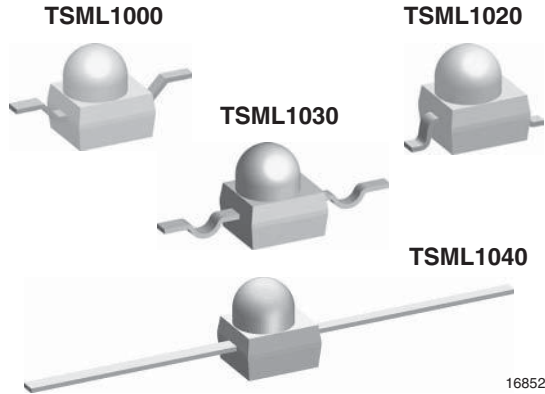




High Power Infrared Emitting Diode, RoHS Compliant, 940 nm, GaAlAs/GaAs



16852

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
- Peak wavelength: $\lambda_p = 940 \text{ nm}$
- High radiant power
- High radiant intensity
- Angle of half intensity: $\phi = \pm 12^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching with Si photodetectors
- Versatile terminal configurations
- Package matches with detector TEMT1000
- 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

TSML1000 is an infrared, 940 nm emitting diode in GaAlAs/GaAs with high radiant power molded in a clear, untinted plastic package (with lens) for surface mounting (SMD).

APPLICATIONS

- For remote control
- Punched tape readers
- Encoder
- Photointerrupters

| PRODUCT SUMMARY | | | | |
|-----------------|---------------|--------------|------------------|------------|
| COMPONENT | I_e (mW/sr) | ϕ (deg) | λ_p (nm) | t_r (ns) |
| TSML1000 | 7 | ± 12 | 940 | 800 |
| TSML1020 | 7 | ± 12 | 940 | 800 |
| TSML1030 | 7 | ± 12 | 940 | 800 |
| TSML1040 | 7 | ± 12 | 940 | 800 |

Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| TSML1000 | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |
| TSML1020 | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing |
| TSML1030 | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Yoke |
| TSML1040 | Bulk | MOQ: 1000 pcs, 1000 pcs/bulk | Axial leads |

Note

- MOQ: minimum order quantity



| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | |
|---|---|------------|---------------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage | | V_R | 5 | V |
| Forward current | | I_F | 100 | mA |
| Peak forward current | $t_p/T = 0.5, t_p = 100\text{ }\mu\text{s}$ | I_{FM} | 200 | mA |
| Surge forward current | $t_p = 100\text{ }\mu\text{s}$ | I_{FSM} | 1.0 | A |
| Power dissipation | | P_V | 190 | 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 | $^{\circ}\text{C}$ |
| Thermal resistance junction/ambient | Soldered on PCB, pad dimensions: 4 mm x 4 mm | R_{thJA} | 400 | $^{\circ}\text{C}$ |

