# "30A → 40A" SERIES

## HIGH VOLTAGE POWER SUPPLY

- 0 to 30kV, 35kV or 40kV 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
- >400,000 Hr. MTBF @ 65°C
- **UL, CUL, IEC-60950-1, and Demko Recognized**

### GENERAL INFORMATION:

The "30A → 40A" Series regulated high-voltage DC-DC converters are an extension of the "A" Series, directly addressing the needs of the miniature PCB or chassis-mount ≥30kV 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 "30A → 40A" match the standard "A" Series for design methodology, wide input range, remote control, enable/disable, reference, shock & vibration.

### HIGH VOLTAGE OUTPUT:

The "30A → 40A" Series is a non-isolated unipolar converter. Positive or negative output must be specified. Output is adjustable from 0 to 30kV, 35kV or 40kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

### HIGH VOLTAGE OUTPUT TERMINATION:

The "30A → 40A" Series utilizes 40kV PVC wire. 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 "30A → 40A" Series features a 1000:1 voltage monitor. The monitor has an output impedance calibrated for use with a 10-Megohm input impedance meter. Overall accuracy is ±2.5% with a temperature coefficient of ±200 ppm per °C.

The "30A" uses a 1.5 Gigohm/1.78 Megohm divider.
The "35A" uses a 5 Gigohm/10 Megohm divider.
The "40A" uses a 5 Gigohm/10 Megohm divider.

For "30A → 40A" 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 "30A → 40A" 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 >20kΩ. Internal voltage dividers create a small, linear-offset voltage. See Application Note AP-13 for more details.

### SHIELDING:

The "30A → 40A" 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% when combined with the Ripple Stripper® filter.

### MECHANICAL:

The "30A → 40A" Series converters are in PCB mountable plastic cases requiring footprints of only 11.1 $in^2$ to 12.75 $in^2$ and volumes of only 11.7 $in^3$ to 16.25 $in^3$. 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 units require the optional "-H" factory-installed heat sink or an equivalent customer-installed device in high-temperature applications.

### ENVIRONMENT:

The "30A → 40A" Series provides full power operation at case temperatures from -40 to +65°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.

ULTRAVOLT®
*"Making High Voltage Easier!"®*

1800 OCEAN AVE., FRNT
RONKONKOMA, NY 11779

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

www.ultravolt.com

# "30A → 40A" 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 | 30A<0.25, 35A<0.35, 40A< 0.38 | | | 30A< 0.30, 35A<0.20, 40A<0.38 | | | | | | 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:** | | **30A** | | | **35A** | | | **40A** | | | |
| Voltage Range | Nominal Input | 0 to 30,000 | | | 0 to 35,000 | | | 0 to 40,000 | | | VDC |
| Nominal Input Voltage / Model | | 12 | 24 | 24 | 12 | 24 | 24 | 12 | 24 | 24 | VDC |
| Power | Nominal Input, Max Eout | 4 | 15 | 30 | 4 | 15 | 30 | 4 | 15 | 30 | Watts |
| Current | Iout Entire Output Voltage Range | 0.13 | 0.50 | 1.0 | 0.11 | 0.42 | 0.86 | 0.10 | 0.37 | 0.75 | mA |
| Ripple | Full Load, Max Eout, 300pF bypass Cap | 0.05 | 0.08 | 0.10 | 0.05 | 0.08 | 0.150 | 0.07 | 0.075 | 0.10 | %V p-p |
| Ripple with –F-M Option | Full Load, Max Eout, 300pF bypass Cap | 0.025 | 0.04 | 0.05 | 0.025 | 0.04 | 0.075 | 0.035 | 0.04 | 0.075 | %V p-p |
| Dynamic Load Regulation | ½ to Full Load, Max Eout per .1mA | <10.0 | <10.0 | <10.0 | <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:** | | **30A/35A** | | **40A** | | | **30A/35A** | | **40A** | | |
| 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 | 6.96 (176.78) | | 7.96 (202.18) | | | 8.00 (203.20) | | 9.00 (228.60) | | In(mm) |
| Width | Not including pins or mounting pts | 1.60 (40.64) | | 1.60 (40.64) | | | 2.00 (50.80) | | 2.00 (50.80) | | In(mm) |
| Height | Not including pins or mounting pts | 1.075 (27.31) | | 1.345 (34.16) | | | 1.30 (33.02) | | 1.50 (38.10) | | In(mm) |
| Volume | Not including pins or mounting pts | 11.70 (191.76) | | 16.24 (266.17) | | | 20.0 (327.80) | | 27 (442.53) | | $In^3$(cc) |
| Weight | Overall | 15.0 (425.24) | | 21.0 (595.34) | | | 22.0 (623.69) | | 30.0 (850.49) | | Oz(g) |

