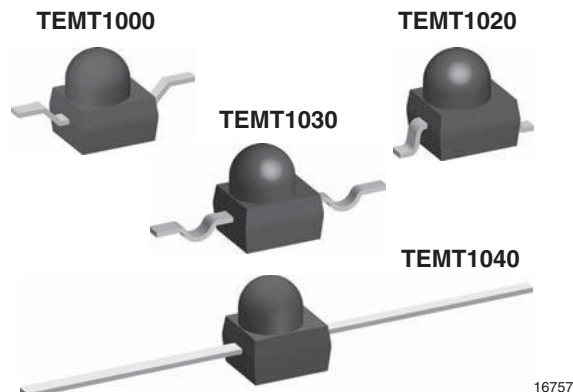


## Silicon NPN Phototransistor, RoHS Compliant



### 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
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm IR 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, acc. J-STD-020
- Compliant to RoHS Directive 2002/95/EC and in accordance with WEEE 2002/96/EC


RoHS  
COMPLIANT

### DESCRIPTION

TEMT1000 series are silicon NPN phototransistors with 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

- Detector in electronic control and drive circuits
- IR detector for daylight application
- Photo interrupters
- Counter
- Encoder

### PRODUCT SUMMARY

| COMPONENT | $I_{ca}$ (mA) | $\phi$ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------|--------------|----------------------|
| TEMT1000  | 7             | $\pm 15$     | 730 to 1000          |
| TEMT1020  | 7             | $\pm 15$     | 730 to 1000          |
| TEMT1030  | 7             | $\pm 15$     | 730 to 1000          |
| TEMT1040  | 7             | $\pm 15$     | 730 to 1000          |

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM     |
|---------------|---------------|------------------------------|------------------|
| TEMT1000      | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |
| TEMT1020      | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing         |
| TEMT1030      | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Yoke             |
| TEMT1040      | 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             |
|-------------------------------------|--|------------|---------------|------------------|
| Emitter collector voltage           |  | $V_{ECO}$  | 5             | V                |
| Collector current                   |  | $I_C$      | 50            | mA               |
| Collector peak current              | $t_p/T = 0.5, t_p \leq 10$ ms                    | $I_{CM}$   | 100           | mA               |
| Power dissipation                   | $T_{amb} \leq 55^\circ\text{C}$                  | $P_V$      | 100           | 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           | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | Soldered on PCB with pad dimensions: 4 mm x 4 mm | $R_{thJA}$ | 400           | K/W              |

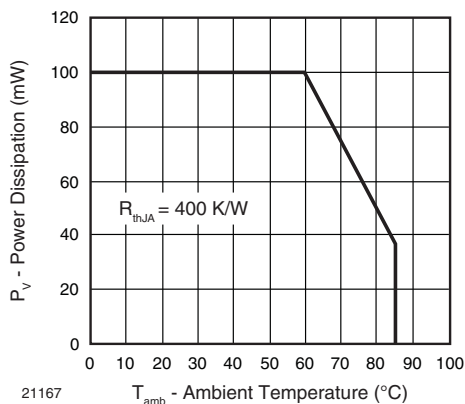


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |                 |      |             |      |               |
|---|--|-----------------|------|-------------|------|---------------|
| PARAMETER   | TEST CONDITION   | SYMBOL          | MIN. | TYP.        | MAX. | UNIT          |
| Collector emitter voltage   | $I_C = 1\text{ mA}$  | $V_{CE0}$       | 70   |             |      | V             |
| Collector emitter dark current  | $V_{CE} = 20\text{ V}, E = 0$  | $I_{CE0}$       |      | 1           | 200  | nA            |
| Collector emitter capacitance   | $V_{CE} = 5\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_{CE0}$       |      | 3           |      | pF            |
| Angle of half sensitivity   |  | $\phi$          |      | $\pm 15$    |      | deg           |
| Wavelength of peak sensitivity  |  | $\lambda_p$     |      | 880         |      | nm            |
| Range of spectral bandwidth   |  | $\lambda_{0.5}$ |      | 730 to 1000 |      | nm            |
| Collector emitter saturation voltage  | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, I_C = 0.1\text{ mA}$ | $V_{CEsat}$     |      |             | 0.3  | V             |
| Turn-on time  | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\text{ }\Omega$         | $t_{on}$        |      | 2.0         |      | $\mu\text{s}$ |
| Turn-off time   | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\text{ }\Omega$         | $t_{off}$       |      | 2.3         |      | $\mu\text{s}$ |
| Cut-off frequency   | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\text{ }\Omega$         | $f_c$           |      | 180         |      | kHz           |
| Collector light current   | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$ | $I_{ca}$        | 2    | 7.0         |      | mA            |

