

## Silicon PIN Photodiode



### FEATURES

- Package type: surface mount
- Package form: top view
- Dimensions (L x W x H in mm): 5 x 4.24 x 1.12
- Radiant sensitive area (in mm<sup>2</sup>): 7.7
- AEC-Q101 qualified
- Enhanced blue photo sensitivity: S (400 nm) rel > 30 %
- Peak sensitivity at 940 nm
- Suitable for visible and near infrared radiation
- Low junction capacitance
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

### DESCRIPTION

TEMD5080X01 is a PIN photodiode with enhanced blue sensitivity. The miniature surface mount package (SMD) include a chip with 7.7 mm<sup>2</sup> sensitive area, covered by clear epoxy.

### Note

\*\* Please see document "Vishay Material Category Policy":  
[www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

- High speed photo detector

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
TEMD5080X01	60	$\pm 65$	350 to 1100

### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD5080X01	Tape and reel	MOQ: 1500 pcs, 1500 pcs/reel	Top view

### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	25	V
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_V$	215	mW
Junction temperature		$T_j$	100	$^\circ C$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^\circ C$
Storage temperature range		$T_{stg}$	- 40 to + 110	$^\circ C$
Soldering temperature	Acc. reflow solder profile fig. 8	$T_{sd}$	260	$^\circ C$
Thermal resistance junction/ambient		$R_{thJA}$	350	K/W

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$		1	1.3	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	25			V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$		2	10	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$		90		pF
	$V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$		30	40	pF
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_o$		350		mV
Temperature coefficient of $V_o$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{V_o}$		-2.6		mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_k$		50		$\mu\text{A}$
Temperature coefficient of $I_k$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{I_k}$		0.1		%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 400\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$		18		$\mu\text{A}$
	$E_v = 100\text{ lx}$ , CIE illuminant A, $V_R = 5\text{ V}$	$I_{ra}$		8.5		$\mu\text{A}$
	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$		60		$\mu\text{A}$
Temperature coefficient of $I_{ra}$	CIE illuminant A	$TK_{I_{ra}}$		0.15		%/K
	$\lambda = 950\text{ nm}$	$TK_{I_{ra}}$		0.1		%/K
Angle of half sensitivity		$\varphi$		$\pm 65$		deg
Wavelength of peak sensitivity		$\lambda_p$		940		nm
Range of spectral bandwidth		$\lambda_{0.1}$		350 to 1100		nm
Noise equivalent power	$V_R = 10\text{ V}$ , $\lambda = 400\text{ nm}$	NEP		$1.1 \times 10^{-13}$		$\text{W}/\sqrt{\text{Hz}}$
Rise time	$V_R = 5\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 850\text{ nm}$	$t_r$		40		ns
Fall time	$V_R = 5\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 850\text{ nm}$	$t_f$		40		ns

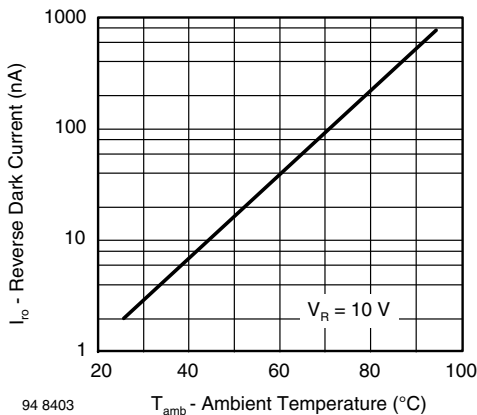
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

