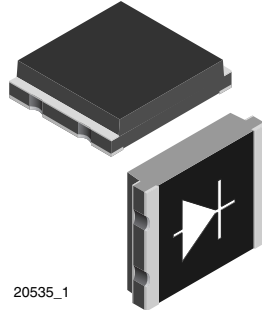


## Silicon PIN Photodiode



20535\_1

### DESCRIPTION

TEMD5110X01 is a high speed and high sensitive PIN photodiode. It is a miniature surface mount device (SMD) including the chip with a 7.5 mm<sup>2</sup> sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength 870 nm or 950 nm.

### 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>): 7.5
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 870 to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
**GREEN**  
(5-2009)\*\*

### Note

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

### APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmissionsystems, e.g. in combination with TSFFxxxx series IR emitters

### PRODUCT SUMMARY

| COMPONENT   | $I_{ra}$ ( $\mu$ A) | $\phi$ (deg) | $\lambda_{0.5}$ (nm) |
|-------------|---------------------|--------------|----------------------|
| TEMD5110X01 | 55                  | $\pm 65$     | 790 to 1050          |

### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| TEMD5110X01   | Tape and reel | MOQ: 1500 pcs, 1500 pcs/reel | Top view     |

### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| 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 + 110 | $^\circ\text{C}$ |
| Soldering temperature               | Acc. reflow solder profile fig. 8 | $T_{sd}$   | 260           | $^\circ\text{C}$ |
| 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   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                      | $V_{(BR)}$      | 60   |                     |      | V                           |
| Reverse dark current  | $V_R = 10\text{ V}$ , $E = 0$   | $I_{ro}$        |      | 2                   | 30   | nA                          |
| Diode capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                             | $C_D$           |      | 70                  |      | pF                          |
|   | $V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                             | $C_D$           |      | 25                  | 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   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$V_R = 5\text{ V}$  | $I_{ra}$        | 45   | 55                  |      | $\mu\text{A}$               |
| Angle of half sensitivity   |   | $\phi$          |      | $\pm 65$            |      | deg                         |
| Wavelength of peak sensitivity  |   | $\lambda_p$     |      | 940                 |      | nm                          |
| Range of spectral bandwidth   |   | $\lambda_{0.5}$ |      | 790 to 1050         |      | 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   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_r$           |      | 100                 |      | ns                          |
| Fall time   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_f$           |      | 100                 |      | ns                          |

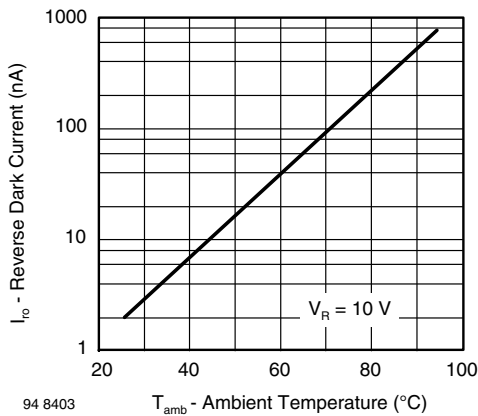
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

