

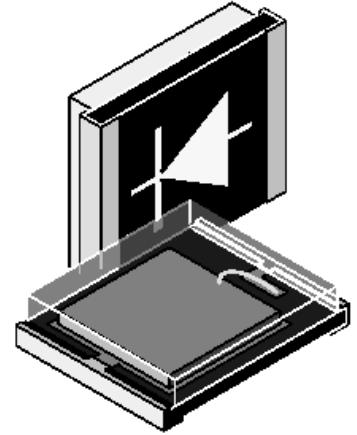
# SMPD5000

Silicon PIN Photodiode



## ❖ Description

SMPD5000 is a high speed and high sensitivity PIN photodiode in a miniature flat plastic package. Its top view construction makes it ideal as a low cost replacement of TO-5 devices in many applications. Due to its ultra clear epoxy the device is sensitive to visible and infrared radiation. The large active area combined with a flat case gives a high sensitivity at a wide viewing angle.



## ❖ Features

- Large radiant sensitive area ( $A=7.5 \text{ mm}^2$ )
- Wide angle of half sensitivity  $\varphi = \pm 65^\circ$
- High photo sensitivity
- Fast response times
- Small junction capacitance
- Suitable for visible and near infrared radiation

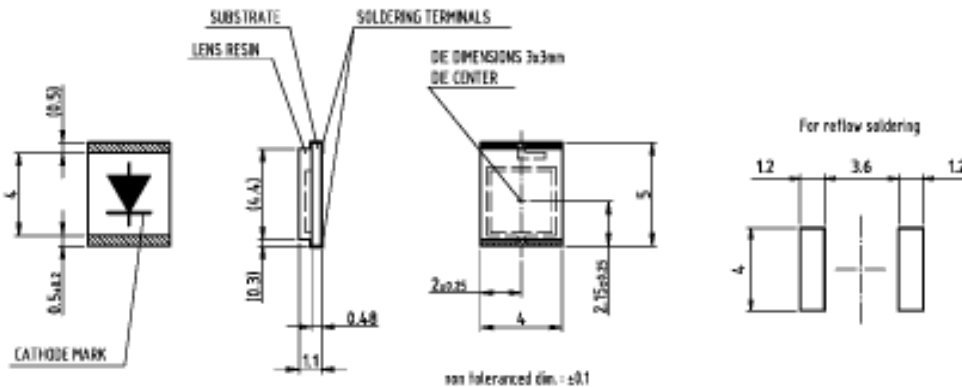
## ❖ Application

- |                           |                               |
|---------------------------|-------------------------------|
| High speed photo detector | Bar code scanners             |
| High speed photometry     | Pulse detectors               |
| Glucometers               | Optical remote/communications |

## ❖ Absolute Maximum Ratings

Parameter	Symbol	Condition	Value	Unit
Reverse Voltage	$V_R$		60	V
Power Dissipation	$P_V$	$T_{amb} \leq 25^\circ\text{C}$	215	mW
Junction Temperature	$T_j$		100	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$		-55 .. +100	$^\circ\text{C}$
Soldering Temperature	$T_{sd}$	$t \leq 3 \text{ s}$	260	$^\circ\text{C}$
Thermal Resistance Junction/Ambient	$R_{thJA}$		350	K/W