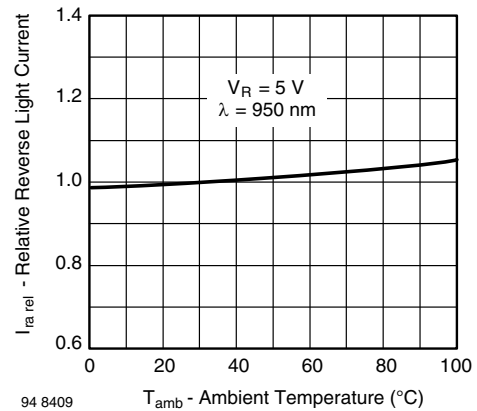


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

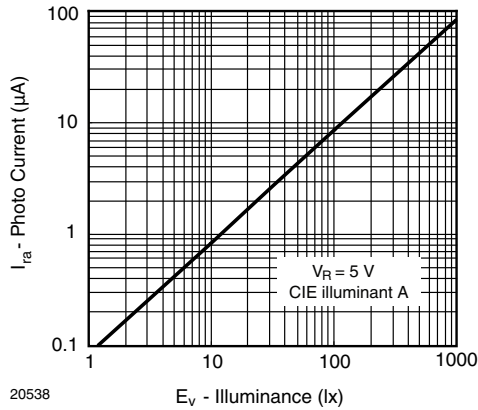


Fig. 3 - Reverse Light Current vs. Irradiance

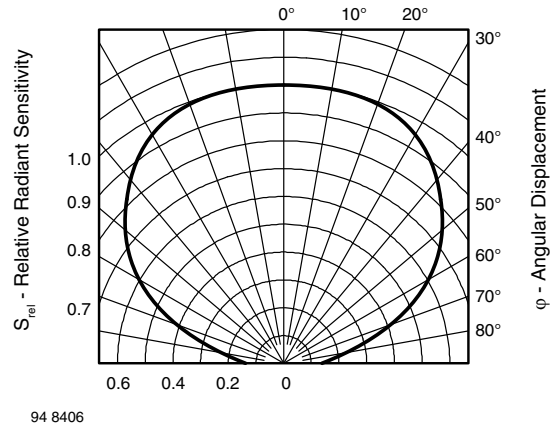


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

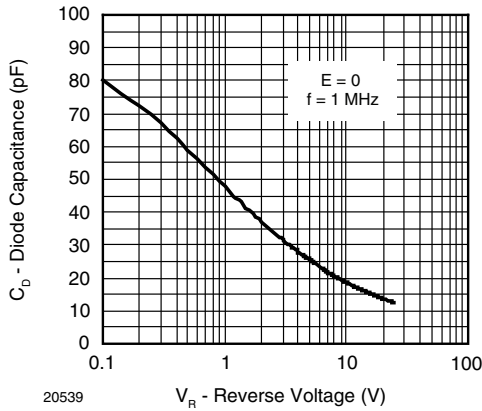


Fig. 4 - Diode Capacitance vs. Reverse Voltage

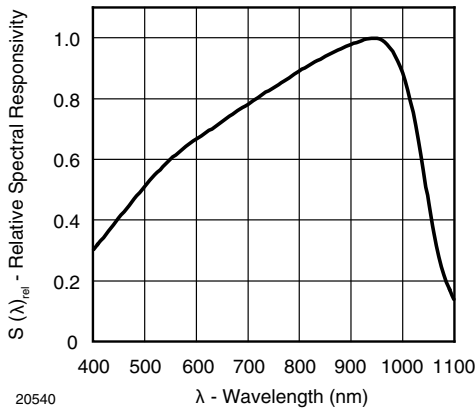
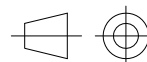
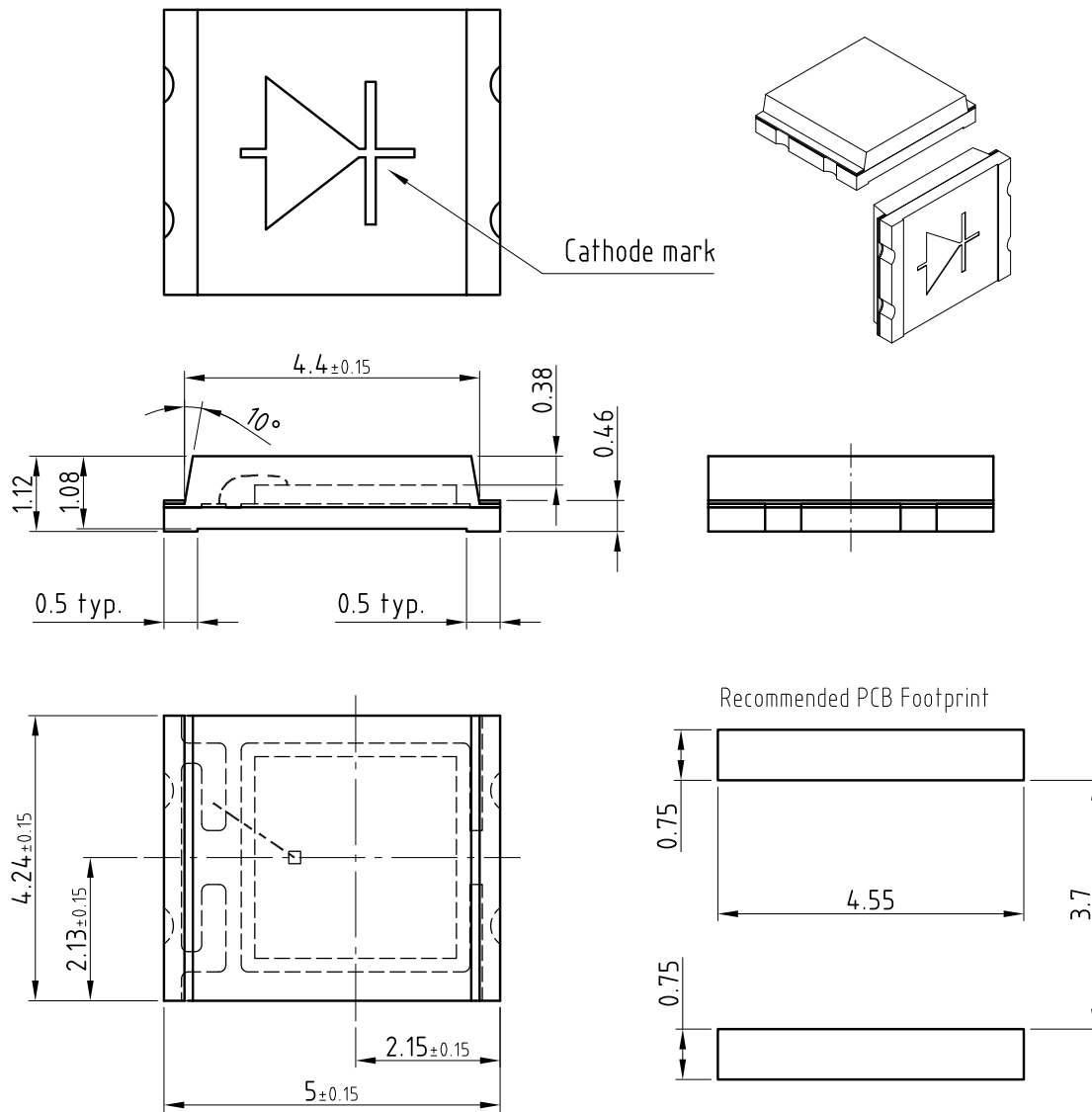


