

High Voltage Power Supply Required to Electrically Charge Nozzles in an EHD System

INDUSTRY

Semiconductor

SOLUTION

High Power A Series

EQUIPMENT

Electrohydrodynamic (“EHD”) Jet Printing

CHALLENGE

A cutting-edge semiconductor company has developed an innovative solution for high resolution & ultra-fine printing technology, based on electrohydrodynamic fluid control. EHD jet printing is a near-field jet printing and patented technology using electrostatic principles. Compared with the conventional EHD jet printing technology, EHD allows more stable and reliable liquid ejection and dispensing for ultra-fine patterns. Their requirement was for a precision, rapid-reversing, low-wattage 4kV HVPS. The power supply must be capable of slewing from +4kV to -4kV and swing cleanly through zero volts, so this demands a high voltage amplifier. The customer also requested that we attempt to reduce the output ripple, as excessive ripple would have a deleterious effect on the integrity of the droplet size and patterns. Finally, the customer’s end user is a global, high-visibility manufacturer of smart phones in the world, so on-time delivery is extremely critical to keep pace with their ongoing product release schedule.

SOLUTION

Advanced Energy’s Ultravolt’s P/N 4HVA24-BP-F was the power supply which met the rigorous requirements of the end-customer and solution. The bipolar nature of this power supply provided the +/-4kV output voltage swing their application required, and the addition of the “Ripple Stripper” option (-F suffix) further reduced the output ripple to their satisfaction.

Essential features of the HVA Series included:

- Bipolar models available at 0 to 10 kV, 15 kV, 20 kV
- Full-range two- and four-quadrant output of voltage and current for bias, amplification or reversing
- Fast voltage slew rates and broad bandwidths up to 500 Hz
- Sources and sinks output current through operating range
- High voltage output controlled using differential analog inputs
- Compact size with electrical performance and mechanical integration options.

CONCLUSION

HVA modules are optimized for bias applications while providing excellent line regulation, load regulation, dynamic response, and stability. The HVA series can both source and sink current operating linearly through 0 V with low ripple and noise over the entire output range. Among the customer's most valued attributes of the HVA Series:

- AE's ability to equip the power supply with a ripple-reduction feature
- HVA Series ability to precisely and rapidly slew over an 8000V range with no zero-switching noise.
- Ppm-level line & load regulation
- The HVA Series' excellent dynamic response during the EHD printing process
- UltraVolt's ability to build this complex product within relatively short lead-times

RESULTS

The HVA Series enabled this customer to take complete technological advantage of their machine's capabilities by powering it with a precision HV product, allowing them to fully achieve their goals of developing the most advanced ultra-fine printing tool available. Along with excellent customer support and face-face meetings, they have developed confidence in our capabilities as a renowned supplier of precision high voltage power and pledged to work with us on future developments which may require higher-power versions of the same power supply.



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