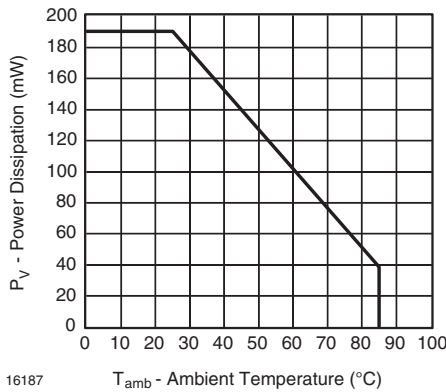


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

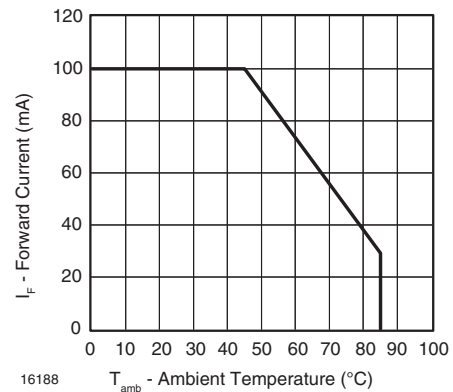


Fig. 2 - Forward Current vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|--|------------------|------|----------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | $I_F = 20\text{ mA}, t_p = 20\text{ ms}$ | V_F | | 1.2 | 1.5 | V |
| | $I_F = 1\text{ A}, t_p = 100\text{ }\mu\text{s}$ | V_F | | 2.6 | | V |
| Temperature coefficient of V_F | $I_F = 1\text{ mA}$ | TK_{V_F} | | - 1.8 | | mV/K |
| Reverse current | $V_R = 5\text{ V}$ | I_R | | | 10 | μA |
| Junction capacitance | $V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0$ | C_j | | 25 | | pF |
| Radiant intensity | $I_F = 20\text{ mA}, t_p = 20\text{ ms}$ | I_e | 3 | 7 | 15 | mW/sr |
| Radiant power | $I_F = 100\text{ mA}, t_p = 20\text{ ms}$ | ϕ_e | | 35 | | mW |
| Temperature coefficient of ϕ_e | $I_F = 20\text{ mA}$ | TK_{ϕ_e} | | - 0.6 | | %/K |
| Angle of half intensity | | φ | | ± 12 | | deg |
| Peak wavelength | $I_F = 100\text{ mA}$ | λ_p | | 940 | | nm |
| Spectral bandwidth | $I_F = 100\text{ mA}$ | $\Delta\lambda$ | | 50 | | nm |
| Temperature coefficient of λ_p | $I_F = 100\text{ mA}$ | TK_{λ_p} | | 0.2 | | nm/K |
| Rise time | $I_F = 100\text{ mA}$ | t_r | | 800 | | ns |
| Fall time | $I_F = 100\text{ mA}$ | t_f | | 800 | | ns |
| Virtual source diameter | | d | | 1.2 | | mm |