**Specifications subject to change without notice**

Typical Performance Curves:

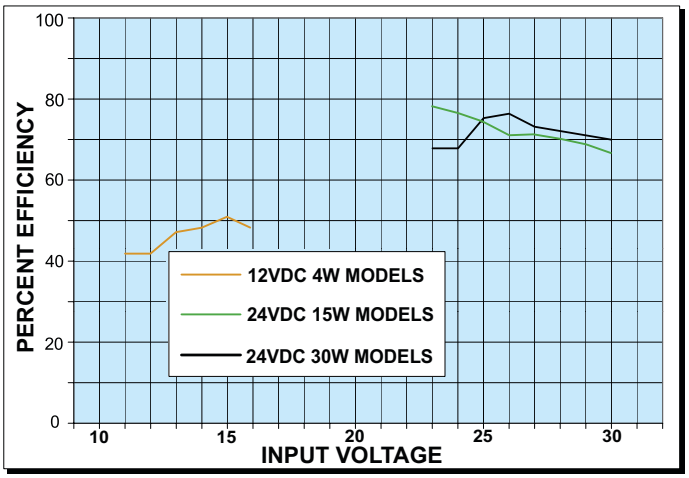



Fig. A
DC Efficency vs. Input Voltage Range

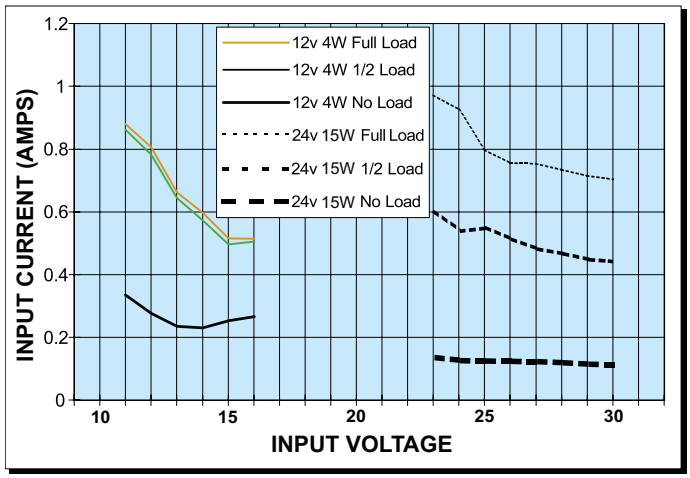



Fig. B
Input Current vs. Input Voltage Range

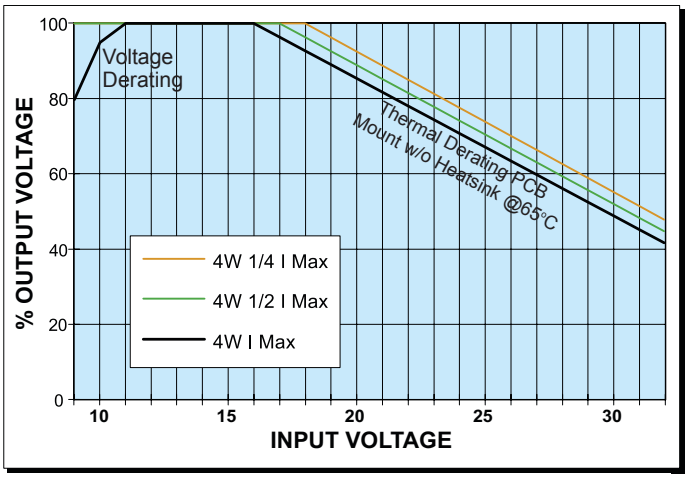



Fig. C
Output Voltage vs. 12V/4 Watt Extended Input Voltage
(Up to 65°C PCB Mount w/o Heatsink)

