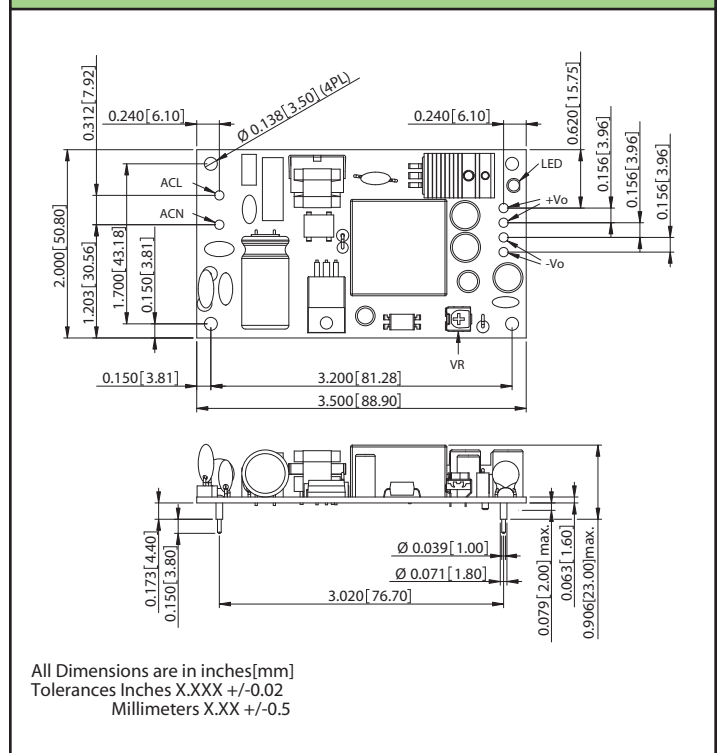
(1) Safety certified for 47 - 63Hz input only

(2) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW

Outline Drawings (ZPSA20)



Outline Drawings (ZPSA20xx/P)



Model Selector

Model	Output (V)	Maximum Output (A)	Peak Load(A) (3)	Output Power (W)
ZPSA20-3R3	3.3	4.4	6.6	14.5
ZPSA20-5	5	4.4	6.6	22
ZPSA20-9	9	2.45	4.0	22
ZPSA20-12	12	1.8	2.7	22
ZPSA20-15	15	1.4	2.1	21
ZPSA20-24	24	0.92	1.4	22

(3) Average not to exceed max power, <30s, 10% duty cycle

Options

Suffix	Description
Blank	Molex connectors
/P	PCB mount pins

Other Industrial Products

KPSA	5 - 15W pcb mount
KM	15 - 40W pcb mount medical
ZPSA/ZPD/ZPT	40 - 60W, single, dual and triple output
ZWS	5 - 240W single output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zpsa-series.htm



2 x 4" 40W to 60W AC-DC Power Supplies

Features

- ◆ Single Output
- ◆ Wide Range AC Input
- ◆ Low 1.07" profile
- ◆ Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Up to 88% efficiency



Key Market Segments & Applications



Specifications

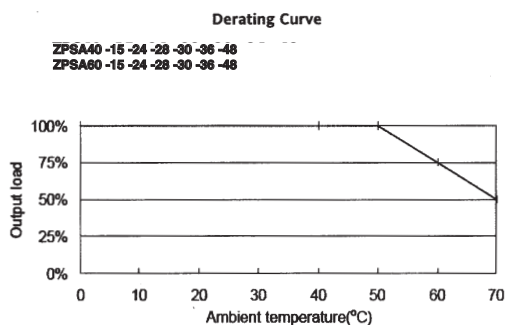
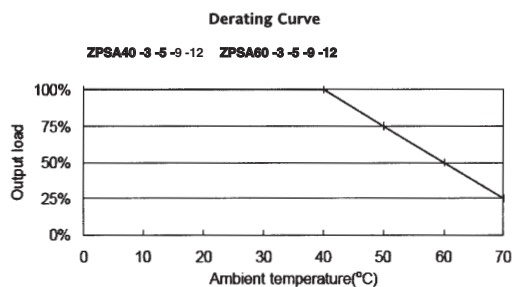
Model		ZPSA40	ZPSA60
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC	
Inrush Current (115 / 230VAC)	A	25 / 50	
Input Current	A	< 1.2A	< 1.4A
Leakage Current	mA	0.8mA maximum (264VAC, 60Hz)	
Temperature Coefficient	-	±0.05%/°C	
Voltage Accuracy	%	±1%	
Minimum Load	-	None	
Load Regulation	%	±1%	
Line Regulation	%	±0.5%	
Ripple & Noise	mV	1% or 50mV whichever is greater	
Short Circuit Protection	-	Continuous - hiccup mode	
Overvoltage Protection	V	Typically 110-130% of nominal	
Hold Up Time (Typ)	ms	8ms at 115VAC input	
LED Indicator	-	Green LED = OK	
Operating Temperature	°C	0 to +70°C derate according to charts on page 2	
Storage Temperature	°C	-20 to +85°C	
Humidity (non condensing)	-	10 - 95% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)		-23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s ² (20G)	
Safety Agency Certification	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark	
Conducted & Radiated EMI	-	EN55022-B, FCC Class B	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Weight (Typ)	g	130	
Size (WxLxH)	in	2 x 4 x 1.07 (including underside components)	
Warranty	yrs	One Year	

Model Selector

Model	Output (V)	Adjustment Range (V)	Maximum Output (A)	Peak Load (A)(4)	Output Power (W)	Efficiency (%)
ZPSA40-3R3	3.3	-	6.0	7.2	20	74
ZPSA60-3R3	3.3	-	8.0	8.5	26	74
ZPSA40-5	5	-	6.0	7.2	30	79
ZPSA60-5	5	-	8.0	9.0	40	79
ZPSA40-9	9	-	4.45	5.34	40	83
ZPSA60-9	9	-	6.67	8.0	60	83
ZPSA40-12	12	-	3.34	4.0	40	85
ZPSA60-12	12	-	5.0	6.0	60	85
ZPSA40-15	15	-	2.67	3.2	40	85
ZPSA60-15	15	-	4.0	4.8	60	85
ZPSA40-24	24	-	1.67	2.0	40	86
ZPSA60-24	24	-	2.5	3.0	60	86
ZPSA40-28	28	-	1.43	1.7	40	86
ZPSA60-28	28	-	2.14	2.6	60	86
ZPSA40-30	30	-	1.33	1.6	40	87
ZPSA60-30	30	-	2.0	2.4	60	87
ZPSA40-36	36	-	1.11	1.33	40	87
ZPSA60-36	36	-	1.67	2.0	60	87
ZPSA40-48	48	-	0.834	1.0	40	88
ZPSA60-48	48	-	1.25	1.5	60	88

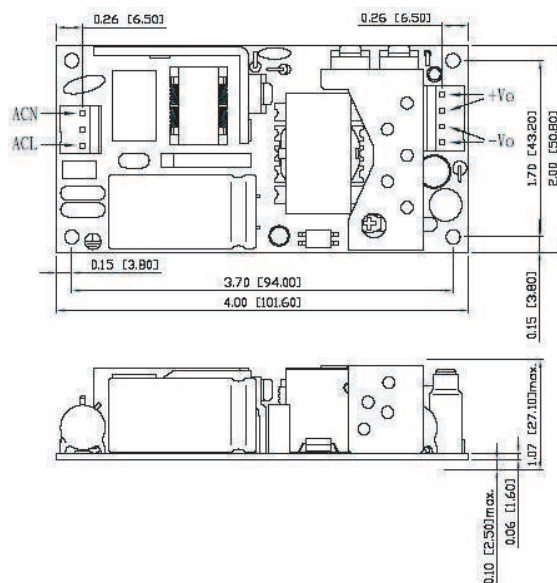
(4) Average not to exceed max power, <30s, 10% duty cycle

Derating Curve



Outline Drawings

All Dimensions are in inches[mm]
Tolerances : X X ±.02[.XX ±.5] unless otherwise noted



Other Industrial Products

SC40/60	40 to 80W, 3x5", 1 - 3 outputs
NV175	175W, 3x5", 1-5 outputs
ZWS	5 to 240W, single output
KPSA	5 to 15W, pcb mount
ZPD, ZPT	40W, 2x4" dual and triple outputs

Options

Suffix	Description
Blank	Molex connectors
/P	PCB mount pins

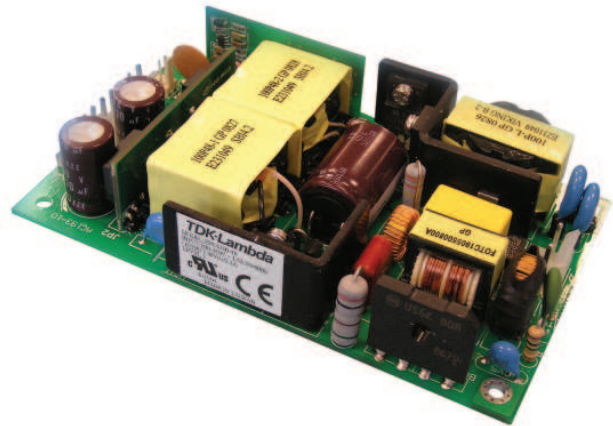
For Additional Information, please visit
us.tdk-lambda.com/lp/products/zpsa-series.htm



3" x 5" 100W AC-DC Power Supplies

Features

- ◆ PFC
- ◆ Wide Range AC Input
- ◆ Low Profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ RoHS Compliant
- ◆ Up to 84% efficiency
- ◆ Meets EN61000-4 Immunity



Key Market Segments & Applications



Specifications

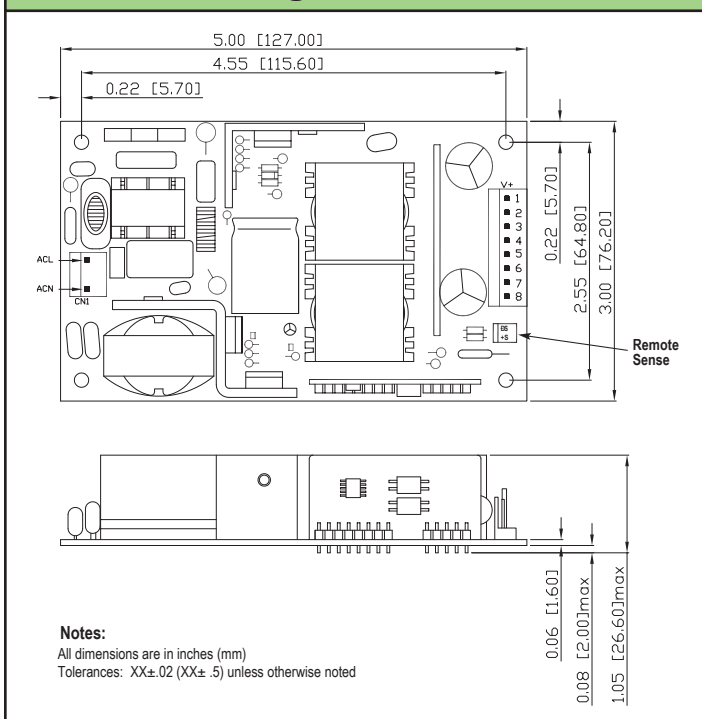
Model		ZPSA100
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC
Inrush Current	A	25 / 50 (cold start)
Input Current (115/230VAC)	A	1.1 / 0.6
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	-	±1%
Minimum Load	A	None
Load Regulation	-	±1%
Line Regulation	-	±0.5%
Ripple & Noise (1)	mV	5V: 2%, others 1%
Short Circuit Protection	-	Foldback
Overvoltage Protection	V	Typically 110-130% of nominal, auto recovery
Hold Up Time (Typ)	ms	16ms at 115VAC input
LED Indicator	-	Green LED = OK
Operating Temperature	°C	0 to +70°C with derating/air flow
Storage Temperature	°C	-20 to +85
Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Convection/air flow
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Certifications	-	UL/CSA/EN60950-1 (2nd Ed) Class I , CE Mark (LVD)
Conducted & Radiated EMI	-	EN55022-B, FCC Class B
Immunity	-	EN61000-4-2,-3,-4,-6,-8
Weight (Typ)	g	385
Size (WxLxH)	in(mm)	3 x 5 x 1.05 in. (76.2 x 127 x 26.6 mm) including underside components
Warranty	yrs	2 Years

- (1) 5V measured with 0.1uF ceramic & 220uF electrolytic at 20MHz BW,
all other models measured with 0.1uF & 10uF ceramic electrolytic at 20MHz BW

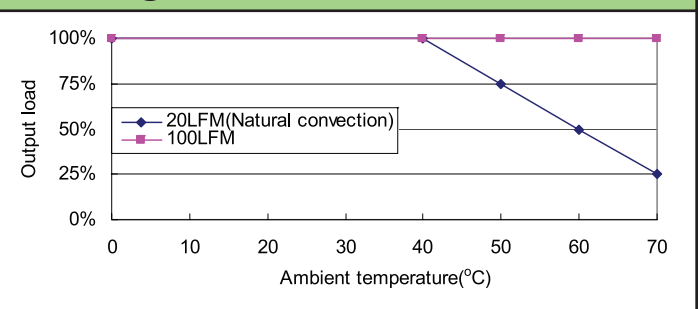
Model Selector

Model	Output Voltage (V)	Maximum Load (A)	Efficiency (%)	Ripple and Noise	Voltage Accuracy	Line Regulation	Load Regulation
ZPSA100-5	5V	20A	83%	2%	± 1%	± 0.5%	± 1%
ZPSA100-9	9V	11.2A	84%	1%	± 1%	± 0.5%	± 1%
ZPSA100-12	12V	8.4A	84%	1%	± 1%	± 0.5%	± 1%
ZPSA100-15	15V	6.7A	84%	1%	± 1%	± 0.5%	± 1%
ZPSA100-18	18V	5.6A	84%	1%	± 1%	± 0.5%	± 1%
ZPSA100-24	24V	4.2A	84%	1%	± 1%	± 0.5%	± 1%
ZPSA100-48	48V	2.1A	84%	1%	± 1%	± 0.5%	± 1%

Outline Drawing



Derating Curve



Input Connector Mates with Molex Housing 09-50-3031 and Molex 2478 Series Crimp Terminal

Output Connector Mates with Molex Housing 09-50-1081 and Molex 5194 Series Crimp Terminal

Sense Connector Mates with Molex Housing 22-01-1022 and Molex 2759 or 5159 Crimp Terminal

Pin Assignments

PIN	Function
1	Vout (+)
2	Vout (+)
3	Vout (+)
4	Vout (+)
5	Vout (-)
6	Vout (-)
7	Vout (-)
8	Vout (-)

Other Industrial Products

KPSA	5 - 15W pcb mount
KM	15 - 40W pcb mount medical
ZPSA/ZPD/ZPT	40 - 60W, single, dual and triple output
ZWS	5 - 240W single output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zpsa-series.htm



Zero up programmable power supplies

Features

- ◆ Constant Voltage / Constant Current
- ◆ Last Setting Memory
- ◆ Digital Meters
- ◆ Built-in RS232 & RS485 Interface w/ GPIB optional
- ◆ Bench or Rack Mount
- ◆ Embedded Microprocessor Controller
- ◆ Voltage up to 120V, Current up to 132A

Key Market Segments & Applications



Specifications

Model		ZUP6	ZUP10	ZUP20	ZUP36	ZUP60	ZUP80	ZUP120
Load Regulation	-	2mV + 0.005% over 0 - 100% load change						
Line Regulation	-	1mV + 0.005% over 85 - 132 or 170 - 265VAC line change						
Recovery Time (1)	ms	1ms	0.5ms	0.2ms				
Temperature Coefficient	-	30ppm/°C following 30 minute warm up						
Temperature Drift(2)	-	0.01% + 2mV change in output						
Up programming response time	ms	50 - 60ms					80ms	120ms
Down prog. resp. time (CV)	ms	50ms (70ms ZUP60-14)						
Down prog. resp. time (CV)	ms	250ms	350ms	400ms	500ms	750ms	600ms	800ms
Load Regulation	-	0.01% + 5mA on 200W and 400W models, 0.07% + 10mA on 800W models						
Line Regulation	-	0.01% + 2mA on 200W and 400W models, 0.01% + 5mA on 800W models						
Temperature Coefficient	-	100ppm/°C from rated current after 30 minute warm up time						
Temperature Drift(2)	-	0.02% + 5mA, 200W and 400W models, 0.05% + 10mA 800W models						
Prog Voltage resolution	-	Better than 0.028% of rated voltage						
Prog Voltage accuracy	mV	.02%+5mV	.02%+8mV	.02%+12mV	.02%+20mV	.02%+35mV	.02%+50mV	.02%+70mV
Prog Current resolution	-	Better than 0.03% of rated voltage						
Prog Current accuracy	-	0.4% + 40mA						
Overvoltage Shutdown	V	0 - 7.5	0 - 13	0 - 24	0 - 40	0 - 66	0 - 88	0 - 132
Thermal Protection	-	Over temperature protected						
Display - Voltage	-	3 digits (6, 20, 36, 60, 80V models), 3.5 digits (10, 120V models). Accuracy 0.2% ± 2 digits						
Display - Current	-	3 digits, (3.5 digits 132A model). Accuracy 0.5% ± 3 digits						
Display - Status	-	CV / CC, Alarm, Foldback, Local/Remote, On/Off						
Remote On/Off	-	TTL signal or dry contact relay						
Output Good	-	Open Collector						
Voltage & Current Programming	-	By either Voltage (0-4V) or Resistance (0-4k)						
Remote Sense	-	Up to 0.5V compensation per output cable						
Communication Interface	-	RS232 & RS485 standard, IEEE488 optional						
Series & Parallel Operation	-	Series: Up to two units; Parallel: Up to five units in master-slave configuration						
AC Input Voltage range	VAC	85-265VAC (47-63Hz)						
Inrush Current (100/200VAC)(3)	A	15/30A, 200W models, 15A, 400W models, 30A, 800W models						
Hold Up Time (Typ) at 100VAC	ms	20						
Power Factor Correction	-	Complies with EN61000-3 Class A (0.99 typ)						
Temperature Range	-	Operating: 0 - 50°C; Storage: -20 to +70°C						
Humidity (non condensing)	-	Operating: 30 - 90% RH, Storage 10 - 95%RH						
Cooling	-	Internal fan						
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.						
Isolation Resistance	-	>100M at 25°C & 70%RH						
Vibration & Shock (non-op.)	-	Vibration:10-55Hz(1 min.) 2G constant X, Y, Z, when correctly mounted; Shock: <20G						
Safety Agency Approvals	-	UL3111-1, EN61010-1, CE Mark						
Conducted & Radiated EMI	-	EN55022-B conducted, A radiated, FCC Class B conducted, A radiated, VCCI-2 conducted, -1 radiated						
Warranty	yrs	Three Years						

Notes: (1) Recovery to within +/-50mV after load change of 50-100% (2) Over 8 hour period following 30 minute warm up time
(3) 25°C ambient (cold start)

Model Selector

Model	Voltage Adjust Range	Current Adjust Range	Max Power	Ripple 5Hz-1MHz mV	Noise 20MHz BW mV	Ripple 5Hz-1MHz mA	Efficiency % (100/200VAC)	Weight kg
ZUP6-33/U	0-6	0-33	198	5	50	50	69 / 72	2.9
ZUP6-66/U	0-6	0-66	396	5	50	100	74 / 77	3.2
ZUP6-132/U	0-6	0-132	792	8	100	200	74 / 77	5.8
ZUP10-20/U	0-10	0-20	200	5	50	25	73 / 77	2.9
ZUP10-40/U	0-10	0-40	400	5	50	50	79 / 82	3.2
ZUP10-80/U	0-10	0-80	800	8	90	100	77 / 81	5.8
ZUP20-10/U	0-20	0-10	200	5	50	15	74 / 78	2.9
ZUP20-20/U	0-20	0-20	400	5	50	30	79 / 83	3.2
ZUP20-40/U	0-20	0-40	800	5	80	60	79 / 82	5.8
ZUP36-6/U	0-36	0-6	216	5	50	7.5	76 / 80	2.9
ZUP36-12/U	0-36	0-12	432	5	50	15	80 / 84	3.2
ZUP36-24/U	0-36	0-24	864	5	70	30	80 / 84	5.8
ZUP60-3.5/U	0-60	0-3.5	210	5	50	5	75 / 79	2.9
ZUP60-7/U	0-60	0-7	420	5	50	10	80 / 84	3.2
ZUP60-14/U	0-60	0-14	840	5	60	20	80 / 84	5.8
ZUP80-2.5/U	0-80	0-2.5	200	30	80	5	77 / 82	2.9
ZUP80-5/U	0-80	0-5	400	30	80	10	83 / 87	3.2
ZUP120-1.8/U	0-120	0-1.8	216	30	80	5	77 / 82	2.9
ZUP120-3.6/U	0-120	0-3.6	432	30	80	10	83 / 87	3.2

Options & Accessories

Option	Model Suffix	Part Number
Front panel terminals (20A max) ⁵	/L ⁴	ZUP200/400/L ⁴
Front panel terminals (20A max) ⁶	/L ⁴	ZUP800/L ⁴
IEC320 cable USA plug	/U	ZUP/U
Serial link cable RJ-45	/W	ZUP/W
GPIO Controller		GP485A*
Dual Unit Assembly		NL200*
(accepts 200W or 400W models)		
19" 3U rack (accepts up to 6 200/400W models)		NL100*
Blanking panels for NL100 (19 in. rack)		NL101*
RS232 Communications Cable DB-9		ZUP/NC401
RS232 Communications Cable DB-25		ZUP/NC403
RS485 Communications Cable DB-9		ZUP/NC402
RS485 Communications Cable DB-25		ZUP/NC404
User Manual		NL102

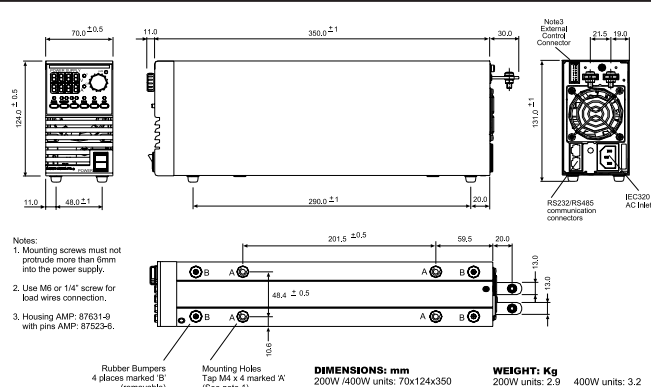
* (See website for more details)

⁴ Not available with ZUP80 or ZUP120 models.

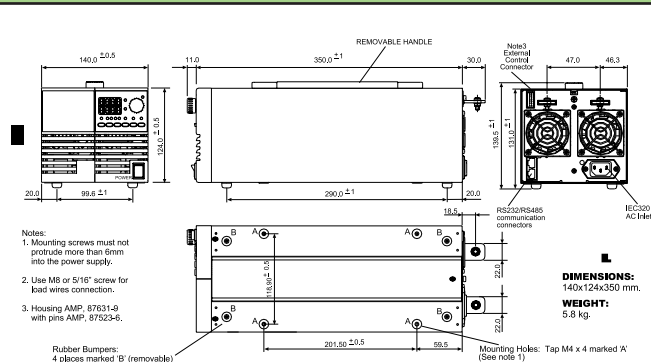
⁵ 200W and 400W models

⁶ 800W models

Outline Drawing 200/400W



Outline Drawing 800W



For Additional Information, please visit
us.tdk-lambda.com/lp/products/zup.htm



100W to 440W Dual Output Power Supplies

Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ 200% Peak Power capability on 24V output
- ◆ Individual output adjustment
- ◆ 2 year warranty
- ◆ Input Transient Protected



Key Market Segments & Applications



Specifications

Model		ZWD100PAF-0524	ZWD150PAF-0524	ZWD225PAF-0524
Input Voltage	-	85-265VAC (47-63Hz), 120-370VDC		
Input Current (1)	A	1.3 / 0.65	1.9 / 0.97	2.81 / 1.43
Inrush Current (1)(2)	A	15 / 30		
Power Factor	-	0.99 at 100VAC, 0.95 at 200VAC, Meets EN61000-3-2		
Leakage Current	mA	0.75mA max		
Temperature Coefficient	-	<0.02%/°C		
Overcurrent Protection (3)	-	5V output: >105%, 24V output: >205%		
Overvoltage Protection (4)	V	120 - 145%		
Hold Up Time (Typ) (1)	ms	5V output: 40ms, 24V output: 20ms		
Efficiency (2)	%	79 / 81	80 / 82	81 / 83
Remote On/Off	-	On 24V output only, remove jumper to shutdown		
Line Regulation	mV	5V output: 20mV, 24V output: 96mV		
Load Regulation	mV	5V output: 40mV, 24V output: 150mV		
Ripple & Noise	mV	5V output: 120mV, 24V output: 100W, 150mV; 150/225W, 240mV		
Operating Temperature	-	(Open frame or L bracket) -10°C to +70°C, derate linearly to 0% load from 50°C to 70°C		
Operating Temperature	-	(With /A cover option) -10°C to +60°C, derate linearly to 0% load from 40°C to 60°C		
Storage Temperature	-	-30 to +85°C		
Humidity (non condensing)	-	Operating: 20 - 90%RH, Non-operating: 10 - 95% RH		
Cooling	-	Convection cooled		
Withstand Voltage	-	I/P to Gnd 2kVAC (20mA), I/P to O/P 3kVAC (20mA), O/P to Gnd 500VAC (100mA) for 1 min.		
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour		
Shock	-	< 196.1 m/s ²		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B, VCCI-B		
Recommended EMI Filter	-	RSEL-2002W	RSEL-2003W	RSEL-2006W
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Weight (Typ)	g	460 (780 with cover)	530 (885 with cover)	670 (1065 with cover)
Size (WxHxD)	in	2.95 x 8.74 x 1.38	3.35 x 8.74 x 1.57	3.74 x 8.74 x 1.77
Warranty	yrs	Two Years		

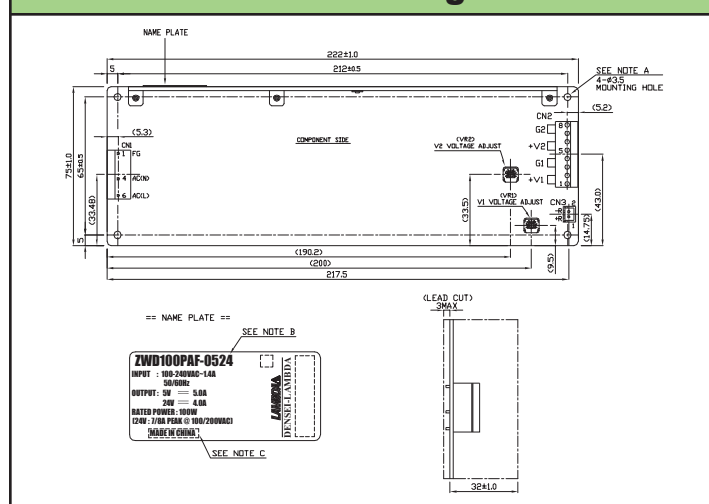
Notes: See installation manual for full specification.

- (1) 100/200VAC
- (2) 25°C ambient (cold start)
- (3) Avoid prolonged operation in overload
- (4) OVP on 24V output will shutdown 24V output only

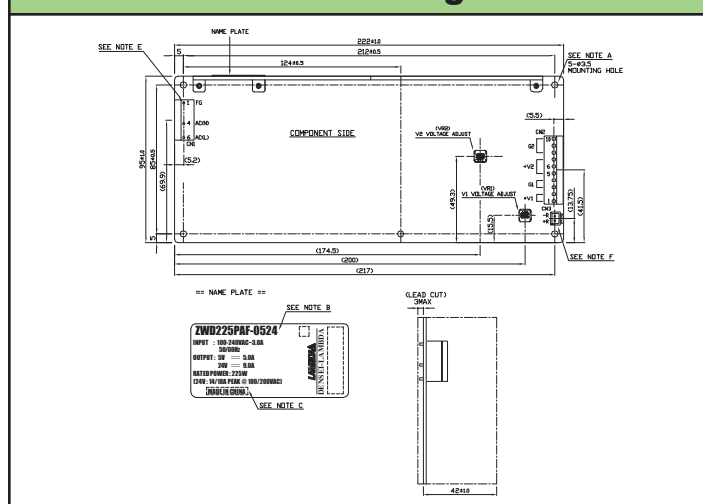
Model Selector

Model	Output Voltage	Output Voltage Accuracy	Output Adjust Range	Max Current	Peak ^{1,5} Current	Peak ^{1,5} Power	Max Average Power	Total ^{1,5} Peak Power
ZWD100PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	100W	172 / 196W
	24V	23.52 - 24.48V	22.8 - 27.6V	4A	7 / 8A	168 / 192W	100W	172 / 196W
ZWD150PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	150W	246 / 294W
	24V	23.52 - 24.48V	22.8 - 27.6V	6A	10 / 12A	240 / 288W	150W	246 / 294W
ZWD225PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	225W	344 / 440W
	24V	23.52 - 24.48V	22.8 - 27.6V	9A	14 / 18A	336 / 432W	225W	344 / 440W

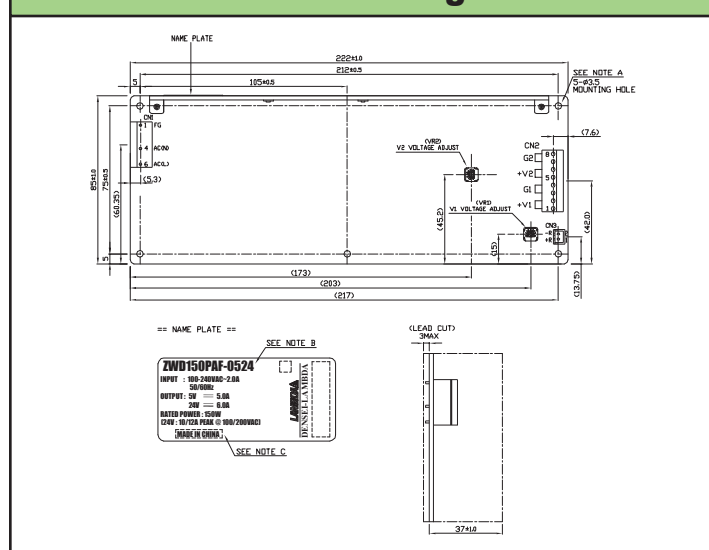
ZWD100 Outline Drawing



ZWD225 Outline Drawing



ZWD150 Outline Drawing



Options

Suffix	Description
blank	Molex Input & Output Connector
/L	L Bracket
/A	Cover & L Bracket
/J	JST Input & Output Connector
/T	Vertical Mount Screw Terminals
Preferred option	combination: blank, /L, /TL, or /TA
Example:	ZWD100PAF-0524/TA

Other Industrial Products

ZWS, ZWSPAF	5-480W Single output, 115/230VAC input
HWS	15-1500W Single output
SWS	50-600W Single output low cost
VSB, VSC, VSP	10-288W Single output 115VAC input

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zwd-paf-series.htm



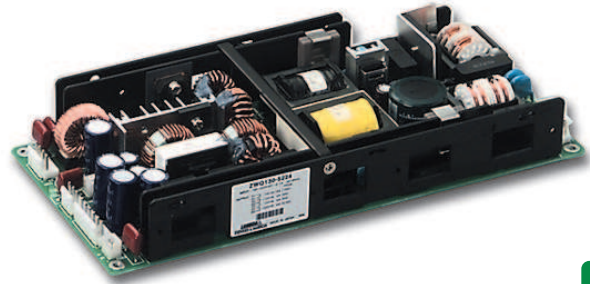
Notes:

- (5) ZWS100PAF: For <10s max, duty cycle ≤ 0.35
 ZWS150PAF: Up to 10A peak, <10s max, duty cycle ≤ 0.35 ; from 10-12A, <5s, duty cycle ≤ 0.2
 ZWS225PAF: Up to 14A peak, <10s max, duty cycle ≤ 0.35 ; from 14-18A, <5s, duty cycle ≤ 0.2

80W to 170W Quad Output Power Supplies

Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power Factor Corrected
- ◆ Floating Adjustable Fourth Output
- ◆ Low Profile <1U High



Key Market Segments & Applications



Specifications

Model		ZWQ80 -5222	ZWQ80 -5223	ZWQ80 -5224	ZWQ80 -5225	ZWQ130 -5222	ZWQ130 -5223	ZWQ130 -5224	ZWQ130 -5225
Input Voltage	-	85-265VAC (47-63Hz), 120-370VDC							
Input Current (1)	A	1.6 / 0.8				2.6 / 1.3			
Inrush Current (1)	A	14/28							
Power Factor	-	Meets EN61000-3-2							
Temperature Coefficient	-	<0.02%/°C							
Max Output Power (convection)	W	80				130			
Max Output Power (forced air)	W	104	88.7	104	104	170	149.6	170	170
Overpower Protection (2)	W	>109	>93	>109	>109	>173	>152	>173	>173
Minimum Load	A	V1: 0.9A Conv, 1.4A Forced Air				V1: 1.5A Conv, 2.1A Forced Air			
Output Voltage Accuracy	%	±5% for outputs V2 and V3							
Efficiency (Typ)	%	72							
Hold Up Time (1)	ms	20							
Leakage Current	-	0.75mA max, 0.2mA (Typ) at 100VAC / 0.44mA(Typ) at 230VAC							
Remote On / Off	-	See installation manual (Not available with /A cover option)							
Oper Temp (convection cooled)	°C	-10°C to 60°C, derate linearly to 50% load from 40°C to 60°C. (3)							
Oper Temp (forced air cooled)	°C	-10°C to 70°C, derate linearly to 50% load from 50°C to 70°C. (>30cfm airflow)(3)							
Storage Temperature	°C	-30° to +85°C							
Humidity (non condensing)	-	Operating: 30 - 90% RH; Non-operating 10-95% RH							
Withstand Voltage	-	I/P~Grnd 2kVAC (20mA), I/P~O/P 3kVAC (20mA), O/P~Grnd 500VAC (100mA) for 1 min.							
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC							
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour							
Shock	-	< 196.1 m/s ²							
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark, EN50178							
Conducted & Radiated EMI	-	EN55011, EN55022-B, FCC Class B, VCCI-B							
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11							
Weight (Typ)	g	550				730			
Size (W x H x D)	mm	93.5 x 35 x 210 (refer to outline drawing)				106 x 35 x 225 (refer to outline drawing)			
Warranty	yrs	One Year							

(1) 100/200VAC

(2) Avoid prolong operation in overload

(3) /A version - additional derating, see installation manual

Model Selector

Model	Output	Voltage (V)	Voltage Adjust Range (V)	Convect. (A)	Peak or Forced Air (A)(4)	Max Load Reg (mV)	Max Line Reg (mV)	Ripple Noise (mV)	OVP (V)(5)
ZWQ80-5222	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	12	11.4-12.6	3.0	4.0	300	48	150	13.8-16.2
ZWQ80-5223	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	7.0	9.0	100	20	120	3.79-4.95
ZWQ80-5224	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	24	22.8-25.2	1.5	2.0	400	96	200	27.6-32.4
ZWQ80-5225	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	5	2.0-5.25	7.0	9.0	100	20	120	5.7-7.0
ZWQ130-5222	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	12	11.4-12.6	4.0	5.0	300	48	150	11.4-12.6
ZWQ130-5223	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	10.0	12.0	100	20	120	3.79-4.95
ZWQ130-5224	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	24	22.8-25.2	2.0	2.5	400	96	200	27.6-32.4
ZWQ130-5225	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	5	2.0-5.25	10.0	12.0	100	20	120	5.7-7.0

* User selectable via connector or PCB. Outputs are floating from V1 & V4. Can be connected in series for 24/30V.

Other Industrial Products

ZWS/ZWD	5W to 480W Single and dual output
SC	30W to 120W Single, dual, & triple output
NV	175 to 700W Single and multiple output
HWS	15 to 1500W Single output

Options

Suffix	Description
blank	No cover or L Bracket
/L	L Bracket
/A	Cover and L Bracket

- (4) The peak current draw must not exceed a 10 sec. duration with a duty cycle of 35%.
- (5) An overvoltage condition on any output will shut down all outputs, the power supply must be re-set by cycling the AC input.

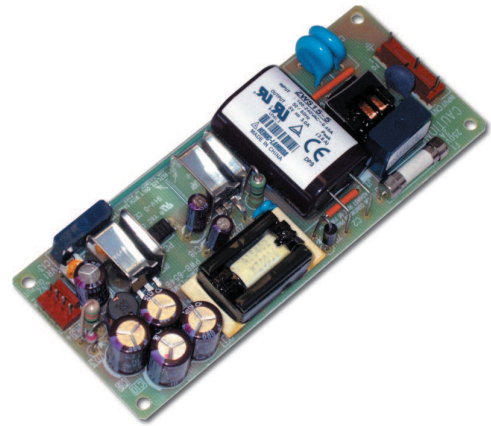
For Additional Information, please visit
us.tdk-lambda.com/lp/products/zwq-series.htm



Single Output, 3.3W to 50W Power Supplies

Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Input transient protected
- ◆ 2 year warranty
- ◆ High quality design
- ◆ Peak Power capability



Key Market Segments & Applications



Specifications				
Model		ZWS5 ZWS10	ZWS15 ZWS30	ZWS50
AC Input Voltage range	-	85-265VAC (47-440Hz)		
DC Input Voltage range	-	110 - 330VDC		
Inrush Current (100/200VAC) (1)	A	15 / 30		
Temperature Coefficient	-	<0.02%/°C		
Overcurrent Protection (2)	-	~125%		
Overvoltage Protection	V	~140% diode clamp		~115 - 130%, manual reset
Hold Up Time (Typ) @ 100VAC	ms	17		
Remote Sense	-	None		
Operating Temperature	°C	(open frame) -10°C~+60°C, derate linearly to 70% load from 50°C~60°C		
Operating Temperature	°C	(with cover) Additional derating applies, please consult Installation Manual		
Storage Temperature	°C	-30 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection		
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.		
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour		
Shock	-	< 196.1 m/s ²		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark		
Conducted & Radiated	EM	EN55022-B, FCC Class B, VCCI-B		
Recommended EMI Filter	-	RSEL-20R5W	RSEL-2001W RSEL-2002W	RSEL-2002W
Weight (Typ)	g	120/120	140/270	370
Size (WxHxD)	mm	See Outline Drawings		
Warranty	yrs	2 years		

Notes:

- (1) 25°C ambient (cold start)
- (2) Avoid prolonged operation in overload

2 Output Module Codes

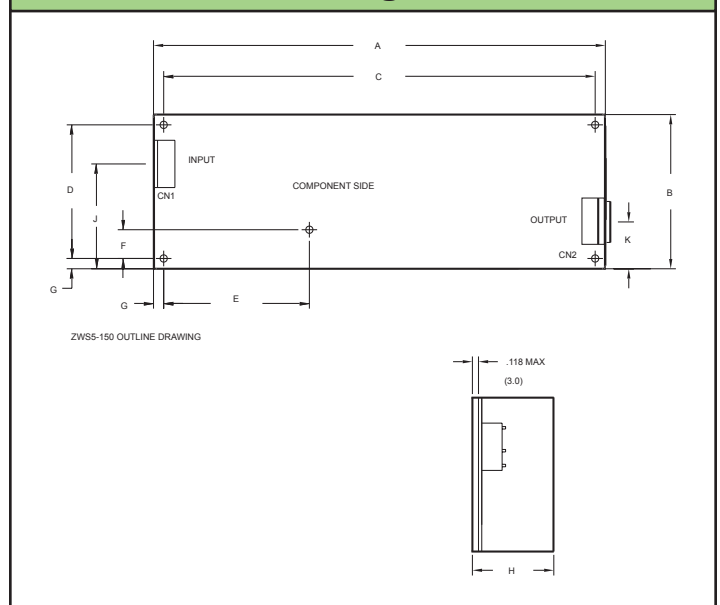
Model	Voltage	Adjust Range	Max Curr. A	Peak Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. %
ZWS5-3	3.3V	2.97-3.63	1	1.2	40	20	120	62
ZWS10-3	3.3V	2.97-3.63	2	2.4	40	20	120	62
ZWS15-3	3.3V	2.97-3.63	3	3.6	40	20	120	63
ZWS30-3	3.3V	2.97-3.63	6	7.2	40	20	120	70
ZWS50-3	3.3V	2.97-3.63	10	12	40	20	120	73
ZWS5-5	5V	4.5-5.5	1	1.2	40	20	120	67
ZWS10-5	5V	4.5-5.5	2	2.4	40	20	120	70
ZWS15-5	5V	4.5-5.5	3	3.6	40	20	120	71
ZWS30-5	5V	4.5-5.5	6	7.2	40	20	120	75
ZWS50-5	5V	4.5-5.5	10	12	40	20	120	77
ZWS5-12	12V	10.8-13.2	0.42	0.51	96	48	150	68
ZWS10-12	12V	10.8-13.2	0.85	1.02	96	48	150	70
ZWS15-12	12V	10.8-13.2	1.25	1.5	96	48	150	71
ZWS30-12	12V	10.8-13.2	2.5	3	96	48	150	77
ZWS50-12	12V	10.8-13.2	4.3	5.16	96	48	150	80
ZWS5-15	15V	13.5-16.5	0.34	0.41	120	60	150	68
ZWS10-15	15V	13.5-16.5	0.7	0.84	120	60	150	71
ZWS15-15	15V	13.5-16.5	1	1.2	120	60	150	71
ZWS30-15	15V	13.5-16.5	2	2.4	120	60	150	77
ZWS50-15	15V	13.5-16.5	3.5	4.2	120	60	150	81
ZWS5-24	24V	21.6-26.4	0.22	0.27	150	96	200	70
ZWS10-24	24V	21.6-26.4	0.45	0.54	150	96	200	71
ZWS15-24	24V	21.6-26.4	0.65	0.78	150	96	200	71
ZWS30-24	24V	21.6-26.4	1.3	1.56	150	96	200	78
ZWS50-24	24V	21.6-26.4	2.1	2.52	150	96	200	82
ZWS30-36	36V	32.4-39.6	0.9	1.08	240	144	300	78
ZWS50-36	36V	32.4-39.6	1.4	1.68	240	144	300	82
ZWS30-48	48V	43.2-52.8	0.7	0.84	300	192	400	78
ZWS50-48	48V	43.2-52.8	1.1	1.32	300	192	400	82

Note for Peak Current: For 10s maximum, 35% duty cycle, average power not to exceed maximum ratings.

