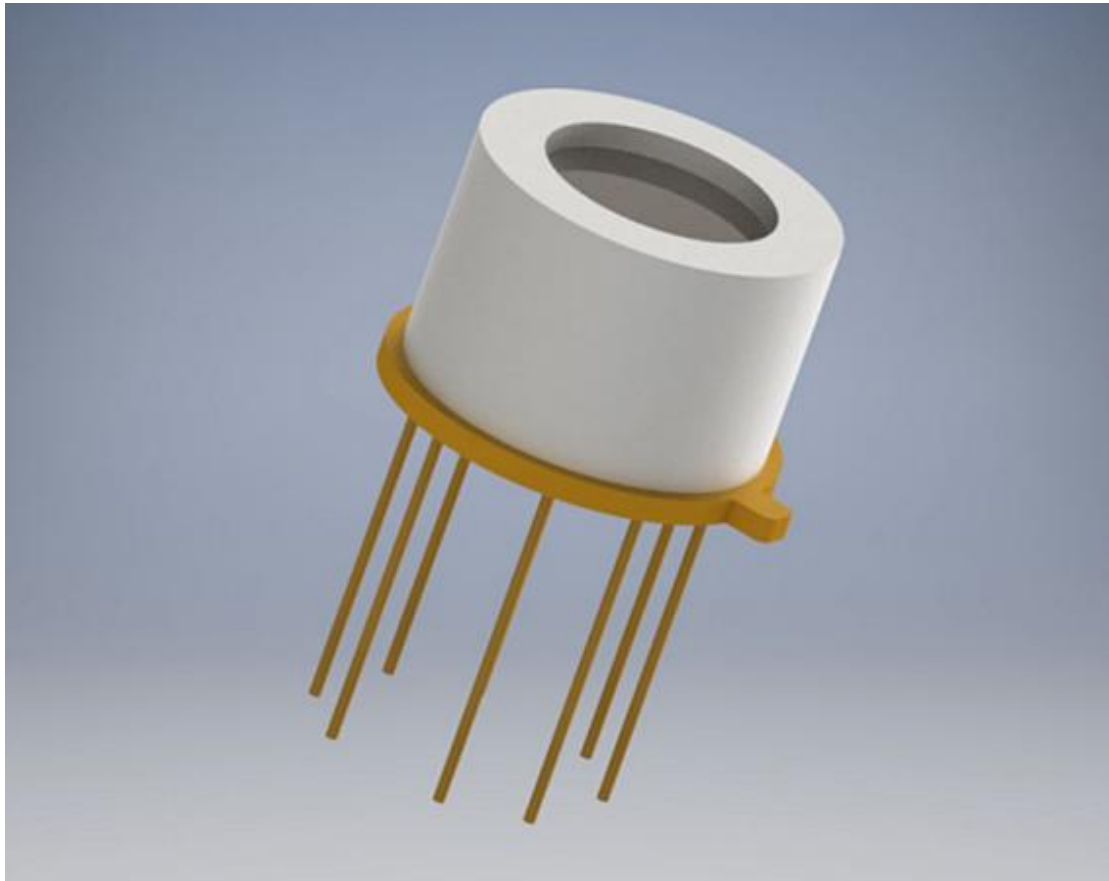


900-2700nm InGaAs photodiode

Two-stage TEC cooling $\Phi 0.5\text{mm}$



● Product Description

The GESTIN-2TE-TO8 series 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.

● Part Number

GESTIN-2TE-TO8-0500

● Product features

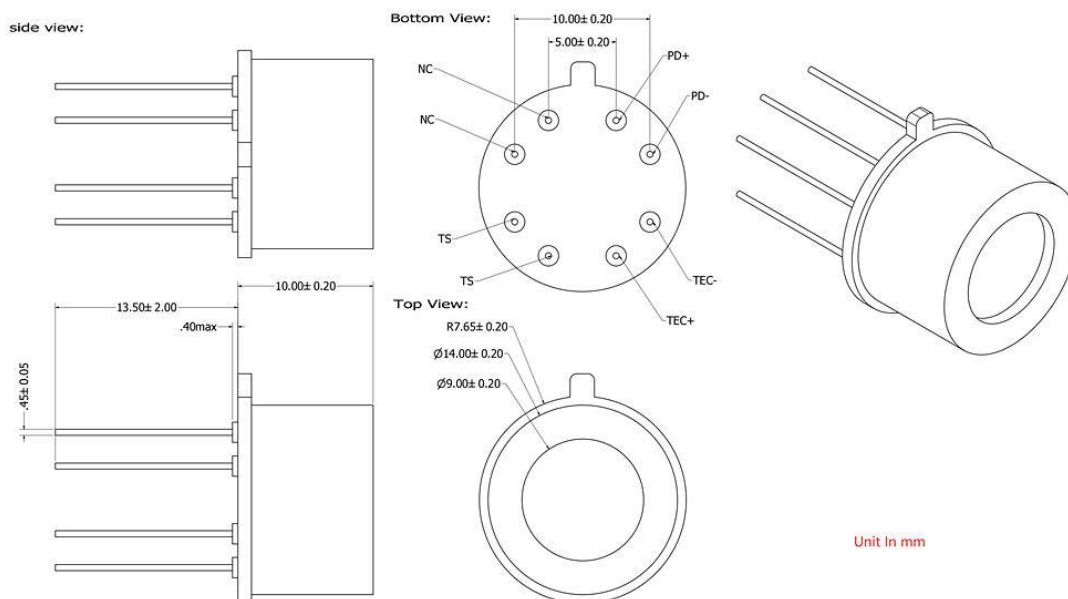
Chip effective diameter from 300 μ m to 3000 μ m、 Spectral response from 900nm to 2700nm、 High shunt resistance for high sensitivity、 TEC built-in

