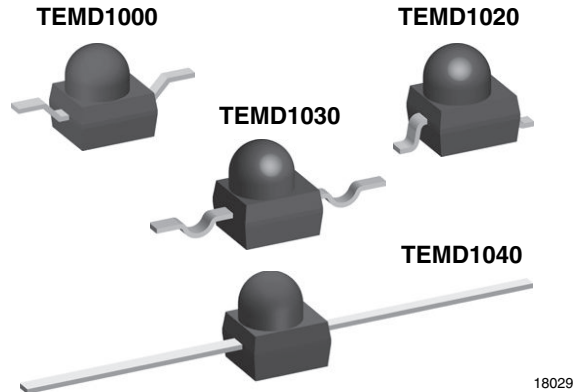




## Silicon PIN Photodiode, RoHS-Compliant



### FEATURES

- Package type: surface-mount
- Package form: GW, RGW, yoke, axial
- Dimensions (L x W x H in mm): 2.5 x 2 x 2.7
- Radiant sensitive area (in mm<sup>2</sup>): 0.23
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 15^\circ$
- Package matches with IR emitter series TSML1000
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS COMPLIANT

### DESCRIPTION

TEMD1000 series are PIN photodiodes with high speed and high radiant sensitivity in black, surface-mount plastic packages with lens and daylight blocking filter. Filter bandwidth is matched with 870 nm to 950 nm IR emitters.

### APPLICATIONS

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

| PRODUCT SUMMARY |                      |                     |                      |
|-----------------|----------------------|---------------------|----------------------|
| COMPONENT       | $I_{ra}$ ( $\mu A$ ) | $\phi$ ( $^\circ$ ) | $\lambda_{0.5}$ (nm) |
| TEMD1000        | 10                   | $\pm 15$            | 790 to 1050          |
| TEMD1020        | 10                   | $\pm 15$            | 790 to 1050          |
| TEMD1030        | 10                   | $\pm 15$            | 790 to 1050          |
| TEMD1040        | 10                   | $\pm 15$            | 790 to 1050          |

#### Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |               |                              |                  |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE        | PACKAGING     | REMARKS                      | PACKAGE FORM     |
| TEMD1000             | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |
| TEMD1020             | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing         |
| TEMD1030             | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Yoke             |
| TEMD1040             | Bulk          | MOQ: 1000 pcs, 1000 pcs/bulk | Axial leads      |

#### 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   | $T_{amb} \leq 25^\circ C$ | $P_V$     | 75          | mW         |
| Junction temperature  |                           | $T_j$     | 100         | $^\circ C$ |
| Operating temperature range   |                           | $T_{amb}$ | -40 to +85  | $^\circ C$ |
| Storage temperature range   |                           | $T_{stg}$ | -40 to +100 | $^\circ C$ |
| Soldering temperature   | $t \leq 5$ s              | $T_{sd}$  | < 260       | $^\circ C$ |



| BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |  |                   |      |             |      |      |
|--|--|-------------------|------|-------------|------|------|
| PARAMETER  | TEST CONDITION   | SYMBOL            | MIN. | TYP.        | MAX. | UNIT |
| Forward voltage  | I <sub>F</sub> = 50 mA   | V <sub>F</sub>    | -    | 1           | 1.3  | V    |
| Breakdown voltage  | I <sub>R</sub> = 100 μA, E = 0   | V <sub>(BR)</sub> | 60   | -           | -    | V    |
| Reverse dark current   | V <sub>R</sub> = 10 V, E = 0   | I <sub>ro</sub>   | -    | 1           | 10   | nA   |
| Diode capacitance  | V <sub>R</sub> = 5 V, f = 1 MHz, E = 0                                   | C <sub>D</sub>    | -    | 1.8         | -    | pF   |
| Reverse light current  | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 870 nm, V <sub>R</sub> = 5 V | I <sub>ra</sub>   | 6.0  | 10          | 13.0 | μA   |
|  | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>R</sub> = 5 V | I <sub>ra</sub>   | -    | 12          | -    | μA   |
| Temperature coefficient of I <sub>ra</sub>                                   | V <sub>R</sub> = 5 V, λ = 870 nm,  | TK <sub>Ira</sub> | -    | 0.2         | -    | %/K  |
| Absolute spectral sensitivity  | V <sub>R</sub> = 5 V, λ = 870 nm   | s(λ)              | -    | 0.60        | -    | A/W  |
|  | V <sub>R</sub> = 5 V, λ = 950 nm   | s(λ)              | -    | 0.55        | -    | A/W  |
| Angle of half sensitivity  |  | φ                 | -    | ± 15        | -    | °    |
| Wavelength of peak sensitivity   |  | λ <sub>p</sub>    | -    | 940         | -    | nm   |
| Range of spectral bandwidth  |  | λ <sub>0.5</sub>  | -    | 790 to 1050 | -    | nm   |
| Rise time  | V <sub>R</sub> = 10 V, R <sub>L</sub> = 50 Ω, λ = 820 nm                 | t <sub>r</sub>    | -    | 4           | -    | ns   |
| Fall time  | V <sub>R</sub> = 10 V, R <sub>L</sub> = 50 Ω, λ = 820 nm                 | t <sub>f</sub>    | -    | 4           | -    | ns   |

BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

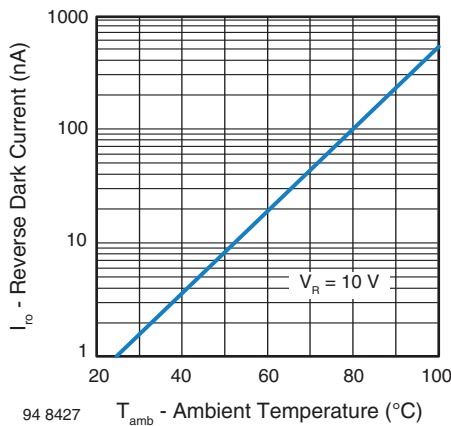


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

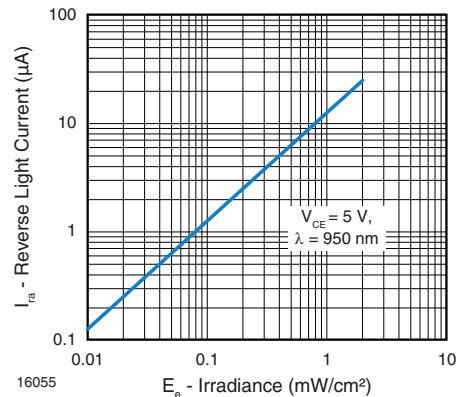


Fig. 3 - Reverse Light Current vs. Irradiance

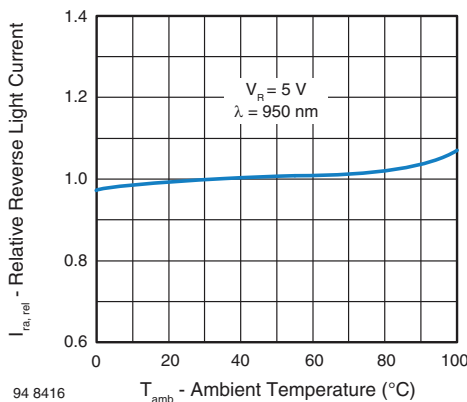


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

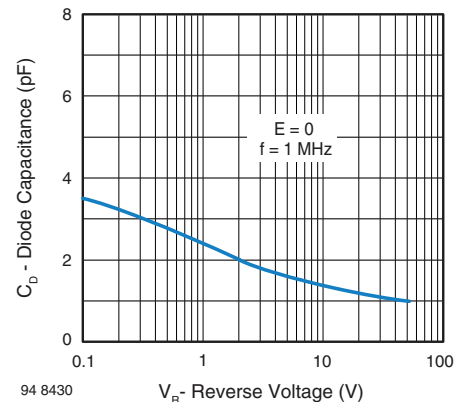


Fig. 4 - Diode Capacitance vs. Reverse Voltage

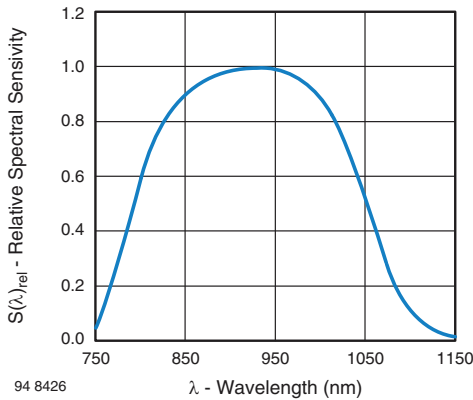


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

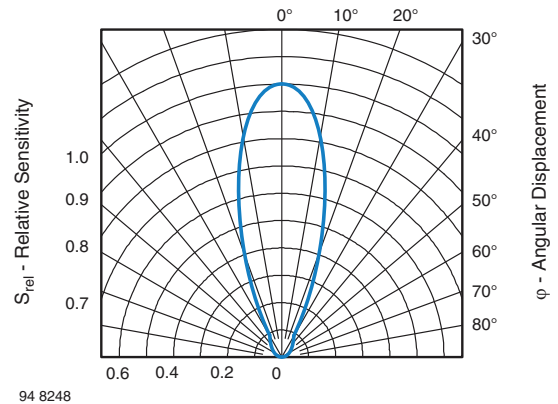


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

## PRECAUTIONS FOR USE

### 1. Over-Current Proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (burn out will happen).

### 2. Storage

- Storage temperature and rel. humidity conditions are: 5 °C to 35 °C, R.H. 60 %
