HIGH POWER "8C→30C" SERIES

HIGH VOLTAGE POWER SUPPLY

- 7 models from 0 to 8kV through 0 to 30kV
- 60 or 125 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 "8C→30C" units provide up to 60/125 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 "8C→30C" 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.

HIGH VOLTAGE OUTPUT:

The High Power "8C→30C" Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output is adjustable from 0 to 8kV, 10kV, 12kV, 15kV, 20kV, 25kV or 30kV. 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 UltraVolt's customer service department for recommended capacitor values.

OUTPUT VOLTAGE MONITOR:

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 "8C→30C" 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 "8C→30C" Series converters are packaged in chassis-mount aluminum enclosures, mounted using #8-32 hardware and thermal interfacing material. Electrical connections are via wiring harness or top cover mounted PCB. All 60W/125W units 8kV and higher use the extended 38 in^3 enclosure. See Application Note 6 for thermal considerations and mounting configurations.

ENVIRONMENT:

The High Power "8C→30C" 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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HIGH POWER "8C→30C" SERIES

HIGH VOLTAGE POWER SUPPLY

Typical Characteristics:

Parameter	Conditions														Units
Input:		**All Types**													
Voltage Range	Full Power	+23 to 30													VDC
Voltage Range	Derated Power Range	+11 to 30													VDC
Current	Standby / Disable	< 40													mA
Current	No Load, Max Eout	8C to 15C < 500, 20C to 25C <600													mA
Current	Max Load, Extended Input Voltage	See High Power "C" Datasheet Figure B													Graph
AC Ripple Current	Nominal Input, Full Load	< 50													mA p-p
Output:		**8C**		**10C**		**12C**		**15C**		**20C**		**25C**		**30C**	
Voltage Range	Nominal Input	0 to 8,000		0 to 10,000		0 to 12,000		0 to 15,000		0 to 20,000		0 to 25,000		0 to 30,000	VDC
Power	Nominal Input, Max Eout	60	125	60	125	60	125	60	125	60	125	60	125	60	125	Watts
Current	Iout, Entire Output Voltage Range	7.5	15.5	6	12.5	5	10.5	4	8.3	3	6.25	2.4	5	2	4.17	mA
Internal Capacitance	Capacitance / 95% Decay (50Meg Load)	2800 / 700		2000 / 575		2000 / 650		2000 / 650		1600 / 240		1600 / 240		1600 / 240	pF / mS
Ripple	Full Load, Max Eout	< 1.0 (Cload ≥0.05uF)								< 1.0 (Cload ≥0.01uF)					V p-p
Overshoot	C Load, 0 Eout to Full Eout	< 0.1%													V pk
Voltage Derating	Max Iout, Extended Input Voltage	Figure C													Graph
Rise Time	Max Iout, Various C Loads & Eout	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	1.00 (1GΩ / 1.1MΩ Divider with 10 MΩ meter)													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% (± 0.05% optional)													VDC
Output Impedance	T=+25°C	464 ± 1%													Ω
Stability	Over Full Temperature Range	See "A" Series Datasheet Figure F (± 5 PPM optional)													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 & Humidity:		**All Types**													
Humidity	All Conditions, Standard Package	0 to 95% non-condensing													
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**													
All Conditions	Standard Package	Sea Level through 70,000													FT
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:		**All Types**													
Material	Outer construction	Aluminum Alloy 5052-H32, Finish: MIL-C-5541 Class 1A													
Length	Not including pins or mounting pts	8.00 ± 0.025 (203.2 ± .6)													In (mm)
Width	Not including pins or mounting pts	4.50 ± 0.025 (114.3 ± .6)													In (mm)
Height	Not including pins or mounting pts	1.075 ± 0.025 (27.3 ± .6)													In (mm)
Volume	Not including pins or mounting pts	38.7 (634)													In^3 (cc)
Weight	Overall	2.6 (1.18)													Lbs (kg)

Specifications subject to change without notice

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Typical Performance Characteristics:

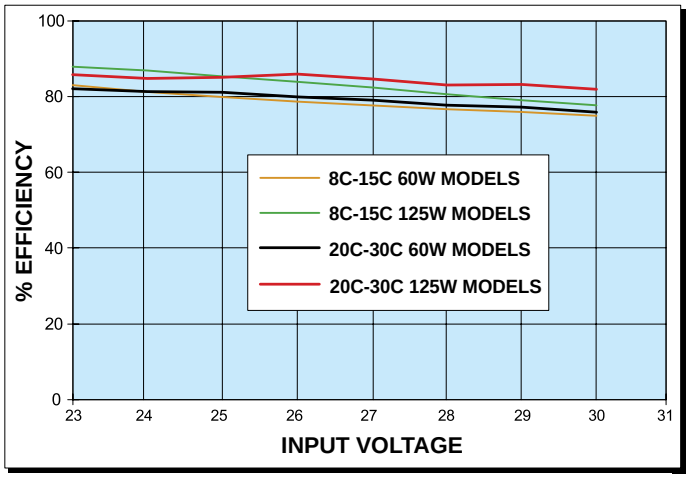

Fig. A
DC Efficiency vs. Input Voltage Range

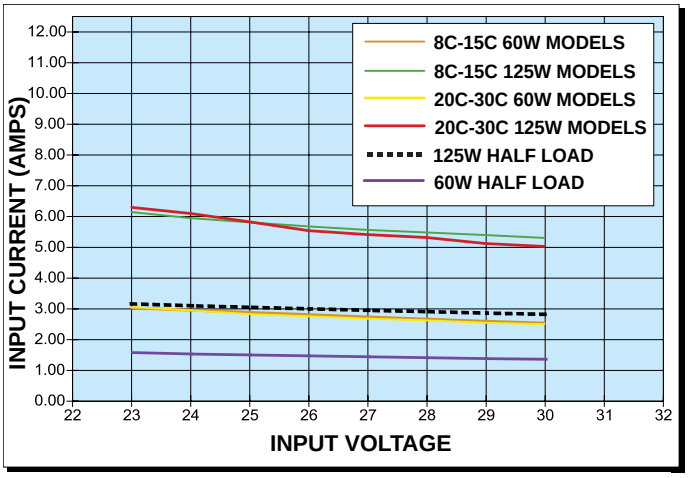

Fig. B
Input Current vs. Input Voltage Range

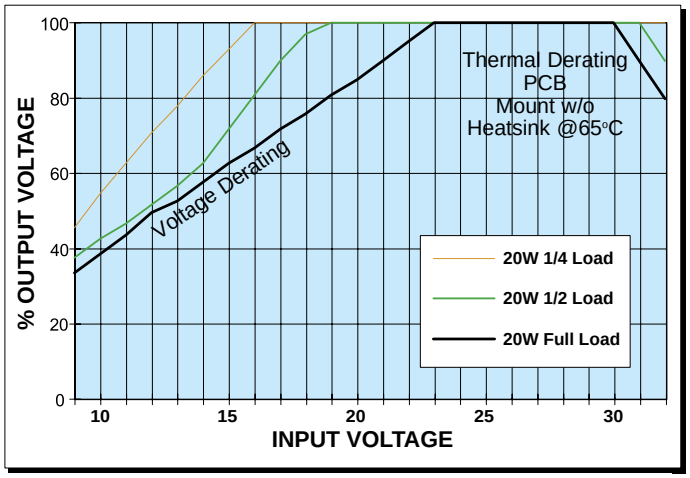

Fig. C
Output Voltage vs. Extended Input Voltage
(Up to 65°C Chassis Mount w/o Heatsink)

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

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 exhibits slower than calculated rise times due to the pulse by pulse current limit.

Fig. D
Rise Time Formulas

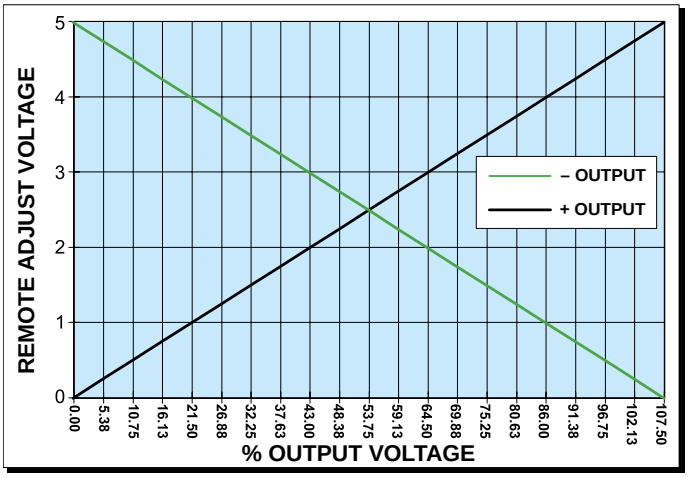

Fig. E
Remote Control Characteristics

Model	60W	125W
8C	2800pF	2800pF
10C	2000pF	2000pF
12C	2000pF	2000pF
15C	2000pF	2000pF
20C	782pF	1182pF
25C	710pF	1110pF
30C	710pF	1110pF