● Application area

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

Parameters

Dimensional Drawing



Main Parameters:

E/O characteristics

Structural parameters

Part Number	Package	cool	Active area	Chip size	Electrode size
GESTIN-2TE-TO8 -0300			$\Phi 300 \mu\text{m}$	850 $\times$ 850 μm	140 $\times$ 180 μm
GESTIN-2TE-TO8 -0500			$\Phi 500 \mu\text{m}$	1000 $\times$ 1000 μm	140 $\times$ 180 μm

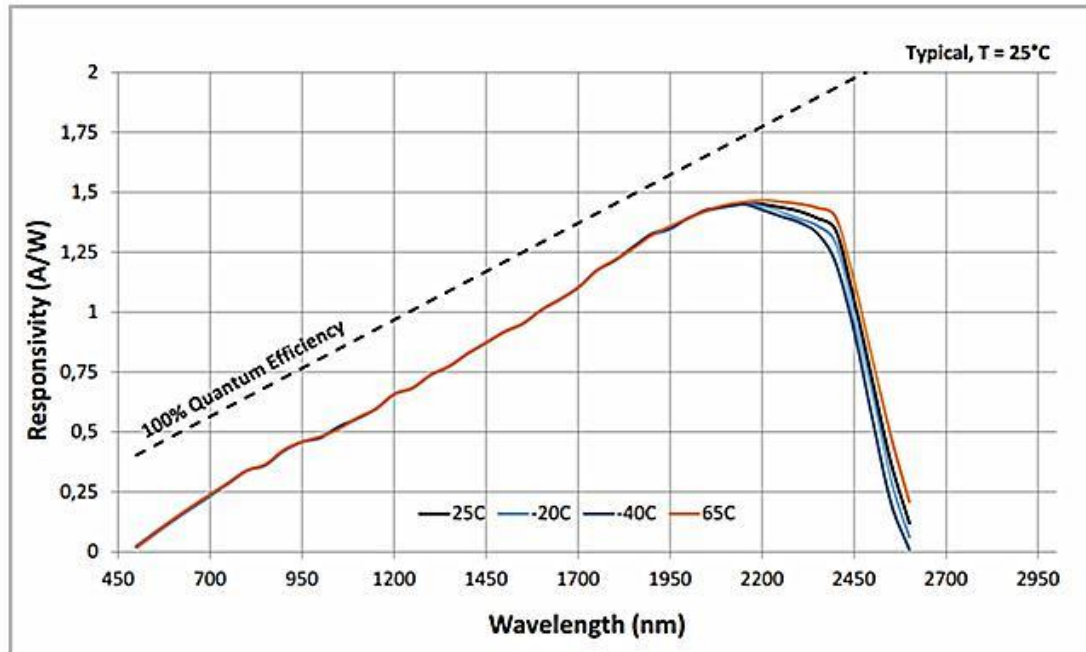
GESTIN-2TE-TO8 -1000	TO-8	2TE	$\Phi 1000 \mu m$	$1410 \times 1410 \mu m$	$140 \times 180 \mu m$
GESTIN-2TE-TO8 -2000			$\Phi 2000 \mu m$	$2560 \times 2560 \mu m$	$280 \times 360 \mu m$
GESTIN-2TE-TO8 -3000			$\Phi 3000 \mu m$	$3560 \times 3560 \mu m$	$320 \times 480 \mu m$

EO parameters

Part Number	Test temperature Tch (°C)	Spectral response λ (nm)	Dark Current ID(μA)		Junction Capacit y (Junction capacitance)C(f=1M Hz , VR =0V) (pF)
			VR =0.01V	VR =0.5V	
GESTIN-2TE -TO8-0300	25	900-2700	0.1	0.5	50
GESTIN-2TE -TO8-0500			0.2	1	100
GESTIN-2TE -TO8-1000			1	4	300
GESTIN-2TE -TO8-2000			4	10	800
GESTIN-2TE -TO8-3000			10	40	2000

Part Number	Peak response (A/W)	Junction impedance Rsh(VR =10mV) M Ω	Peak detection rate D*(cm • Hz ^{1/2} /W)	Noise Equivalent Power NEP (W/Hz ^{1/2})
GESTIN-2TE-TO8 -0300	1.0	3500	3×10^{12}	8.9×10^{-15}
GESTIN-2TE-TO8 -0500		1000		1.5×10^{-14}
GESTIN-2TE-TO8 -1000		300		3.0×10^{-14}
GESTIN-2TE-TO8 -2000		80		5.9×10^{-14}
GESTIN-2TE-TO8 -3000		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 (k Ω)	Temperature(°C)	Resistance (k Ω)
-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 k Ω ;

R2: Thermistor resistance corresponding to T2, in k Ω ;

B: Thermistor resistance corresponding to T2, in k Ω ;

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 $<10\text{s}$;