

Connector Type



Pin Type ("D" Suffix)



Enclosed Case ("-E" Suffix)



Size: 3.34 x 1.36 x 0.77in (84.8 x 34.6 x 19.6mm)

Size: 2.74 x 1.36 x 0.95in (69.7 x 34.6 x 24.1mm)

Size: 2.89 x 1.50 x 1in (73.3 x 38.1 x 25.4mm)

OPTIONS

- Protection Type
 - Class II
 - Class I (For Connector Type)
- Package Options
 - JST Connector
 - Molex Connector
 - Terminal Block Connector
 - Pin Type
- Conformal Coating

FEATURES

- Universal Input Voltage Range of 85~264VAC
- Adjustable Output Voltage
- RoHS Compliant
- REACH Compliant
- 5 Years Warranty
- Several Connector Options Available
- High Efficiency
- Optional Conformal Coating
- Over Voltage, Over Load, and Short Circuit Protection
- Low Standby Power
- Low Leakage Current
- 4000VAC Reinforced Insulation
- Protection Class I or II
- 2xMOPP
- Designed to Meet EN/IEC/ANSI/AAMI ES60601-1 & IEC/EN/UL 62368-1 Safety Standards

APPLICATIONS

- Medical
- Industrial
- Automation
- Datacom
- IPC
- Measurement
- Telecom

DESCRIPTION

The PSMHA30 series of medical AC/DC power supplies offers up to 30 watts of output power in a compact package. This series consists of single output models with adjustable output voltage and a universal input voltage range of 85~264VAC. Each model in this series features low standby power and low leakage current, high efficiency, and 4000VAC reinforced insulation. Several options are available for this series including protection type, conformal coating, and connector. This series so has over voltage, over load, and short circuit protection, is RoHS and REACH compliant, and is designed to meet EN/IEC/ANSI/AAMI ES60601-1 and IEC/EN/UL 62368-1 safety standards.

MODEL SELECTION TABLE

Model Number ⁽¹⁾	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise	Output Power	Efficiency	Max. Capacitor Load
			Min Load	Max Load				
PSMHA30-33S	85~264VAC (120~370VDC)	3.3VDC	0%	6A	50mVp-p	20W	84%	10000µF
PSMHA30-5S		5VDC	0%	6A	50mVp-p	30W	87%	12000µF
PSMHA30-75S		7.5VDC	0%	4A	50mVp-p	30W	87%	5340µF
PSMHA30-9S		9VDC	0%	3.34A	50mVp-p	30W	88%	3720µF
PSMHA30-12S		12VDC	0%	2.5A	50mVp-p	30W	90.5%	2085µF
PSMHA30-121S		12VDC	0%	2.5A	50mVp-p	30W	88%	2085µF
PSMHA30-15S		15VDC	0%	2A	50mVp-p	30W	90.5%	1350µF
PSMHA30-151S		15VDC	0%	2A	50mVp-p	30W	88%	1350µF
PSMHA30-18S		18VDC	0%	1.67A	50mVp-p	30W	88%	930µF
PSMHA30-24S		24VDC	0%	1.25A	50mVp-p	30W	89.5%	520µF
PSMHA30-28S		28VDC	0%	1.08A	50mVp-p	30W	89.5%	385µF
PSMHA30-36S		36VDC	0%	0.84A	50mVp-p	30W	90%	235µF
PSMHA30-48S		48VDC	0%	0.63A	50mVp-p	30W	91.5%	130µF
PSMHA30-53S		53VDC	0%	0.58A	50mVp-p	30W	91%	109µF