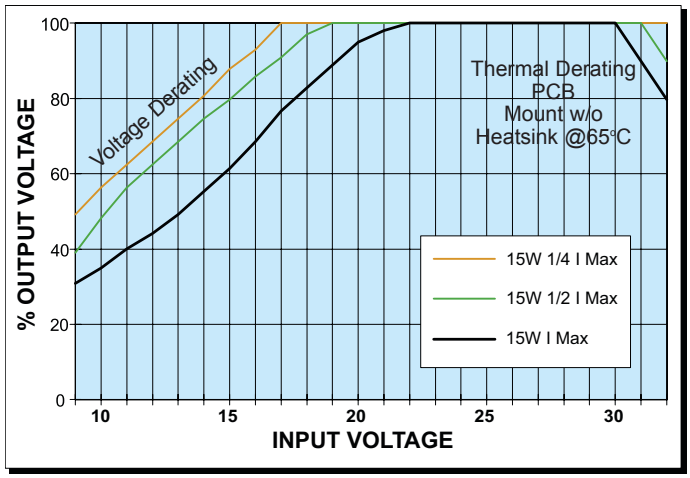



Fig. D
Output Voltage vs. 24V/15 Watt Extended Input Voltage
(Up to 65°C PCB Mount w/o Heatsink)

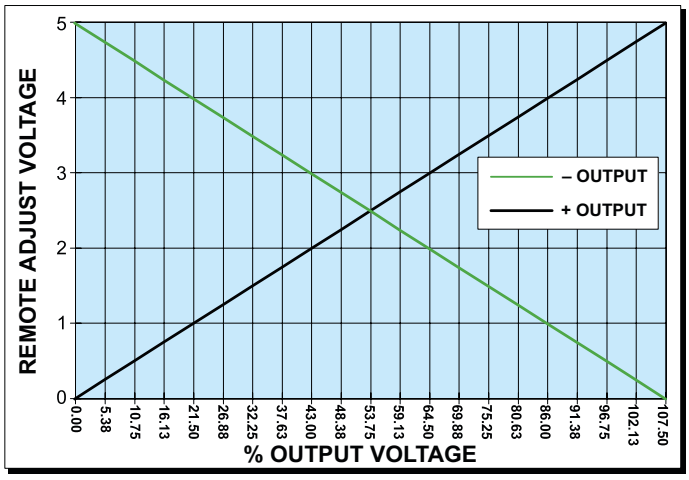



Fig. E
Remote Control Characteristics

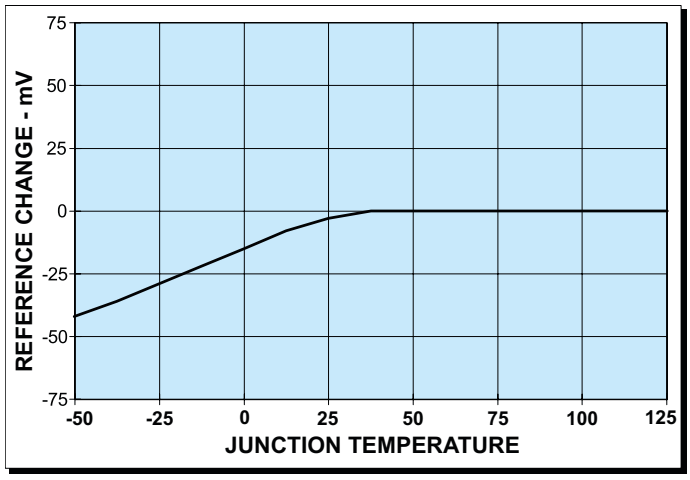



Fig. F
Reference Stability mV vs. °C

## PLASTIC CASE

CONSTRUCTION:

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

TOLERANCE:

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

MOUNTING:

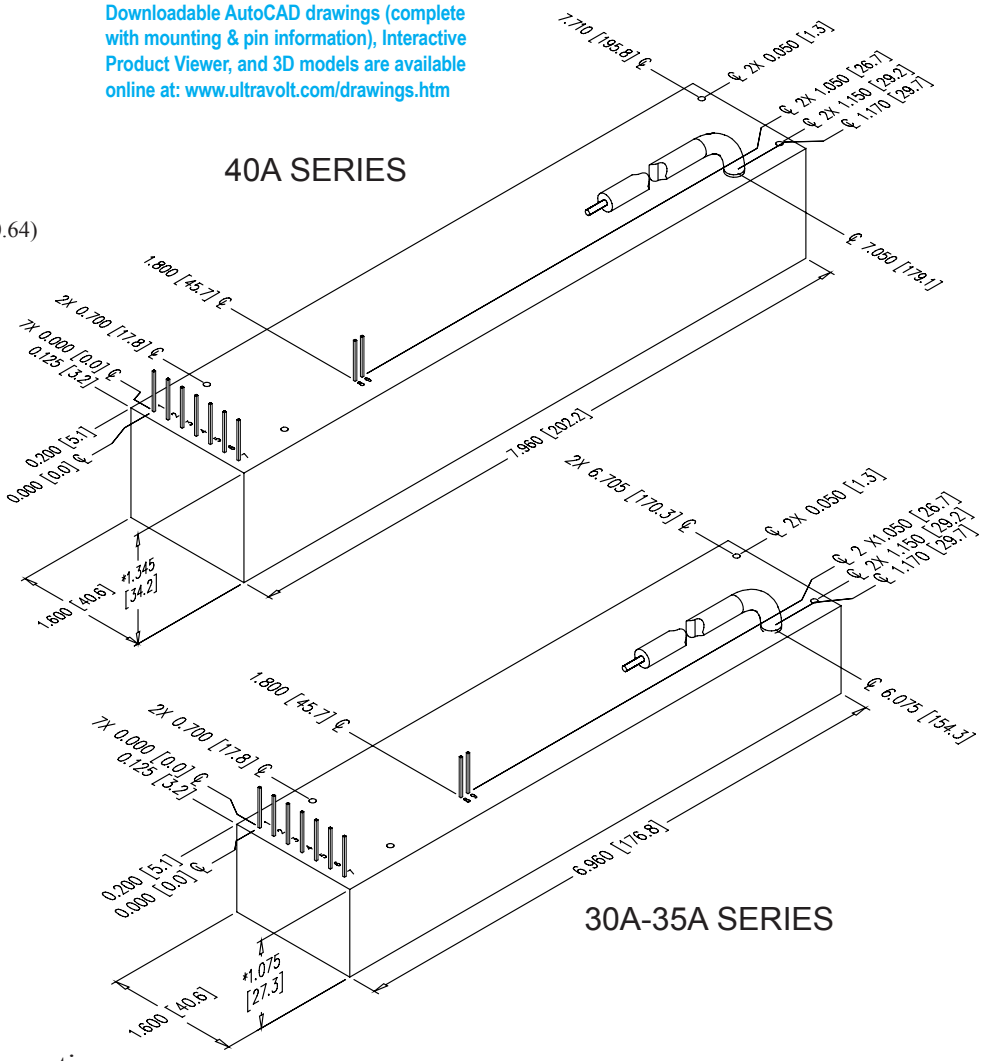
2-56 x 0.30 (7.62) 2 places
threaded post may not be
flush to cover

NOTE:

-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 >100kΩ, .01uF / 50V (Max) on all models except -M, -M-C and -M-E configurations which are 0Ω. |

### Ordering Information

| | | |
|---|---|---|
| **Type:** | 0 to 30,000 VDC Output | **30A** |
| | 0 to 35,000 VDC Output | **35A** |
| | 0 to 40,000 VDC Output | **40A** |
| **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** |

Example: 40A12-P4-C

Type — Voltage — Model — Input — Polarity — Power — Option (Case)

PROUDLY

MADE IN THE USA

IEC-60950-1