

## Silicon PIN Photodiode


 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### 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
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### DESCRIPTION

TEMD7000X01 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 detecting visible and near infrared radiation.

### APPLICATIONS

- High speed photo detector

| PRODUCT SUMMARY |                      |              |                      |
|-----------------|----------------------|--------------|----------------------|
| COMPONENT       | $I_{ra}$ ( $\mu A$ ) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
| TEMD7000X01     | 3                    | $\pm 60$     | 350 to 1120          |

#### Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |               |                              |              |
|----------------------|---------------|------------------------------|--------------|
| ORDERING CODE        | PACKAGING     | REMARKS                      | PACKAGE FORM |
| TEMD7000X01          | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805         |

#### Note

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified) |                                   |            |             |            |
|---|-----------------------------------|------------|-------------|------------|
| PARAMETER   | TEST CONDITION                    | SYMBOL     | VALUE       | UNIT       |
| Reverse voltage   |                                   | $V_R$      | 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 +100 | $^\circ C$ |
| Soldering temperature   | Acc. reflow solder profile fig. 8 | $T_{sd}$   | 260         | $^\circ C$ |
| Thermal resistance junction / ambient   | Acc. J-STD-051                    | $R_{thJA}$ | 270         | 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           |      | V             |
| Breakdown voltage   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                   | $V_{(BR)}$      | 60   |             |      | V             |
| Reverse dark current  | $V_R = 10\text{ V}$ , $E = 0$  | $I_{ro}$        |      | 1           | 3    | 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   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                       | $I_k$           |      | 3           |      | $\mu\text{A}$ |
| 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   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 2.4  | 3           | 3.6  | $\mu\text{A}$ |
| Angle of half sensitivity   |  | $\phi$          |      | $\pm 60$    |      | deg           |
| Wavelength of peak sensitivity  |  | $\lambda_p$     |      | 900         |      | nm            |
| Range of spectral bandwidth   |  | $\lambda_{0.1}$ |      | 350 to 1120 |      | 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            |

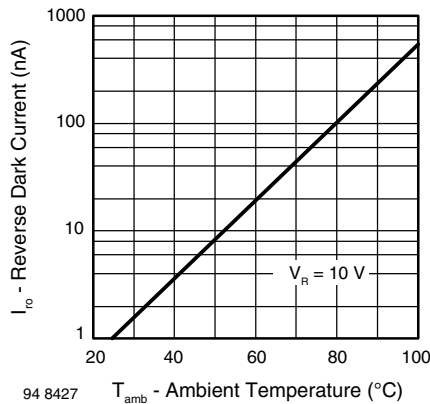
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

