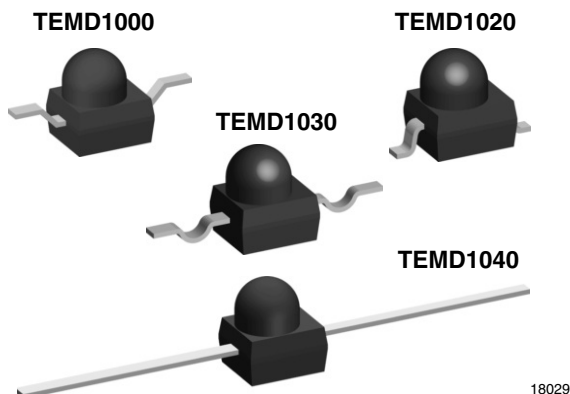


## Silicon PIN Photodiode, RoHS Compliant



### 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.

### 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 TSMF1000
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### 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 | $I_{ra}$ (mA) | $\phi$ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------|--------------|----------------------|
| TEMD1000  | 12            | $\pm 15$     | 790 to 1050          |
| TEMD1020  | 12            | $\pm 15$     | 790 to 1050          |
| TEMD1030  | 12            | $\pm 15$     | 790 to 1050          |
| TEMD1040  | 12            | $\pm 15$     | 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

| PARAMETER                   | TEST CONDITION                  | SYMBOL    | VALUE         | UNIT             |
|-----------------------------|---------------------------------|-----------|---------------|------------------|
| Reverse voltage             |                                 | $V_R$     | 60            | V                |
| Power dissipation           | $T_{amb} \leq 25^\circ\text{C}$ | $P_V$     | 75            | mW               |
| Junction temperature        |                                 | $T_j$     | 100           | $^\circ\text{C}$ |
| Operating temperature range |                                 | $T_{amb}$ | - 40 to + 85  | $^\circ\text{C}$ |
| Storage temperature range   |                                 | $T_{stg}$ | - 40 to + 100 | $^\circ\text{C}$ |
| Soldering temperature       | $t \leq 5\text{ s}$             | $T_{sd}$  | < 260         | $^\circ\text{C}$ |

#### Note

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



# TEMD1000, TEMD1020, TEMD1030, TEMD1040

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| BASIC CHARACTERISTICS               |                                                                                 |                 |      |             |      |               |
|-------------------------------------|---------------------------------------------------------------------------------|-----------------|------|-------------|------|---------------|
| 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                | $V_R = 10 \text{ V}$ , $E = 0$                                                  | $I_{ro}$        |      | 1           | 10   | nA            |
| Diode capacitance                   | $V_R = 5 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0$                             | $C_D$           |      | 1.8         |      | pF            |
| Reverse light current               | $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 870 \text{ nm}$ ,<br>$V_R = 5 \text{ V}$ | $I_{ra}$        |      | 10          |      | $\mu\text{A}$ |
|                                     | $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ ,<br>$V_R = 5 \text{ V}$ | $I_{ra}$        | 5    | 12          |      | $\mu\text{A}$ |
| Temperature coefficient of $I_{ra}$ | $V_R = 5 \text{ V}$ , $\lambda = 870 \text{ nm}$                                | $TK_{I_{ra}}$   |      | 0.2         |      | %/K           |
| Absolute spectral sensitivity       | $V_R = 5 \text{ V}$ , $\lambda = 870 \text{ nm}$                                | $s(\lambda)$    |      | 0.60        |      | A/W           |
|                                     | $V_R = 5 \text{ V}$ , $\lambda = 950 \text{ nm}$                                | $s(\lambda)$    |      | 0.55        |      | A/W           |
| Angle of half sensitivity           |                                                                                 | $\varphi$       |      | $\pm 15$    |      | deg           |
| Wavelength of peak sensitivity      |                                                                                 | $\lambda_p$     |      | 940         |      | nm            |
| Range of spectral bandwidth         |                                                                                 | $\lambda_{0.5}$ |      | 790 to 1050 |      | nm            |
| Rise time                           | $V_R = 10 \text{ V}$ , $R_L = 50 \text{ } \Omega$ , $\lambda = 820 \text{ nm}$  | $t_r$           |      | 4           |      | ns            |
| Fall time                           | $V_R = 10 \text{ V}$ , $R_L = 50 \text{ } \Omega$ , $\lambda = 820 \text{ nm}$  | $t_f$           |      | 4           |      | ns            |

