

Extended InGaAs Photodiodes IG22-Series

Description

The IG22-series is a panchromatic PIN photodiode with a nominal wavelength cut-off at 2.2 μm . This series has been designed for demanding spectroscopic and radiometric applications. It offers excellent shunt resistance in combination with superior responsivity over a wide range.

Features

- 50% cut-off wavelength: $\geq 2.15 \mu\text{m}$
- Typical peak responsivity: 1.40 A/W
- Excellent temperature stability
- Reduced edge effect

Applications

- Spectrophotometer
- Diode laser monitoring
- Non-contact temperature measurement
- Flame control
- Moisture monitoring

Versions

- Uncooled
TO-can, SMD, chip only, ceramic substrate, digital module
- Cooled
TE1, TE2, TE3



Optical Characteristics, Specifications @ 25°C

Part Number	Diameter [μm]	50% Cut off Wavelength ^a [μm]	Peak Wave- length ^a [μm]	Peak Responsivity ^{a,b} [A/W]		Responsivity @ 900 nm ^{a,b} [A/W]		Responsivity @ 1300 nm ^{a,b} [A/W]		Responsivity @ 1500 nm ^{a,b} [A/W]	
				Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
IG22X250S4i	250	≥ 2.15	1.95 ± 0.1	1.20	1.40	0.33	0.41	0.74	0.92	0.87	1.09
IG22X1000S4i	1000										
IG22X2000G1i	2000										
IG22X3000G1i	3000										

^a Parameter tested on batch level at T = 25°C

^b Responsivity measured at 0 V Bias.

Electro-Optical Characteristics, Specifications @ 25°C

Part Number	Diameter [μm]	Shunt Impedance @ $V_r = 10 \text{ mV}^b$ [kOhm]		Dark Current @ $V_r = 0.25 \text{ V}^b$ [μA]		Peak D^*^a [$\text{cm Hz}^{1/2}/\text{W}$]	Peak NEP ^a [$\text{W}/\text{Hz}^{1/2}$]	Capacitance @ $V_r = 0 \text{ V}^a$ [pF]	Forward Voltage [V]
		Min.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Typ.
IG22X250S4i	250	500	1320	0.08	1	$2.9\text{E}+11$	$7.8\text{E}-14$	40	0.56
IG22X1000S4i	1000	50	150	0.5	10	$3.8\text{E}+11$	$2.3\text{E}-13$	650	
IG22X2000G1i	2000	10	20	10	40	$2.8\text{E}+11$	$6.3\text{E}-13$	1745	
IG22X3000G1i	3000	3	6	6	100	$2.2\text{E}+11$	$1.2\text{E}-12$	5200	

^a Parameter tested on batch level

^b Parameter 100% tested

Thermoelectrically Cooled InGaAs Detectors

Part Number	Diameter [μm]	Operating Temperature [$^{\circ}\text{C}$]	Shunt Impedance @ $V_r = 10 \text{ mV}^b$ [kOhm]		Peak $D^* \text{ }^a$ [$\text{cm Hz}^{1/2}/\text{W}$]	Peak NEP ^a [$\text{W}/\text{Hz}^{1/2}$]	Capacitance @ $V_r = 0 \text{ V}^a$ [pF]
			Min.	Typ.	Typ.	Typ.	Typ.
IG22X250T7	250	-20	11000	23500	1.2E+12	1.8E-14	40
IG22X1000T7	1000		600	1200	1.0E+12	8.1E-14	650
IG22X2000T7	2000		120	240	9.8E+11	1.8E-13	1745
IG22X3000T7	3000		62	190	1.3E+12	2.0E-13	5200
IG22X250T9	250	-40	48000	90000	2.7E+12	8.3E-15	40
IG22X1000T9	1000		1600	3200	2.0E+12	4.4E-14	650
IG22X2000T9	2000		400	800	2.0E+12	8.8E-14	1745
IG22X3000T9	3000		260	610	2.6E+12	1.0E-13	5200