- Floor life must not exceed 168 h, according to JEDEC® level 3, J-STD-020. Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp proof box with desiccant. Considering tape life, we suggest to use products within one year from production date
- If opened more than one week in an atmosphere 5 °C to 35 °C, R.H. 60 %, devices should be treated at 60 °C ± 5 °C for 15 h
- If humidity indicator in the package shows pink color (normal blue), then devices should be treated with the same conditions as 2.3

## REFLOW SOLDER PROFILE

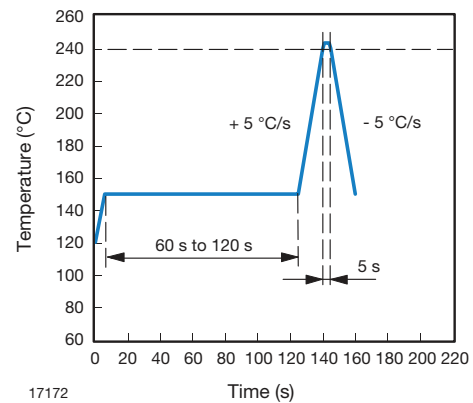


Fig. 7 - Lead Tin (SnPb) Reflow Solder Profile

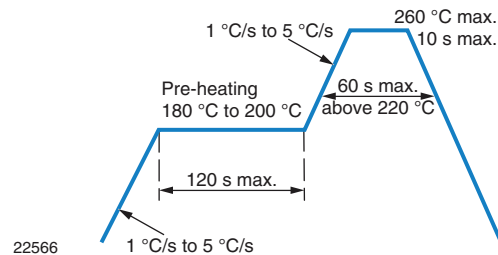
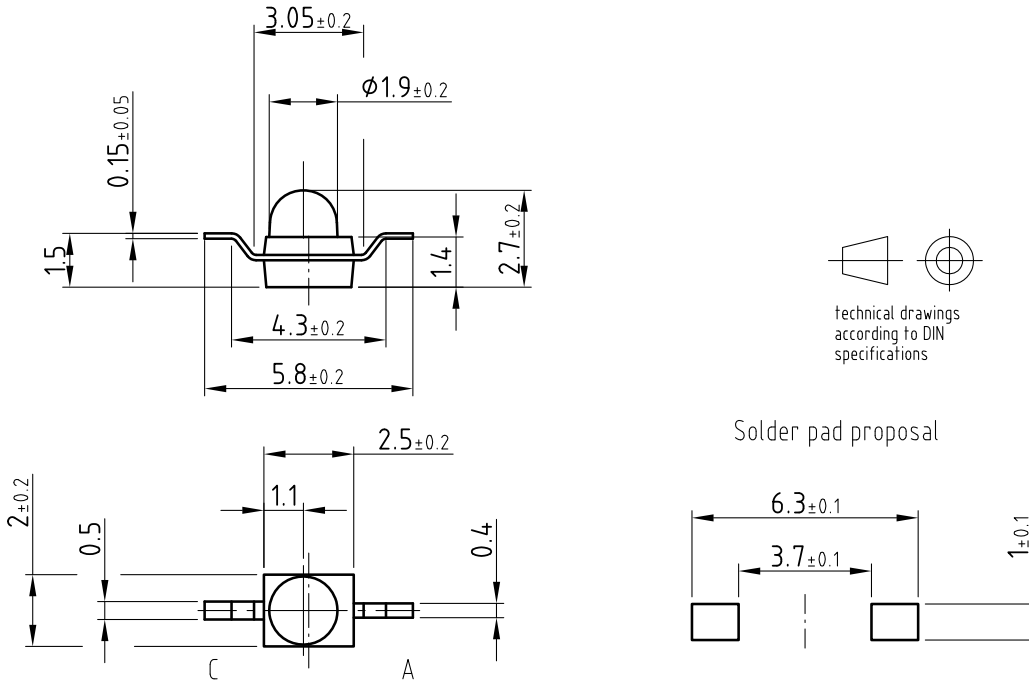