## ❖ Dimensions



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## ❖ Basic Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Breakdown Voltage	$V_{(BR)}$	$I_R = 100 \mu A, E = 0$	60	-		V
Reverse Dark Current	$I_{ro}$	$V_R = 10 V, E = 0$		2	30	nA
Diode Capacitance	$C_D$	$V_R = 0 V, f = 1 MHz, E = 0$		70		pF
		$V_R = 3 V, f = 1 MHz, E = 0$		25	40	
Open Circuit Voltage	$V_O$	$E_e = 1 mW/cm^2, \lambda = 950 nm$		350		mV
Temp. Coefficient of $V_O$	$TK_{V_O}$	$E_e = 1 mW/cm^2, \lambda = 950 nm$		-2.6		mV/K
Short Circuit Current	$I_k$	$E_A = 1 klx$		70		$\mu A$
		$E_e = 1 mW/cm^2, \lambda = 950 nm$		50		
Temp. Coefficient of $I_k$	$TK_{I_k}$	$E_e = 1 mW/cm^2, \lambda = 950 nm$		0.1		%/K
Reverse Light Current	$I_{ra}$	$E_A = 1 klx, V_R = 5 V$		75		$\mu A$
		$E_e = 1 mW/cm^2, \lambda = 950 nm, V_R = 5 V$	40	55		
Angle of Half Sensitivity	$\varphi$			$\pm 65$		deg
Wavelength of Peak Sensitivity	$\lambda_p$			900		nm
Range of Spectral Bandwidth	$\lambda_{0.5}$			600 .. 1050		nm
Noise Equivalent Power	NEP	$V_R = 10 V, \lambda = 950 nm$		$4 \times 10^{-14}$		$W / \sqrt{Hz}$
Rise Time	$t_r$	$V_R = 10 V, R_L = 1 k\Omega, \lambda = 820 nm$		100		ns
Fall Time	$t_f$	$V_R = 10 V, R_L = 1 k\Omega, \lambda = 820 nm$		100		ns

## ❖ Typical Characteristics

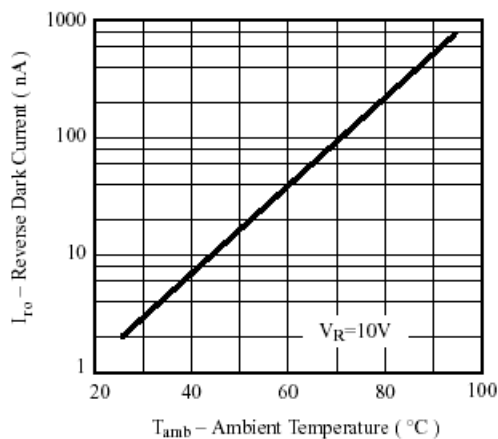


Fig. 1. Reverse Light Current vs. Ambient Temperature

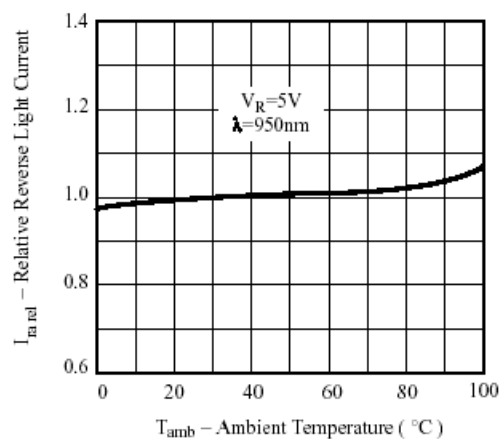


Fig. 2. Relative Reverse Light Current vs. Ambient Temperature

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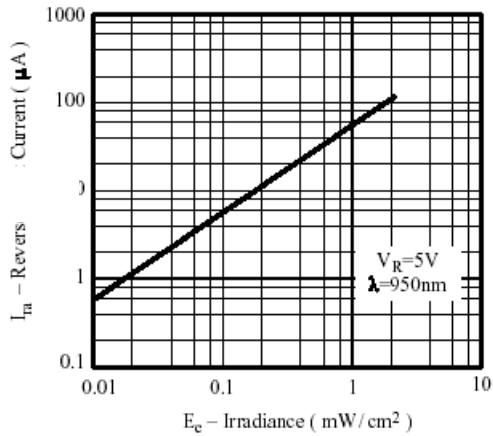