Absolute Maximum Ratings

	Min.	Max.
Storage Temperature [$^{\circ}\text{C}$]	-55	+125 $^{\circ}$
Operating Temperature [$^{\circ}\text{C}$]	-40	+85
Reverse Bias, cw [V]		1
Forward Current, cw [mA]		1
Soldering temperature, 5 sec. [$^{\circ}\text{C}$]		260
ESD Damage Threshold, Human Body Model Class 0* [V]	0	<250
TE Cooler allowable voltage [V]		3.7
TE Cooler allowable current [A]		1.1

*ANSI/ ESD STM5. 1-2007

Fig. 1: Spectral Response

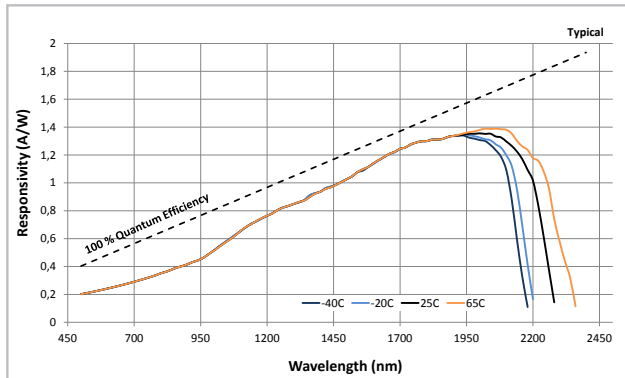


