

# InGaAs PIN Photodiode

## Model: OPR1000-IGA26-T-O

### Features

- Enhance InGaAs PIN: 1000 to 2600nm
- TEC for temperature control

### Applications

- Optical Instrumentation
- Laser Power Measurement
- NIR Sensing
- Power meters



### Thermoelectric Submount

Symbol	Characteristic	Min.	Typ.	Max.	Unit
$D_{TMAX}$	Maximum temperature difference at $I=I_{MAX}$		40	78	k
$Q_{TMAX}$	Maximum heat pumping capacity at $I=I_{MAX}$			1.7	W
$I_{MAX}$	Maximum current			1.2	A
$U_{MAX}$	Maximum voltage drop			2.35	V

### Absolute Maximum Ratings ( $T_a=25^{\circ}C$ )

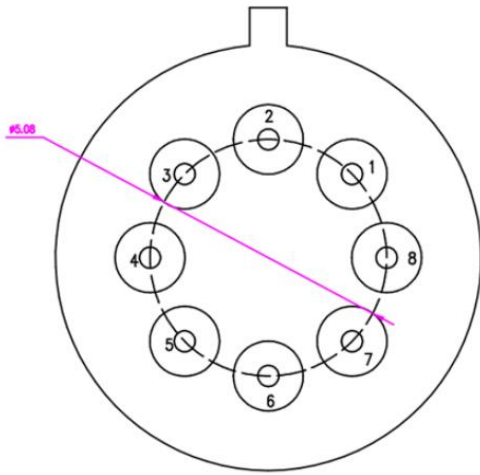
Parameter	Symbol	Value			Unit	Test conditions
		Min.	Typ.	Max.		
Chip Size	s	1290 × 1290 × 175			μm	
Active area	A	Φ1000			μm	
Forward current	$I_F$	10			mA	
Reverse current	$I_R$	10			mA	
Dark current	$I_D$		0.02 5		μA	$V_R=0V$ $V_R=5V$
Rise time	$t_R$		25	35	ns	$V_R=0V, R_L=50\Omega,$ $f=1MHz$
Forward Voltage	$V_F$			1	V	$I_F=1mA$
Reverse breakdown voltage	$V_{(BR)R}$	2			V	$I_R=10\mu A, E_V=0lx$
Shunt resistance	$R_{SH}$		175		MΩ	$V_R=10mV$
Junction Capacitance	$C_J$		372		pF	$V_R=0V; f=1MHz$
Photo sensitivity	$S_R$	0.95	0.97		A/W	1310nm

		0.97	1.10			2000nm
Spectral Application Range	$\lambda_{range}$	800		2600	nm	
Spectral Response-Peak	$\lambda_p$		2500		nm	
Saturation power	L	1 2 6	1.6 5.3 12.1		mW	$V_R=0V, \lambda=1.55\mu m$ $V_R=2V, \lambda=1.55\mu m$ $V_R=5V, \lambda=1.55\mu m$
Angular Resp 50% resp pt	$\theta_{1/2}$		$\pm 35$		Degrees	
Noise Equivalent Power	NEP		$8.16 \times 10^{-13}$		$W/Hz^{1/2}$	$V_R=5V, \lambda=1.55\mu m$
Specific Detectivity	$D^*$		$2.17 \times 10^{12}$		$cm(Hz/W)^{1/2}$	$V_R=5V, \lambda=1.55\mu m$

\*please note that depending on operation voltage , The operation at temperatures below  $-15^{\circ}C$  may require sophisticated control circuit.

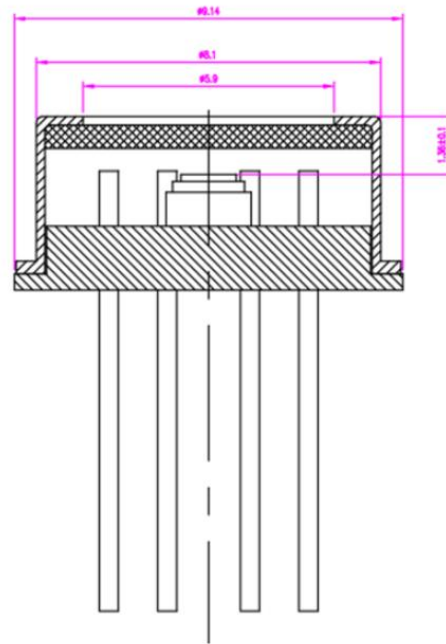
### Block Diagram and Pin description

Note: All dimension are in millimeters.

