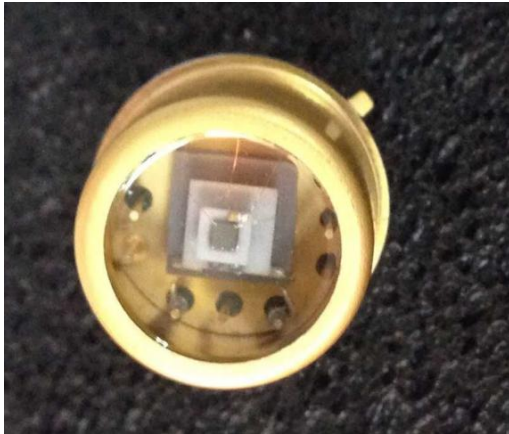


Silicon Photomultiplier Detector

SiPM1-TE



Description

The SiPM1-TE is a photon counting solid state replacement For photomultiplier tubers. The low dark count rates made Available by the low temperature of the TEC, combined

Extremely fast rise time and short recovery time, facilitate high performance operation: both in analog/linear mode, as Multi-photon detectors in which the output signal is proportional to the number of input photons, as well as in digital mode, as high speed photon counters with a wide dynamic range.

Features

- * Very low dark current
- * High speed (1ns rise time typical)
- * Wide single photon counting dynamic range (>30MHz)
- * 3-stage, thermoelectric cooled, TO8 package
- * Operating temperature is from -25 to +30°C
- * Storage temperature is from -45 to +70°C

Applications

- * High Energy Physics(HEP)
- * Fluorescence lifetime measurements
- * DNA sequencing
- * PET scanning
- * Dynamic spectrometry
- * Nuclear medicine

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Specifications are subject change without notice

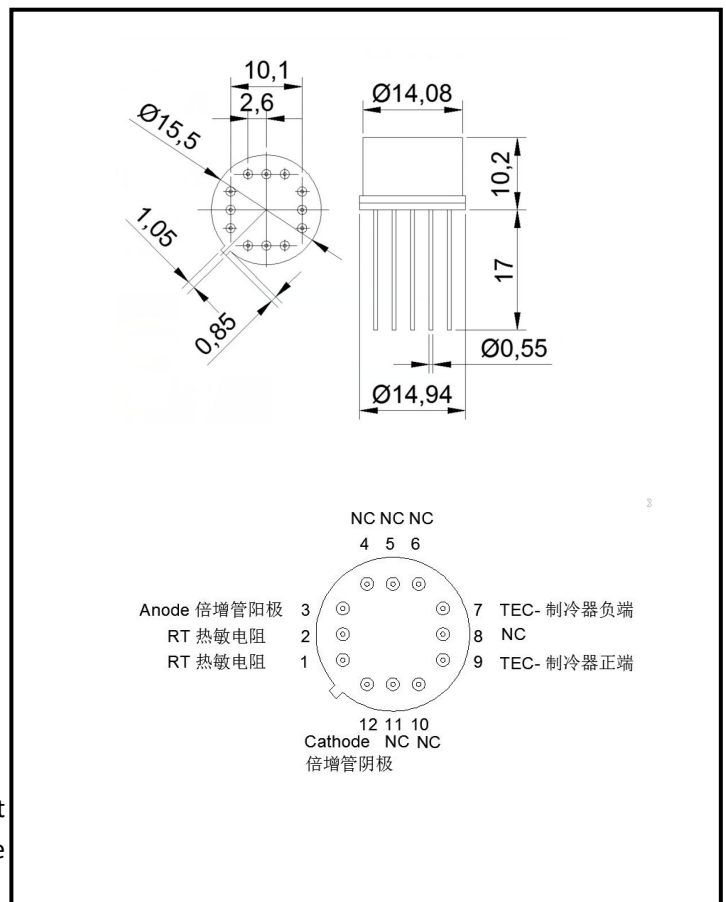
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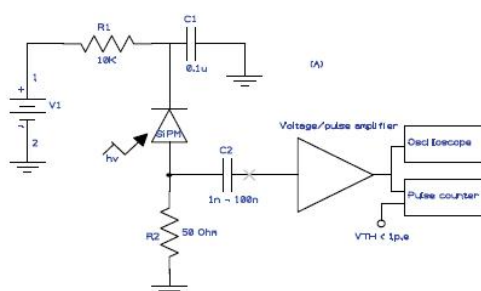


Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Sensitive area	A			1		mm ²
Interconnect elements	Pix	32*32 square		1024		pixels
Breakdown Voltage	Vbr	-20°C, I=1nA		36		V
Vbr Temperature Coefficient	TC Vbr			107		mV/°C
Over voltage range		-20°C	1		10	V
Pixel gain	Gain	Depending on overvoltage (Ubr+5V)	105		106	
Pixel capacitance	C			10		fF
Dark current	I _D	room temperature, before breakdown			0.5	nA
Dark count rate		-20°C and Ubr=+5V		50		KHz
Spectral Response Range	λ _{range}		350		1100	nm
Photon detection efficiency*	E	λ=500nm	25%			
Pulse width		FWHM	2.2	3.2	6	ns
Rise time	Tr	U _p =Ubr+5V, λ=500nm	Leading edge	1		ns
Fall time	Tf		Trailing edge	1.5		ns
Single photon counting dynamic range		Comparator threshold<1 p.e.	40			MHz
Saturation power	Pmin				10	uW
TEC cooling time	T		10		12	s

* PDE includes crosstalk and afterpulsing

Typical application circuit



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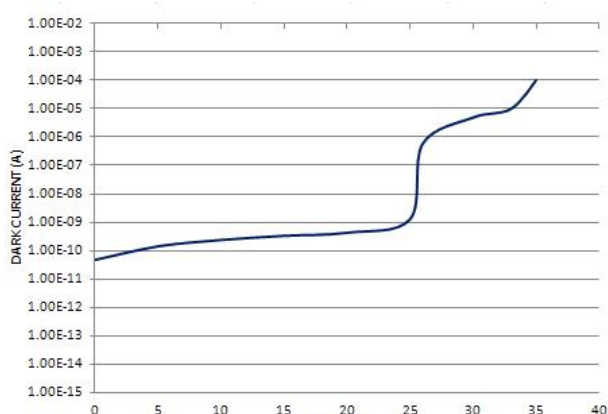
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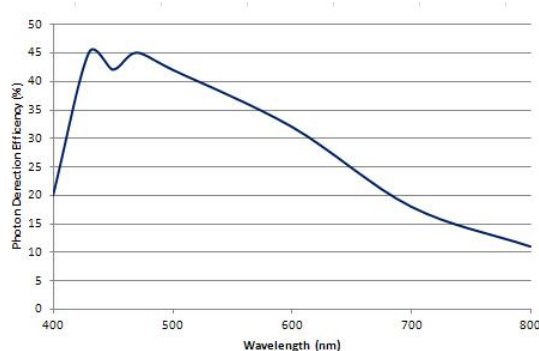
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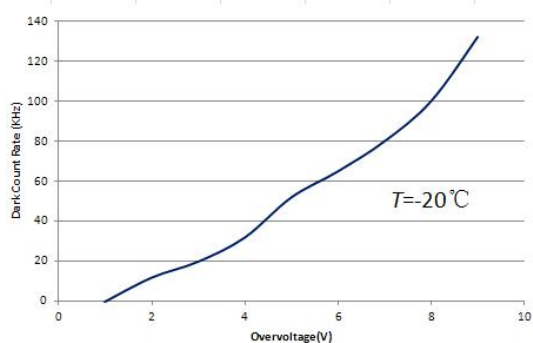
■ Dark current vs. reverse voltage



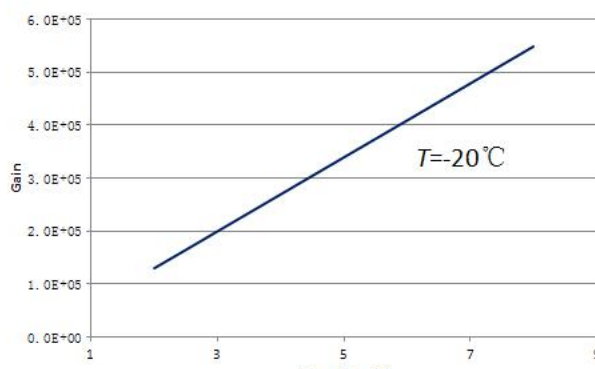
■ Photon detect efficiency vs. wavelength



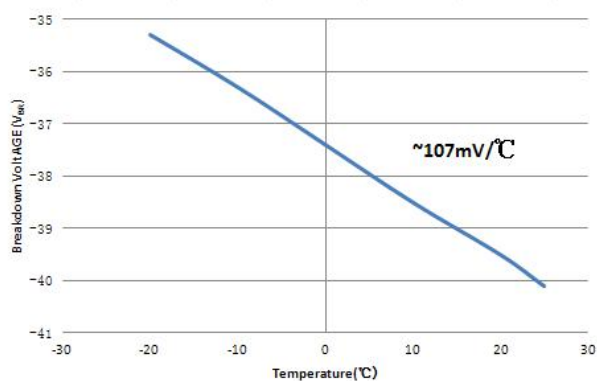
■ Dark count Vs. Overbias



■ Gain Vs. Overbias



■ Breakdown voltage VS. Temperature



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