Fig. 3. Reverse Light Current vs. Irradiance

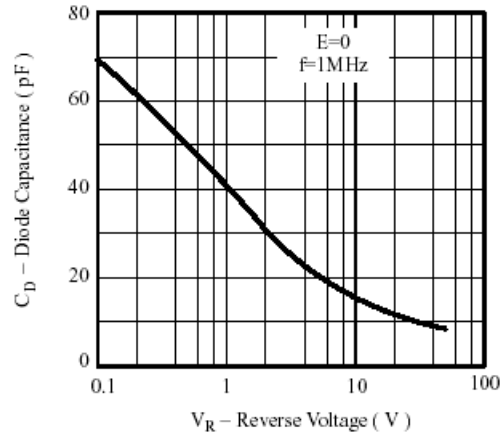


Fig. 4. Diode Capacitance vs. Reverse Voltage

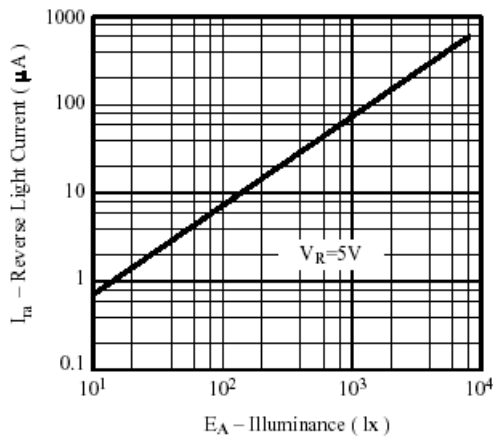


Fig. 5. Reverse Light Current vs. Illuminance

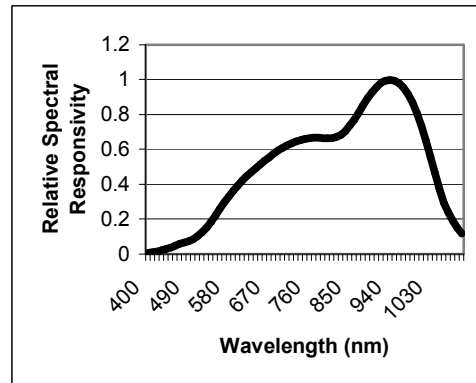


Fig. 6. Relative Spectral Sensitivity vs. Wavelength

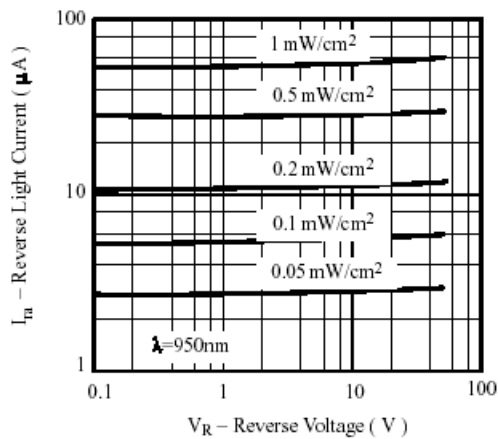


Fig. 7. Reverse Light Current vs. Reverse Voltage

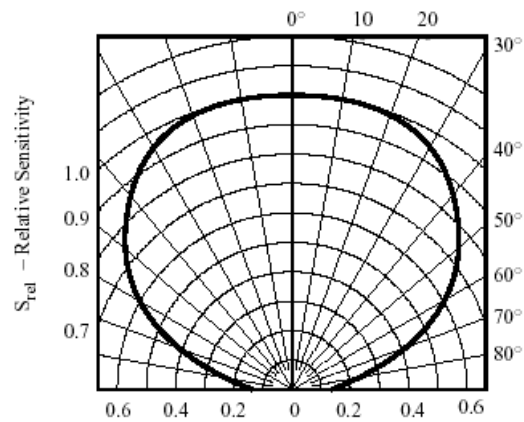


Fig. 8. Relative Radiant Sensitivity vs. Angular Displacement