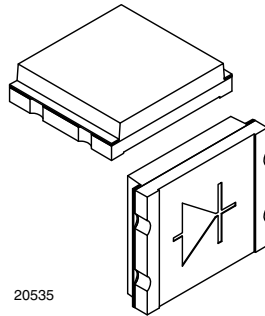


Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released



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: $\phi = \pm 65^\circ$
- 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

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 ($T_{amb} = 25^\circ C$, 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 + 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 |

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 | | 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 |

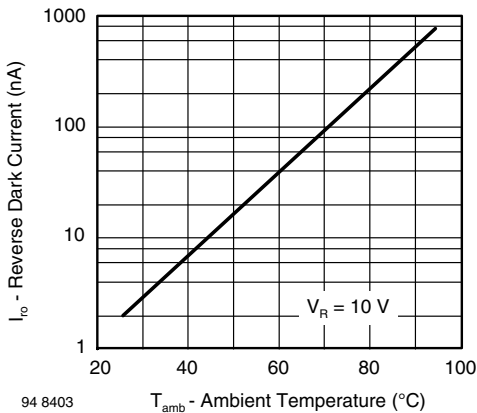
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

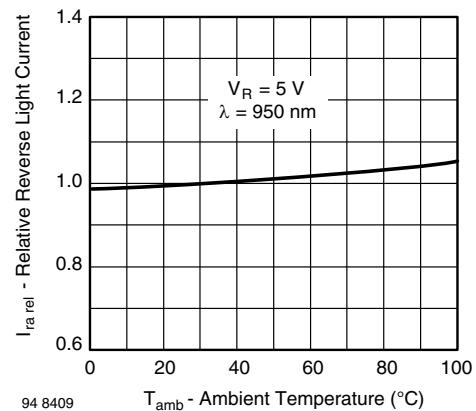
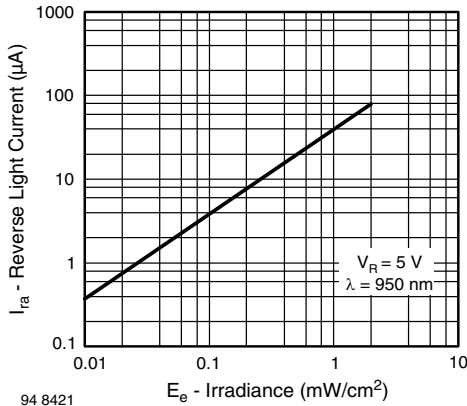
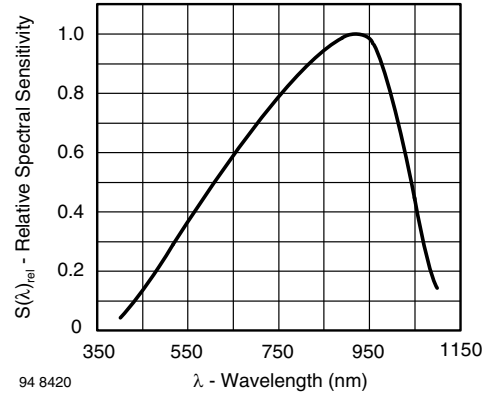


