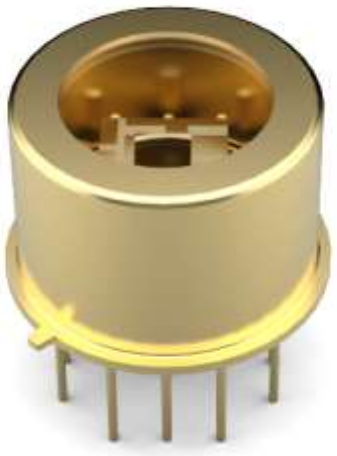
Joinbon
PASSION FOR LIGHT DETECTION

Cooling Type SiPM

Low noise, high reliability



HIGHLIGHT FEATURES

- High sensitivity
- Significantly reduced dark count rate
- Low crosstalk, low afterpulse probability
- Excellent single photon counting capability
- High reliable metal package
- Low operating voltage

APPLICATIONS

- Fluorescence analysis
- Flow cytometry
- Scattered light detection
- DNA sequencing
- Laser confocal microscope
- Other low light detection

The cooling type SiPM adopts the cooling method to reduce the temperature of the SiPM, thereby significantly reduce the noise of the SiPM, especially the dark count rate, which is reduced to below 1/20 of the room temperature, and is suitable for the application of processing the extremely low light signal at single photon level.

Structural Parameters

Product	JSP-1050-TEC	Unit
Active Area	1×1	mm
Pixel Pitch	324	--
No. of Pixels	50	μm
Cover Material	TO-8	--
Cover Refractive Index	glass	--
Module Dimensions	1.52@589nm	--

Performance Parameters

Parameter		Value	Condition	Unit
		JSP-1050-TEC		
Spectral Response Range		250-950	--	nm
Peak Sensitivity Wavelength		420	--	nm
Breakdown Voltage		25.3±0.2	@ 25℃	V
Overvoltage [1]		1 - 5	--	V
PDE @420nm [2]		35%	Vov=2V	--
Gain		3.8×10^6	Vov=2V	--
Rise Time		0.9	Vov=2V	ns
Recovery Time τ [3]		34	Vov=2V	ns
Dark Count Rate [4]	Typ.	3.3	Vov=1V	kHz/mm^2
	Max.	7	Vov=1V	
Temperature Dependency of V_{br}		34.4	--	mV/℃
Crosstalk Probability		0.7%	Vov=1V	--
Afterpulse Probability [5]		0.2%	Vov=1V	--
Pixel Capacitance		165	Vov=2V	fF

1 Overvoltage (Vov) =Operating Voltage (Vop)-Breakdown Voltage (Vbr)

2 Photon detection efficiency does not include crosstalk and afterpulse

3 RC charging time of the pixel

4 Threshold=0.5 p.e at 25℃

5 The integration interval is 150-500ns

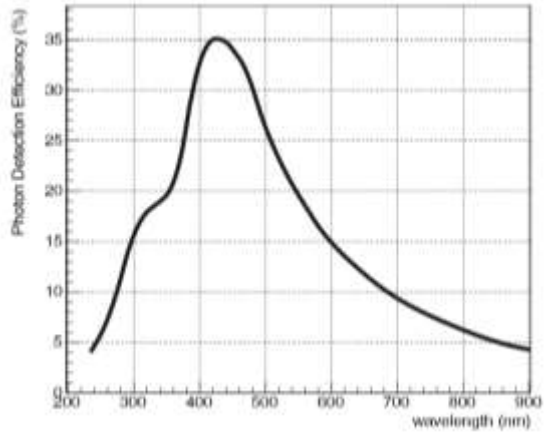
General Parameters

	JSP-TP1050-SMT
Storage Temperature range	-45℃~+100℃
Operating Temperature range	-25℃~+60℃
Reflow Solder Compatibility	YES
Peak Temperature and Condition	260℃