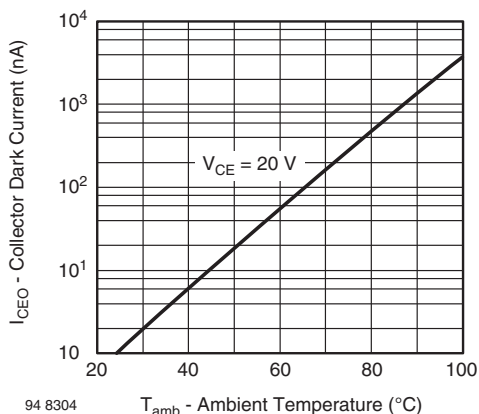
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 2 - Collector Dark Current vs. Ambient Temperature

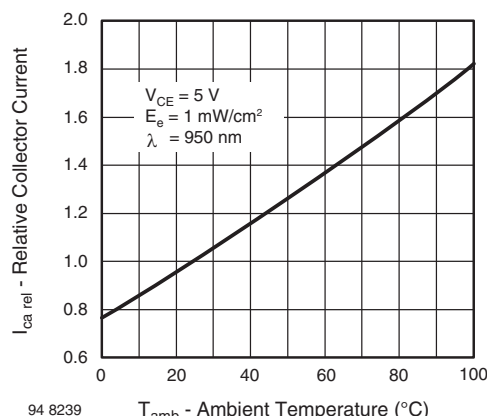


Fig. 3 - Relative Collector Current vs. Ambient Temperature

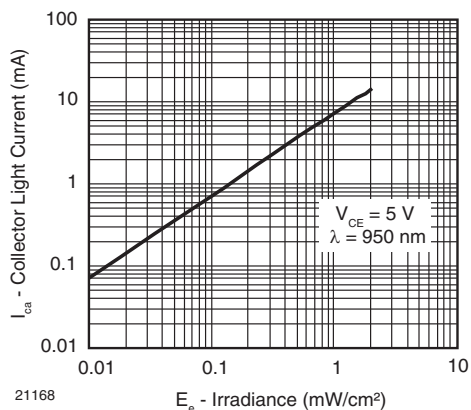


Fig. 4 - Collector Light Current vs. Irradiance

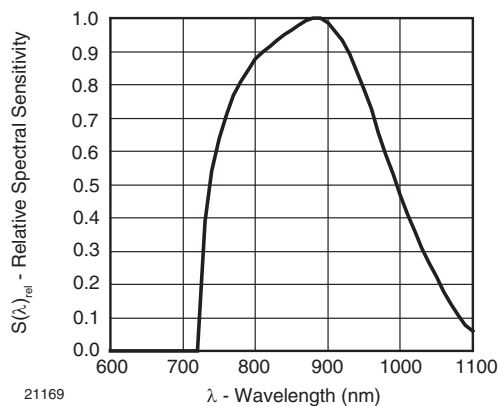


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

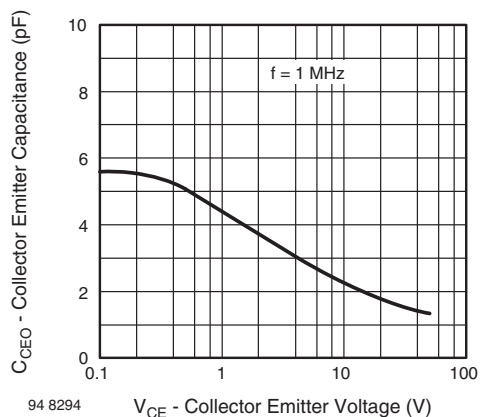


Fig. 5 - Collector Emitter Capacitance vs. Collector Emitter Voltage

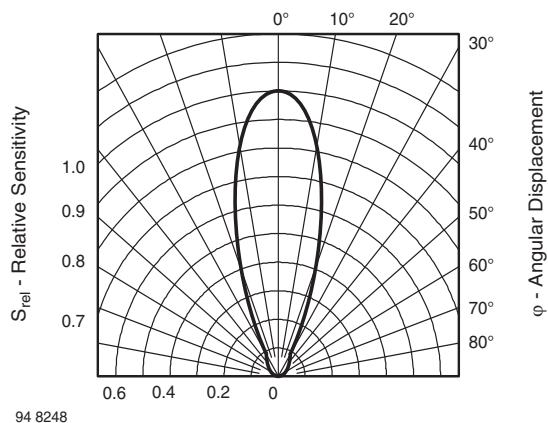


Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement

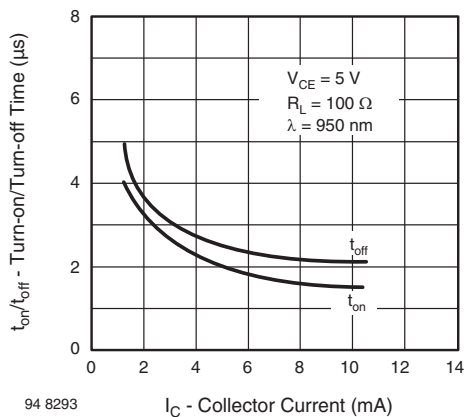


Fig. 6 - Turn-on/Turn-off Time vs. Collector Current



## 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, 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.
- 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.
- 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

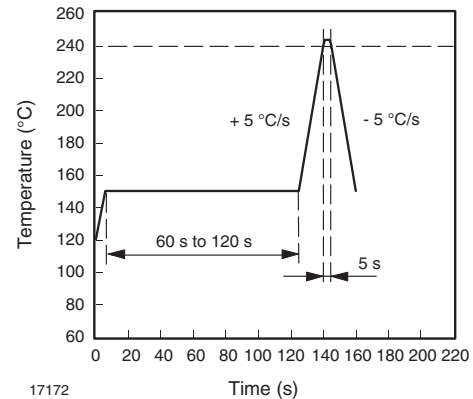
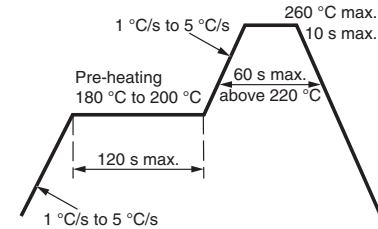


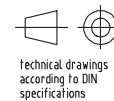
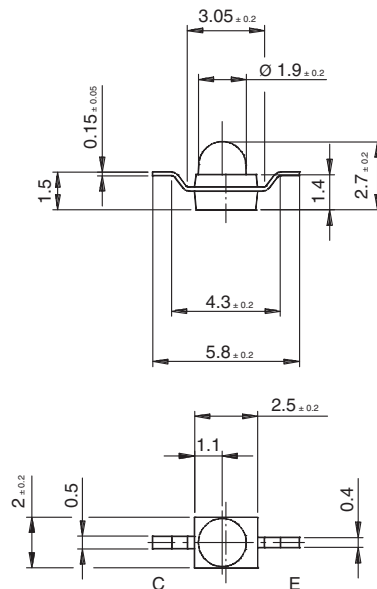
Fig. 9 - Lead Tin (SnPb) Reflow Solder Profile



22566

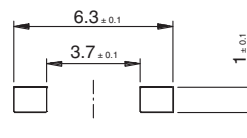
Fig. 10 - Lead (Pb)-Free Reflow Solder Profile acc. J-STD-020

