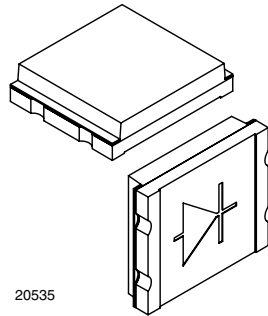


Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released



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 mm² 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 mm²): 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_{ra} (μA)	φ (deg)	$\lambda_{0.1}$ (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_R	60	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	Soldered on PCB with pad dimensions: 4 mm x 4 mm	R_{thJA}	350	K/W

Note

$T_{amb} = 25^\circ C$, 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		μA
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		μA
Angle of half sensitivity		ϕ		± 65		deg
Wavelength of peak sensitivity		λ_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		4×10^{-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

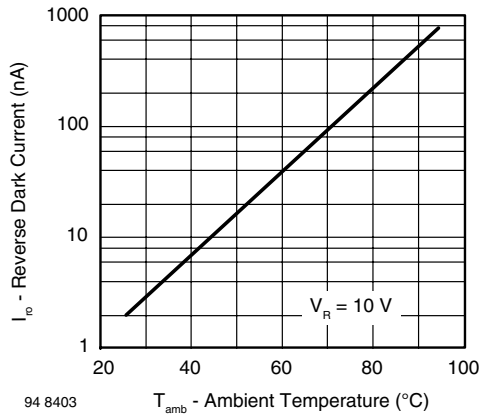


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

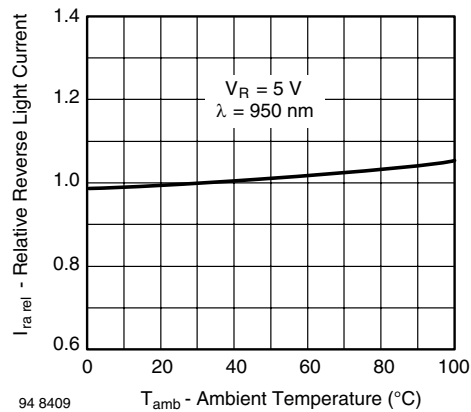


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

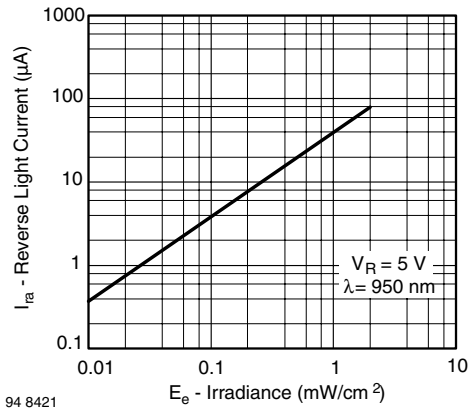


Fig. 3 - Reverse Light Current vs. Irradiance

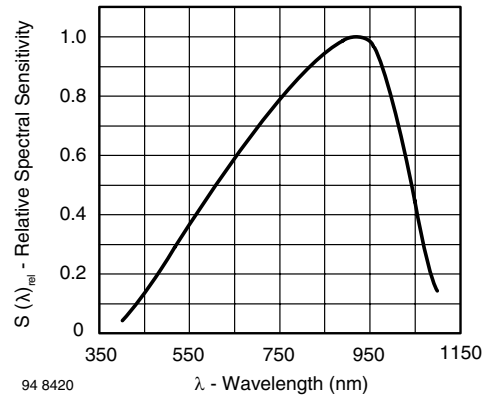


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

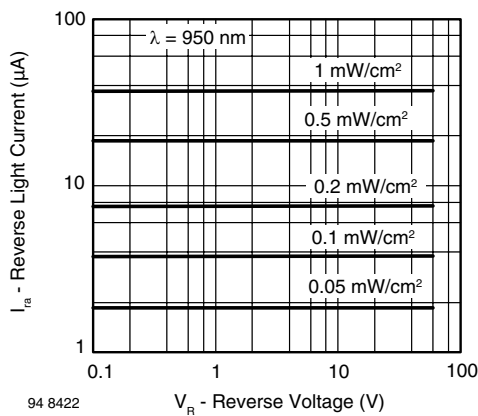


Fig. 4 - Reverse Light Current vs. Reverse Voltage

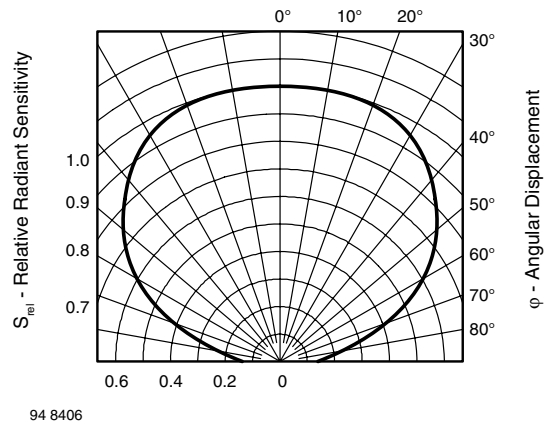


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

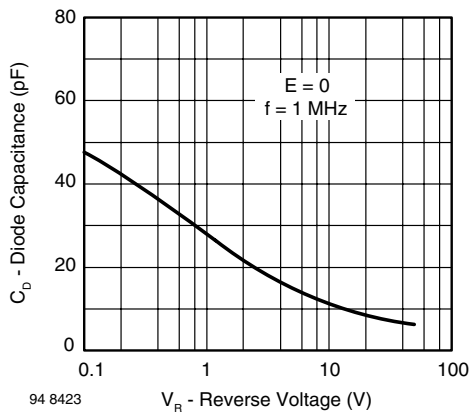


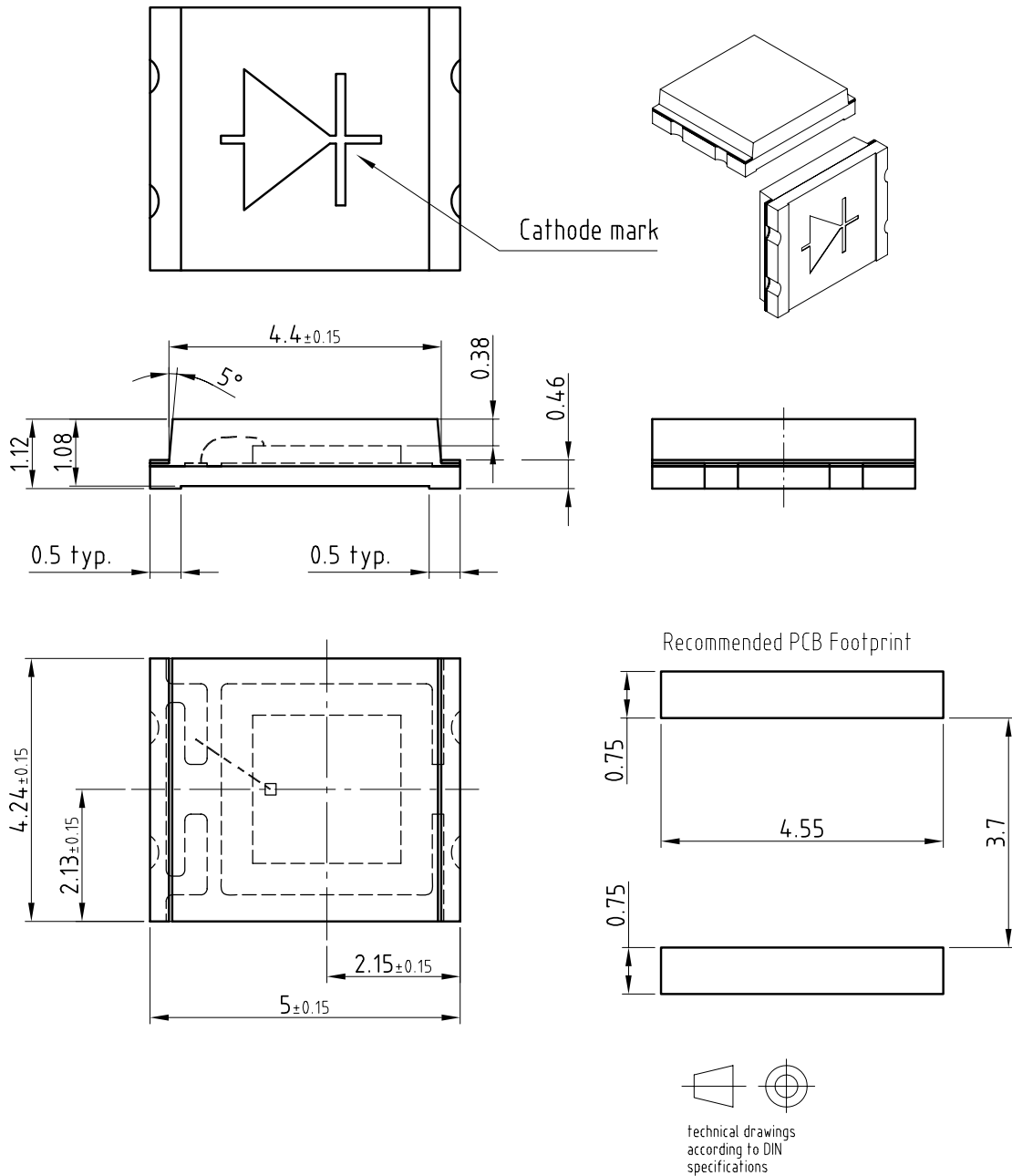
Fig. 5 - Diode Capacitance vs. Reverse Voltage

