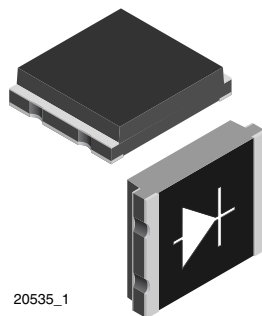




Silicon PIN Photodiode, RoHS Compliant, Released for Lead (Pb)-free Reflow Soldering, AEC-Q101 Released



20535_1



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 radiant sensitivity
- Daylight blocking filter matched with 870 nm 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

Note

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

DESCRIPTION

TEMD5120X01 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 and a daylight blocking filter matched with IR emitters operating at wavelength 870 nm or 950 nm.

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} (μA) | φ (deg) | λ _{0.5} (nm) |
| TEMD5120X01 | 35 | ± 65 | 790 to 1050 |

Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|--------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| TEMD5120X01 | Tape and reel | MOQ: 1500 pcs, 1500 pcs/reel | Top view |

Note

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|-----------------------------------|-------------------|---------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage | | V _R | 60 | V |
| Power dissipation | T _{amb} ≤ 25 °C | P _V | 215 | mW |
| Junction temperature | | T _j | 100 | °C |
| Operating temperature range | | T _{amb} | - 40 to + 100 | °C |
| Storage temperature range | | T _{stg} | - 40 to + 110 | °C |
| Soldering temperature | Acc. reflow solder profile fig. 8 | T _{sd} | 260 | °C |
| Thermal resistance junction/ambient | | R _{thJA} | 350 | K/W |



| BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | |
|--|---|-----------------------------|------|-----------------------|------|-------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | I _F = 50 mA | V _F | | 1 | 1.3 | V |
| Breakdown voltage | I _R = 100 μA, E = 0 | V _(BR) | 60 | | | V |
| Reverse dark current | V _R = 10 V, E = 0 | I _{ro} | | 2 | 30 | nA |
| Diode capacitance | V _R = 0 V, f = 1 MHz, E = 0 | C _D | | 48 | | pF |
| | V _R = 3 V, f = 1 MHz, E = 0 | C _D | | 17 | 40 | pF |
| Open circuit voltage | E ₀ = 1 mW/cm ² , λ = 950 nm | V _o | | 350 | | mV |
| Temperature coefficient of V _o | E ₀ = 1 mW/cm ² , λ = 950 nm | TK _{V_o} | | -2.6 | | mV/K |
| Short circuit current | E ₀ = 1 mW/cm ² , λ = 950 nm | I _k | | 32 | | μA |
| Temperature coefficient of I _k | E ₀ = 1 mW/cm ² , λ = 950 nm | TK _{I_k} | | 0.1 | | %/K |
| Reverse light current | E ₀ = 1 mW/cm ² , λ = 950 nm, V _R = 5 V | I _{ra} | 25 | 35 | | μA |
| Angle of half sensitivity | | φ | | ± 65 | | deg |
| Wavelength of peak sensitivity | | λ _p | | 940 | | nm |
| Range of spectral bandwidth | | λ _{0.5} | | 790 to 1050 | | nm |
| Noise equivalent power | V _R = 10 V, λ = 950 nm | NEP | | 4 x 10 ⁻¹⁴ | | W/√Hz |
| Rise time | V _R = 10 V, R _L = 1 kΩ, λ = 820 nm | t _r | | 100 | | ns |
| Fall time | V _R = 10 V, R _L = 1 kΩ, λ = 820 nm | t _f | | 100 | | ns |