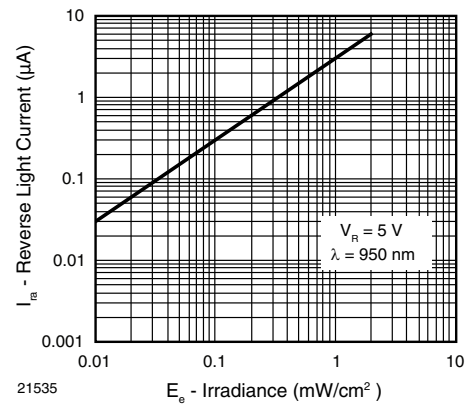


Fig. 3 - Reverse Light Current vs. Irradiance

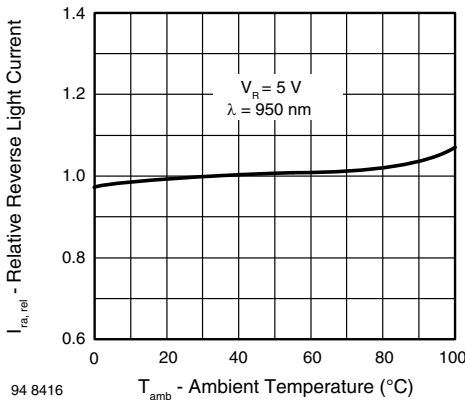


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

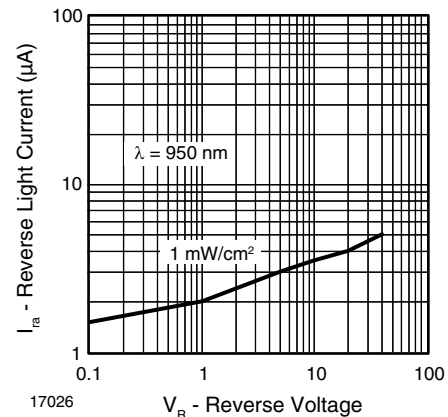


Fig. 4 - Reverse Light Current vs. Reverse Voltage

**REFLOW SOLDER PROFILE**

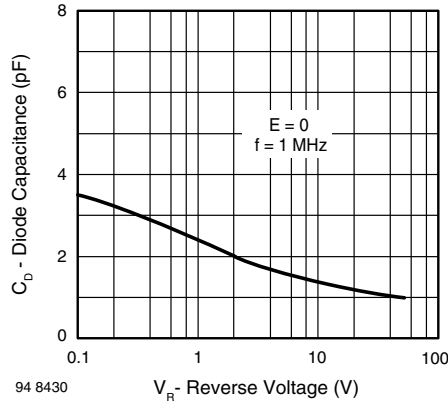


Fig. 5 - Diode Capacitance vs. Reverse Voltage

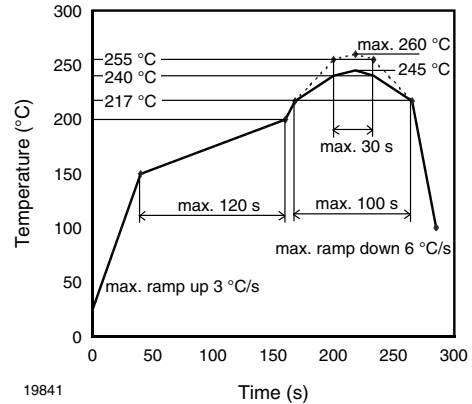


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

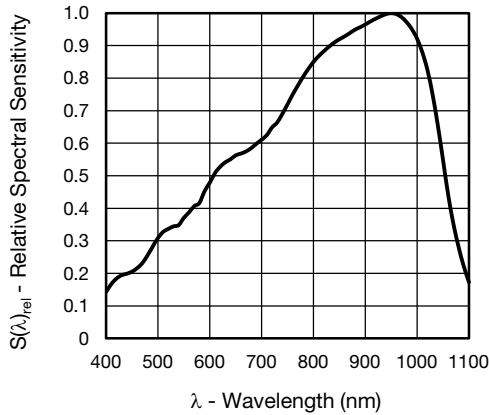