SPECIFICATIONS

All specifications are typical based on 25°C, 230VAC Input, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	AC Input		85		264	VAC
	DC Input		120		370	VDC
Input Frequency	AC Input		47		63	Hz
Input Current	100VAC, Full Load				0.8	A
	240VAC, Full Load				0.4	
No Load Input Power	230VAC			40		mW
Leakage Current	264VAC				100	μA
Input Inrush Current	230VAC			40		A
Input Protection	Internal Fuse In Line and Neutral		T1.6A/250VAC			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Initial Set Voltage Accuracy	230VAC and Full Load		-1.0		+1.0	%
Line Regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load Regulation	No Load to Full Load	3.3Vout, 5Vout Models	-0.7		+0.7	%
		Others	-0.5		+0.5	
	10% Load to 90% Load	3.3Vout, 5Vout Models	-0.6		+0.6	
		Others	-0.4		+0.4	
Voltage Adjustability			-10		+10	%
Output Power			See Table			
Output Current			See Table			
Minimum Load				0		%
Ripple & Noise	Measured by 20MHz bandwidth					mVp-p
	With a 10μF/25V 1206 X7R MLCC	3.3Vout, 5Vout, 7.5Vout, 9Vout Models		50		
	With a 1μF/50V 1206 X7R MLCC	12Vout, 15Vout, 18Vout, 24Vout, 28Vout, 36Vout Models		50		
	With a 0.1μF/100V 1206 X7R MLCC	48Vout, 53Vout Models		50		
Transient Response	Load step from 50~75% change at 2.5A/μs	Peak Deviation			3	%Vout
		Recovery Time		500		μs
Start-Up Time					1500	ms
Rise Time	24Vout, 28Vout, 36Vout			40		ms
	48Vout, 53Vout Models			50		
	Others			20		
Hold Up Time	115VAC and Full Load			16		mS
Temperature Coefficient			-0.02		+0.02	%/
PROTECTION						
Short Circuit Protection			Continuous, Automatic Recovery			
Over Load Protection	% of Iout Rated; Hiccup Mode			140		%
Over Voltage Protection	% of Vout(nom); Automatic Recovery		125		140	%
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	Natural Convection with Derating		-40		+85	°C
Storage Temperature			-40		+85	°C
Operating Altitude					5000	m
Relative Humidity	Non-Condensing		5		95	%RH
Shock			IEC60068-2-27			
Vibration			IEC60068-2-6			
MTBF	MIL-HDBK-217F, Full Load			3,341,000		Hours
GENERAL SPECIFICATIONS						
Efficiency			See Table			
Switching Frequency	230VAC and Full Load		30	45	60	kHz
Isolation Voltage	1 minute (2MOPP insulation)	Input to Output	4000			VAC
Isolation Resistance	500VDC		0.1			GΩ
PHYSICAL SPECIFICATIONS						
Weight	Connector Type		2.13oz (60.5g)			
	Pin Type		2.05oz (58g)			
	Enclosed Case		3.47oz (106g)			
Dimensions (L x W x H)	Connector Type		3.34 x 1.36 x 0.77in (84.8 x 34.6 x 19.6mm)			
	Pin Type		2.74 x 1.36 x 0.95in (69.7 x 34.6 x 24.1mm)			
	Enclosed Case		2.89 x 1.50 x 1in (73.3 x 38.1 x 25.4mm)			

SPECIFICATIONS

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SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
SAFETY CHARACTERISTICS						
Safety Standards ⁽²⁾	IEC/EN/ANSI/AAMI ES 60601-1 IEC/EN/UL 62368-1 ⁽²⁾		CB: UL (Demko)			
EMI	EN55011, EN55032, EN60601-1-2 and FCC Part 18/15		Conducted		Class B	
			Radiated		Class B	
Harmonic Currents	EN61000-3-2	Full Load	Class A			
Voltage Flicker	EN61000-3-3					
EMS	EN55024 and EN60601-1-2					
ESD	EN61000-4-2	Air ±15kV and Contact ±8kV	Perf. Criteria A			
Radiated Immunity	EN61000-4-3	20V/m	Perf. Criteria A			
Fast Transient	EN61000-4-4	±2kV	Perf. Criteria A			
Surge	EN61000-4-5	DM ±1kV	Perf. Criteria A			
Conducted Immunity	EN61000-4-6	20 Vr.m.s	Perf. Criteria A			
Power Frequency Magnetic Field	EN61000-4-8	30 A/m	Perf. Criteria A			
Dip and Interruptions	EN61000-4-11					

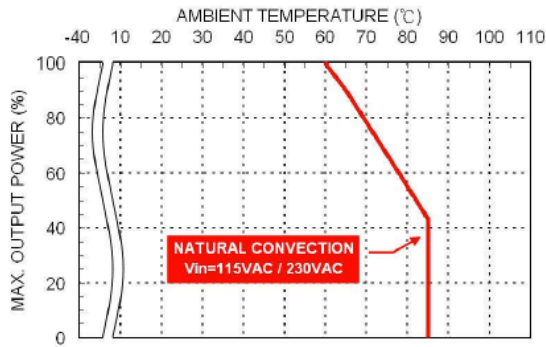
NOTES

- Several package and connector options are available for this series. See Model Number Setup for suffix details.
- This product is Listed to applicable standards and requirements by UL.

