

- 0 to 10kV, 15kV, 20kV, or 25kV output
- 4, 15, or 30 watts of output power
- Wide input voltage range
- Indefinite output short-circuit protection
- Maximum Iout capability down to 0 Volts
- Fixed-frequency, low-stored-energy design
- Output current & voltage monitors
- >450,000 Hr. MTBF @ 65°C
- UL, CUL, IEC-60950-1, and Demko Recognized



GENERAL INFORMATION:

The "10A→25A" Series of regulated, high-voltage DC-DC converters are an extension of the "A" Series, directly addressing the needs of the miniature PCB or chassis-mount $\geq 10\text{kV}$ application. Designed and built utilizing state-of-the-art power conversion topology, these units feature surface-mount technology and encapsulation techniques providing high reliability and low cost.

COMPATIBILITY:

The Series "10A→25A" match the standard "A" Series for design methodology, wide input range, remote control, enable/disable, reference, shock, and vibration.

HIGH VOLTAGE OUTPUT:

The "10A→25A" Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output is adjustable from 0 to 10kV, 15kV, 20kV, or 25kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

HIGH VOLTAGE OUTPUT TERMINATION:

The "10A→25A" Series utilizes silicon 20kV wire on the 10A and 15A, silicon 30kV wire on the 20A and 25A. All flying leads are 18" and can be terminated with a variety of industry-standard connectors. Contact customer service for details.

OUTPUT VOLTAGE MONITOR:

The "10A→25A" Series features a 1000:1 voltage monitor. The monitor has an output impedance calibrated for use with a 10 Meg Ω input impedance meter. Overall accuracy is $\pm 2.5\%$ with a temperature coefficient of ± 200 ppm per $^{\circ}\text{C}$.

The "10A" uses a 500 Meg Ω /523 k Ω divider.
The "15A" uses a 750 Meg Ω /806 k Ω divider.
The "20A" uses a 1 Gig Ω /1.1 Meg Ω divider.
The "25A" uses a 1.25 Gig Ω /1.43 Meg Ω divider.

For "10A→25A" applications requiring a different scale factor, such as a 0 to 5VDC ADC compatible design, a single, external, low-voltage resistor may be added in parallel with the output voltage monitor, to rescale its output. The voltage monitor is output on pin 9 and referenced to signal-ground pin 5.

OUTPUT CURRENT MONITOR:

The "10A→25A" Series is equipped with an output current monitor. Current from the high-voltage multiplier can be monitored by reading the voltage appearing between output-monitor pin 3 and signal-ground pin 5. The monitor has an output impedance of >20 k Ω . Internal voltage dividers create a small, linear-offset voltage. See Application Note AP-13 for more details.

SHIELDING:

The "10A→25A" Series models are available with optional six-sided, wrap-around Mu-Metal Shielding. This shielding attenuates magnetic and electrostatic emissions, while shielding internal circuitry from outside noise, thereby reducing overall output ripple by as much as 25% to 50%.

MECHANICAL:

The "10A→25A" Series converters are in PCB-mountable plastic cases requiring footprints of only 5.5in² to 11.0in² and volumes of only 4.9in³ to 11.6in³. Mounting plates and brackets are available for chassis mounting. Also available is a metal RF-tight, PCB/chassis-mount package. See Application Note 6 for thermal considerations and mounting configurations. All models are available with optional "-M" six-sided, wrap-around Mu-Metal Shielding. Despite their high efficiency, the compact, PCB-mounted, 15- & 30-watt units require the optional "-H" factory-installed heat sink or an equivalent customer-installed device in high-temperature applications.

ENVIRONMENT:

The "10A→25A" Series provides full power operation at case temperatures from -40 to $+65^{\circ}\text{C}$. All units receive a 24-hour burn-in prior to final test. Extended temperature range is available along with other enhanced capabilities. Please contact the factory.



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"10A→25A" SERIES

HIGH VOLTAGE POWER SUPPLY

Typical Characteristics:

Parameter	Conditions	Models												Units
Input:		12V						24V						
Voltage Range	Full Power	+ 11 to 16						+ 23 to 30						VDC
Voltage Range	Derated Power Range	+ 9 to 32						+ 9 to 32						VDC
Current	Standby / Disable	< 30						< 30						mA
Current	No Load, Max Eout	10A < 0.20, 15A/20A/25A < 0.25						10A < 0.17, 15A < 0.20, 20A < 0.21, 25A < 0.25						A
Current	Max Load, Extended Input Voltage	Figures A & B						Figures A & B						Graph
AC Ripple Current	Nominal Input, Full Load	< 80						< 80						mA p-p
Output:		10A			15A			20A			25A			
Voltage Range	Nominal Input	0 to 10,000			0 to 15,000			0 to 20,000			0 to 25,000			VDC
Nominal Input Voltage / Model		12	24	24	12	24	24	12	24	24	12	24	24	VDC
Power	Nominal Input, Max Eout	4	15	30	4	15	30	4	15	30	4	15	30	Watts
Current	Iout Entire Output Voltage Range	0.40	1.5	3.0	0.26	1.0	2.0	0.20	0.75	1.5	0.16	0.60	1.2	mA
Ripple	Full Load, Max Eout, 300pF bypass Cap	0.05	0.10	0.20	0.06	0.20	0.20	0.07	0.07	0.15	0.08	0.08	0.12	%V p-p
Ripple with -F-M Option	Full Load, Max Eout, 300pF bypass Cap	0.025	0.05	0.10	0.03	0.10	0.10	0.035	0.035	0.075	0.04	0.04	0.06	%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout per 0.1mA	<5.0	<5.0	<5.0	<7.5	<7.5	<7.5	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	V pk
Voltage Derating	Max Iout, Extended Input Voltage	Figures C & D												Graph
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %												VDC
Static Load Regulation	No Load to Full Load, Max Eout	<0.01%												VDC
Stability	30 Min. warmup, per 8 hr/ per day	<0.01% / <0.02%												VDC
Output Voltage Monitor:		All Types												
Voltage	Full Eout Range, Full Iout Range	1.00												V per kV
Proportionality	Full Eout Range, Full Iout Range	±0.1%												V per kV
Remote Programming:		All Types												
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref												MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)												Ω
Adjust Linearity	0% to 100%	Figure E												Graph
Adjust Voltage	Referenced to signal ground	Figure E (0 to +5 VDC)												Graph
Adjust Logic	0 to +5 for +Out, +5 to 0 for -Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout												
Reference:		All Types												
Output Voltage	T=+25°C, Initial Value	+ 5.00 ± 2%												VDC
Output Impedance	T=+25°C	464 ± 1%												Ω
Stability	Over Full Temperature Range	Figure F												Graph
Enable:		All Types												
Power Supply On	Floated, or voltage ≥ TTL High	+2.4 to 32												VDC
Power Supply Off	Grounded, or voltage ≤ TTL Low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)												VDC
Temperature:		All Types												
Operating	Full Load, Max Eout, Case Temp.	-40 to +65												°C
Storage	Non-Operating, Case Temp.	-55 to +105												°C
Coefficient	Over the Specified Temperature	± 50												PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65												°C
Altitude:		All Types												
Operating	Standard Package	Sea Level through Vacuum												
Non-operating	Standard Package	Sea Level through Vacuum												
Shock & Vibration:		Standard						-C Option						
Shock	Mil-Std-810, Method 516.5, Proc. IV	20						40						G's
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10						20						G's
Packaging:		10A	15A	20A	25A	10A	15A	20A	25A	10A	15A	20A	25A	
Material	Outer construction	Plastic (DAP) ASTM-D-5948						Aluminum Alloy 5052-H32, Finish: Mil-C-5541 Class 1A						
		Length, width, and height specs are ± 0.050in (1.27mm)						Length, width, and height specs are ± 0.025in (0.635mm)						
Length	Not including pins or mounting pts	3.70 (93.98)	4.70 (119.38)	5.70 (144.78)	6.96 (176.78)	4.00 (101.6)	5.00 (127.00)	6.00 (152.40)	8.00 (203.20)					In (mm)
Width	Not including pins or mounting pts	1.50 (38.10)	1.50 (38.10)	1.50 (38.10)	1.60 (40.64)	2.00 (50.80)	2.00 (50.80)	2.00 (50.80)	2.00 (50.80)					In (mm)
Height	Not including pins or mounting pts	0.90 (22.86)	0.90 (22.86)	1.00 (25.40)	1.075 (27.31)	1.10 (27.94)	1.10 (27.94)	1.20 (30.48)	1.30 (33.02)					In (mm)
Volume	Not including pins or mounting pts	4.90 (80.31)	6.35 (104.08)	8.55 (140.13)	11.70 (191.76)	8.80 (144.23)	11.00 (180.29)	14.4 (236.02)	20.0 (327.80)					In³ (cc)
Weight	Overall	6.0 (170.10)	8.0 (226.80)	11.0 (311.84)	15.0 (452.24)	11.5 (326.02)	14.0 (396.89)	19.0 (538.64)	22.0 (623.69)					Oz (g)