## PACKAGE DIMENSIONS in millimeters: TEMT1000



technical drawings  
according to DIN  
specifications

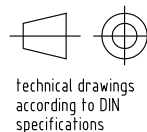
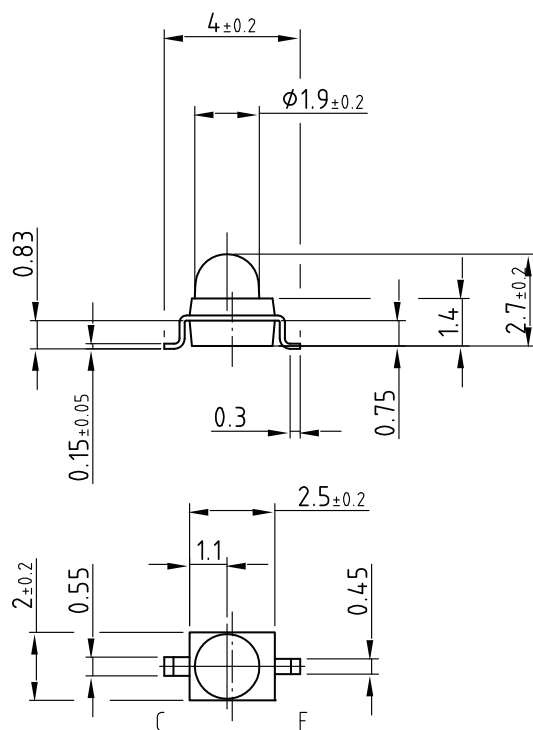
Solder pad proposal



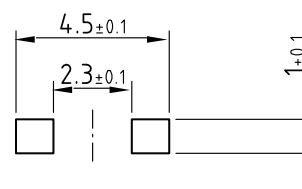
Drawing-No.: 6.544-5326.01-4

Issue: 4; 02.04.03

16104

**PACKAGE DIMENSIONS** in millimeters: **TEMT1020**

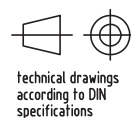
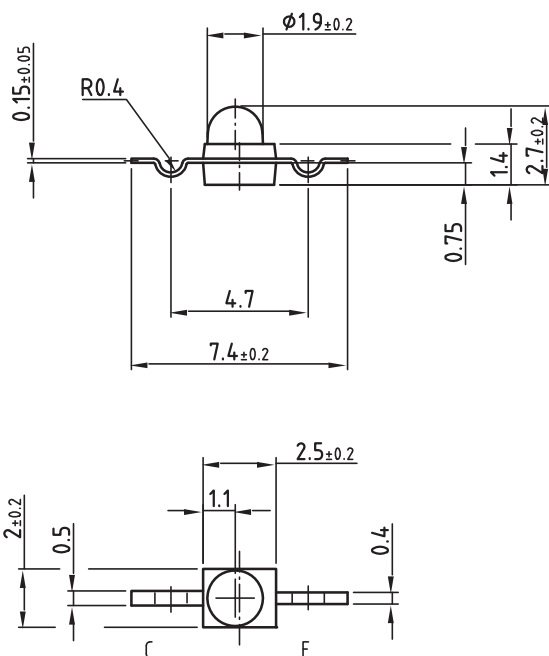
### Solder pad proposal



Drawing-No.: 6.544-5325.01-4

Issue: 5; 19.01.06

16105

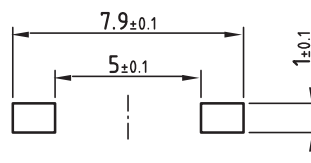
**PACKAGE DIMENSIONS** in millimeters: **TEMT1030**