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

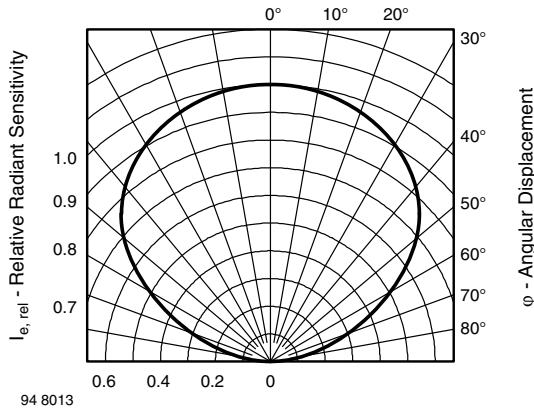


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

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

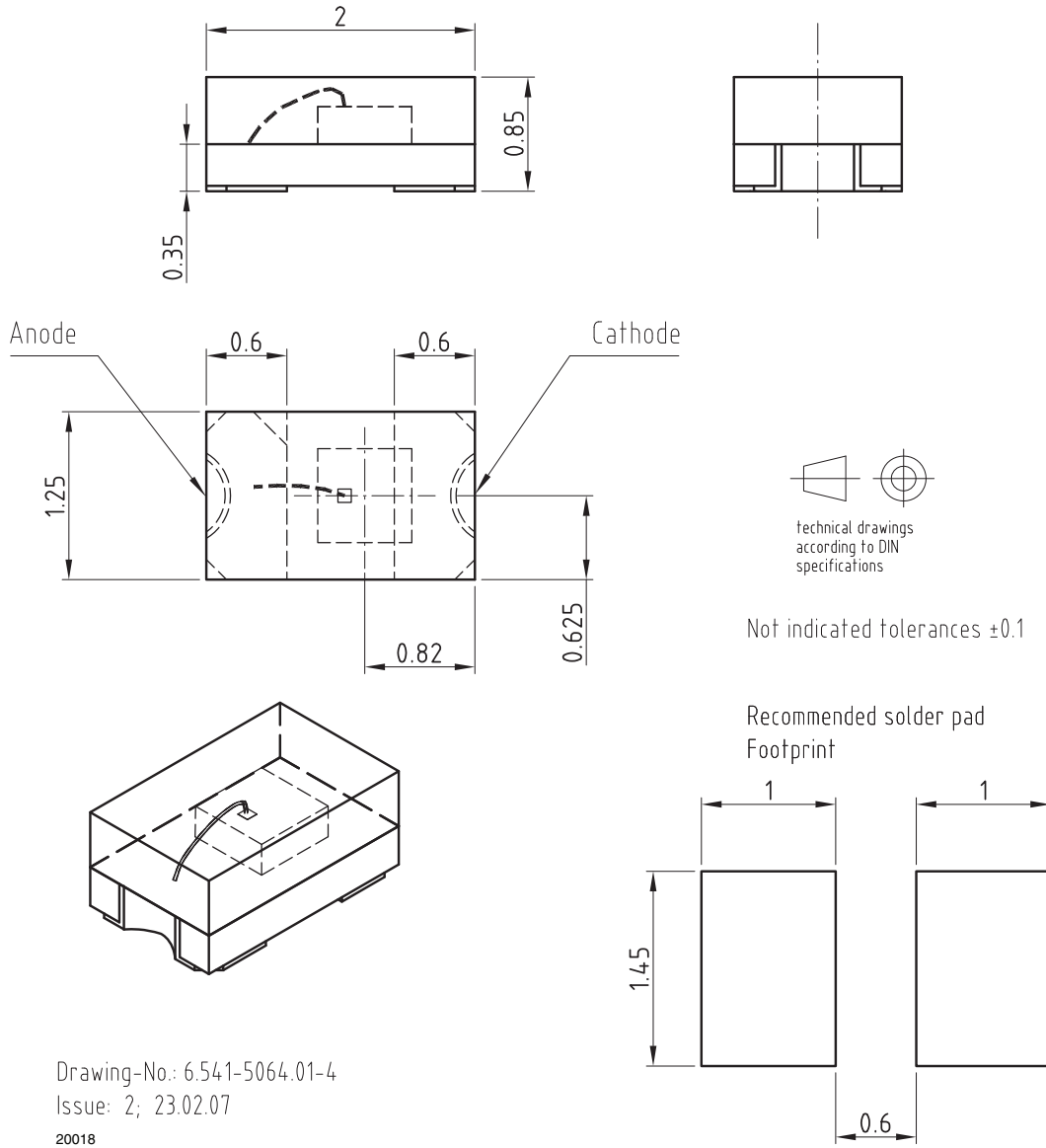
Moisture sensitivity level 3, according to J-STD-020.

**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  $40\text{ °C}$  (+  $5\text{ °C}$ ),  $RH < 5\%$ .



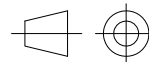
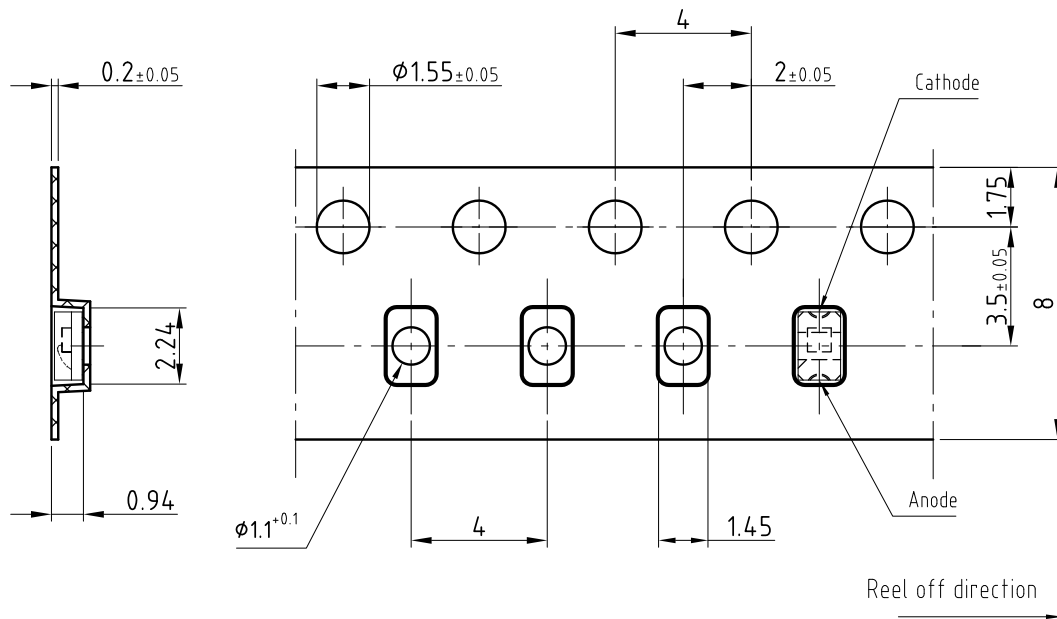
PACKAGE DIMENSIONS in millimeters