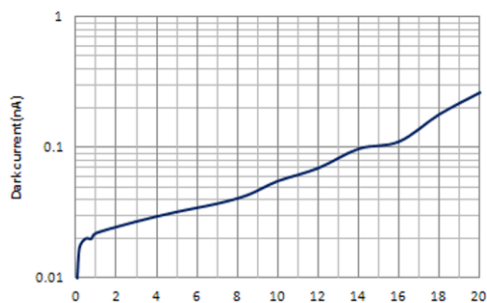


Bottom View

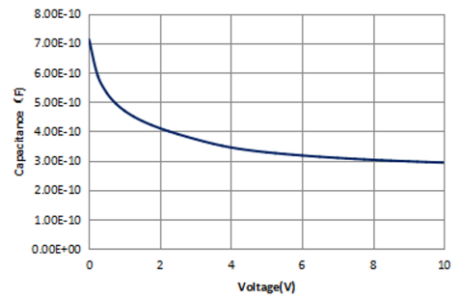
- |          |            |
|----------|------------|
| 1. NTC   | 5. Cathode |
| 2. Anode | 6. NTC     |
| 3. TEC+  | 7. NC      |
| 4. TEC-  | 8. NC      |



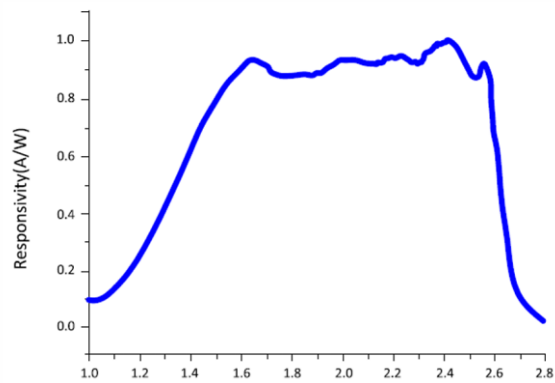
Dark current vs. reverse voltage



Relative Junction Capacitance VS. Voltage



Spectral response



### Temperature Sensor (NTC)

Temp		Resistance(kΩ)		
K	°C	Min.	Typ.	Max.
233.15	-40	321.904	336.795	352.339
238.15	-35	233.56	243.573	253.99
243.15	-30	171.306	178.091	185.127
248.15	-25	126.93	131.559	136.343
253.15	-20	94.955	98.129	101.4
258.15	-15	71.424	73.6	75.835
263.15	-10	54.238	55.735	57.268
268.15	-5	41.558	42.59	43.644
273.15	0	32.114	32.826	22.551
278.15	5	24.988	25.478	25.974
283.15	10	19.603	19.938	20.277
288.15	15	15.498	15.726	15.955
293.15	20	12.344	12.496	12.649
298.15	25	9.9	10	10.1
303.15	30	7.959	8.056	8.155
308.15	35	6.439	6.532	6.626

313.15	40	5.242	5.328	5.416
318.15	45	4.292	4.372	4.452
323.15	50	3.535	3.607	3.68
328.15	55	2.929	2.995	3.061
333.15	60	2.441	2.5	2.56
338.15	65	2.045	2.098	2.152
343.15	70	1.721	1.769	1.818
348.15	75	1.456	1.499	1.543
353.15	80	1.237	1.275	1.315
358.15	85	1.057	1.092	1.127
363.15	90	0.908	0.939	0.971
368.15	95	0.783	0.811	0.84
373.15	100	0.678	0.703	0.729
378.15	105	0.589	0.612	0.635
383.15	110	0.514	0.534	0.556
388.15	115	0.45	0.468	0.488
393.15	120	0.395	0.412	0.43
398.15	125	0.348	0.364	0.38

B(K)	3969.3	3930	3890.7
T <sub>N</sub> (K)	298.15		

$$T = \frac{B \times T_n}{B + \ln\left(\frac{R_T}{R_N}\right) \times T_N}$$