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

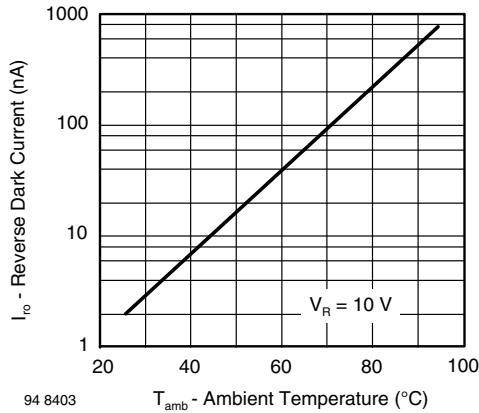


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

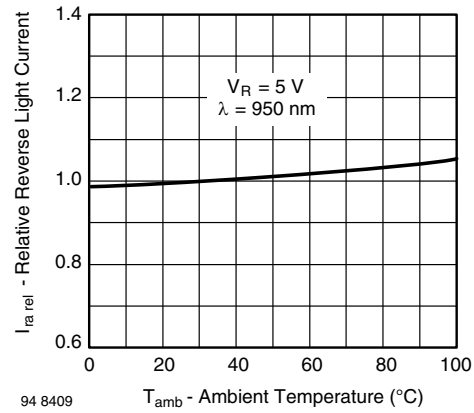


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

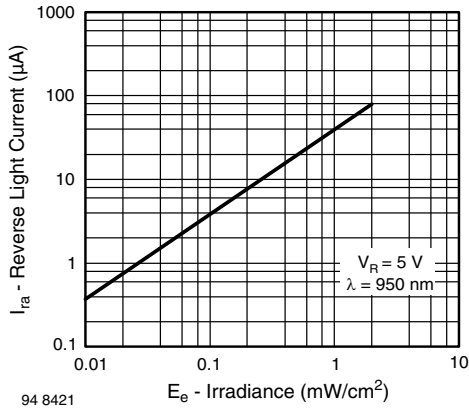


Fig. 3 - Reverse Light Current vs. Irradiance

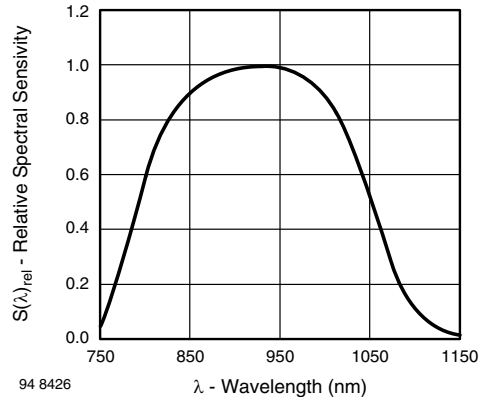


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

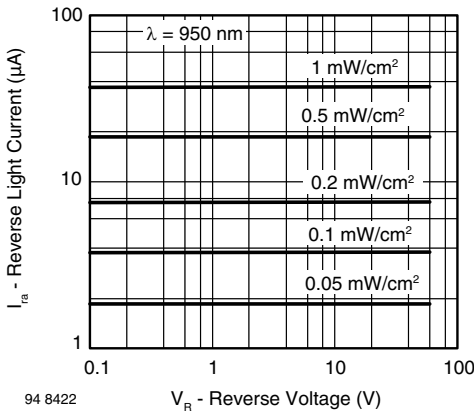


Fig. 4 - Reverse Light Current vs. Reverse Voltage

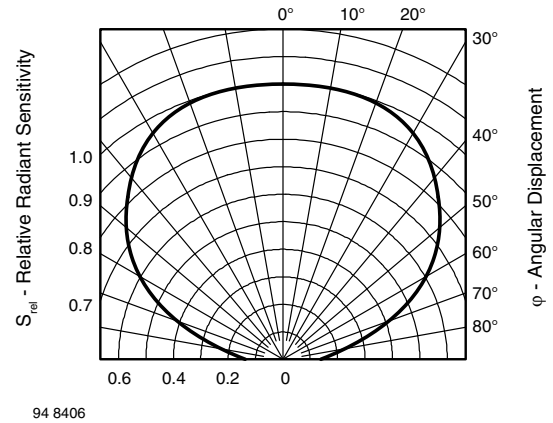


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

