

## Updating from User-regulated Proportional HVPS to UltraVolt's Off-the-shelf Regulated HVPS

In the past, engineers have had to use proportional high-voltage power supplies (HVPSs) for their low-power needs. If the application required tight tolerances or output-voltage regulation, engineers built their own regulated HVPS. By placing a control loop around a proportional HVPS, a regulated output voltage with stable characteristics could be maintained. Isolation was generally not an issue, so a specific polarity output was available.

UltraVolt manufactures a line of off-the-shelf standard products incorporating internal regulation circuitry. These switching power supplies help achieve a more cost-effective, reliable, high-voltage power system. Let's examine the different areas where the UltraVolt HVPS contributes to these factors....

### Economic Advantages

What is the cost of the proportional HVPS? While most proportional-regulation solutions are similar, the most basic circuits consist of assembling a minimum of 12 parts into a subassembly. Typically, that consists of the following:

OEM proportional HVPS	stable voltage reference
Host PCB	various compensation/trim capacitors
HV-feedback resistor	various compensation/trim resistors
HV-feedback capacitor	pass transistor
HV-filter capacitor	input filter capacitors
Op Amp	PCB headers

Assembly and Inspection labor  
Test and Troubleshooting labor

Note the impact on overhead where the individual parts listed above must be procured, expedited, received, inspected as parts, kitted, assembled, inspected, tested as a subassembly and burned in. In addition, subassembly manufacturing documentation must be maintained. UltraVolt's single-part solution costs less!

### Reliability Advantages

UltraVolt's single-part solution lasts longer! As an assembly, our 4-watt HVPS has a mean time between failures (MTBF) of 654,583 hours at 55°C. What is the MTBF of the proportional HVPS? Is that calculated at 55°C or 21°C? Does that MTBF factor in the 12 or more components required for regulation?

### Shielding

UltraVolt's single-part solution is easier to shield! All of our HVPSs have reduced emissions. Optional wrap-around Mu-metal shielding further reduces EMI & RFI emissions for sensitive applications. Conversely, the proportional HVPS solution will radiate more noise, due to its

inherent design and because the radiating components are spread over a larger surface area. If the unit requires full shielding, you must also box in the proportional HVPS and ALL of the regulation circuits with a custom shield. Not only will this increase the cost, but it will also raise the ambient temperature, increasing drift and reducing component life.

### Size

UltraVolt's single-part solution is smaller! With a footprint of only 5.5in<sup>2</sup>, along with a volume of 4.3in<sup>3</sup> our HVPS frees up valuable space in your system. If your product is portable, the proportional power supply solution adds to system weight. The proportional HVPS solution also uses up valuable space that could be used to enhance your products.

### Output Power

UltraVolt's single-part solution is more powerful! With 12VDC models producing 4 watts, and 24VDC models producing 20 watts, our HVPS can provide all the power required for your system. Typical proportional solutions have limited output power from 1 to 3 watts.

### Control

UltraVolt's single-part solution is fully compatible! Output voltage can be programmed just like the proportional power-supply solution. Both resistance and voltage programming, along with simple two-resistor scaling, are fully supported.

As you can see from the analysis above, it is evident that the single-component solution has many advantages. Whether your interest is in reducing production cost, raising system MTBF, or finding more space for new circuits, we believe UltraVolt's series of regulated HVPSs will help you to reach your goals.