

- 8 models from 0 to 62V through 0 to 6kV
- 4, 20, or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Wide input voltage range
- Available with Ripple Stripper® Filter
- Indefinite output short-circuit protection
- Output current monitor
- Fixed-frequency, low-stored-energy design
- >430,000 hour MTBF @65°C
- **UL, cUL, IEC-60950-1, and Demko Recognized**



GENERAL INFORMATION:

The “A” Series of high-voltage, regulated DC-DC converters addresses the needs of the miniature-PCB-mount-regulated-high-voltage-power-supply user. 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.

DESIGN METHODOLOGY:

The “A” converters utilize a dual-ended forward converter topology with a nominal switch frequency of <100kHz. A precision reference is provided so the remote control can program the power supply for a specific voltage. Once input voltage stabilizes, under-voltage lockout is released. As soon as enable is raised above a TTL 1, the converter begins to switch. The soft-start circuit brings the converter to full power over a 1mS period, reducing surges on the source supply. A constant-frequency PWM regulation system controls the MOSFET push-pull power stage, which drives the high voltage transformer. The power stage is protected from output current overloads or short circuits via a secondary current limit circuit. High voltage is developed by a multistage multiplier while feedback voltage is developed and sent to the CTRL circuit to maintain regulation. Internal filters are provided to reduce input current ripple and output voltage ripple.

WIDE INPUT RANGE:

The “A” Series is designed for full power operation at up to 90% efficiency. A wide input range of +11 to +16VDC or +23 to +30VDC will maintain full power output without derating. The derated input range is +9 to +32VDC. See Application Note 16 for protection information.

WIDE OUTPUT RANGE:

The “A” Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output voltage is adjustable from 0 to 62, 125, 250, 500, 1kV, 2kV, 4kV, or 6kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

OUTPUT CURRENT MONITOR:

The “A” Series features 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 Return pin 5. Internal voltage dividers create a small linear offset voltage. See Application Note 13.

REMOTE CONTROL:

The “A” Series is remotely programmed with 0 to +5 VDC to produce an output voltage. Input may be from a control voltage, a DAC, or from a variable or fixed resistor. On a negative output converter the programming logic of the remote adjust would be inverted, i.e.: +5 to 0VDC. Connections are on the converter for the internal reference, analog remote adjust and the signal ground. The reference is +5.0VDC, temperature compensated with a 464Ω output impedance. See Figure E & F or Application Note 1 for more information.

STANDBY MODE:

The “A” converters also have an enable function. When the enable is TTL 0 (<+0.7V Isink=1mA) the converter is in a standby mode and input current is reduced to <30 mA. All functions other than the internal reference are shut down. If the enable pin is left unconnected, TTL 1, or at greater voltages up to +32VDC the converter operates normally. The open circuit output voltage from the Enable pin is <+5VDC. In the inhibit mode, 1 mA will have to be sunk for proper shutdown.

MECHANICAL:

“A” Series converters are in PCB mountable plastic cases requiring a footprint of 5.5 in² and only 4.3 in³ of volume. Mounting plates and brackets are available for chassis mounting. This Series is also available in an RF-tight metal PCB/chassis mount package. See Application Note 6 for thermal considerations and mounting configurations. All models are available with optional, six-sided, wrap-around Mu-Metal Shielding.

ENVIRONMENTAL:

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



1800 OCEAN AVE., FRNT
RONKONKOMA, NY 11779

TEL 800-9HV-POWER
TEL 631-471-4444
FAX 631-471-4696

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"A" 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	< 100												< 90												mA
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:		1/16A	1/8A	1/4A	1/2A	1A	2A	4A	6A																	
Voltage Range	Nominal Input	0 to 62	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	
Nominal Input Voltage / Model		12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	12 24 24	VDC			
Power	Nominal Input, Max Eout	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	4 20 30	Watts			
Current	Iout Entire Output Voltage Range	64 320 480	32 160 240	16 80 120	8 40 60	4 20 30	2 10 15	1 5 7.5	0.67 3.3 5														mA			
Ripple	Full Load, Max Eout	.02 .03 .05	.013 .015 .016	.01 .04 .048	.001 .02 .017	.038 .071 .15	.01 .05 .065	.019 .057 .022	.018 .073 .112														%V p-p			
Ripple with -F-M Option	Full Load, Max Eout, 300pF bypass Cap	.002 .004 .006	.0048 .0056 .006	.0052 .0028 .005	.001 .0138 .0016	.0005 .0008 .002	.0007 .0038 .004	.0004 .0088 .0026	.0003 .0012 .004														%V p-p			
Dynamic Load Regulation	½ to Full Load, Max Eout per .1mA	<.12 <.12 <.12	<.12 <.12 <.12	<.20 <.20 <.20	<.50 <.50 <.50	<1.0 <1.0 <1.0	<2.0 <2.0 <2.0	<4.0 <4.0 <4.0	<6.0 <6.0 <6.0														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				
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 & Humidity:		Standard												-C Option												
Humidity	All Conditions, Standard Package	0 to 95% non-condensing												0 to 95% non-condensing												
Operating	Full Load, Max Eout, Case Temp.	-40 to +65												+10 to +45												°C
Storage	Non-Operating, Case Temp.	-55 to +105												-55 to +105												°C
Coefficient	Over the Specified Temperature	± 50												± 25												PPM/°C
Thermal Shock	Mil-Std-810, Method 503-4, Proc. II	-40 to +65												-40 to +65												°C
Altitude:		All Types																								
All Conditions	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:		Standard												-C Option												
Material	Outer construction	Plastic (DAP) ASTM-D-5948												Aluminum Alloy 5052-H32, Finish: MIL-C-5541 Class 1A												
Length	Not including pins or mounting pts	3.70 ± 0.050 (94.0)												4.75 ± 0.025 (120.7)												In (mm)
Width	Not including pins or mounting pts	1.50 ± 0.050 (38.1)												2.00 ± 0.025 (50.8)												In (mm)
Height	Not including pins or mounting pts	0.77 ± 0.050 (19.6)												1.00 ± 0.025 (25.4)												In (mm)
Volume	Not including pins or mounting pts	4.30 (70.5)												8.00 (131.1)												In ³ (cc)
Weight	Overall	5.0 (142)												10.0 (284)												Oz (g)

Specifications subject to change without notice



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TEL 800-9HV-POWER or 800-948-7693 or 631-471-4444 FAX 631-471-4696

Typical Performance Characteristics:

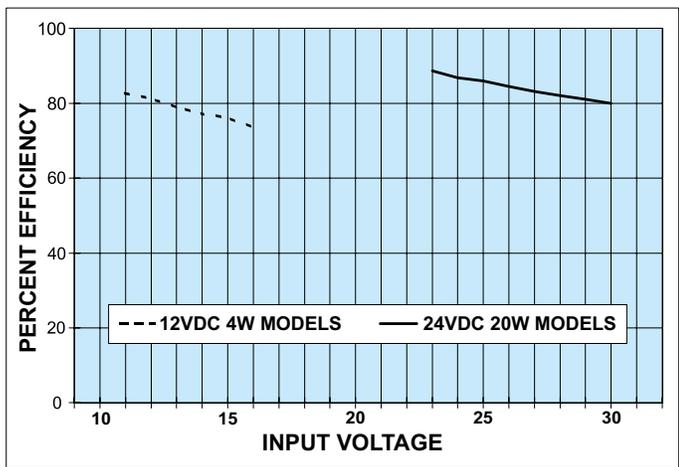


Fig. A

DC Efficiency vs. Input Voltage Range

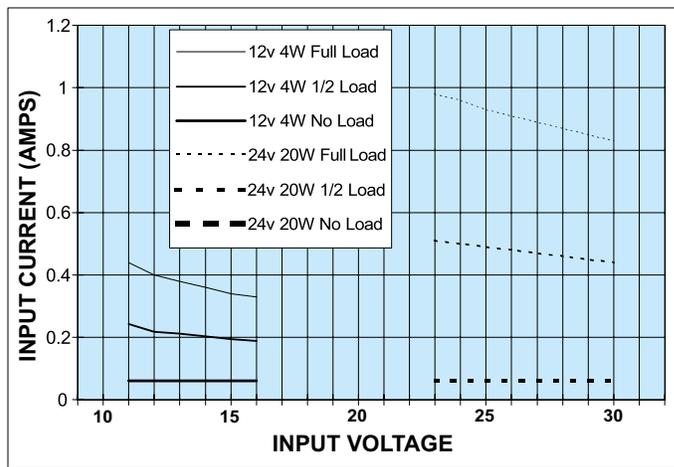


Fig. B

Input Current vs. Input Voltage Range

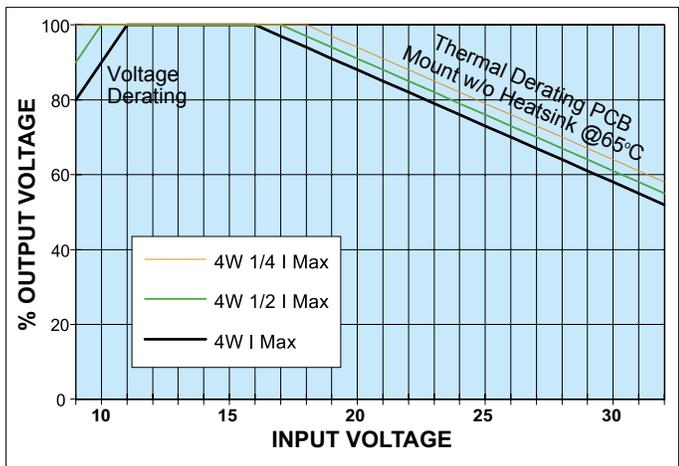


Fig. C

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

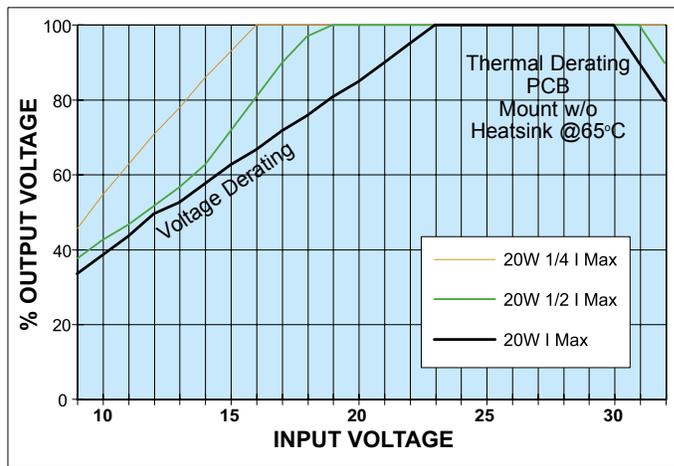


Fig. D

Output Voltage vs. 24V/20 Watt Extended Input Voltage (Up to 65°C Chassis Mount w/o Heatsink)

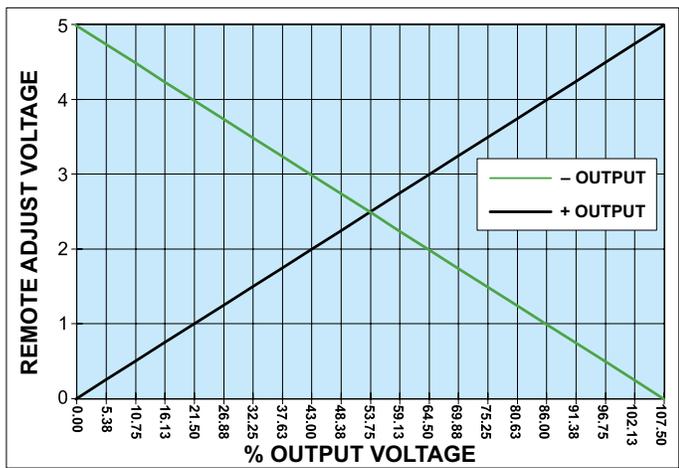


Fig. E

Remote Control Characteristics

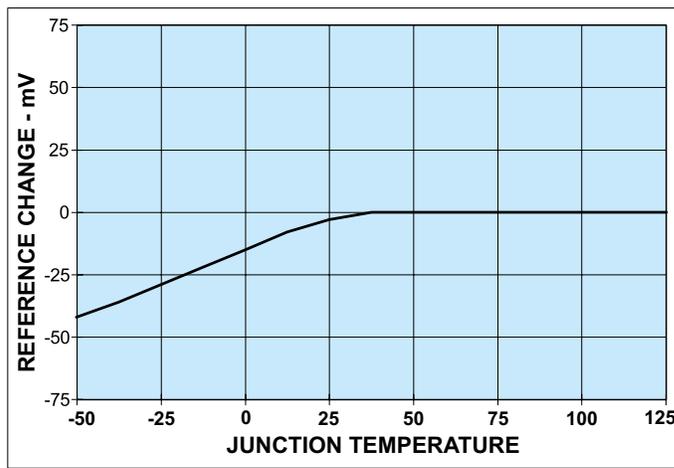


Fig. F

Reference Stability



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"A" 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 location $\pm 0.025''$ (0.64)

MOUNTING:

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

PINS:

Gold-plated 0.025 (0.64) sq.
The center of the pins and mounting holes is located from the center of pin 1
Pins 1 thru 7 spacing 0.200 (5.08) on center, height from cover 0.470 (11.7) min
Pins 8, 9, and 10, 11 spacing 0.100 (2.54) on center, height from cover 0.470 (11.7) min

NOTE:

20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) in height.
Contact UV customer service for drawings on models equipped with -E or -H options.

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 - +5VDC Reference Output
8 - HV Ground Return
9 - HV Ground Return or Eout Monitor (-Y5)
10 - HV Output
11 - HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by $>100k\Omega$, .01uF / 50V (Max) on all models except -M, -C, and -M-E configurations which are 0 Ω .

