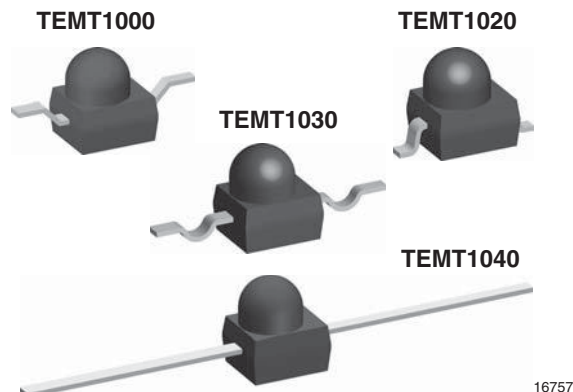


Silicon NPN Phototransistor, RoHS Compliant



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) | ϕ (deg) | $\lambda_{0.5}$ (nm) |
|-----------|---------------|--------------|----------------------|
| TEMT1000 | 7 | ± 15 | 730 to 1000 |
| TEMT1020 | 7 | ± 15 | 730 to 1000 |
| TEMT1030 | 7 | ± 15 | 730 to 1000 |
| TEMT1040 | 7 | ± 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 |

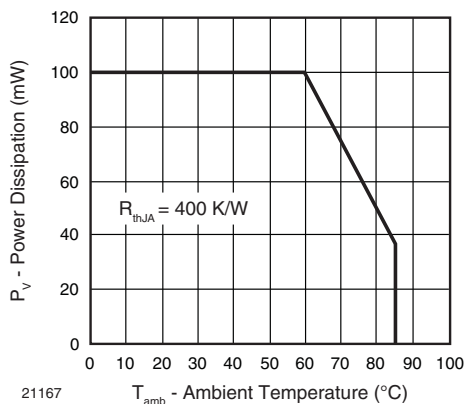


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 | | ϕ | | ± 15 | | deg |
| Wavelength of peak sensitivity | | λ_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 | | μs |
| Turn-off time | $V_S = 5\text{ V}, I_C = 5\text{ mA}, R_L = 100\text{ }\Omega$ | t_{off} | | 2.3 | | μs |
| 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 |

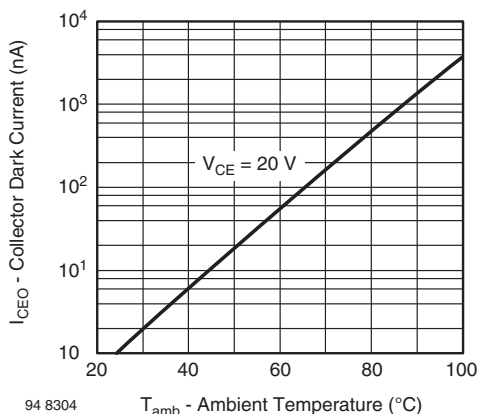
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 2 - Collector Dark Current vs. Ambient Temperature