Drawing-No: 6.541-5064.01-4  
 Issue: 2; 23.02.07  
 20018



### BLISTER TAPE DIMENSIONS in millimeters



technical drawings according to DIN specifications

Not indicated tolerances ±0.1

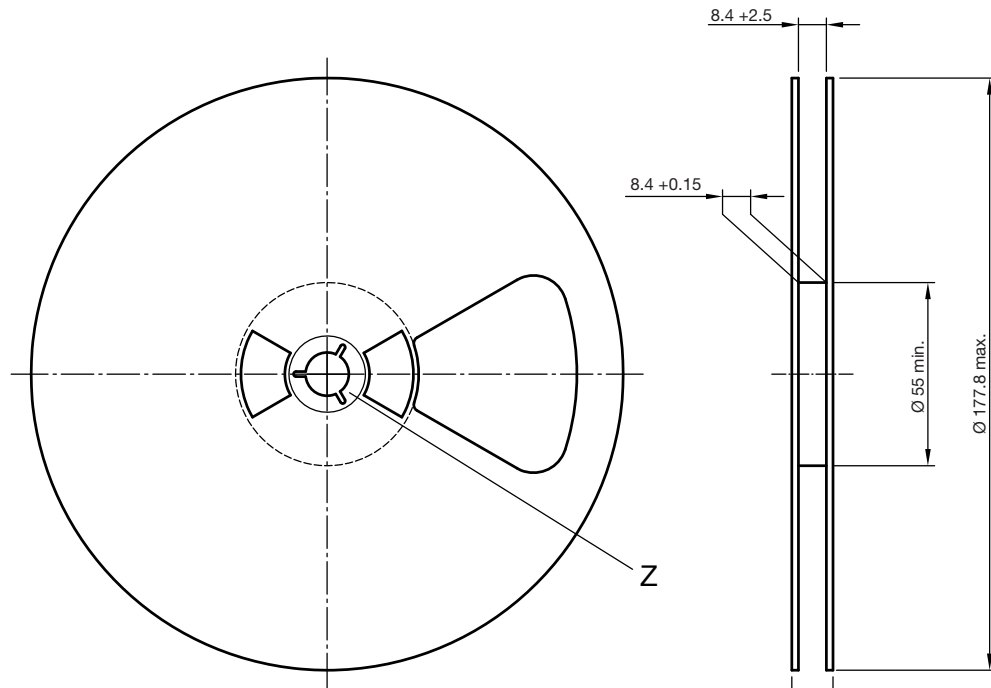
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Issue: 1; 23.02.07

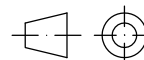
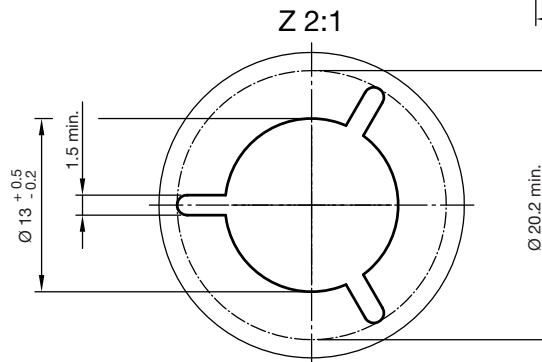
21501



REEL DIMENSIONS in millimeters



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



technical drawings according to DIN specifications

Drawing-No.: 9.800-5096.01-4  
Issue: 2; 26.04.10  
20875



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