HIGH POWER "C" SERIES

HIGH VOLTAGE POWER SUPPLY

- 7 models from 0 to 125 Volts through 0 to 6kV
- 60, 125, or 250 watts of output power
- Maximum Iout capability down to 0 Volts
- Maximum Iout during charge/rise time
- Output short-circuit protection
- Very fast rise with very low overshoot
- High power density
- Output current & voltage monitors
- >200,000 hour MTBF @65°C
- Fixed-frequency, low-stored-energy design
- **UL, CUL, IEC-60950-1, and Demko Recognized**

GENERAL INFORMATION:

This High Power line of high-voltage regulated DC to DC converters is an extension of the "C" Series, directly addressing the high power density needs of >30 watt applications. High Power "C" units provide up to 60/125/250 watts. This high power density is especially suited to high-energy systems with large capacitances, fast repetition rates, or high continuous-DC-power requirements. See Application Note 10 for more charging information.

COMPATIBILITY:

The High Power "C" Series matches the standard 30 watt "C" Series for design methodology, wide input range, remote control, enable/disable, and reference.

LOW VOLTAGE INPUT:

The input is a dual row, 7 pin IDC header. The first row has the same pin out & signals as the 30 watt "C" Series. The second row provides the pins required to support the High Power "C" Series version. Connections can be made via J-hooked and soldered leads, or via AMP MOD-U connectors with high-pressure, high-current pins. See Application Note 3. A direct-mounted PCB with header sockets, such as the UltraVolt interface board, can mate to the chassis-mounted power supply's input header. Seven #4-40 and two #2-56 PEM nuts are provided on the top cover for this purpose. The 250 watt models also feature a four-pin, high-current input power connector.

HIGH VOLTAGE OUTPUT:

The High Power "C" Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output is adjustable from 0 to 125, 250, 500, 1kV, 2kV, 4kV or 6kV on all 60W/125W/250W units. Additionally, 60W/125W models are adjustable from 0 to 8kV, 10kV, 12kV or 15kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged. Internal capacitance is kept to a minimum to facilitate fast-rise applications. Most fast-rise applications involve charging a storage capacitor, which also acts as an additional output filter/storage capacitor. If your application is continuous DC bias power, an external filter/storage capacitor should be added. Contact UV CSD for recommended capacitor values.

OUTPUT VOLTAGE MONITOR:

A 100 MegΩ divider provides a 100:1 voltage monitor on models up to 6kV. On models 8kV and higher a 1 GigΩ divider provides a 1000:1 test point. The monitor has an output impedance of 1.1 MegΩ and is calibrated for use with a 10 MegΩ input impedance meter. Overall accuracy is +/-2.0% with a temperature coefficient of +/-200 ppm per °C. For applications requiring a different scale factor, such as an ADC compatible design, an external resistor may be added in parallel with the output.

OUTPUT CURRENT MONITOR:

The High Power "C" Series is equipped with an output current monitor. Current from the high-voltage multiplier can be monitored by reading the voltage generated between Output Monitor pin 3 and Signal Ground pin 5. The monitor has an output impedance of 5.1 kΩ. Internal voltage dividers create a small linear offset voltage. See Application Note 13 for more information, including scale factor.

MECHANICAL:

The High Power "C" Series converters are packaged in chassis-mount aluminum enclosures, mounted using the four #8-32 studs and thermal interfacing material. Electrical connections are via wiring harness or top cover mounted PCB. The 60W/125W units up to 6kV utilize the standard 19 in^3 enclosure. The 60W/125W units 8kV and higher use the extended 38 in^3 enclosure along with the 250W units up to 6kV. See Application Note 6 for thermal considerations and mounting configurations.

ENVIRONMENT:

The High Power "C" Series provides full power at case temperature from -40 to +65°C. Extended temperature range is available along with other enhanced capabilities. Please contact the factory. All units receive a 24 hour burn in prior to final testing.

