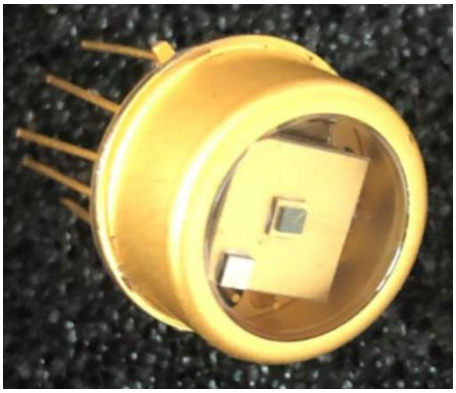
OEC Opto-Electronic Components

Si **Avalanche Photodiode**

for Linear-/ Geiger Mode Operation , Single Photon Detection

O-SPAD-050-TEC 400nm – 1100nm

Stand 2026



Description

The O-SPAD-050-TEC is a broad band Si avalanche photodiode for Geiger Mode Operation, Single Photon detection mounted on a TE3 (three stage TE-Cooler). The device is intended for use at voltage biases above breakdown voltage (Vbr) so that a single photon incident on the detector will give rise to a macroscopic current pulse.
Combined with an appropriate pulse detection circuitry this device allows for the detection of single photons in the spectral range 400nm - 1100nm.
Chips thereof are available.

Application

- Quantum optics
- Quantum computing
- very low light sensing

Features

- Linear and Geiger Mode operation
- Single photon counting capability
- 50µm dia active area
- integrated 3-stage TE-cooler for -50°C operation

Absolute Maximum Ratings

	Conditions	Max	Units
Forward Current	Continuous bias	+1	mA
Forward Voltage	Continuous bias	+1	V
Optical Power	Continuous wave (CW)	1	mW
Reverse Current	Continuous bias	-1	mA
Reverse Voltage	Continuous bias	-(Vb+5)	V
Reverse Voltage	Pulsed (gated operation)	-(Vb+10)	V

Electro-optical Characteristics

Linear Mode (295K, all voltage and currents are reverse biased, 25°C)

Parameter	Condition	Min.	Typ.	Max.	Units
Breakdown Voltage, Vb@-40°C	Id=10µA		54		V
Temperature dependence of Ubias	Between 300K and 225K, linear approximation		0.1		V/K
Capacitor, C	M=10, 1 MHz		0.25		pF
Geiger Mode Parameters (-40°C, all voltage and currents are reversed biased)					
Dark Count Rate, DCR	At 20% detection efficiency			5	KHz
Detection Efficiency, DE	At max DCR	10			%

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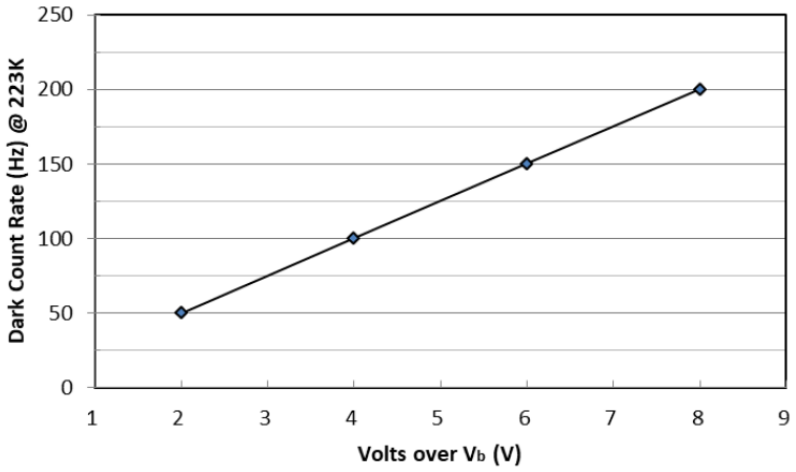
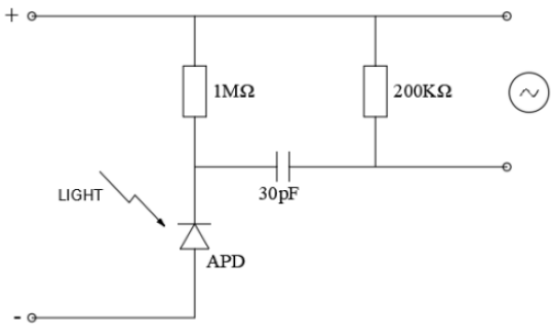
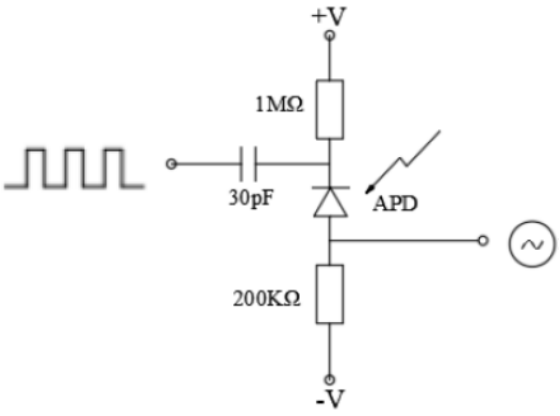
Wavelength/nm	Detection Efficiency	
	type	Units
532	30	%
850	20	%
905	15	%
1064	1.5	%



Typical Application Circuit





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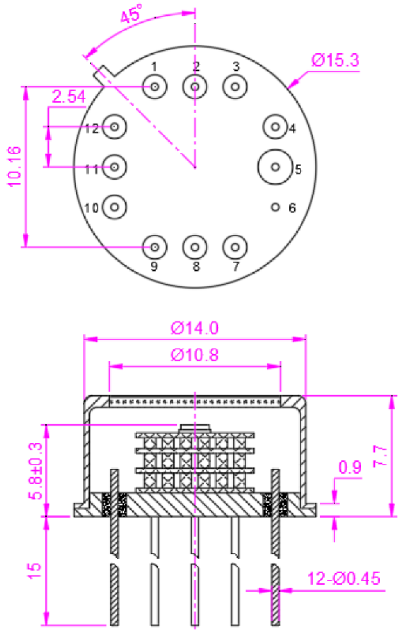
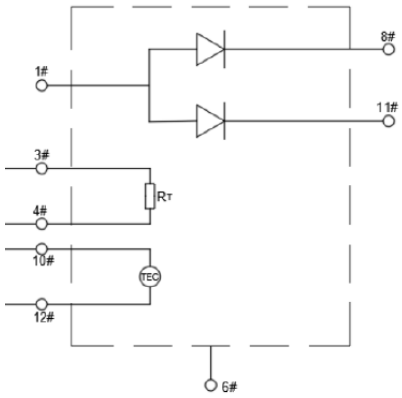
Package



All Dimensions in “mm”

$$R = R1 \times E^{B\times(\frac{1}{T}-\frac{1}{T1})}$$

Pin NO.	Function	Pin NO.	Function
1#	P	7#	N/C
2#	N/C	8#	N1
3#	Thermistor	9#	N/C
4#	Thermistor	10#	TEC-



TEC Specification

Thermistor = 2.0 KΩ (R1) at 300K(T1); B=3200.

Parameter	Condition	Max.	Units
TEC Voltage		8	V
TEC Current		0,7	A
TEC delta T	<25°C	80	°C

The information in this data sheet is believed to be correct and reliable. However, no responsibility is assumed for possible inaccuracies or omissions. The specifications are subject to change without notice.

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