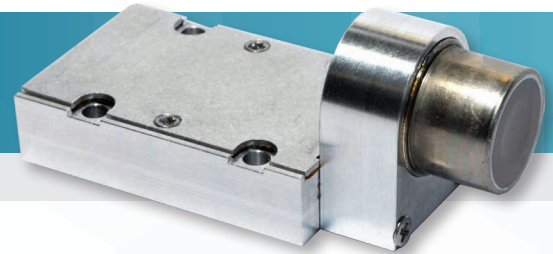




Model SXD15M-500-CM-PA

X-PIPS™ Detector (SDD)



Nuclear



Healthcare



Homeland
Security
& Defense



Labs and
Education



Industrial and
Manufacturing

KEY FEATURES

Detector System Includes:

- Silicon Drift Detector (SDD)
- Be Window
- CMOS Preamplifier
- Low Power Peltier Cooler

PERFORMANCE

- Active Area – 25 mm²
- Collimated Active Area – 15 mm²
- Thickness – 0.5 mm
- Typical Resolution – 127 eV (FWHM)*
- Energy Range – 1 to 30 keV
- ΔT>75K at 30 °C heat sink temperature

DESCRIPTION

The X-PIPS Detector is a spectroscopy sub-system sensitive to X-rays and low-energy gamma rays. It comprises a hermetically sealed silicon drift detector (SDD) element with a low noise CMOS reset type preamplifier and Peltier cooler. The detector element and CMOS preamplifier are cooled. The Beryllium entrance window is standard 0.5 mil.

The preamplifier has a reset mechanism providing fast reset time and excellent count rate performance.

The energy resolution is guaranteed at typical operating temperature within an ambient temperature range of +10 °C to +30 °C.

The X-PIPS Detector has an internal multilayer collimator for improved peak to background.

| Model | Active Area (mm ²) | Collimator | PTB | | Energy Resolution FWHM (eV)* | |
|------------------|--------------------------------|------------|---------|--------|------------------------------|-----|
| | | | Typical | Min | Typical | Max |
| | | | | | @ Optimum Rise Time | |
| SXD15M-500-CM-PA | 15 | Multilayer | 15000 | >12000 | 127 | 132 |

* Energy resolution is given at 5.9 keV (Mn-Kα), with an ambient temperature ranging from +10 °C to +30 °C, on a digital spectroscopy system with trapezoid shaping filter. Cooled at typical operating temperature of -35°, maximal cooling at room temperature is -55 °C.

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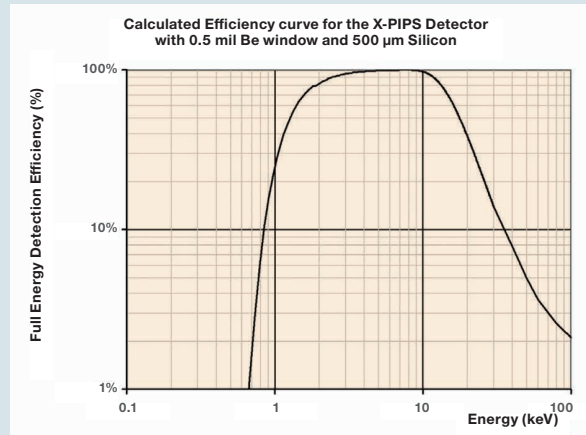


Figure 1 - Calculated efficiency curve.

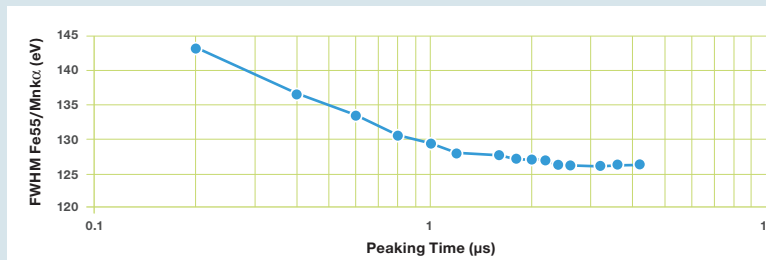


Figure 2 - Typical resolution as a function of the Peaking Time with Flat Top 0.1 μs @ -35 $^{\circ}\text{C}$.