Options

Suffix	Description
-	Molex Terminals
/A	Cover option
/J	JST Connectors*
/JA	JST Connectors & Cover
Note:	* Recommended for new designs

ZWS Outline Drawing



DIMENSIONS:

MODEL	A	B	C	D	E	F	G	H	J	K	L
ZWS5	3.86 (98.0)	1.77 (44.9)	3.580 (90.9)	1.500 (38.1)	-	-	.14 (3.5)	.83 (21.0)	1.05 (26.6)	.54 (13.7)	-
ZWS10	4.14 (105.1)	1.97 (50.0)	3.860 (98.0)	1.690 (42.9)	-	-	.14 (3.5)	.83 (21.0)	.99 (25.1)	.67 (18.4)	-
ZWS15	4.93 (125.2)	1.97 (50.0)	4.650 (118.1)	1.690 (42.9)	-	-	.14 (3.5)	.83 (21.0)	1.04 (25.0)	.57 (14.4)	-
ZWS30	5.24 (133.0)	2.17 (55.1)	4.850 (123.1)	1.770 (45.0)	-	-	.20 (5.0)	1.02 (25.9)	.20 (31.0)	1.16 (40.2)	-
ZWS50	7.68 (195.0)	2.17 (55.1)	7.290 (185.1)	1.770 (45.0)	-	-	.20 (5.0)	1.02 (25.9)	1.32 (33.5)	.72 (18.2)	-

Other Industrial Products

ZWS-AF	50W to 150W Active PFC
ZWD/ZWQ	100W to 440W Single & multiple output
SC	30W to 120W Single, dual, & triple output
HWS	15W to 1800W Single output enclosed

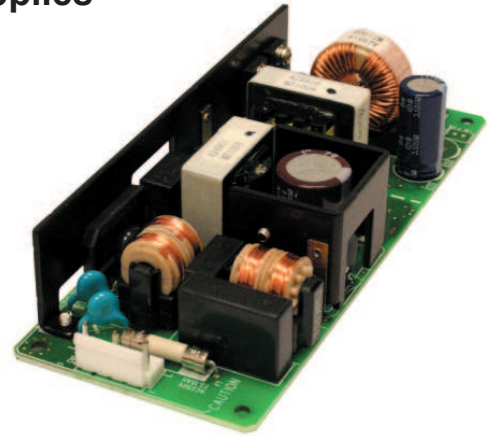
For Additional Information, please visit
us.tdk-lambda.com/lp/products/zws-series.htm



Single Output, High Reliability AC-DC Power Supplies

Features

- ◆ 33W to 150W
- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ Convection Cooled
- ◆ 5 year warranty
- ◆ Compact Design



Key Market Segments & Applications



Specifications

Model		ZWS50BAF	ZWS75BAF	ZWS100BAF	ZWS150BAF
AC Input Voltage range	-	85-265VAC (47-63Hz)			
DC Input Voltage range	-	120 - 370VDC			
Input Current (Typical)	A	0.65 / 0.35	0.95 / 0.5	1.3 / 0.65	1.9 / 0.95
Inrush Current	A	14 / 28 25°C ambient, cold start			
Power Factor (Active)	-	Meets EN61000-3-2 (Typically 0.97/0.91)			
Maximum Ripple and Noise	mV	3.3 & 5V: 120mV, 12 to 24V: 150mV, 48V: 200mV			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection (1)	-	>105% of maximum output current			
Hold Up Time (Typ) at 100VAC	ms	20ms			
Leakage Current	-	0.5mA max, 0.4mA typ at 230VAC			
Remote On / Off	-	None		Optional	
Operating Temperature (Convection)	°C	-10 to +70°C, derate linearly to 50% load from 50 to 70°C			
Operating Temperature (Forced Air)	°C	N/A		-10 ~+70°C, derate linearly to 75% load from 60 ~70°C	
Storage Temperature	°C	-30 to +75°C			
Humidity (non condensing)	-	Operating: 30 - 90%RH, storage: 10 - 90%RH			
Withstand Voltage	-	I/P to Grnd 2kVAC (10mA), I/P to O/P 3kVAC (10mA), O/P to Grnd 500VAC (20mA) for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s ²			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark			
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B, VCCI-B			
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv3), -4 (lv 3), -5 (lv 3,4), -6 (lv 3), -8 (lv 4), -11			
Weight (Typ)	g	165	230	290	390
Size (W x H x D)	in	1.97 x 1.02 x 5.2"	1.97 x 1.3 x 5.9"	2.44 x 1.3 x 6.1"	2.95 x 1.66 x 6.3"
Warranty	yrs	Five Years			

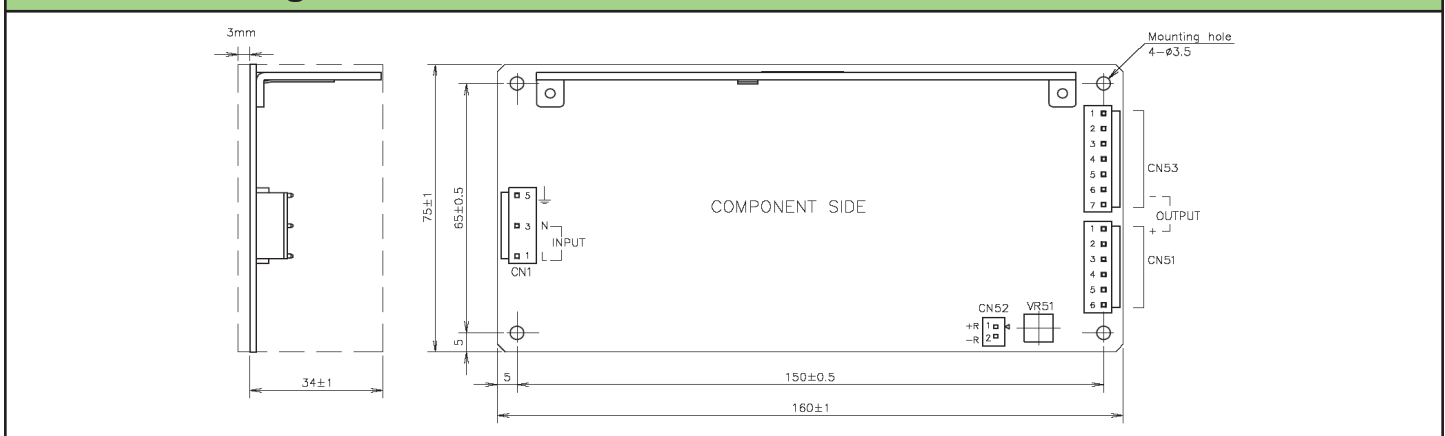
Notes:

- (1) Avoid prolonged operation in overload
- (2) 100 / 200VAC Input
- (3) 60°C: 70% load

Model Selector

Model	Adjust Voltage	Max Range	Current	Load Reg Efficiency (typ) %	Line Reg (mV)	OVP (mV)	(V)
ZWS50BAF-3	3.3V	2.97-3.63V	10A	76 / 78	40	20	3.79-4.95
ZWS75BAF-3	3.3V	2.97-3.63V	15A	76 / 78	40	20	3.79-4.95
ZWS100BAF-3	3.3V	2.97-3.63V	20A	82 / 84	40	20	3.79-4.95
ZWS150BAF-3	3.3V	2.97-3.63V	30A	82 / 84	40	20	3.79-4.95
ZWS50BAF-5	5V	4.5-5.5V	10A	82 / 84	40	20	5.75-7.0
ZWS75BAF-5	5V	4.5-5.5V	15A	82 / 84	40	20	5.75-7.0
ZWS100BAF-5	5V	4.5-5.5V	20A	84 / 86	40	20	5.75-7.0
ZWS150BAF-5	5V	4.5-5.5V	30A	85 / 87	40	20	5.75-7.0
ZWS50BAF-12	12V	10.8-13.2V	4.3A	83 / 85	96	48	13.8-16.2
ZWS75BAF-12	12V	10.8-13.2V	6.3A	83 / 85	96	48	13.8-16.2
ZWS100BAF-12	12V	10.8-13.2V	8.5A	86 / 88	96	48	13.8-16.2
ZWS150BAF-12	12V	10.8-13.2V	12.5A	85 / 88	96	48	13.8-16.2
ZWS50BAF-15	15V	13.5-16.5V	3.5A	83 / 86	120	60	17.3-20.3
ZWS75BAF-15	15V	13.5-16.5V	5A	84 / 86	120	60	17.3-20.3
ZWS100BAF-15	15V	13.5-16.5V	6.7A	86 / 88	120	60	17.3-20.3
ZWS150BAF-15	15V	13.5-16.5V	10A	86 / 89	120	60	17.3-20.3
ZWS50BAF-24	24V	21.6-26.4V	2.1A	84 / 87	150	96	27.6-32.4
ZWS75BAF-24	24V	21.6-26.4V	3.2A	84 / 87	150	96	27.6-32.4
ZWS100BAF-24	24V	21.6-26.4V	4.3A	87 / 89	150	96	27.6-32.4
ZWS150BAF-24	24V	21.6-26.4V	6.3A	88 / 90	150	96	27.6-32.4
ZWS50BAF-48	48V	39.5-52.8V	1.1A	84 / 86	240	192	55.2-64.8
ZWS75BAF-48	48V	39.5-52.8V	1.6A	85 / 88	240	192	55.2-64.8
ZWS100BAF-48	48V	39.5-52.8V	2.1A	88 / 90	240	192	55.2-64.8
ZWS150BAF-48	48V	39.5-52.8V	3.2A	89 / 91	240	192	55.2-64.8

Outline Drawing ZWS150BAF



Other Industrial Products

HWS	15W to 1800W Single output
ZPSA	20W to 60W Single, Dual & Triple output
NV	175W to 300W Single, Dual, Triple & Quad output
CSS	40W to 150W Single output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zws-series.htm



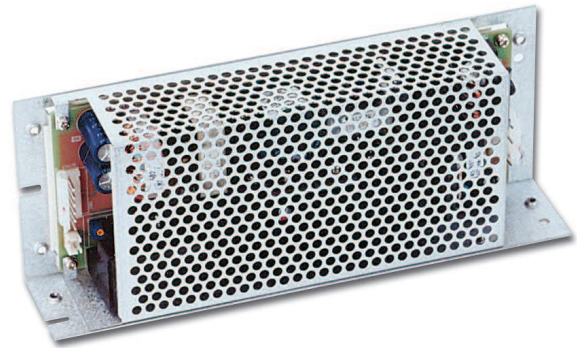
Options

Suffix	Description	Notes
-	Open Frame	-
/L	With L bracket case	-
/A	With L bracket & Cover	-
/R	Remote On/Off	Not on ZWS50 or 75BAF
/CO2	Conformal Coating	-

150W to 480W Single Output Power Supplies

Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ 200% Peak Power capability
- ◆ 2 year warranty
- ◆ Less than 0.5mA earth leakage current
- ◆ Input Transient Protected



Key Market Segments & Applications



Specifications

Model		ZWS150PAF	ZWS240PAF
Input Voltage	-	85-265VAC (47-63Hz), 120-370VDC	
Input Current (Forced air (1))	A	2.8/1.4	4.0/2.0
Inrush Current (1,2)	A	14 / 28	
Power Factor	-	0.99 at 100VAC, 0.95 at 200VAC, Meets EN61000-3-2	
Leakage Current	mA	0.5mA Max. Typically 0.1mA (100VAC), 0.22mA (230VAC)	
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection (3)	-	>102% of peak current capability	
Overvoltage Protection	V	24V: 30-35V, 36V: 43.2-50.4, 48V: 55.2-64.8V	
Hold Up Time (Typ) at 100VAC	ms	20 (16ms at forced air power ratings)	
Efficiency	%	82	
Remote On/Off	-	See installation manual (Not available with /A cover option)	
Line Regulation	%	0.4%	
Load Regulation	%	0.8%	
Ripple & Noise	%	1%	
Operating Temperature (4)	°C	(Open frame or L bracket) -10°C to +70°C, derate linearly to 70% load from 60°C to 70°C	
Operating Temperature (4)	°C	(With /A cover option) -10°C to +60°C, derate linearly to 70% load from 50°C to 60°C	
Storage Temperature	°C	-30 to +85°C	
Humidity (non condensing)	-	Operating: 30 - 90% RH, Operating: 10 - 95% RH	
Cooling	-	Convection or Forced Air Cooled (1.5m/s)	
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70% RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour	
Shock	-	< 196.1 m/s ²	
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55022/EN55022-B, FCC Class B, VCCI-B	
Recommended EMI Filter	-	RSEL-2006W	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Weight (Typ)	g	500g (800g with cover)	750g (1100g with cover)
Size (WxHxD)	mm	See Outline Drawings	
Warranty	yrs	Two Years	

Notes:

- (1) 100/200VAC
- (2) 25°C ambient (cold start)
- (3) Avoid prolonged operation in overload
- (4) With 0.7m/s airflow. See derating table for convection cooling

Model	Voltage	Adjust Range	Max Current Convection	Max Power Convection	Max Current Forced Air ⁽⁶⁾	Max Power Forced Air ⁽⁶⁾	Peak Current ⁽⁵⁾	Peak Power ⁽⁵⁾
ZWS150PAF24	24V	21.6 - 28.8V	6.3A	151.2W	8.4A	201.6W	12A	288W
ZWS150PAF36	36V	32.4 - 41.4V	4.2A	151.2W	5.6A	201.6W	8A	288W
ZWS150PAF48	48V	43.2 - 52.8V	3.1A	148.8W	4.3A	206.4W	6A	288W
ZWS240PAF24	24V	21.6 - 28.8V	10A	240W	12.5A	300W	20A	480W
ZWS240PAF36	36V	32.4 - 41.4V	6.7A	241.2W	8.4A	302.4W	13.3A	478.8W
ZWS240PAF48	48V	43.2 - 52.8V	5A	240W	6.3A	302.4W	10A	480W

Note 6: With 1.5m/s forced air

Model	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
ZWS150PAF**	100%	100%	100%	100%	100%	100%	85%	70%
ZWS150PAF**/A	100%	100%	90%	80%	72.5%	65%	-	-
ZWS240PAF**	100%	100%	100%	100%	100%	86.7%	73.3%	60%
ZWS240PAF**/A	100%	90%	80%	70%	60%	50.0%	-	-

[illegible][illegible]

The drawing consists of three main views: a front elevation, a side elevation, and a detail of the window handle mechanism.

- Front Elevation:** Shows a rectangular window unit with a width of 1000mm and a height of 2000mm. The unit features a central glass pane with a decorative pattern of horizontal lines. The top and bottom frames are labeled "1000mm" and "2000mm" respectively. The side frames are labeled "1000mm" and "2000mm". The unit is shown in a closed position.
- Side Elevation:** Shows the side profile of the window unit. The height is 2000mm. The side frame is labeled "1000mm". The unit is shown in a closed position.
- Detail of Window Handle Mechanism:** A detailed view of the handle mechanism, showing the handle, the mounting plate, and the internal components. The handle is labeled "HANDLE" and the mounting plate is labeled "HANDLE PLATE". The internal components are labeled "HANDLE PLATE" and "HANDLE PLATE".

Notes:

1. THE WINDOW HANDLE AND MOUNTING PLATE (H) IS TO BE PROVIDED BY THE CUSTOMER.
2. THE WINDOW HANDLE AND MOUNTING PLATE (H) IS TO BE PROVIDED BY THE CUSTOMER.
3. THE WINDOW HANDLE AND MOUNTING PLATE (H) IS TO BE PROVIDED BY THE CUSTOMER.
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9. THE WINDOW HANDLE AND MOUNTING PLATE (H) IS TO BE PROVIDED BY THE CUSTOMER.
10. THE WINDOW HANDLE AND MOUNTING PLATE (H) IS TO BE PROVIDED BY THE CUSTOMER.

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Suffix	Option
Blank	Molex Input & Output Connectors
/L	L Bracket
/A	Cover and L Bracket
/J	JST Input & Output Connectors
/T	Vertical Mount Screw Terminals
/S	Horizontal Mount Screw Terminals

Preferred option combinations: Blank, /L, /TL or /TA.
Example: ZWS240PAF24/TA

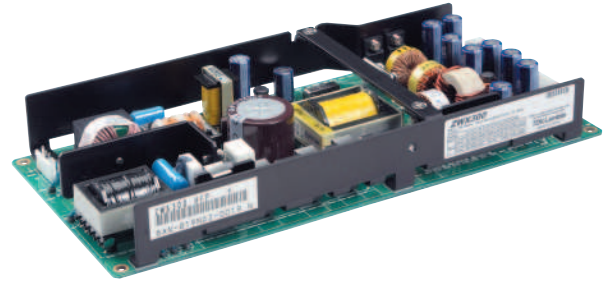
VSΒ/VSC	10W to 150W Single output 115VAC input
ZWS	5W to 150W Single output, 115/230VAC input
SC	30W to 120W Single, dual & triple output
HWS	15W to 1500W Single output. enclosed



180W to 300W Industrial ATX Power Supplies

Features

- ◆ 90 - 150W convection cooled ratings
- ◆ 1U high
- ◆ Power factor corrected
- ◆ Peak power ratings
- ◆ No minimum loading required



Key Market Segments & Applications



Specifications

Model		ZWX180	ZWX240	ZWX300
Input Voltage	V	85-265VAC (47-63Hz)		
Input Current (1)(2)	A	1.9 / 1.0	2.6 / 1.3	3.2 / 1.6
Inrush Current (2)	A	14 / 28 Cold start 25°C ambient		
Power Factor	-	Meets EN61000-3-2		
Leakage Current	mA	< 0.75mA		
Temperature Coefficient	°C	<0.02%/°C		
Overcurrent Protection (3)	-	>1.05% of forced air current rating (5s delay and manual reset on V1, 2 & 3)		
Overvoltage Protection (4)	V	+3.3V: 3.76 - 4.3V, +5V: 5.74 - 7V, +12V: 13.4 - 15.6V		
Hold Up Time (Typ) (1)	ms	20ms at 100VAC		
Efficiency (1)(2)	%	81 / 84%		
Remote On/Off PS_ON	-	High: Unit off, Low: Unit On (enabled). Meets SFX 12V		
DC Good PWR_OK	-	High: Power supply is good. Meets SFX12V		
Remote Sense	-	+3.3V Only		
Output Voltage Setpoint Accuracy	-	±5% (all outputs)		
Output Voltage Adjustment	-	None		
Line Regulation	mV	3.3V: 20mV, 5V: 48mV, +12V: 48mV, -12V: 20mV, +5Vsb: 20mV		
Load Regulation	mV	3.3V: 100mV, 5V: 300mV, +12V: 300mV, -12V: 100mV, +5Vsb: 100mV		
Ripple & Noise	mV	3.3V: 120mV, 5V: 150mV, +12V: 150mV, -12V: 120mV, +5Vsb: 120mV		
Operating Temperature	-	-10°C to +70°C, derate linearly to 20% load from 50°C to 70°C		
Storage Temperature	°C	-30 to +85°C		
Humidity (non condensing)	-	Operating: 30 - 90%RH, Non operating: 10 - 95% RH		
Cooling	-	Convection or forced air cooled (30CFM, 0.85m3/min)		
Withstand Voltage	-	I/P to Grnd 2kVAC (20mA), I/P to O/P 3kVAC (20mA), O/P to Grnd 500VAC (100mA) for 1 min.		
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour		
Shock (non operating)	-	< 392m/s ²		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark		
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC Class B, VCCI-B		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Weight (Typ)	g	500	650	800
Size (WxHxD)	in	3.7 x 1.42 x 8.27	4.17 x 1.42 x 8.86	4.65 x 1.42 x 9.84
Warranty	yrs	Three Years		

- (1) With output loading of:
 ZWX180: V1=6.5A, V2=6.5A, V3=7.7A, V4=0.2A, V5=1A
 ZWX240: V1=8.9A, V2=7.7A, V3=10.2A, V4=0.3A, V5=2A
 ZWX300: V1=12A, V2=7A, V3=1=5A, V3-2=9.4A, V4=0.2A, V5=1A
- (2) 100/200VAC
- (3) Avoid prolonged operation in overload
- (4) <5s operation at peak load

Model Selector

Model		Output Voltage	Max Curr. (Convection)	Max Power (Convection)	Max Curr. (Forced Air)	Max Power (Forced Air)	Peak Curr.(4) (Forced Air)	Peak Power(4) (Forced Air)
ZWX180	V1	+3.3V	6A(5)	90W	8.4A(5)	153W	12A(5)	180W
	V2	+5V	5A(5)	90W	7A(5)	153W	10A(5)	180W
	V3	+12V	6A	90W	9A	153W	13A	180W
	V4	-12V	0.2A	90W	0.3A	153W	-	180W
	V5	+5V (sb)	1.4A	90W	2A	153W	-	180W
ZWX240	V1	+3.3V	7A	120W	9.8A	204W	14A	240W
	V2	+5V	6A	120W	8.4A	204W	12A	240W
	V3	+12V	8A	120W	11.2A	204W	16A	240W
	V4	-12V	0.2A	120W	0.3A	204W	-	240W
	V5	+5V (sb)	1.4A	120W	2A	204W	-	240W
ZWX300	V1	+3.3V	10A	150W	14A	255W	20A	300W
	V2	+5V	6A	150W	8.4A	255W	12A	300W
	V3-1	+12V	4A(6)	150W	5.6A	255W	8A(7)	300W
	V3-2	+12V	8A(6)	150W	11.2A	255W	16A(7)	300W
	V4	-12V	0.2A	150W	0.4A	255W	-	300W
	V5	+5V (sb)	1.4A	150W	2A	255W	-	300W

(5) Maximum combined power of V1 & V2: 32W convection, 54W forced air, 63W peak

(6) V3-1 & V3-2 combined current limited to 10.9A (131W)

(7) V3-1 & V3-2 combined current limited to 22A (264W)

Cable Harness

Connector	Harness	ZWX180	ZWX240	ZWX300
CN1	HA-2-IN	Y	Y	Y
CN21	ZWX-HA-04	Y	Y	Y
CN21(S-ATA)	ZWX-HA-02	Y	Y	Y
CN31/CN41	ZWX-HA-01	Y	Y	Y
CN51	ZWX-HA-03	-	-	Y

Options

Suffix Description

Blank	Open Frame
/L1	L bracket - input on the left side (rear mounting side facing away)
/L2	L bracket - input on the right side (rear mounting side facing away)
/A1	L bracket & cover - input on the left side (rear mounting side facing away)
/A2	L bracket & cover - input on the right side (rear mounting side facing away)

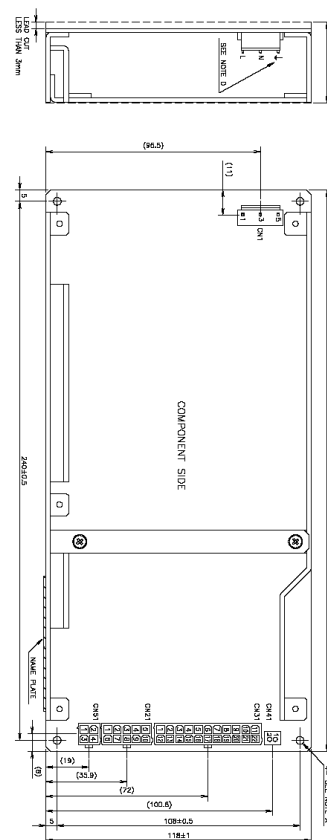
Other Industrial Products

ZWS, ZWSPAF	5-480W Single Output, 115/230VAC input
NV	175W to 300W 4-5 Outputs

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zwx-series.htm



Outline Drawing (ZWX300)



200 to 800W Programmable Power Supplies

Features

- ◆ 2U high
- ◆ Built-in USB, RS-232 & RS-485 Interface
- ◆ Optional LAN, GPIB & Isolated Analog Programming
- ◆ Bench or Rack Mount
- ◆ Constant Current or Voltage Modes
- ◆ Five Year Warranty

Key Market Segments & Applications



Model Selector

Model	Voltage Adjust Range	Current Adjust Range	Max Power (W)	Ripple 5Hz-1MHz (mV)	Noise 20MHz BW (mV)	Ripple 5Hz-1MHz (mA)	Efficiency % (100-200VAC)	Front Panel Output Jacks (Option)
Z10-20-U	0 - 10	0 - 20	200	5	50	50	80 / 82	Yes
Z10-40-U	0 - 10	0 - 40	400	5	50	50	80 / 82	Yes
Z10-60-U	0 - 10	0 - 60	600	6.25	75	75	80 / 82	Yes
Z10-75-U	0 - 10	0 - 75	750	6.25	75	75	80 / 82	Yes
Z20-10-U	0 - 20	0 - 10	200	5	50	30	82 / 84	Yes
Z20-20-U	0 - 20	0 - 20	400	5	50	30	81 / 83	Yes
Z20-30-U	0 - 20	0 - 30	600	6.25	75	45	82 / 84	Yes
Z20-40-U	0 - 20	0 - 40	800	6.25	75	45	82 / 84	Yes
Z36-6-U	0 - 36	0 - 6	216	5	50	15	83 / 85	Yes
Z36-12-U	0 - 36	0 - 12	432	5	50	15	83 / 85	Yes
Z36-18-U	0 - 36	0 - 18	648	6.25	75	22	84 / 85	Yes
Z36-24-U	0 - 36	0 - 24	864	6.25	75	22	84 / 85	Yes
Z60-3.5-U	0 - 60	0 - 3.5	210	5	50	8	83 / 85	Yes
Z60-7-U	0 - 60	0 - 7	420	5	50	8	83 / 85	Yes
Z60-10-U	0 - 60	0 - 10	600	6.25	75	12	83 / 85	Yes
Z60-14-U	0 - 60	0 - 14	840	6.25	75	12	83 / 85	Yes
Z100-2-U	0 - 100	0 - 2	200	8	80	3	83 / 85	No
Z100-4-U	0 - 100	0 - 4	400	8	80	3	84 / 86	No
Z100-6-U	0 - 100	0 - 6	600	10	100	4.5	84 / 86	No
Z100-8-U	0 - 100	0 - 8	800	10	100	4.5	84 / 86	No

Factory Installed Options

	Option Code
Front panel terminals (60V or 24A max)*	-L
Only one of the options below can be included:	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface (Complies with "LXI" Class C)	-LAN

Part Number Example

Z10-20-LAN-L-U

*Requires wide body (105mm) case style

Accessories

	Part Number
19" Rack Housing	
(Accepts four 105mm width units or six 70mm width units)	Z-NL100
Blanking Panel for 19" Rack (70mm)	Z-BP
Blanking Panel for 19" Rack (105mm)	Z-WBP
Dual/Triple Housing	
(Accepts two 105mm case units or three 70mm case units)	Z-NL200
Serial Link Cable (One is included with each power supply)	Z-RJ45
Communication Cable RS485	Z-485-9
Communication Cable RS232	Z-232-9
North American Line Cord (One included with -U suffix)	Z-U

Specifications (See website for detailed specifications)

Model		Z10	Z20	Z36	Z60	Z100
Load Regulation	CV	2mV + 0.01% of rated voltage over 0 - 100% load change				
Line Regulation	CV	2mV + 0.01% of rated voltage over a 85 - 132 or 170 - 265VAC line change				
Recovery Time(1)	CV	1ms				
Temperature Coefficient	CV	30ppm/°C following 30 minute warm up				
Temperature Stability	CV	0.02% of rated voltage over 8 hours following 30 minute warm up time				
Warm up Drift(2)	CV	<0.05% of rated voltage + 2mV of rated output voltage				
Up programming response time (10-90% or 90-10% of Vmax)	CV	15ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (10-90% or 90-10% of Vmax)	Full load	10ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (90-10% of Vmax)	Zero load	190ms	200ms	250ms	310ms	900ms
Load Regulation	CC	5mA + 0.01% of rated current over 0 - 100% Vout change				
Load Regulation thermal drift	CC	< 0.05% of rated current over 30 minutes after load change				
Line Regulation	CC	2mA + 0.01% of rated current over a 85 - 132 or 170 - 265VAC line change				
Temperature Coefficient	CC	100ppm/°C of rated current after 30 minute warm up time				
Temperature Stability	CC	0.05% of rated current over 8 hours following 30 minute warm up time				
Warm up Drift(2)	CC	<±0.1% of rated current				
Vout & Iout programming & readback resolution	Digitally	< 0.012% of rated voltage/current				
Vout & Iout programming & readback accuracy	Digitally	< 0.05% of rated voltage, < 0.1% of rated current				
Voltage & Current Programming	Analog	By either Voltage (0-5V or 0-10V) or Resistance (0-5k or 0-10k)				
Voltage & Current Monitoring	Analog	0-5V or 0-10V Voltage (user selectable), ±1% accuracy				
Overvoltage Shutdown (user programmable)	V	0.5 - 12	1 - 24	2 - 40	5 - 66	5 - 110
Overtemperature Protection	-	User selectable - latched or non-latching				
Display - Voltage	-	4 digits. Accuracy 0.5% of rated voltage or current ±1 count				
Remote On/Off	-	By applied voltage or dry contact relay (user selectable logic)				
Output Good	-	Open Collector, Low on fail				
Remote Sense Compensation (per wire)	V	1	1	2	3	5
Communication Interface	-	RS232, RS485 & USB standard, IEEE488 (GPIB) & LAN optional				
Series Operation	-	Up to two identical units (with external diodes)				
Parallel Operation	-	Up to six units in master-slave configuration				
Input Voltage / Frequency	-	85-265VAC, 47-63Hz				
Inrush Current	-	< 25A				
Hold Up Time (Typical)	ms	16ms				
Power Factor Correction	-	Complies with EN61000-3-2 Class A (0.99 typ)				
Operating Temperature	°C	0 - 50°C				
Storage Temperature	°C	-20 to +85°C				
Humidity (non condensing)	%RH	Operating: 10 - 90%RH, Storage 10 - 95%RH				
Cooling	-	Internal temperature controlled fan				
Withstand Voltage	-	I/P to GND 2kVAC, I/P to O/P 3kVAC, O/P to GND 1380VDC 1 min				
Insulation Resistance	-	>100M at 25°C & 70%RH				
Vibration (non operating)	-	IEC60068-2-64				
Shock	-	<20G, half sine, 11ms. IEC60068-2-27				
Safety Agency Certifications	-	UL61010-1, EN61010-1, IEC61010 (Designed to meet UL/EN60950-1)				
Immunity	-	IEC61326 (Designed to meet EN55022 / EN55024)				
Conducted & Radiated EMI	-	EN55022-B, FCC part 15-B, VCCI-B				
Size (H x W x D) (Excluding handles and busbars)	mm	Standard body 83 x 70 x 350mm; Wide Body 83 x 105 x 350mm				
Weight	kg	Standard body 1.9kg; Wide Body 2.4kg				
Warranty	yrs	Five Years				

Notes:

- (1) Recovery to within 0.5% of rated voltage after a load change of 10-90% (Output current 10-100% of I_{max})
- (2) Over 30 minute warm up time after power on

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zplus-series.htm





AC-DC Products

DC-DC Products

Filters

Enclosed or L Bracket	PCB Mount
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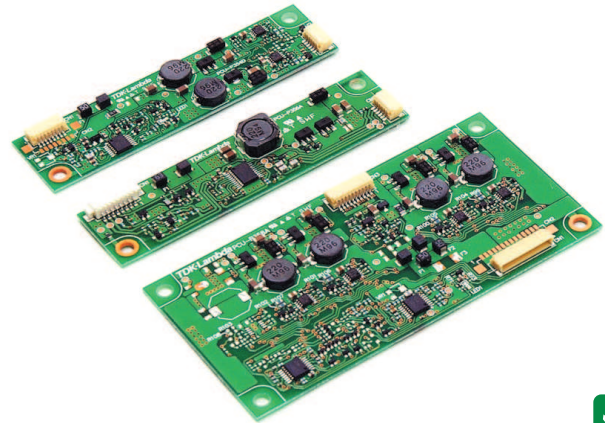
Nominal Input Voltage	# of Outputs	Output Power (W)							
		3	10	30	50	100	150	300	600
5V	Single/Dual	CC-E							
12V	Single	CC-E							
			PX						
				DPX					
				i series (POL)					
	Dual	CC-E							
			PX						
				DPX					
	Triple+		ALD	PXF					
24V	Single	CC-E			CN-A				
			PX						
				DPX					
					PH-F			PAF	
					PH-S				
								PAH300	
	Dual	CC-E							
			PX						
				DPX					
	Triple			PXF					
				DPX					
48V	Single	CC-E							
			PX						
				DPX					
					PH-F/PH-S			PAF	
					PAH				
	Dual	CC-E							
			PX						
				DPX					
	Triple			PXF					
				DPX					
82-185VDC	Single				PH-S/PH-F				
200-400VDC	Single				PH-S/PH-F			PAF	

* See website

LED Backlighting DC-DC Converters

Features

- ◆ Two to Five Strings
- ◆ 12VDC Input
- ◆ Analog or Resistive Dimming
- ◆ Low Profile
- ◆ Off the shelf solution



Key Market Segments & Applications



Specifications					
Model		ALD-214012PJ111	ALD-310012PJ125	ALD-414012PJ126	ALD-514012PJ134
Number of LED Strings	-	2	3	4	5
DC Input	VDC	10.8 - 13.2VDC			
Input Current Max.(norm./inhib.)	A	1.2 / 0.001A	1.5 / 0.001A	2.0 / 0.001A	2.5 / 0.001A
Output Current (each string)	mA	140mA	100mA	140mA	140mA
Dimming Frequency	Hz	200Hz	225Hz	200Hz	200Hz
Analog Dim. (Dark to Light) Vbr	VDC	2.5V to 0V	0V to 4V (Vbr2)	2.5V to 0V	2.5V to 0V
Analog Dim. (Dark to Light) Rbr	kΩ	50 - 0kΩ	0 - 10kΩ	50 - 0kΩ	50 - 0kΩ
PWM Dimming	VDC	2.5V to 0V	0 to 2.5V	2.5V to 0V	2.5V to 0V
Remote On/Off (Vrmt)	VDC	OFF: 0V - 0.4V, ON: 2.5V - Vin			
Maximum Output Voltage	VDC	44V	38V	44V	44V
Overvoltage Alarm	VDC	Approximately 5V if any one string is open			
Operating Temperature	°C	-30 to +85°C			
Storage Temperature	°C	-40 to +85°C			
Maximum Humidity (1)	%RH	95%RH (Storage or Operating)			
Cooling	-	Convection			
Input to Output Isolation	-	None			
Vibration	-	588m/s ² (60G) 11ms Half-sine wave once each axis X,Y,Z,-X,-Y,-Z total 6 times			
Shock	-	5~10Hz Amplitude 10mm 10~200Hz Accelerated Velocity 21.6m/s ² (2.2G)			
Weight (Typ)	g	9g	9g	22g	22g
Size (LxWxH)	mm	85 x 21.5 x 5mm	85 x 21.5 x 5.5mm	100 x 50 x 5.2mm	100 x 50 x 5.2mm
Warranty	yr	One Year			

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) non condensing

Revision A5: Nov 2011

1 to 6 output LED Backlighting DC-DC Converter

Features

- ◆ One to Six Strings in One Package
- ◆ 12VDC Input
- ◆ Analog, Resistive, or PWM Dimming
- ◆ Small Size
- ◆ Through Hole or Surface Mount
- ◆ Off the shelf solution



Key Market Segments & Applications

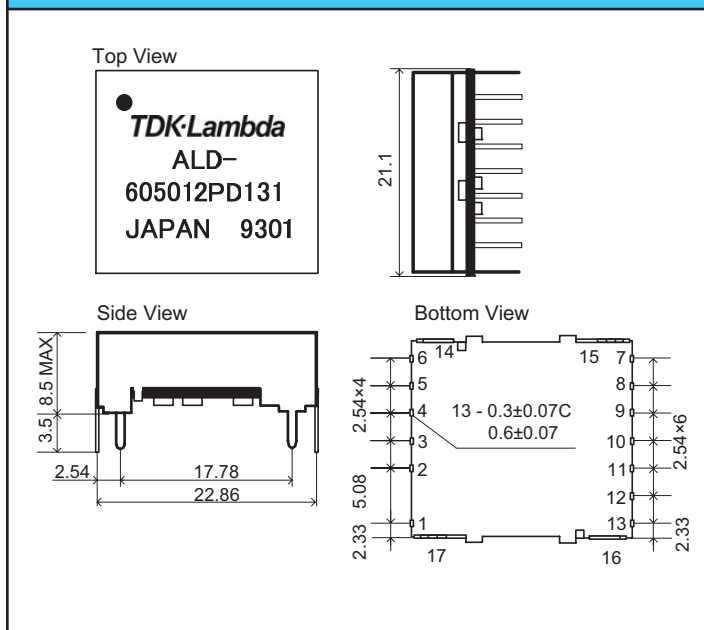


Specifications

Model		Through Hole Version: ALD-605012PD131 Surface Mount Version: ALD-605012PS131
Number of LED Strings	-	1, 2, 3 or 6 (user parallelable)
DC Input	VDC	10.8 - 13.2VDC
Input Curr. Max. (normal/inhibited)	A	1.4 / 0.001
Output Current (each string)	mA	50mA (300mA if all 6 strings are paralleled)
PWM Dimming Frequency	Hz	230Hz
PWM Dimming	V	0 to 3.3V
Analog Dimming (Dark-Light) Vbr	VDC	1.6V to 3.8V
Analog Dimming (Dark-Light) Rbr	kΩ	1 to 10kΩ
Remote On/Off (Vrmt)	VDC	OFF: 0V - 0.4V or floating, ON: 2.5V - Vin
Output Voltage	VDC	38V Maximum, +Vin + 2V Minimum
Overvoltage Alarm	-	5V if any one string is open
Operating Temperature	°C	-30 to +80°C (See page 2 for derating curves)
Storage Temperature	°C	-40 to +85°C
Max. Humidity (non condensing)	%RH	95%RH (Storage or Operating)
Cooling	-	Convection
Input to Output Isolation	-	None
Vibration	-	588m/s ² (60G) 11ms Half-sine waveonce each axis X,Y,Z,-X,-Y,-Z total 6 times
Shock	-	5~10Hz Amplitude 10mm10~200Hz Accelerated Velocity 21.6m/s ² (2.2G)
Weight (Typ)	g	5.5g
Size (LxWxH)	mm	22.86 x 21.1 x 8.5mm (8.8mm SMT version)
Warranty	yr	One Year

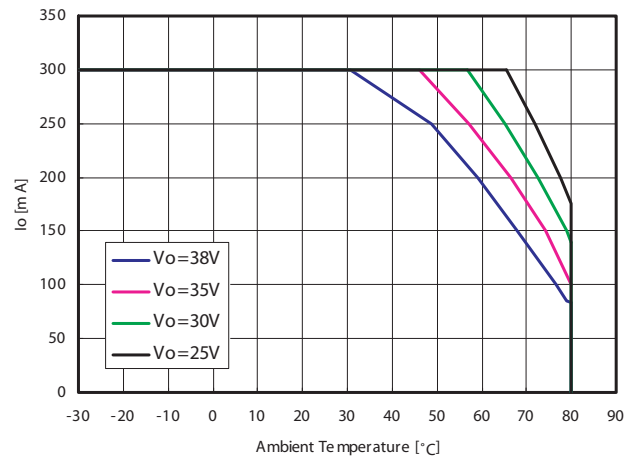
Note: See Installation Manual for full details, test methods of parameters and application notes

Outline Drawing (Through Hole Version)



Derating Curves

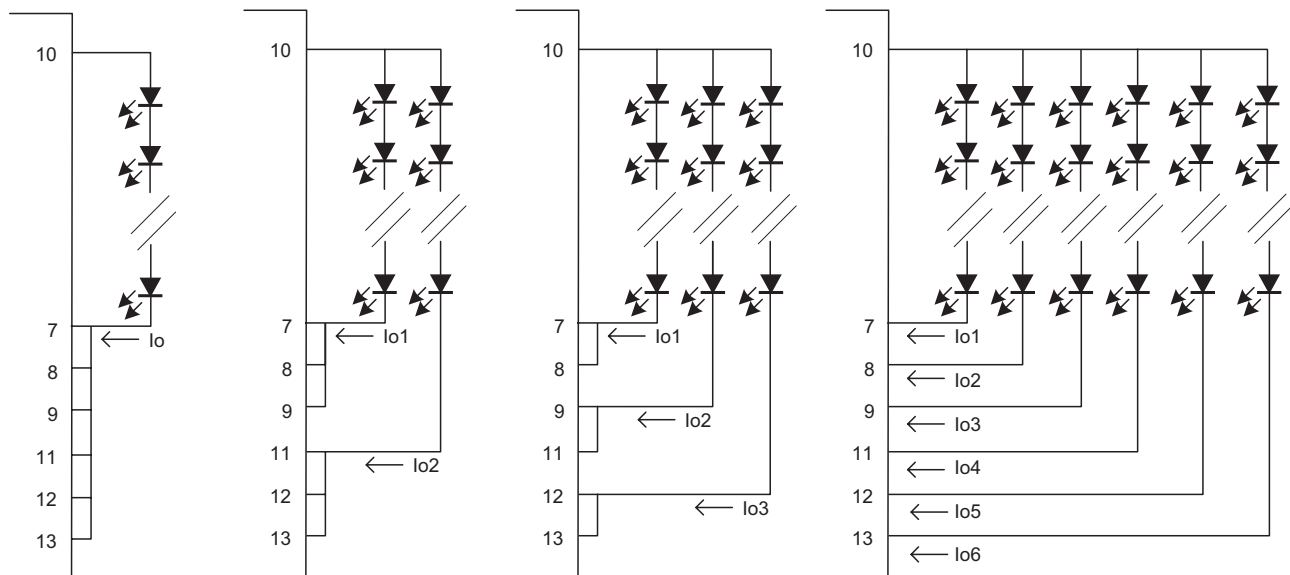
The following is derating curve of output current on our evaluation board.
Io=Total Io current of CH1 ~ 6.



*Attention : In the case of parallel connection, temperature rise of IC(point 'B') is higher if each string has varied voltage (total of forward voltage).

Typical Applications

- One serial connection
Vo : 38V max
Io : 300mA max
- Two serial connections
Vo : 38V max
Io1, 2 : 150mA max
- Three serial connections
Vo : 38V max
Io1, 2, 3 : 100mA max
- Six serial connections
Vo : 38V max
Io 1, 2, 3, 4, 5, 6 : 50mA max



For Additional Information, please visit
us.tdk-lambda.com/lp/products/ald6-series.htm



Ultra Compact, 1.5W to 25W Single and Dual DC-DC Converters

Features

- ◆ Compact Footprint / Low Profile
- ◆ Through Hole or SMT Versions
- ◆ 5V, 12V, 24V & 48V Inputs
- ◆ 3.3 to 30V1 Single, ± 12 to 15V Dual Outputs
- ◆ Output Voltage Adjustment
- ◆ Input - Output Isolation
- ◆ RoHS Compliant
- ◆ 5 Year Warranty
- ◆ Self contained
- ◆ Multiple Input Voltage configurations
- ◆ Open frame (no potting)



Key Market Segments & Applications



Specifications					
Model					
Nominal Output Voltage	V	3.3V	5V	12/15V	±12/15 (24/30) ¹
DC Input	V	5V: 4.5-9.0V, 12V: 9-18V, 24V: 18-36V, 48V: 36-76V			
Efficiency	%	71 to 90% model dependant			
Output Voltage Tolerance	%	1.5-10W: ±3%, 15-25W: ±5%			±5%
Output Adjustment (via trim pin)	V	3.15-3.6V (5)	4.75-6.0V (5)	11.4-15V	22.8 - 30V
Line Regulation	mV	20 (40 CC15; 30 CC25)		40	80
Load Regulation	mV	40 (120 CC15; 200 CC25)		100	600 ²
Temperature Coefficient	%	≤± 0.02%/°C			
Preload	-	No preload required			
Output Ripple (typ./max.BW 50MHz)	mV	40/120		30/120	
Overcurrent Protection	-	Output current limiting with automatic recovery, shutdown CC15, 25 type			
Overvoltage Protection	-	No			
Remote On/ Off	-	CC1R5, 3, 6, & 10: RC terminal open, output is OFF; RC terminal to -Vin (0-0.4V), output is ON CC15 & CC25: RC terminal open, output is ON; RC terminal to +Vin, output is OFF			
Operating Temp.- Convection	°C	-40 to 85°C, derates linearly to 40% load from 50°C to 85°C			
Operating Temp.- Forced Air	°C	-40°C to 85°C with 1m/s air full load			
Storage Temperature	°C	-40°C to 85°C			
Humidity (non Condensing)	-	95% RH max.(maximum wet-bulb temperature: 38°C)			
Isolation Voltage	-	500VAC 1 min. Input to output, input to case, output to case			
Isolation Resistance	-	Input to output, input to case, output to case: 50M ohm min. (500VDC)			
Shock	m/s ²	980m/s ² (100G) 6ms (6 directions, each 3 times)			
Vibration (non Operating)	-	10 to 55Hz (sweep for 15min) 1.52mm constant, 3 directions X, Y, Z each 2 hours			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark			
Weight	g	CC1R5: 3.2, CC3: 4.5, CC6: 5.8, CC10:10.0, CC15: 12.5, CC25: 20.0			
Size (L x W x H) (DIP Through Hole and SMD package) (SIP Through Hole only)	in	CC1R5: 0.650 x 0.654 x 0.335; CC3: 0.900 x 0.654 x 0.335; CC6: 0.900 x 0.831 x 0.335 CC10: 1.400 x 0.890 x 0.335; CC15: 1.500 x 1.264 x 0.295; CC25: 1.701 x 1.768 x 0.295 CC3 (SIP): 1.09 x 0.362 x 0.705			
Warranty	yrs	5 years			

1. For 24V/30V output - connect across +Vout & -Vout and leave "common out" pin not connected
2. Based upon equal load current from both outputs

3. For 15V output connect trim to -Vout
4. See Installation Manual for full specs, test methods of parameters & application notes
5. Not available on CC15 and CC25 models

Output Voltage (V)	Output Current (A)	Output Power (W)	5V Input	12V Input	24V Input	48V Input
Single Outputs						
3.3	0.4	1.5	CC1R5-0503SF-E	CC1R5-1203SF-E	CC1R5-2403SF-E	CC1R5-4803SF-E
3.3	0.8	3	CC3-0503SF-E	CC3-1203SF-E	CC3-2403SF-E	CC3-4803SF-E
3.3	1.2	6	CC6-0503SF-E	CC6-1203SF-E	CC6-2403SF-E	CC6-4803SF-E
3.3	2.5	10	CC10-0503SF-E	CC10-1203SF-E	CC10-2403SF-E	CC10-4803SF-E
3.3	4.5	15	-	-	CC15-2403SF-E	-
3.3	7.5	25	-	-	CC25-2403SF-E	-
5	0.3	1.5	CC1R5-0505SF-E	CC1R5-1205SF-E	CC1R5-2405SF-E	CC1R5-4805SF-E
5	0.6	3	CC3-0505SF-E	CC3-1205SF-E	CC3-2405SF-E	CC3-4805SF-E
5	1.0	5	CC6-0505SF-E	-	-	-
5	1.2	6	-	CC6-1205SF-E	CC6-2405SF-E	CC6-4805SF-E
5	2.0	10	CC10-0505SF-E	CC10-1205SF-E	CC10-2405SF-E	CC10-4805SF-E
5	3.0	15	-	-	CC15-2405SF-E	-
5	5.0	25	-	-	CC25-2405SF-E	-
12(15)	0.125(0.1)	1.5	CC1R5-0512SF-E	CC1R5-1212SF-E	CC1R5-2412SF-E	CC1R5-4812SF-E
12(15)	0.25(0.2)	3	CC3-0512SF-E	CC3-1212SF-E	CC3-2412SF-E	CC3-4812SF-E
12(15)	0.5(0.4)	6	CC6-0512SF-E	CC6-1212SF-E	CC6-2412SF-E	CC6-4812SF-E
12(15)	0.8(0.64)	10	CC10-0512SF-E	-	-	-
12(15)	1.0(0.8)	10	-	CC10-1212SF-E	CC10-2412SF-E	CC10-4812SF-E
Dual Outputs						
±12 (15)3	0.06(0.05)	1.5	CC1R5-0512DF-E	CC1R5-1212DF-E	CC1R5-2412DF-E	CC1R5-4812DF-E
±12 (15)3	0.125(0.1)	3	CC3-0512DF-E	CC3-1212DF-E	CC3-2412DF-E	CC3-4812DF-E
±12 (15)3	0.25(0.2)	6	CC6-0512DF-E	CC6-1212DF-E	CC6-2412DF-E	CC6-4812DF-E
±12 (15)3	0.4(0.32)	10	CC10-0512DF-E	-	-	-
±12 (15)3	0.45(0.36)	10	-	CC10-1212DF-E	CC10-2412DF-E	CC10-4812DF-E

Technical drawing of the PCB layout showing top, bottom, and side views with dimensions in mm.

Top View Dimensions:

- Overall width: 38.86
- Overall height: 5.08 (3.68)
- Left side features:
 - Feature 1: 7-0.3-0.6
 - Feature 2: 10.16
 - Feature 3: 3.68
- Right side features:
 - Feature 4: 1.8
 - Feature 5: 5.08
 - Feature 6: 5.08
 - Feature 7: 5.08

Bottom View Dimensions:

- Overall width: 35.56
- Overall height: 8.5 (8.8max.)

Side View Dimensions:

- Overall width: 22.6±0.2
- Overall height: 4.0
- Thickness: t=0.1
- Coplanarity: 0.1max.

