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## Extended InGaAs Photodiodes IG22-Series

### Description

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

### Features

- 50% cut-off wavelength: > 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, chip only
- Cooled:  
TE1, TE2, TE3



## Extended InGaAs Photodiodes IG22-Series

### Optical Characteristics, Specifications @ 25 °C <sup>c</sup>

Part Number	Diameter [μm]	50% Cut off Wavelength <sup>a</sup> [μm]	Peak Wavelength <sup>a</sup> [μm]	Peak Responsivity <sup>a,b</sup> [A/W]		Responsivity @ 520 nm <sup>a,b,d</sup> [A/W]		Responsivity @ 1300 nm <sup>a,b</sup> [A/W]		Responsivity @ 1500 nm <sup>a,b</sup> [A/W]	
				Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
IG22X250S4i	250	≥ 2.15	1.95 ± 0.1	1.15	1.40	TBD	0.1	0.74	0.92	0.87	1.09
IG22X500S4i	500										
IG22X1000S4i	1000										
IG22X1300S4i	1300										
IG22X2000G1i	2000										
IG22X3000G1i	3000										

<sup>a</sup> Parameter tested on batch level at T = 25 °C

<sup>b</sup> Responsivity measured at 0 V Bias.

<sup>c</sup> Data are prior to window integration.

<sup>d</sup> Preliminary data.

### Electro-Optical Characteristics, Specifications @ 25 °C

Part Number	Diameter [μm]	Shunt Impedance @ V <sub>r</sub> = 10 mV <sup>b</sup> [kOhm]		Dark Current @ V <sub>r</sub> = 0.25 V <sup>b</sup> [μA]		Peak D* <sup>a</sup> f = 1 kHz [cm Hz <sup>1/2</sup> /W]		Peak NEP <sup>a</sup> f = 1 kHz [W/Hz <sup>1/2</sup> ]	
		Min.	Typ.	Typ.	Max.	Min.	Typ.	Max.	Typ.
IG22X250S4i	250	500	1000	0.05	0.5	3.1 E+11	4.5 E+11	1.6 E-13	1.1 E-13
IG22X500S4i	500	200	600	0.1	1	2.8 E+11	4.9 E+11	2.5 E-13	1.4 E-13
IG22X1000S4i	1000	60	300	0.2	2.5	2.2 E+11	4.9 E+11	4.6 E-13	2.0 E-13
IG22X1300S4i	1300	25	150	0.5	5	1.6 E+11	4.0 E+11	7.1 E-13	2.9 E-13
IG22X2000G1i	2000	12	40	1	10	1.3 E+11	2.5 E+11	1.0 E-12	5.6 E-13
IG22X3000G1i	3000	4	12	5	50	9.8 E+10	1.7 E+11	1.8 E-12	1.0 E-12

# Extended InGaAs Photodiodes IG22-Series

## Electrical Characteristics, Specifications @ 25 °C

Part Number	Diameter [μm]	Capacitance @ $V_r = 0$ V <sup>a</sup>	Forward Voltage
		[pF]	[V]
		Typ.	Typ.
IG22X250S4i	250	40	0.56
IG22X500S4i	500	160	
IG22X1000S4i	1000	650	
IG22X1300S4i	1300	1100	
IG22X2000G1i	2000	1750	
IG22X3000G1i	3000	5200	

<sup>a</sup> Parameter tested on batch level

<sup>b</sup> Parameter 100% tested

## Thermoelectrically Cooled InGaAs Detectors

Part Number	Diameter [μm]	Operating Temperature [°C]	Shunt Impedance @ $V_r = 10$ mV <sup>b</sup>		Peak $D^*$ <sup>a</sup>	Peak NEP <sup>a</sup>	Capacitance @
			[kOhm]	[kOhm]	[cm Hz <sup>1/2</sup> /W]	[W/Hz <sup>1/2</sup> ]	$V_r = 0$ V <sup>a</sup>
			Min.	Typ.	Typ.	Typ.	Typ.
IG22X250T7	250	-10	2500	5000	1.0E+12	5.0E-14	40
IG22X1000T7	1000		300	1500	1.1E+12	9.1E-14	650
IG22X2000T7	2000		60	200	5.7E+11	2.5E-13	1750
IG22X3000T7	3000		20	60	3.8E+11	4.6E-13	5200
IG22X250T9	250	-20	5000	10000	1.4E+12	3.5E-14	40
IG22X1000T9	1000		600	3000	1.5E+12	6.5E-14	650
IG22X2000T9	2000		120	400	8.0E+11	1.8E-13	1750
IG22X3000T9	3000		-	-	-	-	5200

