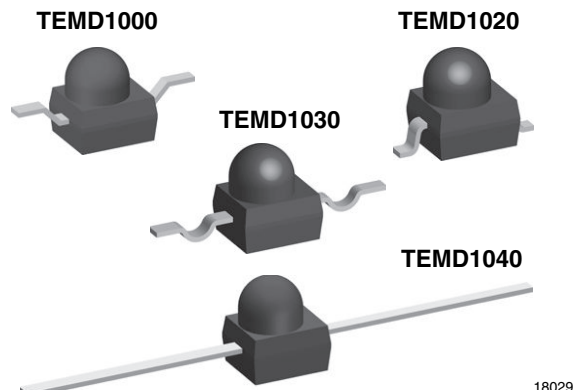


## Silicon PIN Photodiode, RoHS-Compliant



### 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 | $I_{ra}$ (μA) | $\phi$ (°) | $\lambda_{0.5}$ (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 ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                   | TEST CONDITION                  | SYMBOL    | VALUE       | UNIT             |
|-----------------------------|---------------------------------|-----------|-------------|------------------|
| Reverse voltage             |                                 | $V_R$     | 60          | V                |
| Power dissipation           | $T_{amb} \leq 25^\circ\text{C}$ | $P_V$     | 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       | $t \leq 5$ s                    | $T_{sd}$  | < 260       | $^\circ\text{C}$ |



| 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   | $V_R = 10\text{ V}$ , $E = 0$  | $I_{ro}$        | -    | 1           | 10   | nA            |
| Diode capacitance  | $V_R = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                          | $C_D$           | -    | 1.8         | -    | pF            |
| Reverse light current  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 870\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 6.0  | 10          | 13.0 | $\mu\text{A}$ |
|  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | -    | 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  |  | $\phi$          | -    | $\pm 15$    | -    | $^{\circ}$    |
| 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            |