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

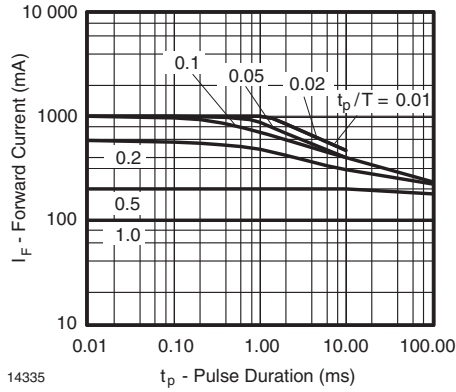


Fig. 3 - Pulse Forward Current vs. Pulse Duration

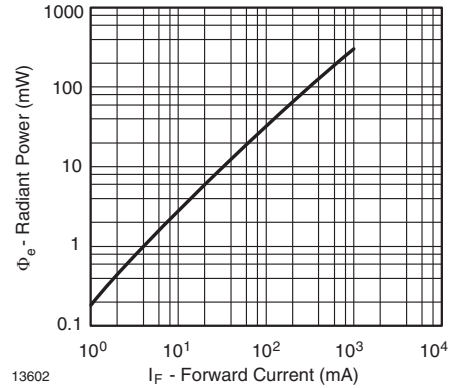


Fig. 6 - Radiant Power vs. Forward Current

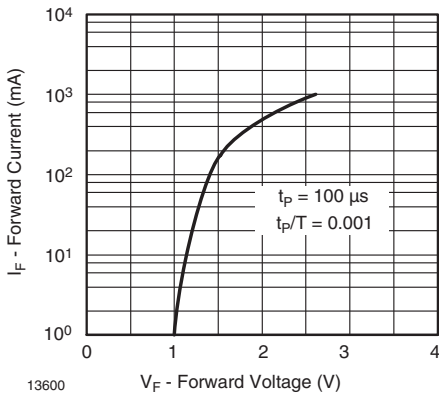


Fig. 4 - Forward Current vs. Forward Voltage

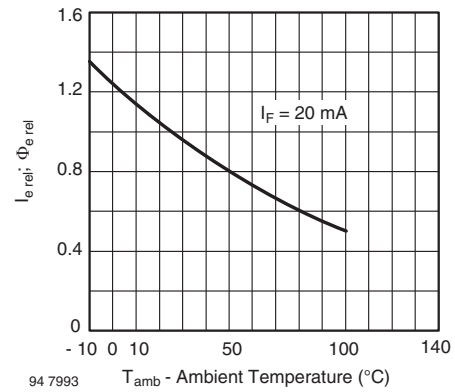


Fig. 7 - Relative Radiant Intensity/Power vs. Ambient Temperature

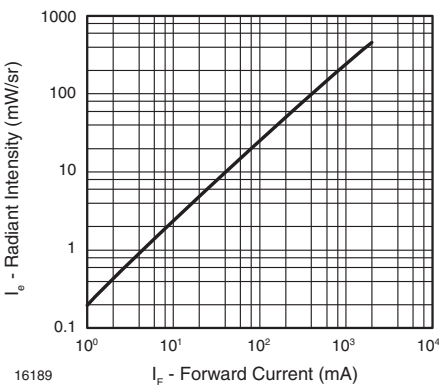


Fig. 5 - Radiant Intensity vs. Forward Current

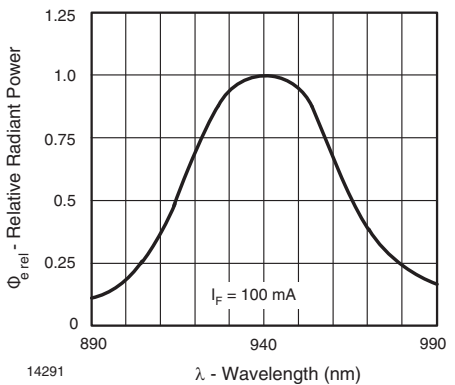


Fig. 8 - Relative Radiant Power vs. Wavelength

REFLOW SOLDER PROFILE

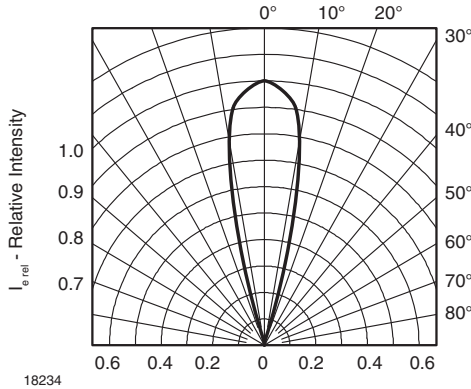


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

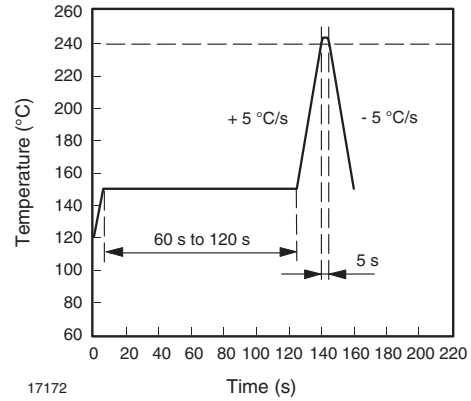


Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

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 %.

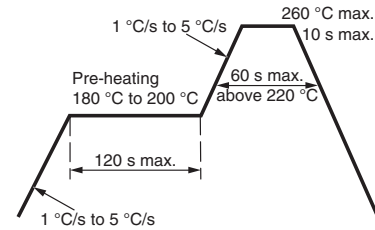
2.2 Floor life must not exceed 168 h, acc. to JEDEC level 3, J-STD-020.

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 ± 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.

