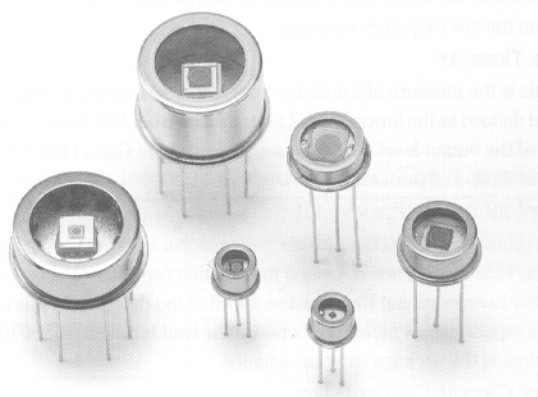


InGaAs PIN Photodiodes (Standard Types)

Spectral Response Range: 0.7 to 1.7/0.9 to 1.7 μm

High-speed and low noise NIR (Near Infrared) detectors



ACCESSORIES (Optional)

Pre-amplifier for InGaAs PIN photodiodes (High-speed application)	: C4159-02
Pre-amplifier for InGaAs PIN photodiodes (Low-light-level detection)	: C4159-03
Heatsink for one-stage TE-cooled	: A3179
Heatsink for two-stage TE-cooled	: A3179-01
Temperature controller for TE-cooled Types	: C1103-04

SPECIFICATIONS (Common)

Peak Sensitivity Wavelength	1.55 μm
Window Material	Borosilicate glass
Operating Temperature	-40 to +85 °C (G7151-16: -25 to +70 °C)
Storage Temperature	-55 to +125 °C (G7151-16: -25 to +70 °C)

InGaAs PIN photodiodes have small terminal capacitance and therefore achieve high-speed response. In addition, these devices feature low noise operation due to high shunt resistance.

A wide range of device types are available:

Large area types, short-wavelength enhanced types, etc.

Standard Types

A wide range of device types are available, ranging in active area from 0.08 mm diameter to 5 mm diameter.

Short-Wavelength (0.7 to 0.9 μm) Enhanced Types

These InGaAs PIN photodiodes have enhanced responsivity in the 0.7 to 0.9 μm region. With a single detector, it is possible to cover a wide spectral range from the short wavelength band to the long wavelength band for use in such fields as optical communications and optical measurement systems.

TE-Cooled Types

Thermoelectrically-cooled devices can greatly reduce the dark current, achieving an improved D^* value. Thus these devices are ideally suited for low-level-light detection in the NIR (near infrared) region. The thermoelectric cooler is available in a one-stage (-10 °C) or two-stage (-20 °C) configuration.

SPECIFICATIONS (TE-cooled Types)

Operating Temperature	-40 to +70 °C
Storage Temperature	-55 to +85 °C
Thermistor Allowable Dissipation	0.2 mW
Peltier Element	1.5 A (one-stage types)
Allowable Current	1.0 A (two-stage types)

(Unless otherwise noted, Typ. $T_a = 25^\circ\text{C}$)

Type No.	Outline No. (P. 34,35)	Package	Active Area (mm)	Photo Sensitivity S			Dark Current I_D $V_R = 5\text{ V}$		Shunt Resistance R_{sh} $V_R = 10\text{ mV}$	D^* $\lambda = \lambda_p$	NEP $\lambda = \lambda_p$	Cut-off Frequency f_c $V_R = 5\text{ V}$ $R_L = 50\ \Omega$	Terminal Capacitance C_t $f = 1\text{ MHz}$	Maximum Reverse Voltage $V_R\text{ Max.}$
				0.78 μm (A/W)	1.3 μm (A/W)	1.55 μm (λ_p) (A/W)	Typ.	Max.						

Standard Types (0.9 to 1.7 μm)

G3476-01	①	TO-18	$\phi 0.08$	-	0.9	0.95	0.08	0.4	8000	5×10^{12}	2×10^{-15}	2 (GHz)	1	20
G3476-03			$\phi 0.3$	-	0.9	0.95	0.3	1.5	1000	5×10^{12}	4×10^{-15}	400	5	20
G3476-05			$\phi 0.5$	-	0.9	0.95	0.5	2.5	300	5×10^{12}	8×10^{-15}	200	12	20
G5832-01			$\phi 1.0$	-	0.9	0.95	1	5	100	5×10^{12}	2×10^{-14}	35	90	10
G5832-02	②	TO-5	$\phi 2.0$	-	0.9	0.95	5 *1	25 *1	25	5×10^{12}	4×10^{-14}	4 *1	550 *1	5
G5832-03			$\phi 3.0$	-	0.9	0.95	15 *1	75 *1	10	5×10^{12}	6×10^{-14}	2 *1	1000 *1	5
G5832-05	③	TO-8	$\phi 5.0$	-	0.9	0.95	25 *1	125 *1	3	5×10^{12}	1×10^{-13}	0.6 *1	3500 *1	2

16-element Array

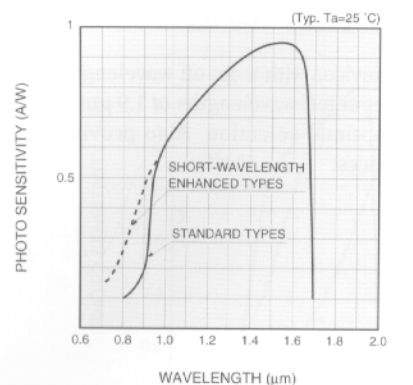
G7151-16	⑫	DIP	0.08×0.2 (16 elements)	-	0.9	0.95	0.2 *1	1 *1	3000	5×10^{12}	3×10^{-15}	500 *1	6 *1	5
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Short-wavelength (0.7 to 0.9 μm) Enhanced Types