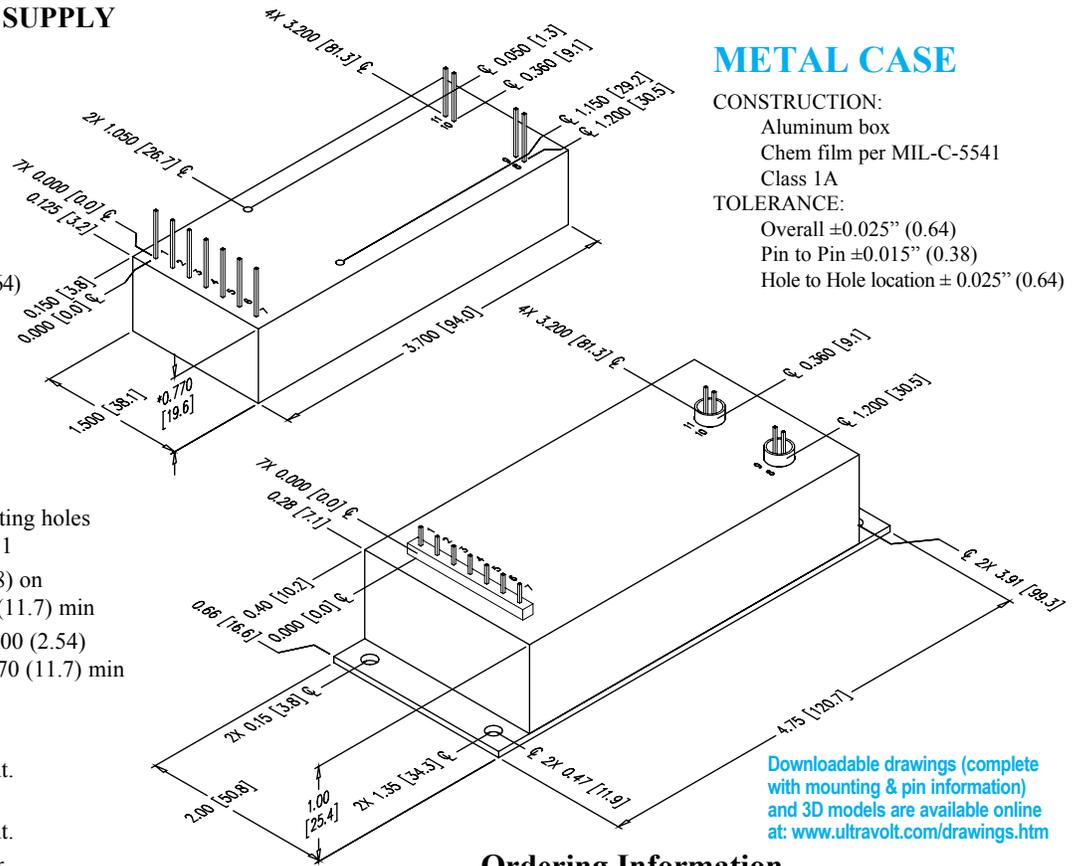
METAL CASE

CONSTRUCTION:

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

TOLERANCE:

Overall $\pm 0.025''$ (0.64)
Pin to Pin $\pm 0.015''$ (0.38)
Hole to Hole location $\pm 0.025''$ (0.64)



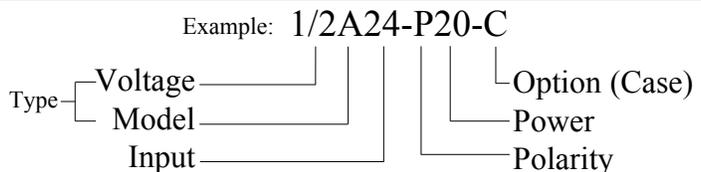
Ordering Information

Type:	0 to 62 VDC Output	1/16A
	0 to 125 VDC Output	1/8A
	0 to 250 VDC Output	1/4A
	0 to 500 VDC Output	1/2A
	0 to 1,000 VDC Output	1A
	0 to 2,000 VDC Output	2A
	0 to 4,000 VDC Output	4A
	0 to 6,000 VDC Output	6A
Input:	12VDC Nominal	12
	24VDC Nominal	24
Polarity:	Positive Output	-P
	Negative Output	-N
Power:	Watts Output (12V only)	4
	Watts Output (24V only)	20
	Watts Output (24V only)	30
Case:	Plastic Case - Diallyl Phthalate	STD
	'Eared' Chassis Mounting Plate	-E
	RF-Tight Aluminum Case	-C
Heat Sink:	.400" High (sized to fit case)	-H
Shield:	Six-Sided Mu-Metal Shield	-M
Ripple Stripper®:	Integral Output Filter (see "F" Series DS)	-F
Voltage Monitor:	Optional Eout Monitor	-Y5
Iout Monitor Boost:	Boosted Iout Monitor Signal Level	-Y10
Temp Coefficient:	25PPM Temperature Coefficient	-25PPM



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