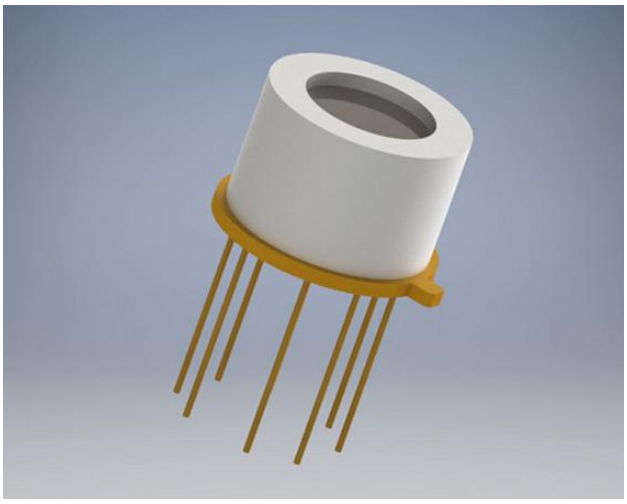
900-2700nm InGaAs photodiode Two-stage TEC cooling Φ0.5mm



Product Description

The unit InGaAs detector is mainly composed of a P-I-N structure InGaAs photosensitive chip, a transition electrode plate, a temperature sensor and a two-stage thermoelectric cooler (2TE), and adopts a TO package. This user manual only introduces the product series.

Product features

Chip effective diameter from 300μm to 3000μm、 Spectral response from 900nm to 2700nm、 High shunt resistance for high sensitivity、 TEC built-in

Part Number

MP-CPD-B-I-9U0.5-2

Application area

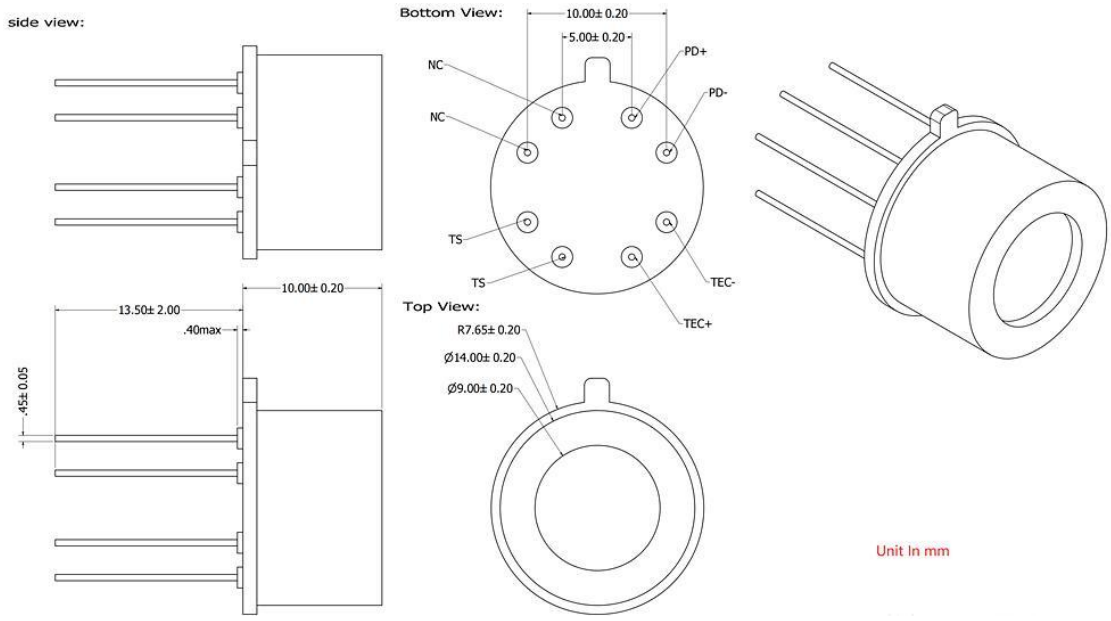
Near infrared sensing/radiometry、 LED/LD characteristics、 Spectroscopy、

Medical diagnostics、 Spectroscopy

Core parameters

Working wavelength	photosensitive surface diameter	packaging
900-2700nm	0.5mm	TO-8

Dimension Drawing



General Parameters

Main Parameters:

E/O characteristics

Structural parameters

Part Number	Package	cool	Active area	Chip size	Electrode size
MP-CPD-B-I-9U0.3-2	TO-8	2TE	Φ300μm	850×850um	140×180um
MP-CPD-B-I-9U0.5-2			Φ500μm	1000×1000um	140×180um
MP-CPD-B-I-9U1-2			Φ1000μm	1410×1410um	140×180um
MP-CPD-B-I-9U2-2			Φ2000μm	2560×2560um	280×360um
MP-CPD-B-I-9U3-2			Φ3000μm	3560×3560um	320×480um

