

## Silicon PIN Photodiode



### DESCRIPTION

TEMD7100X01 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) including the chip with a 0.23 mm<sup>2</sup> sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength of 830 nm to 950 nm.

### FEATURES

- Package type: surface mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- Radiant sensitive area (in mm<sup>2</sup>): 0.23
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Find out more about Vishay's Automotive Grade Product requirements at: [www.vishay.com/applications](http://www.vishay.com/applications)


**RoHS**  
COMPLIANT


### APPLICATIONS

- High speed photo detector
- Infrared remote control
- Infrared data transmission
- Photo interrupters
- Shaft encoders

### PRODUCT SUMMARY

COMPONENT	$I_{ra}$ (μA)	$\varphi$ (deg)	$\lambda_{0.5}$ (nm)
TEMD7100X01	3	$\pm 60$	750 to 1050

#### Note

Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD7100X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

#### Note

MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	60	V
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	$P_V$	215	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	Acc. reflow solder profile fig. 8	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ambient	Acc. J-STD-051	$R_{thJA}$	270	K/W

#### Note

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

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$		1		V
Breakdown voltage	$I_R = 100 \text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	32			V
Reverse dark current	$V_R = 10 \text{ V}$ , $E = 0$	$I_{ro}$		1	10	nA
Diode capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$		4		pF
	$V_R = 5 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$	$C_D$		1.3		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	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_R = 5 \text{ V}$	$I_{ra}$		3		$\mu\text{A}$
Angle of half sensitivity		$\phi$		$\pm 60$		deg
Wavelength of peak sensitivity		$\lambda_p$		950		nm
Range of spectral bandwidth		$\lambda_{0.5}$		750 to 1050		nm
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