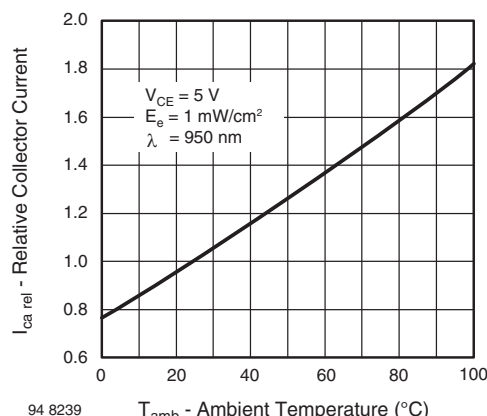


Fig. 3 - Relative Collector Current vs. Ambient Temperature

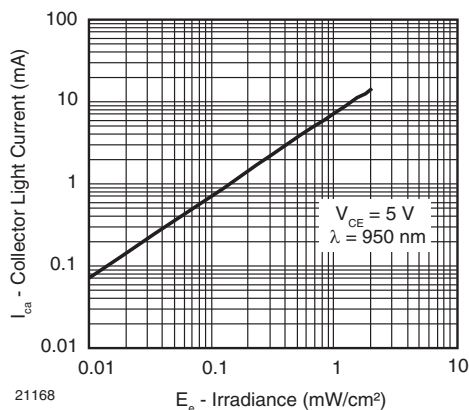


Fig. 4 - Collector Light Current vs. Irradiance

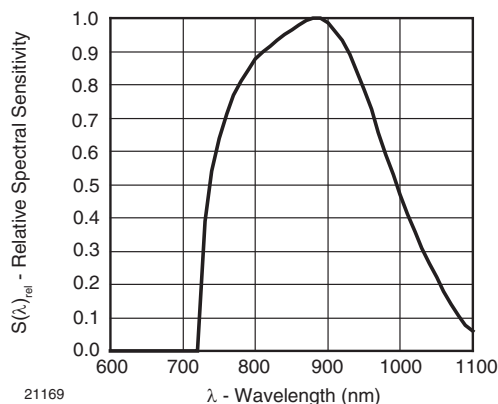


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

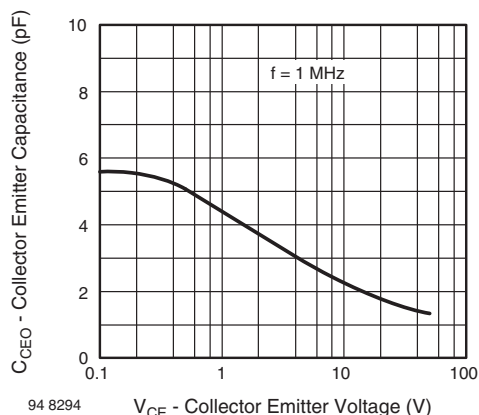


Fig. 5 - Collector Emitter Capacitance vs. Collector Emitter Voltage

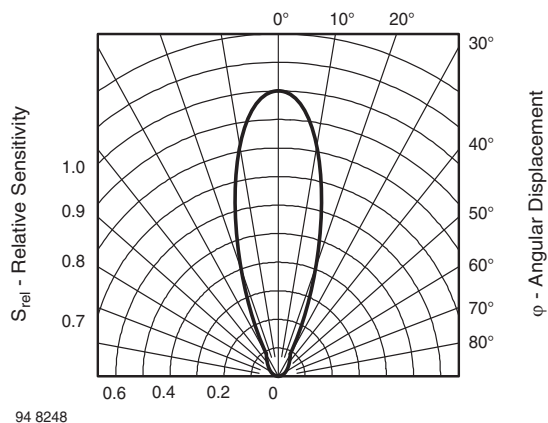


Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement

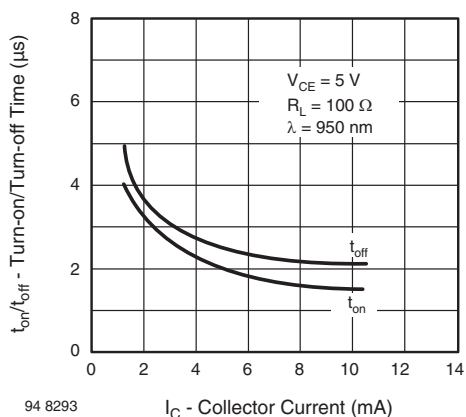


Fig. 6 - Turn-on/Turn-off Time vs. Collector Current



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

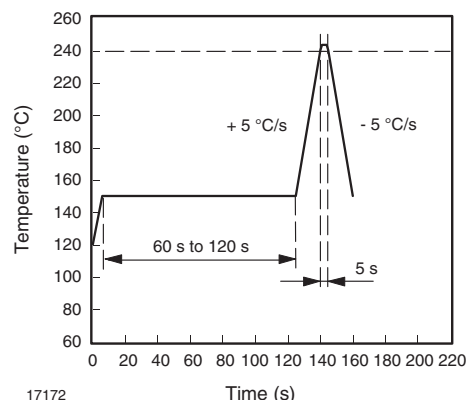
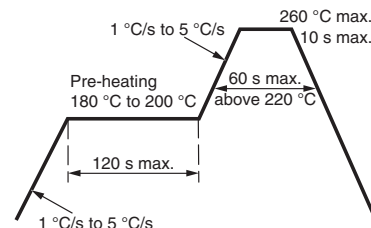