Fig. 2: Dark Current vs. Reverse Voltage

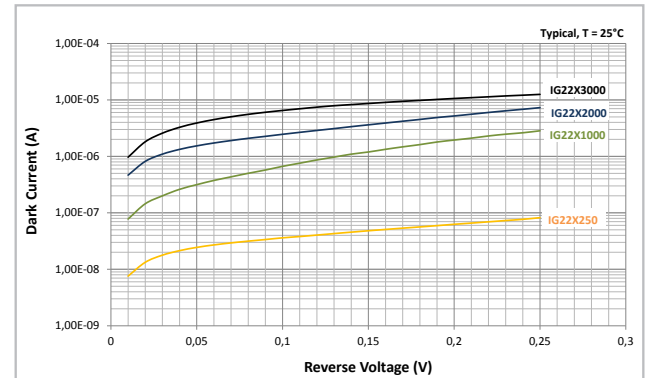


Fig. 3: Shunt Resistance vs. Temperature

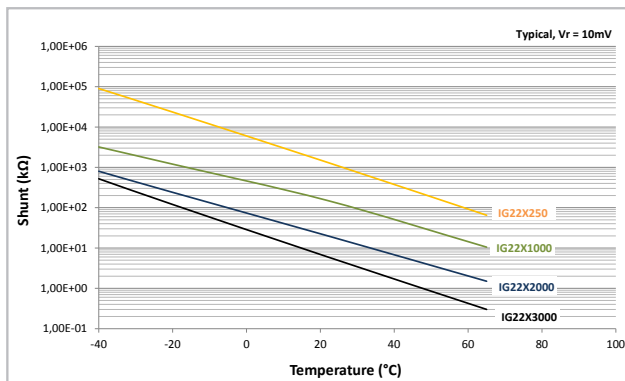


Fig. 4: Detectivity vs. Shunt x Area

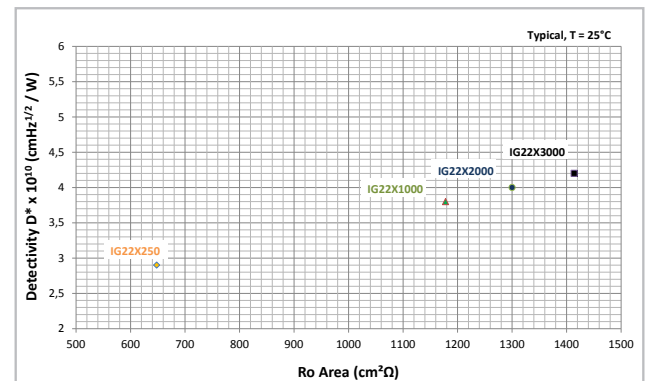


Fig. 5: Capacitance vs. Reverse Voltage

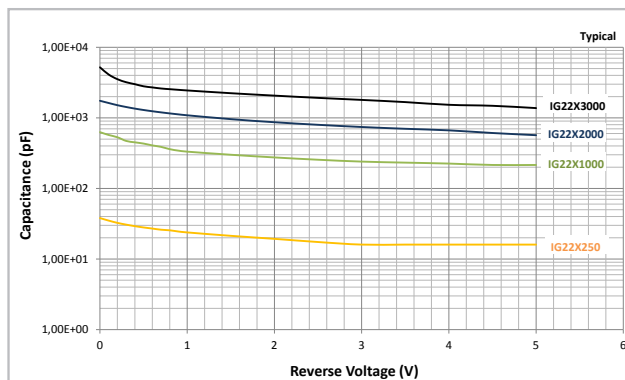


Fig. 6: Responsivity Temperature Coefficient

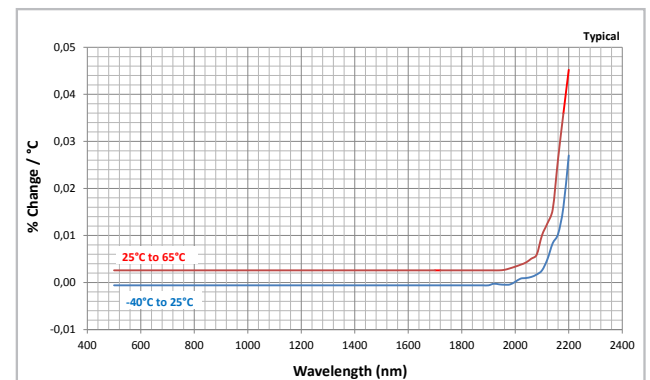


Fig. 7: Sample Pulse Response

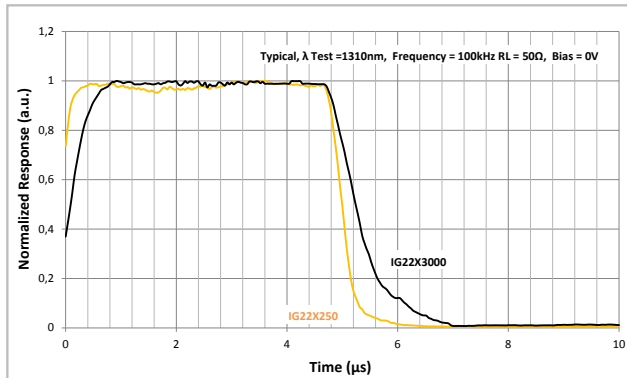