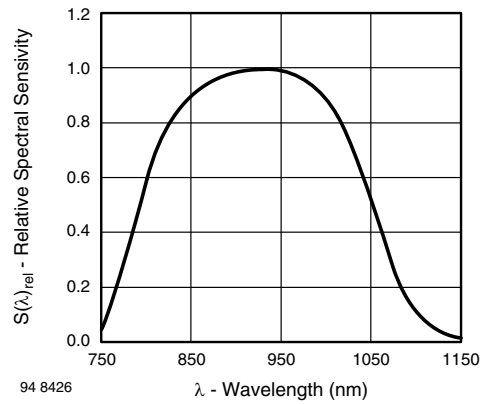


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature



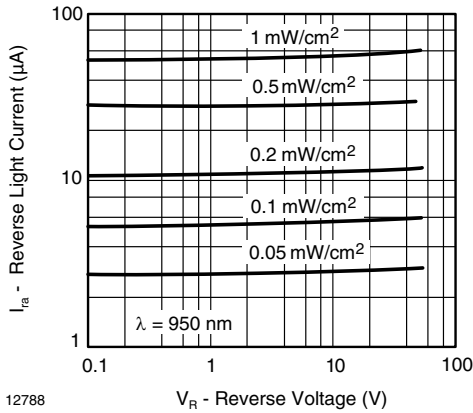
12787

Fig. 3 - Reverse Light Current vs. Irradiance



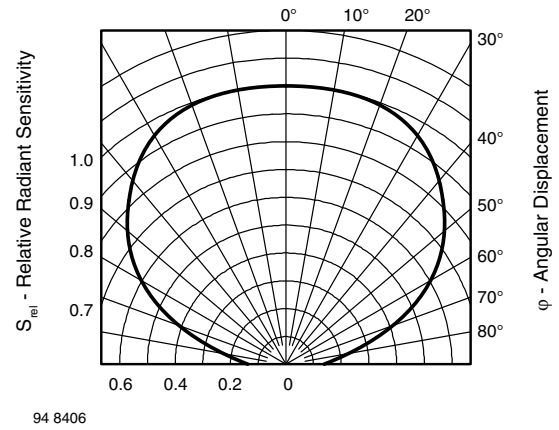
94 8426

Fig. 6 - Relative Spectral Sensitivity vs. Wavelength



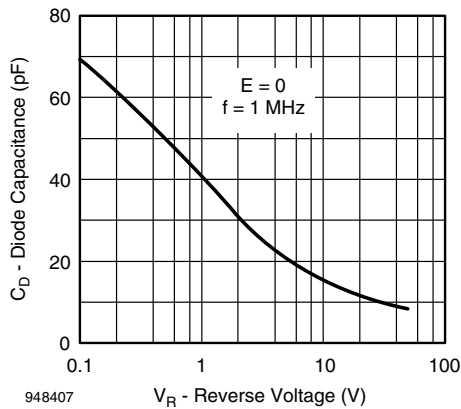
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Fig. 4 - Reverse Light Current vs. Reverse Voltage



94 8406

Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

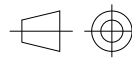
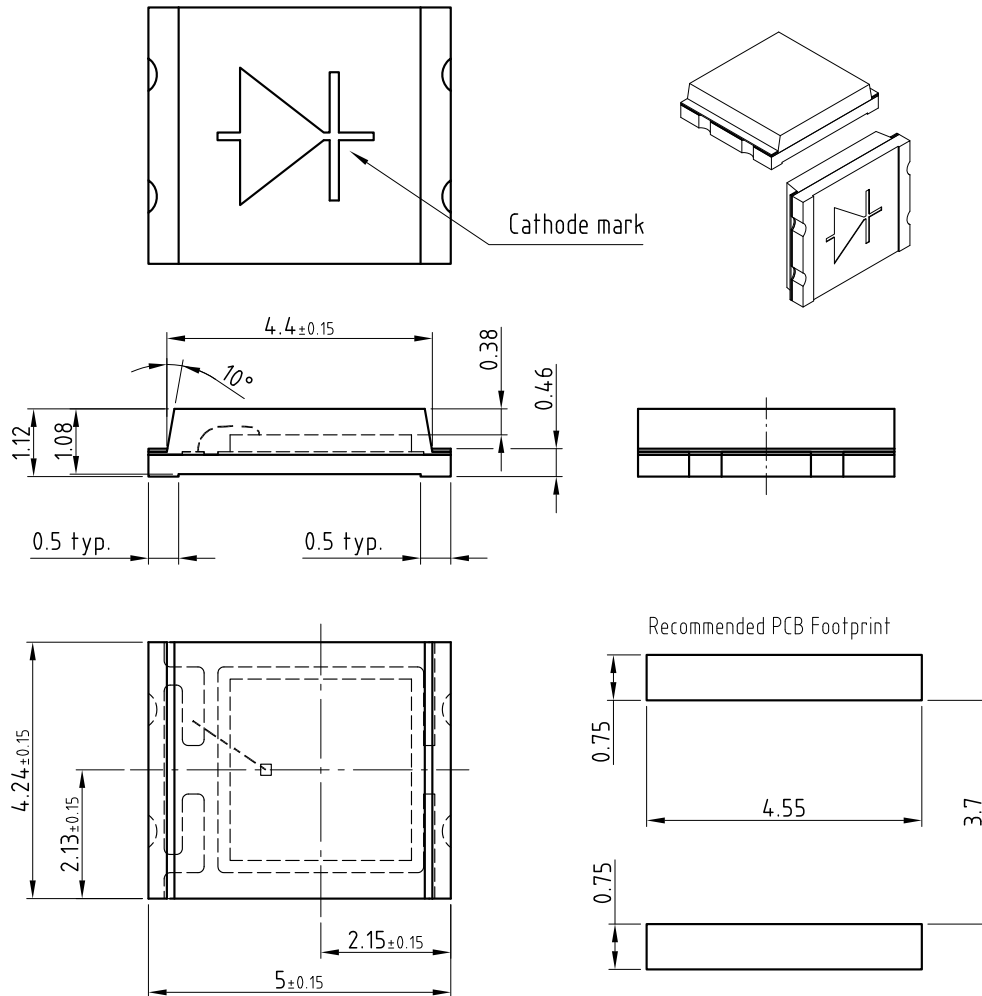