## Note

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

## BASIC CHARACTERISTICS

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

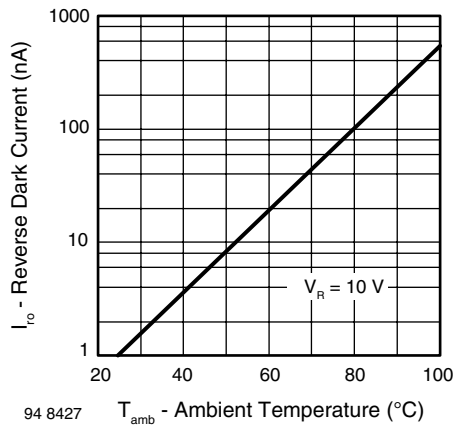


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

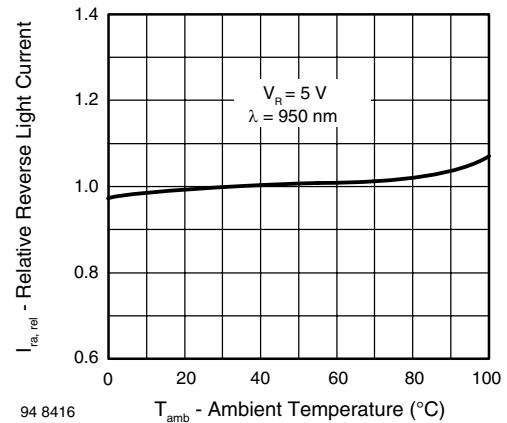


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

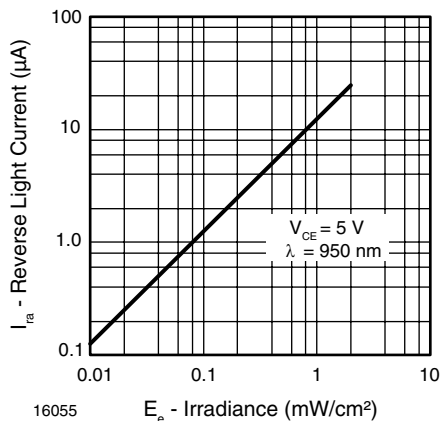


Fig. 3 - Reverse Light Current vs. Irradiance

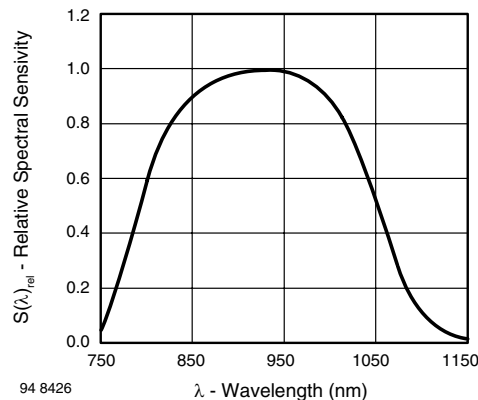


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

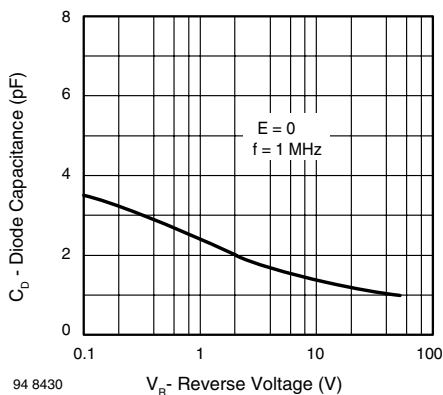


Fig. 4 - Diode Capacitance vs. Reverse Voltage

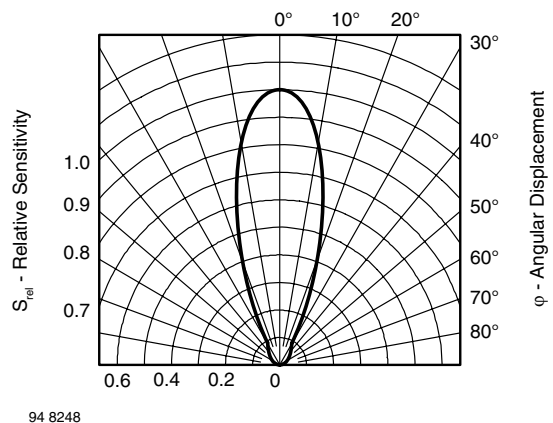


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

## 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

2.1 Storage temperature and rel. humidity conditions are: 5 °C to 35 °C, R.H. 60 %.

2.2 Floor life must not exceed 168 h, acc. 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.

2.3 If opened more than one week in an atmosphere 5 °C to 35 °C, R.H. 60 %, devices should be treated at 60 °C  $\pm$  5 °C for 15 h.