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

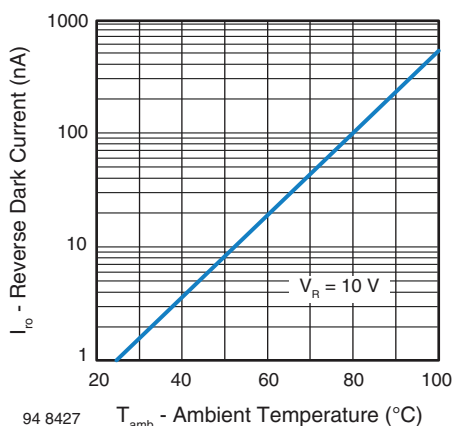


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

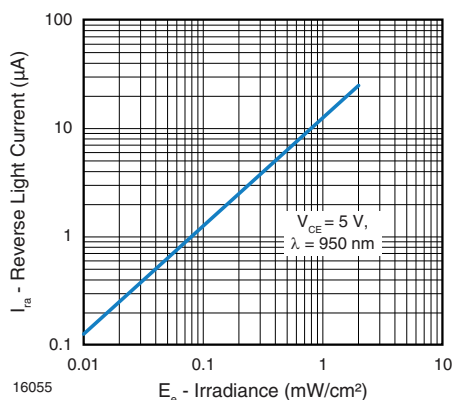


Fig. 3 - Reverse Light Current vs. Irradiance

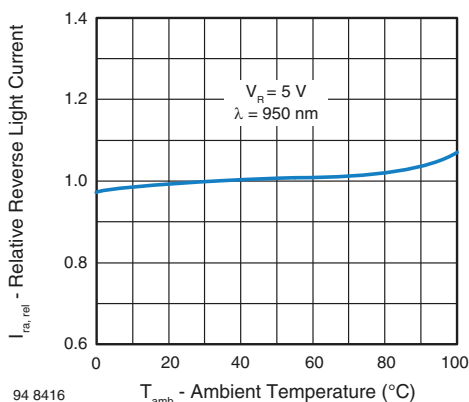


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

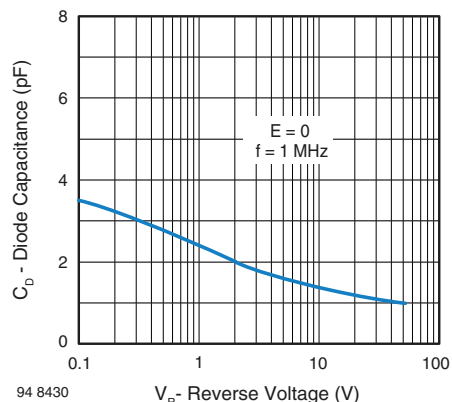


Fig. 4 - Diode Capacitance vs. Reverse Voltage

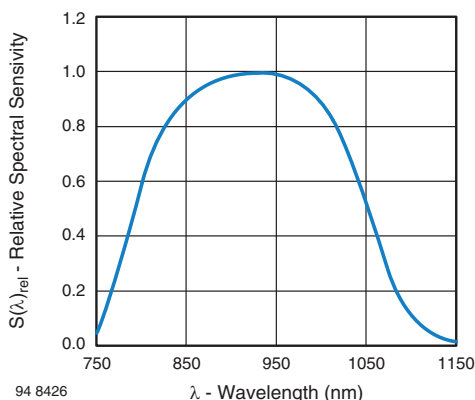


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

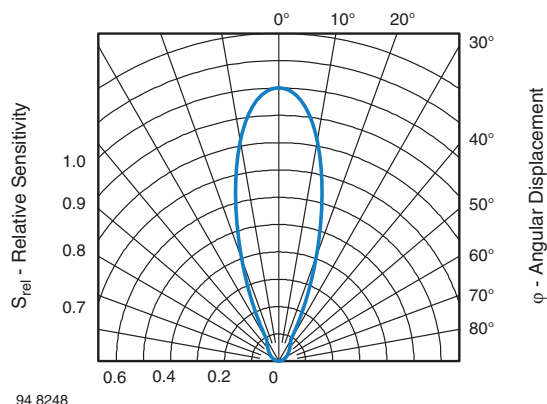


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

## 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

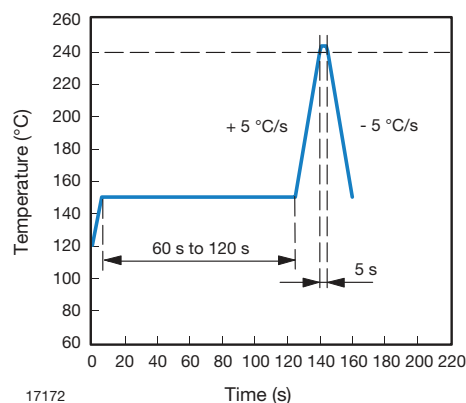


Fig. 7 - Lead Tin (SnPb) Reflow Solder Profile

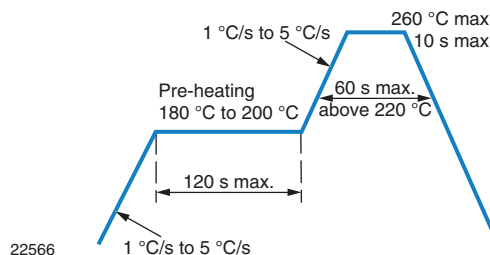
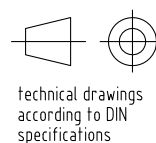
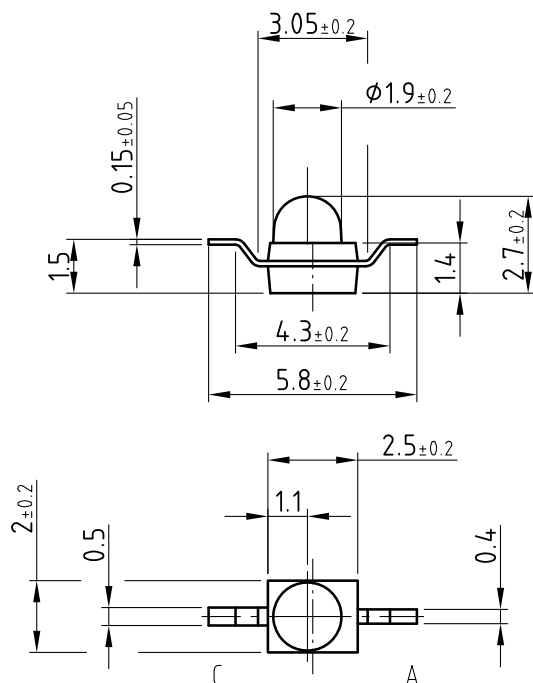