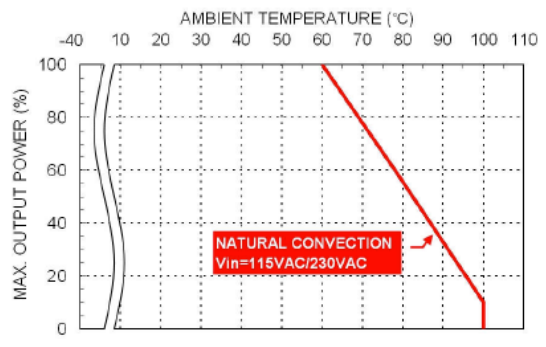
**Due to advances in technology, specifications subject to change without notice.*

DERATING CURVES

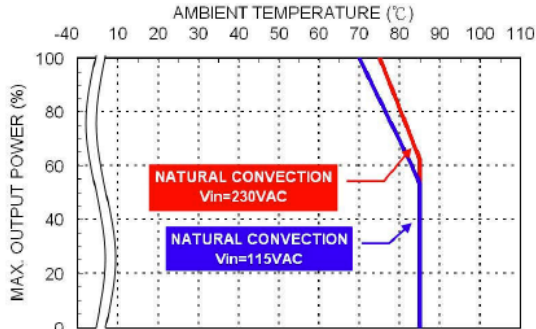
Derating Curve vs. Ambient Temperature
PSMHA30-xxS, xx=33, 5, 75, 9, 121, 151, 18
Class I, Connector Option: JST (Blank)



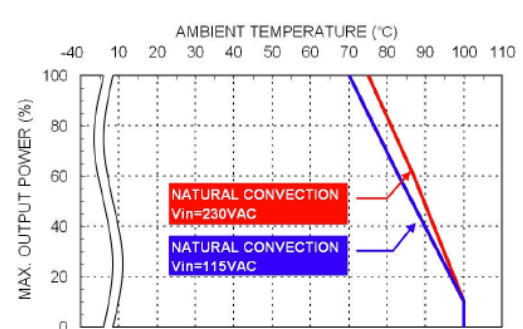
Derating Curve vs. Ambient Temperature
PSMHA30-xxS, xx=33, 5, 75, 9, 121, 151, 18
Class I, Connector Option: -M, -T, -D



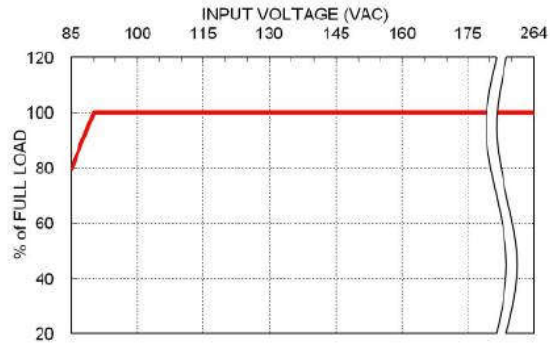
Derating Curve vs. Ambient Temperature
PSMHA30-xxS, xx=12, 15, 24, 28, 36, 48, 53
Class I, Connector Option: JST (Blank)



Derating Curve vs. Ambient Temperature
PSMHA30-xxS, xx=12, 15, 24, 28, 36, 48, 53
Class I, Connector Option: -M, -T, -D