2.4 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

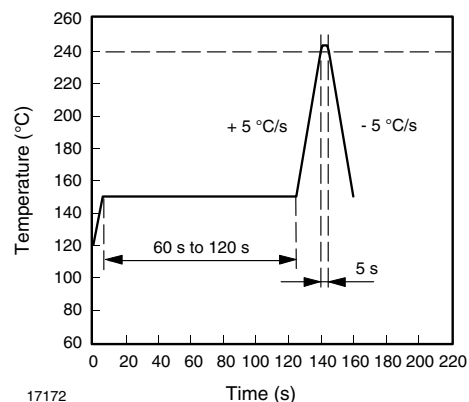


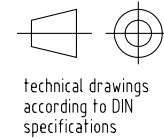
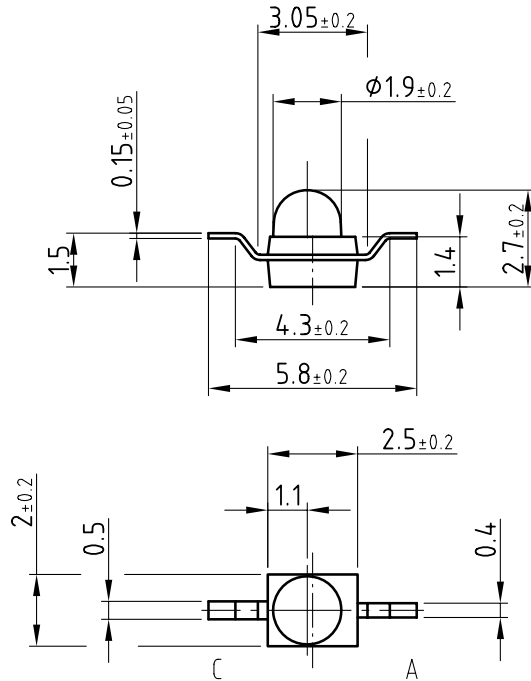
Fig. 7 - Lead Tin (SnPb) Reflow Solder Profile



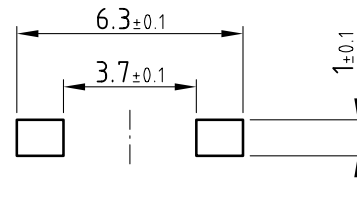
# TEMD1000, TEMD1020, TEMD1030, TEMD1040

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## PACKAGE DIMENSIONS in millimeters: TEMD1000



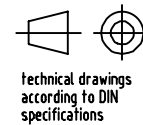
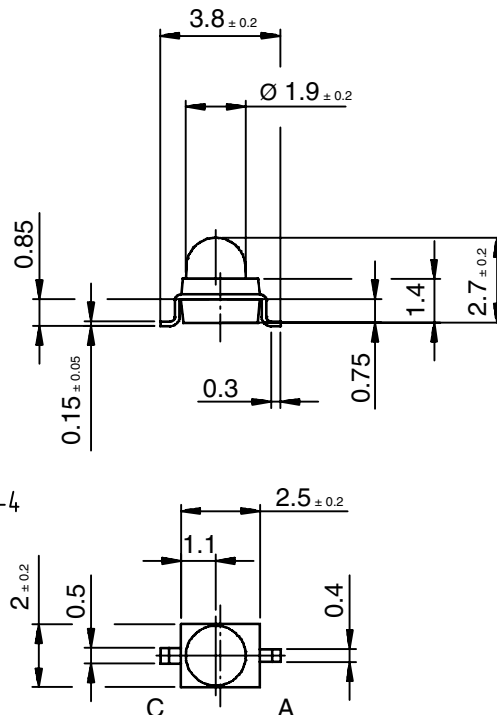
Solder pad proposal



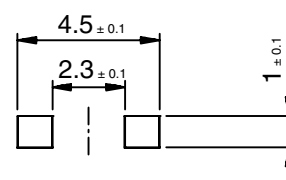
Drawing-No.: 6.544-5326.02-4  
Issue: 3; 02.04.03