Fig. 8: TEC Voltage vs. Temperature

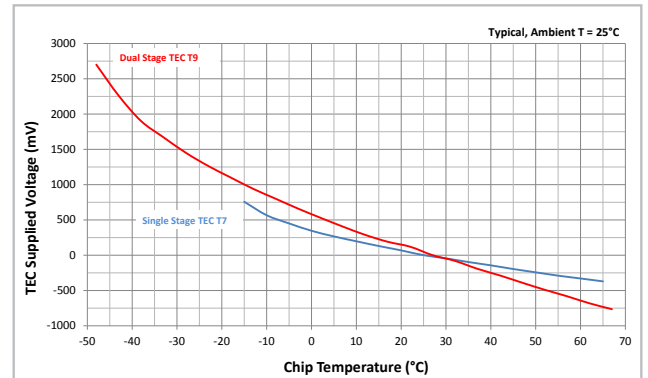


Fig. 9: TEC Current vs. Temperature

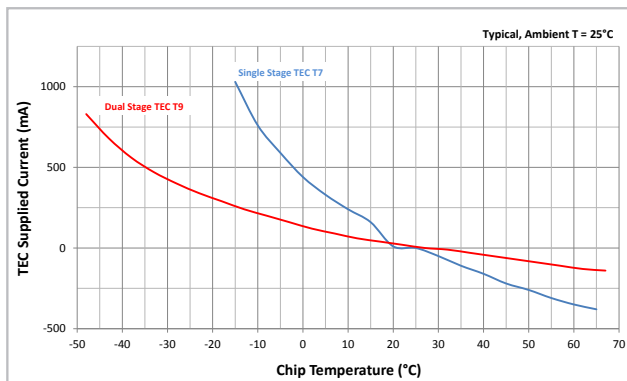


Fig. 10: TEC Power vs. Temperature

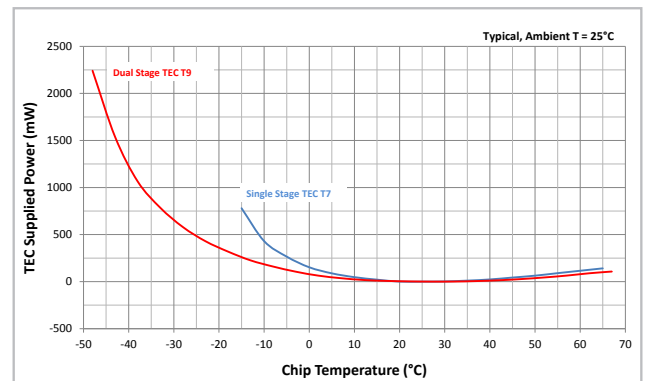


Fig. 11: T9 Thermistor Temperature Characteristics

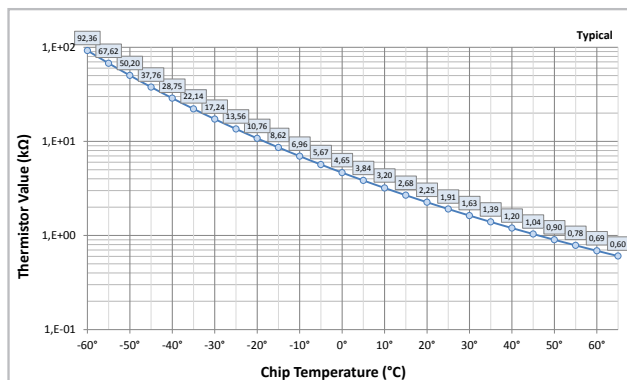


Fig. 12: T7 Thermistor Temperature Characteristics

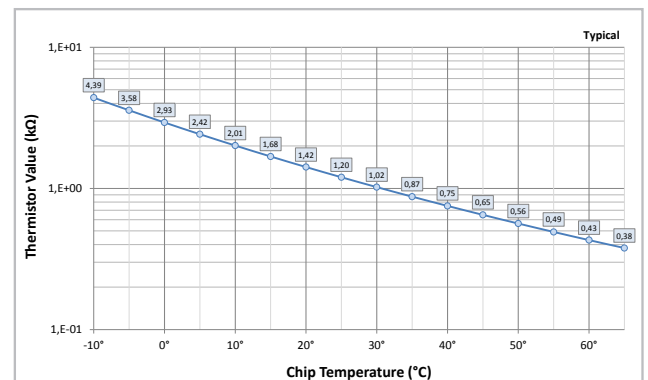
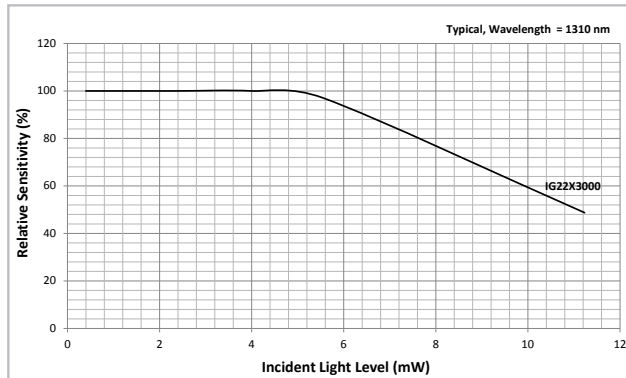


