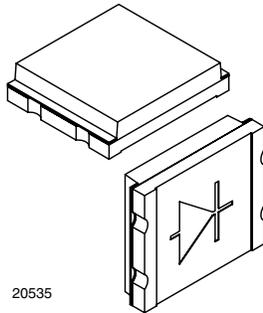


## Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released



20535

### DESCRIPTION

TEMD5020X01 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) including the chip with a 4.4 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation.

### 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>): 4.4
- AEC-Q101 qualified
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Lead (Pb)-free component
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### APPLICATIONS

- High speed photo detectors

### PRODUCT SUMMARY

COMPONENT	I <sub>ra</sub> (μA)	φ (deg)	λ <sub>0.1</sub> (nm)
TEMD5020X01	35	± 65	430 to 1100

#### Note

Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD5020X01	Tape and reel	MOQ: 1500 pcs, 1500 pcs/reel	Top view

#### Note

MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	60	V
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	215	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 110	°C
Soldering temperature	Acc. reflow solder profile fig. 8	T <sub>sd</sub>	260	°C
Thermal resistance junction/ambient	Soldered on PCB with pad dimensions: 4 mm x 4 mm	R <sub>thJA</sub>	350	K/W

#### Note

T<sub>amb</sub> = 25 °C, unless otherwise specified

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$		1	1.3	V
Breakdown voltage	$I_R = 100 \text{ }\mu\text{A}, E = 0$	$V_{(BR)}$	60			V
Reverse dark current	$V_R = 10 \text{ V}, E = 0$	$I_{ro}$		2	30	nA
Diode capacitance	$V_R = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	$C_D$		48		pF
	$V_R = 3 \text{ V}, f = 1 \text{ MHz}, E = 0$	$C_D$		17	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	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$	$I_k$		32		$\mu\text{A}$
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	$E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_R = 5 \text{ V}$	$I_{ra}$	25	35		$\mu\text{A}$
Angle of half sensitivity		$\phi$		$\pm 65$		deg
Wavelength of peak sensitivity		$\lambda_p$		900		nm
Range of spectral bandwidth		$\lambda_{0.1}$		430 to 1100		nm
Noise equivalent power	$V_R = 10 \text{ V}, \lambda = 950 \text{ nm}$	NEP		$4 \times 10^{-14}$		$\text{W}/\sqrt{\text{Hz}}$
Rise time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	$t_r$		100		ns
Fall time	$V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	$t_f$		100		ns