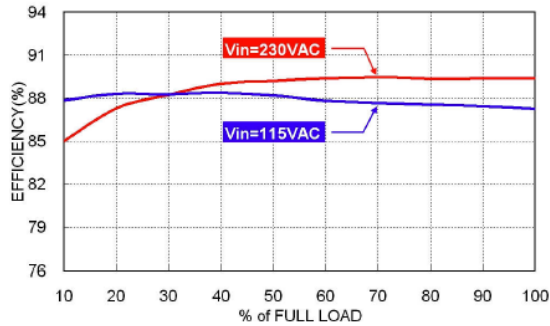


Derating Curve vs. Input Voltage

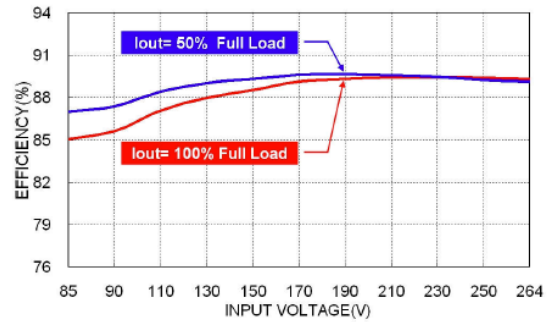


EFFICIENCY GRAPHS

PSMHA30-24S Efficiency vs. Output Load

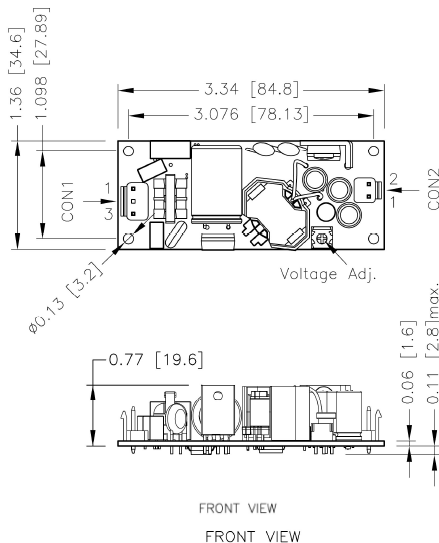


PSMHA30-24S Efficiency vs. Input Voltage



MECHANICAL DRAWINGS

Connector Type



CONNECTORS

CON1-Input Connector

Pin 1	Line
Pin 3	Neutral

CON2-Output Connector

Pin 1	+Vout
Pin 2	-Vout

Notes:

- All dimensions in inch [mm]
- Tolerance: $x.xx \pm 0.02$ [$x.xx \pm 0.5$]
 $x.xxx \pm 0.01$ [$x.xx \pm 0.25$]
- Screw locked torque: MAX 5.0kgf-cm/0.49N.m

*Either one of four screw holes of Open/Chassis type can be considered as PE connection for CLASS I application

CONNECTOR OPTIONS

*For Connector Type Models

Blank: JST Type



Housing
CON1: **VHR-3N**
CON2: **VHR-2N**

Crimp Terminals
CON1: **SVH-21T-P1.1**
CON2: **SVH-21T-P1.1**

-M: Molex Type



Housing
CON1: 09-50-8031
CON2: 09-50-8021

Crimp Terminals
CON1: SD-2478
CON2: SD-2478

-T: Terminal Block

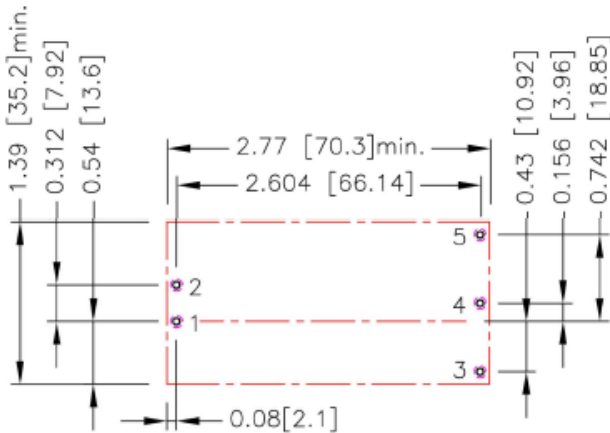


Mates with
Screw locked torque
MAX 2Kgf.cm/0.2N.m

Wire dimension range
26~16AWG

RECOMMENDED PAD LAYOUT

-D Pin Type



All dimensions in inch [mm]
Pad size (lead free recommended)
Through hole 1.2.3.4.5: $\Phi 0.051$ [1.30]
Top View Pad 1.2.3.4.5: $\Phi 0.064$ [1.63]
Bottom View Pad 1.2.3.4.5: $\Phi 0.102$ [2.60]

OUTPUT VOLTAGE ADJUSTMENT

It allows the user to increase or decrease the output voltage of the module.