948407

Fig. 5 - Diode Capacitance vs. Reverse Voltage



### PACKAGE DIMENSIONS in millimeters

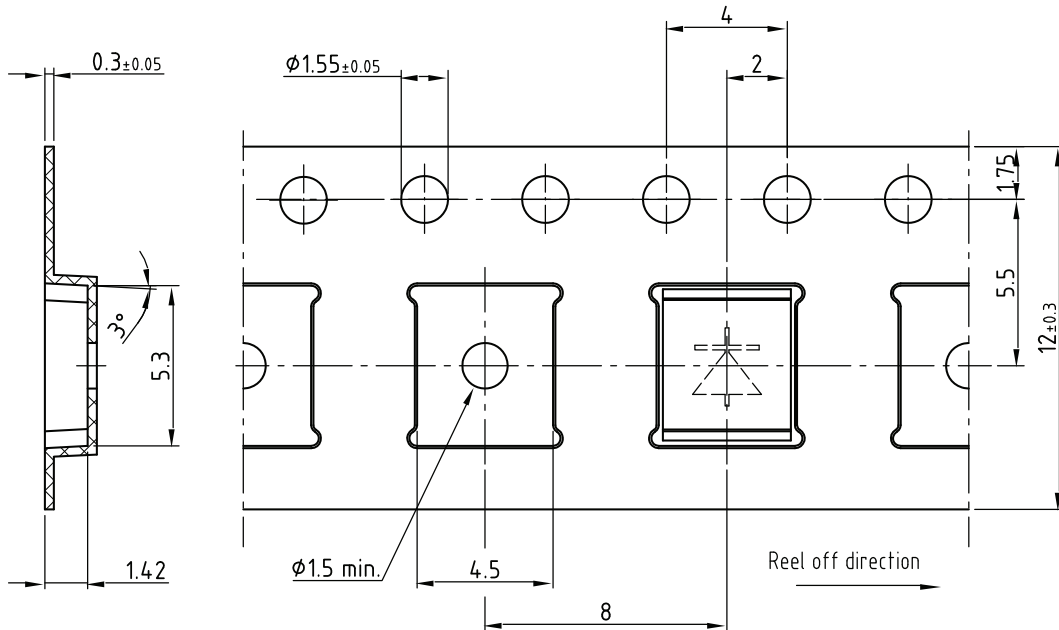


technical drawings according to DIN specifications

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

Not indicated tolerances  $\pm 0.1$

**TAPING DIMENSIONS** in millimeters

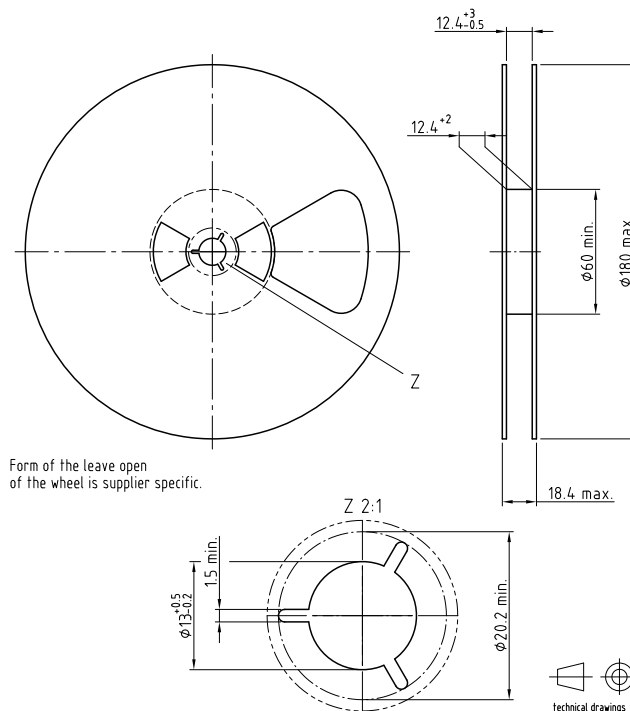


Drawing-No.: 9.700-5293.01-4  
 Issue: 1; 03.12.04  
 20537

Not indicated tolerances ±0.1

technical drawings according to DIN specifications

**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

technical drawings according to DIN specifications

**SOLDER PROFILE**

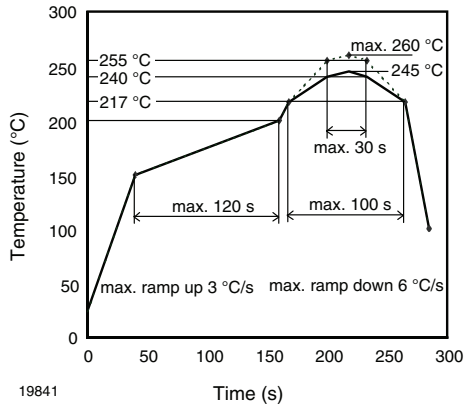


Fig. 8 - Lead (Pb)-free Reflow Solder Profile  
acc. J-STD-020D

**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:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , 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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