Version	Description
F-E	Through hole mounting (DIP pkg)
R-E	Surface mount (DIP pkg)
S-E	Through hole mounting (SIP pkg - CC3)

PX	10 - 40W 12, 24, 48V DC-DC converters
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks

Pin	Single	Dual
1	+Vin	+Vin
2	RC	RC
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	Common out
6	TRM	TRM
7	+Vout	+Vout

For CC15 and 25 see Installation Manual online



Ultra Compact, 15W to 30W Single Output DC-DC Converters

Features

- ◆ Compact Footprint / Low Profile
- ◆ 24V & 48V Inputs
- ◆ 3.3V to 15V Outputs
- ◆ Five Sided Shielding (Cased Version)
- ◆ Input - Output Isolation
- ◆ Parallel Operation
- ◆ Through Hole or SMT Versions
- ◆ DC OK signal
- ◆ Sequencing pin



Key Market Segments & Applications



Specifications

Model					
Nominal Output Voltage	V	3.3V	5V	12V	15V
DC Input	VDC	24V Nominal: 18-36V, 48V Nominal: 36-76V			
Efficiency	%	89 to 92% model dependant			
Initial set accuracy	%	±1%			
Total Regulation limits	%	+5%, -3%			
Output Adjustment	-	None			
Temperature Coefficient	%/°C	<0.02%/°C			
Preload	A	None			
Output Ripple	mV	50mV		150mV	
Overcurrent Protection	-	> 103% of nominal rating			
Overvoltage protection	-	Operates at 115 - 145% of nominal voltage			
Remote On/Off (RC)	-	Logic high (pull high to shutdown), referenced to -Vin			
Alarm (ALM)	-	Low On Fail, referenced to -Vin. 20 units maximum			
Sequencing (PO)	-	Connecting PO terminals on multiple power supplies ensures all simultaneously start up (20 units maximum)			
Cooling	-	Convection			
Operating Temp. Range	°C	-40 to 85°C, see derating curves on website			
Storage Temperature	°C	-40 to 85°C			
Humidity (Non condensing)	%RH	5 - 95%RH			
Isolation Voltage (Cased version)	VDC	1000VDC 1 min. Input-Output, Input-Chassis, Output-Chassis			
Isolation Voltage (Uncased version)	VDC	1500VDC 1 min. Input-Output			
Isolation Resistance	-	>50M at 25°C and 70%RH, 500 VDC Input-Output, Input-Case, Output-Case			
Shock (Non operating)	-	980m/s ² (100G), 6ms, 6 directions, 3 times			
Vibration (non operating)	-	10-55-10 Hz (sweep for 15 min.) 1.52mm amplitude, 2 hour X, Y, Z			
Safety Certifications	-	UL60950-1, CSA C22.2 No.60950-1 (c-UL), EN60950-1			
Weight	g	With case: CC15 15g, CC30 20g. Without case: CC15 10g, CC30 15g			
Size (LxWxH) (Thru hole ver., w/ case)	mm	CC15: 38.4 x 6.8 x 29.6mm, CC30: 38.4 x 8.3 x 33.5mm			
Warranty	yrs	5 years			

Note: See Installation Manual for full specifications, test methods of parameters and application notes

Model Selector

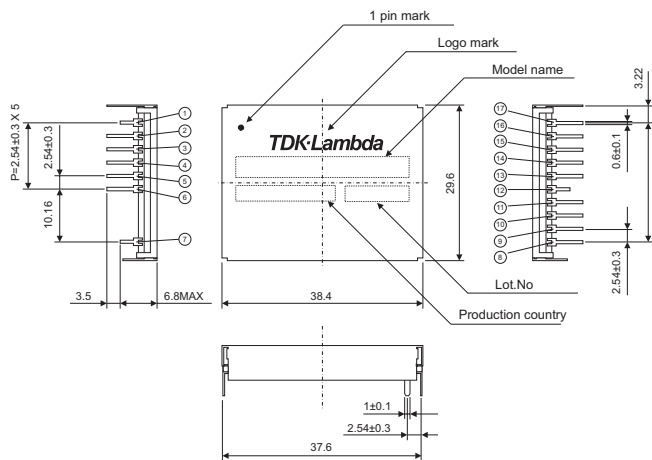
Output Volt.(V)	Output Curr.(A)	Max O/P Pwr (W)	24V Input	48V Input
3.3	4.5	15	CC15-2403SFP-E	CC15-4803SFP-E
3.3	9	30	CC30-2403SFP-E	CC30-4803SFP-E
5	3	15	CC15-2405SFP-E	CC15-4805SFP-E
5	6	30	CC30-2405SFP-E	CC30-4805SFP-E
12	1.25	15	CC15-2412SFP-E	CC15-4812SFP-E
12	2.5	30	CC30-2412SFP-E	CC30-4812SFP-E
15	1	15	CC15-2415SFP-E	CC15-4815SFP-E
15	2	30	CC30-2415SFP-E	CC30-4815SFP-E

Options

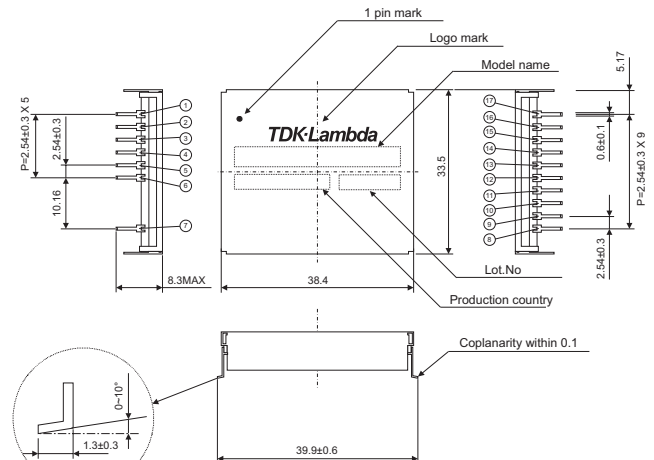
Version	PIN	Case
CCxx-yyyysFP-E	Through hole	Yes
CCxx-yyyysFH-E	Through hole	No
CCxx-yyyysRP-E	SMT	Yes
CCxx-yyyysRH-E	SMT	No

Where xx is output power & yyyy is input and output voltage combination. Shaded line is Preferred model

Outline Drawing CC15-xxxxSFP-E



Outline Drawing CC30-xxxxSRP-E



Other Industrial Products

CC-E	1.5 - 30W, 1 to 2 outputs, 5 to 48VDC input
PX	10 - 60W, 1 to 3 outputs, 12V, 24V, 48VDC input

For Additional Information, please visit us.tdk-lambda.com/lp/products/cc-series.htm



100W 14.4 to 36VDC Input DC-DC Converters

Features

- ◆ 14.4 - 36VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base-plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Small Size
- ◆ Quarter Brick Footprint
- ◆ Wide input range



Key Market Segments & Applications



Specifications

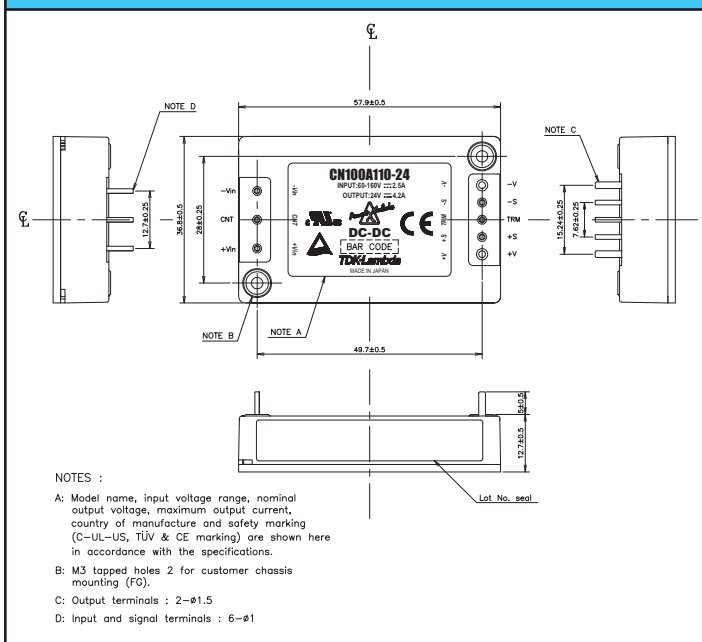
Model		5V	12V	15V	24V
Nominal Output Voltage	VDC	5V	12V	15V	24V
Input Voltage Range	VDC	14.4 - 36VDC (40V transient for 3 seconds)			
Input Current	A	4.83 - 4.91A (model dependant)			
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	Pending	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	Pending	240
Line Regulation (max)	mV	20	48	Pending	96
Load Regulation (max)	mV	40	96	Pending	192
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	125 - 145% (Cycle input or remote on/off to reset)			
Remote Sense	-	Yes			
Remote On/Off	-	Yes; Low = ON, Open = OFF			
Operating Temperature	°C	-40°C to +100°C Baseplate			
Storage Temperature	°C	-40°C to +100°C			
Temperature Coefficient	%/°C	0.02%/°C			
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Withstand Voltage	VAC	Input to Base-plate: 2kVAC; Input to Output 3.0kVAC for 1 min.; Output to Base-plate: 500VAC for 1 min			
Isolation Resistance	-	>100M at 25C and 70%RH, Output to Base plate 500VDC			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s²) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B			
Shock	-	196.1m/s², IEC61373 - Category 1, Grade B			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1			
Weight (Typ)	g	70g			
Size (WxHxD)	in(mm)	1.45 x 0.5 x 2.28" (36.8 x 12.7 x 57.9)			
Warranty	yrs	5 Years			

Note: See Installation Manual for full details, test methods of parameters and application notes

Model Selector

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 110VDC In)
CN100A24-5	5	20	100	4.91	86
CN100A24-12	12	8.4	100.8	4.83	88
CN100A24-15	15		Pending		
CN100A24-24	24	4.2	100.8	4.83	88

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/cn-series.htm



30W to 200W 60 to 160VDC Input DC-DC Converters

Features

- ◆ 60 - 160VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Parallel Operation (200W Only)
- ◆ Small Size
- ◆ Quarter / Half Brick Footprint
- ◆ Full Power from -40 to +100°C
- ◆ Parallel Function (CN200)



Key Market Segments & Applications



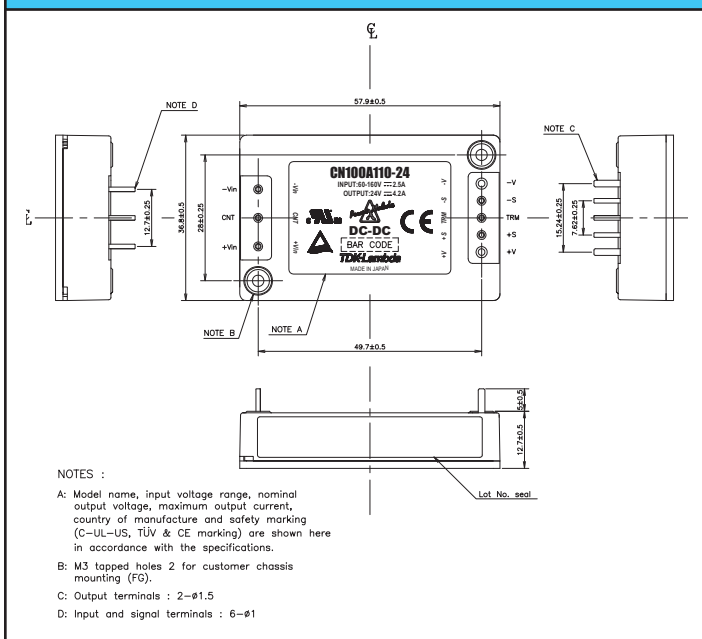
Specifications					
Model					
Nominal Output Voltage	VDC	5V	12V	15V	24V
Input Voltage Range	VDC	60 - 160VDC			
Input Current	A	0.34 - 2.16A (model dependant)			
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	13.5 - 16.5	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	150	240
Line Regulation (max)	mV	20	48	60	96
Load Regulation (max)	mV	40	96	120	192
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	125 - 145% (Cycle input or remote on/off to reset)			
Remote Sense	-	Yes			
Remote On/Off	-	Yes; Low = ON, Open = OFF			
Parallel Operation	-	CN200A 12V, 15V & 24V only			
Operating Temperature	°C	-40°C to +100°C Baseplate			
Storage Temperature	°C	-40°C to +100°C			
Temperature Coefficient	%/°C	0.02%/°C			
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Withstand Voltage	VAC	Input to Baseplate: 1.5kVAC; Input to Output 3.0kVAC for 1 min.; Output to Baseplate: 500VAC for 1 min			
Isolation Resistance	-	>100M at 25°C and 70%RH, Output to Base plate 500VDC			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B			
Shock	-	196.1m/s ² , IEC61373 - Category 1, Grade B			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	CN30A-100A: 70g, CN200A 150g			
Size (WxHxD)	in	CN30A-100A: 1.45 x 0.5 x 2.28", CN200A: 2.4 x 0.5 x 2.28"			
Warranty	yrs	5 Years			

Note: See Installation Manual for full details, test methods of parameters and application notes

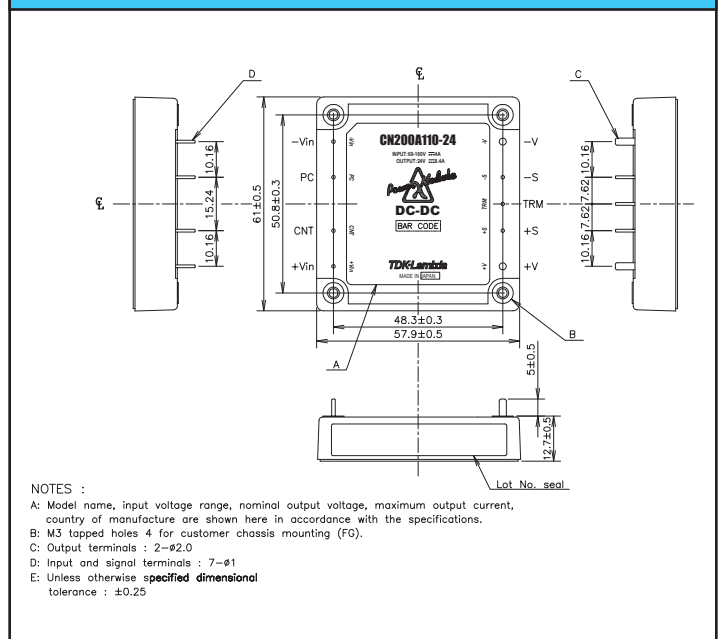
Model Selector

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 110VDC In)
CN30A110-5	5	6	30	0.34	83
CN50A110-5	5	10	50	0.55	84
CN100A110-5	5	20	100	1.08	85
CN200A110-5	5	40	200	2.16	85
CN30A110-12	12	2.5	30	0.34	84
CN50A110-12	12	4.2	50.4	0.55	86
CN100A110-12	12	8.4	100.8	1.05	88
CN200A110-12	12	16.7	200.4	2.09	88
CN30A110-15	15	2	30	0.34	84
CN50A110-15	15	3.4	51	0.55	86
CN100A110-15	15	6.7	100.5	1.05	88
CN200A110-15	15	13.4	201	2.1	88
CN30A110-24	24	1.3	31.2	0.34	84
CN50A110-24	24	2.1	50.4	0.55	86
CN100A110-24	24	4.2	100.8	1.05	88
CN200A110-24	24	8.4	201.6	2.11	88

Outline Drawing CN30A to CN100A



Outline Drawing CN200A



For Additional Information, please visit
us.tdk-lambda.com/lp/products/cn-series.htm



Single, Dual & Triple Output 40W to 60W DIN Mount DC-DC Converters

Features

- ◆ DIN Rail Mount Version of TDK-Lambda's PX Series
- ◆ 1600VDC Input to Output Isolation
- ◆ Wide Operating Temperature Range
- ◆ Internally Protected
- ◆ All In One Package



Key Market Segments & Applications



Industrial



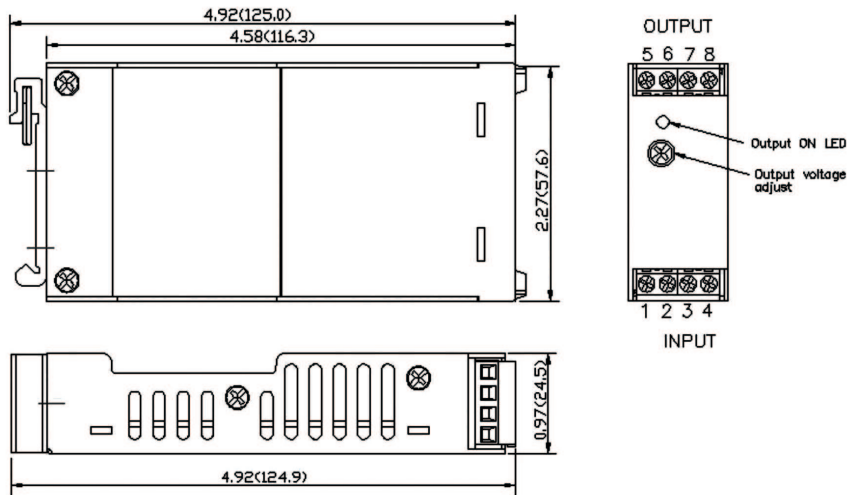
RoHS

Specifications

Model		DPX40	DPX60
Max Output Power	W	40W	60W
Efficiency	%	85% typical at nominal input & full load	
Voltage Accuracy	%	Single, Dual & Triple Main $\pm 1\%$, Triple auxiliaries $\pm 5\%$	
Volt. Adjust. (Single Output Only)	%	$\pm 10\%$	
Minimum Load, each output (1)	%	Single output 0%, Dual & Triple outputs 10%	
Line Regulation	%	Single / Dual $\pm 0.5\%$, Triple (main) $\pm 1\%$, (auxiliaries) $\pm 5\%$	
Load Regulation (10% to 100%)	%	Single $\pm 0.5\%$, Dual $\pm 1\%$, Triple (main) $\pm 2\%$, (auxiliaries) $\pm 5\%$	
Cross Regulation (25% to 100%)	%	Triple (main) $\pm 1\%$, Dual / Triple (auxiliaries) $\pm 5\%$	
Start up time	ms	100ms typ.	
Remote on/off (ref. to neg. input)	-	Positive Logic: ON: Open or 3.5-12V, OFF: Short or $< 1.2V$	
Temperature Coefficient	%/ $^{\circ}C$	$< \pm 0.02\%/^{\circ}C$	
Operating Temperature	$^{\circ}C$	-40 to $85^{\circ}C$, derate linearly to 20% load from $60^{\circ}C$ to $85^{\circ}C$	
Storage Temperature	$^{\circ}C$	-40 to $85^{\circ}C$	
Thermal Shock	-	MIL-STD-810D	
Relative Humidity	%RH	5 to 95%RH (non condensing)	
Trans. Resp.(25% step load chng.)	ms	250 μ s recovery	
Overvolt. Protection (Zener clamp)	-	5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurr. & Short Circuit Protection	-	Typically at 150%, hiccup with self recovery	
Input Surge Volt. (Max. for 100ms)	-	12V input: 36V, 24V input: 50V, 48V input: 100V	
Isolation Voltage	VDC	1600VDC minimum	
Isolation Resistance	Ω	10^9 Ohms minimum	
Typical Switching Frequency (Fixed)	kHz	300kHz (typ)	
Shock & Vibration	-	MIL-STD-810F	
Conducted & Radiated Emissions	-	EN55022 Level B	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Approval	-	CE Mark	
Size (W x H x L)	in(mm)	0.96 x 2.27 x 4.92" (24.5 x 57.6 x 125mm)	
Weight	g	182g	
Warranty	yrs	Two Years	

1. No load operation will not damage the unit

Outline Drawing



Model Selector

Output Voltage (V)	Output Current (A)	Input Voltage (VDC)	Model	Ripple & Noise (Pk to Pk mV)	Max Load Cap (uF)
Single Outputs					
5V	8A	9.5 - 36VDC	DPX4024WS05	50mV	13600uF
12V	3.33A	9.5 - 36VDC	DPX4024WS12	75mV	2360uF
15V	2.67A	9.5 - 36VDC	DPX4024WS15	75mV	1510uF
5V	8A	18 - 75VDC	DPX4048WS05	50mV	13600uF
12V	3.33A	18 - 75VDC	DPX4048WS12	75mV	2360uF
15V	2.67A	18 - 75VDC	DPX4048WS15	75mV	1510uF
5V	12A	18 - 36VDC	DPX6024S05	75mV	20400uF
12V	5A	18 - 36VDC	DPX6024S12	100mV	3550uF
15V	4A	18 - 36VDC	DPX6024S15	100mV	2300uF
5V	12A	36 - 75VDC	DPX6048S05	75mV	20400uF
12V	5A	36 - 75VDC	DPX6048S12	100mV	3550uF
15V	4A	36 - 75VDC	DPX6048S15	100mV	2300uF
Dual Outputs					
±12	1.667A	9.5 - 36VDC	DPX4024WD12	120mV	±1200uF
±15	1.333A	9.5 - 36VDC	DPX4024WD15	150mV	±1510uF
±12	1.667A	18 - 75VDC	DPX4048WD12	120mV	±1200uF
±15	1.333A	18 - 75VDC	DPX4048WD15	150mV	±1510uF
Triple Outputs					
+5V, ±12V	6, ±0.4A	9.5 - 18VDC	DPX4012T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	9.5 - 18VDC	DPX4012T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	18 - 36VDC	DPX4024T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	18 - 36VDC	DPX4024T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	36 - 75VDC	DPX4048T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	36 - 75VDC	DPX4048T0515	50 / 75mV	6800uF, ±110uF

Other Industrial Products

DPP / DSP	10W to 960W, 5V to 48V power supplies
DLP	75W to 240W, 24V power supplies
DLP-PU	Redundancy Module (20A)
R Series	6A to 30A, single and three phase EMI filters

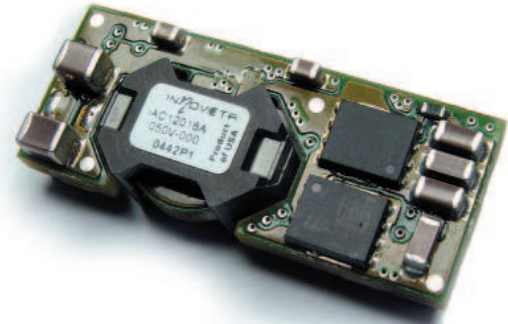
For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpx-series.htm



15 - 16A Non-isolated SMT Point of Load

Features

- ◆ Standard Industry Footprint
- ◆ 3.0-5.5V and 6.0-14.0V Inputs
- ◆ 0.8-5.0V Nominal Outputs
- ◆ Surface Mount
- ◆ High operating efficiency (up to 95%)
- ◆ Constant switching frequency
- ◆ Starts with pre-biased output



Key Market Segments & Applications



Specifications			
Model		iAA05015A008V	iAC12016A008V
Nominal Output Voltage	VDC	0.75-3.63	0.8 - 5.0
Input Voltage Range	VDC	3.0-5.5 ⁽²⁾	6.0 ⁽¹⁾ -14
Input Current (max)	A	16	18
Output Voltage Tolerance	VDC	±3.3% Vo, set	-2.5 to +3.5% Vo, set
Ripple & Noise (max)(pk to pk) (3)	mV	75	100
Line Regulation (max)	mV	5	10
Load Regulation (max)	mV	10	15
Overload Protection	%	Inception - 175-235% of rated output; Short circuit - auto recovery	
Overvoltage Protection	-	N/A	
Remote Sense	-	Yes	
Remote On / Off	-	Positive or Negative Logic available, see Model Selector	
Sequencing	-	See Model Selector	
Temperature (operating)	°C	-40 to 125	
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	Per IPC / JEDEC J-STD-020, for MSL-1 ⁴ (<30C/85%RH) in original packaging	
Cooling	-	Convection or forced air	
Isolation Voltage	-	N/A	
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4	
Shock	-	196.1m/s ²	
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)	
Weight (max)	g	12	
Size	mm	33 x 13.5 x 8.5	
Warranty	-	3 Years	

Notes: See website for detailed specifications

(1) 8.3 - 14.0V when output is >3.63V

(2) 4.5 - 5.5V when output is ≥3.0V

(3) Measured across one 0.1μF ceramic capacitor and one 47μF ceramic capacitor; BW = 20MHz

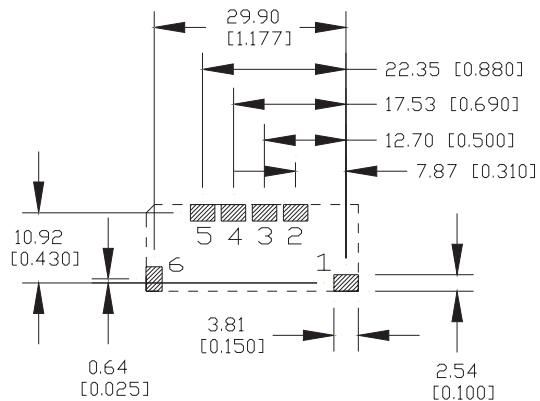
(4) iAC MSL-2

Model Selector

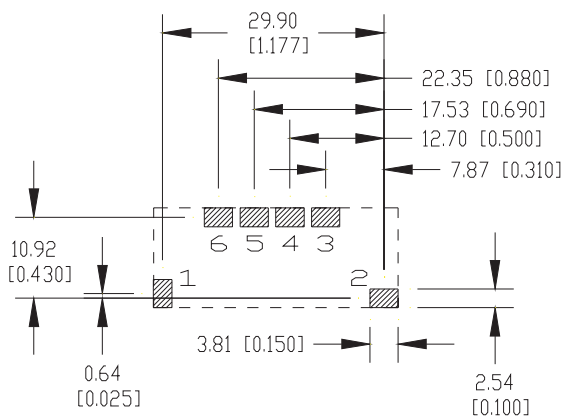
Model	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off	Sequencing
iAA05015A008V-000-R	0.75 - 3.63	15	49.5	94.5	X		
iAC12016A008V-002-R	0.80 - 5.00	16	80.0	94.5 @ 5V	X		
iAC12016A008V-003-R	0.80 - 5.00	16	80.0	94.5 @ 5V		X	

Recommended Footprint (Top View)

iAA



iAC (No Seq.)



Pinout

PIN	Function iAA	iAC(No Seq)
1	Vin	On/Off
2	Gnd	Vin
3	Vout	Gnd
4	Trim	Vout
5	Sense	Trim
6	On/Off	Sense
7	-	-

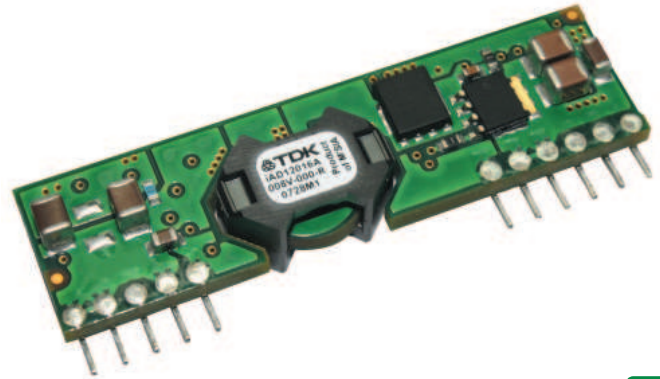
For Additional Information, please visit
us.tdk-lambda.com/lp/products/iaa-series.htm



16A Non-isolated Point of Load

Features

- ◆ Standard SIP Footprint
- ◆ 6.0-14VDC Input
- ◆ 0.8-5.5V Outputs
- ◆ Through Hole Mounting
- ◆ High operating efficiency (up to 94%)
- ◆ Constant switching frequency
- ◆ Starts with pre-biased output



Key Market Segments & Applications



Specifications		
Model		iAD
Nominal Output Voltage	VDC	0.8 - 5.5V
Input Voltage Range	VDC	6 - 14V
Input Current (max)	A	18A
Output Voltage Tolerance	VDC	N/A
Ripple & Noise (max) (pk-pk)	mV	100
Line Regulation (max)	mV	15
Load Regulation (max)	mV	22
Overload Protection	%	Inception - 28A; Short circuit - auto recovery
Overvoltage Protection	-	N/A
Remote Sense	-	Yes
Remote On / Off	-	Positive or Negative Logic available, see Model Selector
Sequencing	-	Yes
Temperature (operating)	°C	-40 to 125
Temperature (storage)	°C	-55 to 125
Humidity (operating)	-	20-95% RH Non condensing
Humidity (storage)	-	10-95% RH Non condensing
Cooling	-	Convection or forced air
Isolation Voltage	-	none
Vibration (non-operating)	-	5 to 50Hz@0.5g (4.9m/s ²), & 50 to 500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4
Shock	-	196.1m/s ²
Safety Agency Certifications	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)
Weight (max)	g	12
Size (LxWxH)	mm	50.8 x 7.9 x 14
Warranty	-	3 Years

Note: See website for detailed specifications and test methods

Model	Output Voltage (V)	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off
iAD12016A008V-000-R	0.8 - 5.5	0.8 - 5.5	16	80	94% @ 5V	X	
iAD12016A008V-001-R	0.8 - 5.5	0.8 - 5.5	16	80	94% @ 5V		X

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PIN	Function	PIN	Function
1	Vout	6	GND
2	Vout	7	Vin
3	Sense	8	Vin
4	Vout	9	Sequencing
5	GND	10	Trim
		11	On / Off

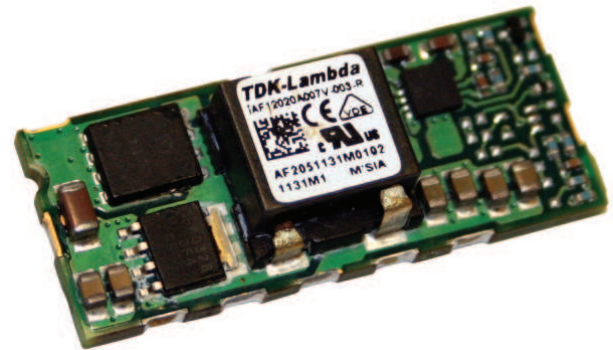
CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iPB	15-35W, 1.5-5V Output, 36-75VDC Input, Pico Brick
iS	Sixteenth Bricks DC-DC
iE	Eighth Brick DC-DC
iQ	Quarter Brick DC-DC
PAH300/350	Half Brick DC-DC
PAF	Full Brick DC-DC
FPS	1kW to 3kW, 12 to 48V Output, AC-DC Front Ends
PFE	AC-DC Power Module
iA, iB	Non Isolated DC-DC Converters



20A Non-isolated SMT Point Of Load

Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
 - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



Key Market Segments & Applications



Specifications		
Model		iAF
DC Output Voltage	V	0.70 - 5.5
DC Input Voltage	V	4.5 - 14
Efficiency	%	82 - 93.5 (1.2Vout to 5Vout)
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	3
Load Regulation	mV	7
Preload	-	none
Output Ripple and Noise	mVpp	10
Overcurrent Protection	A	Hiccup Type
Remote On / Off	-	yes
Remote Sense	-	(+) Sense
Power Good Signal	-	yes
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)
Weight	g / oz	5.5g / 0.194
Size (LxWxH)	mm / in.	33 x 13.46 x 7.75 / 1.3 x 0.53 x 0.305
Warranty	yrs	3 years

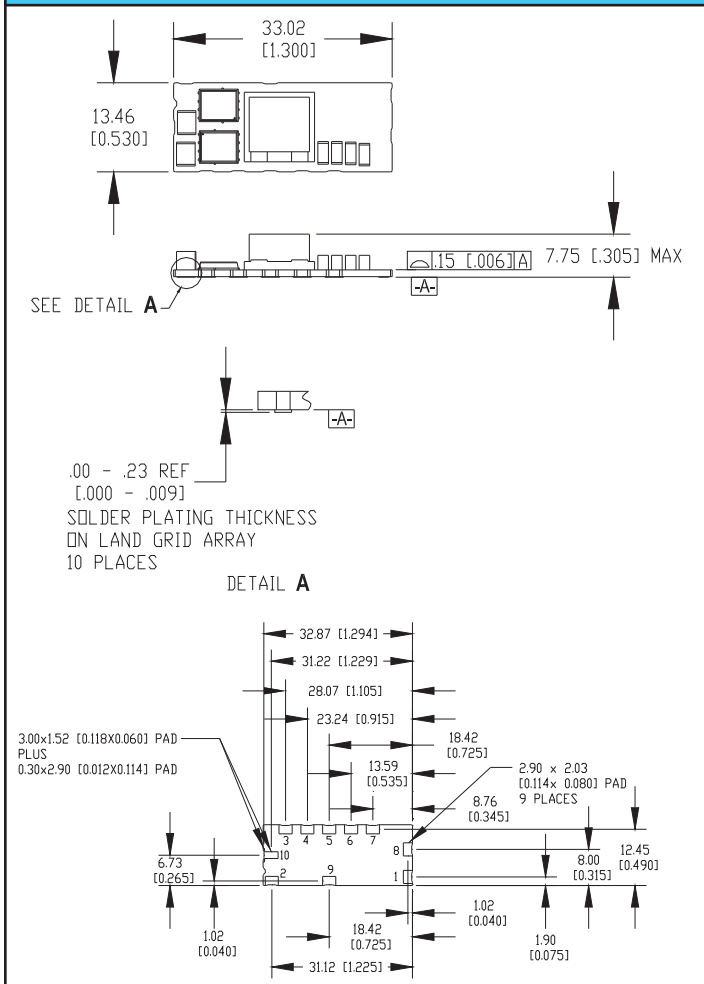
*See website for detailed specifications

Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iAF12020A007V-003-R	4.5 -14	20	0.70 - 5.5	-	yes	-	yes*

*For LGA solder bumping specify -007-R model suffix

Outline Drawing



Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	SENSE (+)
3	Reserved	8	Reserved
4	GND	9	PWR GOOD
5	VOUT	10	Reserved

Other Industrial Products

CC-E	1.5-30W 3.3 to 30V DC-DC Converters
PX	10-60W 12, 24, 48V DC-DC Converters
PAH, PAF	100-700W Half and Full Bricks

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iaf-series.htm

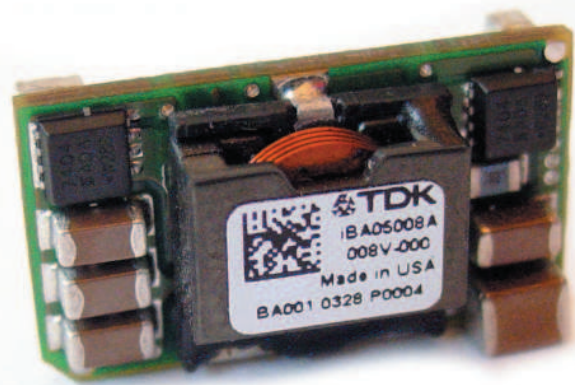


7 - 8A Non-isolated Point of Load

Features

- ◆ Standard Industry Footprint
- ◆ 3.0-5.5V and 6.0-14.0V Input
- ◆ 0.8-5.0V Nominal Output
- ◆ Low 8.38mm Profile
- ◆ High operating efficiency (up to 95%)
- ◆ Constant switching frequency
- ◆ Starts with pre-biased output

Key Market Segments & Applications



Specifications			
Model		iBA05008A008V	iBC12007A008V
Nominal Output Voltage	VDC	0.75 - 3.63	0.8 - 5.0
Input Voltage Range	VDC	3.0 - 5.5 ⁽²⁾	6.0 ⁽¹⁾ - 14
Input Current (max)	A		8.5
Output Voltage Tolerance	VDC		N/A
Ripple & Noise (max)(pk to pk) (3)	mV	75	100
Line Regulation (max)	mV	5	20
Load Regulation (max)	mV	10	30
Overload Protection	%	Inception- 185-215% of rated output; Short circuit - auto recovery	
Overvoltage Protection	-	N/A	
Remote Sense	-	No	
Remote On / Off	-	Positive or Negative Logic available, see Module Selector	
Sequencing	-	No	Yes
Temperature (operating)	°C	-40 to 125	
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	Per IPC / JEDEC J-STD-020, for MSL-1 ⁴ (<30C/85%RH) in original packaging	
Cooling	-	Convection or forced air	
Isolation Voltage	VDC	none	
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4	
Shock	-	196.1m/s ²	
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)	
Weight (max)	g	7	
Size	mm	20.3 x 11.4 x 8.38	27.9 x 11.4 x 8.38
Warranty	-	3 Years	

Notes: See website for detailed specifications

(1) 8.3-14V when output is >3.63V

(2) 4.5 - 5.5V when output is ≥3.0V

(3) Measured across one 0.1μF ceramic capacitor and one 47μF ceramic capacitor; BW = 20MHz

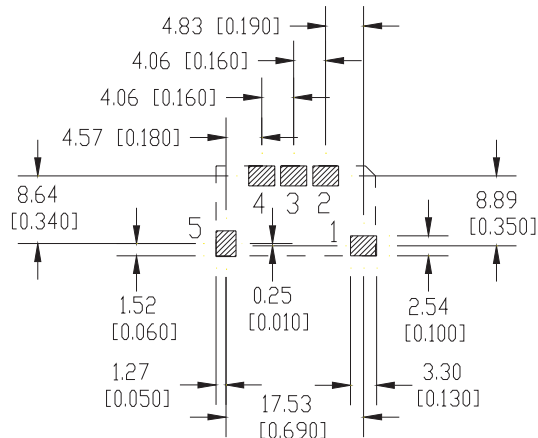
(4) iBC MSL-2

Model Selector

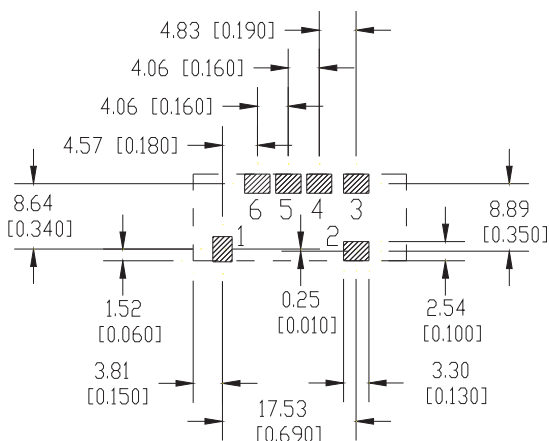
Model	Output Voltage (V)	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off	Seq.
iBA05008A008V-000-R	0.75-3.63	0.75-3.63	8	26.4	94 @ 3.3V	X		
iBA05008A008V-001-R	0.75-3.63	0.75-3.63	8	26.4	94 @ 3.3V		X	
iBC12007A008V-000-R	0.80-5.50	0.80-5.00	7	35.0	93 @ 5.0V	X		X
iBC12007A008V-001-R	0.80-5.50	0.80-5.00	7	35.0	93 @ 5.0V		X	X

Recommended Footprint (Top View)

iBA



iBC



Pinout

PIN	Function	
	iBA	iBC
1	Vin	On/Off
2	Gnd	Vin
3	Trim	Seq
4	Vout	Gnd
5	On/Off	Trim
6	-	Vout

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iba-series.htm



Other DC-DC Products

CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iPB	15-35W, 1.5-5V Output, 36-75VDC Input, Pico Brick
iSA	30-78W, 1.2-12V Output, 36-75VDC Input, Sixteenth Bricks
iEA	30-78W, 1.2-28V Output, 36-75VDC Input, Eighth Brick DC-DC
PAE50/100	36-100W, 1.9-5V Output, 36-75VDC Input, Eighth Brick DC-DC
iEB	150W, 12V Output, 42-56V Input, Eighth Brick Intermediate Bus DC-DC
iQD	300W, 12V Output, 42-53VDC Input, Quarter Brick Intermediate Bus DC-DC
iQB	30-300W, 1.2-12V Output, 24 to 48VDC Input, Quarter Brick DC-DC
PAH300/450	300-450W, 12 to 28V Output, 36-75VDC Input, Half Brick DC-DC
PAF	400-700W, 1.8 to 48V output, 24 to 400VDC Input, Full Brick DC-DC
FPS	1kW to 3kW, 24 to 48V Output, AC-DC Front Ends
iAA, iAD	Non Isolated DC-DC Converters

7A Non-isolated Point of Load

Features

- ◆ Standard SIP Footprint
- ◆ 6.0-14VDC Input
- ◆ 0.8 - 5.5V Outputs
- ◆ Through Hole Mounting
- ◆ High operating efficiency (up to 92%)
- ◆ Constant 240kHz switching frequency
- ◆ Starts with pre-biased output



Key Market Segments & Applications



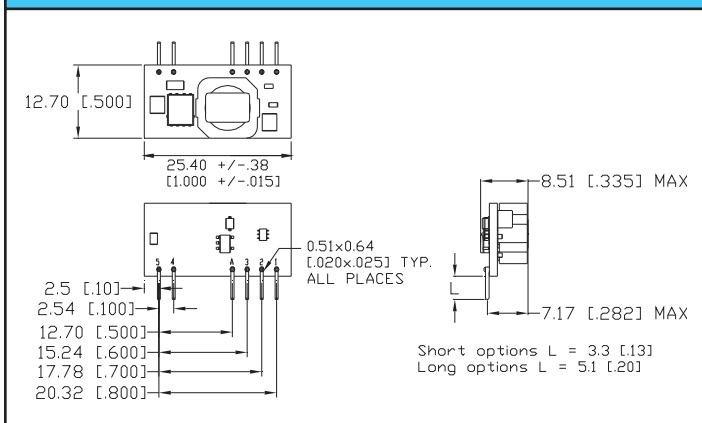
Specifications			
Model		iBD	
Nominal Output Voltage	VDC	0.8 - 5.5V	
Input Voltage Range	VDC	6 - 14V	
Input Current (max)	A	7A	
Output Voltage Tolerance	%	±3.5%	
Ripple & Noise (max) (pk - pk)	mV	125	
Line Regulation (max)	%	0.2%	
Load Regulation (typical)	mV	20	
Overload Protection	A	Inception- 11.5A; Short circuit - auto recovery	
Overvoltage Protection	-	N/A	
Remote Sense	-	Yes	
Remote On / Off	-	Positive Logic standard. Negative logic available, see detailed datasheet	
Sequencing	-	Yes	
Temperature (operating)	°C	-40 to 105 (See detailed datasheet for derating)	
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	10-95% RH Non condensing	
Cooling	-	Convection or forced air (See detailed datasheet for derating)	
Isolation Voltage	-	None	
Vibration (non operating)	-	5 to 50Hz@0.5g(4.9m/s ²), & 50 to 500Hz@1.5g(14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4	
Shock	-	196.1m/s ²	
Safety Agency Certifications	-	Pending - UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)	
Weight (max)	g	6	
Size (LxWxH)	mm	25.4 x 8.51 x 12.7	
Warranty	yrs	3 Years	

Note: See website for detailed specifications and test methods

Model Selector

Model	Output Voltage	Output Adjust	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iBD12007A008V-000-R	0.80 - 5.5	0.80 - 5.5	7	35	92% at 5V

Outline Drawing



Pinout

PIN	Function
1	Vout
2	Trim
3	GND
A	Sequencing
4	Vin
5	On / Off

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iba-series.htm



Other DC-DC Products

CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iPB	15-35W, 1.5-5V Output, 36-75VDC Input, Pico Brick
iS	Sixteenth Bricks DC-DC
iE	Eighth Brick DC-DC
iQ	Quarter Brick DC-DC
PAH	Half Brick DC-DC
PAF	Full Brick DC-DC
FPS	1kW to 3kW, 12 to 48V Output, AC-DC Front Ends
PFE	AC-DC Power Module
iA, iB	Non Isolated DC-DC Converters

12A Non-isolated SMT Point Of Load

Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
 - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



Key Market Segments & Applications



Specifications		
Model		iBF
DC Output Voltage	V	0.70 - 5.5
DC Input Voltage	V	4.5 - 14
Efficiency	%	83 - 94.5 (1.2Vout to 5Vout)
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	6
Load Regulation	mV	5
Preload	-	none
Output Ripple and Noise	mVpp	30
Overcurrent Protection	A	Hiccup Type
Remote On / Off	-	yes
Remote Sense	-	yes
Power Good Signal	-	yes
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)
Weight	g / oz	5.5g / 0.194
Size (LxWxH)	mm / in.	20.32 x 11.43 x 8.5 / 0.80 x 0.45 x 0.335
Warranty	yrs	3 years

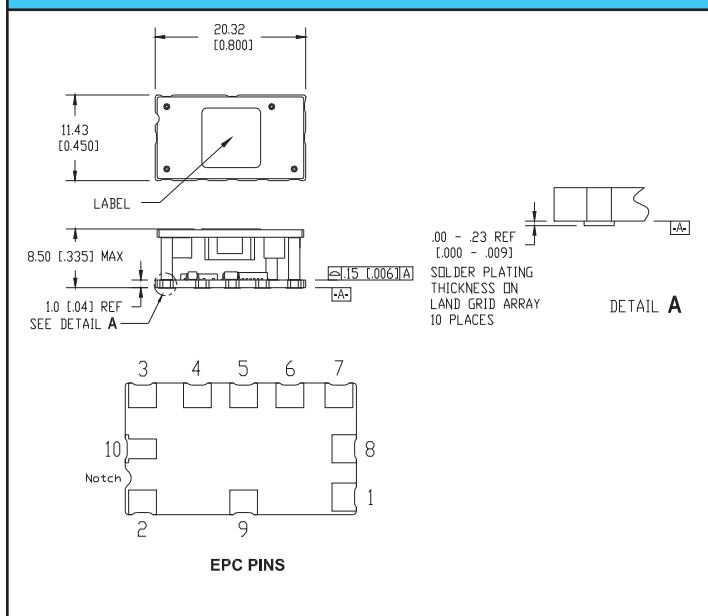
*See website for detailed specifications

Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iBF12012A007V-003-R	4.5 -14	12	0.70 - 5.5	-	yes	-	yes*

*For LGA solder bumping specify -007-R model suffix

Outline Drawing



Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	VOUT
2	VIN	7	SENSE (+)
3	Reserved	8	Reserved
4	GND	9	PWR GOOD
5	TRIM	10	Reserved

Other Industrial Products

CC-E	1.5-30W 3.3 to 30V DC-DC Converters
PX	10-60W 12, 24, 48V DC-DC Converters
PAH, PAF	100-700W Half and Full Bricks

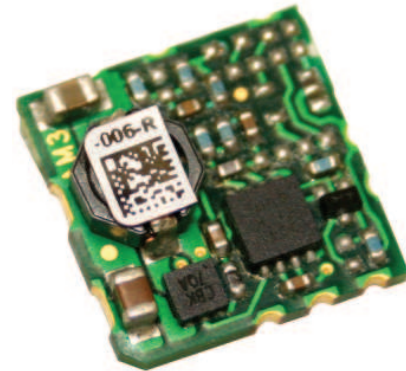
For Additional Information, please visit
us.tdk-lambda.com/lp/products/ibf-series.htm



3A Non-isolated SMT Point Of Load

Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
 - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



Key Market Segments & Applications



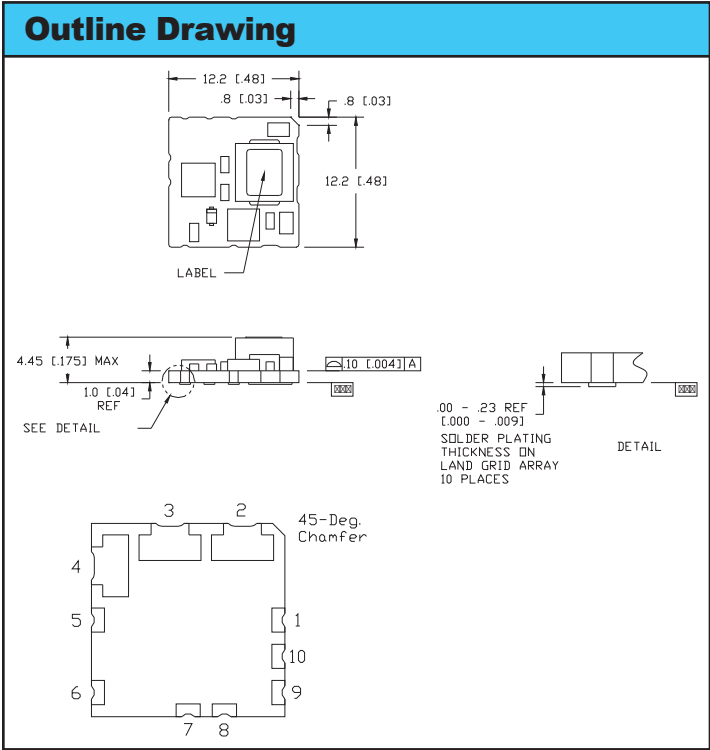
Specifications

Model		iCF
DC Output Voltage	V	0.7 - 5.5
DC Input Voltage	V	4.5 - 14
Efficiency	%	85 - 93.5 (1.2Vout to 5Vout)
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	3
Load Regulation	mV	6
Preload	-	none
Output Ripple and Noise	mVpp	15
Overcurrent Protection	A	Hiccup Type
Remote On / Off	-	yes
Remote Sense	-	yes
Power Good Signal	-	yes
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)
Weight	g / oz	1.5g / 0.053
Size (LxWxH)	mm / in.	12.2 x 12.2 x 4.45 / 0.48 x 0.48 x 0.175
Warranty	yrs	3 years

*See website for detailed specifications

Model Selector							
Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iCF12003A007V-003-R	4.5 -14	3	0.70 - 5.5	-	yes	-	yes*

*For LGA solder bumping specify -007-R model suffix



Pinout			
PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	GND
3	GND	8	no connection
4	VOUT	9	no connection
5	SENSE	10	PWR GOOD

Other Industrial Products	
CC-E	1.5-30W 3.3 to 30V DC-DC Converters
PX	10-60W 12, 24, 48V DC-DC Converters
PAH, PAF	100-700W Half and Full Bricks

For Additional Information, please visit us.tdk-lambda.com/lp/products/icf-series.htm



6A Non-isolated SMT Point Of Load

Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
 - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response

Key Market Segments & Applications



Specifications		
Model		iCG
DC Output Voltage	V	0.70 - 5.5
DC Input Voltage	V	4.5 - 14
Efficiency	%	84 - 94 (1.2Vout to 5Vout)
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	3
Load Regulation	mV	6
Preload	-	none
Output Ripple and Noise	mVpp	15
Overcurrent Protection	A	Hiccup Type
Remote On / Off	-	yes
Remote Sense	-	yes
Power Good Signal	-	yes
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)
Weight	g / oz	3g / 0.106
Size (LxWxH)	mm / in.	12.2 x 12.2 x 8.5 / 0.48 x 0.48 x 0.335
Warranty	yrs	3 years

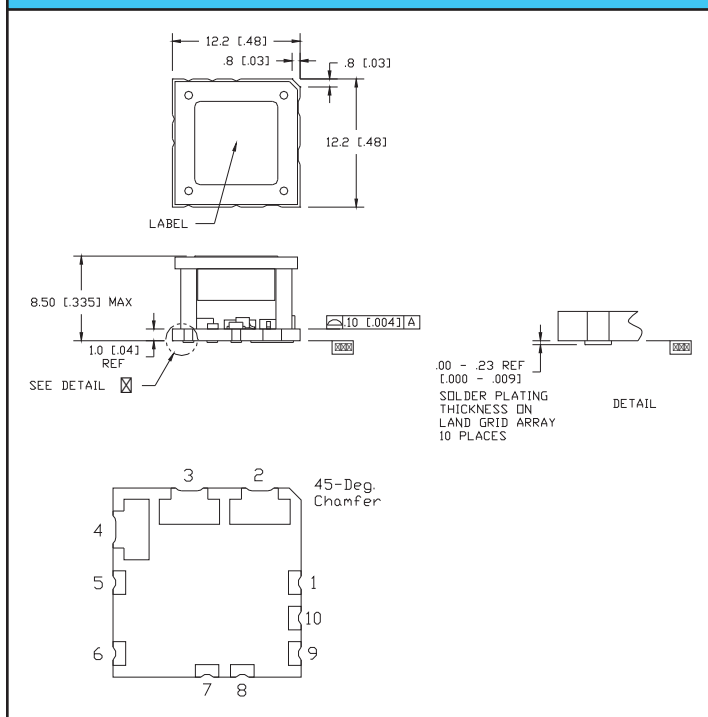
*See website for detailed specifications

Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iCG12006A007V-003-R	4.5 -14	6	0.70 - 5.5	-	yes	-	yes*

*For LGA solder bumping specify -007-R model suffix

Outline Drawing



Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	GND
3	GND	8	no connection
4	VOUT	9	reserved
5	SENSE	10	PWR GOOD

Other Industrial Products

CC-E	1.5-30W 3.3 to 30V DC-DC Converters
PX	10-60W 12, 24, 48V DC-DC Converters
PAH, PAF	100-700W Half and Full Bricks

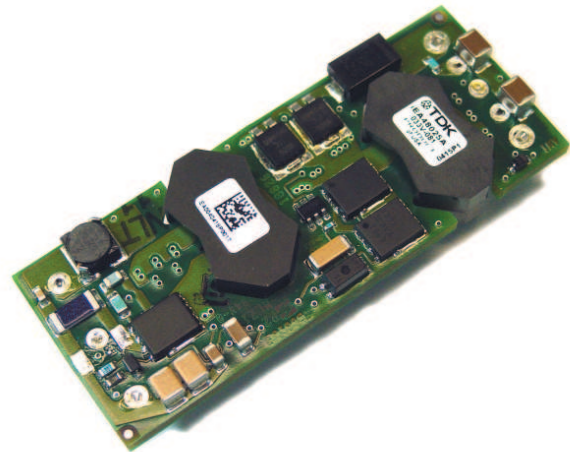
For Additional Information, please visit
us.tdk-lambda.com/lp/products/icg-series.htm



66 - 78W Eighth Brick DC-DC Converters

Features

- ◆ Standard Eighth Brick Footprint
- ◆ 36-75VDC Input
- ◆ 3.3V 20A - 28V 2.67A Nominal Output
- ◆ Through Hole Mounting
- ◆ Low 8.8mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 91%)
- ◆ Constant switching frequency
- ◆ Open frame design



Key Market Segments & Applications



Specifications							
Model							
Nominal Output Voltage	VDC	3.3	5	12	15	18	28
Input Voltage Range	VDC	36 - 75					
Input Current (max)	A	4.5					
Output Voltage Tolerance	VDC	3.20 - 3.40	4.85 - 5.15	11.58 - 12.42	14.47 - 15.52	17.28 - 18.72	26.88 - 29.12
Ripple & Noise (max) (pk-pk) (1)	mV	100	125	200	150	200	250
Line Regulation (max)	mV	7	10	24	35	45	70
Load Regulation (max)	mV	8	10	24	35	45	70
Overload Protection (typ)	A	29	20	8.5	6	4.4	4
Overvoltage Protection	VDC	3.75 - 4.4	5.7 - 6.7	13.6 - 15.7	16.8 - 22.0	20.0 - 26.0	32.0 - 38.0
Remote Sense	-	Yes					
Remote On / Off	-	Positive or Negative Logic, see Model Selector					
Temperature (operating)	°C	-40 to 125					
Temperature (storage)	°C	-55 to 125					
Humidity (operating)	-	20 - 95% RH Non condensing					
Humidity (storage)	-	10 - 95% RH Non condensing					
Cooling	-	Convection or forced air					
Isolation Voltage	VDC	1500					
Vibration (non operating)	-	5~50Hz@0.5g (4.9m/s ²), & 50~500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4					
Shock	-	196.1m/s ²					
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)					
Weight (max)	g	30.4					
Size	mm	58.4 x 22.9 x 8.8					
Warranty	yrs	3 Years					

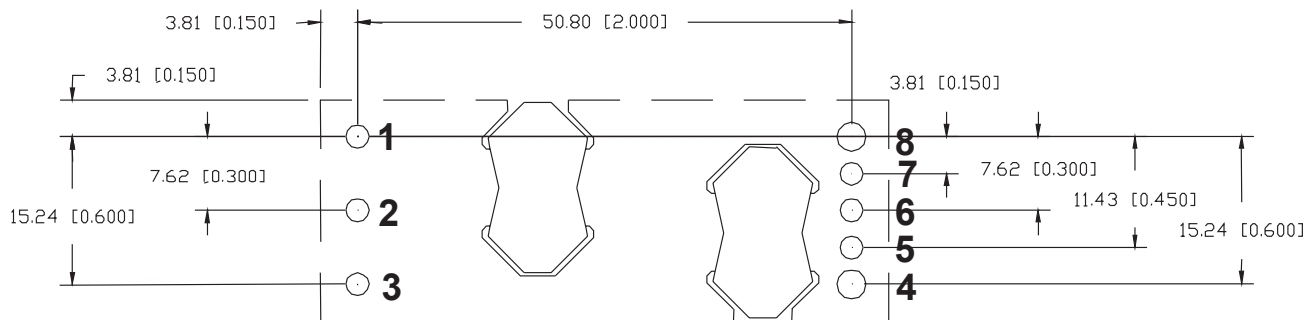
Notes: See website for detailed specifications

(1) Measured across one 1.0 μ F ceramic capacitor and one 10 μ F tantalum capacitor; BW = 20MHz

Model Selector

Model	Voltage Output (V)	Voltage Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off
iEA48020A033V-000-R	3.3	2.97 - 3.63	20	66	90	X	
iEA48020A033V-001-R	3.3	2.97 - 3.63	20	66	90		X
iEA48015A050V-000-R	5	4.5 - 5.5	15	75	90	X	
iEA48015A050V-001-R	5	4.5 - 5.5	15	75	90		X
iEA48007A120V-000-R	12	10.8 - 13.2	7	78	91	X	
iEA48007A120V-001-R	12	10.8 - 13.2	7	78	91		X
iEA48005A150V-001-R	15	13.5 - 16.5	4.5	67.5	90		X
iEA48004A180V-001-R	18	16.2 - 19.8	3.75	67.5	90.5		X
iEA48003A280V-001-R	28	19.6 - 30.8	2.67	75	90		X

Recommended Footprint (Top View)



Other DC-DC Products

CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iPB	15-35W, 1.5-5V Output, 36-75VDC Input, Pico Brick
iSA	30-78W, 1.2-12V Output, 36-75VDC Input, Sixteenth Bricks
PAE50/100	36-100W, 1.9-5V Output, 36-75VDC Input, Eighth Brick DC-DC
iEB	150W, 12V Output, 42-56V Input, Eighth Brick Intermediate Bus DC-DC
iQD	300W, 12V Output, 42-53VDC Input, Quarter Brick Intermediate Bus DC-DC
iQB	30-300W, 1.2-12V Output, 24 to 48VDC Input, Quarter Brick DC-DC
PAH300/450	300-450W, 12 to 28V Output, 36-75VDC Input, Half Brick DC-DC
PAF	400-700W, 1.8 to 48V output, 24 to 400VDC Input, Full Brick DC-DC
FPS	1kW to 3kW, 24 to 48V Output, AC-DC Front Ends
iAA, iBC, iAD	Non Isolated DC-DC Converters

Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iea-series.htm



50 - 300W, 48V Input Half Brick Converter

Features

- ◆ Standard Half Brick Footprint
- ◆ 36 -75VDC Input
- ◆ 3.3V 30A - 5V 60A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 92.5%)
- ◆ Constant switching frequency
- ◆ Low component count



Key Market Segments & Applications



Specifications					
Model		iHG48030A033V-002-R	iHG48070A033V-001-R	iHG48010A050V-002-R	iHG48060A050V-002-R
Nominal Output Voltage	VDC	3.3	3.3	5	5
Input Voltage Range	VDC	36 - 75			
Efficiency	%	92.5	90	89	91
Ripple & Noise (max)(pk-pk) (1)	mV	50	50	60	60
Line Regulation (max)	mV	10	10	10	12
Load Regulation (max)	mV	10	10	10	12
Overload Protection Threshold (3)	A	38	82	13.8	70
Overvoltage Protection (2)	VDC	4.1	4.1	6.1	6.1
Overtemperature Protection (3)	-	Yes			
Remote Sense	-	Yes			
Remote On-Off	-	Positive or Negative Logic Available, see Model Selector			
Temperature (operating)	°C	-40 to 115	-40 to 123	-40 to 125	-40 to 125
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20 to 95% (non-condensing)			
Humidity (storage)	-	10 to 95% (non-condensing)			
Cooling	-	Convection or Forced Air			
Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s ²), and 50 to 500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	50 G at 6ms pulse in three axes			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)			
Weight (max)	g	63			
Size	mm	59.94 x 56.90 x 11.68			
Warranty	yrs	3 years			

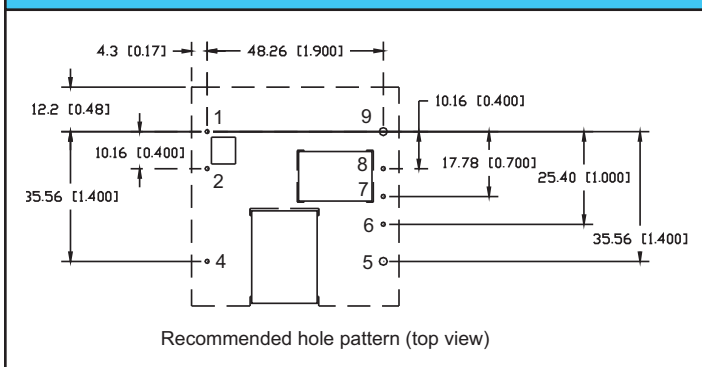
Notes:

- (1) Measured across one 10uf, one 0.47uf, one 0.1uf ceramic capacitors, and one 220uf electrolytic capacitor. BW = 20MHz.
- (2) Latching
- (3) Non-latching

Model Selector

Model	Input Volt. (V)	Output Volt. (V)	Adjust Range (V)	Max. Current (A)	Max. Output Power (W)	On/Off Logic	Pin Length
iHG48030A033V-002-R	36 - 75	3.3	1.65 - 3.63	30	99	P	0.145
iHG48070A033V-001-R	36 - 75	3.3	1.65 - 3.63	70	231	N	0.145
iHG48010A050V-002-R	36 - 75	5	2.5 - 5.5	10	50	P	0.145
iHG48060A050V-002-R	36 - 75	5	2.5 - 5.5	60	300	P	0.145

Outline Drawing



PIN Assignments

PIN	Function	PIN	Function
1	Vin (+)	6	Sense (-)
2	On / Off	7	Trim
3	N / A	8	Sense (+)
4	Vin (-)	9	Vout (+)
5	Vout (-)		

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iHG-series.htm



Other DC-DC Products

CC-E	1.5 - 25W, 1 - 2 Outputs, 5 - 48VDC Input
PX	10 - 40W, 1 - 3 Outputs, 12 - 48VDC Input
iPB	15 - 35W, 1.5 - 5V Output, 36 - 75VDC Input, Pico Brick
iSA	30 - 78W, 1.2 - 12V Output, 36 - 75VDC Input, Sixteenth Brick
iEA	30 - 78W, 1.2 - 28V Output, 36 - 75VDC Input, Eighth Brick
PAE50/100	36 - 100W, 1.9 - 5V Output, 36 - 75VDC Input, Eighth Brick
iEB	150W, 12V Output, 42 - 56VDC Input, Eighth Brick Intermediate Bus
iQD	300W, 12V Output, 42 - 53VDC Input, Quarter Brick Intermediate Bus
iQL	150 - 300W, 2.5 - 12V Output, 36 - 75VDC Input, Quarter Brick
iQE	96 - 204W, 3.3 - 15V Output, 18 - 75VDC Input, Quarter Brick
PAH	300 - 450W, 12 - 28V Output, 36 - 75VDC Input, Half Brick
PAF	400 - 700W, 1.8 - 48V Output, 36 - 75VDC Input, Full Brick
iA, iB	Non Isolated
FPS	1kW - 3kW, 12 - 48VDC Output, AC - DC Front Ends
PFE	300 - 1000W, 12 - 48VDC Output, AC - DC Front End Brick

33 - 150W Quarter Brick Converter

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 3.3V 10A, 12V 12.5A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 8.81mm Profile
- ◆ 1500VDC Basic Isolation



Key Market Segments & Applications



Specifications					
Model		iQB			
Nominal Output Voltage	VDC	3.3	3.3	5	12
Input Voltage Range	VDC	18-36		36 - 75	
Input Current (max)	A	4.25	4.25	4	6.5
Output Voltage Tolerance	VDC	3.20 - 3.40	3.20 - 3.40	4.85 - 5.15	11.58 - 12.42
Ripple & Noise (max) (pk-pk) (1)	mV	100	100	125	250
Line Regulation (max)	mV	5	5	10	24
Load Regulation (max)	mV	7	7	10	24
Overload Protection (typ)	A	21	32	23	15
Overvoltage Protection	VDC	3.75 - 4.4	3.75 - 4.4	5.7 - 6.7	13.6 - 16
Remote Sense	-	Yes			
Remote On / Off	-	Positive or Negative Logic, see Model Selector			
Temperature (operating)	°C	-40 to 115°C	-40 to 120°C	-40 to 120°C	-40 to 115°C
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20 - 95% RH Non condensing			
Humidity (storage)	-	10 - 95% RH Non condensing			
Cooling	-	Convection or forced air			
Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s ²			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)			
Weight (max)	g	39			
Size	mm	57.9 x 36.8 x 8.81 (10.11 for 12V 8.3A model)			
Warranty	-	3 Years			

Notes: See website for detailed specifications

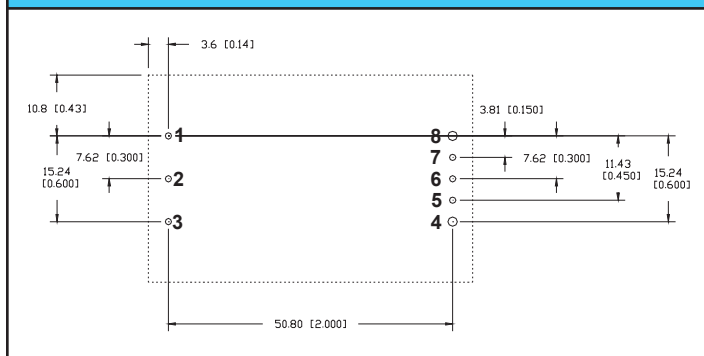
- (1) Measured across one 1μF ceramic capacitor and one 10μF Tan capacitor;
BW = 20MHz

Model Selector

Model	Output Voltage (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off	OVP Latching	Pin Length
iQB48010A033V-005-R	3.3	10	33	90		X		0.200
iQB48010A033V-011-R	3.3	10	33	90		X	X	0.145
iQB24015A033V-000-R*	3.3	15	49.5	89	X			0.145
iQB48020A033V-011-R	3.3	20	66	89		X	X	0.145
iQB48025A033V-001-R	3.3	25	82.5	88		X		0.145
iQB48015A050V-005-R	5	15	75	90		X		0.200
iQB48015A050V-011-R	5	15	75	90		X	X	0.145
iQB48008A120V-000-R	12	8	96	90	X			0.145
iQB48008A120V-001-R	12	8	96	90		X		0.145
iQB48012A120V-001-R	12	12.5	150	92		X		0.145

*24V Nominal Input

Recommended Footprint (Top View)



Pinout

PIN	Function	PIN	Function
1	Vin (+)	2	On / Off
3	Vin (-)	4	Vout (-)
5	Sense (-)	6	Trim
7	Sense (+)	8	Vout (+)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iqb-series.htm



Other DC-DC Products

CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iSA	30-78W, 1.2-12V Output, 36-75VDC Input, Sixteenth Bricks
iEA	30-78W, 1.2-28V Output, 36-75VDC Input, Eighth Brick DC-DC
PAE50/100	36-100W, 1.9-5V Output, 36-75VDC Input, Eighth Brick DC-DC
iQD	300W, 12V Output, 42-53VDC Input, Quarter Brick Intermediate Bus DC-DC
PAH300/450	300-450W, 12 to 28V Output, 36-75VDC Input, Half Brick DC-DC
PAF	400-700W, 1.8 to 48V output, 24 to 400VDC Input, Full Brick DC-DC
FPS, HFE	1kW to 2.5kW, 12 to 48V Output, AC-DC Front Ends
iAA, iAD, iBC	Non Isolated DC-DC Converters
iCF, iCG, iBF, iAF	Non Isolated DC-DC Converters (DOSA 2)

96 - 204W Quarter Brick Converter

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 3.3V 40A - 15V 10A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 10.41mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (>90%)
- ◆ Constant switching frequency
- ◆ Low component count



Key Market Segments & Applications



Specifications					
Model					
Nominal Output Voltage	VDC	3.3	5	12	15
Input Voltage Range	VDC	See Model Selector			
Input Current (max)	A	10			
Efficiency	-	Typically 90% at full load			
Output Voltage Tolerance	VDC	3.2 - 3.4	4.85 - 5.15	11.58 - 12.42	14.48 - 15.52
Ripple & Noise (max)(pk to pk) (1)	mV	150	150	150	150
Line Regulation (max)	mV	10	15	30	30
Load Regulation (max)	mV	10	30	30	30
Overload Protection (typ)	%	Inception- 133-158% of rated output; Short circuit - auto recovery			
Overvoltage Protection	VDC	3.8 - 4.6	5.7 - 6.7	13.6 - 16.5	16.7 - 21
Remote Sense	-	Yes			
Remote On / Off	-	Positive or Negative Logic available, see Model Selector			
Temperature (operating)	°C	-40 to 125			
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Convection or forced air			
Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s ²			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)			
Weight (max)	g	50			
Size	mm	57.9 x 36.8 x 10.41			
Warranty	-	3 Years			

Notes: See website for detailed specifications

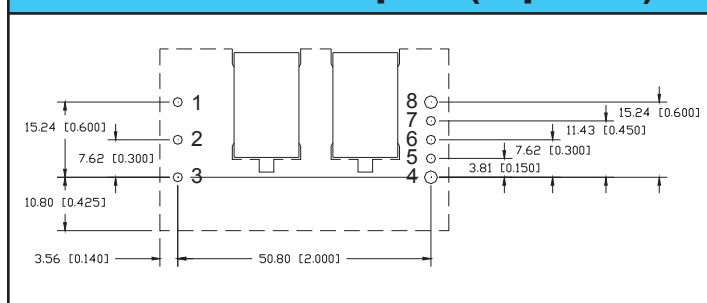
- (1) Measured across one 22μF and one 0.1μF ceramic capacitor;
BW = 20MHz

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length
iQE48040A033V-001-R	36 - 75	3.3	2.97 - 3.63	40	132	Neg	0.145
iQE24024A050V-001-R	18 - 36	5	4.5 - 5.5	24	120	Neg	0.145
iQE48030A050V-001-R	36 - 75	5	4.5 - 5.5	30	150	Neg	0.145
iQE24009A120V-001-R	18 - 36	12	10.8 - 13.2	9	108	Neg	0.145
iQE4W011A120V-001-R	18 - 60	12	10.8 - 13.2	11	132	Neg	0.145
iQE48017A120V-001-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.145
iQE48010A150V-007-R	36 - 75	15	13.5 - 16.5	10	150	Neg	0.180

Other models available for volume opportunities. Contact factory.

Recommended Footprint (Top View)



Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iqe-series.htm



300W Quarter Brick Converter

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 36-75VDC Input
- ◆ 12V 25A Output
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile (13.21mm with baseplate)
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 95%)
- ◆ Constant 115kHz switching frequency
- ◆ Starts with pre-biased output
- ◆ Baseplate cooled



Key Market Segments & Applications



Specifications

Model		iQG
Nominal Output Voltage	VDC	12V
Input Voltage Range	VDC	36 - 75VDC
Input Current (max)	A	9A
Efficiency	%	67% loading: 95%, 100% loading: 94% - 48V Input
Output Voltage Tolerance	VDC	11.1 - 12.1V
Ripple & Noise (max) (pk - pk)	mV	70mV
Line Regulation (max)	mV	50mV
Load Regulation (typical)	mV	50mV (10 - 100% load)
Overload Protection	A	Inception- 30A; Short circuit - auto recovery
Overvoltage Protection	VDC	13.7 - 15.6V (Latching)
Remote Sense	-	None
Remote On / Off	-	Negative Logic standard. Positive logic available, contact factory
Temperature (operating)	°C	-40 to 125 (See detailed datasheet for derating)
Temperature (storage)	°C	-55 to 125
Humidity (operating)	%RH	20-95% RH Non condensing
Humidity (storage)	%RH	10-95% RH Non condensing
Cooling	-	Conduction, convection or forced air (See detailed datasheet for derating)
Isolation Voltage	VDC	1500VDC Input to Output, Input to Baseplate
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s ²), and 50 to 500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4
Shock	-	196.1m/s ²
Safety Agency Certifications	-	UL60950-1 (US and Canada), VDE0805 (IEC60950-1), CB scheme (IEC60950-1)
Weight (max)	g	55g open frame, 70g with baseplate
Size (LxWxH)	mm	58.91 x 36.83 x 13.21 (Baseplate version)
Warranty	-	3 Years

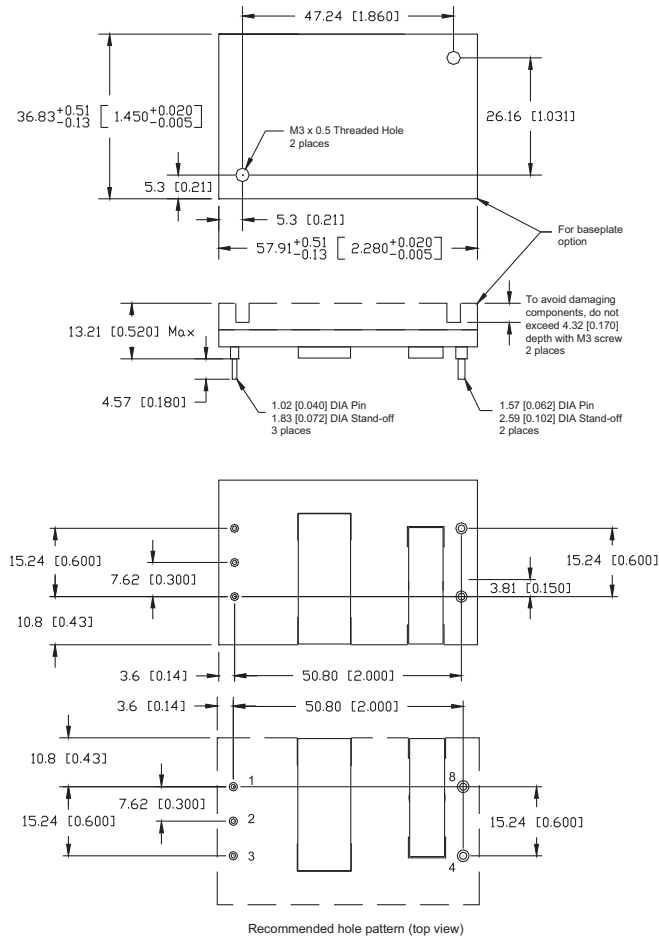
Note: See website for detailed specifications and test methods

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length	Base Plate
iQG48025A120V-101-R	36 - 75	12	25	300	Neg	0.145"	Yes
iQG48025A120V-109-R	36 - 75	12	25	300	Neg	0.180"	Yes

Recommended Footprint (Top View)

Dimensions are in mm [in]. Unless otherwise specified tolerances are: x.x ± 0.5 [0.2], x.xx and x.xxx ± 0.25 [0.010]



Pinout

PIN	Function	PIN	Function
1	Vin (+)	5	None
2	On / Off	6	None
3	Vin (-)	7	None
4	Vout (-)	8	Vout (+)

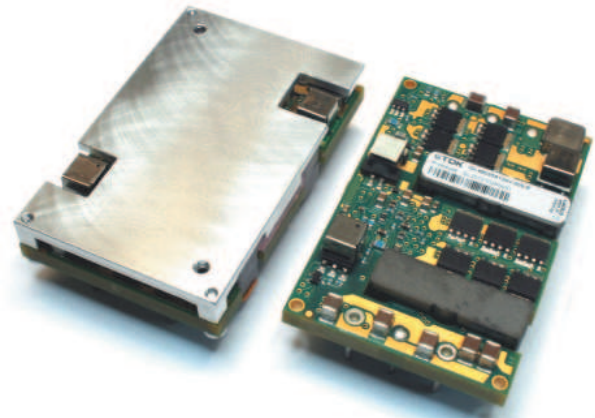
For Additional Information, please visit
us.tdk-lambda.com/lp/products/iqg-series.htm



72-308W Quarter Brick Converter

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 2.5V 60A, 28V 11A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ Baseplate cooling
- ◆ High operating efficiency (up to 93.5%)
- ◆ Constant switching frequency



Key Market Segments & Applications



Specifications

Model		IQL					
Nominal Output Voltage	VDC	2.5	3.3	5	8.3	12	28
Input Voltage Range	VDC	See Model Selector					
Ripple & Noise (max)(pk-pk) (1)	mV	30	100	80	100	120	500
Line Regulation (max)	mV	5	6.6	10	30	60	100
Load Regulation (max)	mV	5	15	10	40	60	100
Overload Protection Threshold (3)	A	69	70	50	34	27.5	12.4
Overvoltage Protection (Typ) (2)	VDC	3.1	4.1	6.1	10	14.7	33.6
Overtemperature Protection (3)	-	Yes					
Remote Sense	-	Yes	Yes	Yes	No	No	No
Remote On / Off	-	Negative Logic					
Temperature (operating)	°C	-40 to 115	-40 to 115	-40 to 125	-40 to 119	-40 to 118	-40 to 115
Temperature (storage)	°C	-55 to 125					
Humidity (operating)	-	20 to 95% (non-condensing)					
Humidity (storage)	-	10 to 95% (non-condensing)					
Cooling	-	Conduction, convection, or forced air					
Isolation Voltage	VDC	1500 Input - Output, 1500 Input - Baseplate					
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s ²), and 50 to 500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4					
Shock	-	50 G at 6 ms pulse in three axes					
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)					
Weight (max)	g	55g open frame, 70g with base plate					
Size	mm	57.9 x 36.8 x 13.21					
Warranty	yrs	3 Years					

(1) Measured across one 0.1mF, one 1.0mF, one 47mF ceramic capacitor, and one 440mF electrolytic capacitor located 2 inches away. BW = 20MHz.

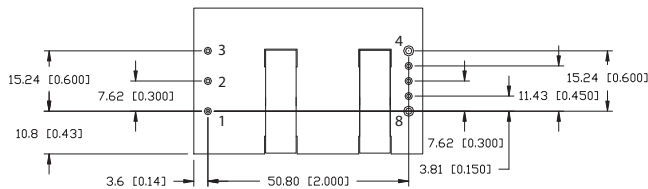
(2) Latching

(3) Non-latching

Model Selector

Input Model	Output Voltage (V)	Adjust Voltage (V)	Max. Range (V)	Max. Output Curr. (A)	Base Power (W)	Efficiency at Plate	Pin Full Load (%)	Length (in)
QL48060A025V-0B9-R	36 - 75	2.5	2.0 - 2.75	60	150.0	No	89.0	0.180
iQL24050A033V-009-R	18 - 36	3.3	2.64 - 3.63	50	165.0	Yes	90.5	0.180
iQL48025A033V-003-R	36 - 75	3.3	2.64 - 3.63	25	82.5	Yes	91.0	0.180
iQL48060A033V-009-R	36 - 75	3.3	2.64 - 3.63	60	198.0	Yes	91.0	0.180
iQL48060A033V-0B9-R	36 - 75	3.3	2.64 - 3.63	60	198.0	No	91.0	0.180
iQL24040A050V-009-R	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.180
iQL48045A050V-009-R	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.180
iQL48045A050V-0B9-R	36 - 75	5.0	4.0 - 5.5	45	225.0	No	91.0	0.180
iQL24024A083V-009-R	18 - 36	8.3	6.64 - 9.13	24	199.2	Yes	89.0	0.180
iQL48030A083V-009-R	36 - 75	8.3	6.64 - 9.13	30	249.0	Yes	90.5	0.180
iQL48025A120V-009-R	36 - 75	12.0	9.6 - 13.2	25	300.0	Yes	93.5	0.180
iQL48025A120V-0B9-R	36 - 75	12.0	9.6 - 13.2	25	300.0	No	93.5	0.180
iQL48011A280V-009-R	36 - 75	28.0	27.4 - 28.6	11	308.0	Yes	92.5	0.180

Recommended Footprint (Bottom View)



Pinout

PIN	Function	PIN	Function
1	Vin (+)	5	Sense (-)(if applicable)
2	On / Off	6	Trim
3	Vin (-)	7	Sense (+)(if applicable)
4	Vo (-)	8	Vo (+)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iql-series.htm



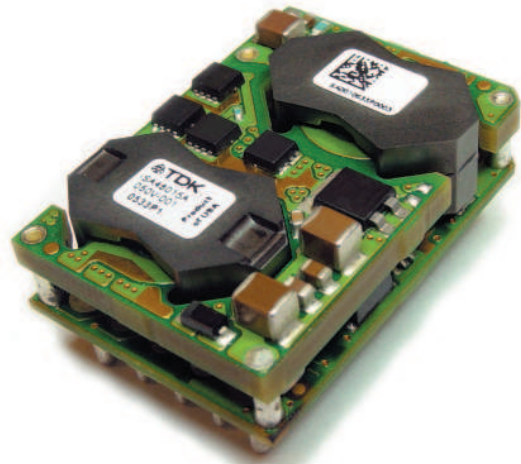
Other DC-DC Products

CC-E	1.5 - 25W, 1 - 2 Outputs, 5-48VDC Input
PX	10 - 40W, 1 - 3 Outputs, 12 to 48VDC Input
iPB	15 - 35W, 1.5 - 5V Output, 36 - 75VDC Input, Pico Brick
iSA	30 - 78W, 1.2 - 12V Output, 36 - 75VDC Input, Sixteenth Brick
iEA	30 - 78W, 1.2 - 28V Output, 36 - 75VDC Input, Eighth Brick
PAE50/100	36 - 100W, 1.9 - 5V Output, 36 - 75VDC Input, Eighth Brick
iEB	150W, 12V Output, 42 - 56VDC Input, Eighth Brick Intermediate Bus
iQD	300W, 12V Output, 42 - 53VDC Input, Quarter Brick Intermediate Bus
PAH	300 - 450W, 12 - 28V Output, 36 - 75VDC Input, Half Brick
PAF	400 - 700W, 1.8 - 48V Output, 24 - 400VDC Input, Full Brick
iA,iB	Non Isolated
FPS	1kW - 3kW, 12 - 48VDC Output, AC-DC Front Ends
PFE	300 - 1000W, 12 - 48VDC Output, AC - DC Front End Brick

75 - 84W Sixteenth Brick Converter

Features

- ◆ Standard Sixteenth Brick Footprint (DOSA)
- ◆ 36 - 75VDC Input
- ◆ 3.3V 25A - 12V 6.5A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 90%)
- ◆ Constant switching frequency
- ◆ 44% smaller than eighth bricks



Key Market Segments & Applications



Specifications

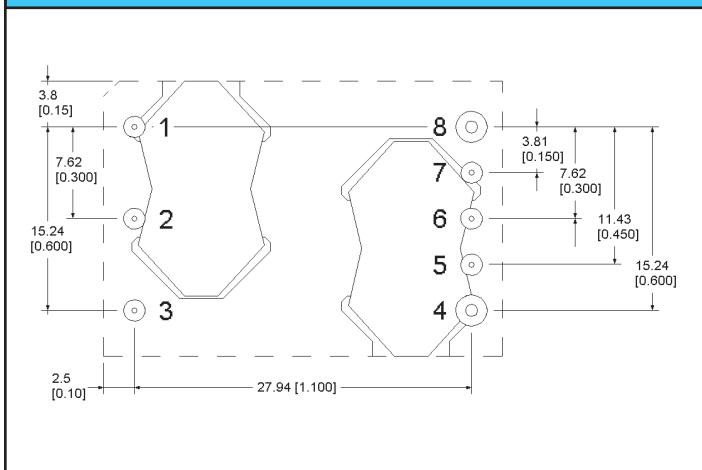
Model		iSA480			
Nominal Output Voltage	VDC	3.3	5	12	
Input Voltage Range	VDC	36 to 75			
Input Current (max)	A	4			
Output Voltage Tolerance	VDC	3.20-3.40	4.85-5.15	11.58-12.42	
Ripple & Noise (max)(pk to pk)	mV	100		200	
Line Regulation (max)	mV	7	10	24	
Load Regulation (max)	mV	8	10	24	
Overload Protection	%	Inception- 130-147% of rated output; Short circuit auto recovery			
Overvoltage Protection	VDC	3.75-4.65	5.7-6.7	13.6-15.7	
Remote Sense	-	Yes			
Remote On / Off	-	Negative Logic			
Temperature (operating)	°C	-40 to 125			
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Convection or forced air			
I/O Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s ²			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)			
Weight (max)	g	30.4			
Size	mm	33 x 22.9 x 12.7			
Warranty	-	3 Years			

Notes: See website for detailed specifications

Model Selector

Model	Output Voltage (V)	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Neg. Logic On/Off	0.145 Pin Length
iSA48025A033V-001-R	3.3	2.97 to 3.63	25	82.5	88	X	X
iSA48015A050V-001-R	5	4.5 to 5.5	15	75	90	X	X
iSA48007A120V-001-R	12	10.8 to 13.2	6.5	78	90	X	X

Recommended Footprint (Top View)



Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/isa-series.htm



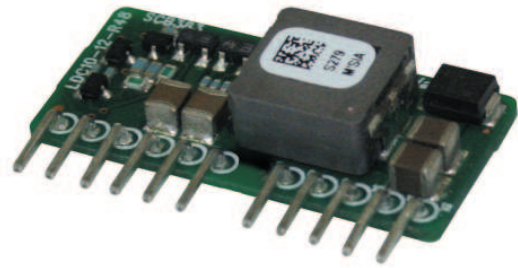
Other DC-DC Products

CC-E	1.5-12W, 1 to 2 Outputs, 5 to 48VDC Input
PX	10-40W, 1 to 3 Outputs, 12 to 48VDC Input
iEA	30-78W, 1.2-28V Output, 36-75VDC Input, Eighth Brick DC-DC
PAE50/100	36-100W, 1.9-5V Output, 36-75VDC Input, Eighth Brick DC-DC
iQB	30-300W, 1.2-12V Output, 24 to 48VDC Input, Quarter Brick DC-DC
PAH300/450	300-450W, 12 to 28V Output, 36-75VDC Input, Half Brick DC-DC
PAF	400-700W, 1.8 to 48V output, 24 to 400VDC Input, Full Brick DC-DC
FPS, HFE	1kW to 2.5kW, 12 to 48V Output, AC-DC Front Ends
iAA, iAD, iBC	Non Isolated DC-DC Converters
iAF, iBF, iCF, iCG	DOSA2 Non-Isolated DC-DC Converters

10W Programmable DC Input LED Driver

Features

- ◆ 0 - 480mA current programming range
- ◆ PWM or Logic programming / dimming
- ◆ Wide 4.5 to 20VDC input range
- ◆ Non Isolated
- ◆ Wide temperature range



Key Market Segments & Applications



Specifications

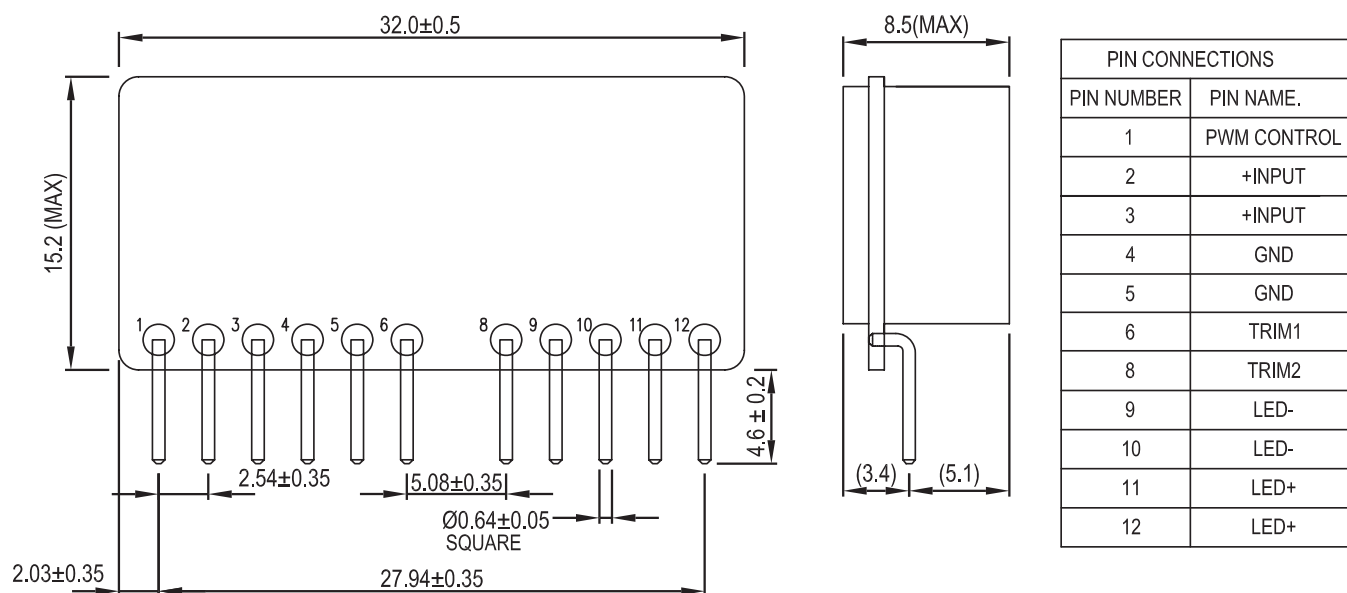
Model		LEDC10-12-R48
DC Input	VDC	4.5 - 20V, nominal 12V
Input Current (Nominal Input Volt.)	mA	920mA full load, 7mA off load
Temperature Coefficient	-	<0.02%/°C
Ripple and Noise	mV	150mV (peak to peak)
Overcurrent Protection	-	Yes, indefinite. Auto recovery
Overvoltage Protection	VDC	26 - 30V (clamp)
Turn on time	ms	< 100ms
Output current rise and fall times	us	3us
Maximum capacitive load	nF	100nF
Efficiency	%	87% typical at full load, nominal input
Operating Temperature	-	-40 to +85°C (Full load)
Storage Temperature	°C	-40 to +125°C
Operating Humidity (1)	-	5 - 95% RH
Storage Humidity (1)	-	5 - 95% RH
Cooling	-	Convection
Input to Output Isolation	-	None
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 30 mins
Shock (In shipping package)	-	< 196.1 m/s ² (20G)
Weight (Typ)	g	6
Size (LxWxH)	in(mm)	1.26 x 0.33 x 0.6" (32 x 8.5 x 15.2mm)
Warranty	yrs	Three Years

(1) Non condensing

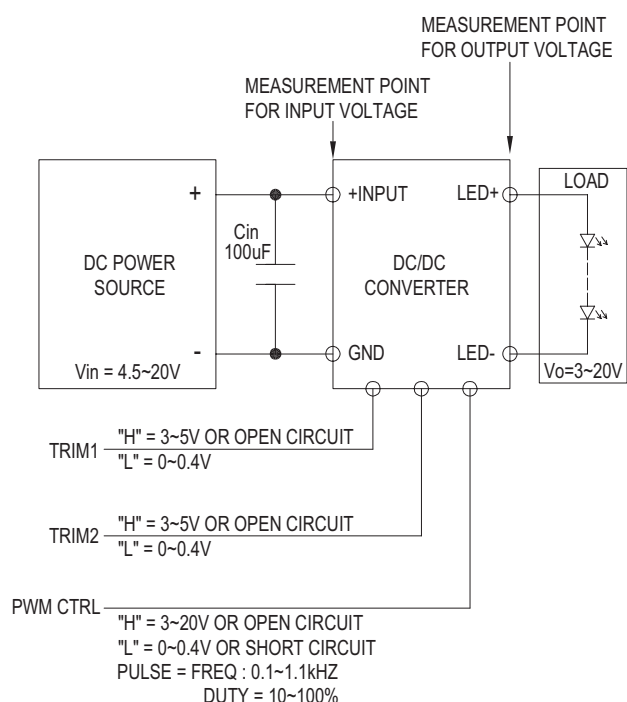
Model Selector

Model	CV/CC	Output Voltage (V)	Input Voltage (V)	Output Accuracy	Output Current (A)	Maximum Output Power (W)
LEDC10-12-R48	CC	3 - 20VDC	4.5 - 9VDC	±5% (±10% for 50mA programming)	0.35A	7W
			9 - 20VDC		0.48A	9.6W

Outline Drawing



Basic Connection



Output Current Setting

Logic			
	Output current	Trim 1 logic level	Trim 2 logic level
	50mA	0	0
	150mA	0	1
	350mA	1	0
	480mA	1	1

Logic "0" = 0 - 0.4V
Logic "1" = 3 - 5V or open

PWM Control

Duty cycle	10 - 100%
Frequency	0.1 - 1.1kHz
“On” voltage range	3 - 20V or open
“Off” voltage range	0 - 0.4V or short to GND

(Leave open if PWM is not used)

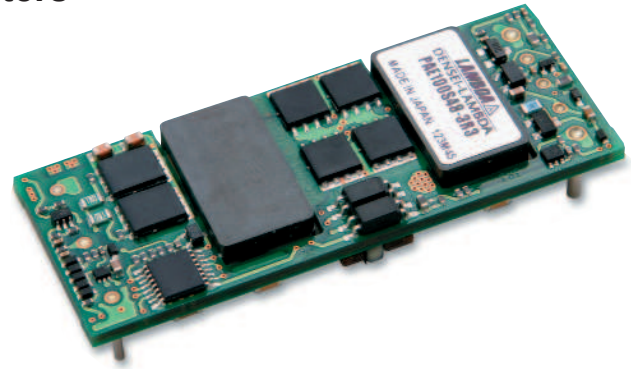
For Additional Information, please visit
us.tdk-lambda.com/lp/products/led10-series.htm



High Efficiency Eighth Brick DC-DC Converters

Features

- ◆ Industry Standard Package and Pin Out
- ◆ Output Currents up to 30 Amps
- ◆ Designed for Telecom Standards
- ◆ Output Voltage Adjustment
- ◆ Remote On / Off
- ◆ High Efficiency
- ◆ Same Pinout as Quarter Bricks
- ◆ Meets Basic Isolation



Key Market Segments & Applications



Specifications					
Model		PAE50S48-1R8 PAE100S48-1R8	PAE50S48-2R5 PAE100S48-2R5	PAE50S48-3R3 PAE100S48-3R3	PAE50S48-5 PAE100S48-5
Nominal Output Voltage		1.8	2.5	3.3	5
Input Voltage Range	VDC	36-76			
Output Voltage Accuracy	%	±1			
Max Ripple & Noise	mV	100			
Max Line Regulation	mV	10			
Max Load Regulation	mV	10			
Overcurrent Protection (1)	-	PAE50 models 105% - 150%, PAE100 models 105% - 140%			
Overvoltage Protection (max) (2)	-	115% - 135% 120%-140%			
Remote Sense	-	Yes			
Remote On / Off	-	Yes (open = off; short to 0V = on)			
Operating Temperature	-	-40°C to +85°C (See website for derating)			
Operating Humidity	-	5 - 95% RH (non-condensing)			
Storage Temperature	-	-40°C to +100°C			
Storage Humidity	-	5 - 95% RH (non-condensing)			
Cooling	-	Convection or Forced Air			
I/O Isolation Voltage	-	Input to Output 1500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute), Amplitude 0.825mm (49m/s² max) X, Y, Z 1 hour			
Shock	-	< 196.1 m/s²			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark			
Weight (Typ)	g	25			
Size (WxHxD)	mm	22.76 X 8.5 X 57.9 (See Outline Drawing)			
Warranty	yrs	Two Years			

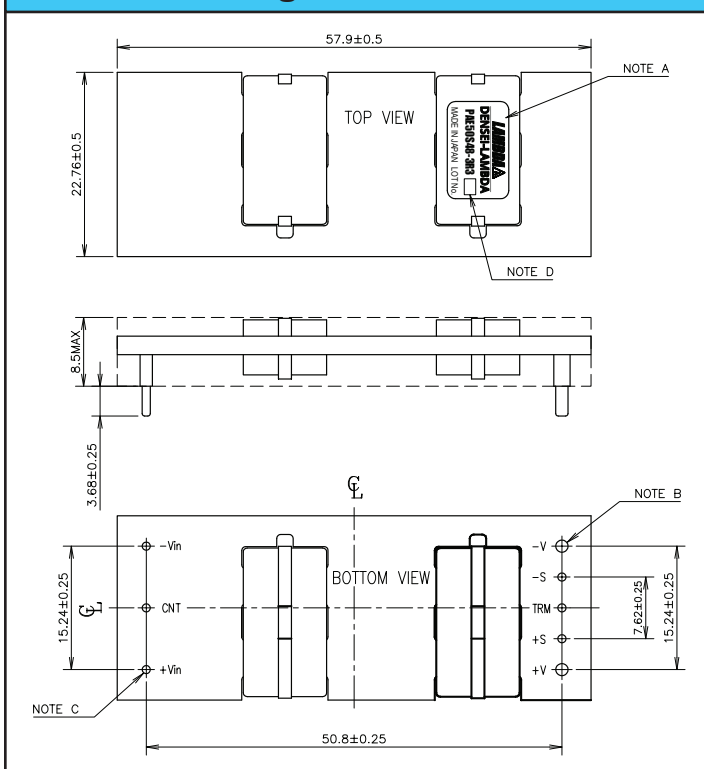
Notes:

- (1) Converter shut down, auto restart
 (2) Auto restart on /V models

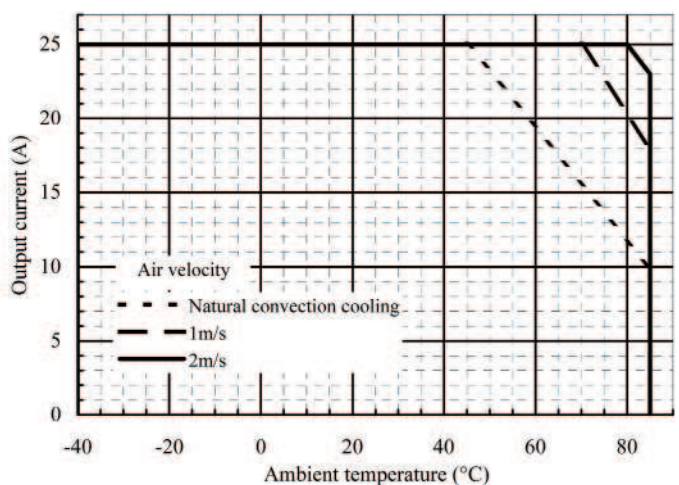
PAE Models

Models	Voltage (V)	Adjust Range	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Input Curr. (A)
PAE50S48-1R8/V	1.8	1.44 - 1.98	20	36.0	87	0.87
PAE100S48-1R8/V	1.8	1.44 - 1.98	30	54.0	87	1.30
PAE50S48-2R5/V	2.5	2.00 - 2.75	18	45.0	89	1.06
PAE100S48-2R5/V	2.5	2.00 - 2.75	25	62.5	89	1.47
PAE50S48-3R3/V	3.3	2.64 - 3.63	16	52.8	90	1.23
PAE100S48-3R3/V	3.3	2.64 - 3.63	25	82.5	90	1.91
PAE50S48-5/V	5.0	4.25 - 5.75	10	50.0	90	1.16
PAE100S48-5/V	5.0	4.25 - 5.75	20	100.0	90	2.32

Outline Drawing



Derating Curve



Other DC-DC Products

PX	10-40W, 12-48V I/P DC-DC
CC-E	1.5-25W, 5V, 12V, 24V & 48V I/P DC-DC
PAQ, PAH, PAF	50-700W quarter, half & full bricks

For Additional Information, please visit us.tdk-lambda.com/lp/products/pae-series.htm



Options

Suffix	Description
Blank	Manual Reset
/V	Auto Reset (Preferred)

High Current Half Brick DC-DC Converters

Features

- ◆ Industry Standard Package
- ◆ Low voltage outputs to 0.96V
- ◆ Output Currents up to 70A
- ◆ Designed for telecom standards
- ◆ Output voltage adjustment
- ◆ Remote On / Off
- ◆ High Efficiency
- ◆ Wide adjustment range
- ◆ ASIC Design
- ◆ No potting materials



Key Market Segments & Applications

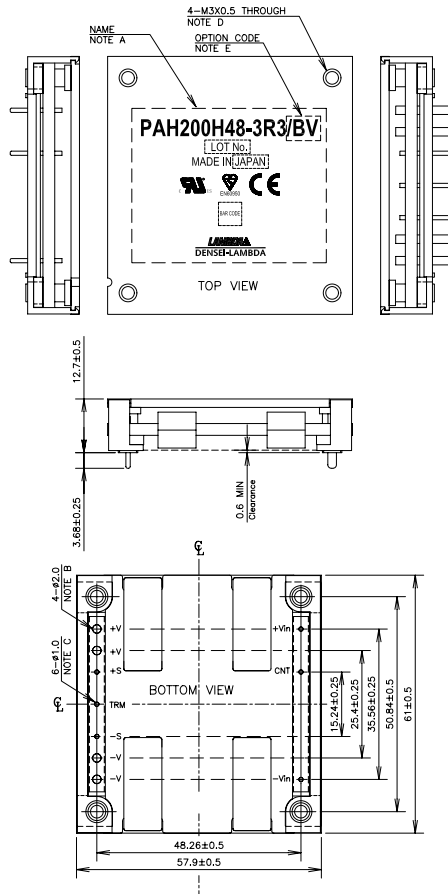


Specifications

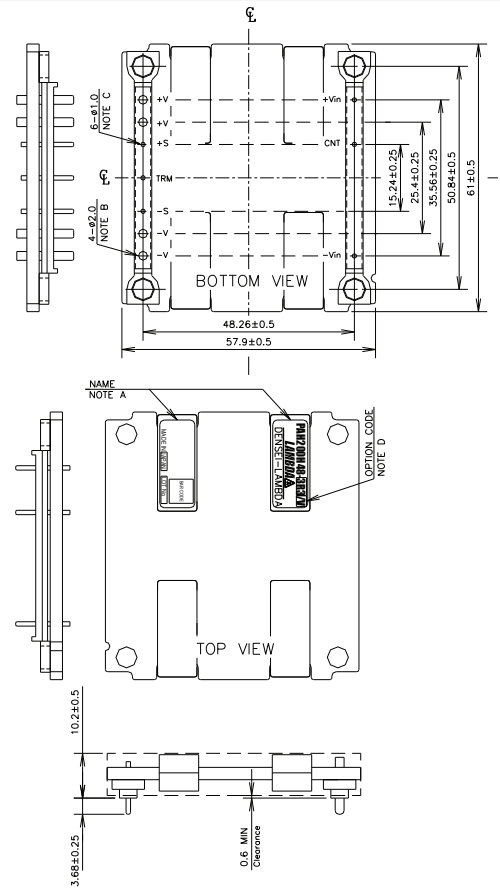
		PAH200H48-1R2	PAH200H48-1R5	PAH200H48-1R8	PAH200H48-2R5	PAH200H48-3R3
Model		(/C version)	(/C version)	(/C version)	(/C version)	(/C version)
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3
Output Current (Max)	A	70 (60)	70 (60)	70 (60)	70 (60)	60 (50)
Max Output Power	W	84(72)	105(90)	126 (108)	175 (150)	198 (165)
Efficiency (Typ)	%	82	84	87	88	90
Input Voltage range	VDC	36 - 76V (100V for 100ms)				
Input Current (typ)	A	2.18 (1.87)	2.66 (2.28)	3.08 (2.64)	4.23 (3.63)	4.68 (3.90)
Output Voltage Accuracy	%	±1				
Output Voltage Adjustment	V	0.96-1.32	1.2-1.65	1.44 - 1.98	2.0 - 2.75	2.805 - 3.795
Max Ripple & Noise	mV	100				
Max Line Regulation	mV	10				
Max Load Regulation	mV	10				
Overcurrent Protection	-	105 - 140% (See Options)				
Overvoltage Protection	-	120 - 140% (See Options)				
Remote Sense	-	Yes				
Remote On / Off	-	Yes (See options)				
Operating Temperature	-	-40°C to +85°C (100°C /B option) Baseplate temperature				
Operating Humidity	-	5 - 95% Non condensing				
Storage Temperature	-	-40°C to +100°C				
Cooling	-	Convection, or forced air				
I/O Isolation Voltage	-	Input to Output 1500VAC Output to Case 500VAC				
Vibration (non operating)	-	10~55Hz (1 minute), amplitude 0.825mm (49m/s ² max), X, Y, Z 1 hr ea.				
Shock	-	196.1 m/s ²				
Safety Agency Approvals	-	UL1950, CSA950, EN60950, & CE				
Weight (Typ)	g	90				
Size (WxHxD)	in(mm)	2.28 x 0.4* x 2.4 (57.9 x 10.2* x 61); * /B version 0.5 (12.7)				
Warranty	yrs	Two Years				

Note: See Installation Manual for full details, test methods of parameters and application notes.

