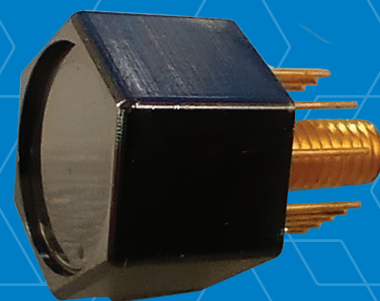




X-RAY APPLICATIONS

Hexagonal

Silicon Drift Detector (SDD)



The Hexagonal Silicon Drift Detector (SDD) is a spectroscopy subsystem sensitive to X-rays and low-energy gamma rays, primarily used for nuclear physics research focused on synchrotron radiation technology.

The X-PIPS™ Detector is a suite of spectroscopy subsystem products sensitive to X-rays and low-energy gamma rays. The Mirion silicon drift detector uses proprietary PIPS® technology.

This X-PIPS Detector is comprised of a hermetically sealed hexagonal silicon drift detector element with a low noise CMOS and a Peltier cooler. It has an internal multilayer collimator for an improved peak-to-background ratio.

This product range is intended to be integrated in multi-element arrays used mainly in synchrotrons. Mirion develops designs, manufactures and assembles everything in house, which has made Mirion the select partner for industrial clients.

FEATURES

- ✓ Hexagonal Silicon Drift Detector
- ✓ Be Window (25 µm)
- ✓ CMOS preamplifier
- ✓ Peltier cooler
- ✓ Easily customizable in a multi-element configuration
- ✓ Faster measurements
- ✓ Excellent packing fraction with individual elements
- ✓ Simplified maintenance

PERFORMANCE

- ✓ Active Area: 75 mm²
- ✓ Collimated Active Area: 55 mm²
- ✓ Thickness: 0.5 mm
- ✓ Resolution <135 eV (FWHM)*
- ✓ Energy Range: 1 to 30 keV
- ✓ ΔT > 100K at 30 °C heat sink temperature

HEXAGONAL SILICON DRIFT DETECTOR

Model	Collimated Active Area (mm ²)	Collimator	PTB		Energy Resolution FWHM (eV)*	
			Typical	Max	Typical	Max
					@ Optimum Rise Time	
SXD55M-HEX-500-CM-T08	55	Multilayer	15000	>12000	128	135

* Energy resolution is given at 5.9 keV (Mn-K α), with an ambient temperature ranging from +10 °C to +30 °C, on a digital spectroscopy system with trapezoid shaping filter. Cooled to -50 °C.

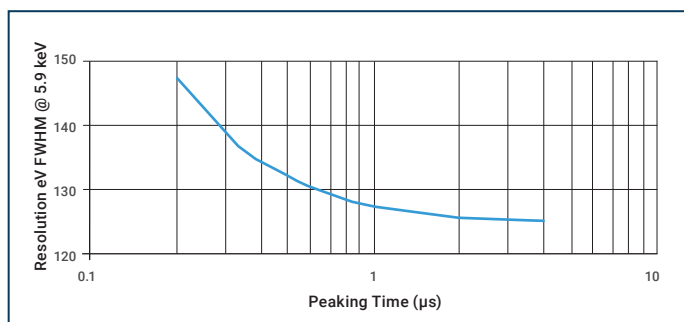


Figure 1: Typical resolution as a function of rise time at -50 °C.

Input count rate (Mcps)	Output count rate (Mcps)	Energy Resolution FWHM (eV)
		Typical
0.5	>0.45	145
1	>0.9	175

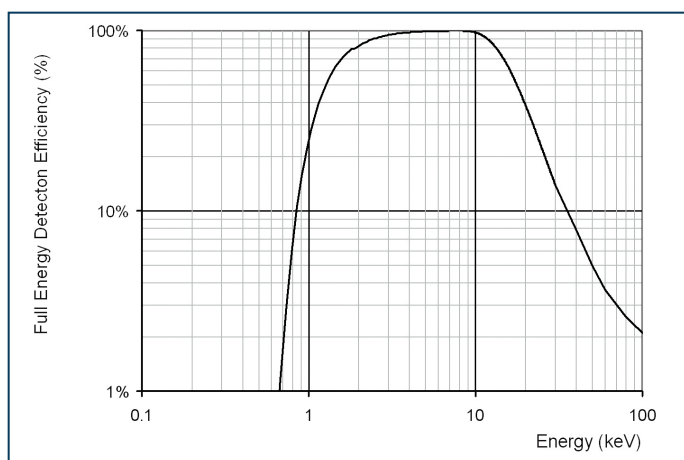


Figure 2: Calculated efficiency curve.