This is accomplished by connecting an external resistor between the Trim pin and either the +Vout or -Vout pins.

With an external resistor between the Trim and -Output pin, the output voltage increases.

With an external resistor between the Trim and +Output pin, the output voltage decreases.

The external Trim resistor needs to be at least 1/16W of rated power.

■ Trim Up Equation

$$R_U = \left[\frac{G \times L}{(V_{O,up} - L - K)} - H \right] \Omega$$

■ Trim Down Equation

$$R_D = \left[\frac{(V_{O,down} - L) \times G}{(V_o - V_{O,down})} - H \right] \Omega$$

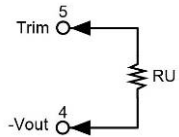
■ Trim Constants

Module	G	H	K	L
PSMHA30-33S	5100	2050	0.8	2.5
PSMHA30-5S	7500	2000	2.5	2.5
PSMHA30-75S	22000	2000	5	2.5
PSMHA30-9S	33000	2000	6.5	2.5
PSMHA30-12S	51000	2000	9.5	2.5
PSMHA30-15S	68000	2000	12.5	2.5
PSMHA30-18S	91000	2000	15.5	2.5
PSMHA30-24S	130000	2000	21.5	2.5
PSMHA30-28S	160000	2000	25.5	2.5
PSMHA30-36S	220000	2000	33.5	2.5
PSMHA30-48S	620000	2000	45.5	2.5
PSMHA30-53S	680000	2000	50.5	2.5

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.

Trim-up



3.3V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.630
RU (k Ω)	384.314	191.132	126.738	94.541	75.223	62.344	53.145	46.245	40.879	36.586

5V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	5.050	5.100	5.150	5.200	5.250	5.300	5.350	5.400	5.450	5.500
RU (k Ω)	373.000	185.500	123.000	91.750	73.000	60.500	51.571	44.875	39.667	35.500

7.5 Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	7.575	7.650	7.725	7.800	7.875	7.950	8.025	8.100	8.175	8.250
RU (k Ω)	731.333	364.667	242.444	181.333	144.667	120.222	102.762	89.667	79.481	71.333

9V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	9.090	9.180	9.270	9.360	9.450	9.540	9.630	9.720	9.810	9.900
RU (k Ω)	914.667	456.333	303.556	227.167	181.333	150.778	128.952	112.583	99.852	89.667

12V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	12.120	12.240	12.360	12.480	12.600	12.720	12.840	12.960	13.080	13.200
RU (k Ω)	1060.500	529.250	352.167	263.625	210.500	175.083	149.786	130.813	116.056	104.250

15V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	15.150	15.300	15.450	15.600	15.750	15.900	16.050	16.200	16.350	16.500
RU (k Ω)	1131.333	564.667	375.778	281.333	224.667	186.889	159.905	139.667	123.926	111.333

18V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	18.180	18.360	18.540	18.720	18.900	19.080	19.260	19.440	19.620	19.800
RU (k Ω)	1261.889	629.944	419.296	313.972	250.778	208.648	178.556	155.986	138.432	124.389

24V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	24.240	24.480	24.720	24.960	25.200	25.440	25.680	25.920	26.160	26.400
RU (k Ω)	1352.167	675.083	449.389	336.542	268.833	223.694	191.452	167.271	148.463	133.417

28V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	28.280	28.560	28.840	29.120	29.400	29.680	29.960	30.240	30.520	30.800
RU (k Ω)	1426.571	712.286	474.190	355.143	283.714	236.095	202.082	176.571	156.730	140.857

36V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	36.360	36.720	37.080	37.440	37.800	38.160	38.520	38.880	39.240	39.600
RU (k Ω)	1525.778	761.889	507.259	379.944	303.556	252.630	216.254	188.972	167.753	150.778