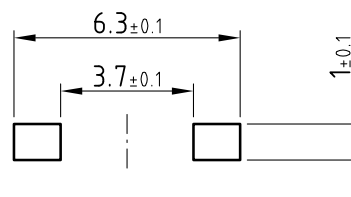
Fig. 8 - Lead (Pb)-Free Reflow Solder Profile According to J-STD-020



## PACKAGE DIMENSIONS in millimeters: TEMD1000



Solder pad proposal

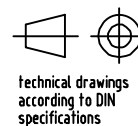
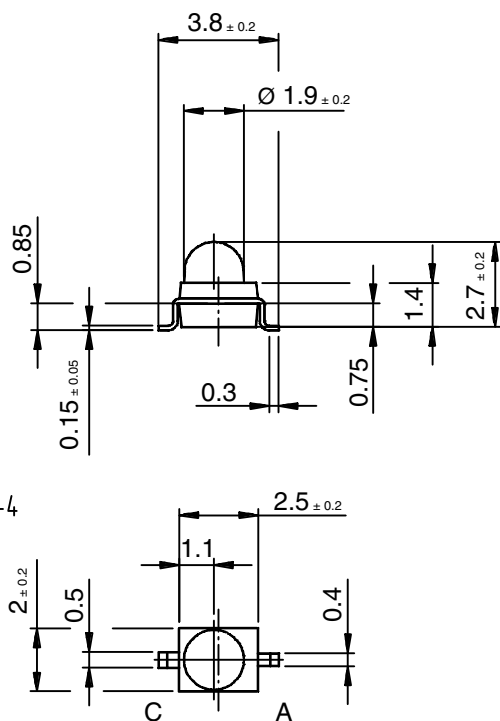


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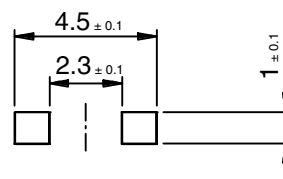
Issue: 3; 02.04.03

16159

## PACKAGE DIMENSIONS in millimeters: TEMD1020



Solder pad proposal

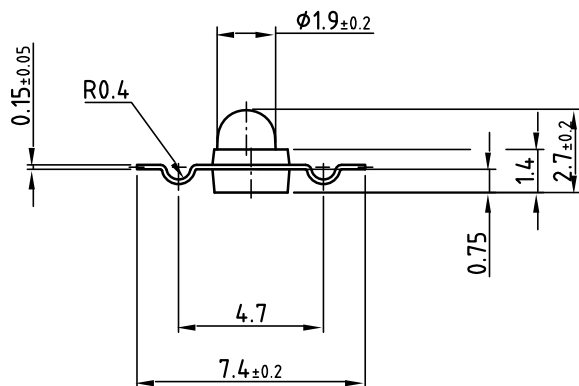


Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

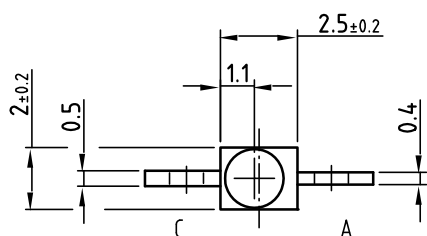
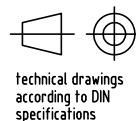
16160

