CASE STUDY

High Voltage Power Supply Required for Mass Spec TOF System

INDUSTRY	SOLUTION	APPLICATION
Life Sciences/ Analytical Instrumentation	+25kV Low Ripple, High Stability HV-DC/DC Power Supply	Time-of-Flight (TOF) Mass Spectrometer

CHALLENGE

The customer required a high voltage DC-DC power supply with very low output ripple and an exceptionally stable DC output for a time-of-flight (TOF) mass spec system. Since the quality of mass analysis results utilizing TOF are highly dependent upon an extremely stable, low-noise DC source, the level of ripple on the high voltage output must be kept as low as possible. The lower the ripple, the better the resolution that the instrument can provide. Additionally, changes in the DC level of the high voltage output, due to changes in the ambient temperature, can adversely affect the flight times of ions being analyzed during the TOF process. Hence, a power supply with very low temperature coefficient is critical for this application.

SOLUTION

After review of the customer's demanding stability and low noise requirements, the most appropriate power supply solution was determined to be Advanced Energy's (AE) standard LE series +25 kV / 15 W power supply, in detail P/N 25LE24-P15. The LE series is fully qualified to meet the customer's specifications by providing the most critical parameters – low noise and high stability – in one compact product. These traits were exhibited in the following real-world test results:

- The LE series has a standard temperature coefficient (TC) of 25 ppm/°C, which is half the TC of other UltraVolt products. This exceptionally low specification provided the customer with the most stable, steady-state high voltage output even during large changes in the ambient temperature.

- Ripple is extremely low (0.002% of the maximum high voltage output) which enables the most accurate mass resolution during the system's TOF process.
- Overall, the 25LE product outperformed the best solution when compared to premium products of two closest competitors.

The characteristics of the LE series were given a high degree of consideration by the customer during their power supply selection process. However, there were other factors and benefits of choosing this product, above the superior electrical performance, such as:

- AE's agreement to conduct an unbiased, transparent, comparative test of the high voltage output ripple between the LE series and a sample of one of the competitor's product. By fully informing the customer with real-world test results (beyond what is documented on published spec sheets), the customer was empowered to make a well-informed, objective product selection.
- The customer appreciated that AE performed the above tests quickly so they could make a data-driven decision.
- The LE series has been adopted successfully by several other analytical applications customers requiring high stability and purity of the high voltage DC output, increasing the customer's confidence in this product line.

RESULT

Selecting the LE series provided the customer with a product that exceeded their technical requirements. Along with a well-established case history of the LE series in similar low-noise, high- stability applications, its excellent specifications and objectively proven technical superiority to the competition, the customer felt confident with their choice. Additionally, the customer was impressed by AE's product portfolio, long-standing experience in life sciences applications and strong customer support throughout the entire customer experience.

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