Fig. 13: Linearity



Nomenclature

I G 2 2 X

Type
Extended InGaAs PIN Photodiode

2 5 0

Diameter
250 = 250 μm
1000 = 1 mm
2000 = 2 mm
3000 = 3 mm

S 4 i

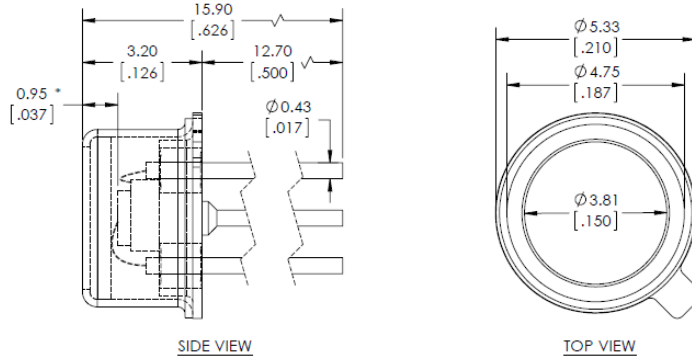
Package Style
S4i - TO-46, isolated
S4ix - TO-46, no window
G1i - TO-5, isolated
G1ix - TO-5, no window
T7 - TO-37 Single Stage TEC
T9 - TO-66 Dual Stage TEC
C - Chip
M9 - 8 pad surface mount device
Y3 - 2 pad ceramic substrate

Standard window: Borosilicate glass

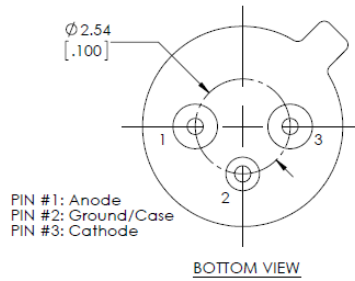
Custom option: AR/AR, 1275-2500 nm, R (avg) < 1%

