All-new Versatile Silicon Drift Detector and Preamplifier Combination for Industrial Applications

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In applications with need for the combination of short measurement time and high resolution a Silicon Drift Detector (SDD) is ideal. Mixed with limited installation space, a direct signal amplification and small power supply close to the SDD is crucial. For these customer needs, KETEK renewed its versatile VIAMP (VITUS SDD + AMPLIFIER PCB) to achieve a high peak stability and excellent spectroscopic performance down to 100ns peaking time over a wide ambient temperature range. First measurements with a 7mm² SDD revealed an energy resolution of the Manganese K-alpha line (FWHM) better than 139eV at 0°C chip temperature, +60°C ambient temperature and 1Mcps. At optimal conditions (2µs, 20kcps, -50°C chip and +20°C ambient temperature) the energy resolution gets lower than 125eV.

The goal of the development was to decrease the customer's implementation efforts and increase the possibilities to adapt to the customer needs at the same time. This led to the standardized mounting and connection (FFC) combined with an optimized thermal connection for better cooling performance and improved heat dissipation in case of mobile applications. The fundamental thermal design can be easily copied and integrated into a custom housing. Measuring only one inch in width, the SDD can be positioned with a pitch of one inch in a row for sorting applications. Customizable signal gain, ramped output minimum, maximum and offset – for 7mm² to 50mm² SDDs – complete the features of this versatile design.

40% less PCB power consumption lead to increased battery lifetime. A temperature monitor for the Peltier hot side and an EEPROM for user specific data can be accessed via a standard interface. An external input to control the ramped output reset via a digital pulse processor is available.