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature



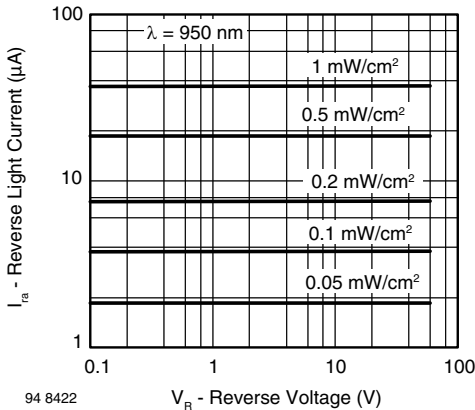
94 8421

Fig. 3 - Reverse Light Current vs. Irradiance



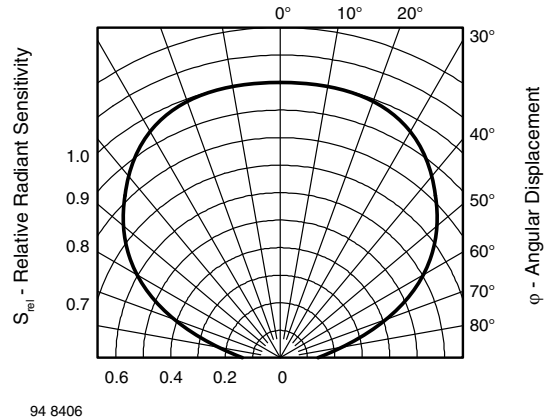
94 8420

Fig. 6 - Relative Spectral Sensitivity vs. Wavelength



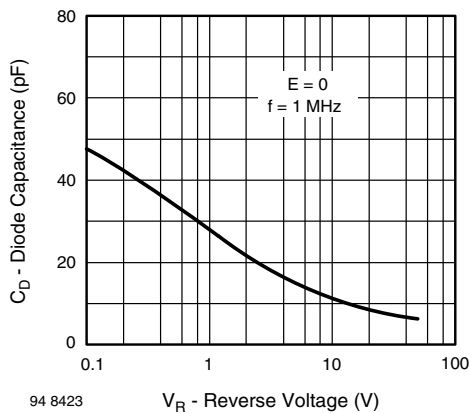
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Fig. 4 - Reverse Light Current vs. Reverse Voltage