Fig. F
Internal Storage Capacitance

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HIGH VOLTAGE POWER SUPPLY

METAL CASE

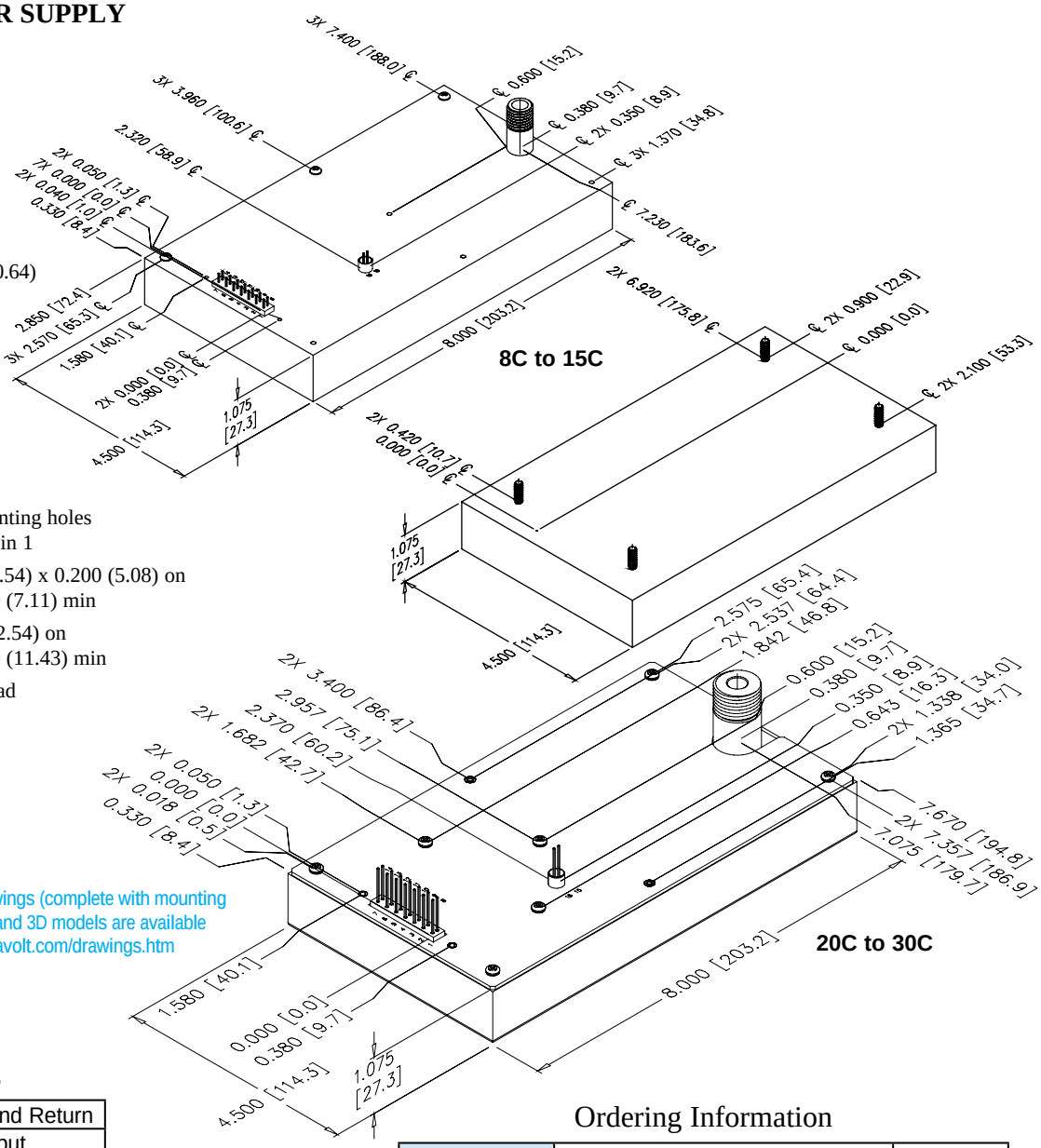
CONSTRUCTION:
- Aluminum box
- Chem film per MIL-C-5541
- Class 1A

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

MOUNTING (8C/10C/12C/15C):
- Bottom mounting,
- 8-32 x 0.440 long threaded stud

MOUNTING (20C/25C/30C):
- 8-32 x 0.112 min thread depth
- blind insert on bottom of unit

PINS:
- Gold-plated 0.025 (0.64) sq.
- The center of the pins and mounting holes are located from the center of pin 1
- Pins 1 thru 14 spacing 0.100 (2.54) x 0.200 (5.08) on center, height from cover 0.280 (7.11) min
- Pins 15 and 16 spacing 0.100 (2.54) on center, height from cover 0.450 (11.43) min
- Unit requires an LGH flying lead connector for proper operation:
  8C to 15C = LGH1
  20C = LGH1L
  25C/30C = LGH3



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

Connections

1 & 8 - Input Power Ground Return
2 & 9 - Positive Power Input
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5 VDC Reference Output
10 & 11 - N/C
12 - N/C
13 - N/C
14 - Eout Monitor
15 & 16 - HV Ground Return
All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 500V (Max)

PROUDLY MADE IN THE USA

Ordering Information

Type:	0 to 8,000 VDC Output	8C
	0 to 10,000 VDC Output	10C
	0 to 12,000 VDC Output	12C
	0 to 15,000 VDC Output	15C
	0 to 20,000 VDC Output	20C
	0 to 25,000 VDC Output	25C
	0 to 30,000 VDC Output	30C
Input:	24VDC Nominal	24
Polarity:	Positive Output	-P
	Negative Output	-N
Power:	60 Watts Output	60
	125 Watts Output	125
Heat Sink:	.400" High (Sized to Fit Case)	-H

IEC-60950-1

Example: 8C24-P125
Type — Voltage — Model — Input — Power — Polarity

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