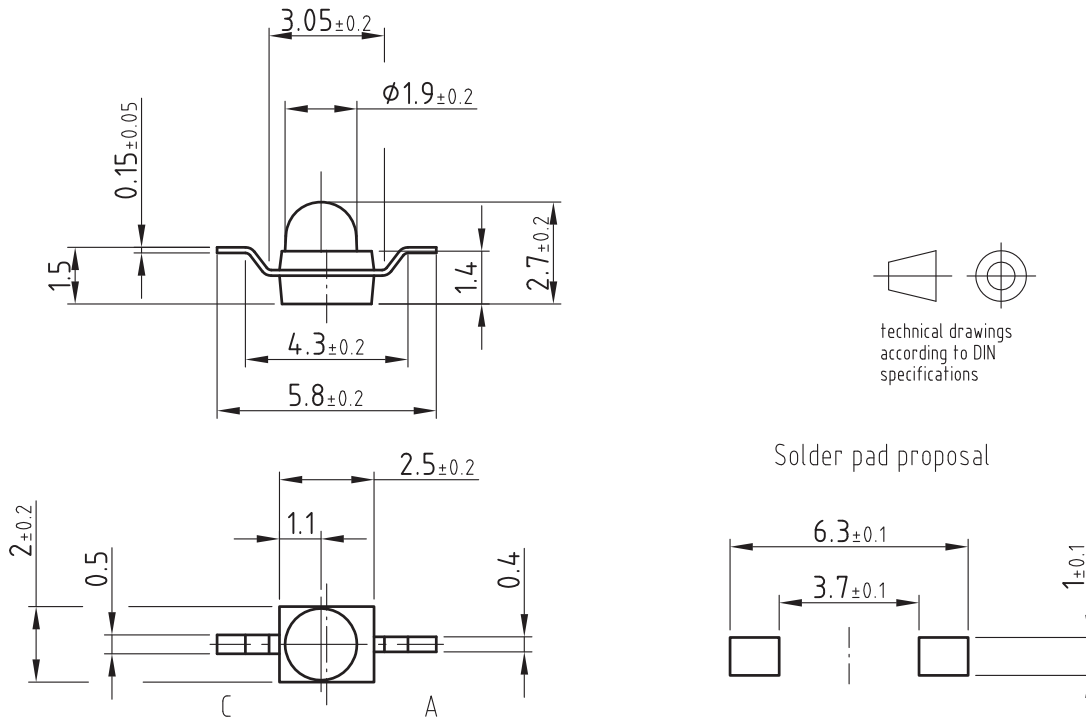


22566

Fig. 11 - Lead (Pb)-Free Reflow Solder Profile acc. J-STD-020

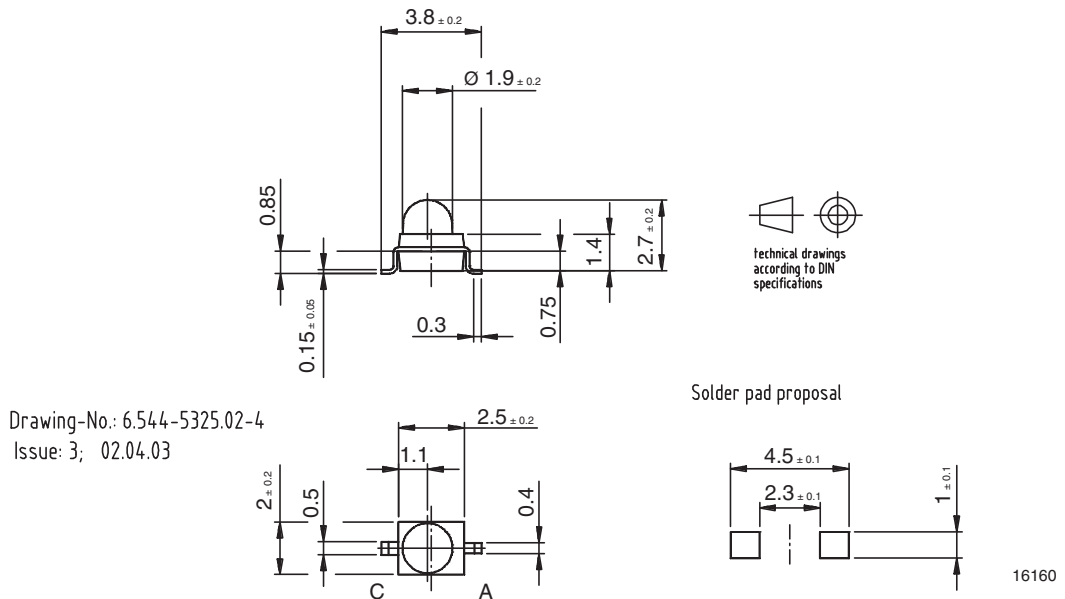


PACKAGE DIMENSIONS in millimeters: TSML1000



Drawing-No.: 6.544-5326.02-4
 Issue: 3; 02.04.03
 16159

PACKAGE DIMENSIONS in millimeters: TSML1020

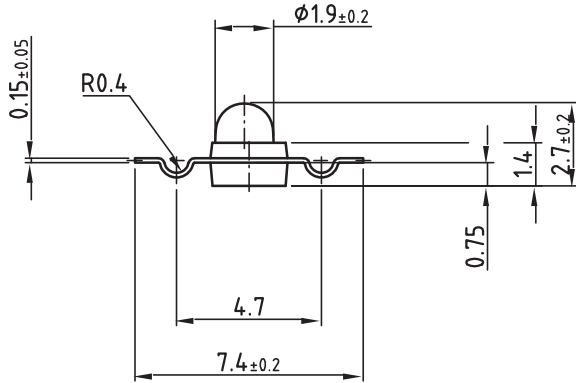


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 Issue: 3; 02.04.03

16160

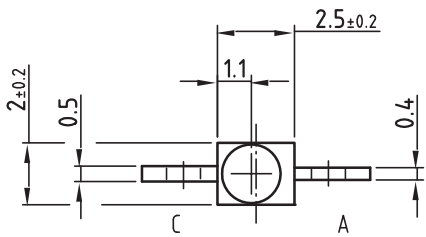
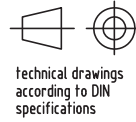