Fig. 8 - Lead (Pb)-Free Reflow Solder Profile According to J-STD-020



## PACKAGE DIMENSIONS in millimeters: TEMD1000

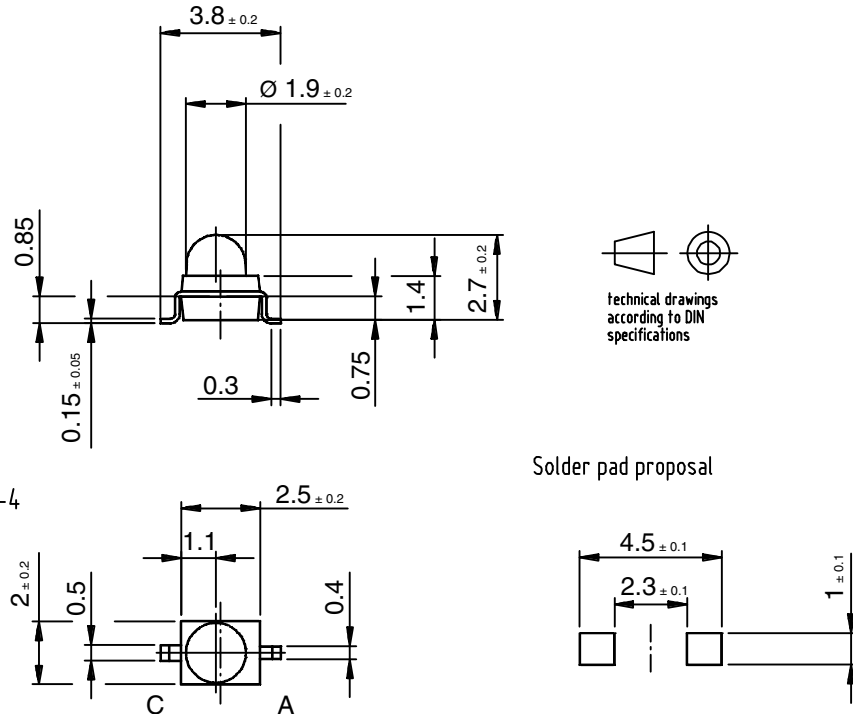


Drawing-No.: 6.544-5326.02-4

Issue: 3; 02.04.03

16159

## PACKAGE DIMENSIONS in millimeters: TEMD1020



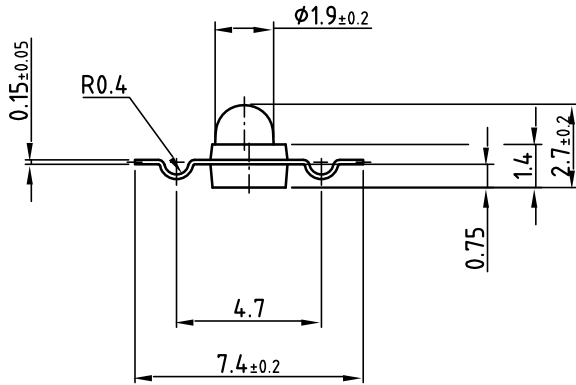
Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