Performance Plots

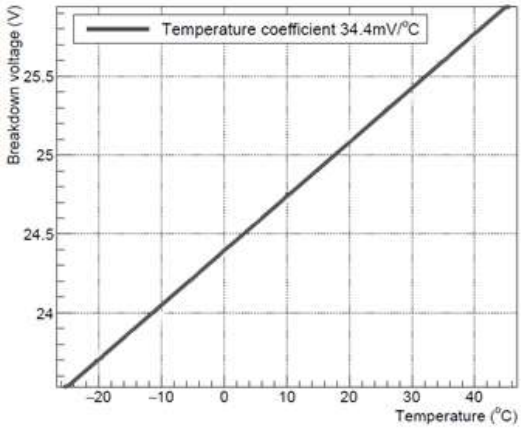
Detection Efficiency versus Wavelength

JSP-1050-TEC



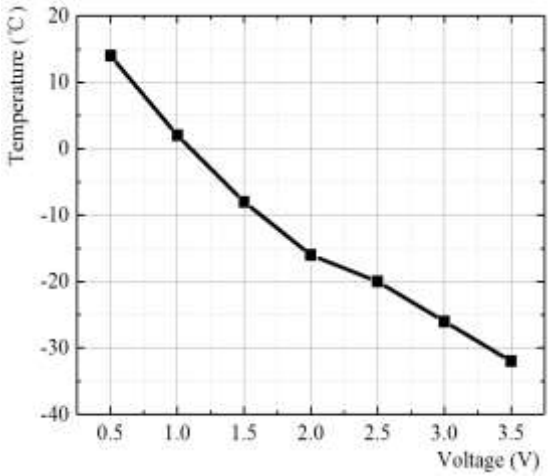
Breakdown Voltage versus Temperature

JSP-1050-TEC



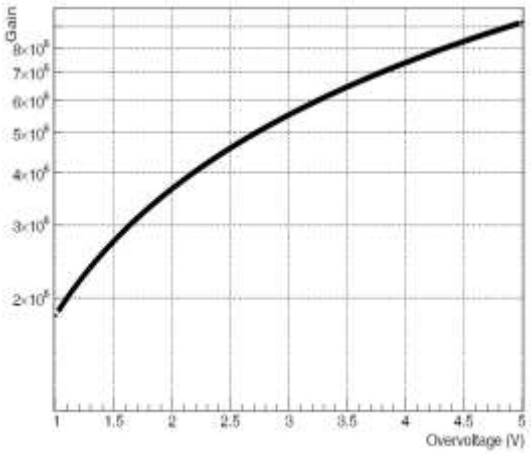
Refrigeration Temperature versus TEC Supply Pressure (or Current)

JSP-1050-TEC



Gain versus Overvoltage

JSP-1050-TEC

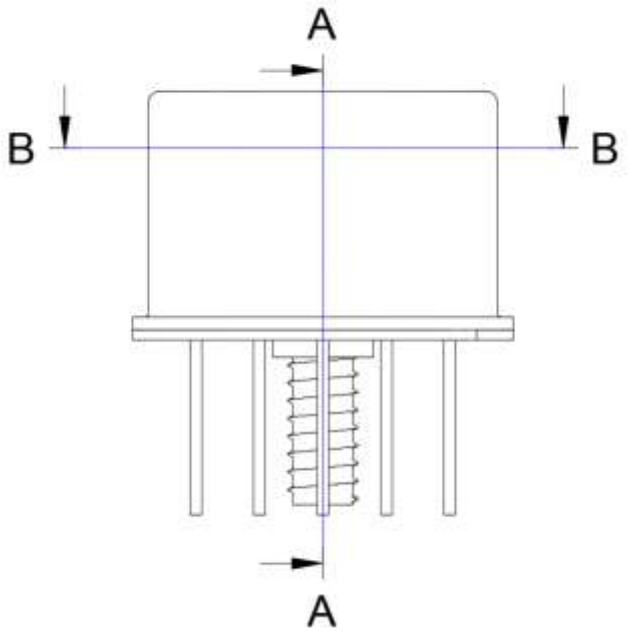


Fixed TEC supply pressure, matched with Joinbon designed heat sink, the curve obtained by maximum power cooling.

