

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

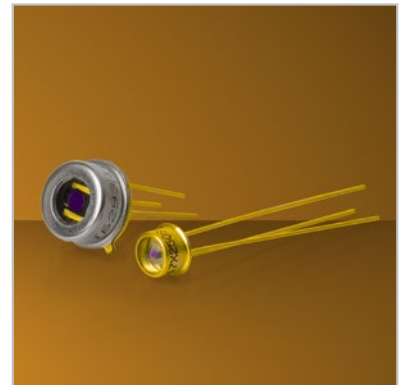
- 50% cut-off wavelength: $\geq 2.15 \mu\text{m}$
- Typical peak responsivity: 1.40 A/W
- Excellent temperature stability
- Reduced edge effect

Applications

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

Versions

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



Optical Characteristics, Specifications @ 25°C^c

Part Number	Diameter [μm]	50% Cut off Wavelength ^a [μm]	Peak Wave- length ^a [μm]	Peak Responsivity ^{a,b} [A/W]		Responsivity @ 520 nm ^{a,b,d} [A/W]		Responsivity @ 1300 nm ^{a,b} [A/W]		Responsivity @ 1500 nm ^{a,b} [A/W]	
				Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
			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										

^a Parameter tested on batch level at T = 25°C^b Responsivity measured at 0 V Bias.^c Data are prior to window integration.^d Preliminary data.

Electro-Optical Characteristics, Specifications @ 25°C

Part Number	Diameter [μm]	Shunt Impedance @ V _r = 10 mV ^b [kOhm]		Dark Current @ V _r = 0.25 V ^b [μA]		Peak D* ^a f = 1 kHz [cm Hz ^{1/2} /W]		Peak NEP ^a f = 1 kHz [W/Hz ^{1/2}]	
		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

^a Parameter tested on batch level^b Parameter 100% tested

Electrical Characteristics, Specifications @ 25°C

Part Number	Diameter [μm]	Capacitance @ $V_r = 0 \text{ V}^a$		Forward Voltage [V]	
		Typ.		Typ.	
IG22X250S4i	250	40		0.56	
IG22X500S4i	500	160			
IG22X1000S4i	1000	650			
IG22X1300S4i	1300	1100			
IG22X2000G1i	2000	1750			
IG22X3000G1i	3000	5200			

^a Parameter tested on batch level^b Parameter 100% tested

Thermoelectrically Cooled InGaAs Detectors

Part Number	Diameter [μm]	Operating Temperature [°C]	Shunt Impedance @ $V_r = 10 \text{ mV}^b$ [kOhm]		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]
			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	1750
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	1750
IG22X3000T9	3000		260	610	2.6E+12	1.0E-13	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]		3.7
TE Cooler allowable current [A]		1.1