16159

## PACKAGE DIMENSIONS in millimeters: TEMD1020



Solder pad proposal



Drawing-No.: 6.544-5325.02-4  
Issue: 3; 02.04.03

16160

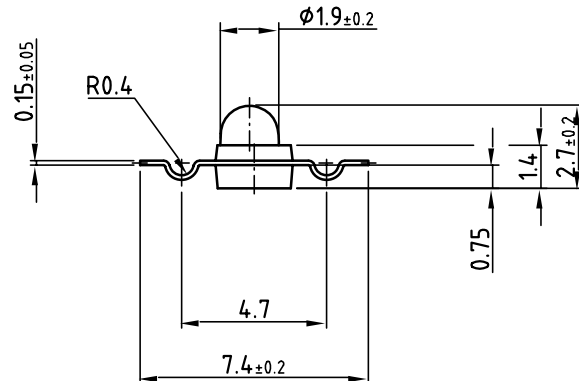
# TEMD1000, TEMD1020, TEMD1030, TEMD1040

Vishay Semiconductors

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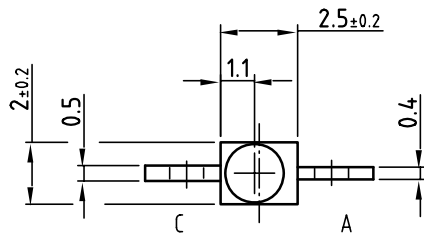
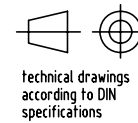


## PACKAGE DIMENSIONS in millimeters: TEMD1030

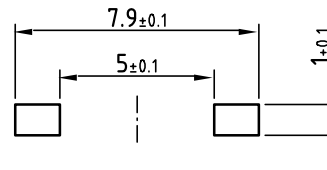


Drawing-No.: 6.544-5329.01-4

Issue: 4; 08.05.03

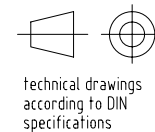
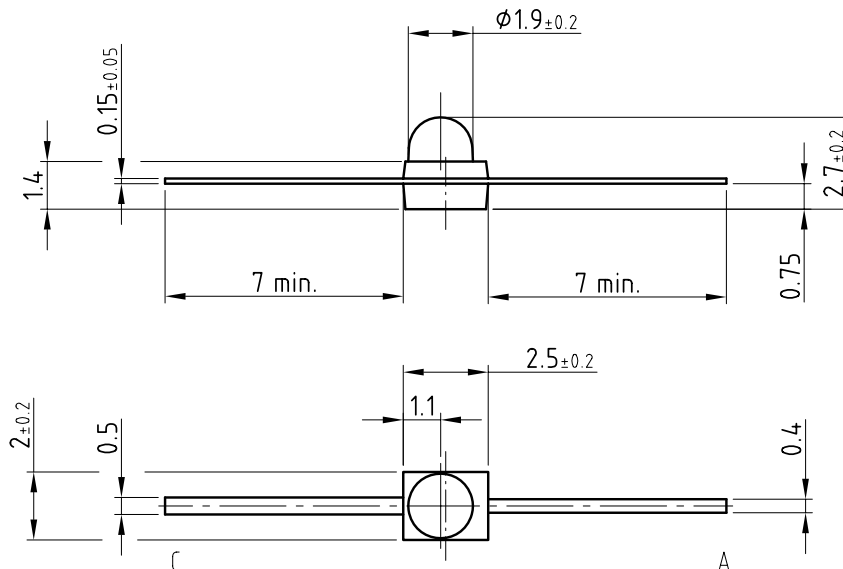


