

photon counting modules



Features

- Peak photon-detection efficiency @ 650 nm: 65% typical
- Active area: SPCM-AQR-1X: 175 μm
- User friendly
- Gated input
- Single +5 V supply



Typical Applications

- LIDAR
- Photon-correlation spectroscopy
- Astronomical observation
- Optical range finding
- Adaptive optics
- Ultra-sensitive fluorescence
- Particle sizing

Datasheets available upon request.

Description

PerkinElmer Optoelectronics provides photon-counting modules based on both APDs and innovative Channel Photomultipliers.

APD Based Single-Photon Counting Modules

The Single-Photon Counting Module (SPCM) is a self-contained photon counter which covers the wavelength range from 400 nm to 1100 nm, with photon detection efficiencies exceeding 60% at 650 nm. It has an integral 2-stage TE cooler, cooler controller, amplifier, discriminator and TTL output driver. It also contains a high-voltage DC-to-DC converter and is powered from a single 5 V source. The module utilizes a patented active-quench circuit which allows it to count over 10 million photons per second. The photosensitive area is 0.2 mm, and units are available with dark-count rates less than 25 counts/second.

SPCM-AQ4C Single-Photon Counting Array

The SPCM-AQ4C is a 4-channel photon-counting card capable of detecting single photons of light over a wavelength range from 400 nm to 1160 nm. Each channel is independent from the others. The SPCM-AQ4C utilizes a unique silicon avalanche photodiode (SliK™) with a circular active area whose peak photon-detection efficiency exceeds 60% at 650 nm. Each photodiode is both thermoelectrically cooled and temperature controlled, ensuring stabilized performance despite changes in the ambient temperature.

Please ask for our RoHs compliant products.

**This product is eligible to bear the CSA and CE mark.
For more details please consult the datasheet.**



Single-Photon Counting Module—SPCM



SPCM-AQ4C Single-Photon Counting Array

SPCM-AQR-1X Series

Technical Specification

Parameter	Typical	Parameter	Typical
Supply current	0.5 Amps	Supply voltage	5 V
Power cable total resistance	0.2 Ω	Case operating temperature	5–40°C
Active area (diameter) @ min. Pd	175 μ m		
Photon detection efficiency (Pd) @ 400 nm 650 nm 830 nm 1060 nm	5% 65% 45% 2%	Output pulse width	35ns
Pd variation at constant case temperature (2 h @ 25° C)	$\pm 1\text{--}\pm 3\%$	Pd variation 5° C to 40° C case temperature	$\pm 4\text{--}\pm 10\%$
Dark count (cps) = SPCM-AQR-12 SPCM-AQR-13 SPCM-AQR-14	250–500 100–250 50–100	Dark count (cps) = SPCM-AQR-15 SPCM-AQR-16	50 max. 25 max.
Average dark count variation at constant case temperature (6 hrs @ 25°C) SPCM-AQR-12/13 SPCM-AQR-14/15/16	$\pm 10\%$ max. $\pm 1\sigma$ max.	Average dark count variation at 5°C to 40°C case temperature SPCM-AQR-12/13 SPCM-AQR-14/15/16	$\pm 20\%$ max. $\pm 2\sigma$ max.
Single-photon timing resolution	Contact Factory	Dead time (Count rates below 5 Mc/s)	50 ns
Output count rate before saturation	15 Mc/s	Afterpulsing probability	0.5%
Linearity correction factor @200 kc/s @1 Mc/s @5 Mc/s	1.01 1.08 1.4	Gating turn on/off (50 Ω output) Disable = TTL Low Enable = TTL High	2 ns 45 ns
Settling time following power up (1% stability) @ 1 meg counts/sec and 25°C	15 S	Threshold setting required on counter for digital output pulse (terminate in 50 Ω)	1 V
Gate threshold voltage: (@ $V_{\text{supply}} = 5$ V) Low level (sink current >90 mA)	0 V–0.4 V	Gate threshold voltage: (@ $V_{\text{supply}} = 5$ V) High level (sink current >30 mA)	3.5–5.25 V

Test Conditions: T=22°C

SPCM-AQ4C

Technical Specification

Parameter	Typical	Parameter	Typical
Supply currents: @+2 V @+5 V @+30 V	1 Amp 0.2 Amps 0.01 Amps	Maximum power consumption: @+2 V @+5 V @+30 V	Counts/Second 6 Watts max. 5 Watts max. 1.2 Watts max.
Supply voltage	1.95 V–2.05 V 4.75 V–5.25 V 29 V–31 V	Photon detection efficiency (per channel) @400 nm @650 nm @830 nm	2.5% 60% 45%
Operating temperature (heatsink)	5°C–40°C	Dark count (per channel)	500 counts/sec.
Average dark count variation per channel @ constant heatsink temp.	$\pm 10\%$	Average dark count variation per channel @ 5° to 40°C heatsink temp.	$\pm 20\%$
Timing resolution	Contact Factory	Dead time	50 ns
Output pulse width	25 ns	Maximum count rate*	4 Mc/s
Continuous	1.5 Mc/s	Afterpulsing probability	0.3%
Gate threshold voltage: (@ $V_{\text{supply}} = 5$ V) Low level (sink current >90 mA)	0 V–0.4 V	Gate threshold voltage: (@ $V_{\text{supply}} = 5$ V) High level (source current >30 mA)	3.5 V–5.25 V

Test Conditions: T=22°C *500 ms duration, 25% duty cycle