CANBERRA

X-PIPS® Detector

Features

Detector System Includes

- Silicon detector
- Be window
- Preamplifier
- HV bias supply
- Peltier cooler
- Temperature controller

Performance

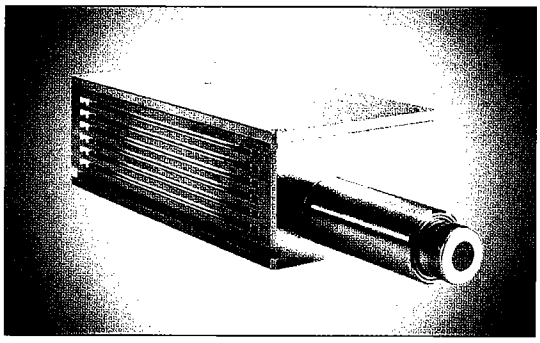
- Active area: 8 mm²
- Thickness: 0.5 mm
- Resolution <190 eV (FWHM)
- Energy range: 1 to 30 keV

Applications

- X-ray spectroscopy
- X-ray fluorescence
- X-ray diffraction
- Mössbauer spectroscopy
- Densitometry
- Many more

PIPS is a registered trademark of Canberra Industries, Inc.

Description



The X-PIPS® Detector is a spectroscopy subsystem sensitive to X rays and low-energy gamma rays. It comprises a hermetically sealed silicon detector element with a low noise FET assembly and Peltier cooler, a reset type preamplifier, a HV bias supply, and a temperature controller. The detector element and FET are cooled and regulated to a fixed temperature, ensuring stable operation in changing environmental conditions. The beryllium entrance window is 25 µm (1 mil) thick.

The preamplifier has a unique digitally controlled source reset mechanism (US Patent 6,587,003) providing fast reset time and excellent count rate performance. A reset inhibit signal is available to prevent storage of spurious pulses due to transient reset effects. The width of the inhibit output pulse can be set from 10 µs to 650 µs.

The energy resolution is guaranteed within an ambient temperature range of +10 °C to + 30 °C with the default factory settings. The unit can be optimized for other temperature ranges on special order.

The X-PIPS Detector is available with an internal collimator (silver) for improved peak to background. This restricts the effective detector area to 5 mm².

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 –0.9 mV/keV.
- Gain tolerance is ±25%.

Model	Active Area (mm²)	Active Thickness (µm)	Collimator	PTB	Energy resolution FWHM (eV)		
					Typical	Max	Max
					RT/FT 26.4/0.1 µs		5.6/0.1 µs
SXP8-190-500	8	500	None	>600	185	≤190	≤220
SXP5C-190-500	5	500	Ag	>1100	180	≤190	≤220

* Energy resolution is given at 5.9 keV with an ambient temperature ranging from +10 °C to +30 °C, on a digital spectroscopy system with trapezoid shaping filter, rise-time 26.4 µs and flat-top 0.1 µs (comparable to Gaussian shaping at 12 µs). The setting 5.6 µs rise-time is equivalent to 2.5 µs Gaussian shaping time.

Phone contact information

Benelux/Denmark (32) 2 481 85 30 • **Canada** 905-660-5373 • **Central Europe** +43 (0)2230 37000 • **France** (33) 1 39 48 57 70 • **Germany** (49) 6142 73820
Japan 81-3-5844-2681 • **Russia** (7-095) 429-6577 • **United Kingdom** (44) 1235 838333 • **United States** (1) 203-238-2351

For other international representative offices, visit our Web Site: **http://www.canberra.com** or contact the Canberra U.S.A. office.

C21094 4/04 Printed in U.S.A.

X-PIPS Detector

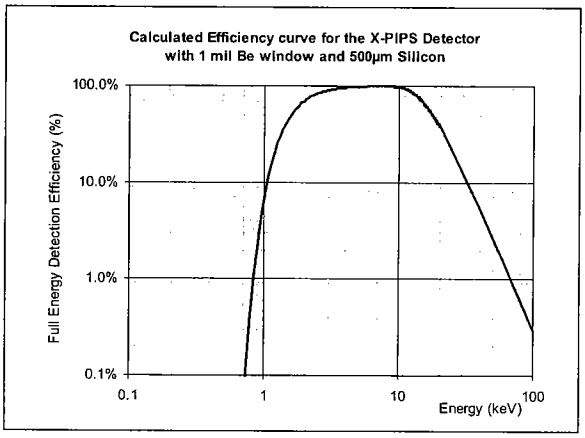


Figure 1.
Calculated efficiency curve.