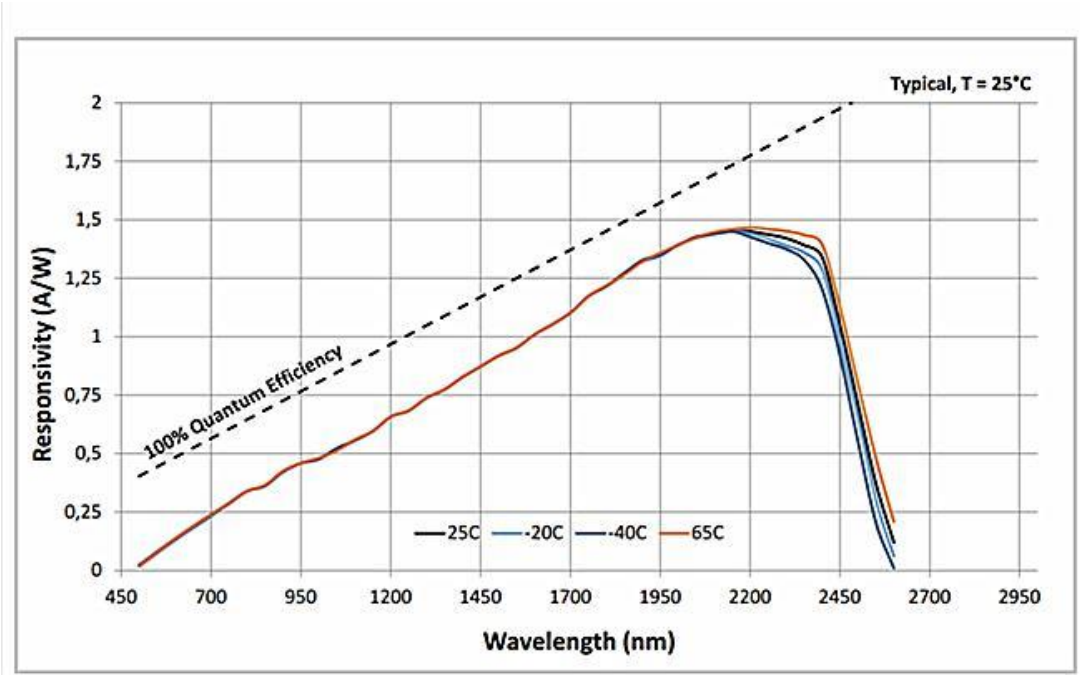
EO parameters

Part Numbe r	Test temperatur e Tch (℃)	Spectral response λ (nm)	Dark Current ID(μA)		Junction Capacit y (Junction capacitance)C(f=1M Hz，VR=0V) (pF)
			VR=0. 01V	VR=0.5 V	
MP-CPD-B-I-9U0.3-2	25	900-2700	0.1	0.5	50
MP-CPD-B-I-9U0.5-2			0.2	1	100

MP-CPD-B-I-9U1-2			1	4	300
MP-CPD-B-I-9U2-2			4	10	800
MP-CPD-B-I-9U3-2			10	40	2000

Part Number	Peak response (A/W)	Junction impedance Rsh(VR =10mV) MΩ	Peak detection rateD*(cm·Hz 1/2/W)	Noise Equivalent Power NEP (W/Hz$^{1/2}$)
MP-CPD-B-I-9U0.3-2	1.0	3500	3×10^{12}	8.9×10^{-15}
MP-CPD-B-I-9U0.5-2		1000		1.5×10^{-14}
MP-CPD-B-I-9U1-2		300		3.0×10^{-14}
MP-CPD-B-I-9U2-2		80		5.9×10^{-14}
MP-CPD-B-I-9U3-2		40		8.9×10^{-14}

Response Curve



TEC parameters

Operating environment

Parameter	Typ
Operating temperature (°C)	-45~+55
Storage temperature (°C)	-50~+60

Characteristics of Thermoelectric Cooler

The detector integrates a two-stage thermoelectric cooler (TEC). The center of the cooling surface is the center of the lower surface of the detector. The cooling area should be ⩾6mm×6mm. Its performance parameters are shown in the following table:

Performance indicators	Value
Max. thermal load power (Qmax/W)	0.93W
Max. allowable load current (ITEC-max/A)	1A
Max. allowable load voltage (VTEC-max/V)	2V

Temperature Monitoring Module Characteristics

This detector uses a thermistor as a temperature monitoring module. The mapping between the resistance value and the temperature at the operating temperature is shown in the following table:

Temperature(℃)	Resistance (kΩ)	Temperature(℃)	Resistance (kΩ)
-65	94.270	-15	6.909
-60	69.290	-10	5.587
-55	51.500	-5	4.549
-50	38.700	0	3.729
-45	29.400	5	3.075
-40	22.560	10	2.55
-35	17.490	15	2.126
-30	13.690	20	1.782
-25	10.810	25	1.5
-20	8.608	30	1.268

The corresponding relationship between thermistor value and temperature is as follows:

$$\frac{1}{(T1+273.15)}=\frac{\ln\left(\frac{R1}{R2}\right)}{B}+\frac{1}{(T2+273.15)}$$

T1: Test target temperature, in °C;

T2: Reference point temperature, in °C. The typical value of reference temperature in the range of -20~70°C is 10 or 40°C. A reference temperature close to the target temperature should be selected.

R1: Thermistor resistance corresponding to T1, in kΩ;

R2: Thermistor resistance corresponding to T2, in kΩ;

B: Thermistor resistance corresponding to T2, in kΩ;

B: Between 20 and 70 degrees, the typical B value is 3019.6±60.

Note:

a) During TEC installation, please pay attention to the new resistance introduced by the external electrical structure. If the new resistance exceeds 10% of the TEC resistance, the I-V curve needs to be recalibrated.

b) It is recommended to open the TEC in a way that the connection resistance is small. If welding is required, short-circuit grounding protection is required, the welding temperature is ≤250°C, and the welding time is<10s;