Package Drawings

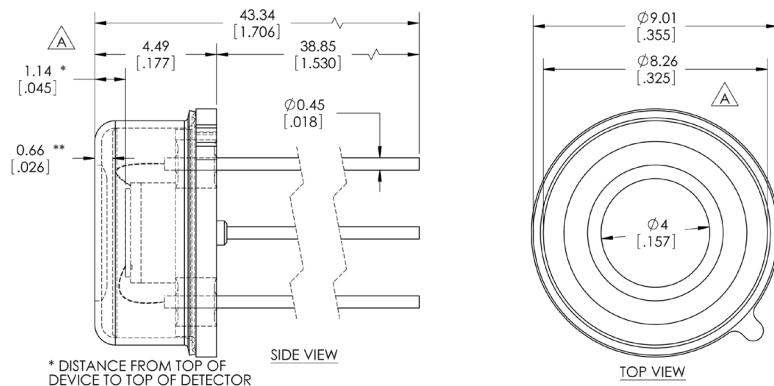
S4i



* DISTANCE FROM TOP OF DEVICE TO TOP OF ACTIVE AREA

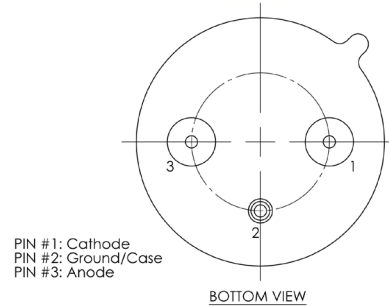


G1i

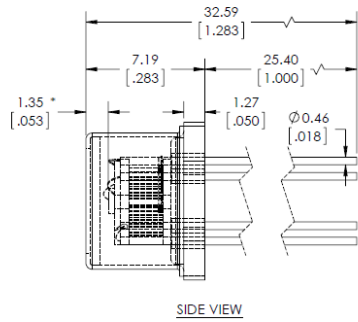


* DISTANCE FROM TOP OF DEVICE TO TOP OF DETECTOR

** DISTANCE FROM TOP OF DEVICE TO BOTTOM OF WINDOW



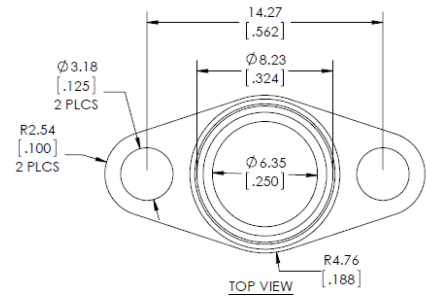
T7



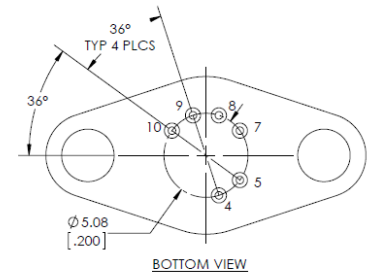
SIDE VIEW

* DISTANCE FROM TOP OF DEVICE TO TOP OF ACTIVE AREA

** DISTANCE FROM TOP OF DEVICE TO TOP OF WINDOW



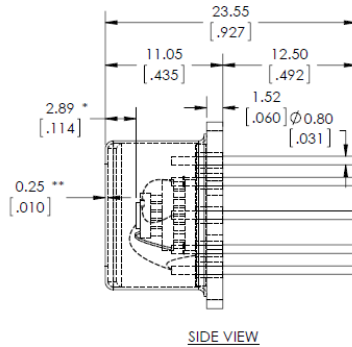
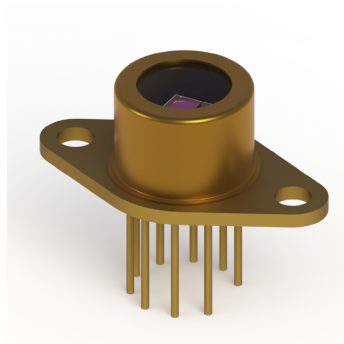
TOP VIEW



BOTTOM VIEW

PIN #4: Thermistor
PIN #5: Thermistor
PIN #7: TEC +
PIN #8: TEC -
PIN #9: Anode
PIN #10: Cathode

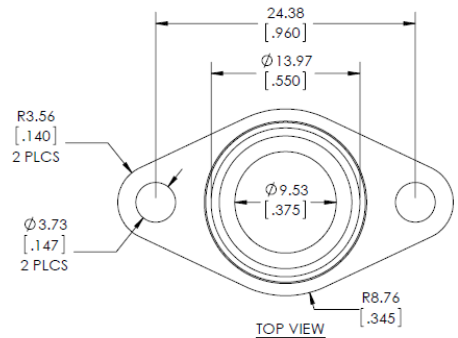
T9



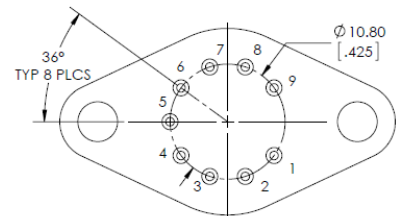
SIDE VIEW

* DISTANCE FROM TOP OF DEVICE TO TOP OF ACTIVE AREA

** DISTANCE FROM TOP OF DEVICE TO TOP OF WINDOW



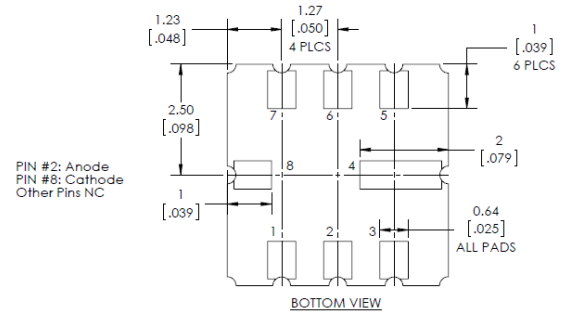
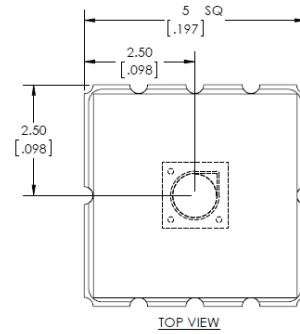
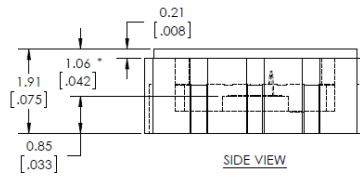
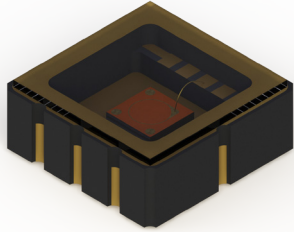
TOP VIEW