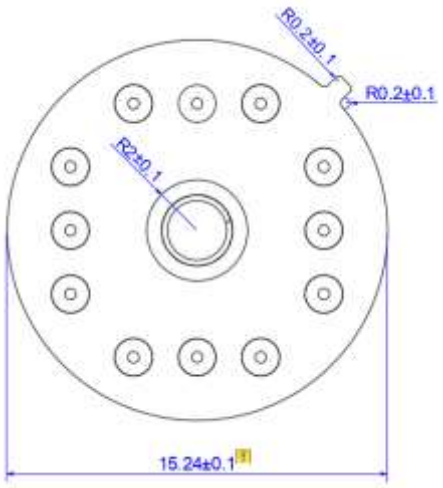
Package Drawing

Unit: mm

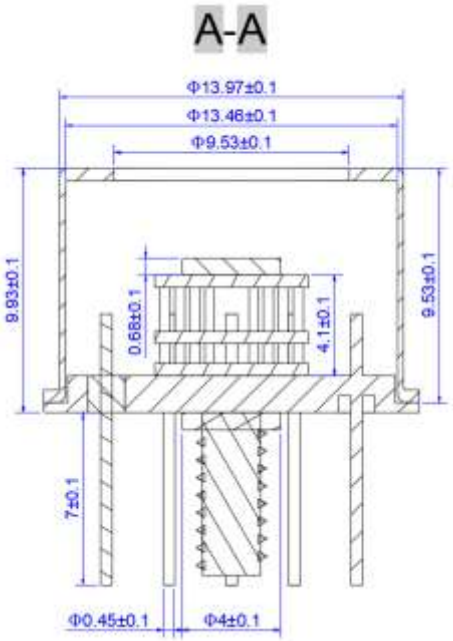
JSP-1050-TEC Package Outline



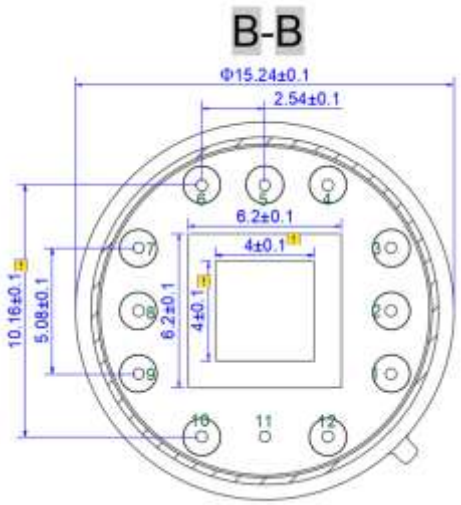
Side View



Bottom View



Section View (side)

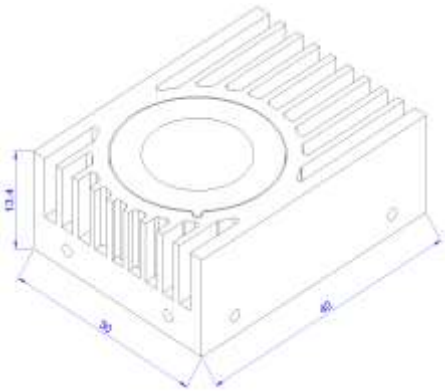


Section View (top)

Pin	Pin Definition	Description	Pin	Pin Definition	Description
1	Cathode	SiPM Cathode	7	Anode	SiPM Anode
2	N.C.	-	8	N.C.	-
3	N.C.	-	9	N.C.	-
4	NTC Thermistor	NTC Thermistor Electrode1	10	TEC(-)	TEC Cathode
5	N.C.	-	11	N.C.	-
6	NTC Thermistor	NTC Thermistor Electrode2	12	TEC(+)	TEC Anode

Related Products

The cooling type SiPM uses a semiconductor thermoelectric cooler to transfer the heat of the SiPM to the metal tube seat, thereby lowering the operating temperature. During the working state, the heat is concentrated in the metal base, the temperature of the metal base is sharply increased, and the temperature difference between the two ends of the thermoelectric cooler is increased, thereby reducing the cooling capacity. Therefore, the heat on the metal base needs to be dissipated in time, and the heat sink is generally used. Joinbon has made customized heat sinks for the cooling type SiPM for customers to purchase. The heat sink specifications are shown below.



- All specifications are subject to change without notice

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