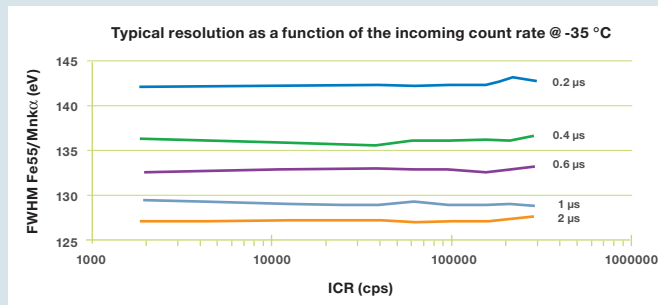


Figure 3 - Typical resolution as a function of the incoming count rate with 0.1 μs Flat Top for different Peaking Times at -35 $^{\circ}\text{C}$.

SPECIFICATIONS

PERFORMANCE

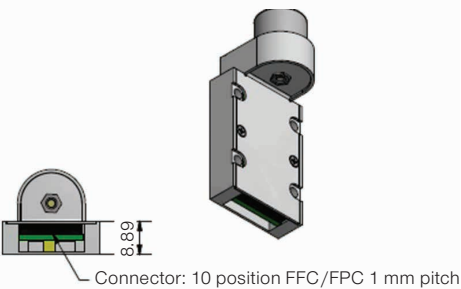
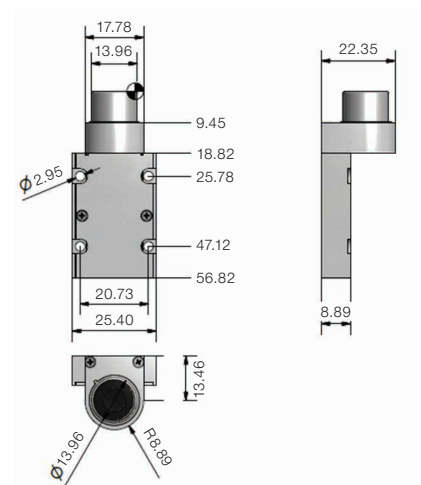
GAIN STABILITY

- <25 ppm/°C over a range of +10 °C to +30 °C.
- <50 ppm over 24 h at constant temperature with 1 h stabilization.

CHARGE SENSITIVITY

- Gain is 4 mV/keV.
- Gain tolerance is $\pm 25\%$.

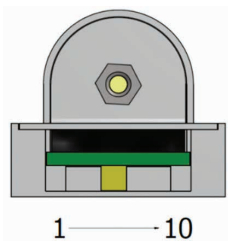
PHYSICAL



POWER REQUIREMENTS

The connector on the preamplifier is a 10 position, 1 mm pitch FFC/FPC right angle connector (FCI part number SFW10R-2STE1LF). The pinout of the preamp (connector is on topside of the board, left to right) is:

| | |
|----|-------------|
| 1 | TEC - |
| 2 | TEC + |
| 3 | +5 V |
| 4 | -5 V |
| 5 | Temp. GND |
| 6 | Signal Out |
| 7 | Temp. Diode |
| 8 | GND |
| 9 | No Connect |
| 10 | HV |



THE PREAMP REQUIRES TWO POWER SUPPLIES

- +5 V (nominal 15 mA, average 12 mA). Absolute maximum voltage is 6.3 V.
- -5 V (nominal 15 mA, average 10 mA). Absolute maximum voltage is -6.3 V.
- HV – -260 V (recommended).

TEMP READOUT

- Use connections Temp. Diode and Temp. GND.
- Temp. Diode (Bias) – 45 μ A.
- SLOPE – -2.183 mV/°C
- V (0 °C) – 636 mV.

COOLER CONTROL

- MAX VOLTAGE – 3.6 V.
- MAX CURRENT – 0.4 A.

HEAT SINK

It is advisable to mount the detector housing to a heat sink in order to guarantee good dissipation of the heat generated by the Peltier cooler.

OUTPUTS

- GAIN – 4 mV/keV $\pm 25\%$.
- DYNAMIC RANGE – -2V to 2V.

ENVIRONMENTAL

- OPERATING TEMPERATURE – 0 to 50 °C (32 to 122 °F).
- OPERATING HUMIDITY – 0 to 80%, non-condensing.

ORDERING INFORMATION

- SXD15M-500-CM-PA.

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