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Typical Characteristics:

Parameter	Conditions	Models																						Units
Input:		**All Types**																						
Voltage Range	Full Power	+ 23 to 30																						VDC
Voltage Range	Derated Power Range	+ 11 to 32																						VDC
Current	Standby / Disable	< 40																						mA
Current	Max Load, Extended Input Voltage	Figures A & B																						Graph
AC Ripple Current	Nominal Input, Full Load	< 50																						mA p-p
Output:		**1/8C**			**1/4C**			**1/2C**			**1C**			**2C**			**4C**			**6C**				
Voltage Range	Nominal Input	0 to 125			0 to 250			0 to 500			0 to 1,000			0 to 2,000			0 to 4,000			0 to 6,000				VDC
Power	Nominal Input, Max Eout	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250		Watts
Current	Iout, Entire Output Voltage Range	480	1000	2000	240	500	1000	120	250	500	60	125	250	30	62	125	15	31	62	10	21	42		mA
Ripple	Full Load, Max Eout, Cload ≥0.5uF	< 1.0			< 1.0			< 1.0			< 1.0			< 1.0			< 1.0			< 1.0				V p-p
Overshoot	C Load, 0 Eout to Full Eout	< 1V			< 1V			< 1V			< 1V			< 1V			< 1V			< 1V				V pk
Voltage Derating	Max Iout, Extended Input Voltage	Figure C																						Graph
Rise Time	Max Iout, Various C Loads & Eouts	Figures D & F																						Table
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	10.00																						V per kV
Proportionality	Full Eout Range, Full Iout Range	± 0.08%																						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	See "A" Series Datasheet 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:		**All Types**																						
Shock	Mil-Std-810, Method 516.5, Proc. IV	20																						G's
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10																						G's
Packaging:		**60W/125W**												**250W**										
Material	Outer construction	Aluminum Alloy 5052-H32, Finish: Mil-C-5541 Class 1A												Aluminum Alloy 5052-H32, Finish: Mil-C-5541 Class 1A										
Length	Not including pins or mounting pts	4.00 ± 0.025 (101.6±.6)												8.00 ± 0.025 (203.2±.6)										In (mm)
Width	Not including pins or mounting pts	4.50 ± 0.025 (114.3±.6)												4.50 ± 0.025 (114.3±.6)										In (mm)
Height	Not including pins or mounting pts	1.075 ± 0.025 (27.3±.6)												1.075 ± 0.025 (27.3±.6)										In (mm)
Volume	Not including pins or mounting pts	19.35 (317)												38.7 (634)										In3 (cc)
Weight	Overall	1.4 (.64)												2.6 (1.18)										Lbs (kg)

Specifications subject to change without notice

Typical Performance Characteristics:

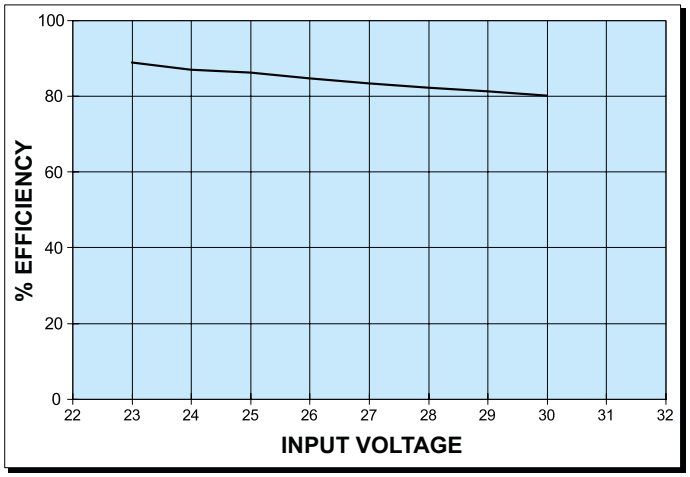

Fig. A
DC Efficiency vs. Input Voltage Range

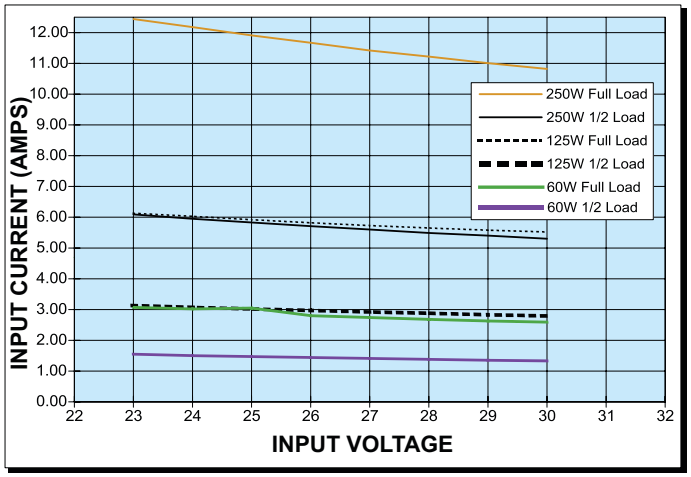

Fig. B
Input Current vs. Input Voltage Range

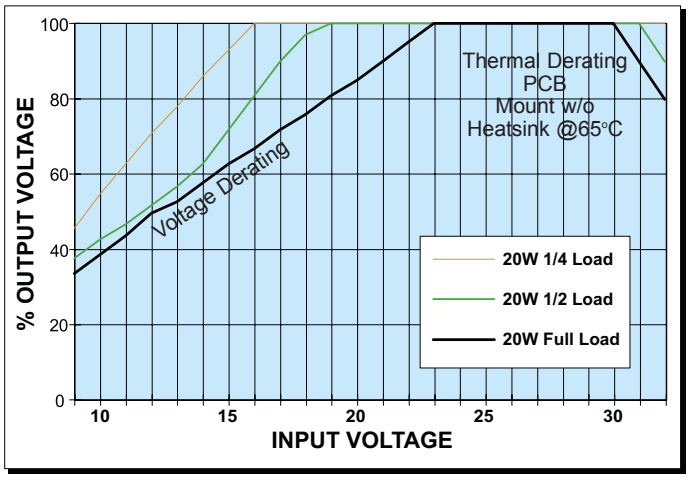

Fig. C
Output Voltage vs. Extended Input Voltage
(Up to 65°C Chassis Mount w/o Heatsink)

$$T = \frac{C \times V}{I} \qquad I = C \times V \times F \qquad F = \frac{I}{C \times V} \qquad J = \frac{C \times E^2}{2}$$

C = uF	C = uF	C = uF	C = uF
V = Volts	V = kV	V = kV	E^2 = kV
I = mA	I = mA	I = mA	J = Ws
T = mS	F = Hz	F = Hz	

NOTES:
Capacitance must include HVPS internal Capacitance, see Fig. F.

For very light capacitive loads the HVPS exibits slower than calculated rise times due to the pulse by pulse current limit.

Fig. D
Rise Time Formulas

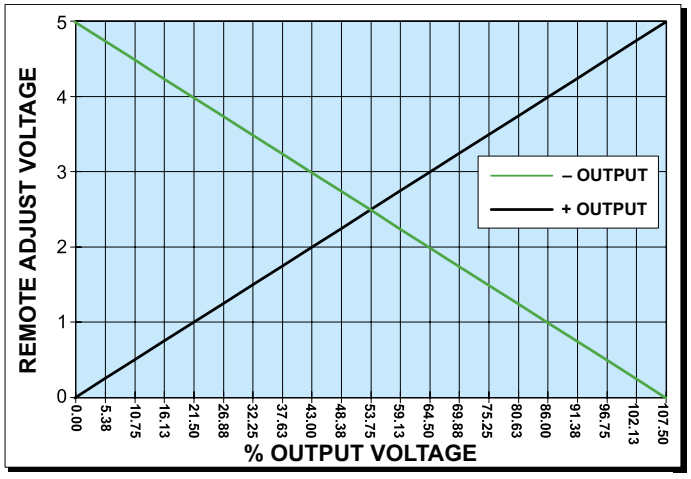

Fig. E
Remote Control Characteristics

Model	60W	125W	250W
1/8C	0.90 uF	0.90 uF	1.80 uF
1/4C	0.90 uF	0.90 uF	1.80 uF
1/2C	0.43 uF	0.43 uF	0.85 uF
1C	0.019 uF	0.019 uF	0.038 uF
2C	0.019 uF	0.019 uF	0.038 uF
4C	0.013 uF	0.013 uF	0.026 uF
6C	0.013 uF	0.013 uF	0.026 uF

Fig. F
Internal Storage Capacitance

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

METAL CASE

CONSTRUCTION:

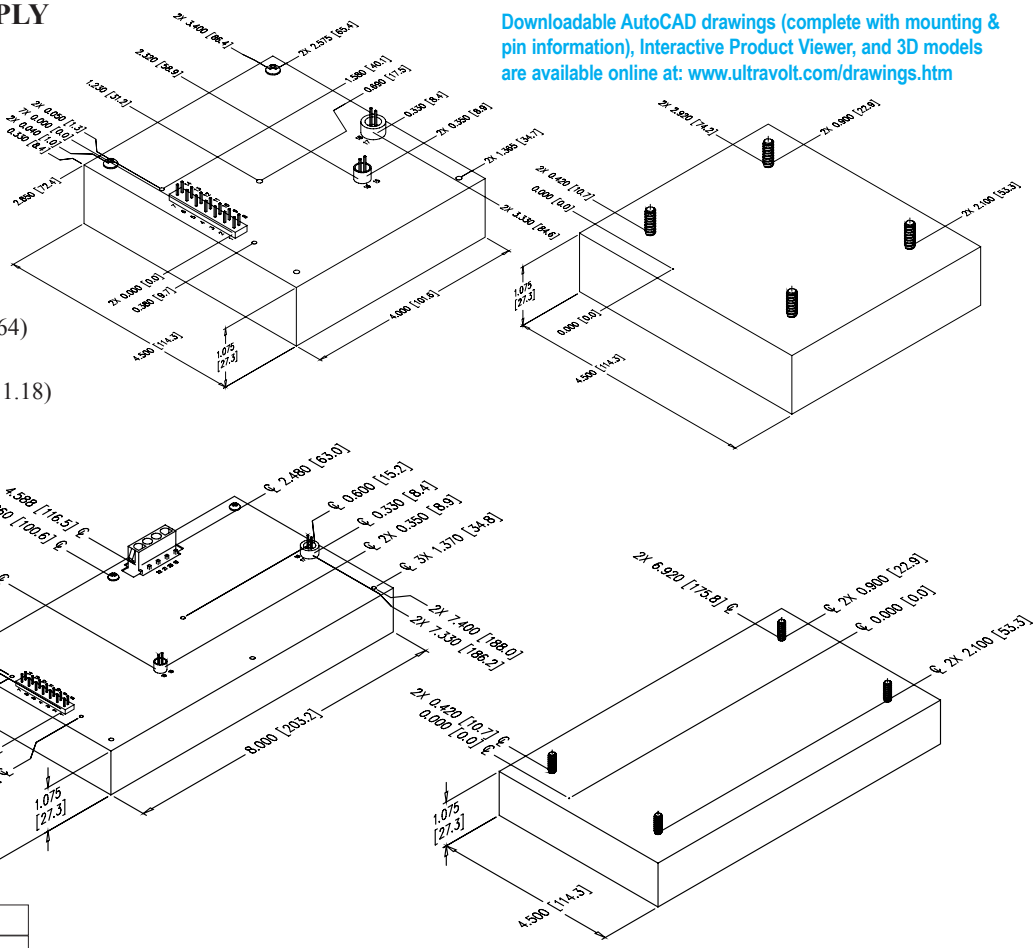
Aluminum box
Chem film per MIL-C-5541
Class 1A

TOLERANCE:

Overall ±0.025" (0.64)
Pin to Pin ±0.015" (0.38)
Hole to Hole location ±0.025" (0.64)

MOUNTING:

Bottom mounting, 8-32 x 0.440 (11.18) long threaded stud



Connections

1 & 8 - Input Power Ground Return
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5 VDC Reference Output
2,9 &10 - Positive Power Input
11 - N/C
12 - N/C
13 - N/C
14 - Eout Monitor
15 & 16 - HV Ground Return
17&18 - HV Output
All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max)

High Power Pin Connections

2,9 &10 - N/C
19 - Positive Power Input
20 - Positive Power Input
21 - Input Power Ground Return
22 - Input Power Ground Return

Ordering Information

Type:	0 to 125 VDC Output	1/8C
	0 to 250 VDC Output	1/4C
	0 to 500 VDC Output	1/2C
	0 to 1,000 VDC Output	1C
	0 to 2,000 VDC Output	2C
	0 to 4,000 VDC Output	4C
	0 to 6,000 VDC Output	6C
Input:	24VDC Nominal	24
Polarity:	Positive Output	-P
	Negative Output	-N
Power:	60 Watts Output	60
	125 Watts Output	125
	250 Watts Output	250
Heat Sink:	.400" High (Sized to Fit Case)	-H

Example: 1/2C24-P125

Type — Voltage / Model — Input — Power — Polarity

IEC-60950-1

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