Outline Drawing



Outline Drawing



Options

Suffix	OCP / OVP	Remote On / Off
Blank	Manual Reset	Negative, Short = On
/V*	Auto Reset	Negative, Short = On
/P	Manual Reset	Positive, Open = On
/PV*	Auto Reset	Positive, Open = On
/C**	Single set of O/P pins	
/B	Baseplate Fitted	
Note	Suffix letter order: /C followed by /P followed by /V Example: /CPV.	
*	Standard US Stock Item.	
**	See website for outline drawing—not available with /B option.	

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

Other DC-DC Products

PAF	500, 600, & 700W Full brick DC-DC
PAH	50W to 350W Half brick DC-DC
PAQ	Up to 100W Quarter brick DC-DC
SX	20W surface mount 24V & 48VDC-DC
X	10, 15, 20W 24V & 48VDC Input DC-DC converters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pah200h-series.htm



200V to 400VDC Input Full brick DC-DC Converters

Features

- ◆ Up to 100A Output Current
- ◆ Fast Transient Response
- ◆ Current Share
- ◆ Full Power at 85°C Baseplate
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design

Key Market Segments & Applications

- ◆ Servers & Rail Systems
- ◆ High End Computers
- ◆ Custom Power Supplies



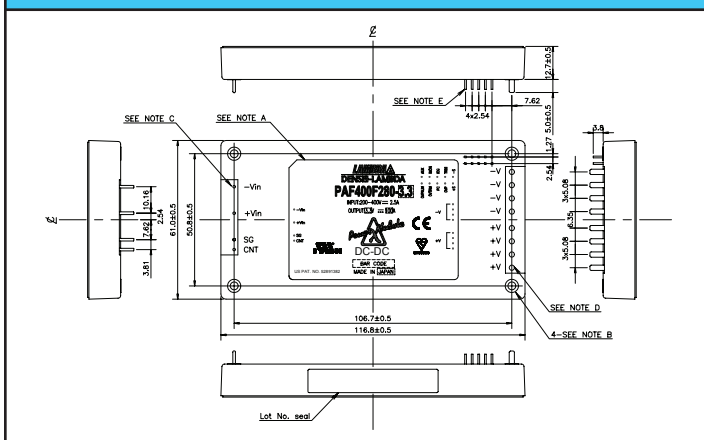
Specifications

Model		PAF400F280-1.8	PAF400F280-3.3	PAF400F280-5
Nominal Output Voltage	VDC	1.8	3.3	5.0
Output Current (Max)	A	100	100	80
Max Output Power	W	240	390	450
Efficiency (Typ)	%	76	83	85
Input Voltage range	VDC	200-400VDC		
Output Voltage Accuracy	%	±2		
Output Voltage Adjustment	VDC	1.0 - 2.6	2.2 - 4.2	2.9 - 6.0
Max Ripple & Noise	mV	200 (0 - 85°C)		
Max Line Regulation	mV	6	10	15
Max Load Regulation	mV	6	10	15
Temperature Coefficient	°C	0.01%/°C		
Overcurrent Protection	A	115 - 130%		
Overvoltage Protection	VDC	1.0 - 2.8	2.5 - 4.5	3.3 - 6.3
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, Inverter Good, 11-14V Auxiliary voltage		
Baseplate Temperature	°C	-20°C to +85°C Baseplate: 100% load		
Humidity (non condensing)	-	20 - 95% RH Operating, 10 - 95% RH Non Operating		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	-	Input to Baseplate: 2500VAC (20mA); Input to Output 3000VAC (20mA) for 1 min.; Output to Baseplate: 500VDC for 1 min		
Shock	-	196.1m/s ²		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD		
Weight (Typ)	g	250		
Size (WxHxD)	mm	(61x12.7x116.8) See outline drawing		
Warranty	yr	2 Years		

Note: See Installation Manual for full details, test methods of parameters and application notes.

OBSOLETE

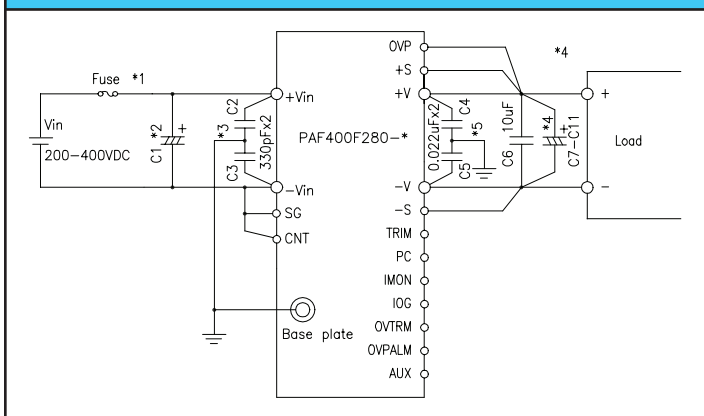
PAF Outline Drawing



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	Remote On/Off terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	11-14V Aux Voltage
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense
SG	Remote ON/OFF Return
IMON	Current Monitor
OVTRM	Overvoltage Trim
OVPALM	Overvoltage Alarm Signal
OVP	Overvoltage Sense Point

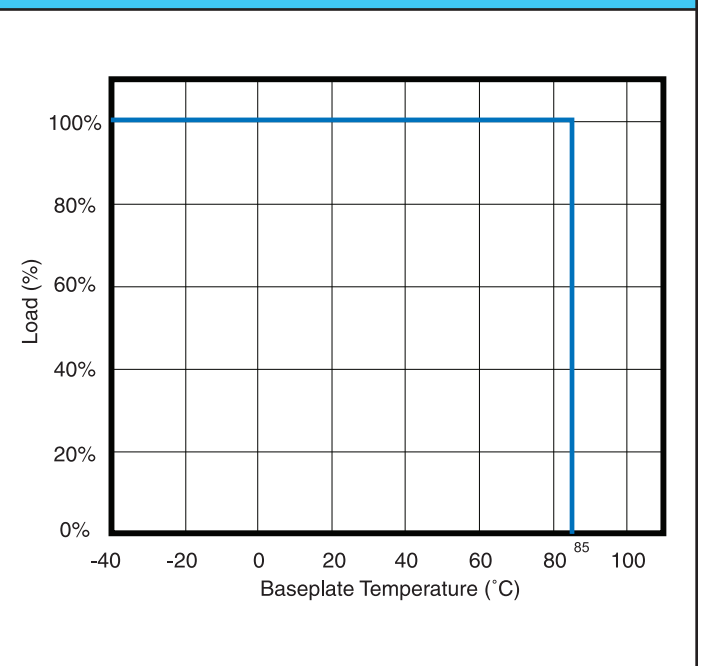
Connection Example



Other DC-DC Products

PAF	500-700W Full Brick 24 & 48V Input
PAH350	350W Half Brick 24 & 48V Input
PH-F	Full function 200-400V Input DC-DC
PH-S	Simple function 200-400V Input DC-DC
PF	Power factor AC - 380VDC Front End
PFE	400-700W AC-DC Power module

Derating Curve



For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf-series.htm



OBSOLETE

24V & 48V Input Full brick DC-DC Converters

Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Up to 80A output current (48V models)
- ◆ Full power at 100°C baseplate
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design
- ◆ No potting materials



Key Market Segments & Applications

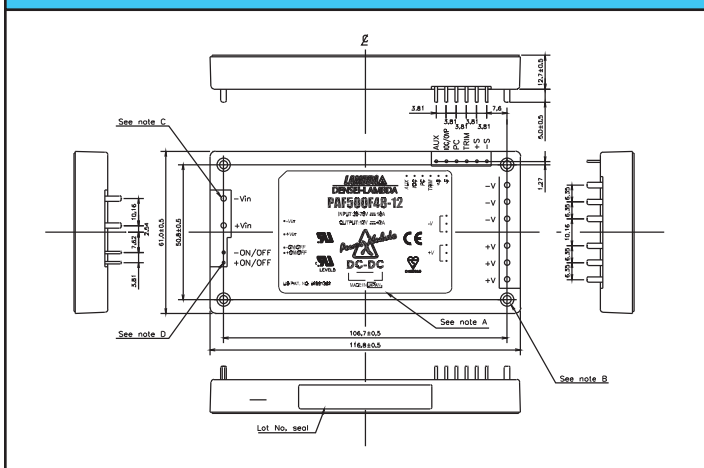


Specifications

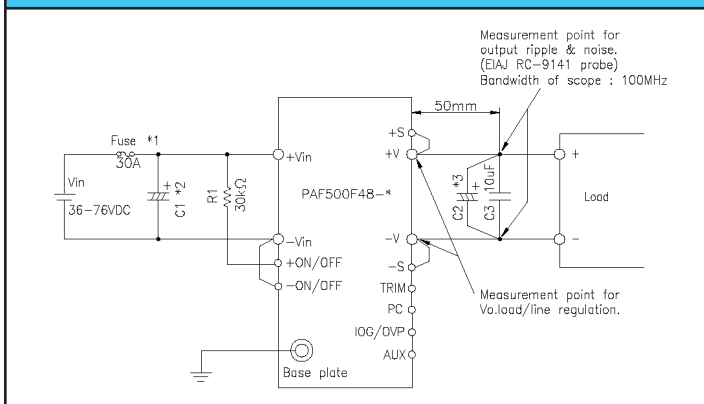
		PAF500F48-3.3	PAF500F48-5	PAF500F24-12 PAF500F48-12	PAF500F24-28 PAF500F48-28
Model					
Nominal Output Voltage	VDC	3.3	5	12	28
Output Current (Max)	A	80	80	42	18
Max Output Power	W	264	400	504	504
Efficiency (Typ)	%	78	83	89	90
Input Voltage range	VDC	36-76		19-36 or 36-76	18-36 or 36-76
Input Current (Typ) (24V/48V)	A	7.3	10.4	24 / 12.2	23.8 / 12.1
Output Voltage Accuracy	%	±1			
Output Voltage Adjustment	VDC	2 - 4	3 - 6	7.2 - 13.2	16.8 - 30.8
Max Ripple & Noise	mV	100	100	200	280
Max Line Regulation	mV	10	10	24	56
Max Load Regulation	mV	10	10	24	56
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	130-160	125-145	115-135	115-135
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good (12, 28V models), Adjustable OVP (3.3, 5V models), 7-10V Auxiliary voltage			
Operating Temperature	-	-40°C to +100°C baseplate			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V			
Shock	-	196.1m/s ²			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)			
Amplitude	-	0.825mm constant (Max 49m/s ²) X, Y, Z 1 hour each			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	250			
Size (WxHxD)	in(mm)	2.4x0.5x4.6 (61x12.7x116.8) See outline drawing			
Warranty	yrs	2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.

PAF Outline Drawing



Connection Example



Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off negative terminal
+ON/OFF	Remote On/Off positive terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux voltage
IOG/OVP	DC Good / OVP adjustment
PC	Parallel control connection
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

Other DC-DC Products

PAF	Full Brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

Options

Suffix	Description
Blank	M3 tapped inserts (4)
/T	3.3mm non-threaded inserts (4)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf-series.htm



24V & 48V Input Full brick DC-DC Converters

Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 100°C baseplate
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design
- ◆ 24V & 48V Inputs



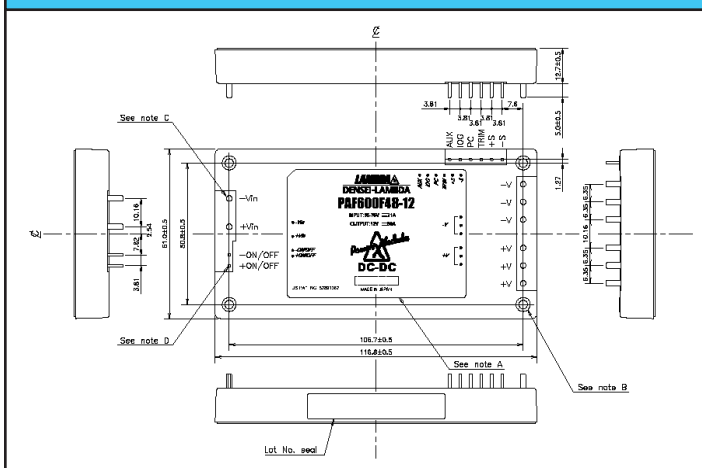
Key Market Segments & Applications



Specifications				
Model		PAF600F24-12 PAF600F48-12		PAF600F24-28 PAF600F48-28
Nominal Output Voltage	VDC	12		28
Output Current (Max)	A	50		21.5
Output Power (Max)	W	600		602
Efficiency (Typ)	%	89 to 90%		
Input Voltage Range	VDC	20-36 / 36-76		19-36 / 36-76
Input Current (Typ) 24/48V input	A	28.9 / 14.2		28.9 / 14.1
Output Voltage Accuracy	%	±1		
Output Voltage Adjustment	VDC	7.2 - 13.2		16.8 - 30.8
Ripple & Noise (Max)	mV	200		280
Line Regulation (Max)	mV	24		56
Load Regulation (Max)	mV	24		56
Temperature Coefficient	-	0.02%/°C		
Overcurrent Protection	%	105 - 140%		
Overvoltage Protection	%	115-135%		
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage		
Operating Temperature	-	-40°C to +100°C baseplate		
Humidity (operating)	-	30-95% RH Non condensing		
Humidity (storage)	-	10-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)		
Shock	-	196.1m/s ²		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V model only)		
Weight (Typ)	g	250		
Size (WxHxD)	in(mm)	2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing		
Warranty	yrs	2 years		

Note: See Installation Manual for full details, test methods of parameters and application notes.

PAF Outline Drawing



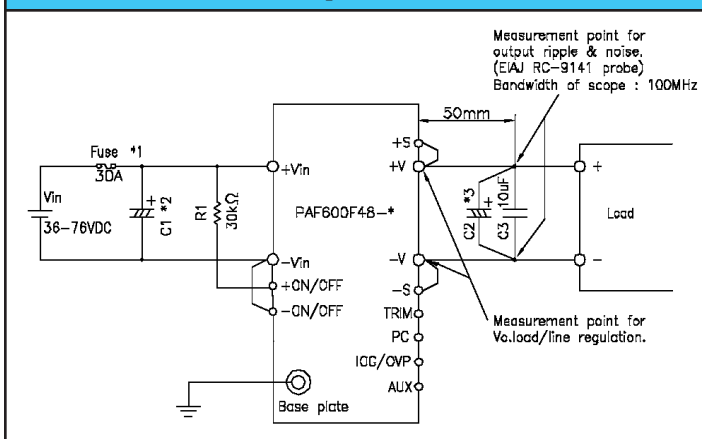
Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off Negative Terminal
+ON/OFF	Remote On/Off Positive Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux Voltage
IOG	DC Good
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense

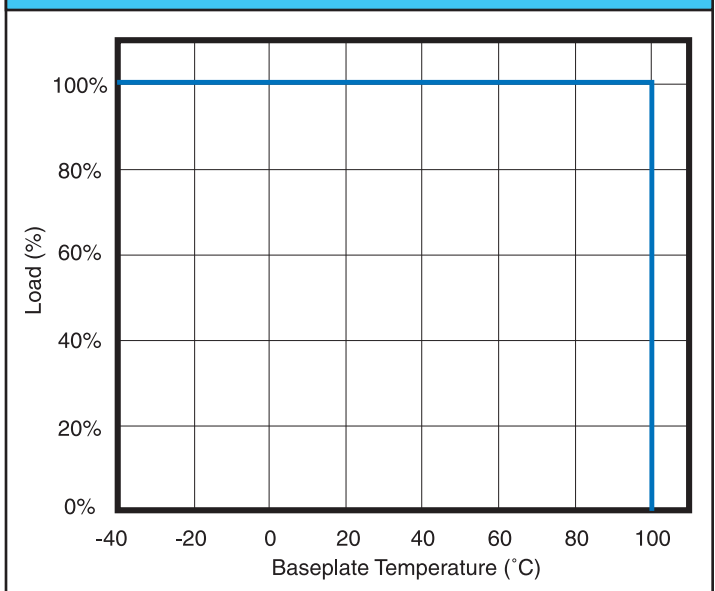
Other DC-DC Products

PAF	Full brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

Connection Example



Derating Curve



Options

Suffix	Description
Blank	
/T	No thread in mounting holes.

Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf-series.htm



200V to 400VDC Input Full brick DC-DC Converters

Features

- ◆ Output Voltages from 7.2V to 57V
- ◆ 450W to 600W Output Power
- ◆ Current Share
- ◆ Operation to 100°C Baseplate
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ High Efficiency - up to 91%



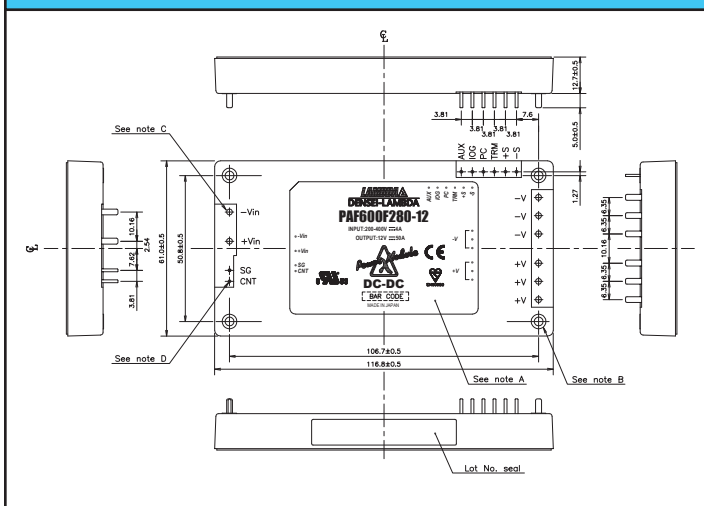
Key Market Segments & Applications



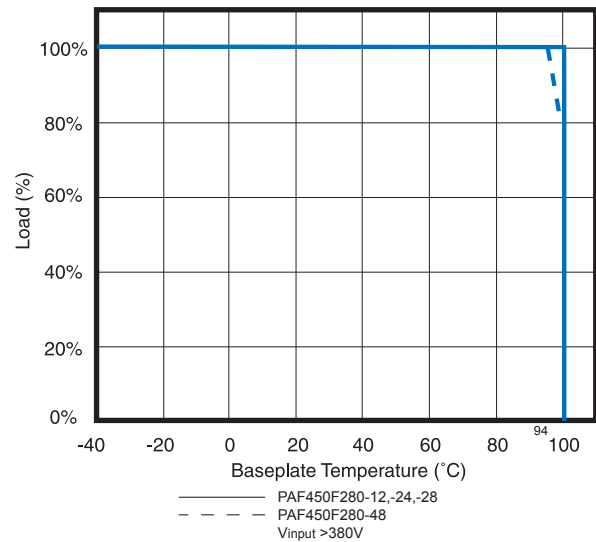
Specifications						
Model			PAF450F280-12 PAF600F280-12	PAF450F280-24 PAF600F280-24	PAF450F280-28 PAF600F280-28	PAF450F280-48 PAF600F280-48
Nominal Output Voltage	VDC		12	24	28	48
Output Current (Max)	A		38	19	16.5	9.5
			50	25	21.5	12.5
Max Output Power	W		456	456	462	456
			600	600	602	600
Efficiency (Typ)	%		89-90	91	91	91
Input Voltage Range	VDC		200-400VDC			
Output Voltage Accuracy	%		±1			
Output Voltage Adjustment	VDC		7.2 - 14.4	14.4 - 28.8	16.8 - 33.6	28.8 - 57.6
Max Ripple & Noise	mV		120	240	280	480
Max Line Regulation	mV		48	56	56	96
Max Load Regulation	mV		48	56	56	96
Temperature Coefficient	°C		0.02%/°C			
Overcurrent Protection	%		105 - 140%			
Overvoltage Protection	%		125 - 145%			
Signals & Control	-		Remote Sense, Remote On/Off, Parallel Pin, Inverter Good, 11-14V Auxiliary voltage			
Baseplate Temperature	-		-40°C to +100°C Baseplate: (See derating chart)			
Humidity (non condensing)	-		5 - 95% RH Operating, 5 - 95% RH Non Operating			
Cooling	-		Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	-		Input to Baseplate: 2500VAC (20mA); Input to Output 3000VAC for 1 min.; Output to Baseplate: 500VDC for 1 min			
Shock	-		196.1m/s ²			
Vibration	-		Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each			
Safety Agency Approvals	-		UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g		200			
Size (WxHxD)	mm		2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing			
Warranty	yrs		2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.

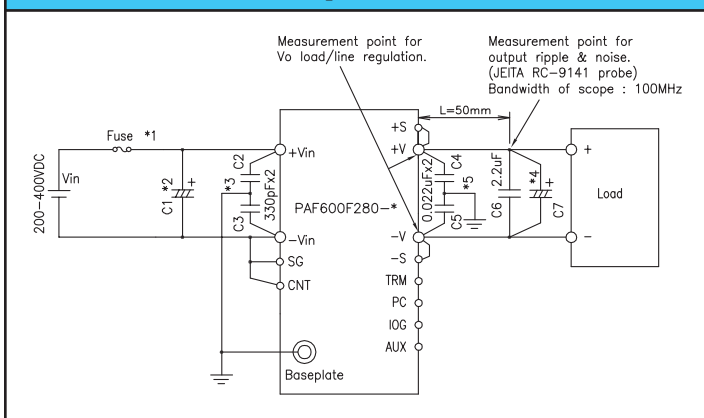
PAF Outline Drawing



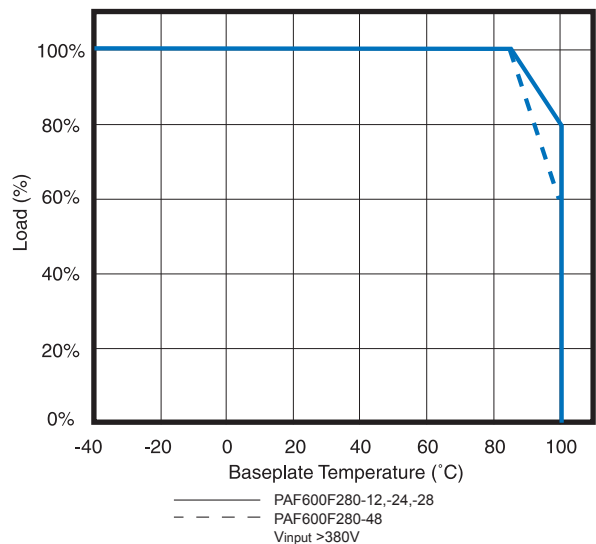
Derating Curve PAF450F280



Connection Example



Derating Curve PAF600F280



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	Remote On/Off
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	11-14V Aux Voltage
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense
SG	Remote ON/OFF Return

Other DC-DC Products

PAF	400-700W Full brick DC-DC
PAH300/450	300-450W Half Brick 24 & 48V Input
PH-F	Full function 200-400V Input DC-DC
PH-S	Simple function 200-400V Input DC-DC
PF	Power factor AC - 380VDC Front End
PFE	300-1000W, AC-DC Power module

Options

Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf400-series.htm



48V Input Full brick DC-DC Converters

Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 85°C baseplate, operation to 100°C
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design



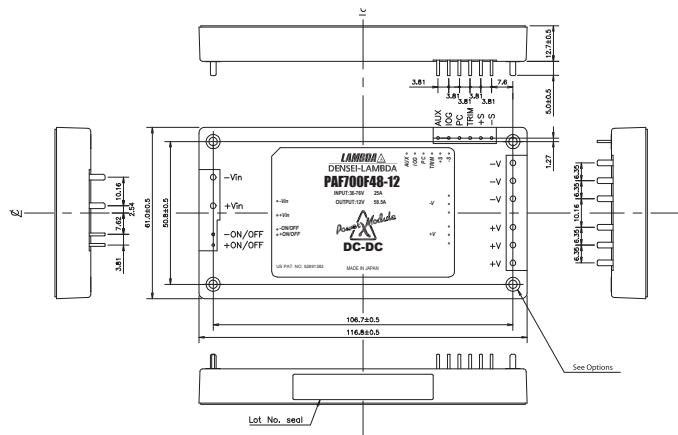
Key Market Segments & Applications



Specifications				
Model		PAF700F48-12		PAF700F48-28
Nominal Output Voltage	VDC	12		28
Output Current (Max)	A	58.5		25
Output Power (Max)	W	702		700
Efficiency (Typ)	%	90 to 91%		
Input Voltage Range	VDC	36-76		
Input Current (Typ)	A	16.5		16.4
Output Voltage Accuracy	%	±1		
Output Voltage Adjustment	VDC	7.2 - 13.8		16.8 - 32.2
Ripple & Noise (Max)	mV	200		280
Line Regulation (Max)	mV	24		56
Load Regulation (Max)	mV	24		56
Temperature Coefficient	-	0.02%/°C		
Overcurrent Protection	%	105 - 140%		
Overvoltage Protection	%	120 - 135%		
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage		
Operating Temperature	°C	-40°C to +100°C baseplate		
Humidity (operating)	-	20-95% RH Non condensing		
Humidity (storage)	-	10-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)		
Shock	-	196.1m/s ²		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD		
Weight (Typ)	g	200		
Size (WxHxD)	in(mm)	2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing		
Warranty	yrs	2 years		

Note: See Installation Manual for full details, test methods of parameters and application notes.

PAF Outline Drawing



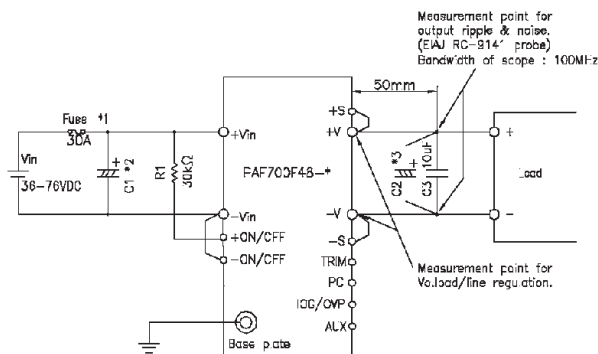
Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off Negative Terminal
+ON/OFF	Remote On/Off Positive Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux Voltage
IOG	DC Good
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense

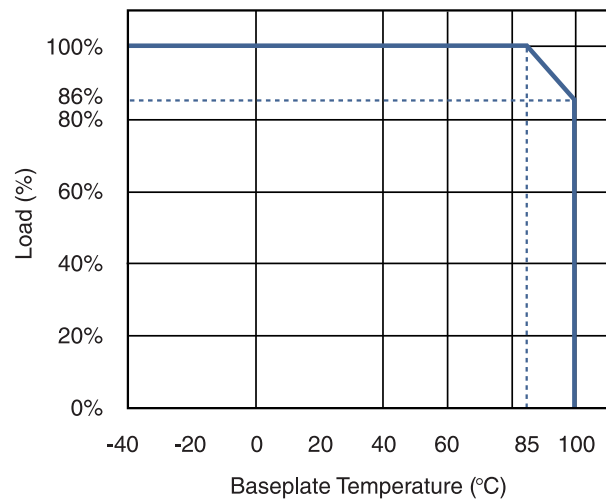
Other DC-DC Products

PAF	Full brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

Connection Example



Derating Curve



Options

Suffix	Description
Blank	M3 tapped inserts (4)
/T	3.3mm non-threaded inserts (4)

Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf700-series.htm



50W to 200W 48V Input Half brick DC-DC Converters

Features

- ◆ Industry Standard Footprint & Pinouts
- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 100°C baseplate
- ◆ Wide Adjustable Output Range
- ◆ Zero Pre-load
- ◆ ASIC Design
- ◆ No potting materials



Key Market Segments & Applications



Specifications									
Model		2.5V	3.3V	5V	12V	15V	24V	28V	48V
Efficiency (Typ)	%	75-76	79-80	83-84	85-86		86-88		88
Input Voltage range	VDC	36-76							
Output Voltage Accuracy	%	±1.6							
Max Ripple & Noise	mV	150			200		280		250
Max Line Regulation	mV	10			24	30	48	56	96
Max Load Regulation	mV	10			24	30	48	56	96
Overcurrent Protection	%	105 - 150% automatic recovery							
Overvoltage Protection (1)	%	120-160	120-140	125-145					135-155
Remote Sense	-	Yes							
Remote On/Off	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON)							
Operating Temperature	°C	-40°C to +100°C baseplate							
Overtemperature	°C	Shutdown between 105 - 130°C, Auto restart							
Cooling	-	Conduction (See Installation Manual for heatsink selection)							
Isolation Voltage	V	Input - Baseplate 1500VAC, Input - Output 1500VAC, Output-Baseplate 500VDC							
Shock	-	196.1m/s ²							
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)							
Amplitude	-	0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each							
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD							
Weight (Typ)	g	80							
Size (WxHxD)	in(mm)	2.28x0.5x2.4 (57.9x12.7x61) See outline drawing							
Warranty	yrs	2 Years							

(1) See options table.

General: See Installation Manual for full details, test methods of parameters and application notes

Model Selector

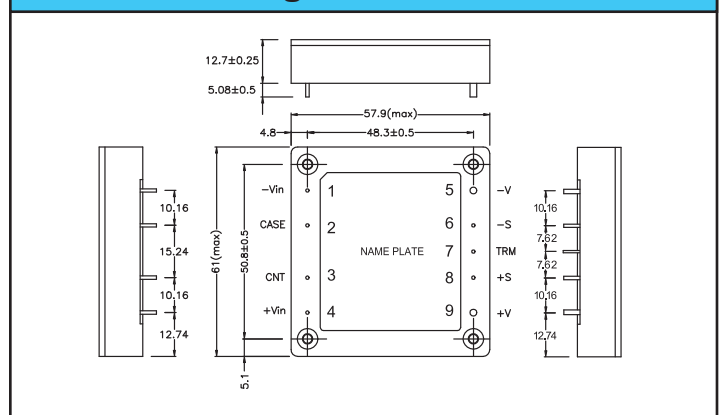
Model Name	Output Voltage	Adjustment	Output Current	Maximum Power
PAH50S48-2.5	2.5	2.25 - 2.75	11.70	29.3
PAH75S48-2.5	2.5	2.25 - 2.75	17.50	43.8
PAH100S48-2.5	2.5	2.25 - 2.75	23.40	58.5
PAH150S48-2.5	2.5	2.25 - 2.75	35.00	87.5
PAH50S48-3.3	3.3	2.97 - 3.63	11.70	38.6
PAH75S48-3.3	3.3	2.97 - 3.63	17.50	57.8
PAH100S48-3.3	3.3	2.97 - 3.63	23.40	77.2
PAH150S48-3.3	3.3	2.97 - 3.63	35.00	115.5
PAH50S48-5	5.0	3.0 - 5.75	10.00	50.0
PAH75S48-5	5.0	3.0 - 5.75	15.00	75.0
PAH100S48-5	5.0	3.0 - 5.75	20.00	100.0
PAH150S48-5	5.0	3.0 - 5.75	30.00	150.0
PAH50S48-12	12.0	7.2 - 13.2	4.20	50.4
PAH75S48-12	12.0	7.2 - 13.2	6.30	75.6
PAH100S48-12	12.0	7.2 - 13.2	8.40	100.8
PAH150S48-12	12.0	7.2 - 13.2	12.50	150.0
PAH200S48-12	12.0	7.2 - 13.2	16.70	200.4
PAH50S48-15	15.0	9.0 - 16.5	3.40	51.0
PAH75S48-15	15.0	9.0 - 16.5	5.00	75.0
PAH100S48-15	15.0	9.0 - 16.5	6.70	100.5
PAH150S48-15	15.0	9.0 - 16.5	10.00	150.0
PAH200S48-15	15.0	9.0 - 16.5	13.40	201.0
PAH50S48-24	24.0	14.4 - 26.4	2.10	50.4
PAH75S48-24	24.0	14.4 - 26.4	3.20	76.8
PAH100S48-24	24.0	14.4 - 26.4	4.20	100.8
PAH150S48-24	24.0	14.4 - 26.4	6.30	151.2
PAH200S48-24	24.0	14.4 - 26.4	8.40	201.6
PAH50S48-28	28.0	16.8 - 30.8	1.80	50.4
PAH75S48-28	28.0	16.8 - 30.8	2.70	75.6
PAH100S48-28	28.0	16.8 - 30.8	3.60	100.8
PAH150S48-28	28.0	16.8 - 30.8	5.40	151.2
PAH200S48-28	28.0	16.8 - 30.8	7.20	201.6
PAH150S48-48	48.0	38.4 - 57.6	3.20	153.6

Options

Suffix	ON/OFF Control	Overshoot
-	Negative	Manual Reset
/P	Positive	Manual Reset
/V*	Negative	Auto Reset
/PV	Positive	Auto Reset

* Standard US Stock Item.

Outline Drawing



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
Case	Baseplate Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

Other DC-DC Products

PAF	400-700W Full Brick DC-DC
PAH75D	Dual output Half Bricks
PAH200H	High Efficiency Half Brick
PAQ	Quarter brick DC-DC
CC-E	1.5 to 30W, 5-48V Input DC-DC
PX	10-60W, 12-48VDC Input DC-DC converters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pah-series.htm



300W to 450W Half Brick Converters

Features

- ◆ Standard Half Brick Footprint
- ◆ 18-36 or 36-76VDC Inputs
- ◆ 12V 29A - 48V 9.4A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile
- ◆ High operating efficiencies (up to 92%)
- ◆ Constant switching frequency
- ◆ Baseplate cooling



Key Market Segments & Applications



Specifications				
Model		PAH300S, 350S, 450S (see model selector)		
Nominal Output Voltage	VDC	12V	28V	48V
Input Voltage range	VDC	18-36 or 36-76		
Input Current (max)	A	6.8-17.4A (model dependant)		
Output Voltage Adjustment	VDC	7.2 - 13.2	16.8 - 33	28.8 - 57.6(5)
Ripple & Noise (max) (pk to pk)	mV	200	280(1)	480
Line Regulation (max)	mV	24	56	96
Load Regulation (max)	mV	24	56	96
Overload Protection	%	105 - 140%, constant current with auto recovery		
Overvoltage Protection (3)	%	115-135%	125-140%(2)	125-145%(6)
Remote Sense	-	Yes		
Remote On / Off (See options)	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON		
Temperature (operating)	°C	-40°C to +100°C baseplate, full power(4)		
Temperature (storage)	°C	-40°C to +100°C		
Temperature Coefficient	-	0.02%/°C		
Humidity (operating)	-	5-95% RH Non condensing		
Humidity (storage)	-	5-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	1500VDC Input to output & baseplate, 500VDC Output to baseplate		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)		
Amplitude	-	0.825mm constant (Max 49 m/s ²) X,Y,Z 1 hour each		
Shock	-	196.1m/s ²		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V input models only)		
Weight (Typ)	g	110		
Size (WxHxD)	in(mm)	2.4x0.5x2.28 (61x12.7x57.9) See outline drawing		
Warranty	yrs	2 Years		

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) 240mV for PAH300

(2) 125-145% for PAH450S48-28

(3) Manual reset

(4) PAH350S24-28 & -48: derate linearly to 85% load from 90°C to 100°C

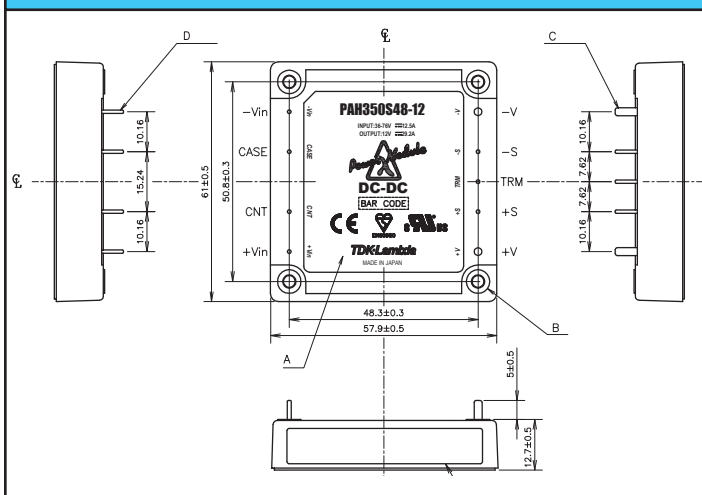
(5) 28.8-52.8 PAH350S28-48

(6) 115-140% PAH350S28-48

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency Typ. (%)
PAH300S24-12	18 - 36	12	25	300	87
PAH300S48-12	36 - 76	12	25	300	90
PAH350S48-12	36 - 76	12	29.2	350	89
PAH300S24-28	18 - 36	28	11	308	88
PAH350S24-28	18 - 36	28	12.5	350	88
PAH350S24-48	18 - 36	48	7.3	350	87
PAH300S48-28	36 - 76	28	11	308	90
PAH350S48-28	36 - 76	28	12.5	350	89
PAH450S48-28	36 - 76	28	16	448	92
PAH450S48-48	36 - 76	48	9.4	451	92

Outline Drawing



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

Options

Suffix	Description
-	M3 Tapped inserts for mounting
/T	M3 clearance inserts for mounting
/P	Positive logic remote On/Off (Not on PAH450S)

Other DC-DC Products

PAF	400-700W Full brick DC-DC
PAH	Other half brick DC-DC converters
PAQ	Quarter brick DC-DC converters
PAE	Eighth brick DC-DC converters
PX	10-48W, 12-48V DC-DC

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pah300-series.htm



Full function, 50 to 300W DC-DC converters

Features

- ◆ High Density
- ◆ Wide Range Input
- ◆ Wide output adjustment capability
- ◆ Remote On/Off
- ◆ Fixed Switching Frequency
- ◆ International Safety Approvals
- ◆ Parallel Operation
- ◆ Low component count
- ◆ Signals to support N+1 redundancy



Key Market Segments & Applications



Specifications

Model		2V	3.3V	5V	12V	15V	24V	28V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	1.6~2.4	2.64~3.96	2~6	4.8~14.4	6~18	9.6~28.8	11.2~33.6
Line Regulation	-	0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation	-	0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV			150mV		240mV	280mV
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	%	150 - 180%			125 - 145%			
Overload Protection	%	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	Yes						
Parallel operation	-	Using current share pin (PC). Will share within 5%, see app. notes for connection details						
Inverter Good signal	-	Signal available for status of inverter						
Auxiliary Bias Supply	-	8V 10mA auxiliary voltage to supply power to interface circuits (AUX pin)						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	°C	Baseplate temperature -20°C to +85°C. -40°C start up possible - consult factory						
Storage Temperature	°C	-40°C to +85°C						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MOhm at 500VDC and 70%RH						
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1 and CE Mark.						
Warranty	-	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) 24V input models input to output: 2kVAC; input to baseplate: 2kVAC

Model Selector

Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
2.0	15.0	30	-	PH75F48-2	PH75F110-2	PH75F280-2
2.0	20.0	40	PH100F24-2	-	-	-
2.0	30.0	60	-	PH150F48-2	PH150F110-2	PH150F280-2
2.0	60.0	120	-	PH300F48-2	PH300F110-2	PH300F280-2
3.3	15.0	45	-	PH75F48-3	PH75F110-3	PH75F280-3
3.3	20.0	60	PH100F24-3	-	-	-
3.3	30.0	90	-	PH150F48-3	PH150F110-3	PH150F280-3
3.3	60.0	180	-	PH300F48-3	PH300F110-3	PH300F280-3
5.0	15.0	75	-	PH75F48-5	PH75F110-5	PH75F280-5
5.0	20.0	100	PH100F24-5	-	-	-
5.0	30.0	150	-	PH150F48-5	PH150F110-5	PH150F280-5
5.0	60.0	300	-	PH300F48-5	PH300F110-5	PH300F280-5
12.0	6.3	75	-	PH75F48-12	PH75F110-12	PH75F280-12
12.0	8.4	100	PH100F24-12	-	-	-
12.0	12.5	150	-	PH150F48-12	PH150F110-12	PH150F280-12
12.0	20.0	240	PH300F24-12	-	-	-
12.0	25.0	300	-	PH300F48-12	PH300F110-12	PH300F280-12
15.0	5.0	75	-	PH75F48-15	PH75F110-15	PH75F280-15
15.0	6.7	100	PH100F24-15	-	-	-
15.0	10.0	150	-	PH150F48-15	PH150F110-15	PH150F280-15
15.0	20.0	300	-	PH300F48-15	PH300F110-15	PH300F280-15
24.0	3.2	75	-	PH75F48-24	PH75F110-24	PH75F280-24
24.0	4.2	100	PH100F24-24	-	-	-
24.0	6.3	150	-	PH150F48-24	PH150F110-24	PH150F280-24
24.0	12.6	300	-	PH300F48-24	PH300F110-24	PH300F280-24
28.0	2.7	50	-	PH75F48-28	PH75F110-28	PH75F280-28
28.0	3.6	100	PH100F24-28	-	-	-
28.0	5.4	150	-	PH150F48-28	PH150F110-28	PH150F280-28
28.0	10.8	300	PH300F24-28	PH300F48-28	PH300F110-28	PH300F280-28

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+S	Positive Remote sense
-S	Negative Remote sense
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	Bias voltage output (secondary reference)
IOG	DC Good
TRIM	Output adjustment trim pin
CNT	On/Off Control Terminal
SG	Signal (CNT RTN)
PC	Parallel control connection

Other DC-DC Products

PH Simple Func.	50 - 300W, lower cost version of PH
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks
PX	10-40W, 12-48V input, DC-DC
CC-E	1.5-30W, 5-48V input, DC-DC

For Additional Information, please visit
us.tdk-lambda.com/lp/products/ph-series-ff.htm



Simple function, 50 to 600W DC-DC converters

Features

- ◆ High Density
- ◆ Wide Range Input
- ◆ Output adjustment Capability
- ◆ Remote On/Off
- ◆ Fixed Switching Frequency
- ◆ International Safety Approvals
- ◆ Low component count