# Extended InGaAs Photodiodes IG22-Series

## Absolute Maximum Ratings

		Min.	Max.
Storage temperature [°C]		-55	+125
Operating temperature [°C]		-40	+85
Reverse bias, cw [V]			1
Forward current, cw [mA]			1
Soldering temperature, 5 sec. [°C]			260
ESD damage threshold, human body model class 0* [V]		0	<250
TE cooler allowable voltage [V]	T7	-	0.8
	T9	-	3.7
TE cooler allowable current [A]	T7	-	1.9
	T9	-	1.2

\*ANSI/ ESD STM5. 1-2007  
Valid with sufficient heat sinking only.

# Extended InGaAs Photodiodes IG22-Series

Fig. 1: Spectral Response

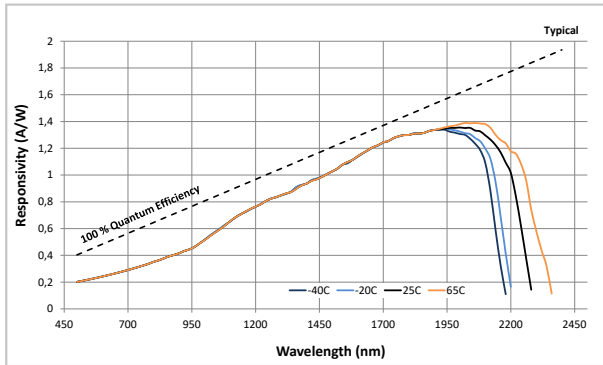


Fig. 2: Dark Current vs. Reverse Voltage

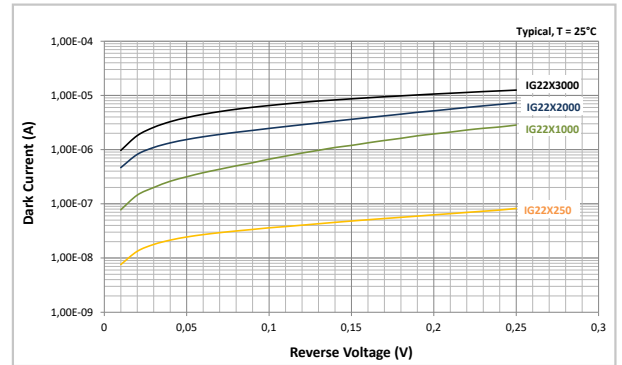


Fig. 3: Shunt Resistance vs. Temperature

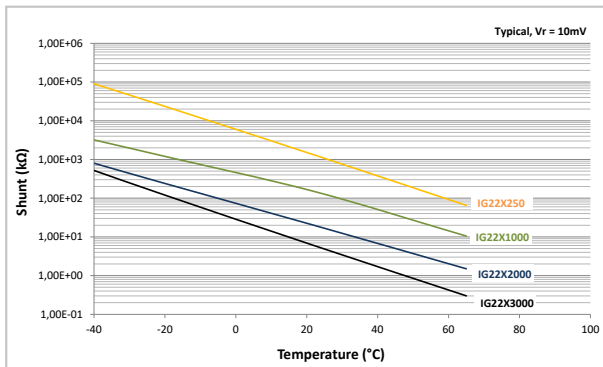


Fig. 4: Shunt Resistance vs. Detectivity

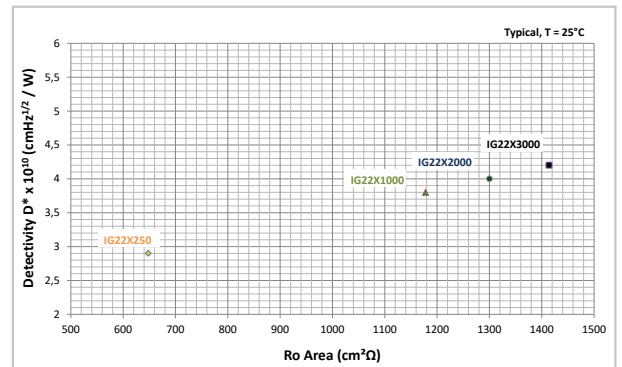


Fig. 5: Capacitance vs. Reverse Voltage

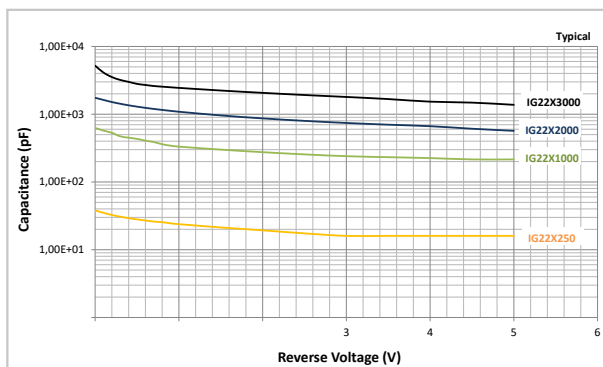
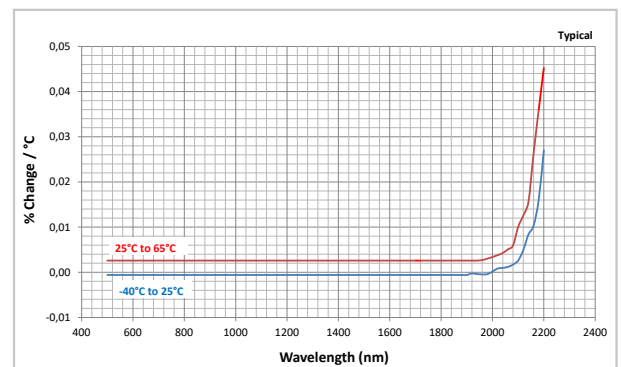