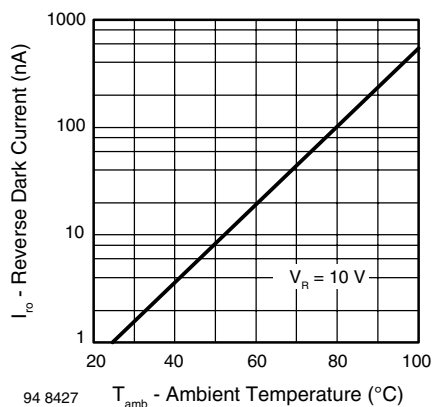


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

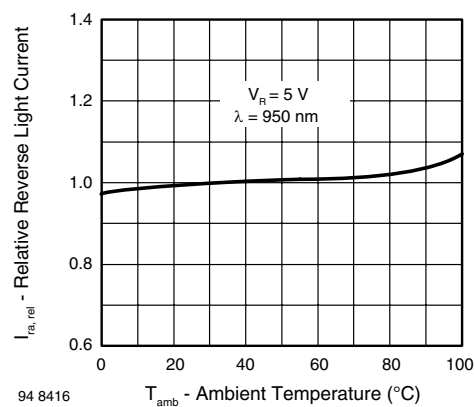


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

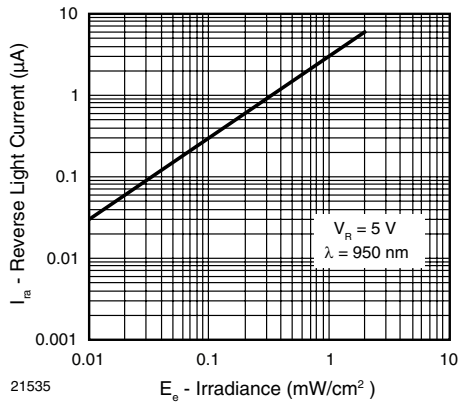


Fig. 3 - Reverse Light Current vs. Irradiance

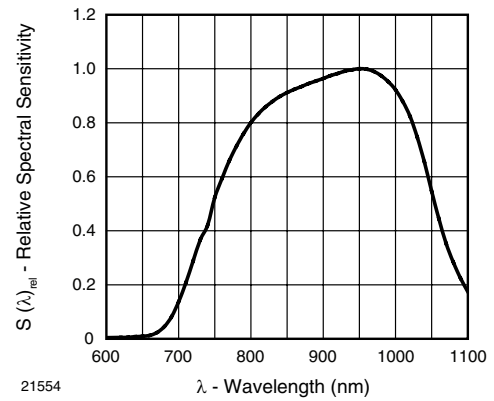


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

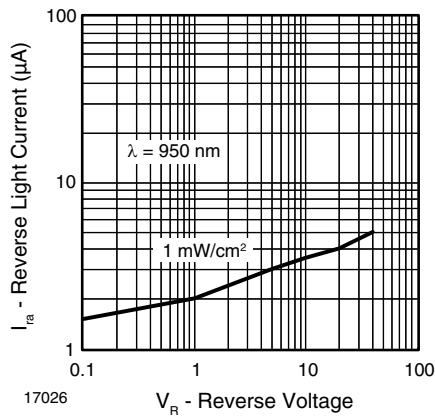


Fig. 4 - Reverse Light Current vs. Reverse Voltage

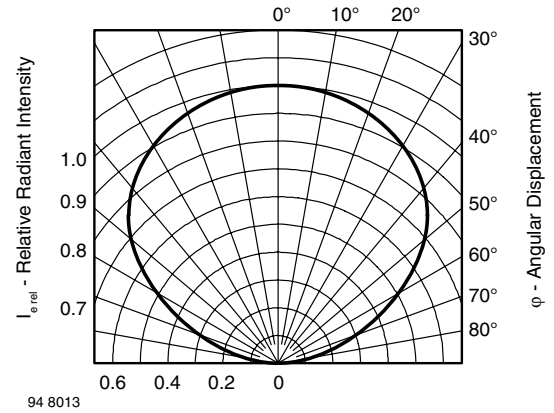


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

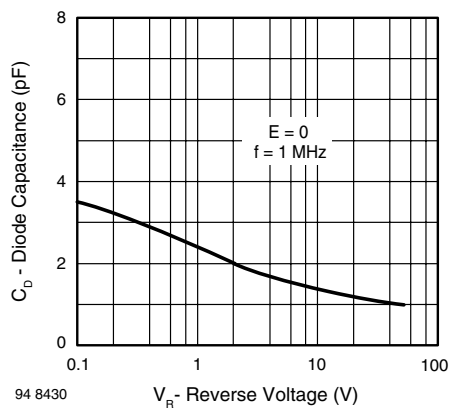