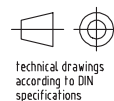
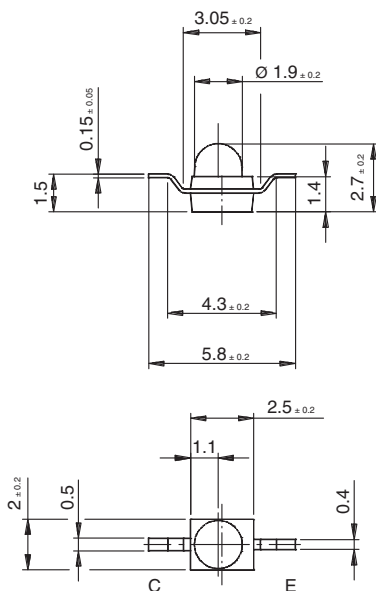
Fig. 9 - Lead Tin (SnPb) Reflow Solder Profile



22566

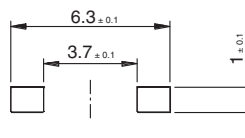
Fig. 10 - Lead (Pb)-Free Reflow Solder Profile acc. J-STD-020

PACKAGE DIMENSIONS in millimeters: TEMT1000



technical drawings
according to DIN
specifications

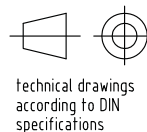
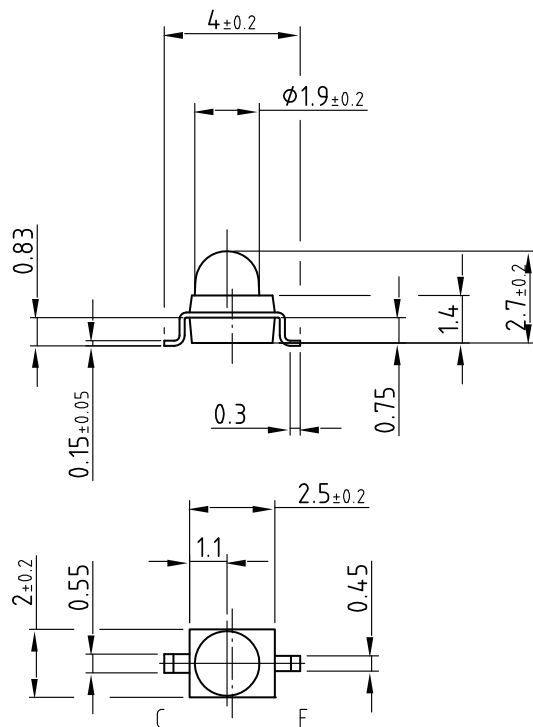
Solder pad proposal



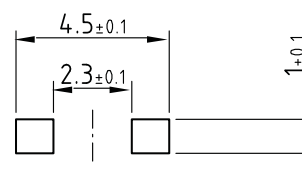
Drawing-No.: 6.544-5326.01-4

Issue: 4; 02.04.03

16104

PACKAGE DIMENSIONS in millimeters: **TEMT1020**

Solder pad proposal

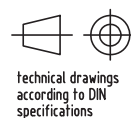
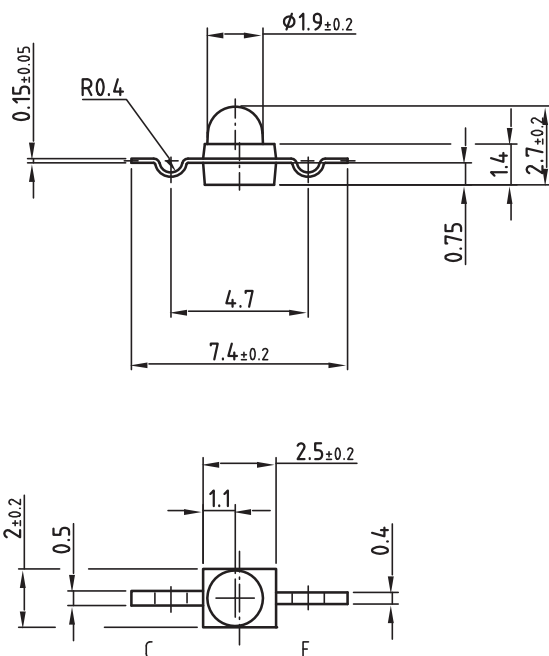