Key Market Segments & Applications



Specifications

Model		3.3V	5V	12V	15V	24V	28V	48V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	2.97~3.63	4.5~5.5	10.8~13.2	13.5~16.5	21.6~26.4	25.2~30.8	43.2~52.8
Line Regulation	-	0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation	-	0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV		150mV		240mV	280mV	480mV
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	%	150 - 180%	125 - 145%					
Overload Protection	%	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	PH100S, PH150S, PH300S, PH600S models						
Parallel operation	-	PH300S & PH600S only: Requires external circuitry						
Inverter Good signal	-	PH300S & PH600S only: Signal available for status of inverter						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	°C	Baseplate temperature -20°C to +85°C (100°C on PH300 & PH600). -40°C start up possible - consult factory						
Storage Temperature	°C	-40°C to +85°C (+100°C on PH300 & PH600)						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MOhm at 500VDC and 70%RH						
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1 and CE Mark.						
Warranty	yrs	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes

Model Selector

Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
3.3	10.0	33.0	-	PH50S48-3.3	-	PH50S280-3.3
3.3	15.0	49.5	-	PH75S48-3.3	-	PH75S280-3.3
3.3	20.0	66.0	-	PH100S48-3.3	-	PH100S280-3.3
3.3	30.0	99.0	-	PH150S48-3.3	-	PH150S280-3.3
3.3	50.0	165.0	-	-	-	PH300S280-3.3
3.3	100.0	330.0	-	-	-	PH600S280-3.3
5.0	10.0	50.0	PH50S24-5	PH50S48-5	PH50S110-5	PH50S280-5
5.0	15.0	75.0	-	PH75S48-5	PH75S110-5	PH75S280-5
5.0	20.0	100.0	-	PH100S48-5	-	PH100S280-5
5.0	30.0	150.0	-	PH150S48-5	PH150S110-5	PH150S280-5
5.0	50.0	250.0	-	-	-	PH300S280-5
5.0	100.0	500.0	-	-	-	PH600S280-5
12.0	4.2	50.0	PH50S24-12	PH50S48-12	PH50S110-12	PH50S280-12
12.0	6.3	75.0	-	PH75S48-12	PH75S110-12	PH75S280-12
12.0	8.4	100.0	-	PH100S48-12	-	PH100S280-12
12.0	12.5	150.0	-	PH150S48-12	PH150S110-12	PH150S280-12
12.0	25.0	300.0	-	-	-	PH300S280-12
12.0	50.0	600.0	-	-	-	PH600S280-12
15.0	3.4	50.0	PH50S24-15	PH50S48-15	PH50S110-15	PH50S280-15
15.0	5.0	75.0	-	PH75S48-15	PH75S110-15	PH75S280-15
15.0	6.7	100.0	-	PH100S48-15	-	PH100S280-15
15.0	10.0	150.0	-	PH150S48-15	PH150S110-15	PH150S280-15
15.0	20.0	300.0	-	-	-	PH300S280-15
15.0	40.0	600.0	-	-	-	PH600S280-15
24.0	2.1	50.0	PH50S24-24	PH50S48-24	PH50S110-24	PH50S280-24
24.0	3.2	75.0	-	PH75S48-24	PH75S110-24	PH75S280-24
24.0	4.2	100.0	-	PH100S48-24	-	PH100S280-24
24.0	6.3	150.0	-	PH150S48-24	PH150S110-24	PH150S280-24
24.0	12.5	300.0	-	-	-	PH300S280-24
24.0	25.0	600.0	-	-	-	PH600S280-24
28.0	1.8	50.0	PH50S24-28	PH50S48-28	PH50S110-28	PH50S280-28
28.0	2.7	75.0	-	PH75S48-28	PH75S110-28	PH75S280-28
28.0	3.6	100.0	-	PH100S48-28	-	PH100S280-28
28.0	5.4	150.0	-	PH150S48-28	PH150S110-28	PH150S280-28
28.0	10.8	302.0	-	-	-	PH300S280-28
28.0	21.5	602.0	-	-	-	PH600S280-28
48.0	6.3	302.0	-	-	-	PH300S280-48
48.0	12.5	600.0	-	-	-	PH600S280-48

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+S	Positive Remote sense
-S	Negative Remote sense
+V	Positive Output Terminal
-V	Negative Output Terminal
IOG	Inverter Good Signal
TRIM	Output adjustment trim pin
CNT	On/Off Control Terminal
CS	Current Monitor Signal

Other DC-DC Products

PH Full Function	50 - 300W, full function versions of PH
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks
PX	10-40W, 12-48V input, DC-DC
CC-E	1.5-30W, 5-48V input, DC-DC

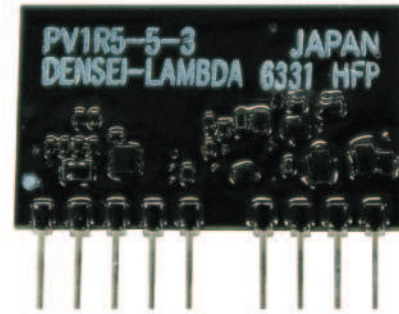
For Additional Information, please visit
us.tdk-lambda.com/lp/products/ph-series-sf.htm



Single Inline Package DC-DC Converters (1-3 Watts)

Features

- ◆ SIP style footprint
- ◆ 5V, 12V, 24V, & 48V Inputs
- ◆ Single and Dual Outputs
- ◆ Adjustable Output Voltages
- ◆ Input-Output Isolation
- ◆ Overcurrent Protection



Key Market Segments & Applications



Specifications					
Model		3.3V		5V	12V
DC Input ranges	VDC	5V: 4.5V-9V; 12V: 9V-18V, 24V: 18V-36V, 48V: 36V-72			
Efficiency (typical)	-	77%			
Output Voltage Accuracy	-	±5%			
Output Voltage Adjustment	VDC	3.3V-3.67V	5V-6V	12V-15V	
Preload	A	0			
Ripple & Noise	mV	100mV	120mV		
Max Line Regulation	mV	20mV			
Max Load Regulation	mV	40mV			
Overcurrent Protection	A	Auto recovery (1)			
Overvoltage Protection	%	None			
Temperature Coefficient	-	0.02%/°C			
Cooling	-	Convection cooled			
Isolation Voltage	VAC	Input-Output: 500VAC 1 min. (5mA)			
Isolation Resistance	Ohm	Greater than 100M			
Shock	-	20G			
Vibration	-	10-55Hz (sweep for 1 min.) 1.5mm constant amplitude max 9G X,Y,Z 2 hours each			
Humidity (non condensing)	-	30%-90% RH (non condensing)			
Storage Humidity	-	10%-95% RH (non condensing)			
Operating Temp. Range	-	-20 to 70°C, derate linearly to 50% load from 50 to 70°C			
Storage Temperature	°C	-30°C to +85°C			
Weight (Typ)	g	5g			
Size (LxWxH)	in	1.12x0.33x0.91(PV1R5); 1.29x0.33x1.29(PV3)			
Warranty	yrs	Two Years			

Note: See Installation Manual for full details, test methods of parameters and application notes

1) Avoid operation in short circuit or overload for more than 30 seconds

Model Selector

Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)
Single Output				
PV1R5-5-3.3	3.3	0.4	1.3	5.0
PV1R5-48-3.3	3.3	0.4	1.3	48.0
PV3-5-3.3	3.3	0.6	2.0	5.0
PV3-48-3.3	3.3	0.6	2.0	48.0
PV1R5-5-5	5.0	0.3	1.5	5.0
PV1R5-12-5	5.0	0.3	1.5	12.0
PV1R5-24-5	5.0	0.3	1.5	24.0
PV1R5-48-5	5.0	0.3	1.5	48.0
PV3-5-5	5.0	0.6	3.0	5.0
PV3-12-5	5.0	0.6	3.0	12.0
PV3-24-5	5.0	0.6	3.0	24.0
PV3-48-5	5.0	0.6	3.0	48.0
PV1R5-5-12	12.0	0.125	1.5	5.0
PV3-5-12	12.0	0.25	3.0	5.0
Dual Outputs				
PVD1R5-5-1212	±12.0	0.06	1.44	5.0
PVD1R5-12-1212	±12.0	0.06	1.44	12.0
PVD1R5-24-1212	±12.0	0.06	1.44	24.0
PVD1R5-48-1212	±12.0	0.06	1.44	48.0
PVD3-5-1212	±12.0	0.125	3.0	5.0
PVD3-12-1212	±12.0	0.125	3.0	12.0
PVD3-24-1212	±12.0	0.125	3.0	24.0
PVD3-48-1212	±12.0	0.125	3.0	48.0

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+Vout	Positive Output Terminal
-Vout	Negative Output Terminal
NC	No connection
COM	Common
TRM	Trim

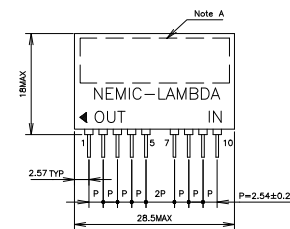
Other DC-DC Products

X	10 - 20W, 24 & 48V input DC-DC converters
SX	Surface Mount 20W, 24 & 48V input DC-DC converters
PC	1.5 - 6W, 5V, 12V, 24V & 48V input DC-DC converters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pv-series.htm

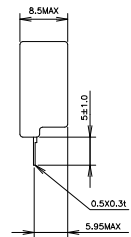


Outline Drawing

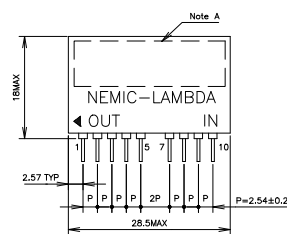


Pin assign
 1 : +Vout 5 : TRM
 2,3 : NC 7,8 : -Vin
 4 : -Vout 9,10 : +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

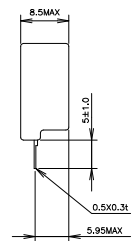


PV1R5

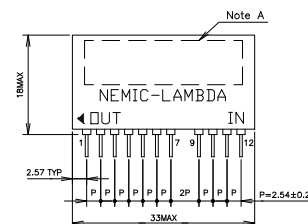


Pin assign
 1 : +Vout 5 : TRM
 2,3 : COM 7,8 : -Vin
 4 : -Vout 9,10 : +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

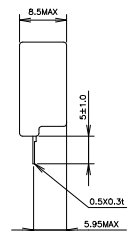


PVD1R5

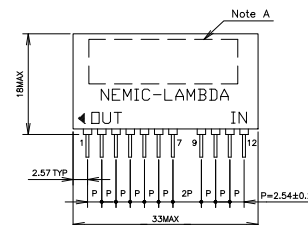


Pin assign
 1,2 : +Vout 7 : TRM
 3,4 : NC 9,10 : -Vin
 5,6 : -Vout 11,12 : +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

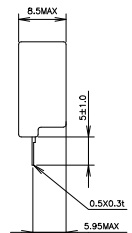


PV3



Pin assign
 1,2 : +Vout 7 : TRM
 3,4 : COM 9,10 : -Vin
 5,6 : -Vout 11,12 : +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

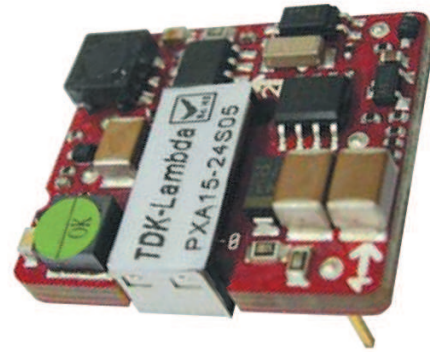


PVD3

Single Output 15W DC-DC Converters

Features

- ◆ Industry Standard 1" x 1" Footprint
- ◆ Through hole or Surface Mount versions
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ Wide range input (PXA15W)



Key Market Segments & Applications



Specifications				
Model		PXA15		PXA15W
Max Output Power	W	15W		15W
Voltage Accuracy	%			±1%
Voltage Adjustment (T Suffix)	%			±10%
Minimum Load	-			None
Line Regulation	%			±0.2%
Load Regulation (0% to 100%)	%			±0.2%
Start up time	ms			30ms
Remote on/off	-	Negative Logic /N (standard): ON: Short or <1.2V, OFF: Open or 3-15V Positive Logic /P (optional): ON: Open or 3-15V, OFF Short or <1.2V		
Temperature Coefficient	°C			<±0.02%/°C
Operating Temperature	°C			-40 to +85°C (See derating curves)
Storage Temperature	°C			-55 to 125°C
Thermal Shock	-			MIL-STD-810F
Relative Humidity (non condensing)	%			5 to 95%
Transient Response (25% step load change)	µs	200µs recovery		300µs recovery
Overvoltage Protection (Zener clamp)	V	1.5-3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V		
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery		
Input Surge Voltage (Maximum for 100ms)	VDC	12V input: 36V, 24V input: 50V, 48V input: 100V		
Reflected input ripple (peak to peak)	mA	30mA		
Isolation Voltage	VDC	2250VDC minimum		
Isolation Resistance	Ω	109 Ohms minimum		
Isolation Capacitance (max)	pF	1000pF		1500pF
Typical Switching Frequency (Fixed)	kHz	3.3, 5V: 270kHz; 12,15V: 470kHz		3.3, 5V: 350kHz; 12,15V: 400kHz
MTBF (BELLCORE TR-NWT-000332)	Hours	2,200,000		1,322,000
Vibration	-			MIL-STD-810F
Conducted and Radiated Emissions	-			EN55022 Level A
Immunity	-			EN61000-4-3,-4,-5,-6
Safety Agency Approval	-	IEC60950-1, UL60950-1, EN60950-1, CE Mark		
Size (L x W x H)	in	1.1 x 0.94 x 0.34"		
Mounting	-	Through Hole standard; Surface Mount (option "S")		
Weight	g	10.5		
Warranty	yrs	Two Years		

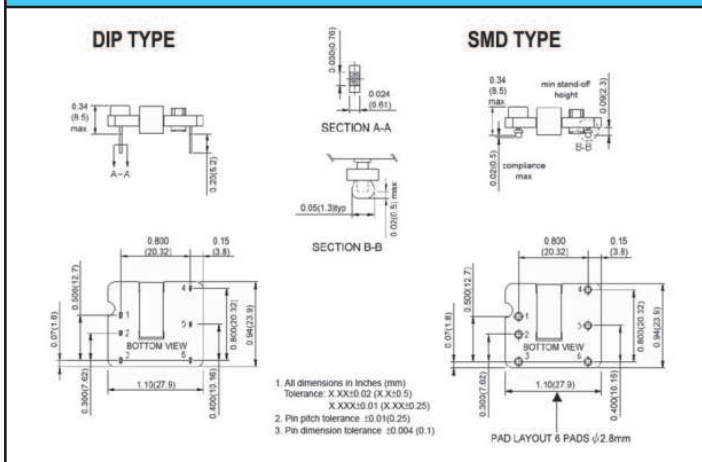
Notes:

See installation manual

Model Selector

Output Voltage (VDC)	Output Current (A)	Output Power (W)	Input Voltage (VDC)	Model	Ripple & Noise (Pk-Pk mV)	Nominal Input Current (mA)	Efficiency (%)	Maximum Load Capacitance (uF)
3.3	4	13.2	9 - 36	PXA15-24WS3P3/NT	100	680	85	1000
3.3	3.5	11.5	18 - 36	PXA15-24S3P3/NT	75	587	86	1000
3.3	4	13.2	18 - 75	PXA15-48WS3P3/NT	100	340	85	1000
3.3	3.5	11.5	36 - 75	PXA15-48S3P3/NT	75	297	85	1000
5	3	15	9 - 36	PXA15-24WS05/NT	100	754	87	1000
5	3	15	18 - 36	PXA15-24S05/NT	75	753	87	1000
5	3	15	18 - 75	PXA15-48WS05/NT	100	377	87	1000
5	3	15	36 - 75	PXA15-48S05/NT	75	377	87	1000
12	1.3	15.6	9 - 36	PXA15-24WS12/NT	100	793	86	330
12	1.25	15	18 - 36	PXA15-24S12/NT	100	753	87	330
12	1.3	15.6	18 - 75	PXA15-48WS12/NT	100	397	86	330
12	1.25	15	36 - 75	PXA15-48S12/NT	100	377	87	330
15	1	15	9 - 36	PXA15-24WS15/NT	100	763	86	220
15	1	15	18 - 36	PXA15-24S15/NT	100	744	88	220
15	1	15	18 - 75	PXA15-48WS15/NT	100	382	86	220
15	1	15	36 - 75	PXA15-48S15/NT	100	372	88	220

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Pinout

Pin #	Function
1	+ Input
2	- Input
3	Remote On/Off
4	+ Output
5	Trim
6	- Output

Options

N	Negative logic remote on/off
P	Positive logic remote on/off
S	Surface mount termination
T	Trim - remote adjust
Preferred	Example PXA15-24WS3P3/NT

Other Industrial Products

CC-E	1.5 - 30W, 5, 12, 24 & 48V DC-DC
PX	10 - 60W, 12, 24 & 48V DC-DC

Single & Dual Output 15W DC-DC Converters

Features

- ◆ Industry Standard 1" x 1" Footprint
- ◆ Through Hole
- ◆ Agency Approved
- ◆ Wide range input (PXB15-xxW)
- ◆ Six sided shielding



Key Market Segments & Applications



Specifications

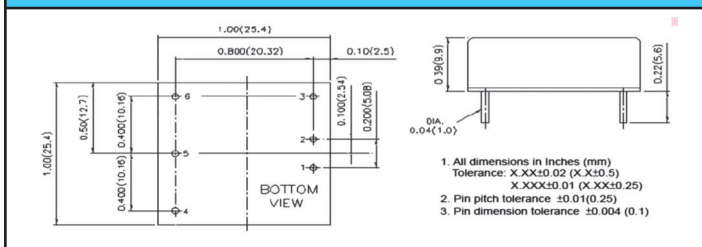
Model		PXB15-xxS	PXB15-xxWS	PXB15-xxD	PXB15-xxWD
Max Output Power	W	15W			
Voltage Accuracy	%	±1%			
Voltage Adjustment (T Suffix)	%	±10%		n/a	
Minimum Load	-	None		25% each output	
Line Regulation	%	±0.2%		±0.5%	
Load Regulation (0% to 100%)	%	±0.2%		±1.0%	
Start up time	ms	30ms			
Remote on/off	-	Negative Logic /N (standard): ON: Short or <1.2V, OFF: Open or 3-15V Positive Logic /P (optional): ON: Open or 3-15V, OFF Short or <1.2V			
Temperature Coefficient	°C	<±0.02%/°C			
Operating Temperature	°C	-40 to +85°C (See derating curves)			
Maximum Case Temperature	°C	105°C			
Storage Temperature	°C	-55 to 125°C			
Thermal Shock	-	MIL-STD-810F			
Relative Humidity (non condensing)	%	5 to 95%			
Transient Response (25% step load change)	µs	250µs recovery			
Overvoltage Protection (Zener clamp)	VDC	3.3V (3.7-5.4); 5V (5.6-7.0); 12V (13.5-19.6); 15V (16.8-20.5)			
Overcurrent and Short Circuit Protection	-	Typically at 150%, hiccup with self recovery			
Input Surge Voltage (Maximum for 100ms)	VDC	12V input: 36V, 24V input: 50V, 48V input: 100V			
Reflected input ripple (peak to peak)	mA	30mA			
Isolation Voltage (Input to Output)	VDC	1600VDC minimum			
Isolation Voltage I/P to Case , O/P to Case	VDC	1000VDC minimum			
Isolation Resistance	Ω	109 Ohms minimum			
Isolation Capacitance (max)	pF	1000pF			
Typical Switching Frequency (Fixed)	Hz	400kHz			
MTBF (BELLCORE TR-NWT-000332)	Hours	1,330,000			
Vibration	-	MIL-STD-810F			
Conducted and Radiated Emissions	-	EN55022 Level A			
Immunity	-	EN61000-4-2,-3,-4,-5,-6			
Safety Agency Approval	-	IEC60950-1, UL60950-1, EN60950-1, CE Mark			
Size (L x W x H)	in	1 x 1 x 0.39"			
Mounting	-	Through Hole			
Weight	g	15			
Warranty	yrs	Two Years			

Notes:
See installation manual

Model Selector

Output Voltage (VDC)	Output Current (A)	Output Power (W)	Input Voltage (VDC)	Model	Ripple & Noise (Pk-Pk mV)	Nominal Input Current (mA)	Efficiency (%)	Maximum Load Capacitance (uF)
3.3	4	13.2	9 - 18	PXB15-12S3P3/NT	75	1375	84	1000
3.3	4	13.2	9 - 36	PXB15-24WS3P3/NT	75	688	86	1000
3.3	4	13.2	18 - 36	PXB15-24S3P3/NT	75	671	86	1000
3.3	4	13.2	18 - 75	PXB15-48WS3P3/NT	75	336	86	1000
3.3	4	13.2	36 - 75	PXB15-48S3P3/NT	75	336	86	1000
5	3	15	9 - 18	PXB15-12S05/NT	75	1524	86	1000
5	3	15	9 - 36	PXB15-24WS05/NT	75	762	86	1000
5	3	15	18 - 36	PXB15-24S05/NT	75	763	86	1000
5	3	15	18 - 75	PXB15-48WS05/NT	75	382	86	1000
5	3	15	36 - 75	PXB15-48S05/NT	75	372	88	1000
12	1.3	15.6	9 - 18	PXB15-12S12/NT	100	1605	85	330
12	1.3	15.6	9 - 36	PXB15-24WS12/NT	100	783	87	330
12	1.3	15.6	18 - 36	PXB15-24S12/NT	100	783	87	330
12	1.3	15.6	18 - 75	PXB15-48WS12/NT	100	392	87	330
12	1.3	15.6	36 - 75	PXB15-48S12/NT	100	387	88	330
15	1	15	9 - 18	PXB15-12S15/NT	100	1506	87	220
15	1	15	9 - 36	PXB15-24WS15/NT	100	753	87	220
15	1	15	18 - 36	PXB15-24S15/NT	100	744	88	220
15	1	15	18 - 75	PXB15-48WS15/NT	100	377	87	220
15	1	15	36 - 75	PXB15-48S15/NT	100	372	88	220
Dual Outputs								
±5	±1.5	15	9-18	PXB15-12D05/N	100	1543	85	±500
±5	±1.5	15	9-36	PXB15-24WD05/N	100	772	85	±500
±5	±1.5	15	18-36	PXB15-24D05/N	100	772	85	±500
±5	±1.5	15	18-75	PXB15-48WD05/N	100	386	85	±500
±5	±1.5	15	36-75	PXB15-48D05/N	100	386	85	±500
±12	±0.625	15	9-18	PXB15-12D12/N	100	1506	87	±150
±12	±0.625	15	9-36	PXB15-24WD12/N	100	753	87	±150
±12	±0.625	15	18-36	PXB15-24D12/N	100	744	88	±150
±12	±0.625	15	18-75	PXB15-48WD12/N	100	382	86	±150
±12	±0.625	15	36-75	PXB15-48D12/N	100	368	89	±150
±15	±0.500	15	9-18	PXB15-12D15/N	100	1488	88	±100
±15	±0.500	15	9-36	PXB15-24WD15/N	100	744	88	±100
±15	±0.500	15	18-36	PXB15-24D15/N	100	744	88	±100
±15	±0.500	15	18-75	PXB15-48WD15/N	100	377	87	±100
±15	±0.500	15	36-75	PXB15-48D15/N	100	372	88	±100

Outline Drawing



Heat Sink (0.22" high)

HAPXB	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

Pinout

Pin #	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
3	Remote On/Off	Remote On/Off
4	+ Output	+ Output
5	Trim	Common
6	- Output	- Output

Options

N	Negative logic remote on/off
P	Positive logic remote on/off
T	Trim - remote adjust (single output models only)
Preferred	Example PXB15-24WS3P3/NT

Other Industrial Products

CC-E	1.5 - 30W, 5, 12, 24 & 48V DC-DC
PX	10 - 60W, 12, 24 & 48V DC-DC

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Single and Dual Output 5W DC-DC Converters

Features

- ◆ Industry Standard 24 Pin Dip Package
- ◆ Five Sided Shielding
- ◆ Agency Approved
- ◆ 3.3, 5, 12, 15 volt outputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



Key Market Segments & Applications



Specifications			
Model			
Max Output Power	W	5W	
Voltage Accuracy	%	±2%	
Voltage Adjustment	-	None	
Minimum Load (1)	%	10%	
Line Regulation	%	±0.2%	
Load Regulation (25% to 100%)	%	Single Output: ±0.5%, Dual Output: ±1%	
Cross Regulation (25% to 100%)	%	Dual: ±5%	
Ripple and Noise	-	50mVp-p (20MHz bandwidth)	
Start up time	-	600ms	
Temperature Coefficient	°C	<±0.02%/°C	
Operating Temperature	-	See derating curves	
Maximum Case Temperature	°C	100°C	
Storage Temperature	°C	-55 to 105°C	
Thermal Shock	-	MIL-STD-810D	
Relative Humidity (non condensing)	%	5 to 95%	
Transient Response	-	200us recovery (25% step load change)	
Overvoltage Protection	-	None	
Overcurrent Protection	-	Typically at 170%, self recovery	
Input Surge Voltage (Max for 100ms)	V	12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak) (2)	mA	20mA	
Isolation Voltage	-	1600VDC min.	
Isolation Resistance	-	10 Ohms min.	
Isolation Capacitance (max)	pF	300pF	
Typical Switching Frequency (Fixed)	kHz	300kHz	
MTBF (BELLCORE TR-NWT-000332)	hrs	3,165,000 hours	
Vibration	-	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted and Radiated Emissions	-	EN55022 Level A	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval	-	IEC606950, UL1950, EN60950, CE Mark	
Size (L x W x H)	in	1.25 x 0.80 x 0.40"	
Weight	oz/g	DIP 0.55 oz (16g) SMD 0.62oz (18g)	
Warranty	yrs	Two Year	

Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device
- (2) 12uH source impedance in series with + input
- (3) SMD package: Add suffix "/SMD" to model number.

Model Selector

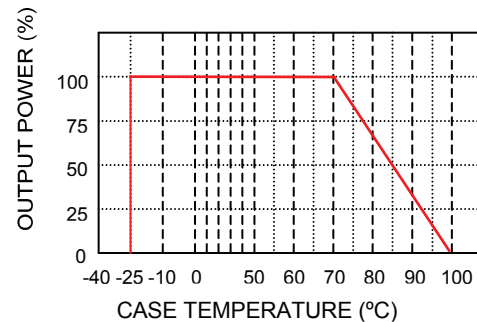
Model	Output Voltage (V)	Output Current (mA)	Output Power (W)	Input Voltage (V)	Nominal Input Current (mA)	Efficiency (%)	Maximum Load Capacitance (uF)
PXC5-24WS3P3	3.3	1000	3.3	9 - 36VDC	191	76	2200
PXC5-48WS3P3	3.3	1000	3.3	18 - 75VDC	100	73	2200
PXC5-24WS05	5	1000	5	9 - 36VDC	285	77	1000
PXC5-48WS05	5	1000	5	18 - 75VDC	145	76	1000
PXC5-24WS12	12	470	5.64	9 - 36VDC	309	80	220
PXC5-48WS12	12	470	5.64	18 - 75VDC	155	80	220
PXC5-24WS15	15	400	6	9 - 36VDC	329	80	150
PXC5-48WS15	15	400	6	18 - 75VDC	167	79	150
Dual Outputs							
PXC5-24WD05	+/-5	+/-500	5	9 - 36VDC	282	78	+/-680
PXC5-48WD05	+/-5	+/-500	5	18 - 75VDC	145	76	+/-680
PXC5-24WD12	+/-12	+/-230	5.52	9 - 36VDC	295	82	+/-100
PXC5-48WD12	+/-12	+/-230	5.52	18 - 75VDC	151	80	+/-100
PXC5-24WD15	+/-15	+/-190	5.7	9 - 36VDC	313	80	+/-68

DIP Pin Connection

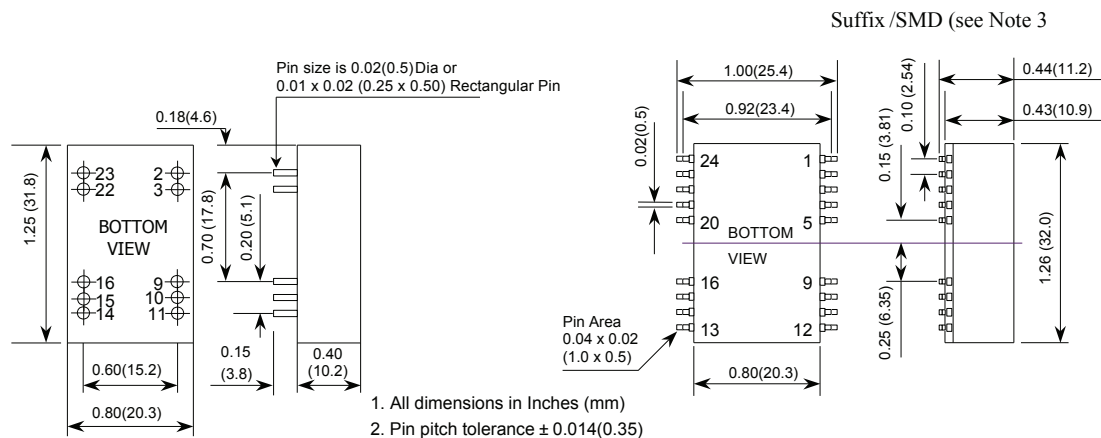
SMD Pin Connection

Pin #	Function	Pin #	Function
Single	Dual	Single	Dual
2	- Input	2	- Input
3	- Input	3	- Input
9	NC	9	NC
10	no pin	10	NC
11	NC	11	NC
23	+ Input	23	+ Input
22	+ Input	22	+ Input
16	- Output	16	- Output
15	no pin	15	NC
14	+ Output	14	+ Output
		Others	NC

Derating Curve



PXC5 Outline Drawing



Other Industrial Products

SX	Surface Mount 20W, DC-DC converters
PX	10-40W DC-DC converters
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks
PS	1.5-10W, DC-DC converters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pxc-series.htm



Single and Dual Output 10 to 20W DC-DC Converters

Features

- ◆ Industry Standard 2" x 1" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



Key Market Segments & Applications



Specifications			
Model	PXD10	PXD15	PXD20
Max Output Power	10W	15W	20W
Voltage Accuracy	±2%	±1%	±1%
Voltage Adjustment (Single Output Only)	None	None	±10%
Minimum Load, each output (1)	10%	10%	Single 0%; Dual 10%
Line Regulation	±1%	±1%	±0.2%
Load Regulation (10% to 100%)	Single Output: ±1% Dual Output: ±2%	Single Output: ±1% Dual Output: ±2%	±0.5%
Cross Regulation (25% to 100%)	±5%		
Ripple and Noise	Single 50mV, Dual 75mV		Single 75mV, Dual 100mV
Start up time	20ms		10ms
Remote on/off (3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V Negative Logic: ON: Short or <1.2V, OFF: Open or 3.5-12V		
Temperature Coefficient	<±0.02%/°C		
Operating Temperature	See derating curves		
Maximum Case Temperature	100°C		
Storage Temperature	-55 to 105°C		
Thermal Shock	MIL-STD-810D		
Relative Humidity	5 to 95% (non condensing)		
Transient Response (25% step load chg.)	500us recovery	500us recovery	300us recovery
Overvoltage Protection (Zener clamp)	1.5-3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V		
Overcurrent & Short Circuit Protection	Typically at 150%, hiccup with self recovery		
Input Surge Voltage (Max. for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V		
Reflected input ripple (peak to peak) (2)	30mA	20mA	20mA
Isolation Voltage	1600VDC minimum		
Isolation Resistance	10 ⁹ Ohms minimum		
Isolation Capacitance (max)	300pF		1000pF
Typical Switching Frequency (Fixed)	300kHz	Single: 500kHz Dual: 300kHz	500kHz
MTBF (BELLCORE TR-NWT-000332)	1,976,000 hours	2,041,000 hours	1,791,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis		
Conducted and Radiated Emissions	EN55022 Level A		
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2		
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)		
Size (L x W x H)	2x1x0.4"		
Weight	0.95 oz (27g)		
Warranty	Two Year		

Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device * See website for detailed specifications
 (2) 12uH source impedance in series with + input
 (3) Positive logic standard on 20W (see options table). Input current 2.5mA

Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
3.3	2.0	6.6	9 - 18VDC	PXD10-12S3P3	80
3.3	2.0	6.6	18 - 36VDC	PXD10-24S3P3	80
3.3	2.0	6.6	36 - 75VDC	PXD10-48S3P3	79
3.3	5.0	16.5	9 - 18VDC	PXD20-12S3P3	84
3.3	5.0	16.5	18 - 36VDC	PXD20-24S3P3	86
3.3	5.0	16.5	36 - 75VDC	PXD20-48S3P3	87
5	2.0	10	9 - 36VDC	PXD10-24WS05	80
5	2.0	10	18 - 75VDC	PXD10-48WS05	80
5	4.0	20	9 - 18VDC	PXD20-12S05	87
5	4.0	20	18 - 36VDC	PXD20-24S05	89
5	4.0	20	36 - 75VDC	PXD20-48S05	89
12	0.83	10	9 - 36VDC	PXD10-24WS12	82
12	0.83	10	18 - 75VDC	PXD10-48WS12	84
12	1.67	20	9 - 18VDC	PXD20-12S12	85
12	1.67	20	18 - 36VDC	PXD20-24S12	87
12	1.67	20	36 - 75VDC	PXD20-48S12	88
15	0.67	10	9 - 36VDC	PXD10-24WS15	80
15	0.67	10	18 - 75VDC	PXD10-48WS15	84
15	1.33	20	9 - 18VDC	PXD20-12S15	85
15	1.33	20	18 - 36VDC	PXD20-24S15	87
15	1.33	20	36 - 75VDC	PXD20-48S15	87
Dual Outputs					
±5	±1.5	15	9 - 18VDC	PXD15-12D05	83
±5	±1.5	15	18 - 36VDC	PXD15-24D05	84
±5	±1.5	15	36 - 75VDC	PXD15-48D05	85
±12	±0.416	10	9 - 36VDC	PXD10-24WD12	80
±12	±0.416	10	18 - 75VDC	PXD10-48WD12	78
±12	±0.833	20	9 - 18VDC	PXD20-12D12	86
±12	±0.833	20	18 - 36VDC	PXD20-24D12	87
±12	±0.833	20	36 - 75VDC	PXD20-48D12	88
±15	±0.333	10	9 - 36VDC	PXD10-24WD15	80
±15	±0.333	10	18 - 75VDC	PXD10-48WD15	81
±15	±0.667	20	9 - 18VDC	PXD20-12D15	86
±15	±0.667	20	18 - 36VDC	PXD20-24D15	87
±15	±0.667	20	36 - 75VDC	PXD20-48D15	87

Pinout

PIN#	PXD10/PXD15		PXD20	
	Single	Dual	Single	Dual
1			+Vin	
2			-Vin	
3			+Vout	
4	No Pin	Com	Trim	Com
5			-Vout	
6	Remote On/Off*		Remote On/Off	

* optional, see table below. If not requested, Pin is not fitted.

Remote On/Off Option

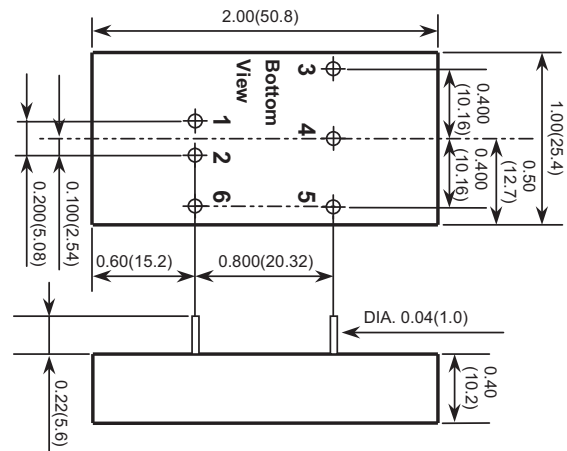
Suffix	Function
-P*	Positive Logic (* Included in PXD20 models)
-N	Negative Logic

Example: PXD1548S12-N

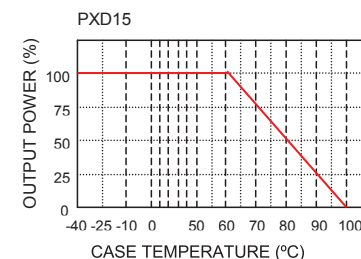
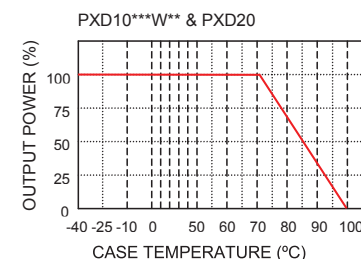
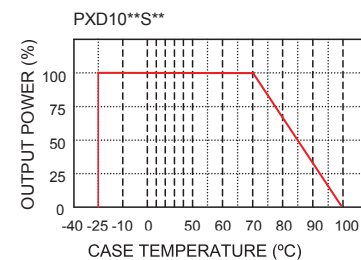
Heat Sink (0.22" high)

HAPXD	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

Outline Drawing



Derating Curves



Other Industrial Products

CC-E	1.5-30W, 5 to 48VDC input
PAQ,PAH,PAF	50-700W quarter, half & full bricks

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Single and Dual Output 30W DC-DC Converters

Features

- ◆ Industry Standard 2" x 1" Footprint
- ◆ Six Sided Shielding
- ◆ Safety Agency Certifications
- ◆ 9-36V or 18-75VDC Input
- ◆ Wide range input



Key Market Segments & Applications



Specifications

Model	Single Output	Dual Output
Max Output Power	30W	
Voltage Accuracy	±1%	
Voltage Adjustment	±10%	None
Minimum Load	None	
Line Regulation	±0.2%	
Load Regulation	±0.5%	±1%
Cross Regulation (25% to 100%)	-	±5%
Ripple and Noise (peak to peak)	<5.1V output: 100mV, 12-15V output: 150mV	
Start up time	30ms	
Remote on/off	Positive Logic: ON: Open or 3-12V, OFF Short or <1.2V Negative Logic: ON: Short or <1.2V, OFF: Open or 3-12V	
Temperature Coefficient	<±0.02%/°C	
Operating Temperature	-40 to +85°C, derating necessary above 50°C	
Maximum Case Temperature	105°C (Overtemperature Protection 115°C)	
Storage Temperature	-55 to 125°C	
Thermal Shock	MIL-STD-810F	
Relative Humidity (non condensing)	5 to 95%	
Transient Response (25% step load change)	250us recovery	
Overvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak)	20mA	
Isolation Voltage	1600VDC minimum	
Isolation Resistance	109 Ohms minimum	
Isolation Capacitance (max)	1500pF	
Typical Switching Frequency (Fixed)	430kHz	
MTBF (BELLCORE TR-NWT-000332)	3,163,000 hours	
Vibration	MIL-STD-810F	
Conducted and Radiated Emissions (1)	EN55022 Level A	
Immunity (2)	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Certifications	IEC60950-1, UL60950-1, EN60950-1, CE Mark	
Size (L x W x H)	2x1x0.4"	
Weight	1.07 oz (30.5g)	
Warranty	Two Year	

Notes:

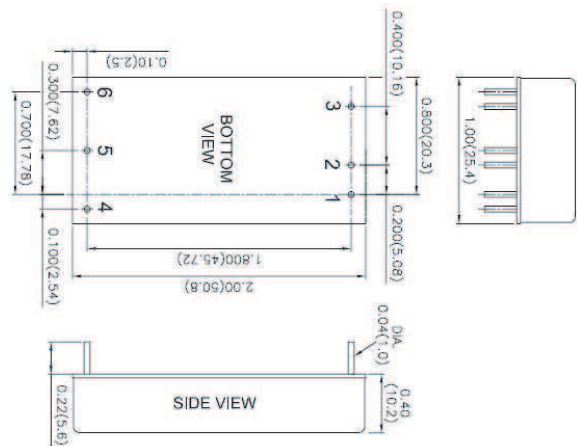
(1) With external ceramic capacitor (24V: 4.7uF, 48V: 2.2uF) connected across input pins

(2) For EN61000-4-4 & -5 compliance fit external electrolytic capacitor (24V: 330uF, 48V: 220uF) connected across input pins

Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
Single Outputs					
3.3V	7.5A	24.75W	9 - 36VDC	PXD30-24WS3P3	86%
3.3V	7.5A	24.75W	18 - 75VDC	PXD30-48WS3P3	86%
5V	6.0A	30W	9 - 36VDC	PXD30-24WS05	88%
5V	6.0A	30W	18 - 75VDC	PXD30-48WS05	88%
12V	2.5A	30W	9 - 36VDC	PXD30-24WS12	89%
12V	2.5A	30W	18 - 75VDC	PXD30-48WS12	90%
15V	2.0A	30W	9 - 36VDC	PXD30-24WS15	89%
15V	2.0A	30W	18 - 75VDC	PXD30-48WS15	91%
Dual Outputs					
±5V	±3.0A	30W	9 - 36VDC	PXD30-24WD05	88%
±5V	±3.0A	30W	18 - 75VDC	PXD30-48WD05	88%
±12V	±1.25A	30W	9 - 36VDC	PXD30-24WD12	87%
±12V	±1.25A	30W	18 - 75VDC	PXD30-48WD12	88%
±15V	±1.0A	30W	9 - 36VDC	PXD30-24WD15	87%
±15V	±1.0A	30W	18 - 75VDC	PXD30-48WD15	88%

Outline Drawing



Pinout

Pin #	Function	
	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
3	Remote On/Off	Remote On/Off
4	+ Output	+ Output
5	- Output	Common
6	Trim	- Output

Remote On/Off Option

Suffix	Function
No Suffix	Positive Logic
-N	Negative Logic

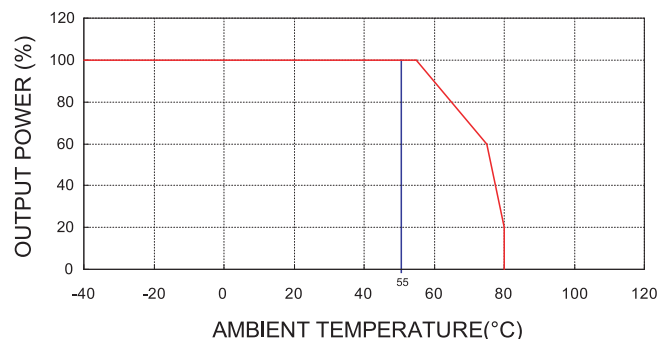
Heat Sink (0.22" high)

HAPXD	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

Other Industrial Products

PXD10, 20	10-20W, 12V, 24V, 48V input 2x1" DC-DC
PXE20, 30	20-30W, 12V, 24V, 48V input 2x1.6" DC-DC
PXF30-40	30-40W, 12V, 24V, 48V input 2x2" DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC

Derating Curves



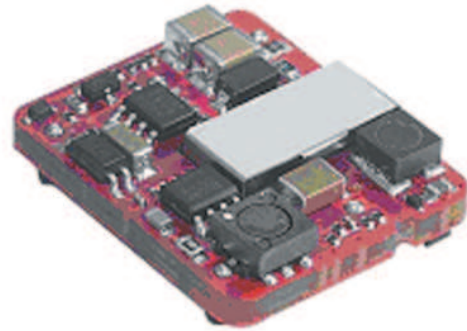
For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Single Output 15W SMT DC-DC Converters

Features

- ◆ Industry Standard Footprint
- ◆ Agency Approved
- ◆ 24V and 48V Inputs
- ◆ RoHS Compliant
- ◆ UL, CSA, EN, CE approvals
- ◆ Surface Mount



Key Market Segments & Applications



Specifications			
Model			
Max Output Power	W	15W	
Voltage Accuracy	%	±1%	
Voltage Adjustment	%	±10%	
Minimum Load	A	0	
Line Regulation	%	±0.2%	
Load Regulation (0% to 100%)	%	±0.2%	
Ripple & Noise	mV	3.3V, 5V: 75mV, 12V, 15V: 100mV	
Start up time	ms	30ms	
Remote on/off	(1) -	Positive Logic: ON: Open or 3-15V, OFF Short or 0.7-1.2V Negative Logic: ON: Short or 0.7-1.2V, OFF: Open or 3-15V	
Temperature Coefficient	%/°C	<±0.02%/°C	
Operating Temperature	°C	-40 to +85°C (Sufficient cooling to be provided)	
Storage Temperature	°C	-55 to 125°C	
Thermal Shock	-	MIL-STD-810D	
Relative Humidity	%	5 to 95% (non condensing)	
Transient Response	us	300us recovery (25% step load change)	
Overvoltage Protection	V	3.3V: 3.7-5.4V, 5V: 5.6-7V, 12V: 13.5-19.6V, 15V: 16.8-20.5V	
Overcurrent/Short Circuit Protection	%	110-140%	
Input Surge Voltage	V	24V input: 50V, 48V input: 100V (Maximum for 100ms)	
Reflected input ripple	(2) mA	30mA	
Isolation Voltage	V	2250VDC minimum	
Isolation Resistance	Ohms	10M Ohms minimum	
Isolation Capacitance (max)	pF	1000pF	
Typical Switching Frequency (Fixed)	kHz	3.3V, 5V: 270kHz, 12V, 15V: 470kHz	
MTBF	hours	2,200,000 hours (Case I, 50% stress, 40°C)	
Vibration	-	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted/Radiated Emissions	(3) -	EN55022 Level B	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval	-	IEC60950-1, UL60950-1, EN60950-1	
Size (L x W x H)	in	1.1x0.94x0.335	
Weight	oz	0.36 oz (10.5g)	
Warranty	yrs	One Year	

Notes:

(1) Input current 20mA, see option table for ordering

(2) 12uH source impedance in series with + input

(3) Input p filter needed: 220uF across supply, 12uH, 33uF mounted close to converter

Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
3.3	3.5	11.55	18 - 36	PXDA15-24S3P3	85
3.3	3.5	11.55	36 - 75	PXDA15-48S3P3	86
5	3	15	18 - 36	PXDA15-24S05	86
5	3	15	36 - 75	PXDA15-48S05	87
12	1.25	15	18 - 36	PXDA15-24S12	85
12	1.25	15	36 - 75	PXDA15-48S12	86
15	1	15	18 - 36	PXDA15-24S15	87
15	1	15	36 - 75	PXDA15-48S15	88

Pinout

PIN#	Function
1	+ Input
2	- Input
3	Remote On/Off
4	+ Output
5	Trim
6	- Output

Remote On/Off Option

Suffix	Function
Blank	No On/Off
-P	Positive Logic
-N	Negative Logic
Example: PXDA1548S12-N	

Other Industrial Products

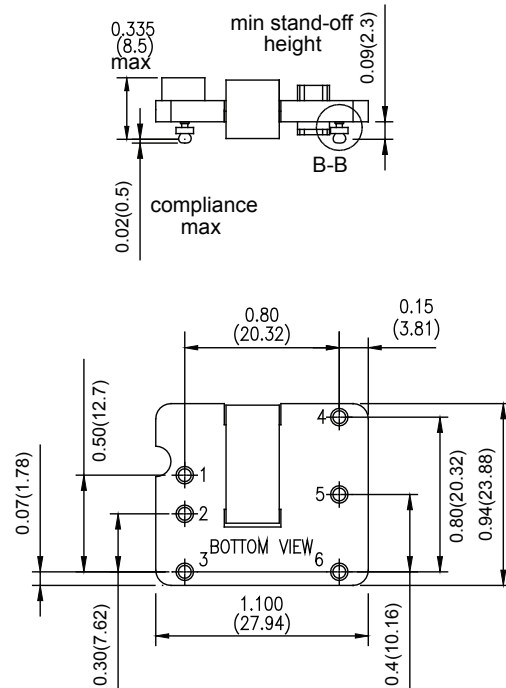
Suffix	Function
PXD, PXE, PXF	10-40W, 12, 24 & 48V input DC-DC converters
PS	1.5-10W, 5, 12, 24 & 48V input DC-DC converters
PAQ, PAH, PAF	50-700W quarter, half and full bricks