Fig. 6: Responsivity Temperature Coefficient



# Extended InGaAs Photodiodes IG22-Series

Fig. 7: Sample Pulse Response

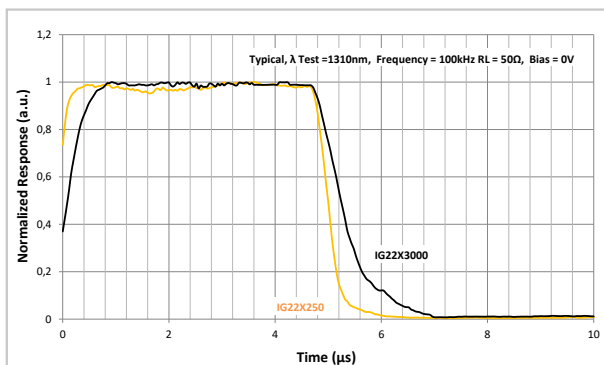


Fig. 8: Linearity



<b>C-</b>	Extended InGaAs Photodiodes				<b>2</b>	<b>5</b>	<b>0</b>	<b>S</b>	<b>4</b>	<b>i</b>	
	<b>I</b>	<b>G</b>	<b>2</b>	<b>X</b>							
Chip only	Type				Diameter			Package Style			
	Extended InGaAs PIN Photodiode				250 = 250 μm	500 = 500 μm	1000 = 1 mm	1300 = 1.3 mm	2000 = 2 mm	3000 = 3 mm	S4i - TO-46, isolated
											S4ix - TO-46, no window
											G1i - TO-39, isolated
											G1ix - TO-39, no window
											T7 - TO-37, single stage TEC
											T9 - TO-66, dual stage TEC
											L5 - TO-46 lens cap

Standard window: Borosilicate glass

Package drawings, TEC and thermistor curves can be found on a separate datasheet.

## 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

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