MITSUBISHI InGaAs PHOTODIODES

PD8XX1 SERIES

FOR OPTICAL COMMUNICATION

T-41-07

TYPE NAME **PD8001, PD8931**

DESCRIPTION

The PD8XX1 series are InGaAs avalanche photodiodes designed to operate in the wavelength range of 1.0～1.6μm. They provide low noise performance, low dark current, and high quantum efficiency compared with germanium avalanche photodiodes. They are well suited for wide-band and long distance fiber-optic communication systems with low transmission and low material dispersion in this wavelength range.

FEATURES

- High quantum effciency
- Very small dark current
- High speed response
- Convenient package for nongrounded operation
- Active diameter 80μm

APPLICATION

Fiber-optic communication systems.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
I_R	Reverse current	500	μA
I_F	Forward current	2	mA
T_C	Case temperature	−30～+80	℃
Tstg	Storage temperature	−40～+100	℃

ELECTRICAL/OPTICAL CHARACTERISTICS (T_C=25℃)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)R}$	Breakdown voltage	I_D=100μA	—	70	—	V
C_t	Total capacitance	V_R=0.9$V_{(BR)R}$, f=1MHz	—	0.8	—	pF
I_D	Dark current	V_R=0.9$V_{(BR)R}$	—	—	100	nA
η	Quatum efficiency	M=1, λ=1300nm	—	80	—	%
f_C	Cut off frequency	M=10, R_L=50Ω, −3dB	1.0	—	—	GHz
F	Excess noise figure	M=10	—	$M^{0.7}$	—	—

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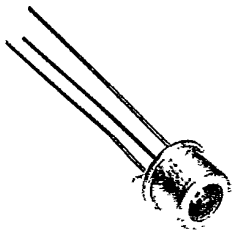
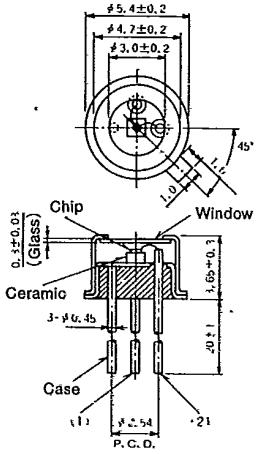
OUTLINE DRAWINGS

PD8001

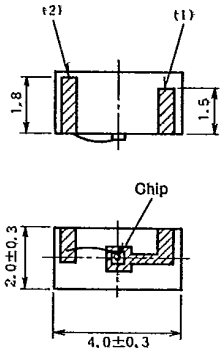


Dimensions in mm



PD8931

Dimensions in mm



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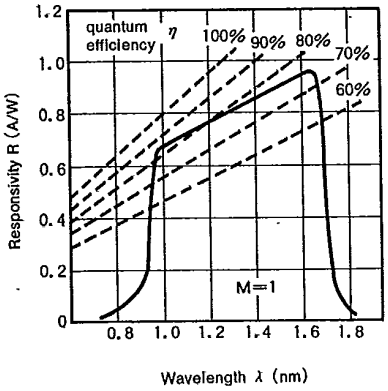
1 Spectral response

Fig. 1 shows typical spectral response for the PD8XX1 series. Dashed line shows quantum efficiency. The PD8XX1 are suitable for detection of the spectral 1000 ~ 1600nm range. In this range, typical quantum efficiency is 80%.

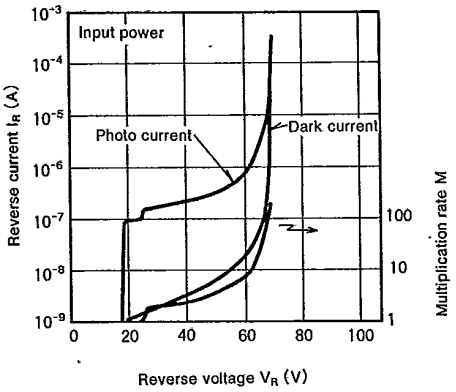
Fig. 1 Spectral response



2 Multiplication characteristics

Fig. 2 shows typical dark current, photocurrent and multiplication rate vs. reverse voltage for the PD8XX1 series. The dark current is 10nA typ. and multiplication rate is 10 typ. under $V_R=0.9V_{(BR)R}$.

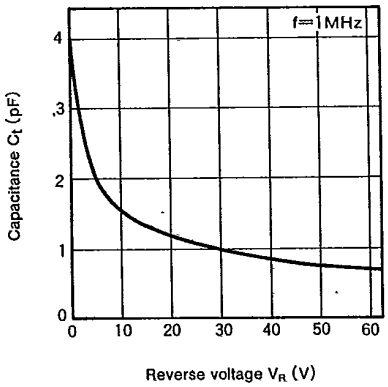
Fig. 2 Dark current, photocurrent and multiplication rate vs. reverse voltage



3 Capacitance vs. reverse voltage

Fig. 3 shows typical capacitance vs. reverse voltage for the PD8XX1 series.
The total capacitance is typically 1pF at $V_R=0.9V_{(BR)R}$.

Fig. 3 Capacitance vs. reverse voltage



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4 Noise charactaeristics

Fig. 4 shows excess noise factor vs. multiplication rate at 1.3μm and 1.55μm wavelength range for the PD8XX1 series.

In general, excess noise factor F is approximated by expression M. x is called excess noise factor. X for the PD8XX1 series approximates to about 0.7.

Fig. 4 Excess noise factor vs. multiplication rate