

MITSUBISHI InGaAs PHOTODIODES

PD7XX5 SERIES

MITSUBISHI (DISCRETE SC) 3LE D 6249829 0014239 9 MITS

FOR OPTICAL COMMUNICATION

T-41-07

TYPE
NAME

PD7005, PD7035, PD7935

DESCRIPTION

Mitsubishi PD7XX5 series are InGaAs photodiodes designed to operate in the wavelength range of 1.0~1.6 μ m with high performance superior to germanium photodiodes in quantum efficiency and dark current. They are well suited for wide-band and long distance fiber-optic communication systems with low transmission loss and low material dispersion in this wavelength range.

FEATURES

- High quantum efficiency
- Very small dark current, less than 1nA
- High speed response
- Convenient package for nongrounded operation
- Active diameter 80 μ m
- Wavelength range 1000~1600nm
- High reliability, long operation life

APPLICATION

Fiber-optic communication systems.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
V_R	Reverse voltage	20	V
I_R	Reverse current	500	μ A
I_F	Forward current	2	mA
T_C	Case temperature	-30~+80	$^{\circ}$ C
T_{stg}	Storage temperature	-40~+100	$^{\circ}$ C

ELECTRICAL/OPTICAL CHARACTERISTICS ($T_C=25^{\circ}$ C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
C_t	Total capacitance	$V_R=10V, f=1MHz$	—	1	2	pF
I_D	Dark current	$V_R=10V$	—	0.1	1	nA
R	Responsivity	$V_R=10V, \lambda=1.3\mu m$	0.6	0.9*	—	A/W
f_C	Cut off frequency	$V_R=10V, \lambda=1.3\mu m, R_L=50\Omega, -3dB$	1.0	—	—	GHz
t_r, t_f	Rise and fall time	$V_R=10V, \lambda=1.3\mu m, R_L=50\Omega$	—	0.3	—	ns

* Coupling response is typical 0.7 A/W to light output (GI 50/125) about PD7035.

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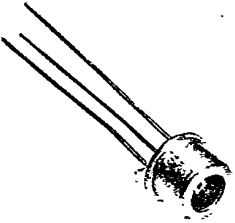
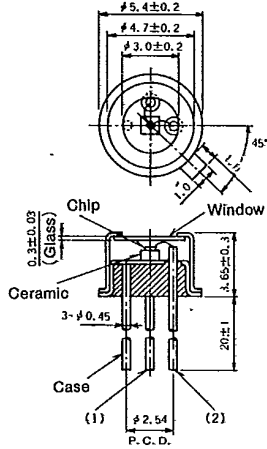

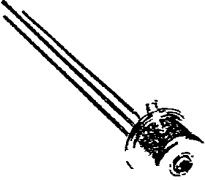
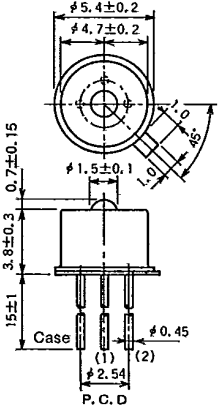


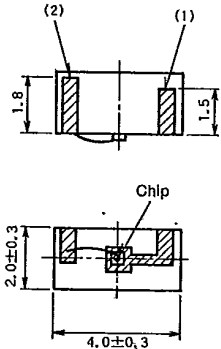

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OUTLINE DRAWINGS

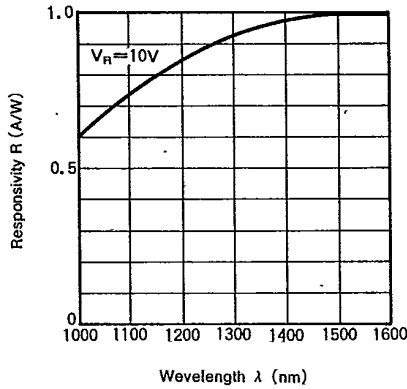
<p>PD7005</p> 	<p>Dimensions in mm</p> 	
<p>PD7035</p> 	<p>Dimensions in mm</p> 	
<p>PD7935</p> 	<p>Dimensions in mm</p> 	

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1 Spectral response

Typical spectral response at $V_R = 10V$ is shown in Fig. 1. The PD7XX5 are suitable for detection of the spectral region between 1000 and 1600nm. The responsivity increases regularly in this region and decreases abruptly above 1600nm. At a wavelength of 1300nm, the responsivity is typically about 0.9A/W.

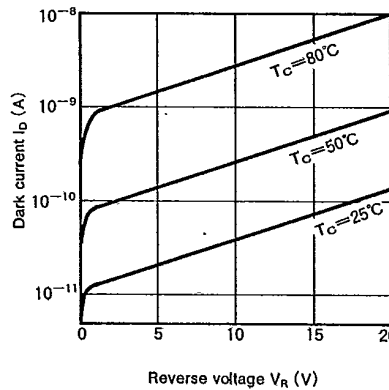
Fig. 1 Spectral response



2 Dark current

Typical dark current vs. reverse bias characteristics are shown in Fig. 2. The dark current at $V_R = 10V$, $T_C = 25^\circ C$ is typically 50pA.

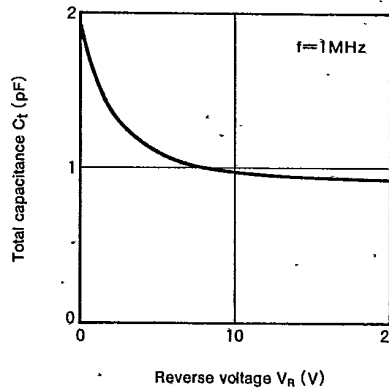
Fig. 2 Dark current vs. reverse voltage at case temperatures of 25, 50 and 80°C



3 Total capacitance

Typical capacitance vs. reverse bias characteristics are shown in Fig. 3. The test frequency is 1MHz. The total capacitance is typically 1pF at $V_R = 10V$.

Fig. 3 Total capacitance vs. reverse voltage at frequency of 1MHz



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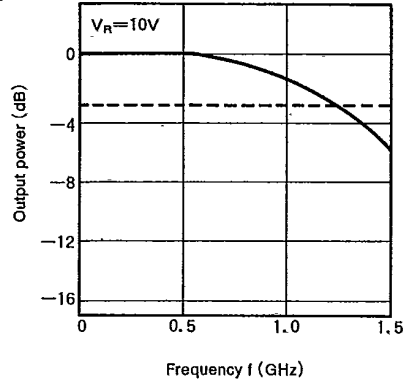
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4 Frequency response

Typical frequency response is shown in Fig. 4. The ML7XX1 (wavelength : 1300nm) are used as light sources and the PD7XX5 are biased at 10V. The cut off frequency (-3dB) is higher than 1GHz.

Fig. 4 Frequency response



5 Pulse response

Typical pulse response at V_R=10V is shown in Fig. 5. The ML7XX1 series (wavelength : 1300nm, rise/fall time : 0.3ns) are used as light sources. Rise and fall times of about 0.3ns are typically obtained.

Fig. 5 Pulse response