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm

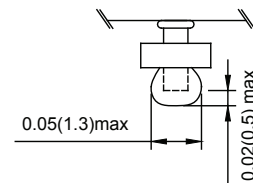


Outline Drawing

SMD TYPE



PAD LAYOUT 6 PADS



SECTION B-B

1. All dimensions in inches (mm)
2. Tolerance : $x.xx \pm 0.02 (x.xx \pm 0.5)$
 $x.xxx \pm 0.010 (x.xx \pm 0.25)$
3. Pin pitch tolerance $\pm 0.014 (0.35)$

Single and Dual Output 20W to 30W DC-DC Converters

Features

- ◆ Industry Standard 2" x 1.6" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



Key Market Segments & Applications



Specifications		
Model	PXE20	PXE30
Max Output Power	20W	30W
Voltage Accuracy	±2%	±1%
Voltage Adjustment	±10%	
Minimum Load, each output (1)	10%	10%
Line Regulation	±0.2% for single, ±0.5% for dual	
Load Regulation (25% to 100%)	Single ±0.5%, Dual ±3%	Single ±0.5%, Dual ±1%
Cross Regulation (25% to 100%)	Dual ±5%	
Ripple and Noise (P-P)	Single: 75mV; Dual: 100mV	
Start up time	20ms - 1100ms typ.	10 - 25ms typ.
Remote on/off (3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V	
Temperature Coefficient	<±0.02%/°C	
Operating Temperature	-40 to +100°C, see derating curve	
Maximum Case Temperature	100°C (Over temperature protection at 115°C - PXE30 model)	
Storage Temperature	-55 to 105°C	
Thermal Shock	MIL-STD-810D	
Relative Humidity (non condensing)	5 to 95%	
Transient Response (25% step load change)	500us recovery	300us recovery
Overvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak) (2)	25mA	30mA
Isolation Voltage	1600VDC minimum (Input-Output, Input-Case)	
Isolation Resistance	10 ⁹ Ohms minimum	
Isolation Capacitance (max)	300pF	1000pF
Typical Switching Frequency (Fixed)	300kHz	
MTBF (BELLCORE TR-NWT-000332)	1,976,000 hours	1,535,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted and Radiated Emissions	EN55022 Level A	
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)	
Size (L x W x H)	2 x 1.6 x 0.4"	
Weight	1.69 oz (48g)	
Warranty	Two Year	

Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device
- (2) 12uH source impedance in series with + input
- (3) Max sink current 20mA (PXE20), 2.5mA (PXE30); The on/off pin is referenced to the negative input

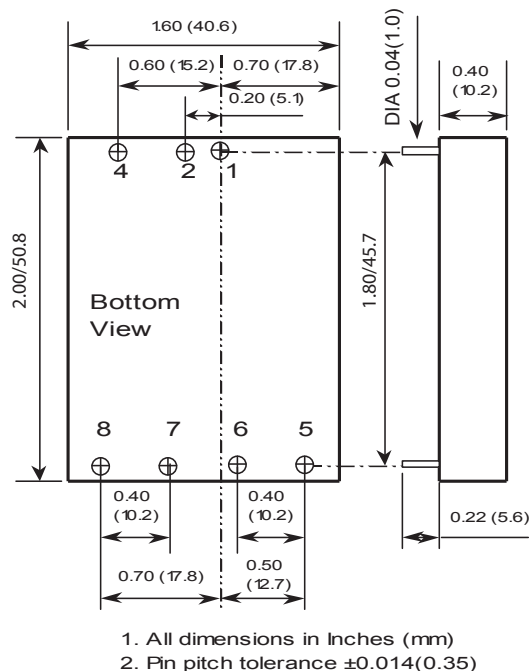
Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (VDC)	Model	Eff.(%)
Single Outputs					
3.3	6.0	18	9 - 18	PXE30-12S3P3	85
3.3	6.0	20	10 - 40	PXE30-24WS3P3	87
3.3	6.0	18	18 - 36	PXE30-24S3P3	86
3.3	6.0	20	18 - 75	PXE30-48WS3P3	87
3.3	6.0	18	36 - 75	PXE30-48S3P3	87
5	4.0	20	9 - 36	PXE20-24WS05	79
5	4.0	20	18 - 75	PXE20-48WS05	80
5	6.0	30	9 - 18	PXE30-12S05	87
5	6.0	30	10 - 40	PXE30-24WS05	87
5	6.0	30	18 - 36	PXE30-24S05	88
5	6.0	30	18 - 75	PXE30-48WS05	88
5	6.0	30	36 - 75	PXE30-48S05	89
12	1.67	20	9 - 36	PXE20-24WS12	81
12	1.67	20	18 - 75	PXE20-48WS12	81
12	2.5	30	9 - 18	PXE30-12S12	88
12	2.5	30	10 - 40	PXE30-24WS12	87
12	2.5	30	18 - 36	PXE30-24S12	89
12	2.5	30	18 - 75	PXE30-48WS12	87
12	2.5	30	36 - 75	PXE30-48S12	90
15	1.33	20	9 - 36	PXE20-24WS15	81
15	1.33	20	18 - 75	PXE20-48WS15	81
15	2.0	30	9 - 18	PXE30-12S15	88
15	2.0	30	10 - 40	PXE30-24WS15	88
15	2.0	30	18 - 36	PXE30-24S15	89
15	2.0	30	18 - 75	PXE30-48WS15	88
15	2.0	30	36 - 75	PXE30-48S15	90
Dual Outputs					
±5	±2.0	20	9 - 36	PXE20-24WD05	79
±5	±2.0	20	18 - 75	PXE20-48WD05	79
±12	±0.833	20	9 - 36	PXE20-24WD12	81
±12	±0.833	20	18 - 75	PXE20-48WD12	83
±12	±1.25	30	9 - 18	PXE30-12D12	87
±12	±1.25	30	18 - 36	PXE30-24D12	88
±12	±1.25	30	36 - 75	PXE30-48D12	88
±15	±0.666	20	9 - 36	PXE20-24WD15	82
±15	±0.666	20	18 - 75	PXE20-48WD15	84
±15	±1.0	30	9 - 18	PXE30-12D15	87
±15	±1.0	30	18 - 36	PXE30-24D15	88
±15	±1.0	30	36 - 75	PXE30-48D15	88

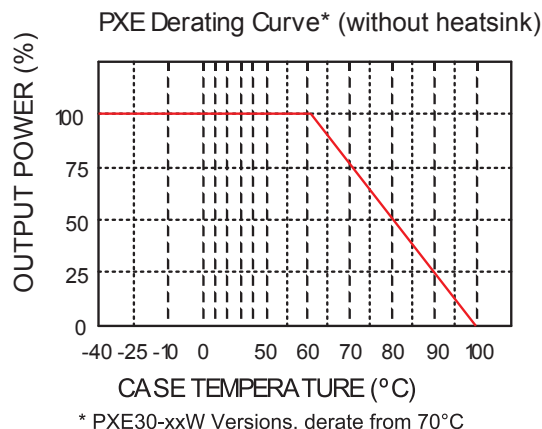
Pinout

PIN #	Function	
	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
4	Remote on/off	Remote on/off
5	No Pin	+ Output
6	+ Output	Common
7	- Output	- Output
8	Trim	Trim

Outline Drawing



Derating Curves



Heat Sink (0.22" high)

HAPXE	(includes thermal adhesive pad)
HAPXECLIP	(two clips required when used)

Other Industrial Products

CC-E	1.5-25W, 5 to 48VDC input
PAQ	50 - 700W quarter, half & full bricks
PAH	
PAF	

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Single, Dual, Triple Output 40W & 60W DC-DC Converters

Features

- ◆ Industry Standard 2" x 2" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12, 24V, and 48V Inputs (including 4:1 ranges)
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



Key Market Segments & Applications



Specifications	
Model	
Maximum Output Power	40W or 60W
Voltage Accuracy (Full Load, Nom. Vin)	Single, Dual and Triple Main $\pm 1\%$, Triple Auxiliaries $\pm 5\%$
Voltage Adjustment (1)	$\pm 10\%$ (Single and Dual Output Only)
Minimum Load, each output (2)	Single Output = 0%, Dual and Triple = 10% of full load rating
Line Regulation	Single / Dual $\pm 0.5\%$, Triple (main) $\pm 1\%$, Triple (auxiliary) $\pm 5\%$
Load Regulation (10% to 100%) (3)	Single $\pm 0.5\%$, Dual $\pm 1\%$, Triple (main) $\pm 2\%$, Triple (auxiliary) $\pm 5\%$
Cross Regulation (25% to 100%) (4)	Triple (main) $\pm 1\%$, Dual/Triple (auxiliary) $\pm 5\%$
Start up time	PXF40: 25ms typ., PXF40xxW, PXF60: 20ms max.
Remote on/off (referenced to negative input)	Positive Logic: ON: Open or 3.0-12V, OFF Short or $< 1.2V$
Temperature Coefficient	$< \pm 0.02\%/^{\circ}C$
Operating Temperature	See derating curves
Maximum Case Temperature	PXF40: 100 $^{\circ}C$, PXF40-xxW 105 $^{\circ}C$, PXF60 110 $^{\circ}C$
Storage Temperature	PXF40: -55 to 105 $^{\circ}C$, PXF40xxW, PXF60 125 $^{\circ}C$
Thermal Shock	MIL-STD-810F
Relative Humidity (non condensing)	5 to 95%
Transient Response (25% step load change)	250us recovery
Overvoltage Protection (Zener clamp)	Typical 3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V
Reflected input ripple (peak to peak) (6)	PXF40: 40mA, PXF40xxW, PXF60: 20mA
Isolation Voltage	Input - Output, Input to Case: 1600VDC minimum
Isolation Resistance	10 ⁹ Ohms minimum
Isolation Capacitance (max)	PXF40, PXF60: 1000pF, PXF40xxW: 2500pF
Switching Frequency (Fixed)	300kHz (typ.)
MTBF (BELLCORE TR-NWT-000332)	PXF40: 1,398,000; PXF40xxW: 1,105,000, PXF60: 1.093,000 hours
Vibration	10 - 55Hz, 10G, 30 minutes each X, Y, Z axis
Conducted and Radiated Emissions	EN55022 Level A, see installation manual
Immunity	EN61000-4-2, -3, -4, -5, -6
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)
Size (L x W x H)	2 x 2 x 0.4"
Weight	2.11 oz (60g)
Warranty	Two Year

- (1) Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Sense and - Sense should be connected to their corresponding outputs; + output, -output.
- (2) Dual and Triple output models require a minimum load of 10% on the output to maintain specified regulation. No load operation will not damage the device.
- (3) Load regulation for triple output: Main output: 10-100%, with 10-100% balanced load on auxiliaries. Auxiliary outputs: 10% to 100% balanced on all outputs.
- (4) Cross regulation for dual output: asymmetrical load 25% / 100% full load. Cross regulation for triple output: Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%. Auxiliary outputs: main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to 100%.
- (5) An external filter capacitor is required for normal operation. The capacitor should be capable of handling a 1A ripple current for 48V and 24V models.
- (6) Simulated Source impedance of 12uH placed in series with + input.

Model Selector

Output Volt(V)	Output Curr(A)	Input Volt(VDC)	Model	Ripple/Noise (mV)	Eff.(%)	Max Load Cap(uF)
Single Outputs						
3.3	8	9 - 18	PXF40-12S3P3	50	84	21000
3.3	10	9 - 36	PXF40-24WS3P3	50	86	25750
3.3	8	18 - 36	PXF40-24S3P3	50	87	21000
3.3	10	18 - 75	PXF40-48WS3P3	50	86	25750
3.3	14	18 - 36	PXF60-24S3P3	75	89	36000
3.3	8	36 - 75	PXF40-48S3P3	50	88	21000
3.3	14	36 - 75	PXF60-48S3P3	75	89	36000
5	8	9 - 18	PXF40-12S05	50	86	13600
5	8	9 - 36	PXF40-24WS05	50	87	13600
5	8	18 - 36	PXF40-24S05	50	89	13600
5	8	18 - 75	PXF40-48WS05	50	88	13600
5	8	36 - 75	PXF40-48S05	50	90	13600
5	12	18 - 36	PXF60-24S05	75	90	20400
5	12	36 - 75	PXF60-48S05	75	90	20400
12	3.333	9 - 18	PXF40-12S12	75	86	2360
12	3.333	9 - 36	PXF40-24WS12	75	87	2360
12	3.333	18 - 36	PXF40-24S12	75	88	2360
12	3.333	18 - 75	PXF40-48WS12	75	87	2360
12	3.333	36 - 75	PXF40-48S12	75	89	2360
12	5	18 - 36	PXF60-24S12	100	90	3550
12	5	36 - 75	PXF60-48S12	100	90	3550
15	2.666	9 - 18	PXF40-12S15	75	87	1510
15	2.666	9 - 36	PXF40-24WS15	75	87	1510
15	2.666	18 - 36	PXF40-24S15	75	89	1510
15	2.666	18 - 75	PXF40-48WS15	75	87	1510
15	2.666	36 - 75	PXF40-48S15	75	89	1510
15	4	18 - 36	PXF60-24S15	100	90	2300
15	4	36 - 75	PXF60-48S15	100	90	2300
Dual Outputs						
±12	±1.667	9 - 36	PXF40-24WD12	120	86	±1200
±12	±1.8	9 - 18	PXF40-12D12	120	85	±1200
±12	±1.8	18 - 36	PXF40-24D12	120	87	±1200
±12	±1.667	18 - 75	PXF40-48WD12	120	86	±1200
±12	±1.8	36 - 75	PXF40-48D12	120	87	±1200
±15	±1.333	9 - 36	PXF40-24WD15	150	86	±750
±15	±1.4	9 - 18	PXF40-12D15	150	85	±750
±15	±1.4	18 - 36	PXF40-24D15	150	87	±750
±15	±1.333	18 - 75	PXF40-48WD15	150	86	±750
±15	±1.4	36 - 75	PXF40-48D15	150	87	±750
Triple Outputs						
3.3V,±12V6.0,±0.4	9 - 18	PXF40-12T3312	50 / 75	83	13000,±330	
3.3V,±12V6.0,±0.4	18 - 36	PXF40-24T3312	50 / 75	85	13000,±330	
3.3V,±12V6.0,±0.4	36 - 75	PXF40-48T3312	50 / 75	86	13000,±330	
5V,±12V 6.0,±0.4	9 - 18	PXF40-12T0512	50 / 75	85	6800, ±330	
5V,±12V 6.0,±0.4	18 - 36	PXF40-24T0512	50 / 75	87	6800, ±330	
5V,±12V 6.0,±0.4	36 - 75	PXF40-48T0512	50 / 75	88	6800, ±330	
5V, ±15V6.0, ±0.3	9 - 18	PXF40-12T0515	50/75	86	6800, ±110	
5V, ±15V6.0, ±0.3	18 - 36	PXF40-24T0515	50/75	87	6800, ±110	
5V, ±15V6.0, ±0.3	36 - 75	PXF40-48T0515	50/75	88	6800, ±110	

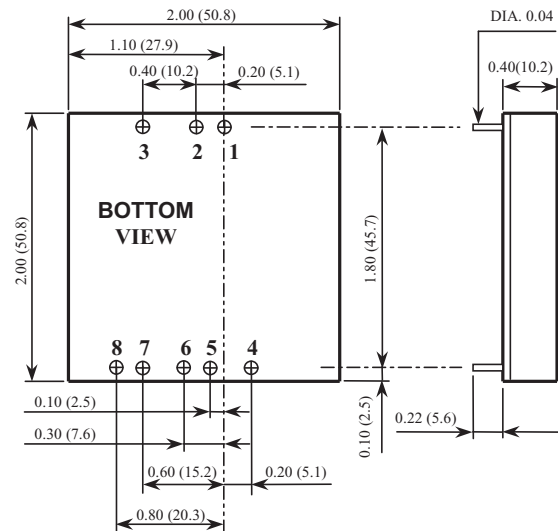
Heat Sink (0.22" high)

HAPXF	(includes thermal adhesive pad)
HAPXFCLIP	(two clips required when used)

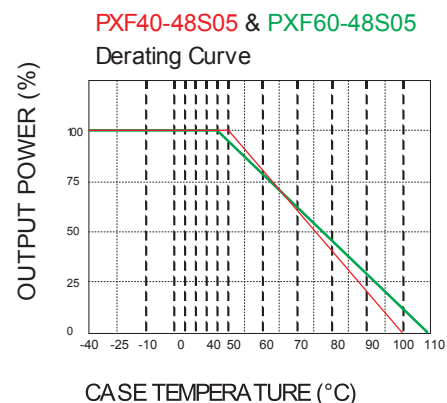
Other Industrial Products

CC-E	1.5 - 30W, 5 to 48VDC input
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks

Outline Drawing



Derating Curves

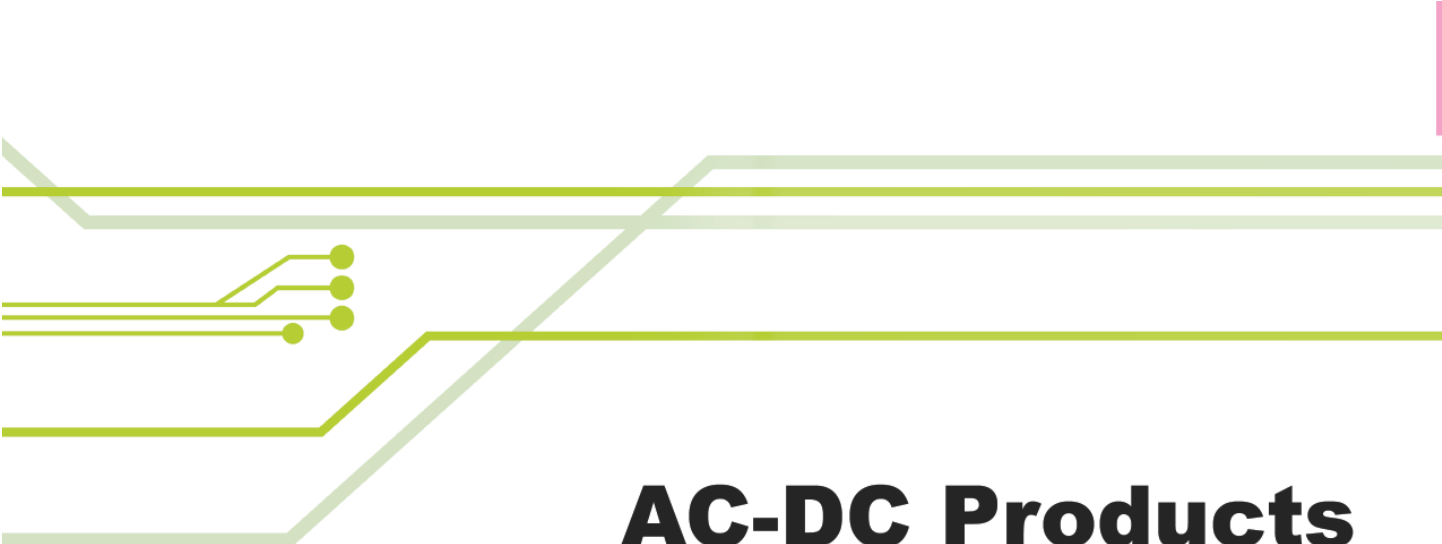


Pinout

PIN#	Function	Dual Output	Triple Output
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	Remote on/off	Remote on/off	Remote on/off
4	No Connection	No Pin	+ Aux
5	- Sense (Note 1)	+ VO	Common
6	+ Sense (Note 1)	Common	- Aux
7	+ Output	Common	+ Output
8	- Output	- VO	- Output (Com)
9	Trim	Trim	N/C

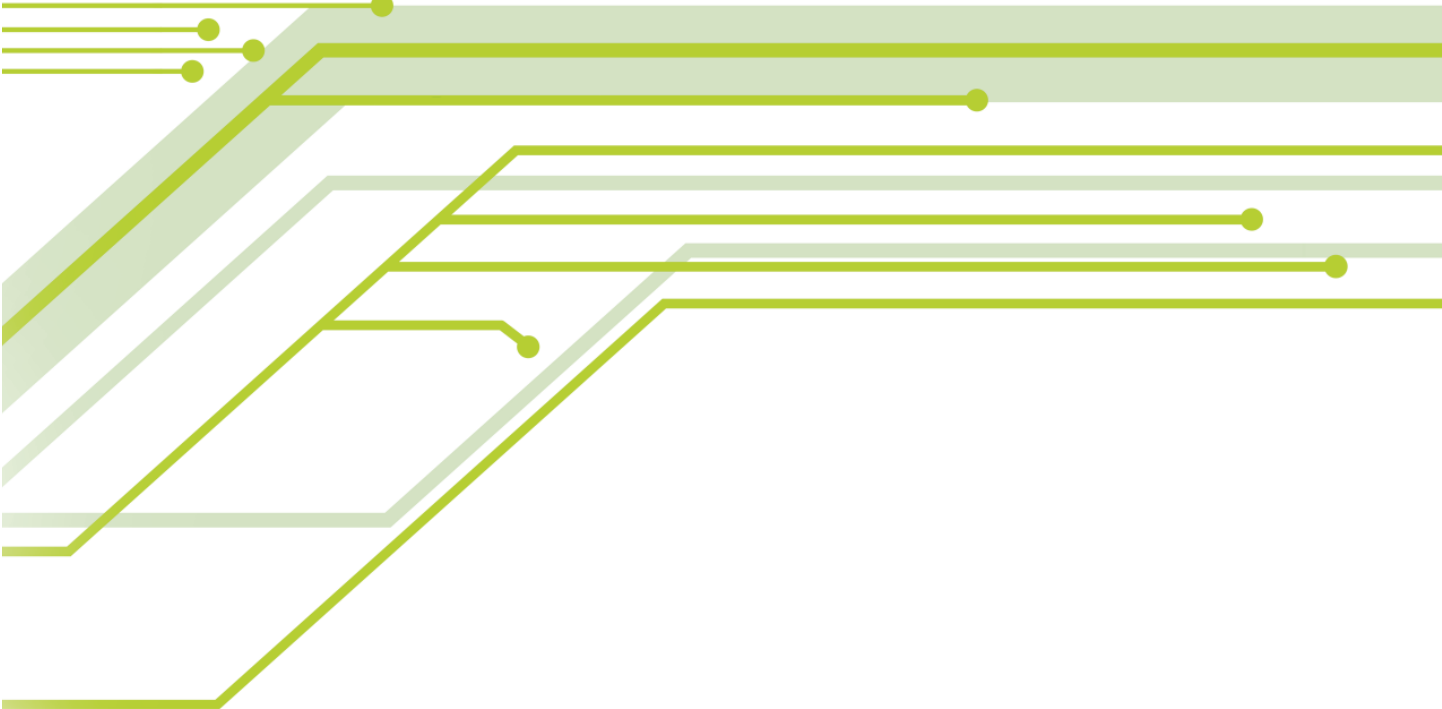
For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm





AC-DC Products

DC-DC Products



Filters

Screw or Wire Termination DIN Rail Mount

Maximum Input Voltage	# of Phases	Current (A)									
		1	6	10	15	30	50	150	300	1000	
250VAC	Single	RSAL									
			RSHN*								
			RSHN*								
500VAC	Three		RTAN*								
			RTAN*								
			RTHN*								

* See website

Single Output Conduction Cooled Power Supplies

Features

- ◆ Universal Input
- ◆ Baseplate cooled
- ◆ No fan required
- ◆ High Efficiency
- ◆ Conformal coated
- ◆ Wide range AC Input



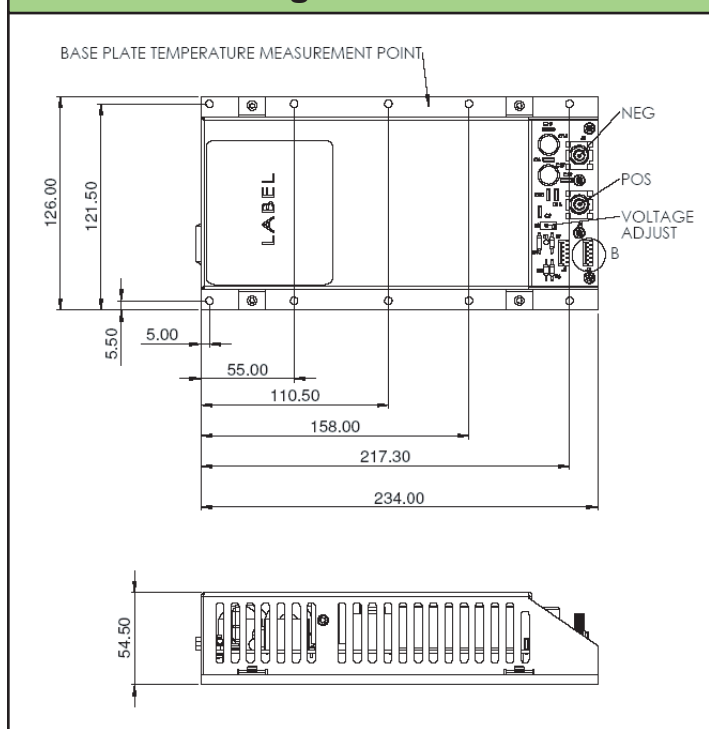
Key Market Segments & Applications



Specifications				
Model		R22095		R22096
Nominal Voltage	V	12V		28V
Output Current	A	33A		16.5A
Output Voltage Adjustment	V	10 - 14V		22.4 - 33.6V
Output Power	W	396W		400W
Line Regulation	mV	50mV		
Load Regulation	mV	50mV		
Ripple & Noise	mV	120mV		
Input Voltage range	-	90 - 264VAC (47 - 63Hz)		
Input Current (Maximum)	A	6.2A		
Inrush Current	A	40A		
Efficiency (200VAC Input)	%	83%		
Power Factor	-	Meets EN61000-3-2		
Temperature Coefficient	-	<0.01%/°C		
Overcurrent Protection	-	105 - 155% of nominal		
Overvoltage Protection	V	125 - 145% (Recycle AC to reset)		
Overtemperature	°C	Shuts down between 90 - 115°C with automatic recovery		
Hold Up Time (230VAC)	ms	25		
Leakage Current (at 230VAC, 50Hz)	mA	< 1.3mA		
Remote Sense	-	Yes, compensates up to 500mV cable drop		
Operating Temperature (Base plate)	-	-20°C to +80°C (See note 1)		
Storage Temperature	°C	-25 to +85°C		
Humidity	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH (PCB assembly conformally coated)		
Cooling	-	Conduction cooled through 6mm base plate		
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 2.5kVAC, Output to ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s ² constant X, Y, Z 1 hour		
Shock	-	< 196.1 m/s ²		
Safety Agency Approvals	-	UL60950-1, EN60950-1, CE Mark		
Line Dip	-	Complies with SEMI F47 (200VAC line only)		
Conducted & Radiated EMI	-	Conducted: EN55022, Class B, Radiated: Class A		
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11		
Weight (Typ)	g	1,210g		
Size (L x W x D)	mm	238 x 126 x 55mm (9.37 x 5 x 2.16")		
Connectors	-	-		
Warranty	yrs	Three Years		

(1) Maximum continuous component temperatures: C11, C12: 68°C, C16, C17: 86°C. Ambient temperature: -20°C to +50°C.

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/bpc-series.htm



Pinout

J2 & J3	Pin functions
1	Not used
2	Not used
3	Trim
4	-ve Sense
5	+ve Sense
6	Not used

AC Input Connection

Customer side mating connector: Tyco (AMP) 'Mate-n-lok'
Housing 3 way 350766-1
Crimp terminals 926893-1 (20-14awg) or 926895-1 (24-18awg)

DC Output Connections

M6 threaded studs. Maximum tightening torque 10Nm

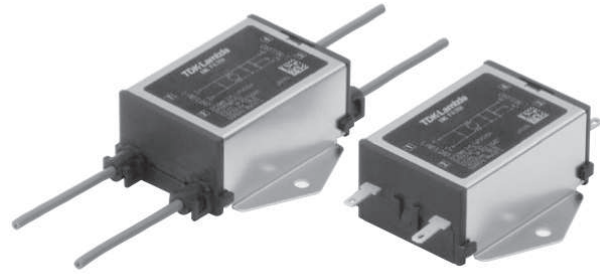
Control and Monitoring Signals

Parallel linked connections to 2 off 2.54mm pitch headers J2-J3.
Customer side mating connector: Molex series 4809
Housing 22-01-2065
Crimp 08-50-0032 (30 – 22awg)

0.5A to 6A, 250VAC EMI Filters

Features

- ◆ High Voltage Pulse Attenuation
- ◆ Lug or Wire Terminations
- ◆ Low Earth Leakage Current Option
- ◆ Conforms to UL, CSA and
- ◆ EN Safety Agency Certifications



Key Market Segments & Applications



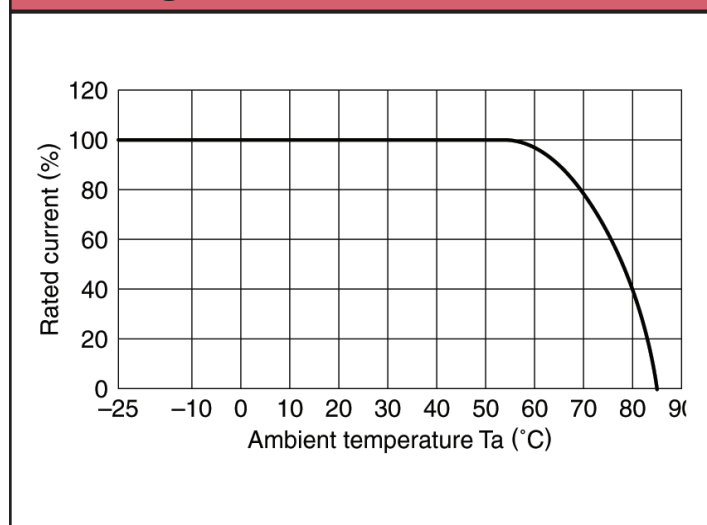
Specifications

Model		RSAL-20R5W RSAL-20R5A RSAL-20R5WL RSAL-20R5AL	RSAL-2001W RSAL-2001A RSAL-2001WL RSAL-2001AL	RSAL-2002W RSAL-2002A RSAL-2002WL RSAL-2002AL	RSAL-2003W RSAL-2003A RSAL-2003WL RSAL-2003AL	RSAL-2006W RSAL-2006A RSAL-2006WL RSAL-2006AL
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	0.5A	1A	2A	3A	6A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSAL-20xxx 1mA; RSAL20xxxL 10uA (250VAC, 60Hz)				
DC Resistance (total)	mΩ	700	600	250	150	80
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283, CSA C22.2 No.8, EN60939				
Weight	g	61g Maximum				
Warranty	yr	1 Year				

Options

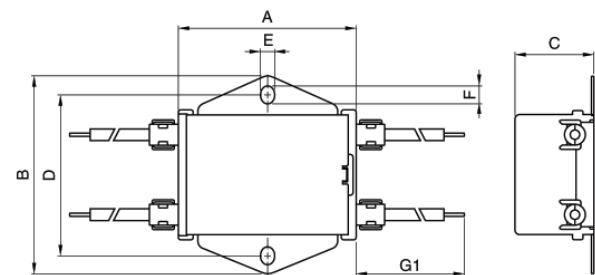
Wire Terminations	RSAL-20xxW
Lug Terminations	RSAL-20xxA
Wire Terminations & Low Leakage Current	RSAL-20xxWL
Lug Terminations & Low Leakage Current	RSAL-20xxAL

Derating

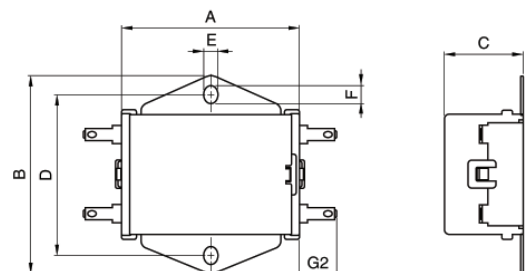


Outline Drawing

RSAL-20R5/2001/2002/2003/2006W(L)

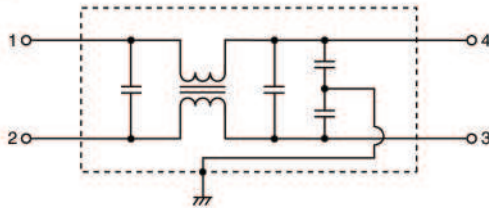


RSAL-20R5/2001/2002/2003/2006A(L)

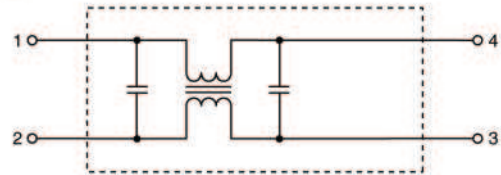


Circuit

RSAL-2 *** W
RSAL-2 *** A

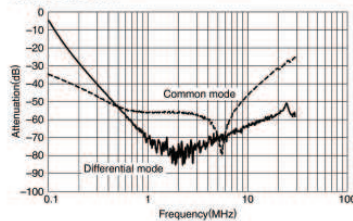


RSAL-2 *** WL
RSAL-2 *** AL

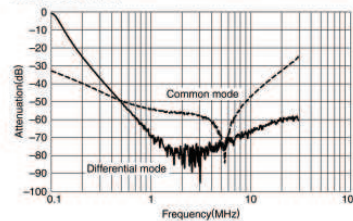


Attenuation Characteristics

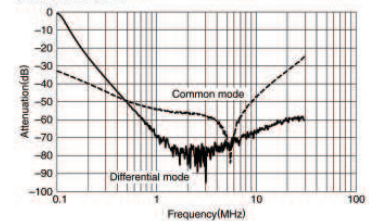
RSAL-20R5W/A



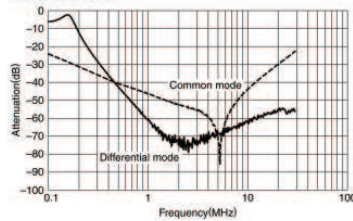
RSAL-2001W/A



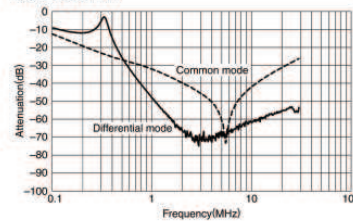
RSAL-2002W/A



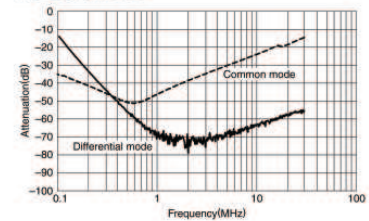
RSAL-2003W/A



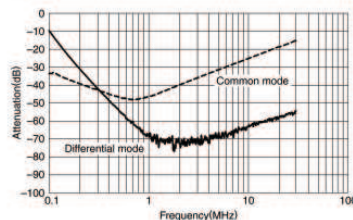
RSAL-2006W/A



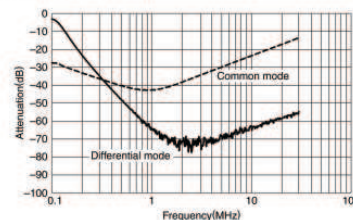
RSAL-20R5WL/AL



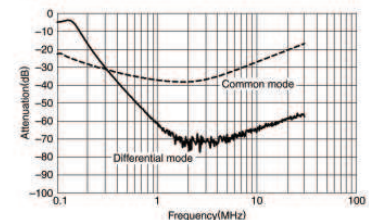
RSAL-2001WL/AL



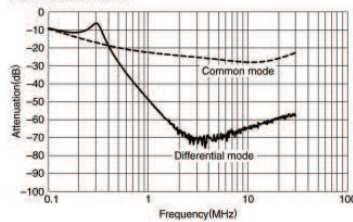
RSAL-2002WL/AL



RSAL-2003WL/AL



RSAL-2006WL/AL



For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



3A to 60A, 250VAC EMI Filters

Features

- ◆ High Voltage Pulse Attenuation
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



Specifications

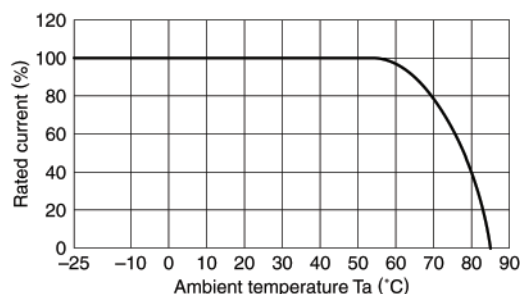
Model		RSAN-2003 RSAN-2003D RSAN-2003L	RSAN-2006 RSAN-2006D RSAN-2006L	RSAN-2010 RSAN-2010D RSAN-2010L	RSAN-2016 RSAN-2016D RSAN-2016L	RSAN-2020 RSAN-2020D RSAN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSAN-20xx 1mA; RSAN20xxL 10uA (250VAC, 60Hz)				
DC Resistance (total)	mΩ	250	110	40	20	10

Model		RSAN-2030 RSAN-2030D RSAN-2030L	RSAN-2040	RSAN-2050	RSAN-2060
Rated Voltage (AC, DC)	V	250V			
Rated Current	A	30A	40A	50A	60A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)			
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)			
Leakage Current (max)	A	RSAN-20xx 1mA; RSAN20xxL 10uA (250VAC, 60Hz)			
DC Resistance (total)	mΩ	6	6	4	3
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)			
Storage Temperature	°C	-25 to +85°C			
Safety Agency Certifications	-	UL1283, CSA C22.2 No.8, EN60939			
Weight	g	170g to 870g model dependant (See weights chart on website)			
Warranty	yr	1 Year			

Options

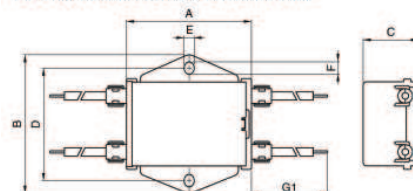
Chassis Mount & Standard Leakage Current	RSAN-20xx
DIN Rail Mount & Standard Leakage Current	RSAN-20xxD
Chassis Mount & Low Leakage Current	RSAN-20xxL

Derating

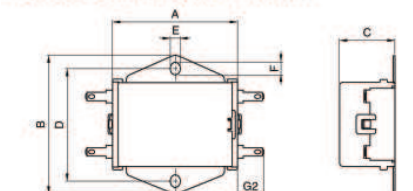


Circuit

RSAL-20R5/2001/2002/2003/2006W (L)

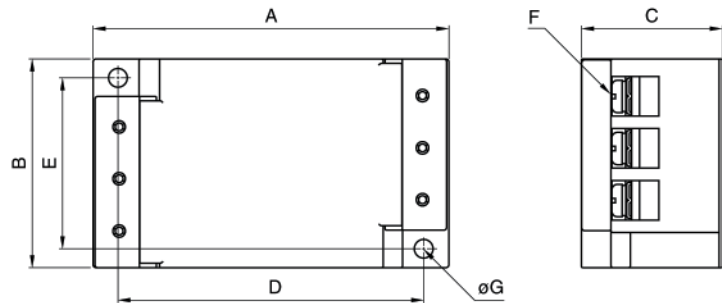


RSAL-20R5/2001/2002/2003/2006A (L)

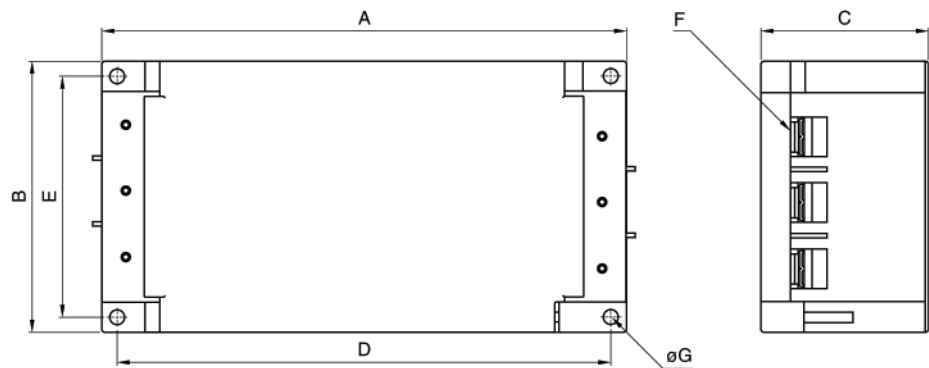


Outline Drawing

RSAN-2003/2006/2010/2016/2020/2030



RSAN-2040/2050/2060



Dimensions in mm								
Part No.	A	B	C	D	E	F	φ G	Recommended clamping torque
RSAN-2003	87	52	35	75	43	M4	4.5	1.27N · m
RSAN-2006								
RSAN-2010								
RSAN-2016								
RSAN-2020								
RSAN-2030								
RSAN-2040	170	90	54	160	80	M5	4.5	2.5N · m
RSAN-2050								
RSAN-2060								

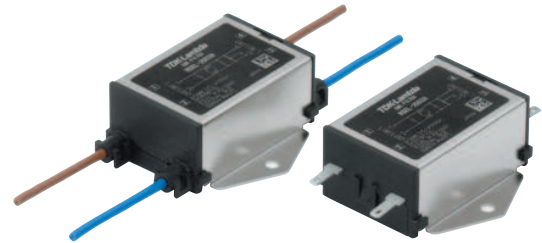
For Additional Information, please visit us.tdk-lambda.com/lp/products/r-series.htm



0.5A to 6A, 250VAC EMI Filters

Features

- ◆ Low Cost (Than RSAL Series)
- ◆ Lug or Wire Terminations
- ◆ Low Earth Leakage Current Option
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



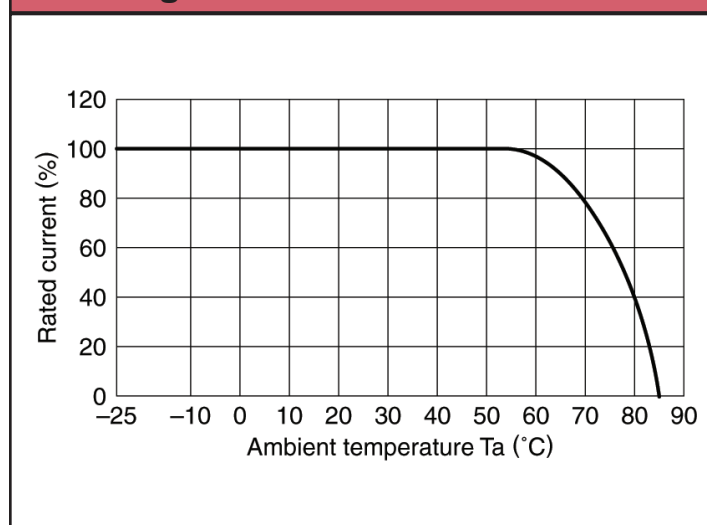
Specifications

Model		RSEL-20R5W	RSEL-2001W	RSEL-2002W	RSEL-2003W	RSEL-2006W
		RSEL-20R5A	RSEL-2001A	RSEL-2002A	RSEL-2003A	RSEL-2006A
		RSEL-20R5WL	RSEL-2001WL	RSEL-2002WL	RSEL-2003WL	RSEL-2006WL
		RSEL-20R5AL	RSEL-2001AL	RSEL-2002AL	RSEL-2003AL	RSEL-2006AL
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	0.5A	1A	2A	3A	6A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSEL-20xxx 1mA; RSEL20xxxL 10uA (250VAC, 60Hz)				
DC Resistance (total)	mΩ	700	600	250	150	80
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL 1283, CSA C22.2 No.8, EN60939				
Weight	g	61g Maximum				
Warranty	yr	1 Year				

Options

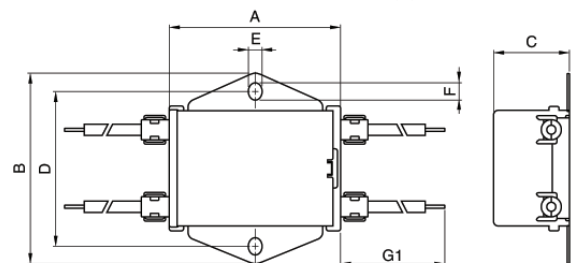
Wire Terminations	RSEL-20xxW
Lug Terminations	RSEL-20xxA
Wire Terminations & Low Leakage Current	RSEL-20xxWL
Lug Terminations & Low Leakage Current	RSEL-20xxAL

Derating

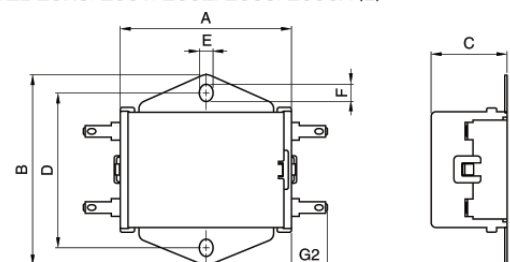


Outline Drawing

RSEL-20R5/2001/2002/2003/2006W (L)

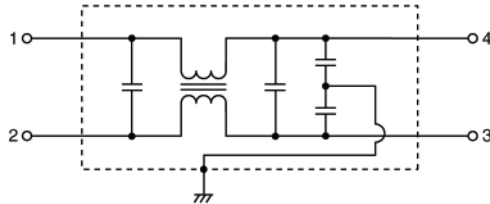


RSEL-20R5/2001/2002/2003/2006A (L)

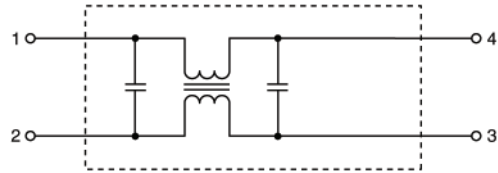


Circuit

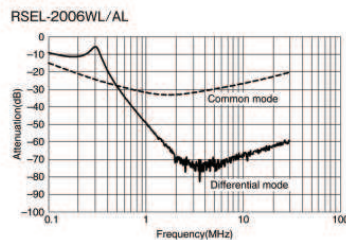
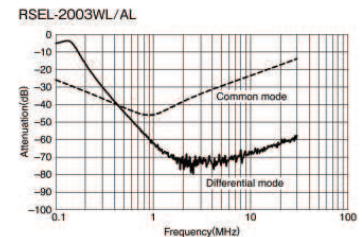
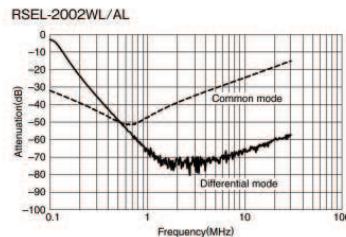
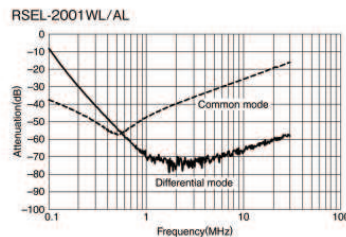
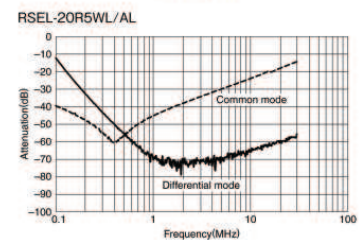
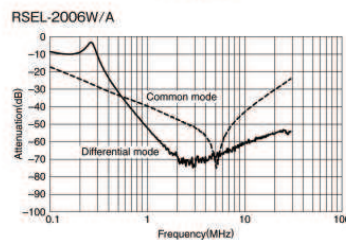
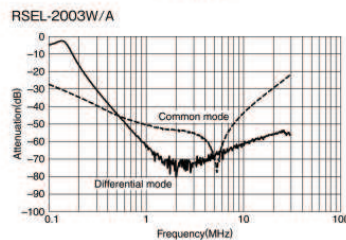
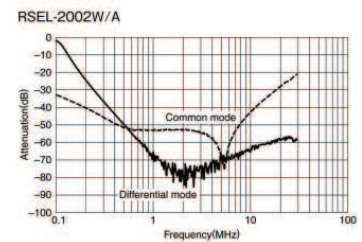
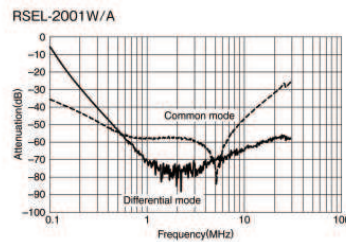
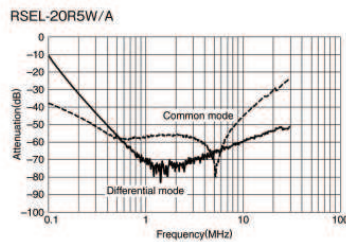
RSEL-2 *** W
RSEL-2 *** A



