

## 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

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

<sup>a</sup> Parameter tested on batch level<sup>b</sup> Parameter 100% tested

### Electrical Characteristics, Specifications @ 25 °C

Part Number	Diameter [μm]	Capacitance @ $V_r = 0$ V <sup>a</sup>		Forward Voltage [V]	
		[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> [cm Hz <sup>1/2</sup> /W]	Peak NEP <sup>a</sup> [W/Hz <sup>1/2</sup> ]	Capacitance @ $V_r = 0$ V <sup>a</sup> [pF]
			[kOhm]				
			Min.	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

## 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.

Fig. 1: Spectral Response

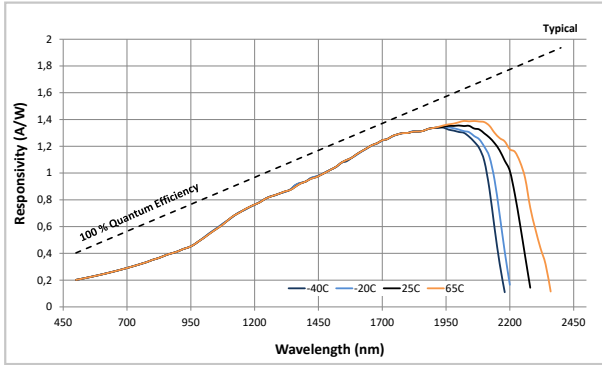


Fig. 2: Dark Current vs. Reverse Voltage

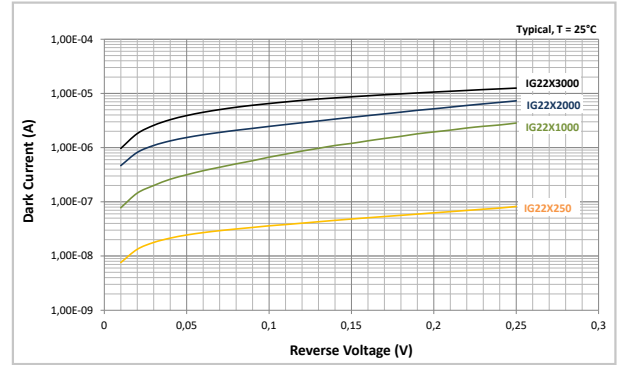


Fig. 3: Shunt Resistance vs. Temperature

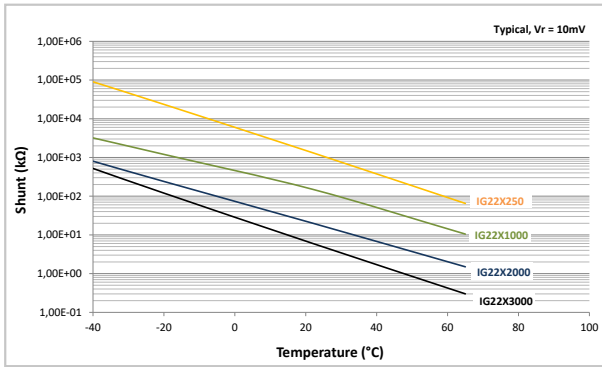


Fig. 4: Shunt Resistance vs. Detectivity

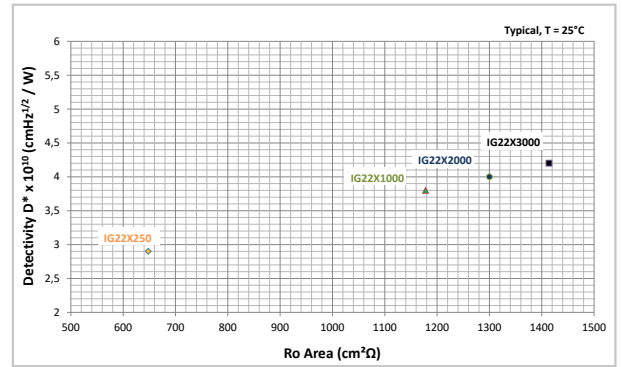


Fig. 5: Capacitance vs. Reverse Voltage

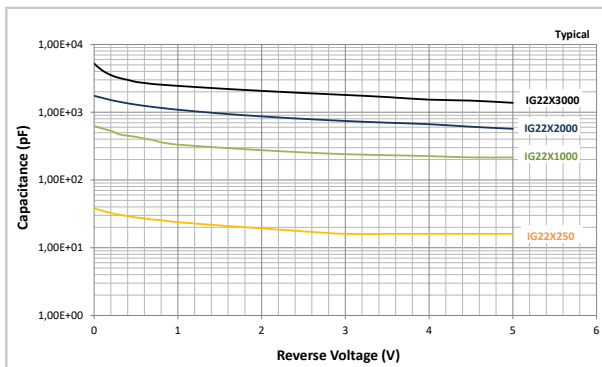


Fig. 6: Responsivity Temperature Coefficient

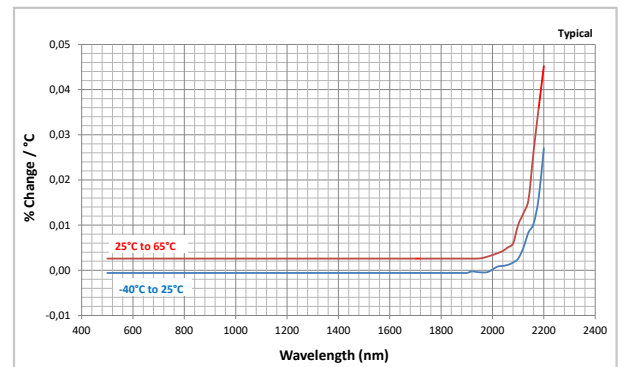


Fig. 7: Sample Pulse Response

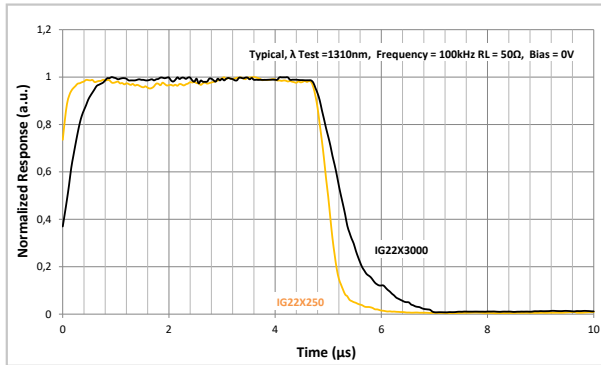
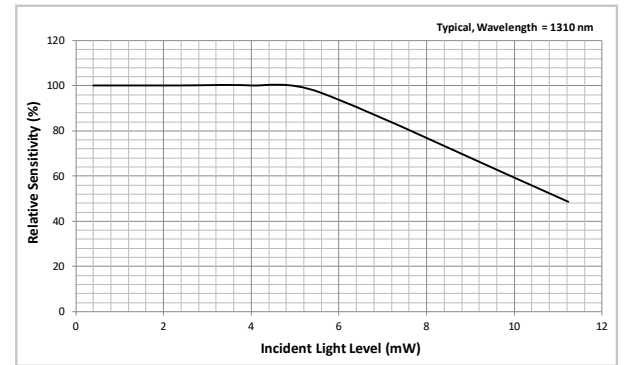


Fig. 8: Linearity



### Nomenclature

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

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at [www.lasercomponents.com](http://www.lasercomponents.com)