PACKAGE DIMENSIONS in millimeters: TSML1030

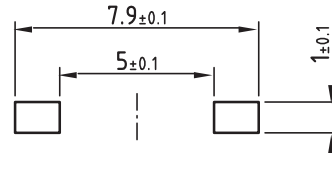


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Issue: 4; 08.05.03

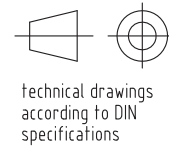
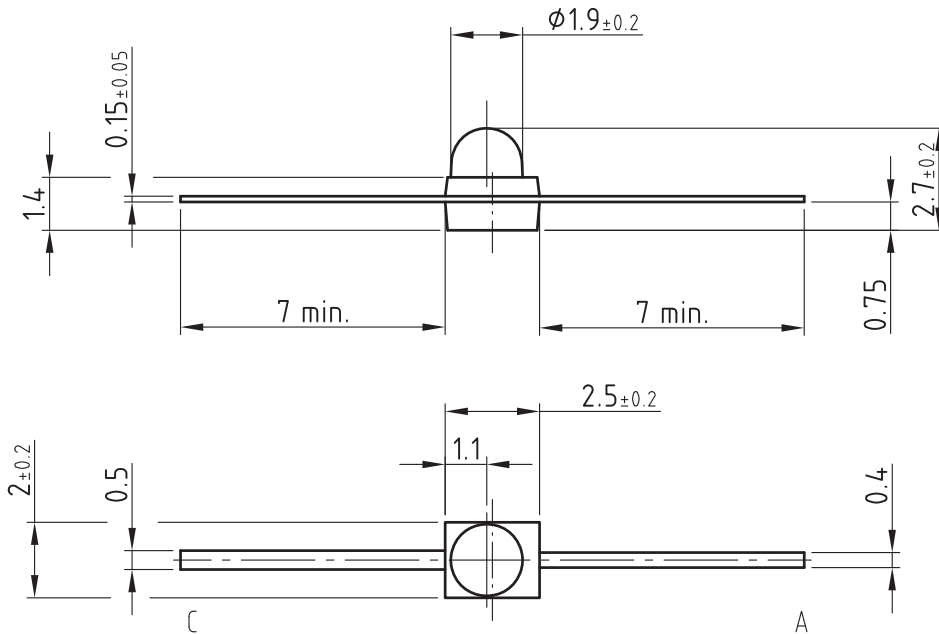