Fig. 5 - Diode Capacitance vs. Reverse Voltage

## REFLOW SOLDER PROFILE

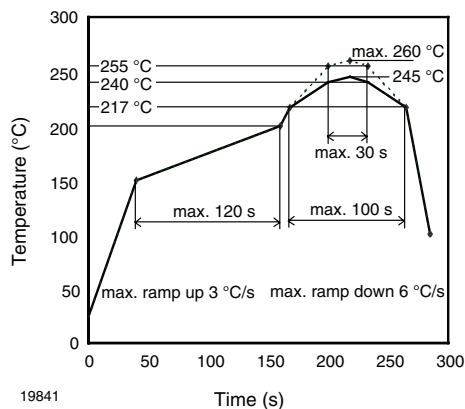


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

## 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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 168 h

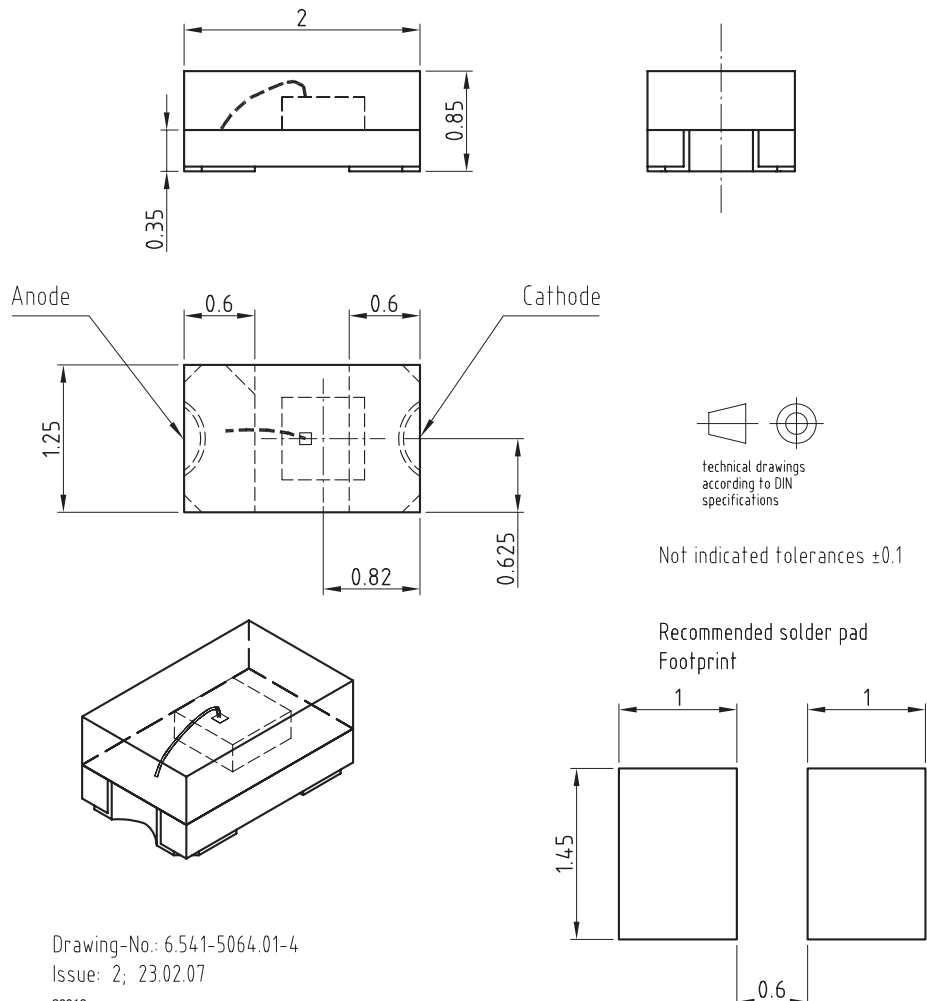
Conditions:  $T_{amb} < 30^{\circ}\text{C}$ ,  $RH < 60\%$

Moisture sensitivity level 3, acc. to J-STD-020.

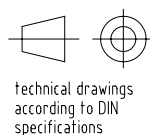
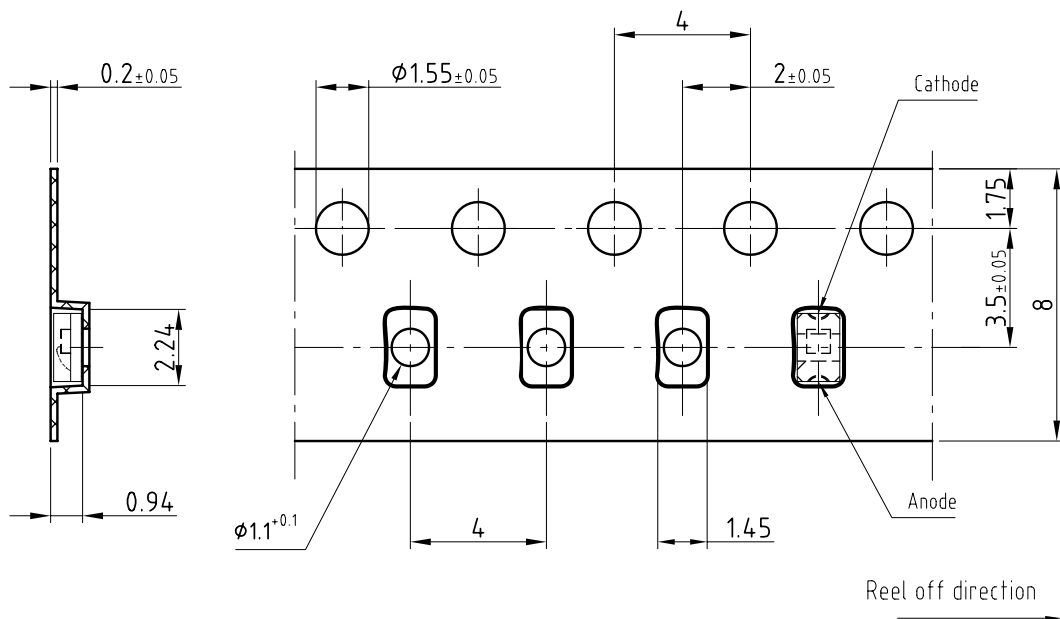
## DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40^{\circ}\text{C}$  ( $+ 5^{\circ}\text{C}$ ),  $RH < 5\%$ .