G5125-03	①	TO-18	$\phi 0.3$	0.25	0.9	0.95	0.3	1.5	1000	5×10^{12}	4×10^{-15}	400	5	6
G5125-10			$\phi 1.0$	0.25	0.9	0.95	1	5	100	5×10^{12}	2×10^{-14}	40	30	6

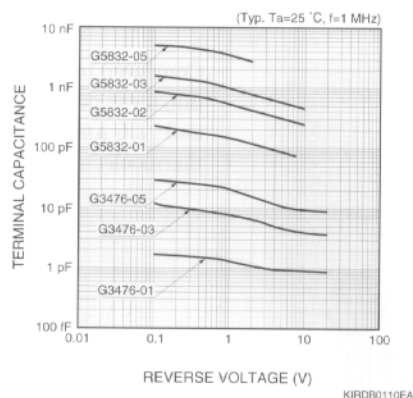
*1: $V_R = 1\text{ V}$

■Spectral Response



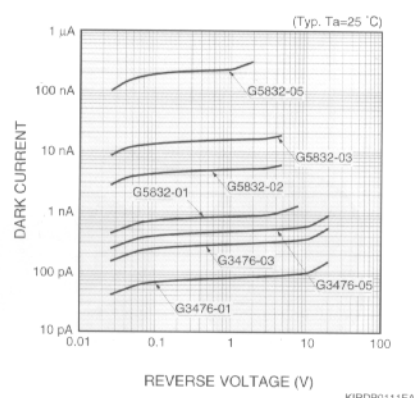
The cut-off wavelengths of the TE-cooled devices shift to shorter wavelengths as compared to the room temperature operating devices.
one-stage TE : 1.67 μm
two-stage TE : 1.65 μm

■Terminal Capacitance vs. Reverse Voltage



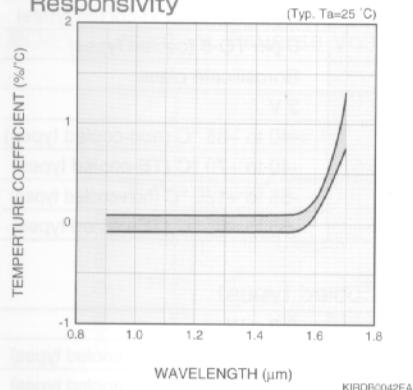
For high-speed applications, the lead length should be as short as possible to minimize the terminal capacitance.

■Dark Current vs. Reverse Voltage

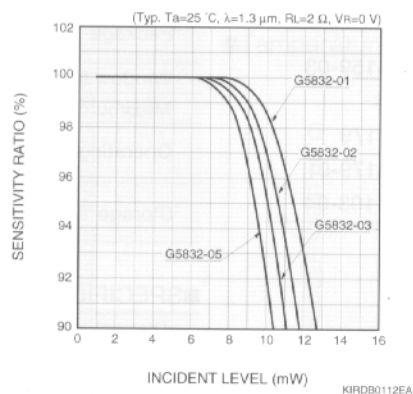


The dark current increases with the application of reverse voltage, but the frequency response and linearity are improved.

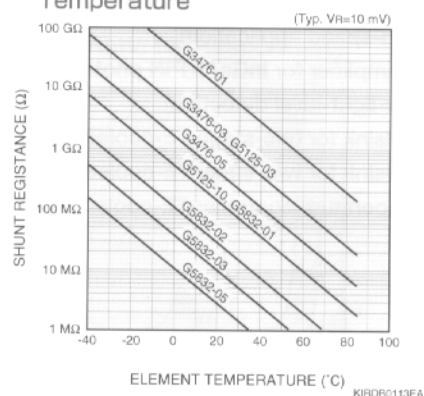
■Temperature Characteristic for Responsivity



■Linearity



■Shunt Resistance vs. Temperature



(Unless otherwise noted, Typ.)

Type No.	Outline No. (P. 34)	Package	Active Area (mm)	Measurement Temperature (°C)	Photo Sensitivity S		Dark Current ID VR=1 V		Shunt Resistance Rsh VR=10 mV	D* λ=λp (cm • Hz ^{1/2} /W)	NEP λ=λp (W/Hz ^{1/2})	Cut-off Frequency fc VR=1 V RL=50 Ω	Terminal Capacitance Ct VR=1 V f=1 MHz	Maximum Reverse Voltage VR Max.
					1.3 μm (A/W)	1.55 μm (λp) (A/W)	Typ.	Max.						

■One-stage TE-cooled Types (0.9 to 1.67 μm)

G5832-11	4	TO-8	φ1.0	-10	0.9	0.95	0.07	0.35	1500	2 × 10 ¹³	5 × 10 ⁻¹⁵	18	150	5
G5832-12			φ2.0				0.3	1.5	300		1 × 10 ⁻¹⁴	4	550	
G5832-13			φ3.0				1	5	100		2 × 10 ⁻¹⁴	2	1000	
G5832-15			φ5.0				2.5	12.5	30		3 × 10 ⁻¹⁴	0.6	3500	

■Two-stage TE-cooled Types (0.9 to 1.65 μm)

G5832-21	5	TO-8	φ1.0	-20	0.9	0.95	0.03	0.15	3000	3 × 10 ¹³	3 × 10 ⁻¹⁵	18	150	5
G5832-22			φ2.0				0.15	0.75	600		7 × 10 ⁻¹⁵	4	550	
G5832-23			φ3.0				0.5	2.5	200		1 × 10 ⁻¹⁴	2	1000	
G5832-25			φ5.0				1.2	6	60		2 × 10 ⁻¹⁴	0.6	3500	

Precautions for Use

Refer to "Precautions for Handling InGaAs PIN Photodiodes" on page 50.