Drawing-No.: 6.544-5325.01-4

Issue: 5; 19.01.06

16105

PACKAGE DIMENSIONS in millimeters: **TEMT1030**

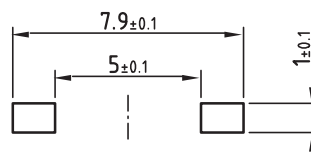


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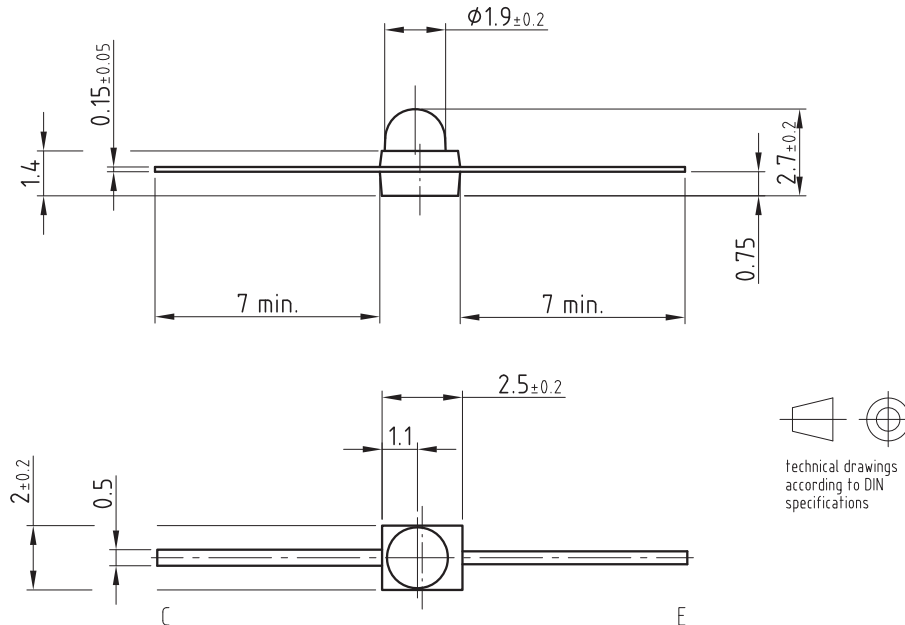
Issue: 3; 08.05.03

All dimensions in mm

Solder pad proposal



16756

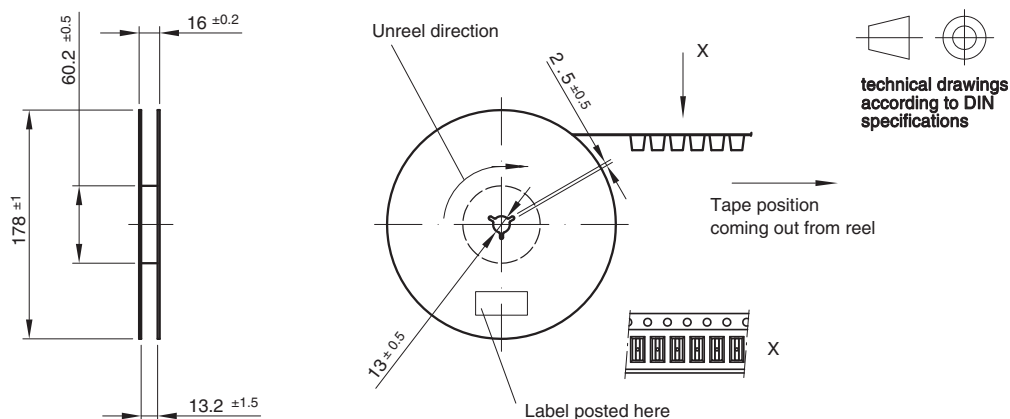
PACKAGE DIMENSIONS in millimeters: **TEMT1040**