## PACKAGE DIMENSIONS in millimeters



**BLISTER TAPE DIMENSIONS** in millimeters



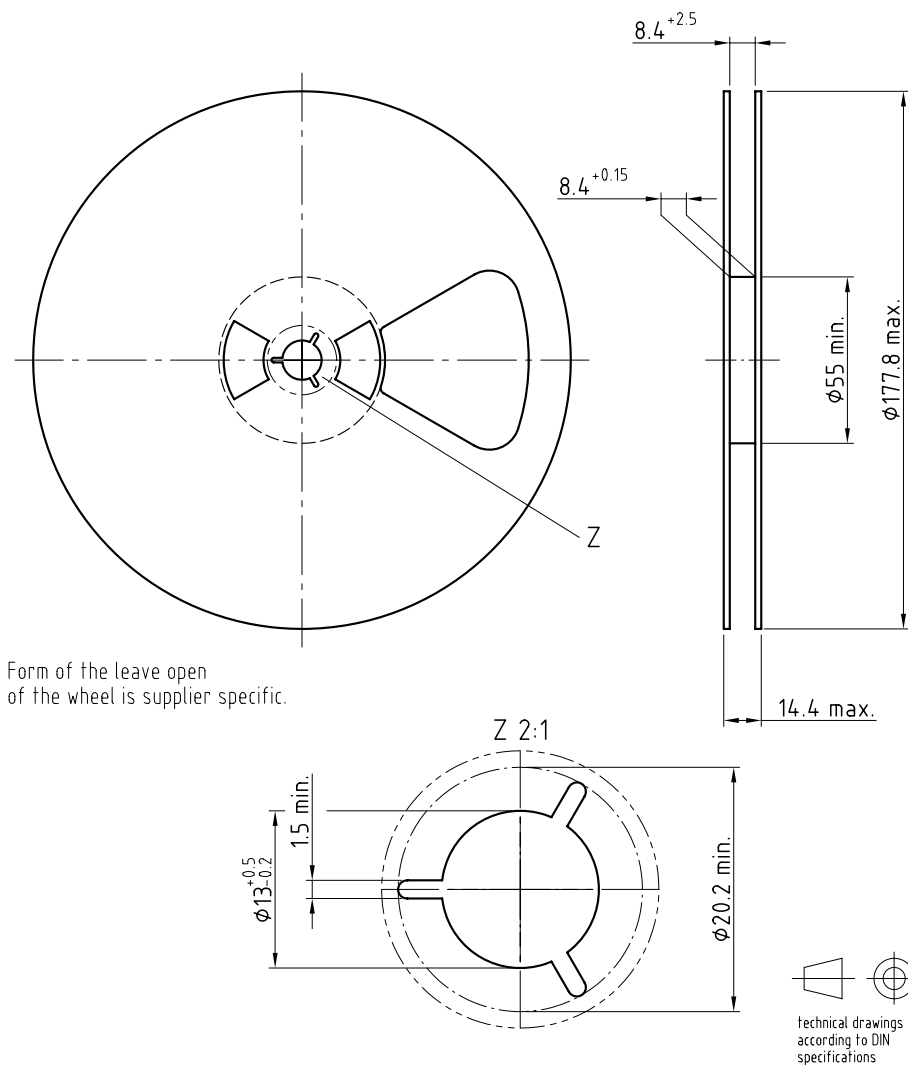
Drawing-No.: 9.700-5311.01-4

Issue: 1; 23.02.07

21501

Not indicated tolerances  $\pm 0.1$

## REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5096.01-4

Issue: 1; 05.05.08

20875



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