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength



### PACKAGE DIMENSIONS in millimeters



Technical drawings according to DIN specifications

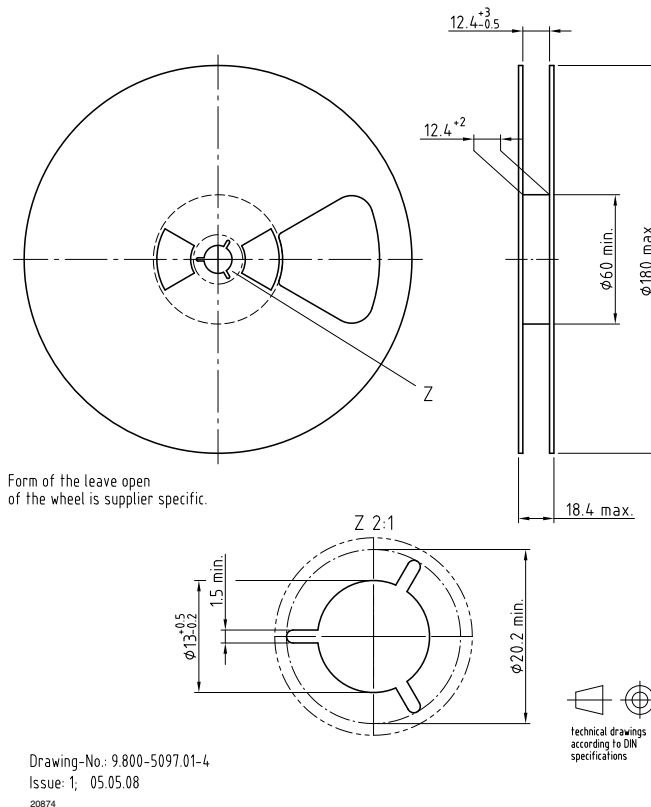
Drawing-No.: 6.541-5060.01-4  
Issue: 3; 05.02.08  
20536

Not indicated tolerances  $\pm 0.1$

**TAPING DIMENSIONS** in millimeters



**REEL DIMENSIONS** in millimeters



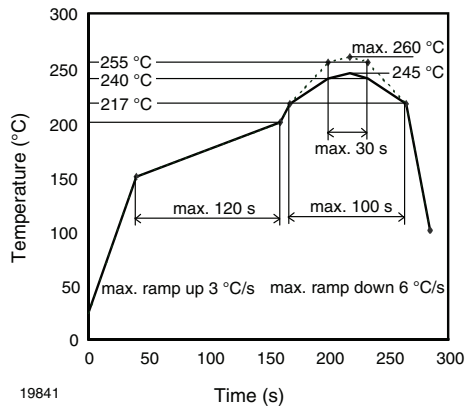
**SOLDER PROFILE**


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
acc. J-STD-020D

**DRYPACK**

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

**FLOOR LIFE**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 4

Floor life: 72 h

Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , RH < 60 %

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at  $40\text{ }^{\circ}\text{C}$  (+ 5  $^{\circ}\text{C}$ ), RH < 5 %

or

96 h at  $60\text{ }^{\circ}\text{C}$  (+ 5  $^{\circ}\text{C}$ ), RH < 5 %.



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