16160

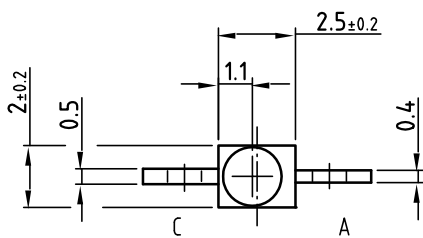
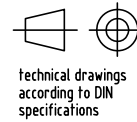


## PACKAGE DIMENSIONS in millimeters: TEMD1030

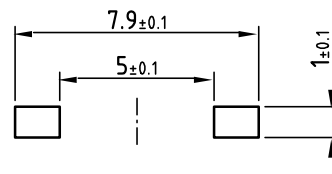


Drawing-No.: 6.544-5329.01-4

Issue: 4; 08.05.03

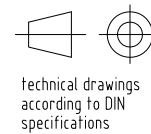
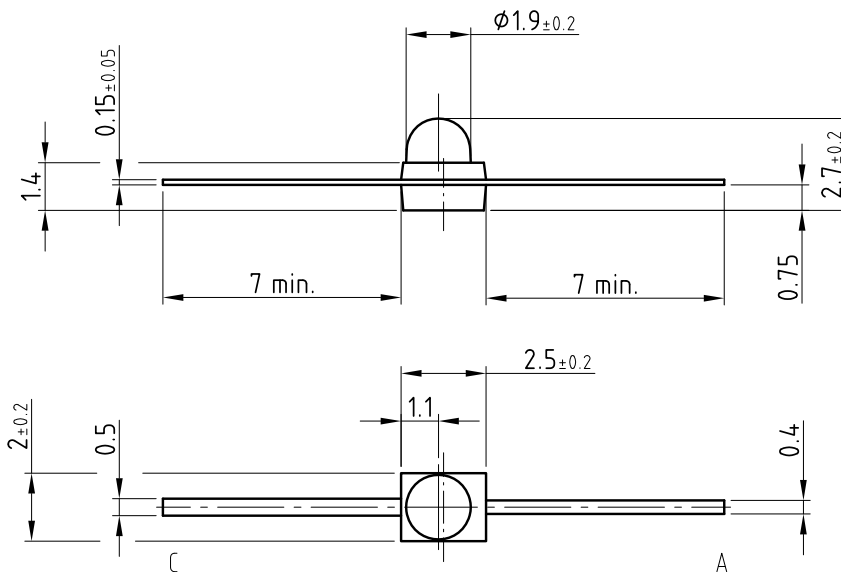