**Note**

$T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

**BASIC CHARACTERISTICS**

$T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

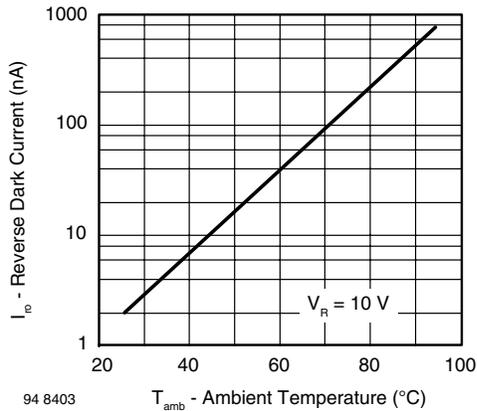


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

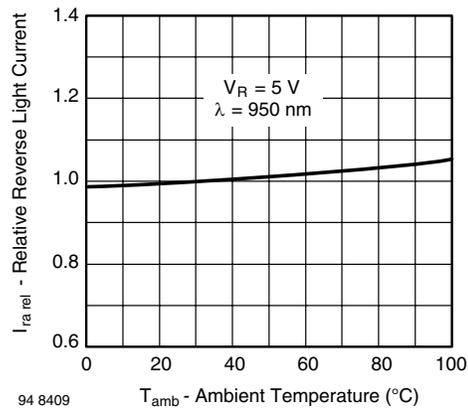


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

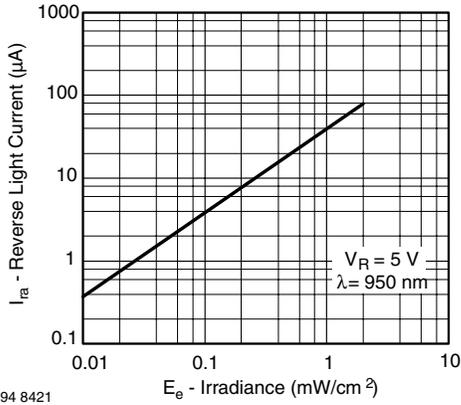


Fig. 3 - Reverse Light Current vs. Irradiance

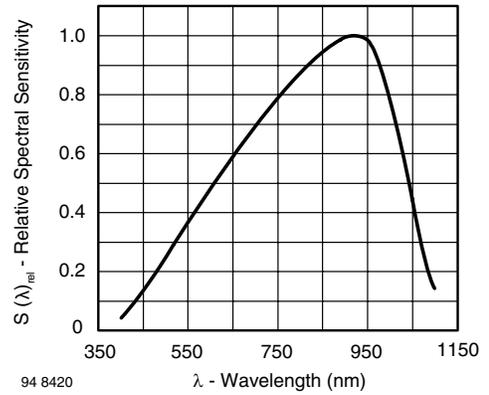


