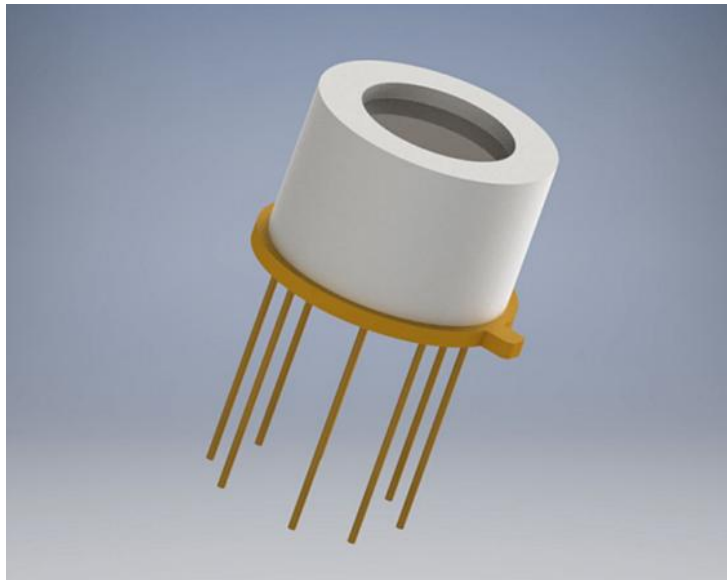


900-2700nm InGaAs photodiode Two-stage TEC cooling $\Phi 0.5\text{mm}$



● 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 300 μ m to 3000 μ m、 Spectral response from 900nm to 2700nm、 High shunt resistance for high sensitivity、 TEC built-in

● Part Number

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

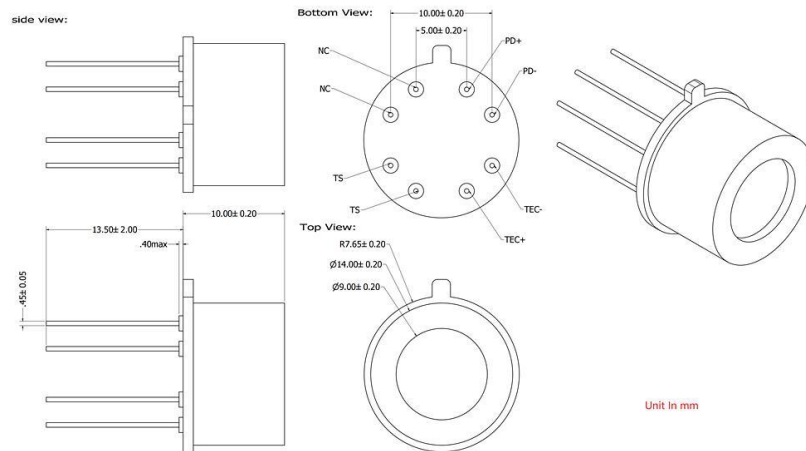
● Application area

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

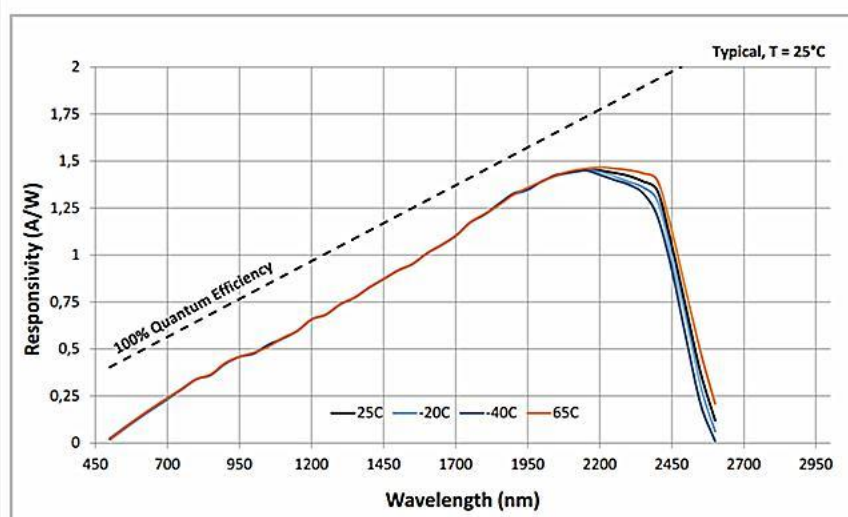
EO parameters

Part Number	Test temperature T _{ch} (°C)	Spectral response λ (nm)	Dark Current I _D (μA)		Junction Capacitance C(f=1MHz, VR=0V) (pF)
			VR=0.01V	VR=0.5V	
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 R _{sh} (VR=10mV) MΩ	Peak detection rate D* (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 $\geq 6\text{mm} \times 6\text{mm}$. 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(°C)	Resistance (kΩ)	Temperature(°C)	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 $\leq 250^{\circ}\text{C}$, and the welding time is $< 10\text{s}$;