Specifications subject to change without notice



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Typical Performance Curves:

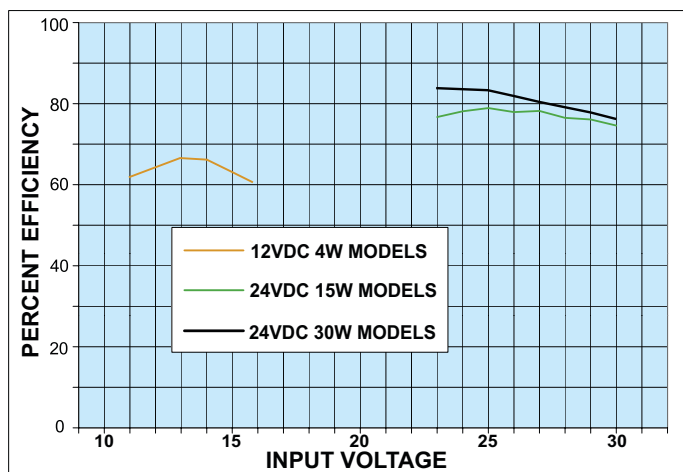


Fig. A

DC Efficiency vs. Input Voltage Range

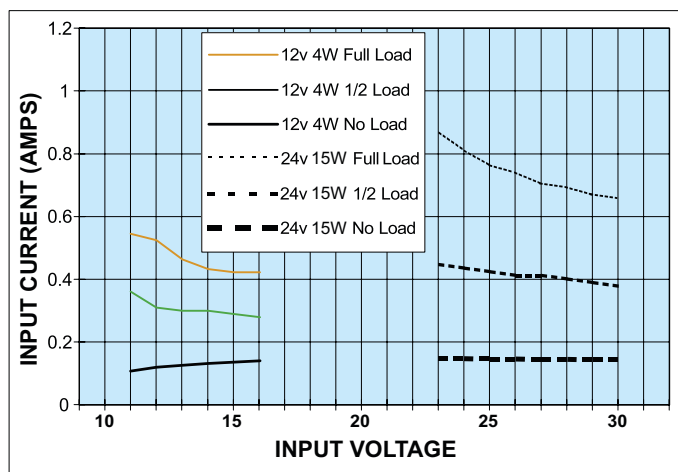


Fig. B

Input Current vs. Input Voltage Range

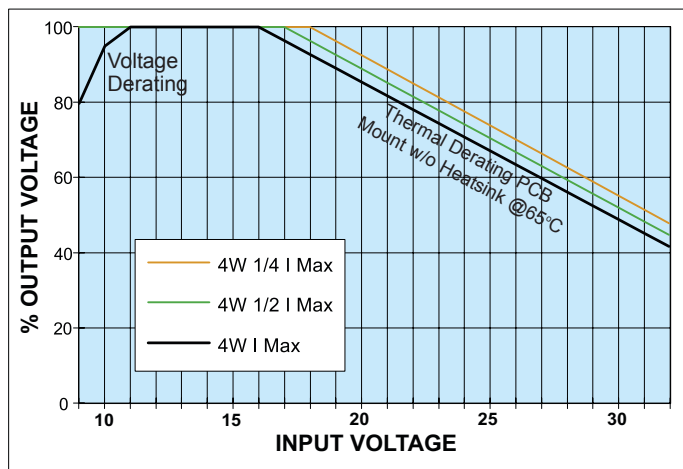


Fig. C

Output Voltage vs. 12V/4 Watt Extended Input Voltage
(Up to 65°C PCB Mount w/o Heatsink)

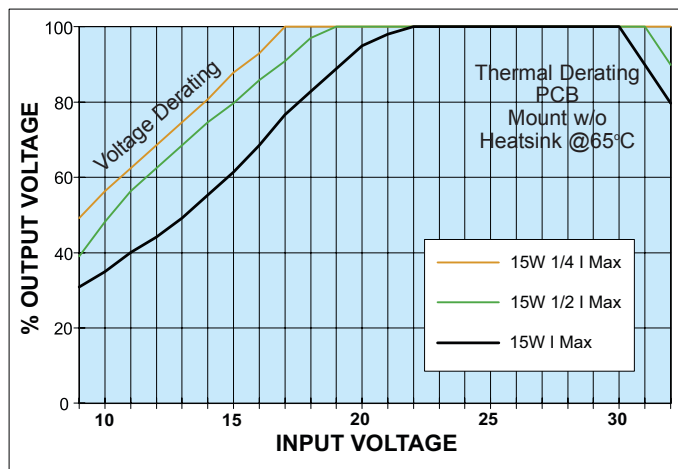


Fig. D

Output Voltage vs. 24V/15 Watt Extended Input Voltage
(Up to 65°C PCB Mount w/o Heatsink)