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

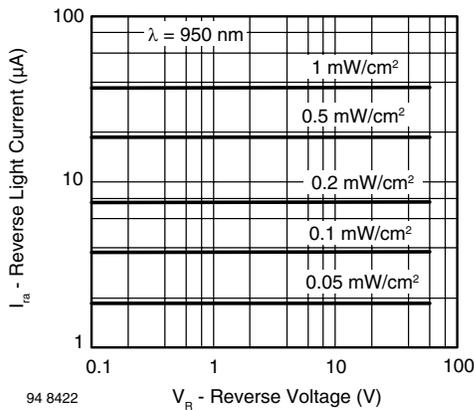


Fig. 4 - Reverse Light Current vs. Reverse Voltage

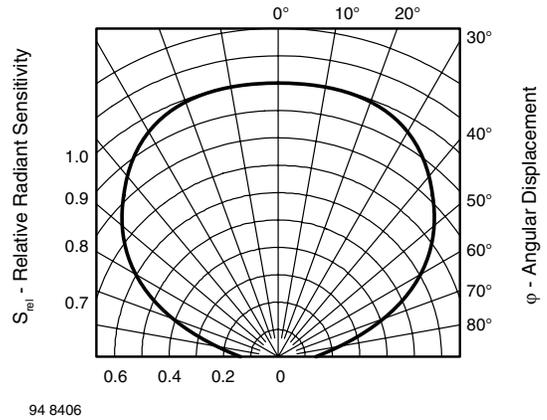


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

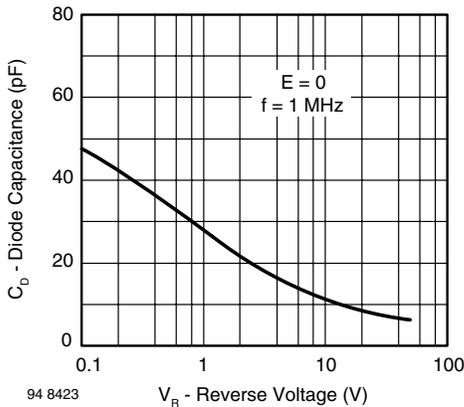


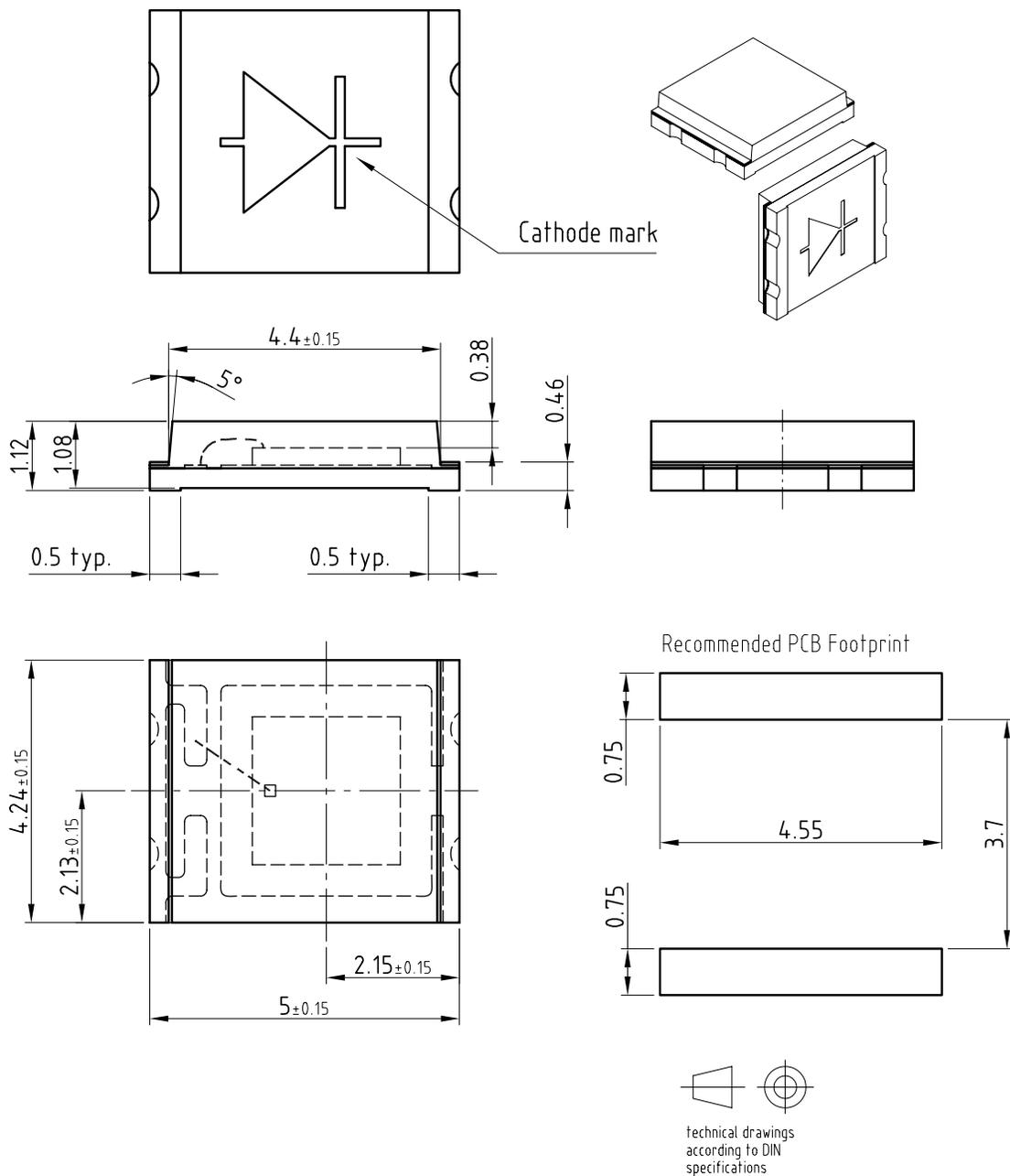
Fig. 5 - Diode Capacitance vs. Reverse Voltage

# TEMD5020X01



Vishay Semiconductors Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released