*ANSI/ ESD STM5. 1-2007

Fig. 1: Spectral Response

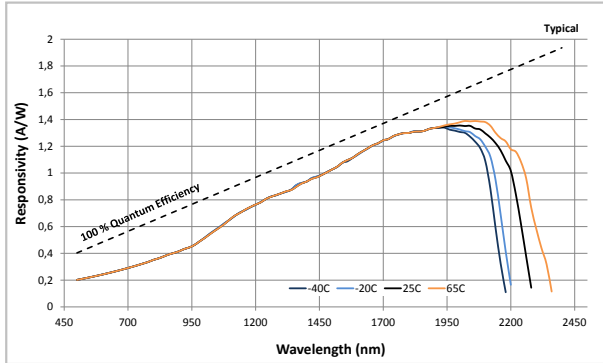


Fig. 2: Dark Current vs. Reverse Voltage

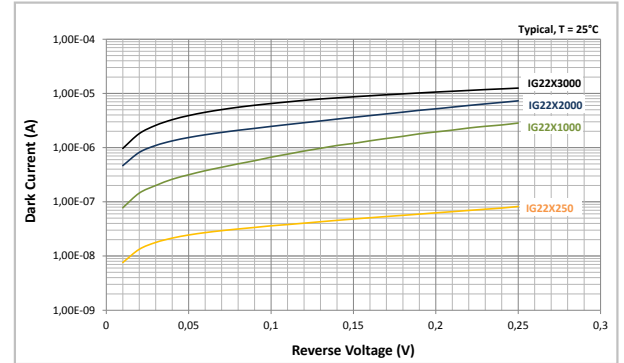


Fig. 3: Shunt Resistance vs. Temperature

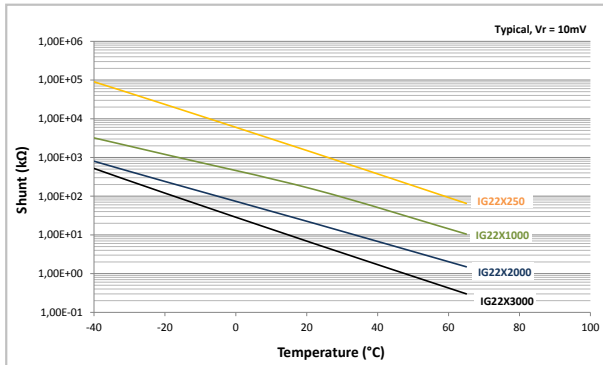


Fig. 4: Detectivity vs. Shunt x Area

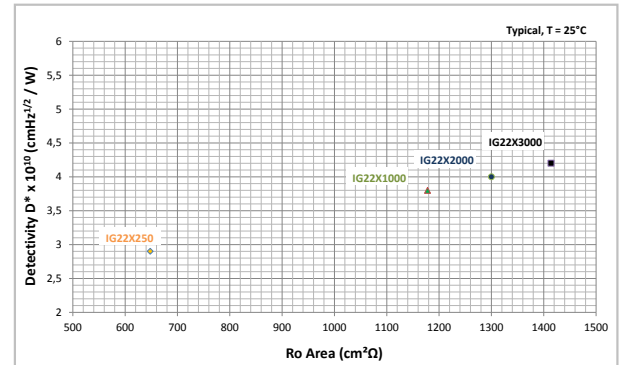


Fig. 5: Capacitance vs. Reverse Voltage

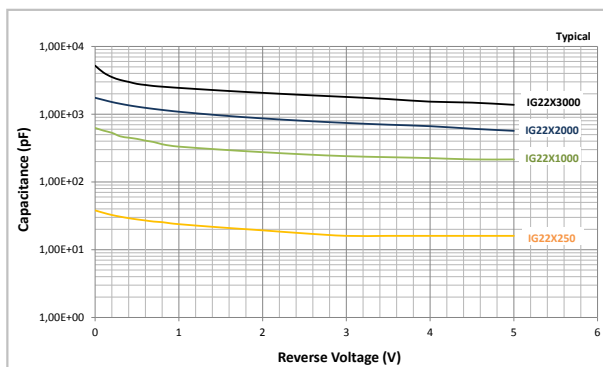


Fig. 6: Responsivity Temperature Coefficient

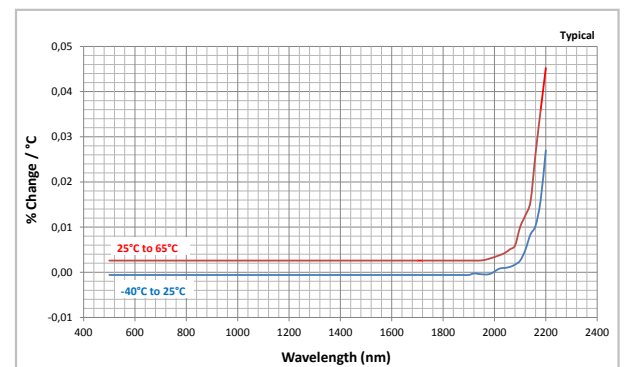


Fig. 7: Sample Pulse Response

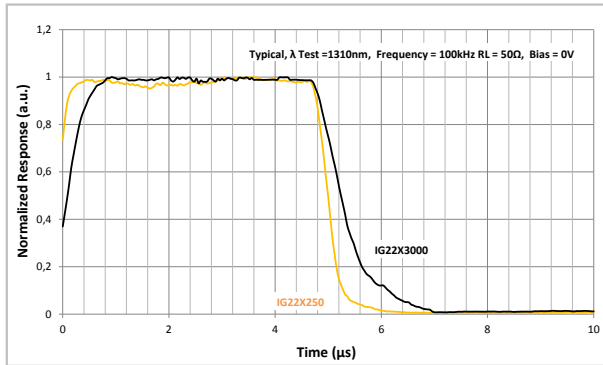
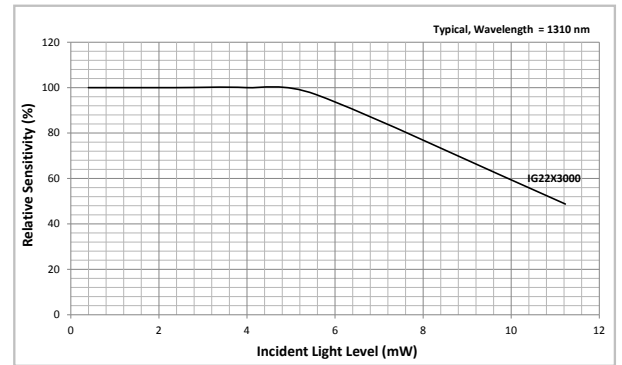


Fig. 8: Linearity



Nomenclature

C-	I	G	2	2	X		2	5	0	S	4	i	
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			
										M2 - 2 pad PCB SMD			
										L5 - TO-46 lens cap			

Standard window: Borosilicate glass

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

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