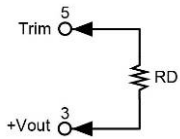
48V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	48.480	48.960	49.440	49.920	50.400	50.880	51.360	51.840	52.320	52.800
RU (k Ω)	3227.167	1612.583	1074.389	805.292	643.833	536.194	459.310	401.646	356.796	320.917

53V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	53.530	54.060	54.590	55.120	55.650	56.180	56.710	57.240	57.770	58.300
RU (k Ω)	3205.547	1601.774	1067.182	799.887	639.509	532.591	456.221	398.943	354.394	318.755

Trim-down


3.3V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.970
RD (k Ω)	116.486	54.668	34.062	23.759	17.577	13.456	10.512	8.305	6.587	5.214

5V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	4.950	4.900	4.850	4.800	4.750	4.700	4.650	4.600	4.550	4.950
RD (k Ω)	365.500	178.000	115.500	84.250	65.500	53.000	44.071	37.375	32.167	365.500

7.5V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	7.425	7.350	7.275	7.200	7.125	7.050	6.975	6.900	6.825	6.750
RD (k Ω)	1442.667	709.333	464.889	342.667	269.333	220.444	185.524	159.333	138.963	122.667

9V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	8.910	8.820	8.730	8.640	8.550	8.460	8.370	8.280	8.190	8.100
RD (k Ω)	2348.333	1156.667	759.444	560.833	441.667	362.222	305.476	262.917	229.815	203.333

12V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	11.880	11.760	11.640	11.520	11.400	11.280	11.160	11.040	10.920	10.800
RD (k Ω)	3984.500	1965.750	1292.833	956.375	754.500	619.917	523.786	451.688	395.611	350.750

15V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	14.850	14.700	14.550	14.400	14.250	14.100	13.950	13.800	13.650	13.500
RD (k Ω)	5596.667	2763.333	1818.889	1346.667	1063.333	874.444	739.524	638.333	559.630	496.667

18V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	17.820	17.640	17.460	17.280	17.100	16.920	16.740	16.560	16.380	16.200
RD (k Ω)	7743.111	3825.056	2519.037	1866.028	1474.222	1213.019	1026.444	886.514	777.679	690.611

24V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	23.760	23.520	23.280	23.040	22.800	22.560	22.320	22.080	21.840	21.600
RD (k Ω)	11513.833	5690.917	3749.944	2779.458	2197.167	1808.972	1531.690	1323.729	1161.981	1032.583

28V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	27.720	27.440	27.160	26.880	26.600	26.320	26.040	25.760	25.480	25.200
RD (k Ω)	14409.429	7123.714	4695.143	3480.857	2752.286	2266.571	1919.633	1659.429	1457.048	1295.143

36V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	35.640	35.280	34.920	34.560	34.200	33.840	33.480	33.120	32.760	32.400
RD (k Ω)	20250.222	10014.111	6602.074	4896.056	3872.444	3190.037	2702.603	2337.028	2052.691	1825.222

48V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	47.520	47.040	46.560	46.080	45.600	45.120	44.640	44.160	43.680	43.200
RD (k Ω)	58148.833	28763.417	18968.278	14070.708	11132.167	9173.139	7773.833	6724.354	5908.093	5255.083

53V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	52.470	51.940	51.410	50.880	50.350	49.820	49.290	48.760	48.230	47.700
RD (k Ω)	64110.453	31714.226	20915.484	15516.113	12276.491	10116.742	8574.065	7417.057	6517.161	5797.245

MODEL NUMBER SETUP

PSMHA	30	-	5	S	B	-	D	E	R
Series Name	Output Power		Output Voltage	Output Quantity	Protection Type		Connector Option	Package	Conformal Coating
			33: 3.3VDC 5: 5VDC 75: 7.5VDC 9: 9VDC 12: 12VDC 121: 12VDC 15: 15VDC 151: 15VDC 18: 18VDC 24: 24VDC 28: 28VDC 36: 36VDC 48: 48VDC 53: 53VDC	S: Single Output	Blank: Class II B: Class I (for Connector Type)		Blank: JST M: Molex T: Terminal Block D: Pin Type	Blank: Open Frame E: Enclosed	Blank: None R: Conformal Coating

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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