## PACKAGE DIMENSIONS in millimeters: TEMD1030

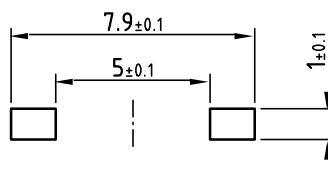


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Issue: 4; 08.05.03

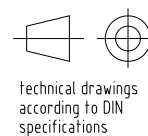
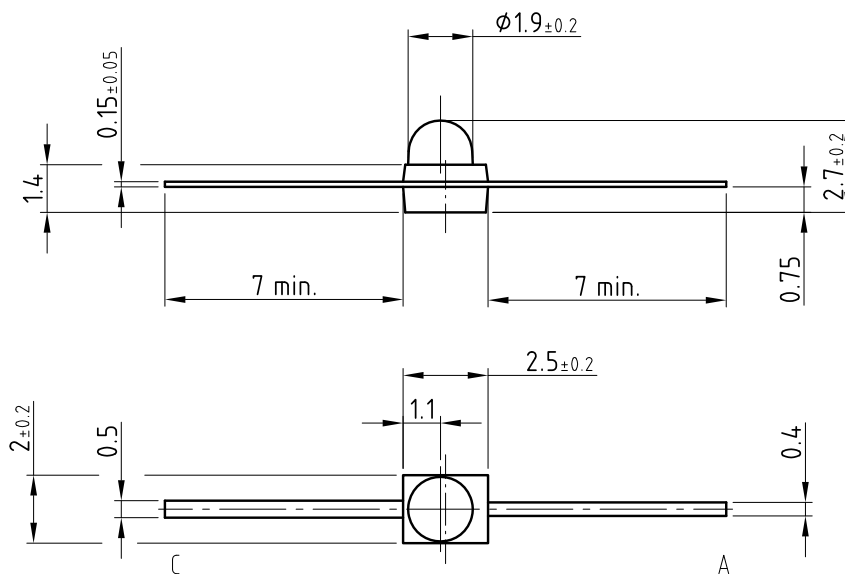


Solder pad proposal



16228

## PACKAGE DIMENSIONS in millimeters: TEMD1040



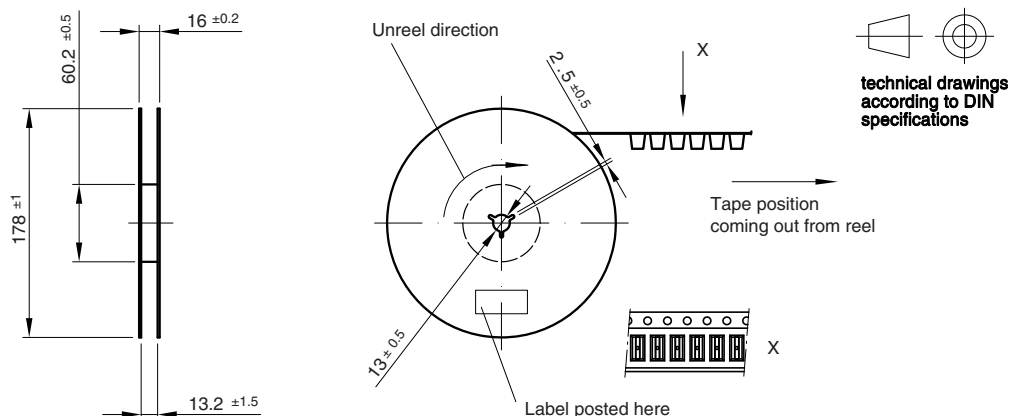
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Issue: 3; 02.04.03