94 8406

Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

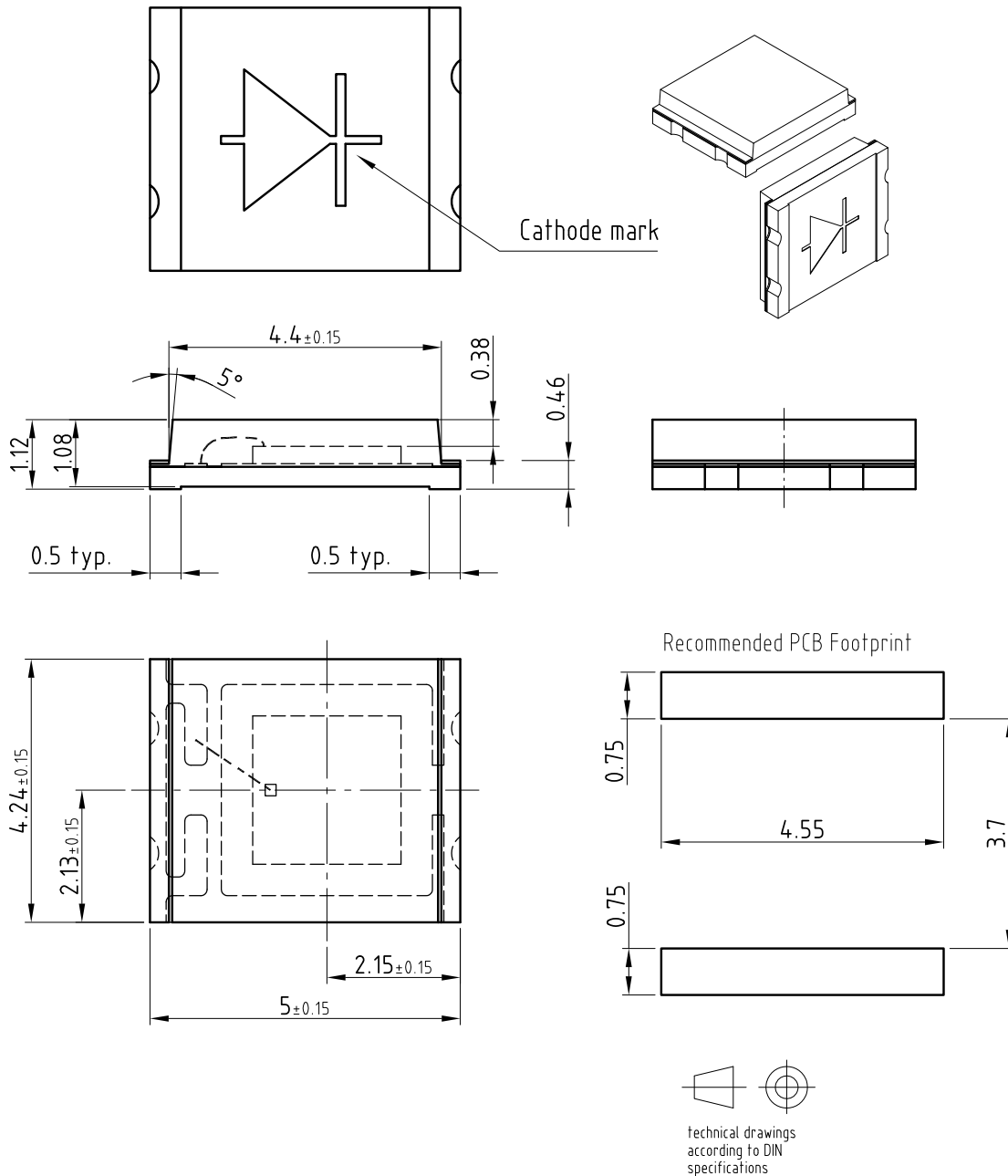


94 8423

Fig. 5 - Diode Capacitance vs. Reverse Voltage



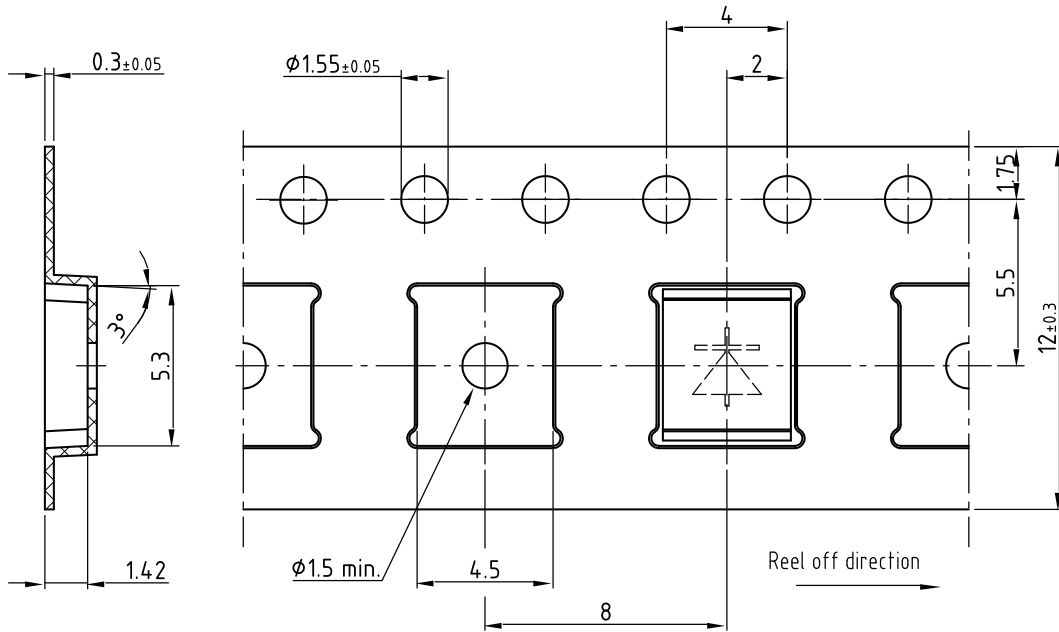
PACKAGE DIMENSIONS in millimeters



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

Not indicated tolerances ± 0.1

TAPING DIMENSIONS in millimeters

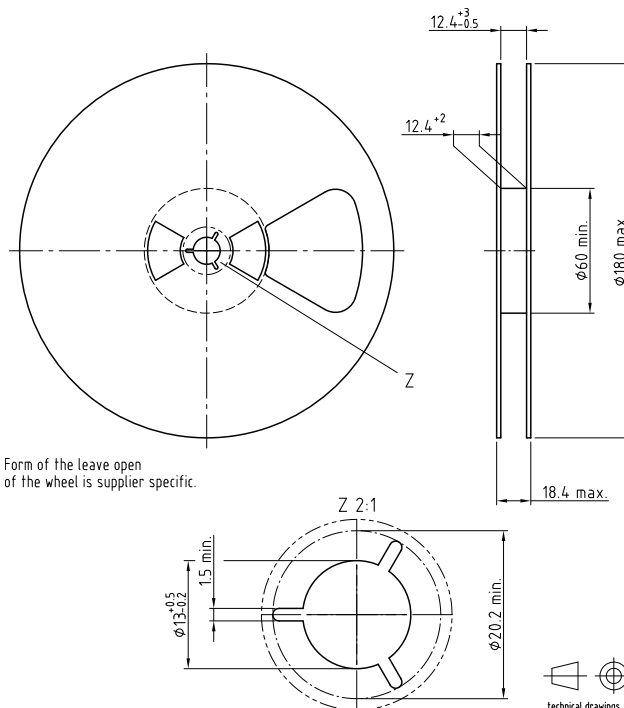


Drawing-No.: 9.700-5293.01-4
 Issue: 1; 03.12.04
 20537

Not indicated tolerances ±0.1

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

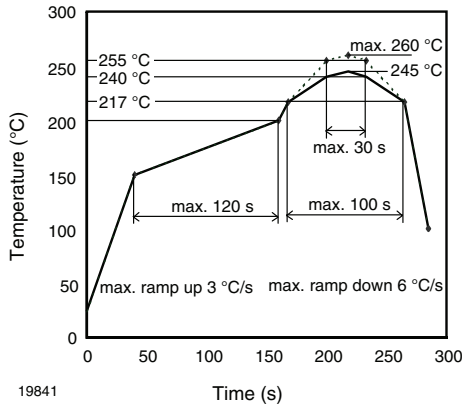


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

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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