RSEL-2 *** WL
RSEL-2 *** AL



Attenuation Characteristics



For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



3A to 300A, 250VAC EMI Filters

Features

- ◆ Lower Cost (Than RSHN Series)
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



Specifications

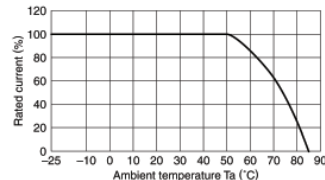
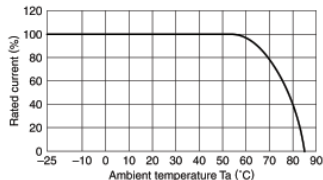
Model		RSEN-2003 RSEN-2003D RSEN-2003L	RSEN-2006 RSEN-2006D RSEN-2006L	RSEN-2010 RSEN-2010D RSEN-2010L	RSEN-2016 RSEN-2016D RSEN-2016L	RSEN-2020 RSEN-2020D RSEN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
DC Resistance (total)	mΩ	250	110	40	20	10

Model		RSEN-2030D RSEN-2030L	RSEN-2040	RSEN-2050	RSEN-2030 RSEN-2060	RSEN-2080
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	30A	40A	50A	60A	80A
DC Resistance (total)	mΩ	6	6	4	3	3.4

Model		RSEN-2100	RSEN-2150	RSEN-2200	RSEN-2250	RSEN-2300
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	100A	150A	200A	250A	300A
DC Resistance (total)	mΩ	2.7	2	1.4	1	0.7
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSEN-20xx 1mA; RSEN20xxL 10uA (250VAC, 60Hz)				
Operating Temperature	°C	-25 to +85°C (Derate above 50 / 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283, CSA C22.2 No.8, EN60939				
Weight	g	170g to 8400g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

Derating

RSEN-2003/2006/2010/2016/2020/2030/2040/2050/2060 RSEN-2080/2100/2150/2200/2250/2300

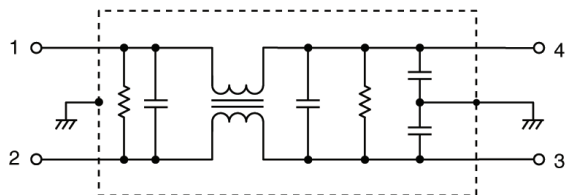


Options

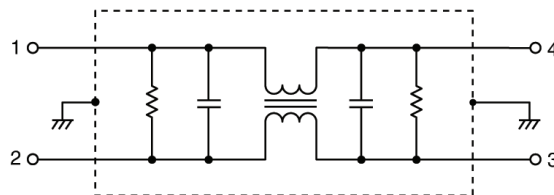
Chassis Mount & Standard Leakage Current	RSEN-20xx
DIN Rail Mount & Standard Leakage Current	RSEN-20xxD
Chassis Mount & Low Leakage Current	RSEN-20xxL

Circuit

RSEN-2 ***
RSEN-2 *** D

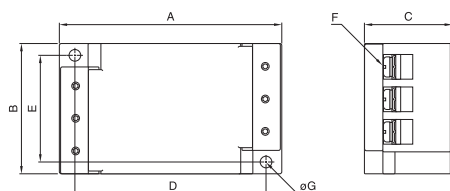


RSEN-2 *** L

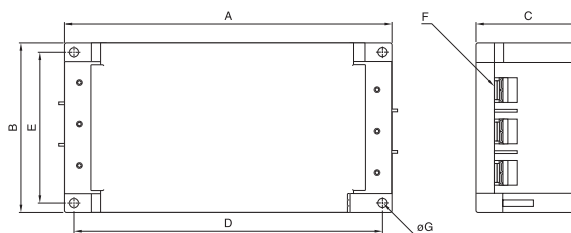


Outline Drawing

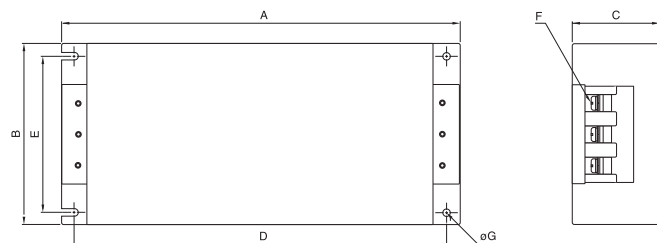
RSEN-2003/2006/2010/2016/2020/2030



RSEN-2040/2050/2060



RSEN-2080/2100/2150/2200/2250/2300



Dimensions in mm							
Part No.	A	B	C	D	E	F	G
RSEN-2003	87	52	35	75	43	M4	4.5
RSEN-2006							
RSEN-2010							
RSEN-2016							
RSEN-2020							
RSEN-2030	170	90	54	160	80	M5	4.5
RSEN-2040							
RSEN-2050							
RSEN-2060	267	161	85	247	135	M8	6.5
RSEN-2080							
RSEN-2100							
RSEN-2150	290	190	87	270	164	M8	6.5
RSEN-2200	395	195	100	375	169	M10	6.5
RSEN-2250							
RSEN-2300							

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



3A to 300A, 250VAC EMI Filters

Features

- ◆ Two Stage Filter for Better Performance
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



Key Market Segments & Applications

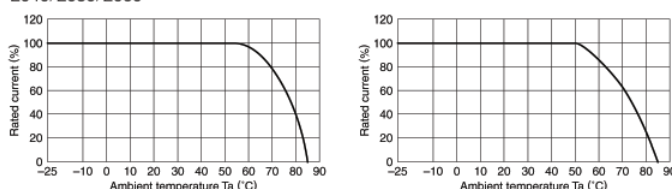


Specifications

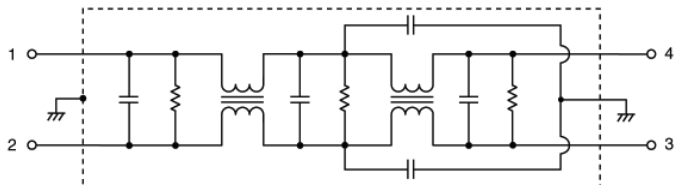
Model		RSHN-2003 RSHN-2003D RSHN-2003L	RSHN-2006 RSHN-2006D RSHN-2006L	RSHN-2010 RSHN-2010D RSHN-2010L	RSHN-2016 RSHN-2016D RSHN-2016L	RSHN-2020 RSHN-2020D RSHN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
DC Resistance (total)	mΩ	350	140	60	35	22
Model		RSHN-2030 RSHN-2030D RSHN-2030L	RSHN-2040	RSHN-2050	RSHN-2060	RSHN-2080
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	30A	40A	50A	60A	80A
DC Resistance (total)	mΩ	12	10	8	6	7
Model		RSHN-2100	RSHN-2150	RSHN-2200	RSHN-2250	RSHN-2300
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	100A	150A	200A	250A	300A
DC Resistance (total)	mΩ	6	4	3	2	1.5
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSHN-20xx 1mA; RSHN20xxL 100uA (250VAC, 60Hz)				
Operating Temperature	°C	-25 to +85°C (Derate above 50 / 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	Up to 30A Models - UL1283, CSA C22.2 No.8, EN60939				
Weight	g	190g to 13000g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

Derating

RSHN-2003/2006/2010/2016/2020/2030/2040/2050/2060 RSHN-2080/2100/2150/2200/2250/2300



Circuit

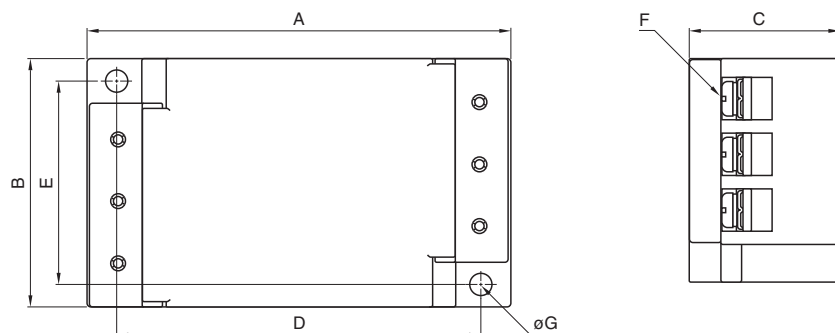


Options

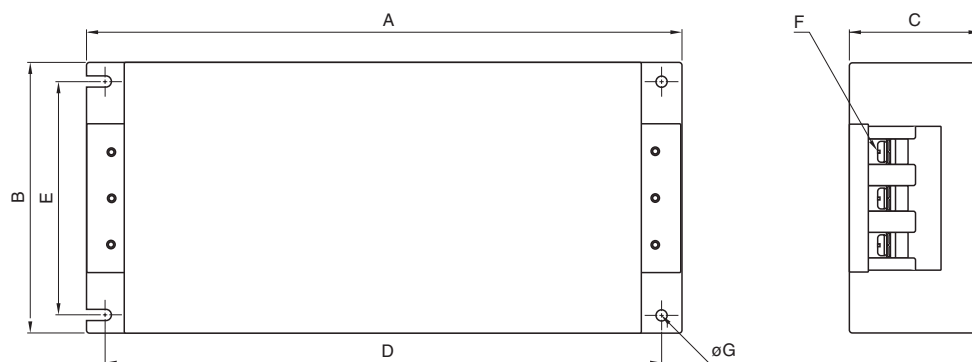
Chassis Mount & Standard Leakage Current	RSHN-20xx
DIN Rail Mount & Standard Leakage Current	RSHN-20xxD
Chassis Mount & Low Leakage Current	RSHN-20xxL

Outline Drawing

RSHN-2003/2006/2010/2016/2020/2030



RSHN-2040/2050/2060/2080/2100/2150/2200/2250/2300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	Recommended clamping torque
RSHN-2003	98	52	35	86	43	M4	4.5	1.27N m
RSHN-2006								
RSHN-2010								
RSHN-2016	127	52	35	115	43	M4	4.5	1.27N m
RSHN-2020								
RSHN-2030								
RSHN-2040	272	100	60	254	82	M5	5.5	2.5N m
RSHN-2050								
RSHN-2060								
RSHN-2080	430	161	85	410	135	M8	6.5	7.64N m
RSHN-2100								
RSHN-2150								
RSHN-2200	593	195	103	573	169	M10	6.5	11.8N m
RSHN-2250								
RSHN-2300								

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



3A to 60A, 250VAC EMI Filters

Features

- ◆ High Voltage Pulse Attenuation
- ◆ Two Stage Filter for Better Performance
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications

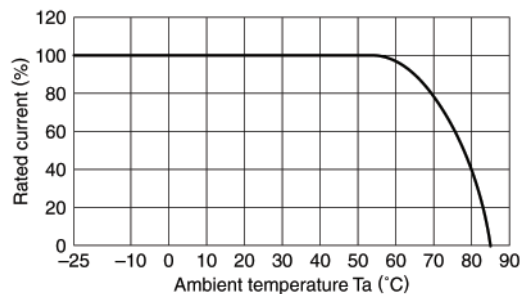


Specifications

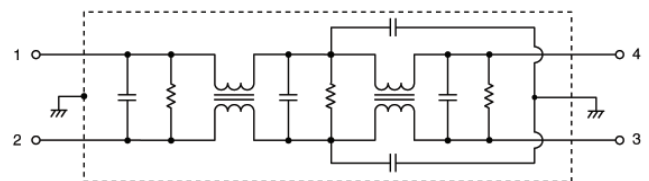
Model		RSMN-2003 RSMN-2003D RSMN-2003L	RSMN-2006 RSMN-2006D RSMN-2006L	RSMN-2010 RSMN-2010D RSMN-2010L	RSMN-2016 RSMN-2016D RSMN-2016L	RSMN-2020 RSMN-2020D RSMN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSMN-20xx 1mA; RSMN20xxL 10uA (250VAC, 60Hz)				
DC Resistance (total)	mΩ	350	140	60	35	22

Model		RSMN-2030 RSMN-2030D RSMN-2030L	RSMN-2040	RSMN-2050	RSMN-2060
Rated Voltage (AC, DC)	V	250V			
Rated Current	A	30A	40A	50A	60A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)			
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)			
Leakage Current (max)	A	RSMN-20xx 1mA; RSMN20xxL 10uA (250VAC, 60Hz)			
DC Resistance (total)	mΩ	12	10	8	6
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)			
Storage Temperature	°C	-25 to +85°C			
Safety Agency Certifications	-	Up to 30A Models - UL1283, CSA C22.2 No.8, EN60939			
Weight	g	190g to 960g model dependant (See weights chart on website)			
Warranty	yr	1 Year			

Derating



Circuit

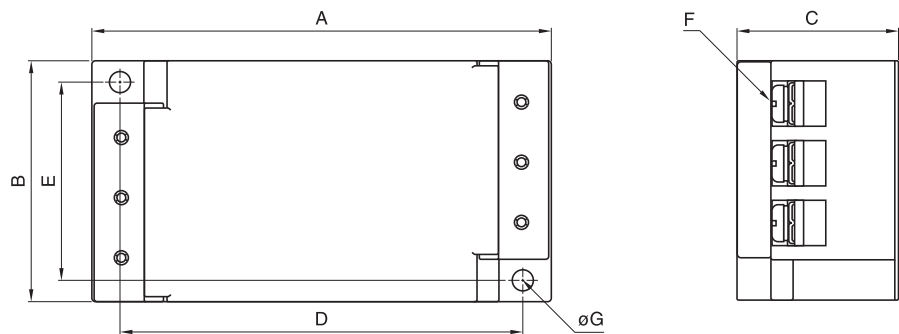


Options

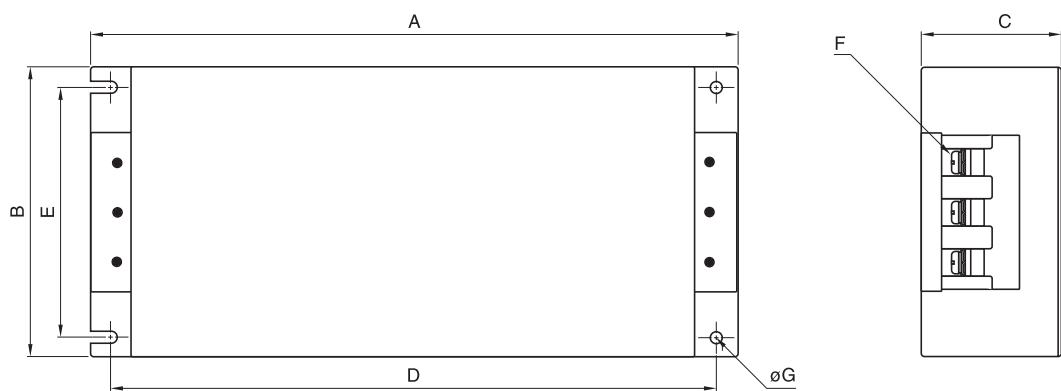
Chassis Mount & Standard Leakage Current	RSMN-20xx
DIN Rail Mount & Standard Leakage Current	RSMN-20xxD
Chassis Mount & Low Leakage Current	RSMN-20xxL

Outline Drawing

RSMN-2003/2006/2010/2016/2020/2030



RSMN-2040/2050/2060



Dimensions in mm								
Part No.	A	B	C	D	E	F	G	Recommended clamping torque
RSMN-2003	98	52	35	86	43	M4	4.5	1.27N m
RSMN-2006								
RSMN-2010								
RSMN-2016	127	52	35	115	43	M4	4.5	
RSMN-2020								
RSMN-2030								
RSMN-2040	272	100	60	254	82	M5	5.5	2.5N m
RSMN-2050								
RSMN-2060								

For Additional Information, please visit us.tdk-lambda.com/lp/products/r-series.htm



6A to 60A, 500VAC EMI Filters

Features

- ◆ High Voltage Pulse Attenuation
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Conforms to UL and EN Safety Agency Certifications



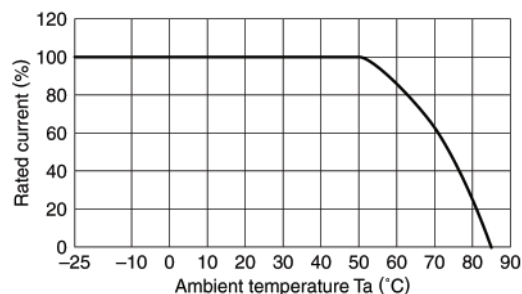
Key Market Segments & Applications



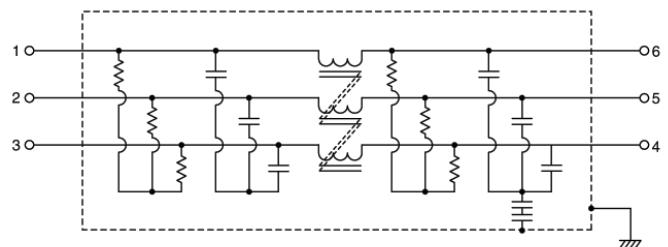
Specifications

Model		RTAN-5006 RTAN-5006D	RTAN-5010 RTAN-5010D	RTAN-5020 RTAN-5020D	RTAN-5030 RTAN-5030D	RTAN-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	350	140	60	35	22
Model		RTAN-5050	RTAN-5060			
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A			
DC Resistance (total)	mΩ	7	5			
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	360g to 1120g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

Derating



Circuit

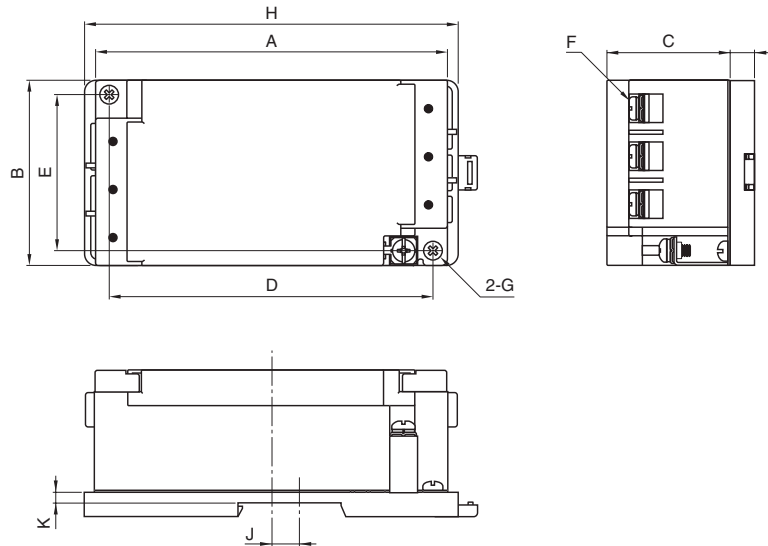


Options

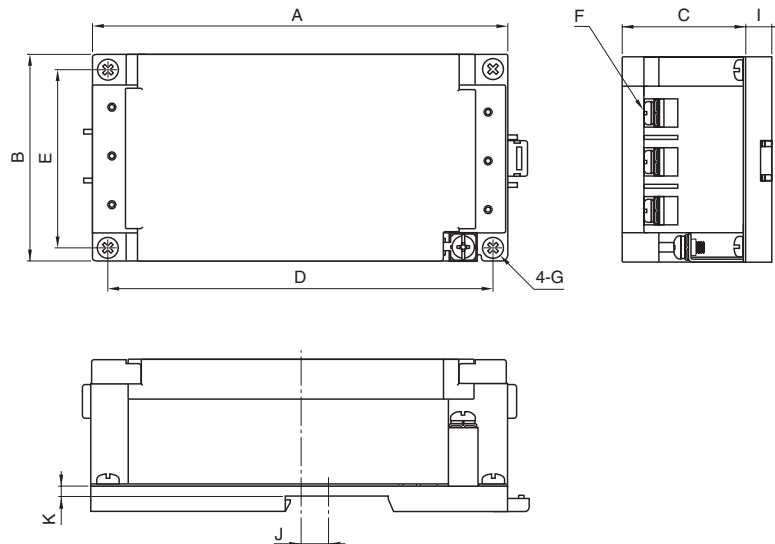
Chassis Mount	RTAN-50xx
DIN Rail Mount (Models up to 30A)	RTAN-50xxD

Outline Drawing

RTAN-5006D/5010D



RTAN-5020D/5030D



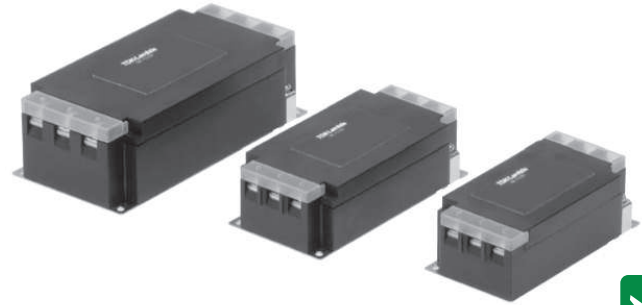
For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 60A, 500VAC EMI Filters

Features

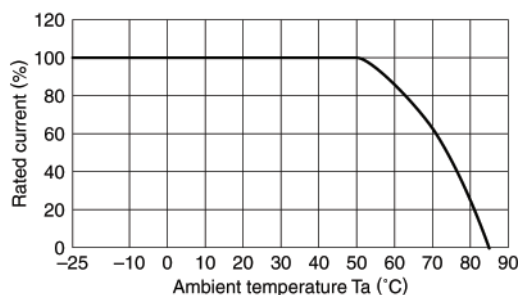
- ◆ Designed for Secondary Side Three Phase Inverters
- ◆ Low Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



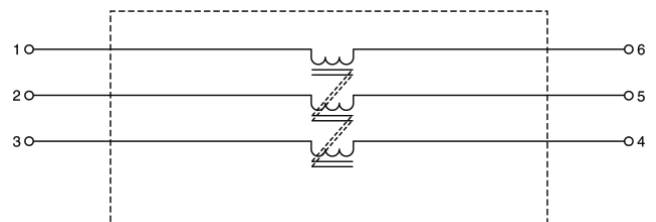
Specifications

Model		RTCN-5006	RTCN-5010	RTCN-5020	RTCN-5030	RTCN-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	145	60	25	13	10
Model		RTCN-5050	RTCN-5060	RTCN-5080	RTCN-5100	RTCN-5150
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	7	5	5	4	3
Model		RTCN-5200	RTCN-5250	RTCN-5300		
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	200A	250A	300A		
DC Resistance (total)	mΩ	4	3	2		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	mA	Not applicable				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 (Up to 150A) & EN60939				
Weight	g	300g to 8900g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

Derating

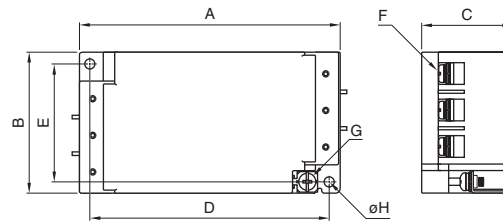


Circuit

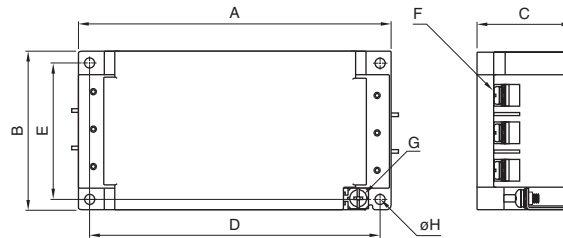


Outline Drawing

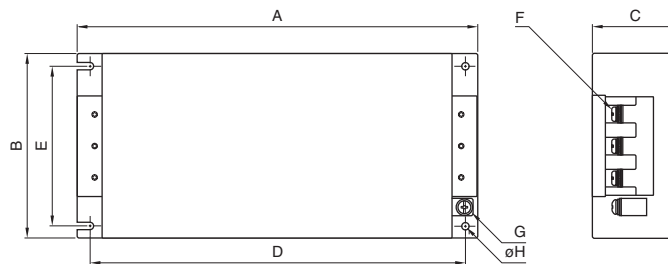
RTCN-5006/5010



RTCN-5020/5030/5040/5050/5060



RTCN-5080/5100/5150/5200/5250/5300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque
RTCN-5006	120	63	42	110	53	M4	M4	4.5	M4 1.27N m M5 2.5N m M6 4.8N m M8 7.64N m M10 11.8N m
RTCN-5010									
RTCN-5020	140	70	42	130	60	M4	M4	4.5	
RTCN-5030									
RTCN-5040	170	90	54	160	80	M5	M4	4.5	
RTCN-5050									
RTCN-5060									
RTCN-5080	267	161	85	247	135	M8	M6	6.5	
RTCN-5100									
RTCN-5150	290	190	88	270	164	M8	M6	6.5	
RTCN-5200	390	195	103	370	169	M10	M8	6.5	
RTCN-5250									
RTCN-5300									

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 300A, 500VAC EMI Filters

Features

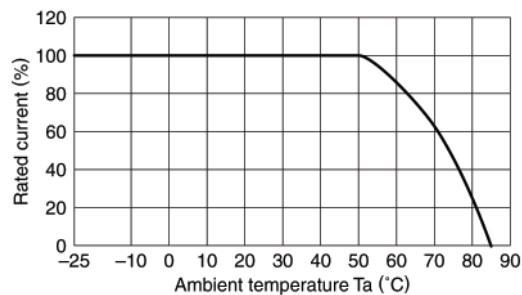
- ◆ Lower cost (Than RTAN Series)
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Conforms to UL and EN Safety Agency Certifications



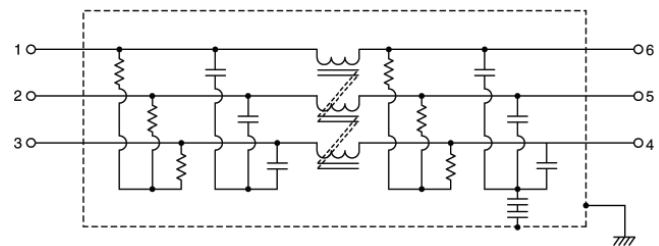
Specifications

Model		RTEN-5006 RTEN-5006D	RTEN-5010 RTEN-5010D	RTEN-5020 RTEN-5020D	RTEN-5030 RTEN-5030D	RTEN-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	145	60	25	13	10
Model		RTEN-5050	RTEN-5060	RTEN-5080	RTEN-5100	RTEN-5150
Rated Voltage (AC, DC)	V	500V Three Phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	7	5	5	4	3
Model		RTEN-5200	RTEN-5250	RTEN-5300		
Rated Voltage (AC, DC)	V	500V Three Phase				
Rated Current	A	200A	250A	300A		
DC Resistance (total)	mΩ	2	1.5	1		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	360g to 9200g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

Derating



Circuit

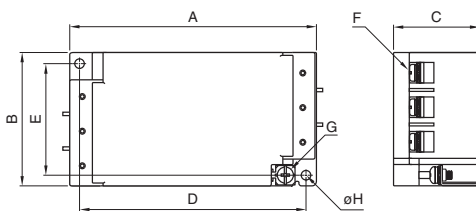


Options

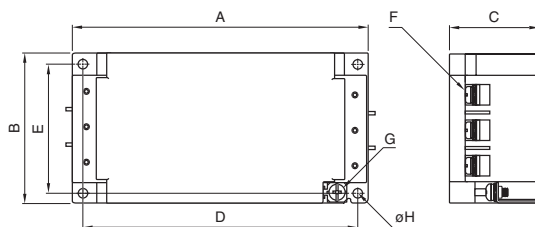
Chassis Mount	RTEN-5xxx
DIN Rail Mount (Models up to 30A)	RTEN-50xxD

Outline Drawing

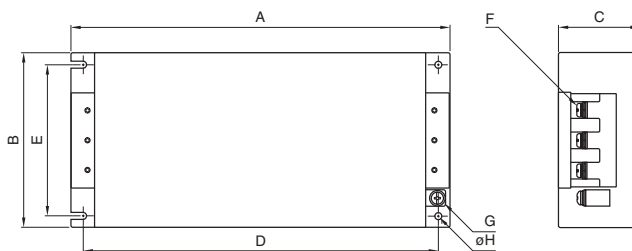
RTEN-5006/5010



RTEN-5020/5030/5040/5050/5060



RTEN-5080/5100/5150/5200/5250/5300



									Dimensions in mm		
Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque		
RTEN-5006	120	63	42	110	53	M4	M4	4.5	M4 1.27N m M5 2.5N m M6 4.8N m M8 7.64N m M10 11.8N m		
RTEN-5010											
RTEN-5020	140	70	42	130	60	M4	M4	4.5			
RTEN-5030											
RTEN-5040	170	90	54	160	80	M5	M4	4.5			
RTEN-5050											
RTEN-5060											
RTEN-5080	267	161	85	247	135	M8	M6	6.5			
RTEN-5100											
RTEN-5150	290	190	88	270	164	M8	M6	6.5			
RTEN-5200	390	195	103	370	169	M10	M8	6.5			
RTEN-5250											
RTEN-5300											

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 150A, 500VAC EMI Filters

Features

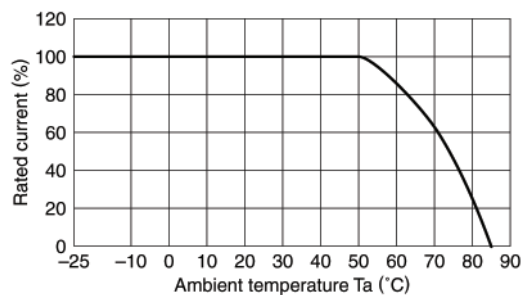
- ◆ Two Stage Filter for Better Performance
- ◆ Narrow Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



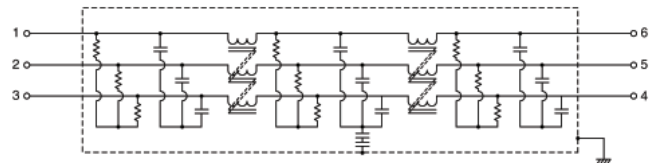
Specifications

Model		RTHB-5006	RTHB-5010	RTHB-5020	RTHB-5030	RTHB-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	290	120	50	26	20
Model		RTHB-5050	RTHB-5060	RTHB-5080	RTHB-5100	RTHB-5150
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	14	10	10	8	6
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	mA	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	800g to 12000g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

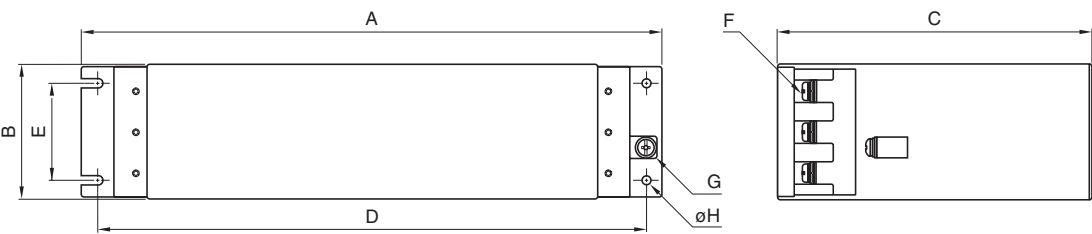
Derating



Circuit



Outline Drawing



									Dimensions in mm	
Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque	
RTHB-5006	210	64	100	200	40	M4	M4	4.5	M4 1.27N m	
RTHB-5010										
RTHB-5020	240	64	115	230	40	M4	M4	4.5		
RTHB-5030										
RTHB-5040	300	80	140	285	46	M5	M4	5.5		
RTHB-5050										
RTHB-5060										
RTHB-5080	472	100	205	452	63	M8	M6	6.5		
RTHB-5100										
RTHB-5150	534	100	234	514	63	M8	M6	6.5		M8 7.64N m

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 300A, 500VAC EMI Filters

Features

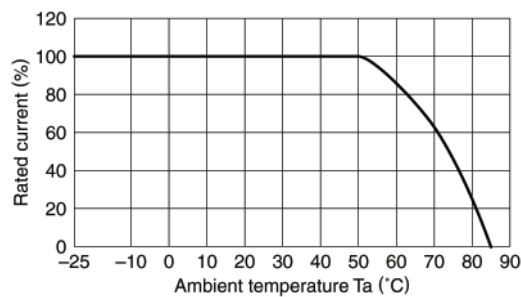
- ◆ Two Stage Filter for Better Performance
- ◆ Square Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



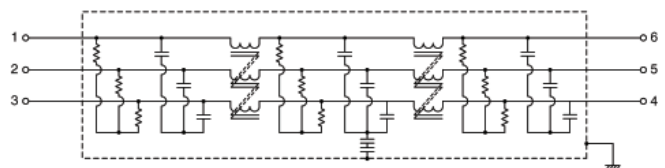
Specifications

Model		RTHC-5006	RTHC-5010	RTHC-5020	RTHC-5030	RTHC-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	290	120	50	26	20
Model		RTHC-5050	RTHC-5060	RTHC-5080	RTHC-5100	RTHC-5150
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	14	10	10	8	6
Model		RTHC-5200	RTHC-5250	RTHC-5300		
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	200A	250A	300A		
DC Resistance (total)	mΩ	4	3	2		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	mA	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 (Up to 150A) & EN60939				
Weight	g	800g to 14800g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

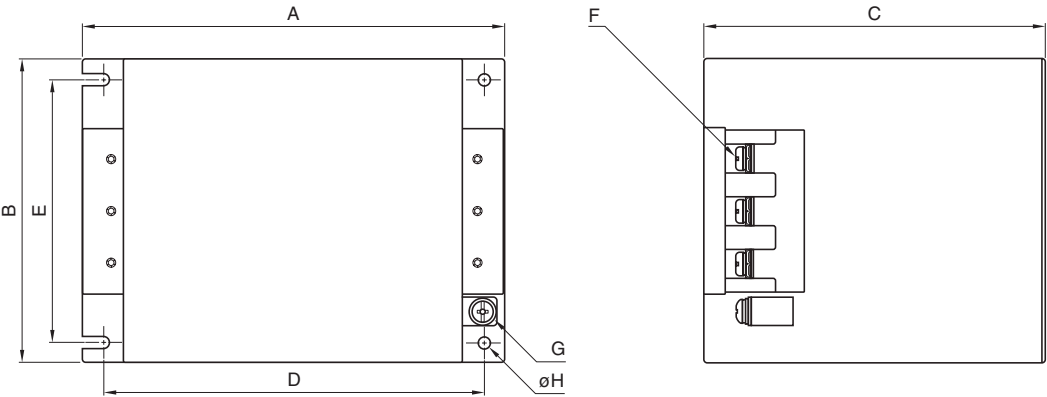
Derating



Circuit



Outline Drawing



Dimensions in mm									
Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque
RTHC-5006	145	95	120	130	78	M4	M4	4.5	M4 1.27N m M5 2.5N m M6 4.8N m M8 7.64N m M10 11.8N m
RTHC-5010									
RTHC-5020	160	105	135	145	85	M4	M4	4.5	
RTHC-5030									
RTHC-5040	190	128	160	170	102	M5	M4	5.5	
RTHC-5050									
RTHC-5060									
RTHC-5080	240	161	210	220	135	M8	M6	6.5	
RTHC-5100									
RTHC-5150	255	190	232	235	164	M8	M6	6.5	
RTHC-5200	340	195	262	320	169	M10	M8	6.5	
RTHC-5250									
RTHC-5300									

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 1000A, 500VAC EMI Filters

Features

- ◆ Two Stage Filter for Better Performance
- ◆ Low Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



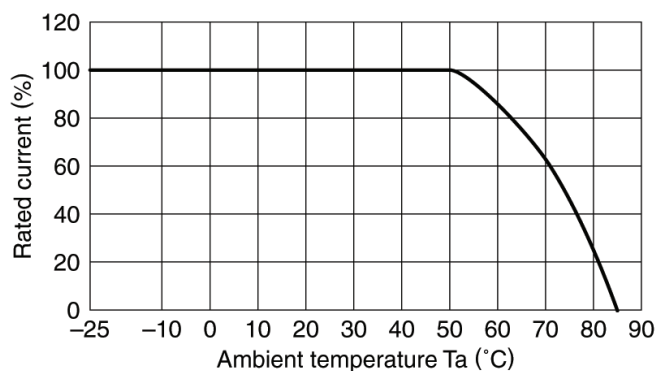
Key Market Segments & Applications



Specifications

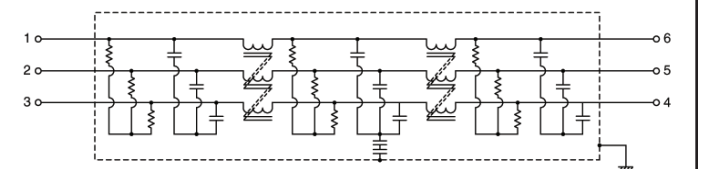
Model		RTHN-5006	RTHN-5010	RTHN-5020	RTHN-5030	RTHN-5040	RTHN-5050
Rated Voltage (AC, DC)	V	500V Three phase					
Rated Current	A	6A	10A	20A	30A	40A	50A
DC Resistance (total)	mΩ	290	120	50	25	20	14
Model	Model	RTHN-5060	RTHN-5080	RTHN-5100	RTHN-5150	RTHN-5200	RTHN-5250
Rated Voltage (AC, DC)	V	500V Three phase					
Rated Current	A	60A	80A	100A	150A	200A	250A
DC Resistance (total)	mΩ	10	10	8	6	4	3
Model		RTHN-5300	RTHN-5400	RTHN-5600	RTHN-5A00		
Rated Voltage (AC, DC)	V	500V Three phase					
Rated Current	A	300A	400A	600A	1000A		
DC Resistance (total)	mΩ	2	0.2	0.3	0.5		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)					
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)					
Leakage Current (max)	mA	6A to 300A Models: 2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz 400A to 1000A Models: 17.5mA at 250VAC 60Hz, 35mA at 500VAC 60Hz					
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)					
Storage Temperature	°C	-25 to +85°C					
Safety Agency Certifications	-	UL1283 (Up to 150A) & EN60939 (Up to 300A)					
Weight	g	700g to 18000g model dependant (See weights chart on website)					
Warranty	yr	1 Year					

Derating

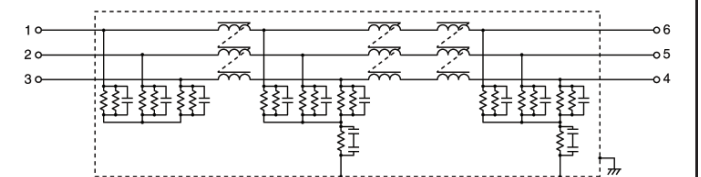


Circuit

RTHN-5006/5010/5020/5030/5040/5050/5060/5080/5100/5150/5200/5250/5300



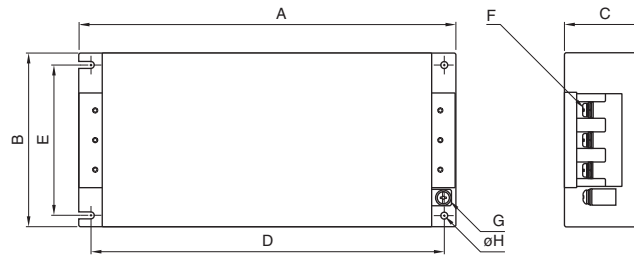
RTHN-5400/5600/5A00



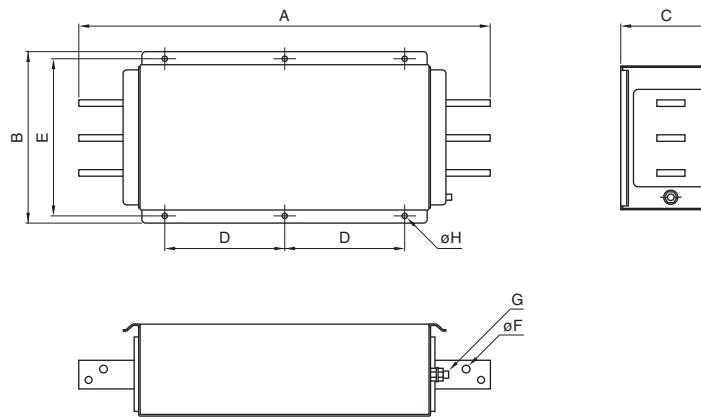
Outline Drawing

RTHN-5006/5010/5020/5030/5040/5050/5060/5080/5

100/5150/5200/5250/5300



RTHN-5400/5600/5A00



Dimensions in mm

Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque		
RTHN-5006	210	95	50	195	78	M4	M4	4.5	M4 1.27N m		
RTHN-5010											
RTHN-5020	240	105	55	225	85	M4	M4				
RTHN-5030											
RTHN-5040	300	128	68	280	102	M5	M4	5.5		M5 2.5N m	
RTHN-5050											
RTHN-5060											
RTHN-5080	430	161	85	410	135	M8	M6	6.5		M6 4.8N m	
RTHN-5100											
RTHN-5150											473
RTHN-5200	593	195	103	573	169	M10	M8			M10 11.8N m	
RTHN-5250											
RTHN-5300											
RTHN-5400	716	300	160	210	275	13	M12			9.0	M12 14.0N m
RTHN-5600	630										
RTHN-5A00	610										

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



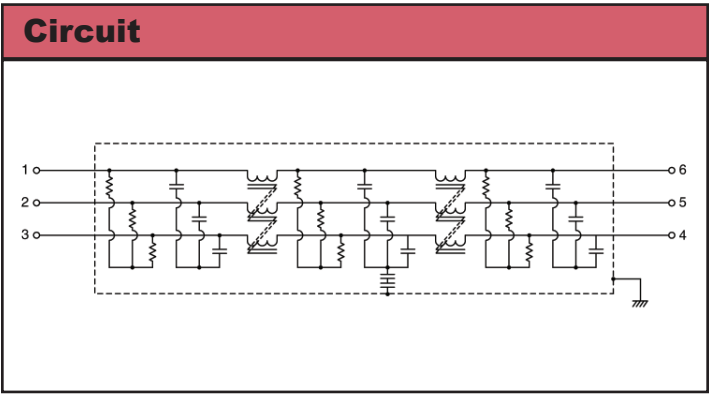
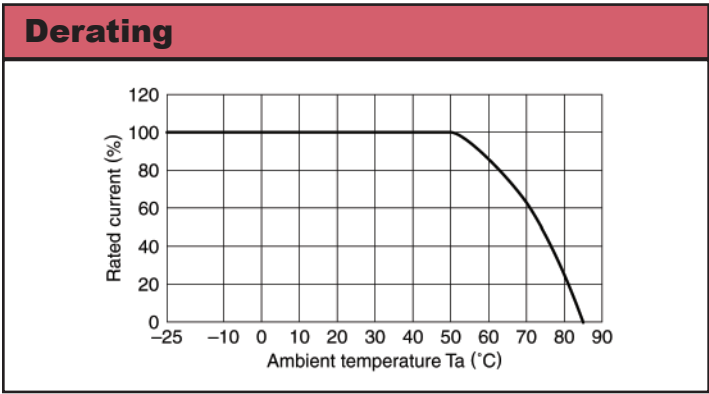
6A to 60A, 500VAC EMI Filters

Features

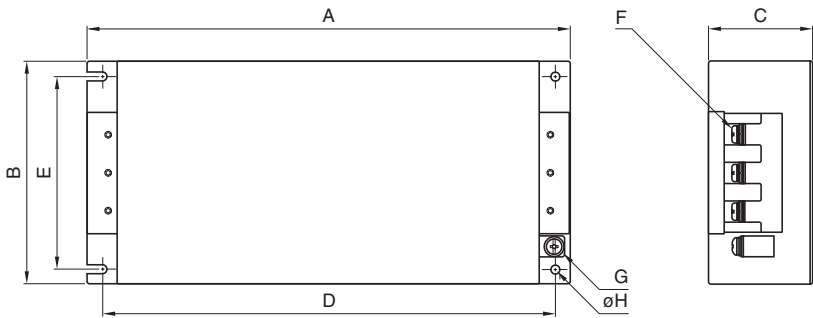
- ◆ High Voltage Pulse Attenuation
- ◆ Two Stage Filter for Better Performance
- ◆ Low Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



Specifications						
Model		RTMN-5006	RTMN-5010	RTMN-5020	RTMN-5030	RTMN-5040
Rated Voltage (AC, DC)	V	500V				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	290	120	50	26	20
Model		RTMN-5050	RTMN-5060			
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A			
DC Resistance (total)	mΩ	14	10			
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	670g to 12500g model dependant (See weights chart on website)				
Warranty	yr	1 Year				



Outline Drawing



Dimensions in mm									
Part No.	A	B	C	D	E	F	G	H	Recommended clamping torque
RTMN-5006	210	95	50	195	78	M4	M4	4.5	M4 1.27N m M5 2.5N m
RTMN-5010									
RTMN-5020	240	105	55	225	85	M4	M4	4.5	
RTMN-5030									
RTMN-5040	300	128	68	280	102	M5	M4	5.5	
RTMN-5050									
RTMN-5060									

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



The choice and application of the power supply is an important one. Working with TDK-Lambda can help you save time and money, from design concept to years after your system or product is first installed.

Why TDK-Lambda?

- ◆ Over the last 60 years, TDK-Lambda has developed a worldwide reputation and heritage for high quality, robust power products.
- ◆ We at TDK-Lambda stand behind our products with industry leading warranties of up to a lifetime (limited).
- ◆ Our research and development budget is one of the largest in the industry, helping you design-in reliable, cutting edge technology, ahead of your competition.
- ◆ A broad range of product enables our customers to choose the right model for the application, and assists with their vendor reduction programs.
- ◆ Multiple manufacturing and design facilities across the globe. We can provide crucial local support when programs move between Asia, North America, and Europe. With those multiple factories we also have proven risk mitigation against natural disasters. Plus, our products are RoHS compliant and our sites are ISO9001 and ISO14001 certified.
- ◆ Our technical support can get your product to market faster. Please see next page for more details.
- ◆ As our Customer's product requirements became more diverse, we responded by broadening our product range from low cost 5W open frame AC-DC power supplies up to 22,500W hot-swap rack mount systems.
- ◆ We developed a large DC-DC converter portfolio to power applications in the growing fields of digital net working, communications, and medical equipment. We continue to launch leading-edge products to support these and other high tech markets.
- ◆ The need for fast customization has been met by our large array of Configurable Power Supplies and by our New York-based Custom Product Solutions Engineering Team. A wide variety of products can be developed, ranging from simple modifications, value-added solutions, or complete custom products.
- ◆ Not all of our Customer needs are product based though. Financial stability and the resources to continue to invest even in down markets, play a key factor in partner selection. Backed by the multi-billion dollar resources of the TDK Corporation*, we have increased our R&D and capital expenditures to offer our customers the latest in leading edge technologies.
- ◆ The end products that use TDK-Lambda power supplies are often designed on one continent and built in another. We can truly provide that global support with nine manufacturing sites, nine R&D facilities, sales and service offices across the world, and our authorized distribution network.



Thank you for your interest in TDK-Lambda products.

* In 2005 Lambda was acquired by the TDK Corporation of Japan (NYSE: TDK) thus combining Lambda's expertise in power supply innovation with TDK's global excellence in Ferrites and Multilayer Capacitor technology



Ilfracombe Plant (U.K.)

Manufacturing and R&D

Modular (Vega, Alpha, Sirius) & DC-DC power supplies



Nagaoka (Japan)

Manufacturing & R&D

AC-DC, DC-DC & custom power supplies



Senai Plant (Malaysia)

Manufacturing

AC-DC, DC-DC power modules & custom products



Wuxi Plant (China)

Manufacturing and R&D

AC-DC Converters, filters & custom products



Kuantan Plant (Malaysia)

Manufacturing

AC-DC Converters & custom products



Karmiel Plant (Israel)

Manufacturing & R&D

AC-DC & programmable products



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