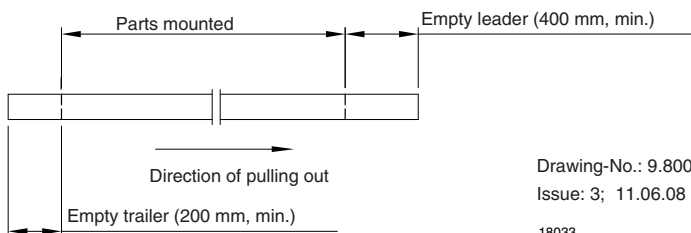
16760



## REEL DIMENSIONS in millimeters



Leader and trailer tape:

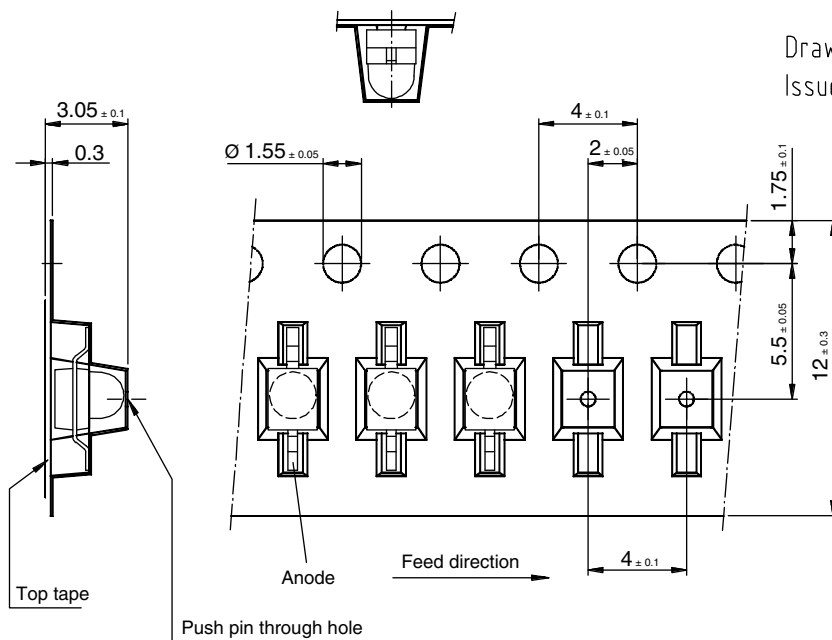


Drawing-No.: 9.800-5080.01-4

Issue: 3; 11.06.08

18033

## TAPING DIMENSIONS in millimeters: TEMD1000



Drawing-No.: 9.700-5268.01-4