TEMD5020X01



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

PACKAGE DIMENSIONS in millimeters

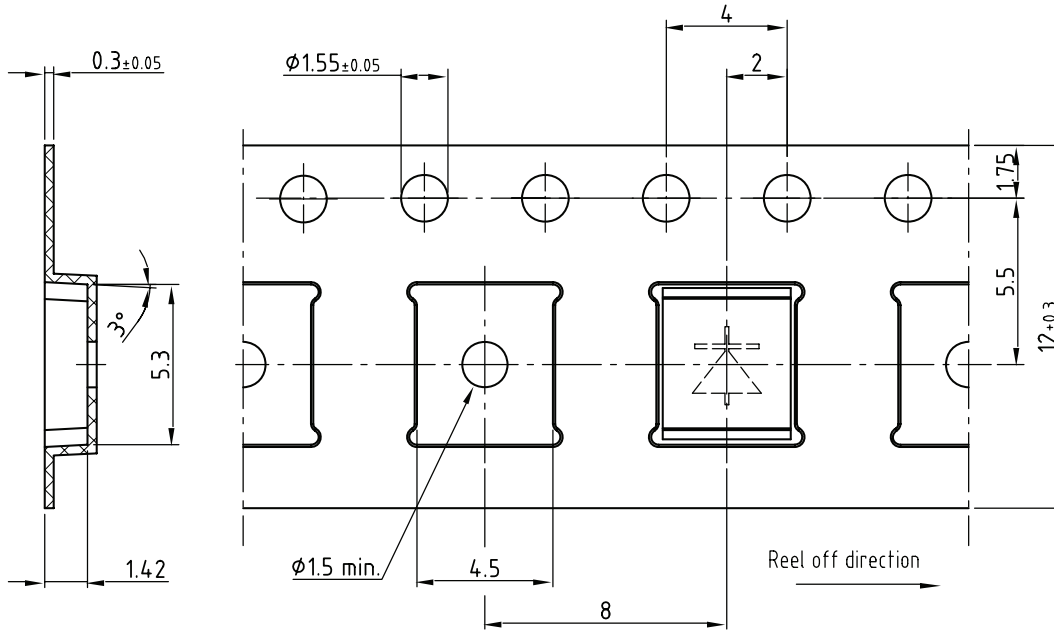


Drawing-No.: 6.541-5059.01-4
Issue: 4; 26.04.07
19280

Not indicated tolerances ± 0.1

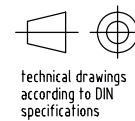


TAPING DIMENSIONS in millimeters

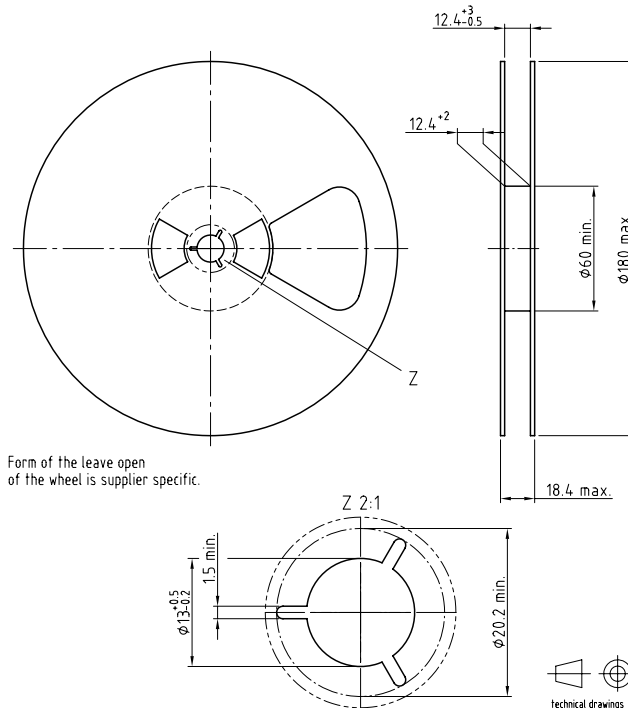


Drawing-No.: 9.700-5293.01-4
Issue: 1; 03.12.04
20537

Not indicated tolerances ±0.1



REEL DIMENSIONS in millimeters

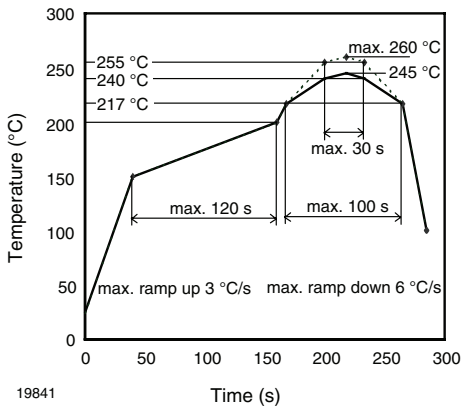


Form of the leave open of the wheel is supplier specific.

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



SOLDER PROFILE



19841

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: $T_{amb} < 30\text{ °C}$, $RH < 60\%$

DRYING

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

192 h at 40 °C (+ 5 °C), $RH < 5\%$

or

96 h at 60 °C (+ 5 °C), $RH < 5\%$.



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