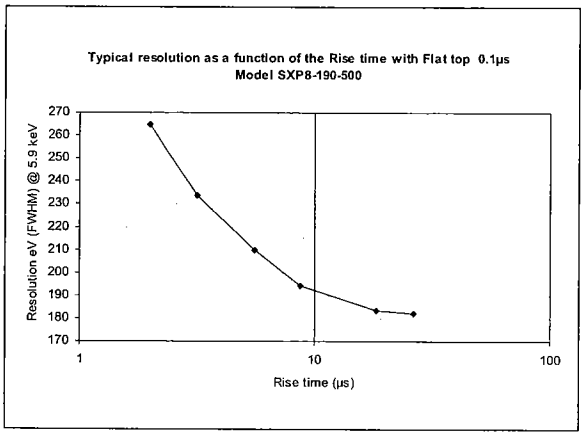


Figure 2.
Typical resolution as a function of rise time.

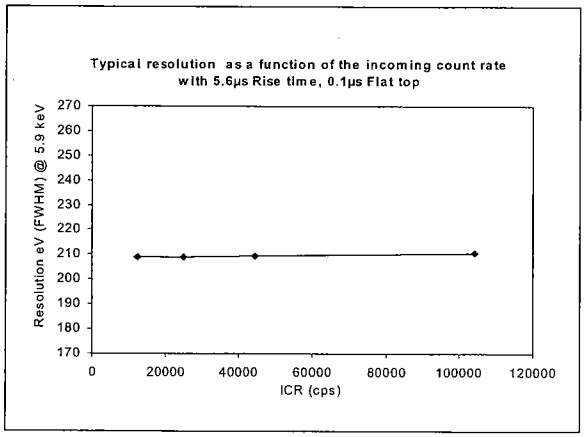


Figure 3.
Typical resolution as a function of the incoming count rate.

Power Requirements

- POWER INPUT – 9-pin male sub-D connector for power supply cable from associated main amplifier or digital spectroscopy system.
- +12 V dc: max 200 mA, typical 70 mA.
- –12 V dc: max 10 mA.

Outputs and Indicators

- ENERGY OUTPUT – Provides staircase output function with step amplitude proportional to the absorbed photon energy. The output swing range is from +2.5 V to –2.5 V open circuit. The reset is through the source of the FET (same behavior as transistor reset). Output impedance is 50 Ω , series connected, dc coupled. BNC connector.
- INHIBIT OUTPUT – Provides a +5 V TTL compatible pulse that is active when the preamplifier is resetting, or when the output is not within normal range. This signal can be used to gate off the ADC when the energy output is not valid. The width of the inhibit pulse can be adjusted using the rear panel PW control. Output impedance is 200 Ω , series connected, BNC connector.
- TEMPERATURE INDICATOR – Amber LED in the cover of the X-PIPS Detector housing illuminates when the detector does *not* reach the set-point temperature and therefore is not controlled.

Controls

- INHIBIT PULSE WIDTH – Potentiometer that controls the width of the inhibit pulse that is used to gate off the ADC when the preamplifier resets. The pulse width can be set from 10 µs to 650 µs. Rear panel screwdriver control.

Physical

- CASE SIZE – 115 x 56 x 36 mm (L x W x H) excluding finger. Front-end is mounted on a 12-pin TO8 header. 25 µm Be window. Finger diameter is 18 mm. Finger axis is located 18 mm from side and 13 mm from bottom of case. Finger length including detector front-end is approximately 50 mm, depending on collimator option.
- NET WEIGHT – 0.35 kg.

Environmental

- Normal OPERATING TEMPERATURE – 0 to 30 °C.
- Maximum OPERATING TEMPERATURE – 0 to 50 °C.
- OPERATING HUMIDITY – 0 to 80%, non-condensing.

ISO 9001
SYSTEM
CERTIFIED