Drawing-No.: 6.544-5339.01-4

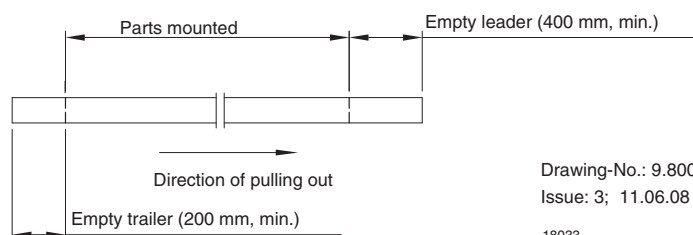
Issue: 2; 02.04.03

16500

REEL DIMENSIONS in millimeters



Leader and trailer tape:



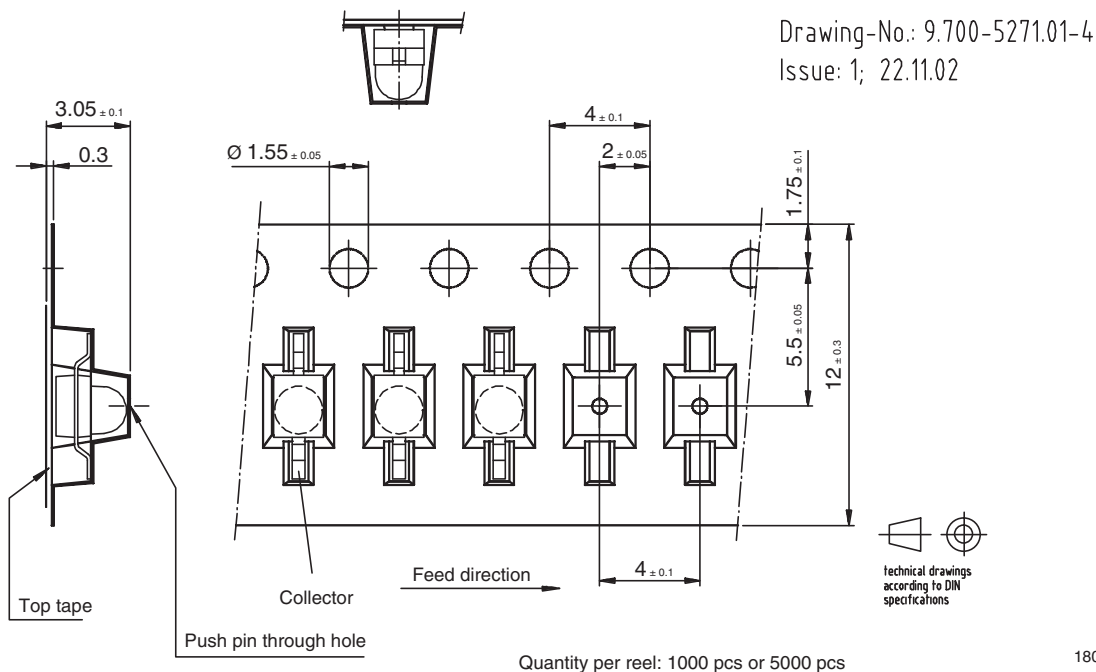
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Issue: 3; 11.06.08