## PACKAGE DIMENSIONS in millimeters

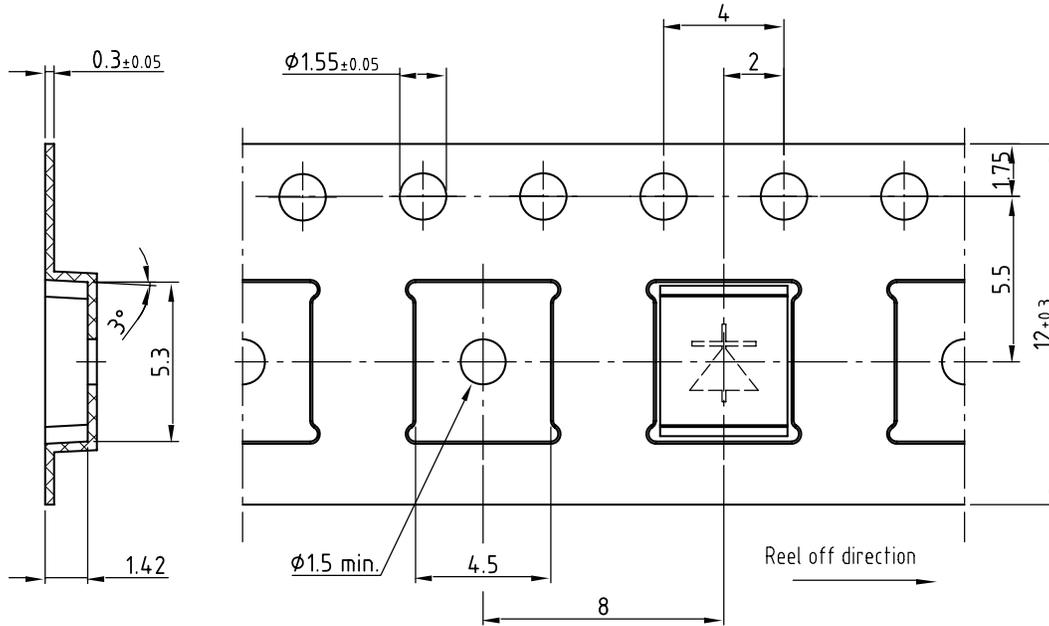


Drawing-No.: 6.541-5059.01-4  
Issue: 4; 26.04.07  
19280

Not indicated tolerances  $\pm 0.1$

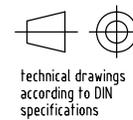


**TAPING DIMENSIONS** in millimeters

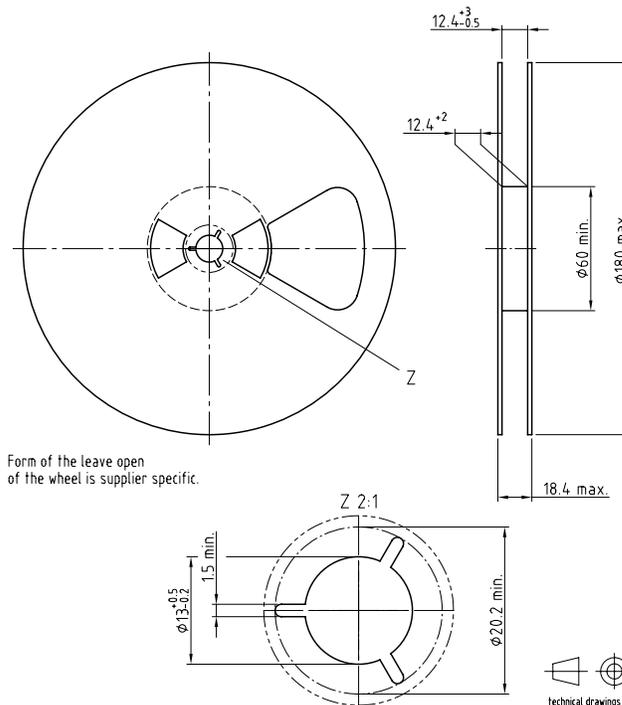


Drawing-No.: 9.700-5293.01-4  
Issue: 1; 03.12.04  
20537

Not indicated tolerances ±0.1



**REEL DIMENSIONS** in millimeters



Drawing-No.: 9.800-5097.01-4  
Issue: 1; 05.05.08  
20874



## SOLDER PROFILE

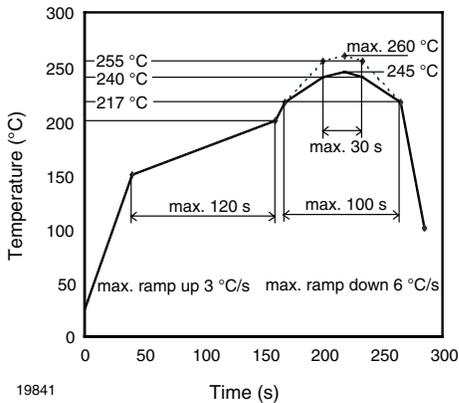


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

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

## 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  $^{\circ}\text{C}$ ),  $\text{RH} < 5\%$

or

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



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