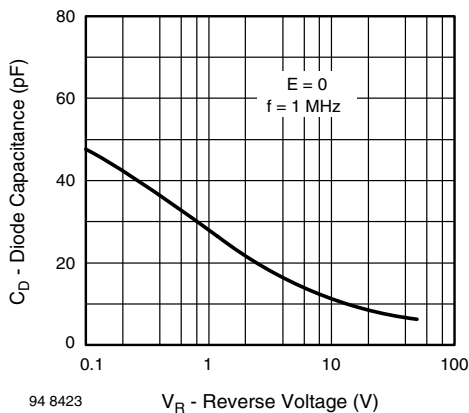
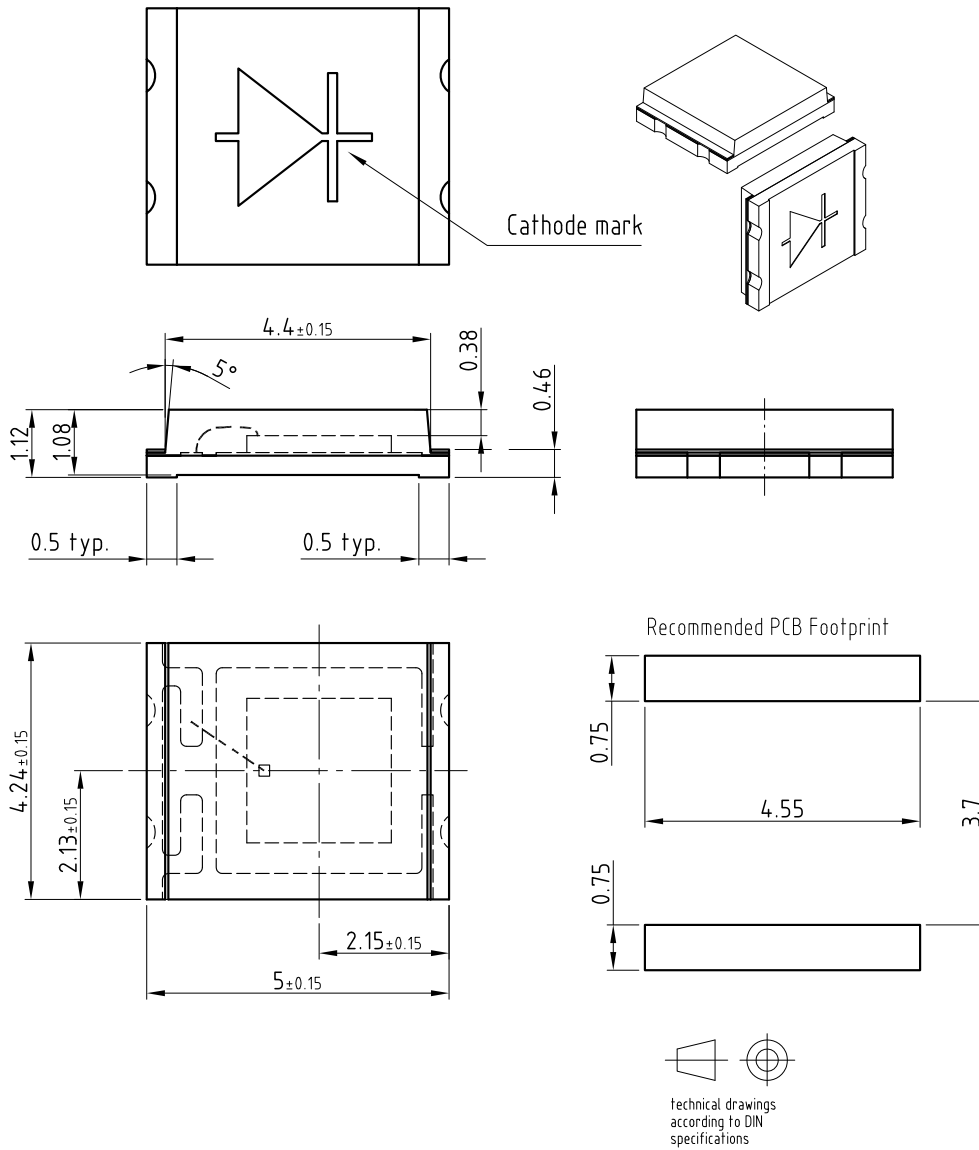


Fig. 5 - Diode Capacitance vs. Reverse Voltage



PACKAGE DIMENSIONS in millimeters



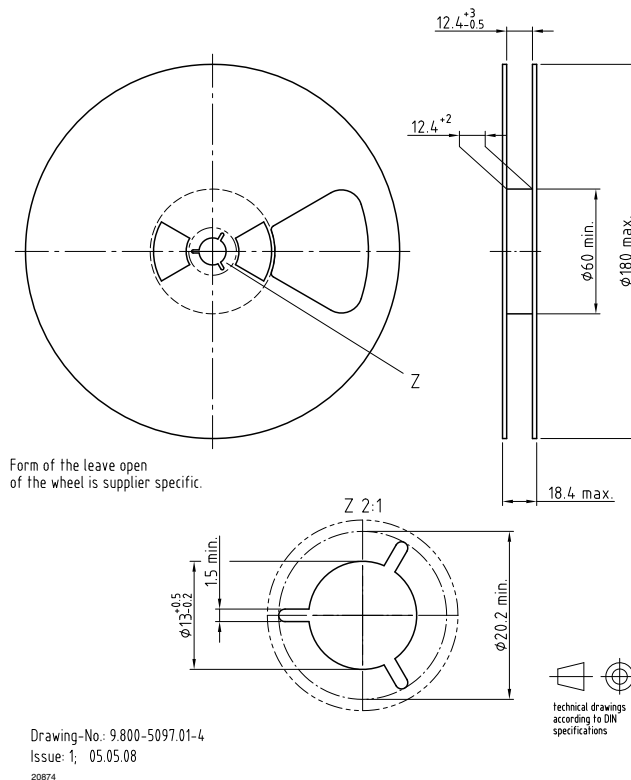
Drawing-No.: 6.541-5059.01-4
Issue: 4; 26.04.07
19280

Not indicated tolerances ± 0.1

TAPING DIMENSIONS in millimeters



REEL DIMENSIONS in millimeters





SOLDER PROFILE

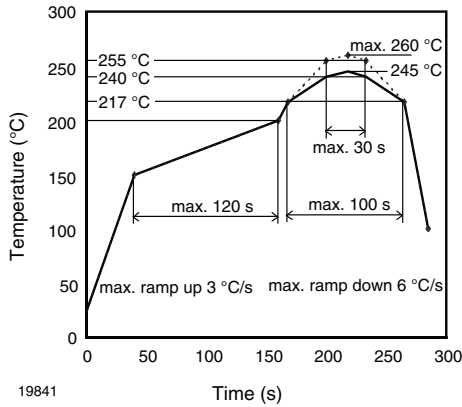


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

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: $T_{amb} < 30\text{ °C}$, 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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