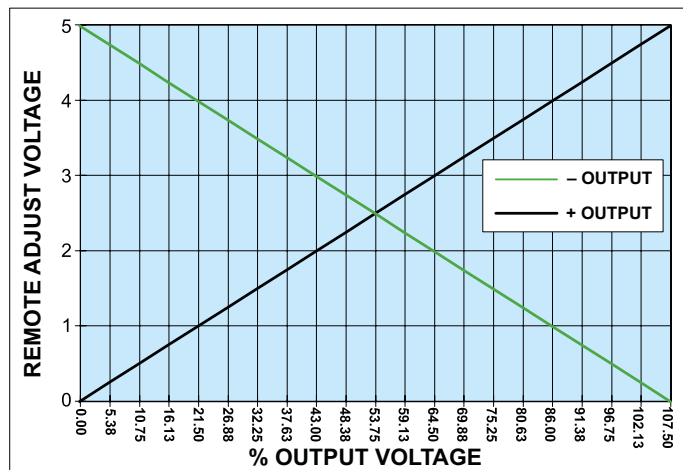


Fig. E

Remote Control Characteristics

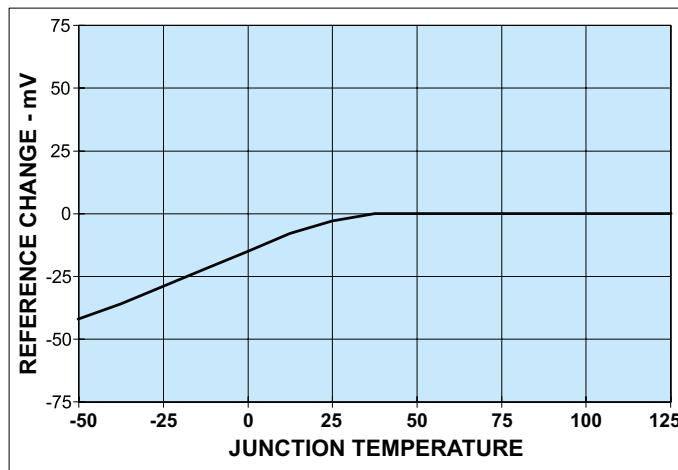


Fig. F

Reference Stability mV vs. °C



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"10A→25A" SERIES

HIGH VOLTAGE POWER SUPPLY

PLASTIC CASE

CONSTRUCTION:

Epoxy-filled DAP box
certified to ASTM-D-5948

TOLERANCE:

Overall $\pm 0.050"$ (1.27)
Pin to Pin $\pm 0.015"$ (0.38)
Mounting hole locations $\pm 0.025"$ (0.64)

MOUNTING:

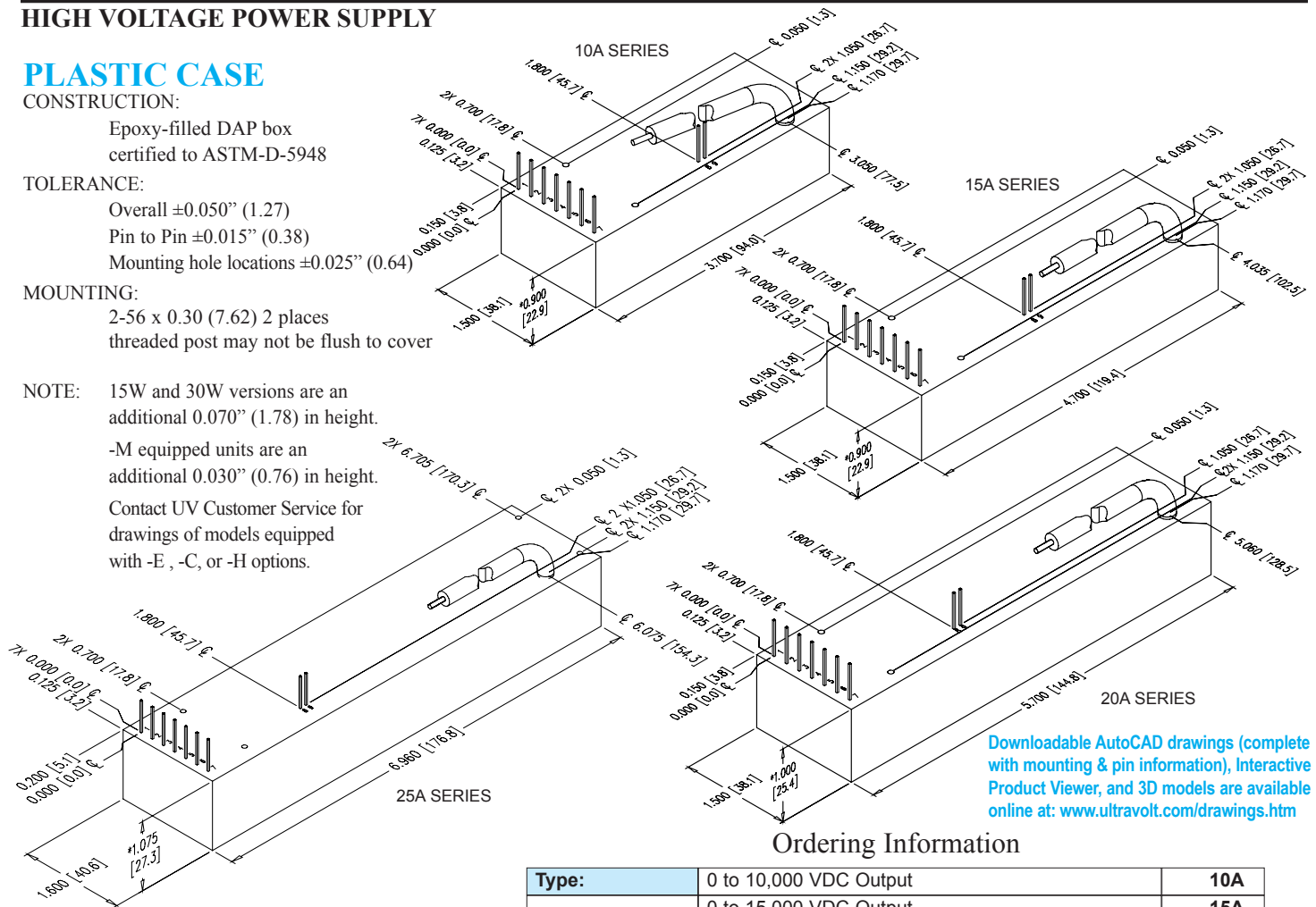
2-56 x 0.30 (7.62) 2 places
threaded post may not be flush to cover

NOTE:

15W and 30W versions are an
additional 0.070" (1.78) in height.

-M equipped units are an
additional 0.030" (0.76) in height.

Contact UV Customer Service for
drawings of models equipped
with -E, -C, or -H options.



Downloadable AutoCAD drawings (complete
with mounting & pin information), Interactive
Product Viewer, and 3D models are available
online at: www.ultravolt.com/drawings.htm

Connections

1 - Input Power Ground Return
2 - Positive Power Input
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5V Reference Output
8 - HV Ground Return
9 - Eout Monitor
All grounds joined internally. Power supply mounting points isolated from internal grounds by >100k Ω , .01uF / 50V (Max) on all models except -M, -M-C and -M-E configurations which are 0 Ω .

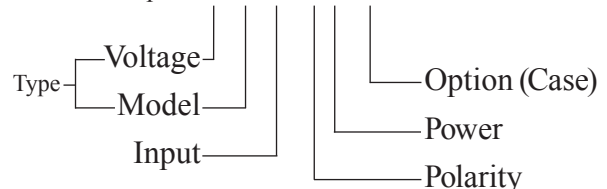
Ordering Information

Type:	0 to 10,000 VDC Output	10A
	0 to 15,000 VDC Output	15A
	0 to 20,000 VDC Output	20A
	0 to 25,000 VDC Output	25A
Input:	12VDC nominal (4W only)	12
	24VDC nominal (15W & 30W only)	24
Polarity:	Positive Output	-P
	Negative Output	-N
Power:	Watts Output (12V Only)	4
	Watts Output (24V Only)	15
	Watts Output (24V Only)	30
Case:	Plastic Case - Diallyl Phthalate	STD
	"Eared" Heatsink Plate (Plastic Case)	-E
	RF-Tight Aluminum Enclosure	-C
Heatsink:	.400" high (sized to fit case)	-H
Shield:	Six-Sided Mu-Metal Shield	-M
Ripple Stripper®:	Integral Output Filter (See "-F" Data Sheet) and Mu-Metal	-F-M
Lead Options:	Shielded Flying Lead	-AS
	Protected Flying Lead	-AP
	Terminated Flying Lead (Contact Customer Service)	-ATxx

PROUDLY



Example: 10A12-P4-C



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