Solder pad proposal



16228

PACKAGE DIMENSIONS in millimeters: TSML1040

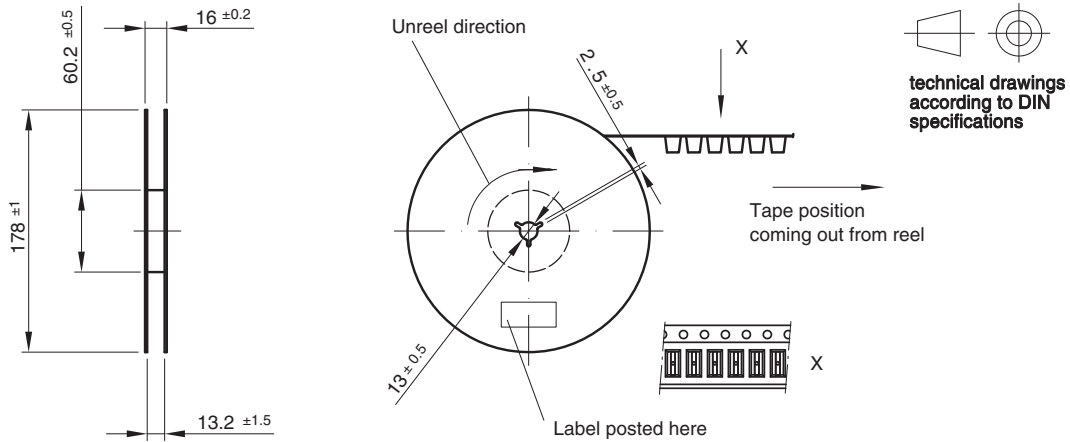


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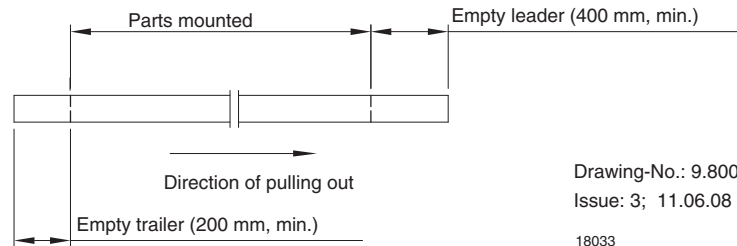
Issue: 3; 02.04.03

16760

REEL DIMENSIONS in millimeters



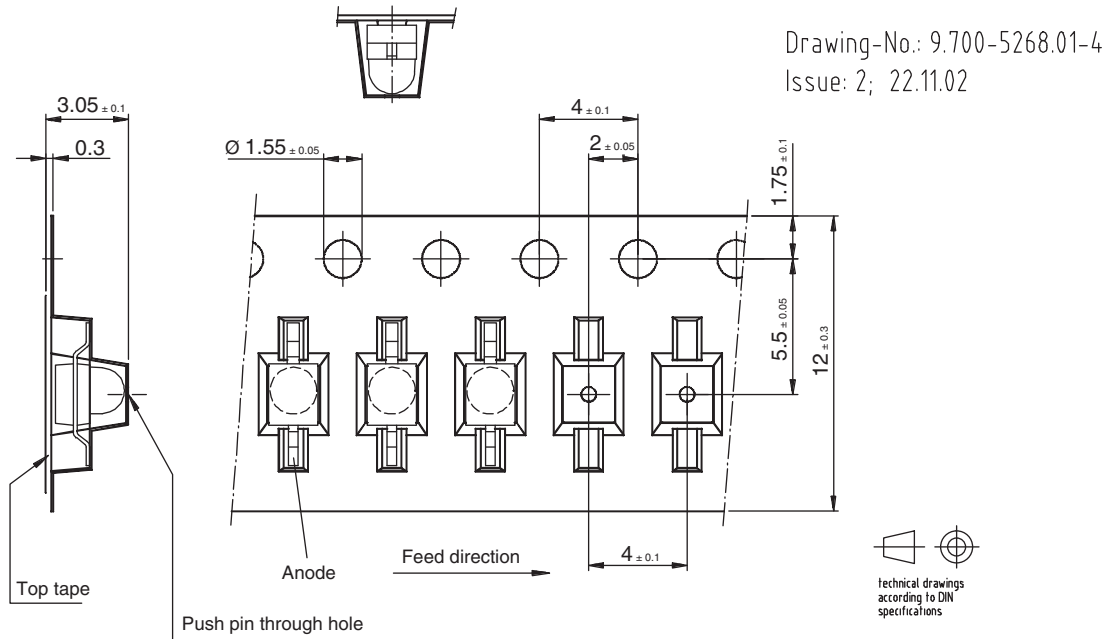
Leader and trailer tape:



Drawing-No.: 9.800-5080.01-4
Issue: 3; 11.06.08

18033

TAPING DIMENSIONS in millimeters: TSML1000



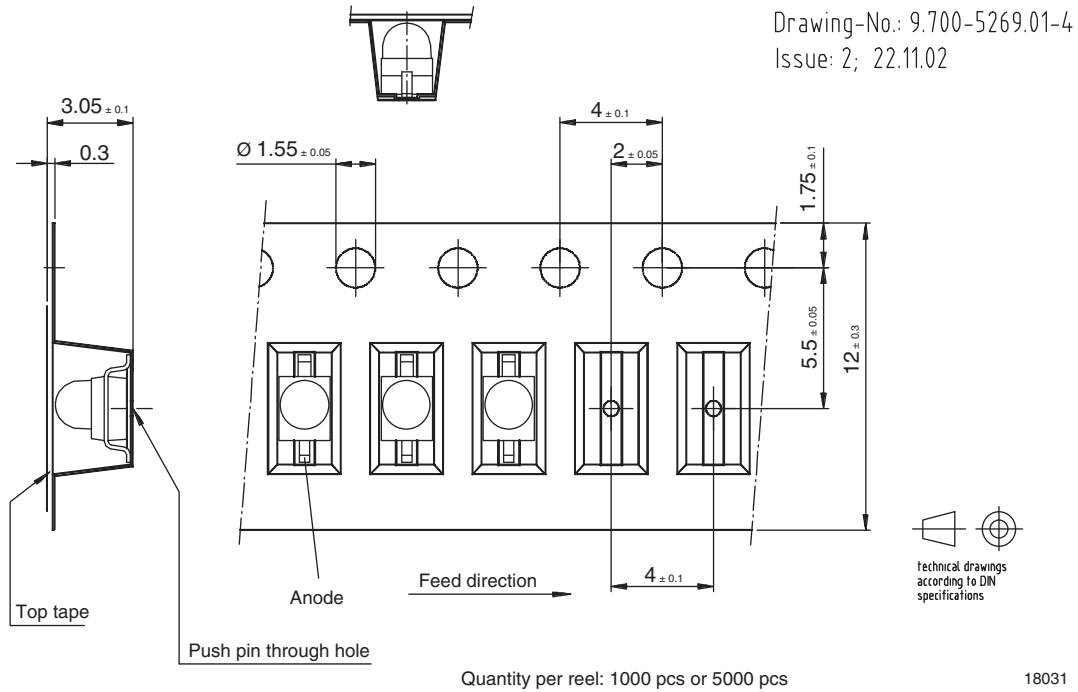
Drawing-No.: 9.700-5268.01-4
Issue: 2; 22.11.02

Quantity per reel: 1000 pcs or 5000 pcs

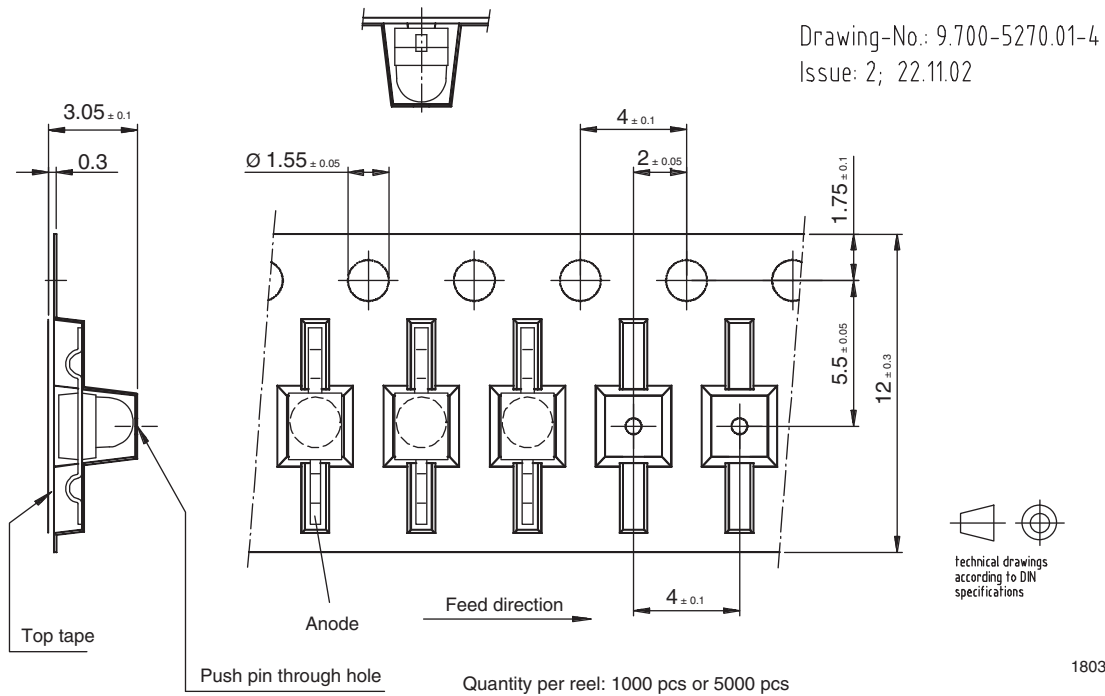
18030



TAPING DIMENSIONS in millimeters: TSML1020



TAPING DIMENSIONS in millimeters: TSML1030





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