Issue: 2; 22.11.02

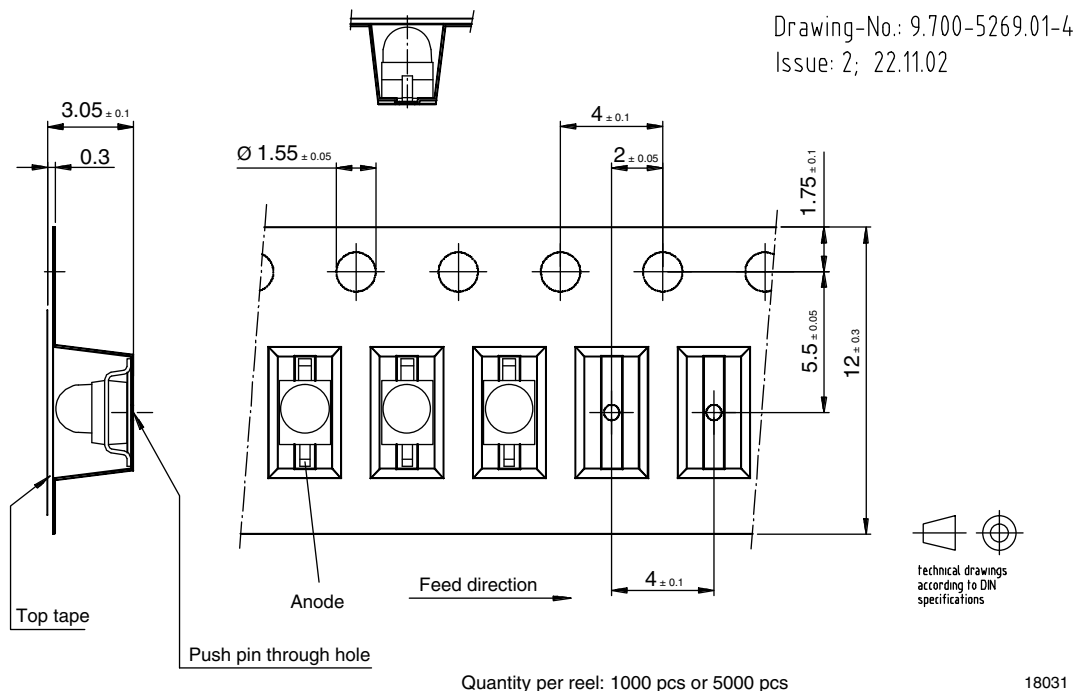


Quantity per reel: 1000 pcs or 5000 pcs

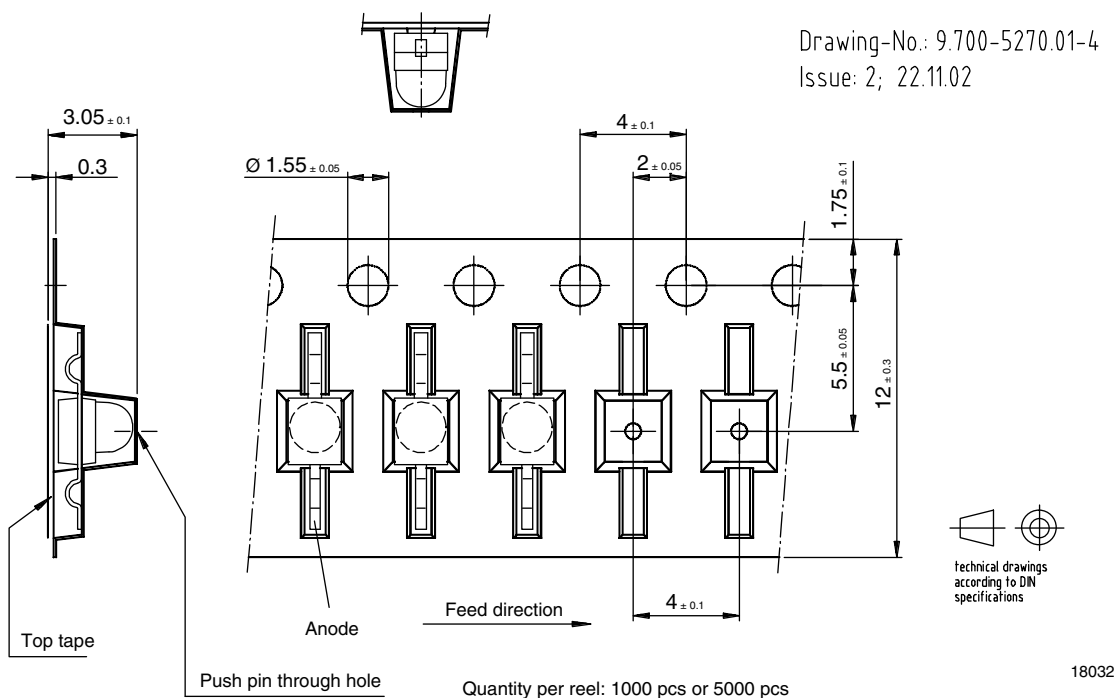
18030



## TAPING DIMENSIONS in millimeters: TEMD1020



## TAPING DIMENSIONS in millimeters: TEMD1030





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