Drawing-No.: 6.544-5329.02-4

Issue: 3; 08.05.03

All dimensions in mm

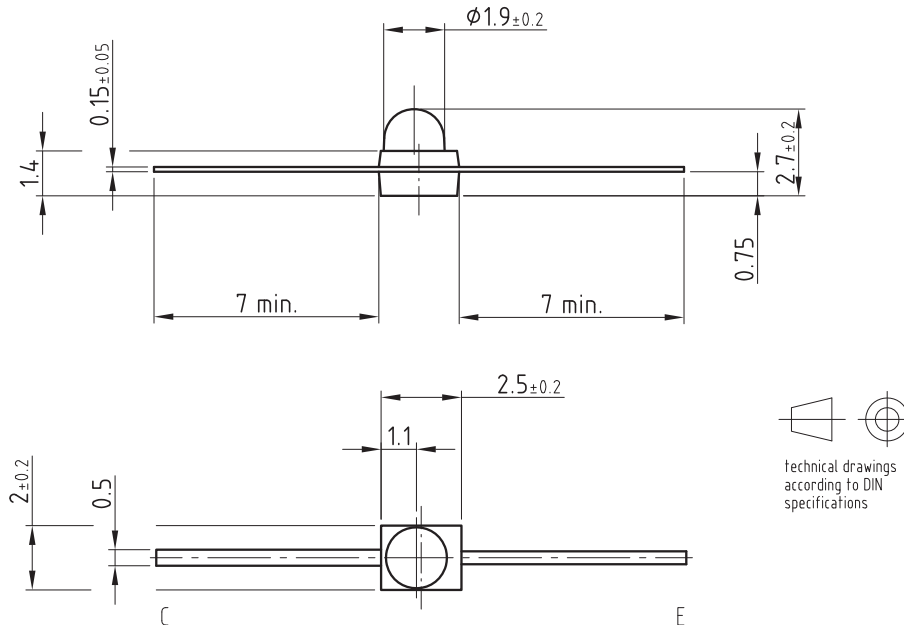
### Solder pad proposal



16756



## PACKAGE DIMENSIONS in millimeters: TEMT1040

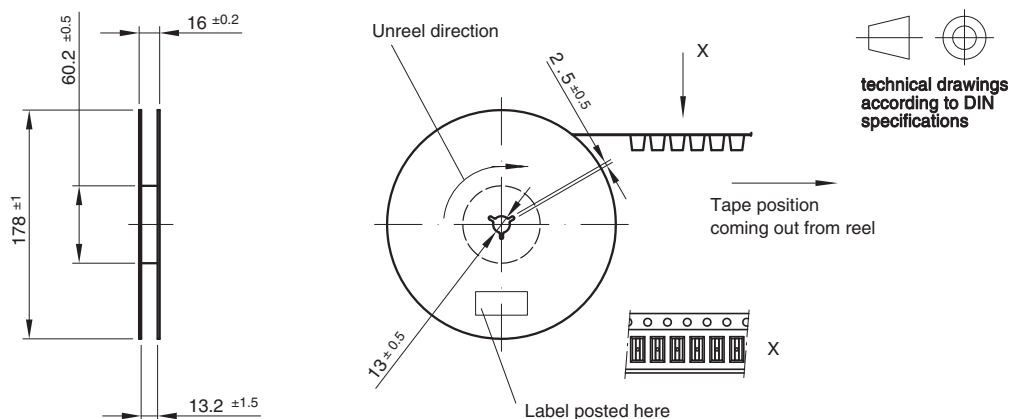


Drawing-No.: 6.544-5339.01-4

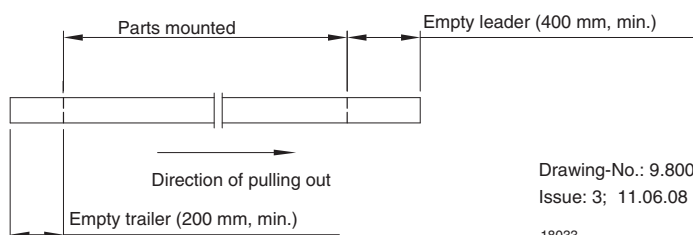
Issue: 2; 02.04.03

16500

## REEL DIMENSIONS in millimeters



Leader and trailer tape:



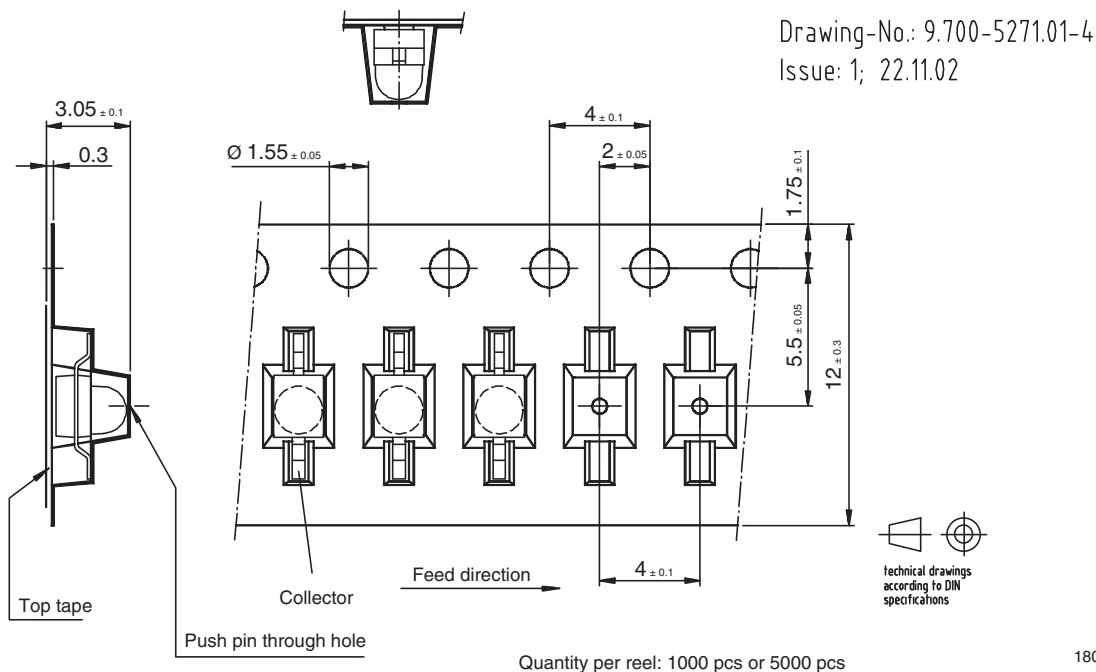
Drawing-No.: 9.800-5080.01-4

Issue: 3; 11.06.08

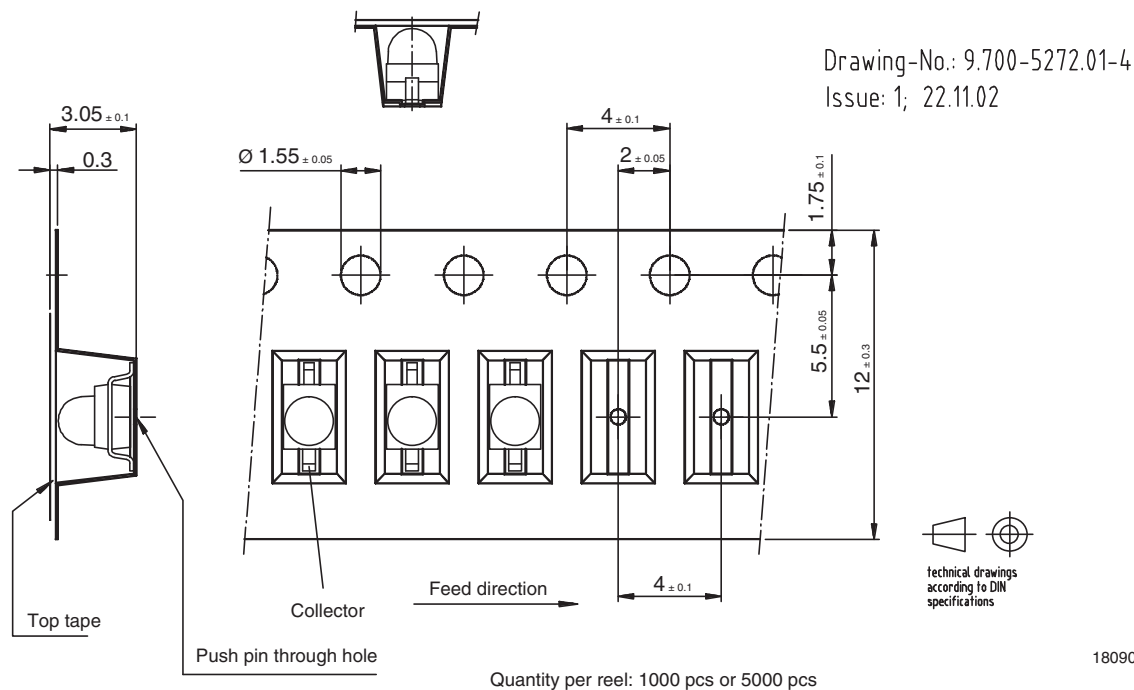
18033



## TAPING DIMENSIONS in millimeters: TEMT1000



## TAPING DIMENSIONS in millimeters: TEMT1020

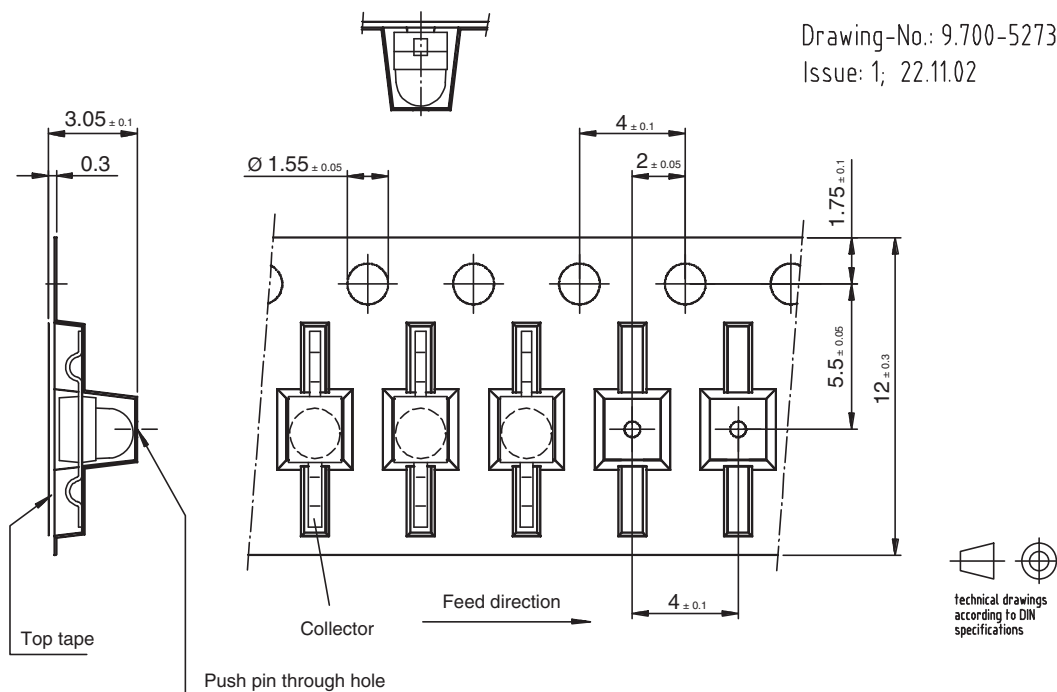




## TAPING DIMENSIONS in millimeters: TEMT1030

Drawing-No.: 9.700-5273.01-4

Issue: 1; 22.11.02



18091

Quantity per reel: 1000 pcs or 5000 pcs



## 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.

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.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Vishay:

[TEMT1000](#) [TEMT1030](#) [TEMT1040](#)