Solder pad proposal



16228

## PACKAGE DIMENSIONS in millimeters: TEMD1040



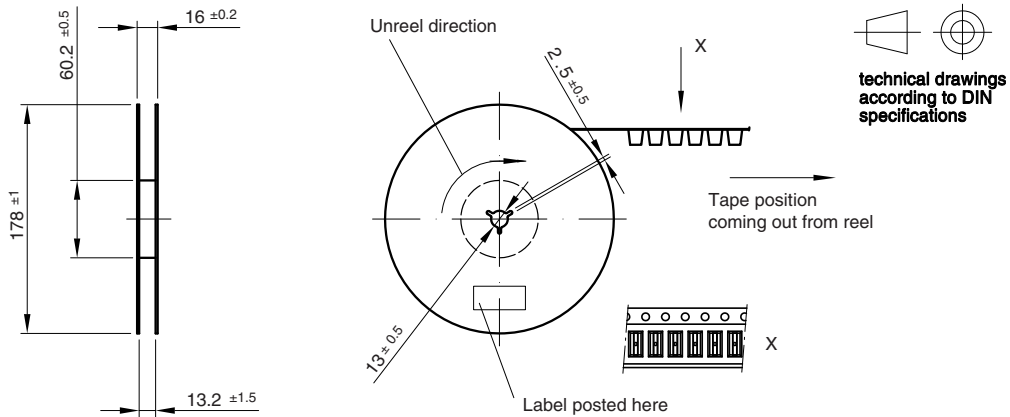
Drawing-No.: 6.544-5339.02-4

Issue: 3; 02.04.03

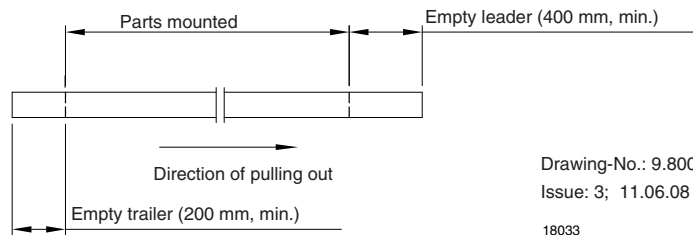
16760



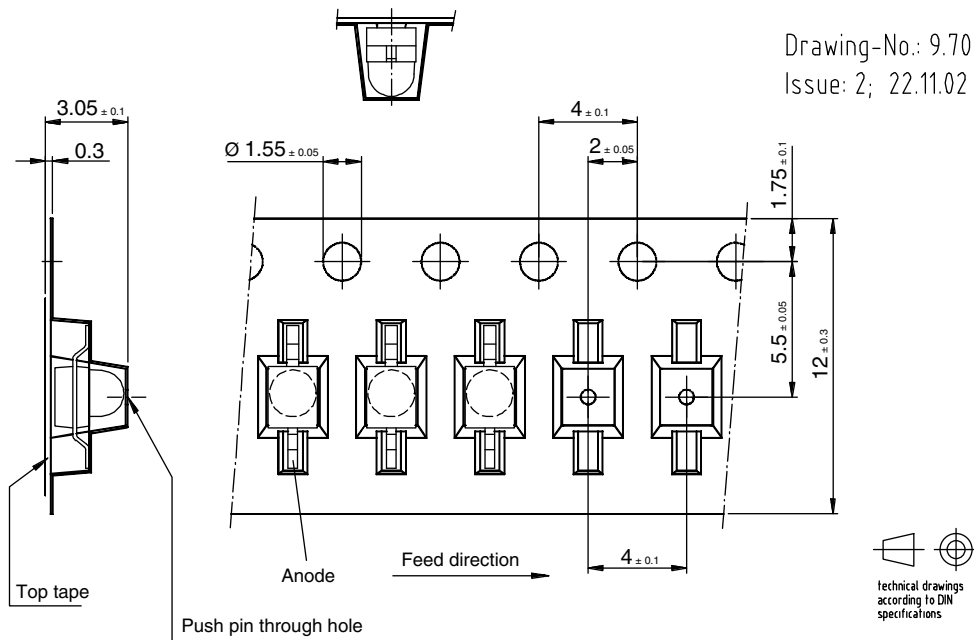
## REEL DIMENSIONS in millimeters



Leader and trailer tape:



## TAPING DIMENSIONS in millimeters: TEMD1000

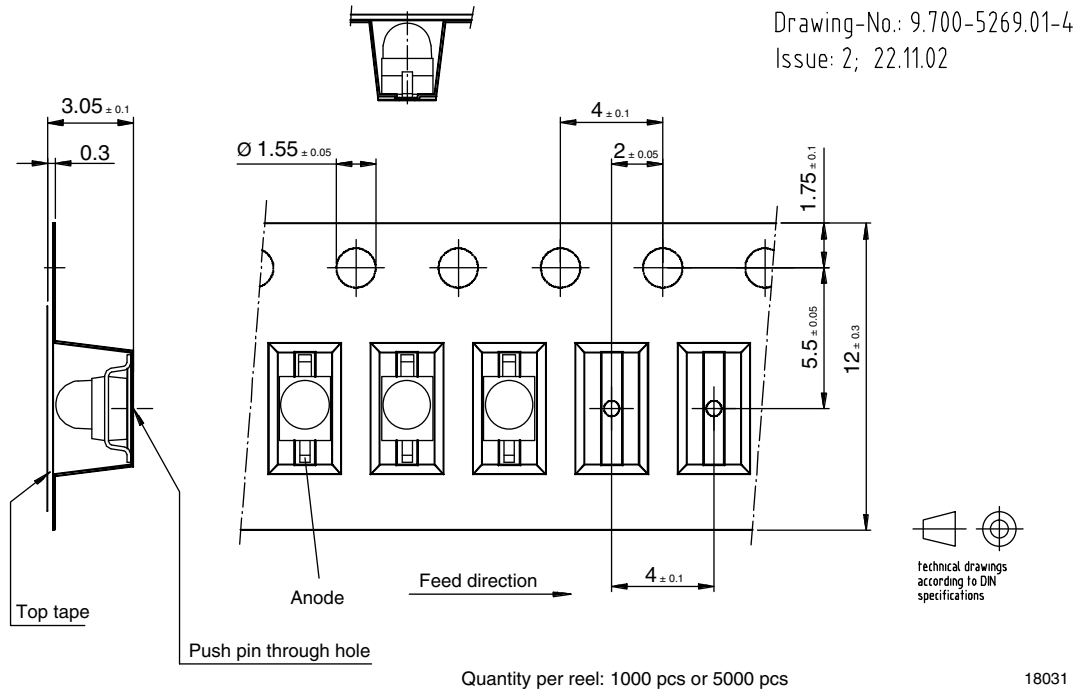


Quantity per reel: 1000 pcs or 5000 pcs

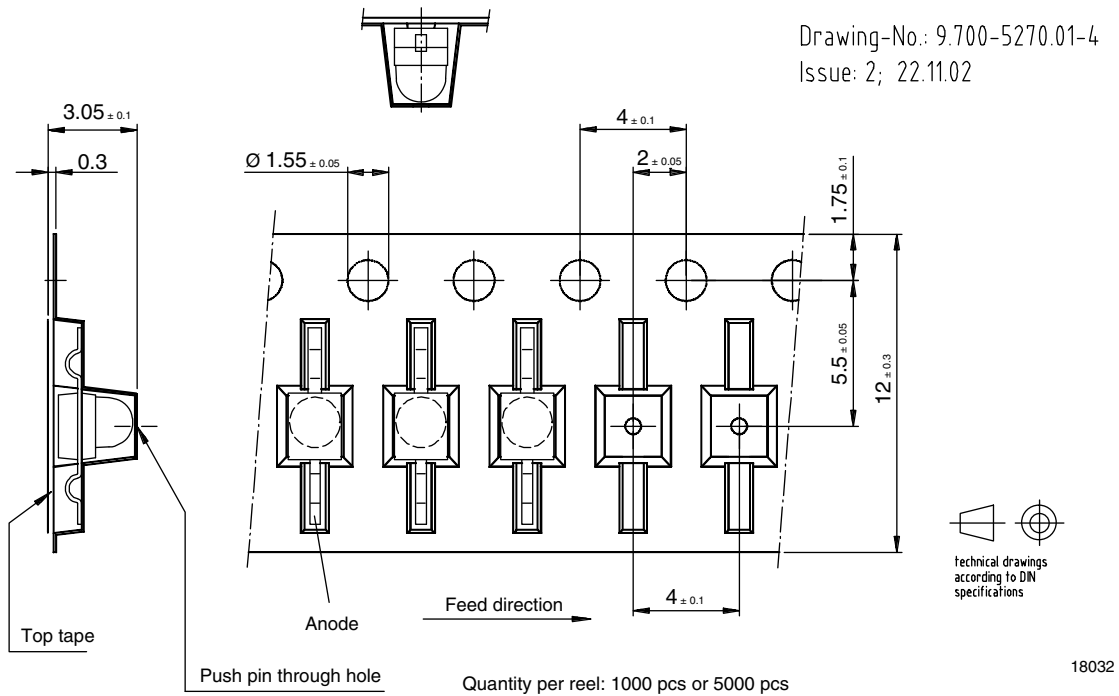
18030



## TAPING DIMENSIONS in millimeters: TEMD1020



## TAPING DIMENSIONS in millimeters: TEMD1030





## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.