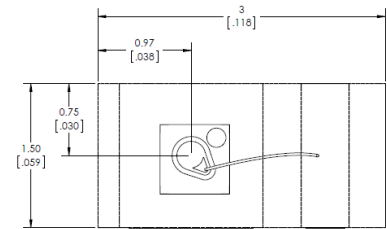
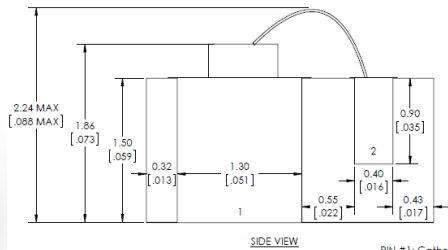
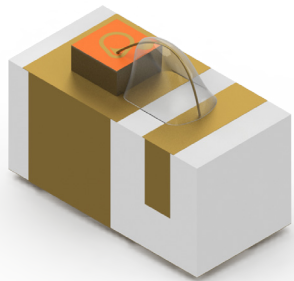
BOTTOM VIEW

PIN #1: TEC +
PIN #2: Ground/Case
PIN #3: Anode
PIN #4: Cathode
PIN #5: Thermistor
PIN #6: Thermistor
PIN #7: NC
PIN #8: NC
PIN #9: TEC -

M9

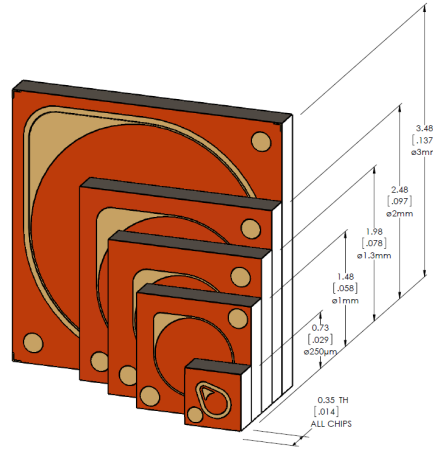


Y3

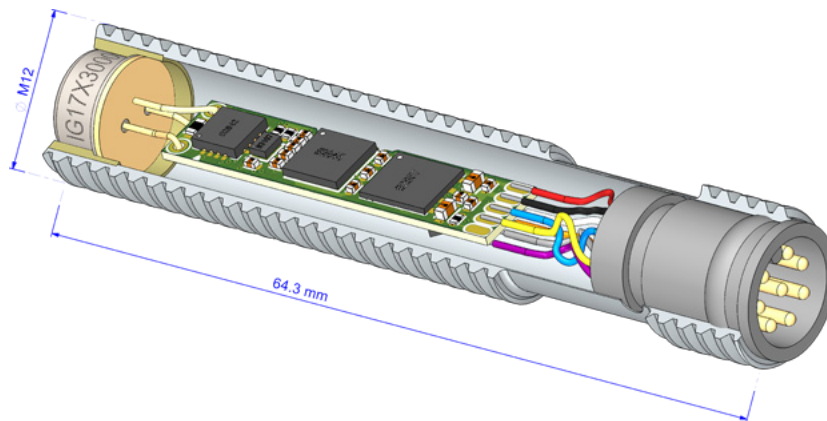


Up to 1mm Only

Chip



D- MAJOR-A: Digital Module, RS-232, Digital and Analog Output



Pin#	Signal Name	Electrical Data	Description
1	TempOut	0... 2500 mV	Analog temp output
2	SensorOut	0...3300 mV	Analog sensor output
3	+5 V	5 V ±10%	Power supply input
4	TxD	RS-232 levels	Serial data output
5	BSLprg	RS-232 levels	BSL programming signal
6	RxD	RS-232 levels	Serial data input
7	Reset	RS-232 levels	Reset input signal, low active
8	GND	0V	Ground signal

Please get in contact for more details of the MAJOR.

Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application.

Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at www.lasercomponents.com