HEXAGONAL SILICON DRIFT DETECTOR

SPECIFICATIONS

SYSTEM REQUIREMENTS:

DETECTOR BIAS

- HV/P+: -225 V 30 μ A
- Ground: 0 V
- LV: -60 V 30 μ A

CMOS PREAMPLIFIER

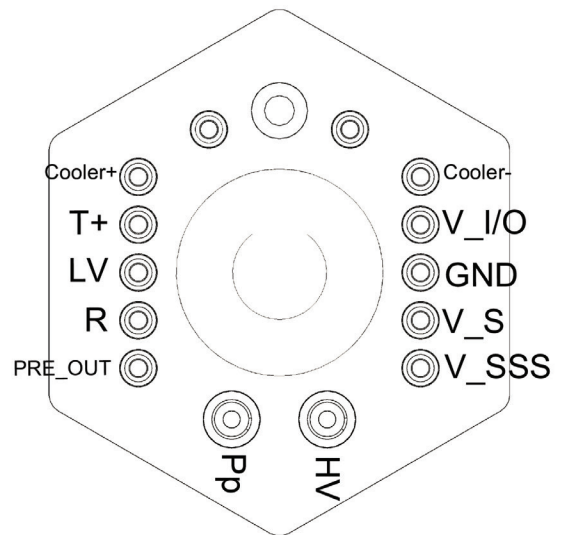
- V_S: +2 V 1 mA
- V_{I/O}: +3.3 V 1 mA
- V_{SSS}: -4.5 V 1 mA
- GND: 0 V 2 mA
- PRE_OUT: between 0.8 V and 3 V

TEC

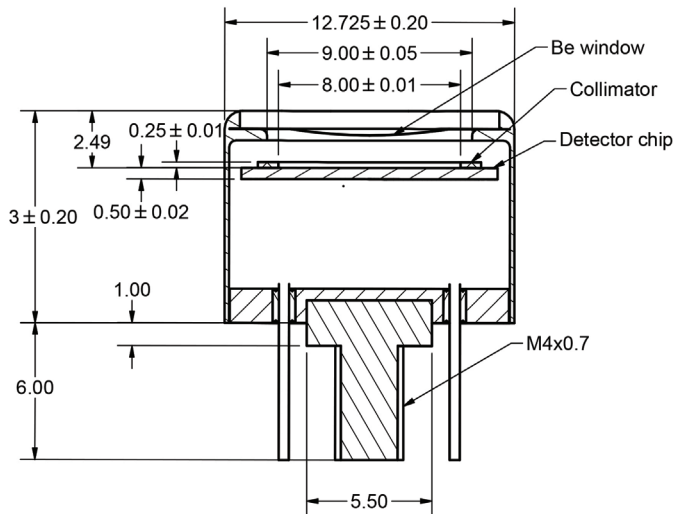
- Max voltage: 5.7 V
- Max current: 0.7 A

TEMPERATURE SENSOR

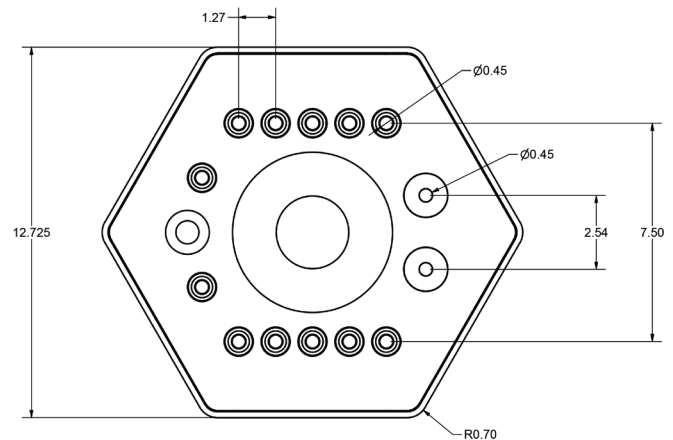
- T+: 45 μ A
- Slope: -2.227 mV/°C
- V (0 °C): 629 mV



Pin configuration (top view)



Detector geometry



Footprint (top view)



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