Solder pad proposal



16228

## PACKAGE DIMENSIONS in millimeters: TEMD1040



Drawing-No.: 6.544-5339.02-4

Issue: 3; 02.04.03

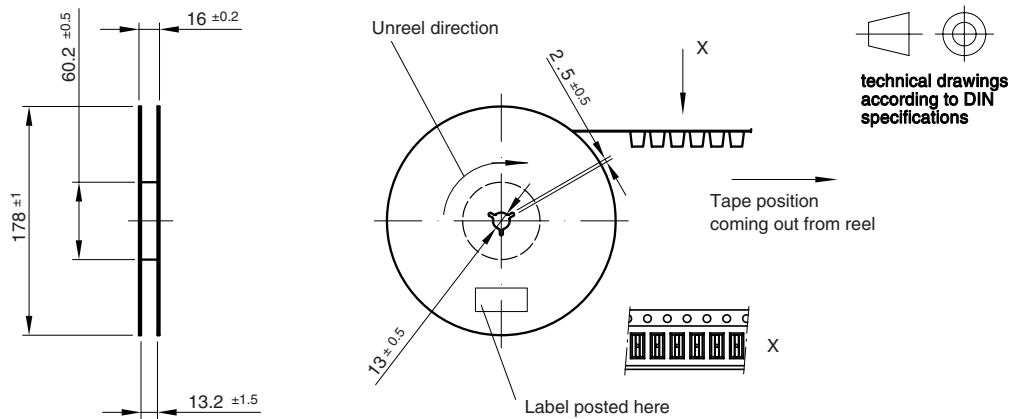
16760



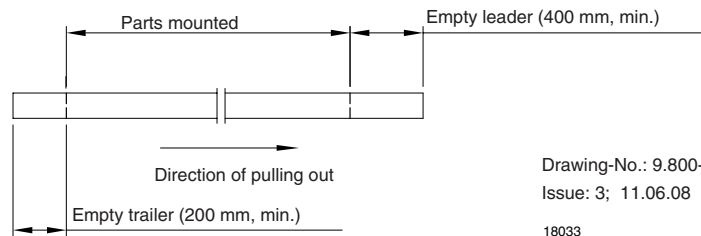
# TEMD1000, TEMD1020, TEMD1030, TEMD1040

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## REEL DIMENSIONS in millimeters



Leader and trailer tape:

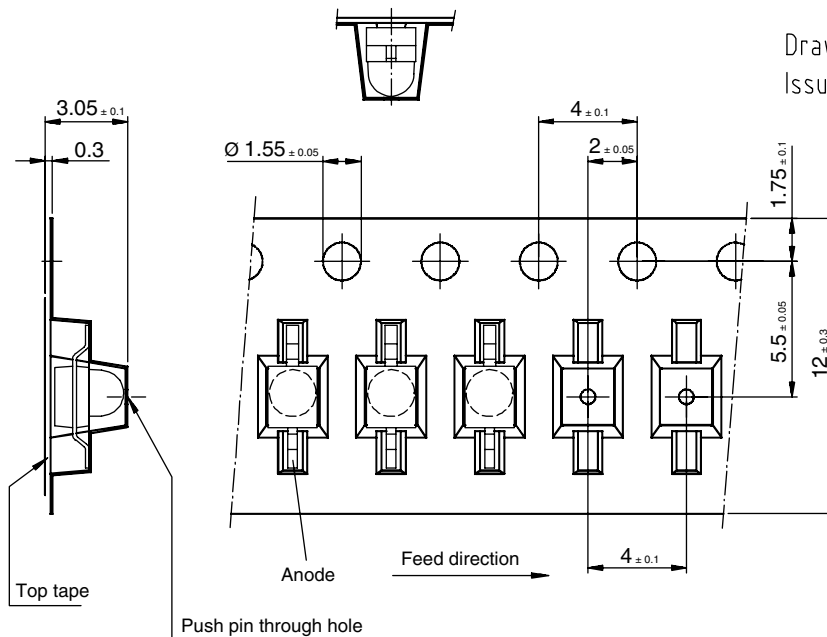


Drawing-No.: 9.800-5080.01-4

Issue: 3; 11.06.08

18033

## TAPING DIMENSIONS in millimeters: TEMD1000



Drawing-No.: 9.700-5268.01-4

Issue: 2; 22.11.02

Quantity per reel: 1000 pcs or 5000 pcs

18030

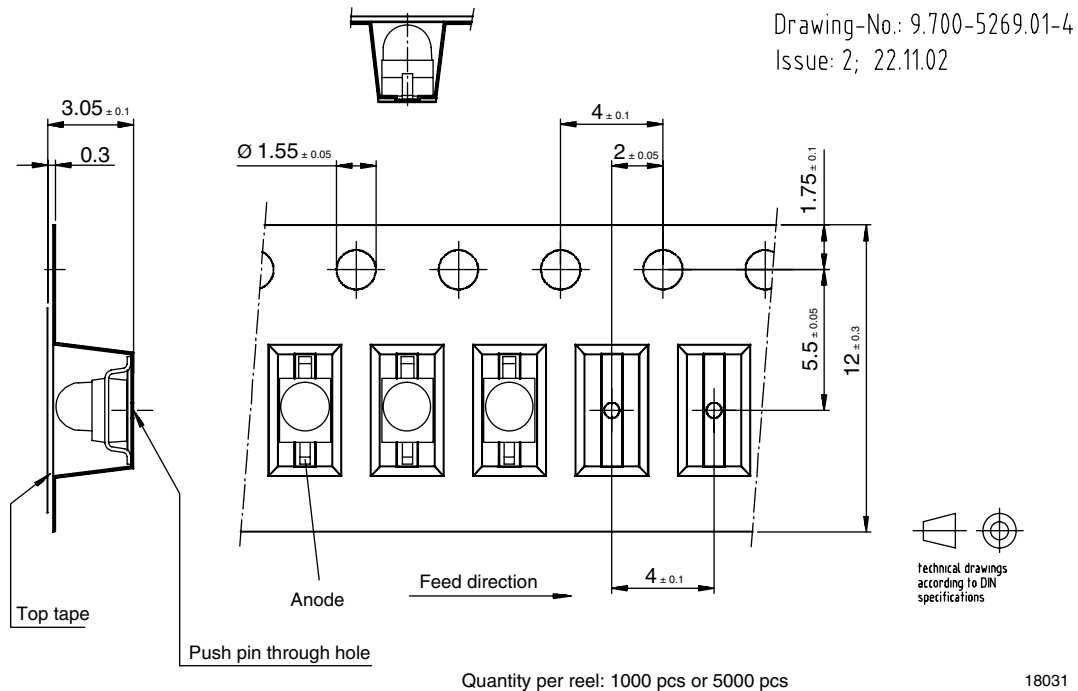
# TEMD1000, TEMD1020, TEMD1030, TEMD1040

Vishay Semiconductors

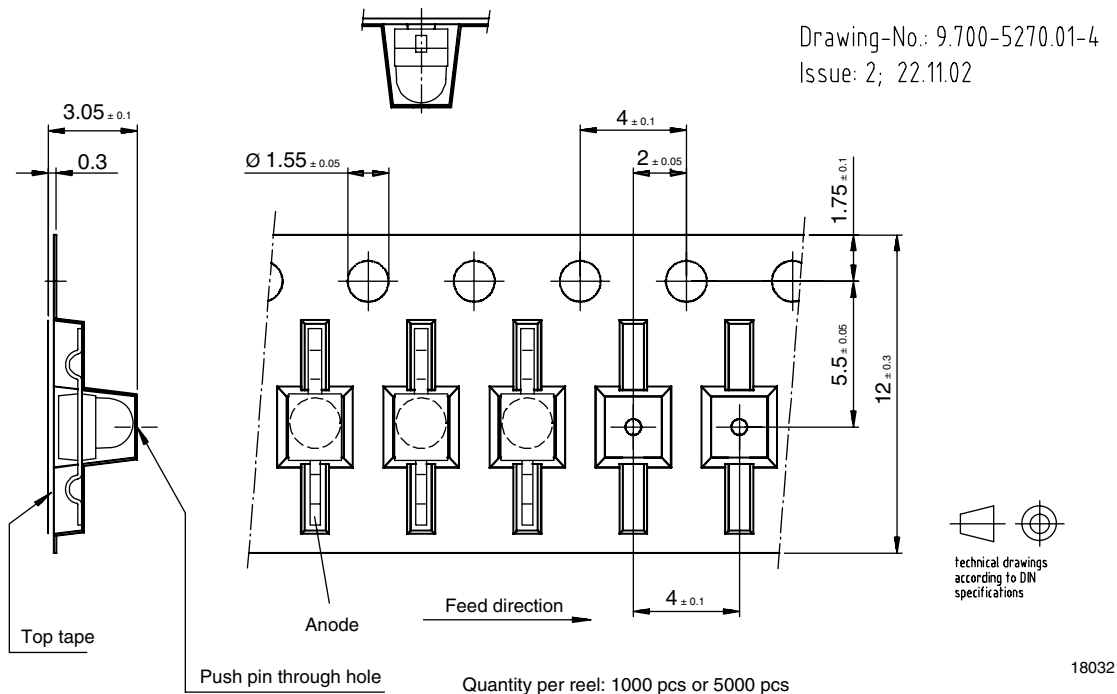
Silicon PIN Photodiode, RoHS Compliant



## TAPING DIMENSIONS in millimeters: TEMD1020



## TAPING DIMENSIONS in millimeters: TEMD1030





### Disclaimer

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