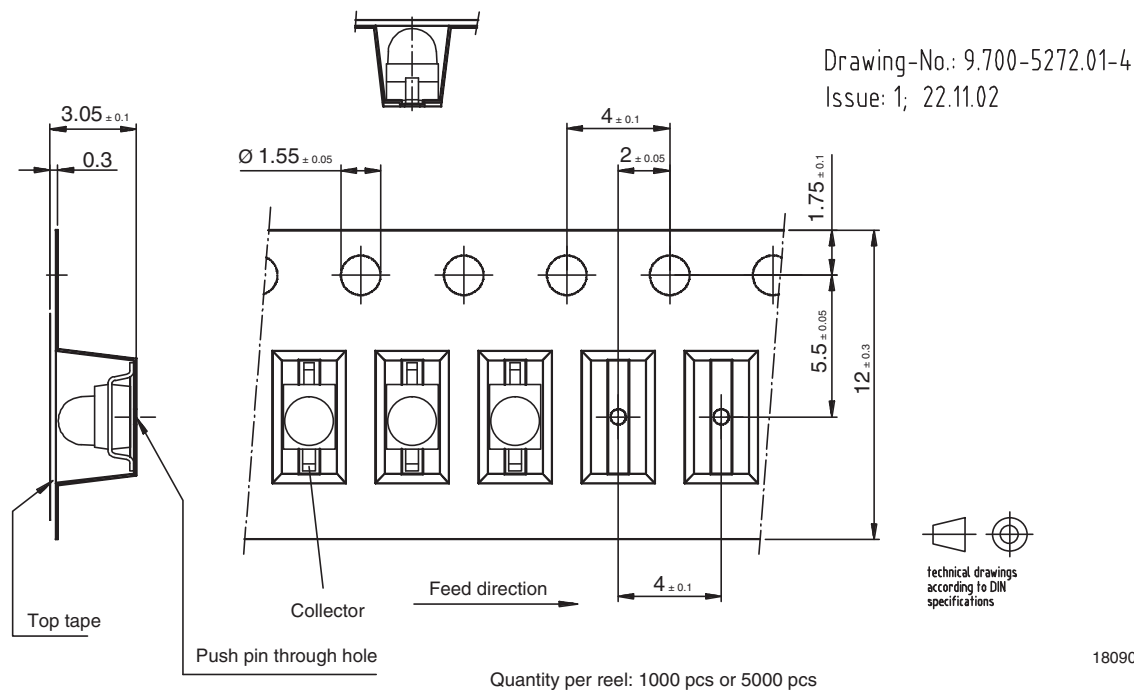
18033



TAPING DIMENSIONS in millimeters: TEMT1000

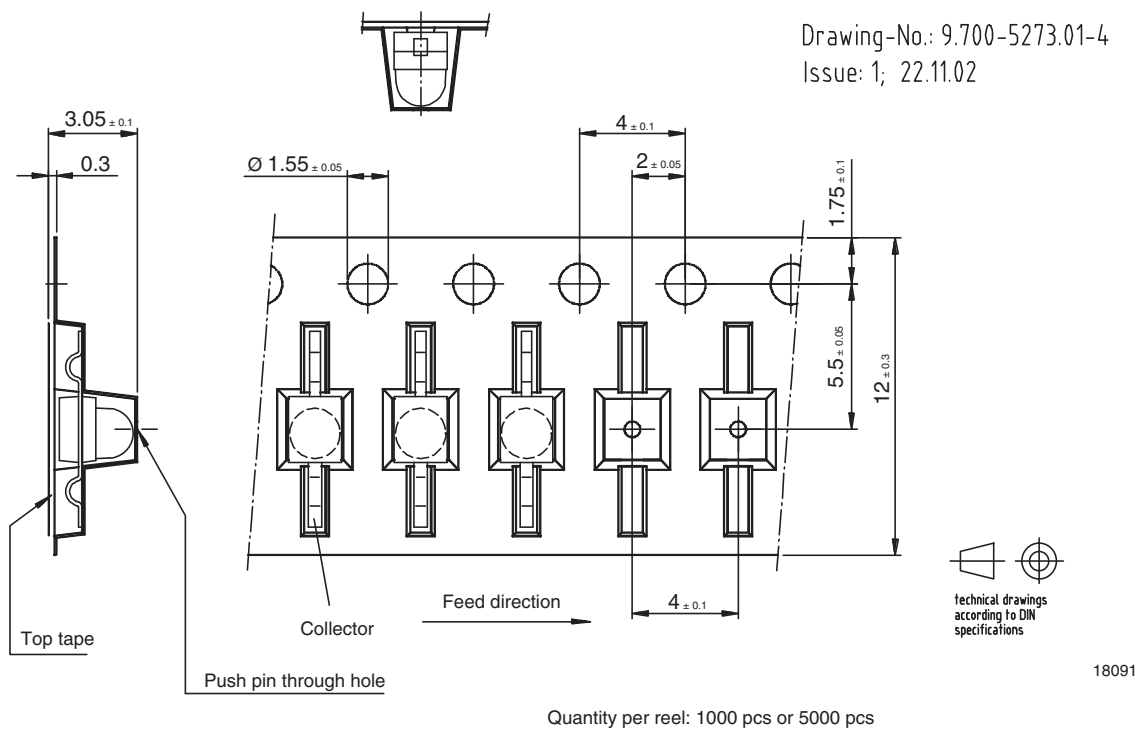


TAPING DIMENSIONS in millimeters: TEMT1020





TAPING DIMENSIONS in millimeters: TEMT1030





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