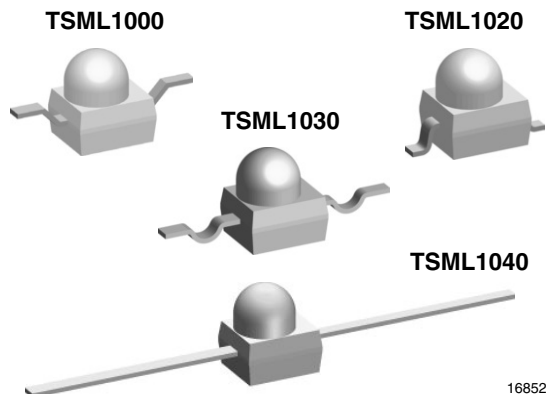


High Power Infrared Emitting Diode, RoHS Compliant, 940 nm, GaAlAs/GaAs



16852

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).

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: $\lambda_p = 940$ 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
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	5	V
Forward current		I_F	100	mA
Peak forward current	$t_p/T = 0.5$, $t_p = 100 \mu s$	I_{FM}	200	mA
Surge forward current	$t_p = 100 \mu s$	I_{FSM}	1.0	A



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ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation		P_V	190	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	$t \leq 5$ s	T_{sd}	< 260	°C
Thermal resistance junction/ambient	Soldered on PCB, pad dimensions: 4 mm x 4 mm	R_{thJA}	400	°C

Note

$T_{amb} = 25$ °C, unless otherwise specified

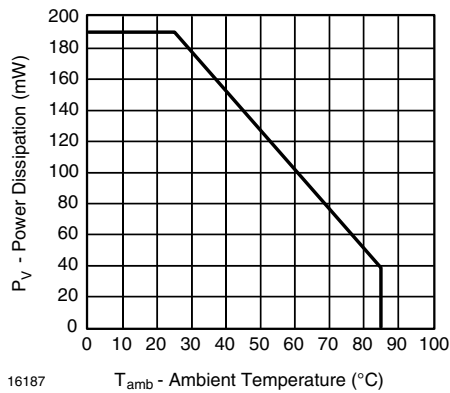


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

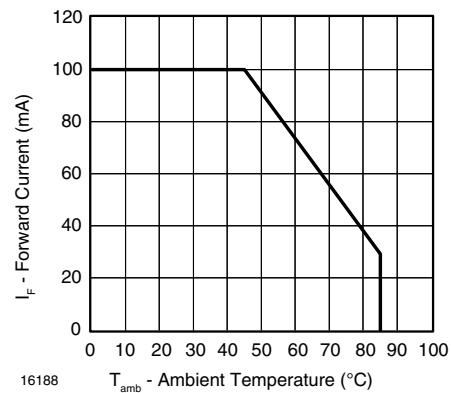


Fig. 2 - Forward Current vs. Ambient Temperature

BASIC CHARACTERISTICS

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

Note

$T_{amb} = 25$ °C, unless otherwise specified

BASIC CHARACTERISTICS

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

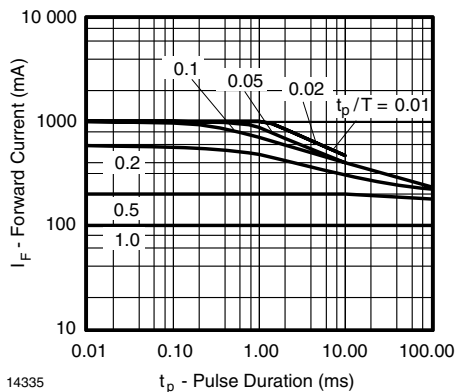


Fig. 3 - Pulse Forward Current vs. Pulse Duration

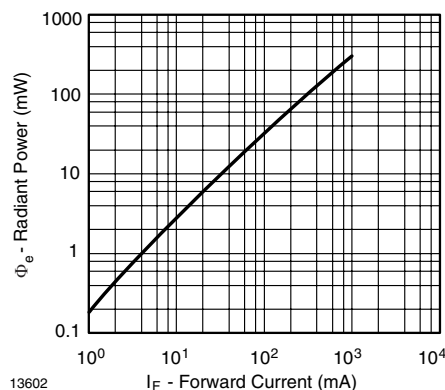


Fig. 6 - Radiant Power vs. Forward Current

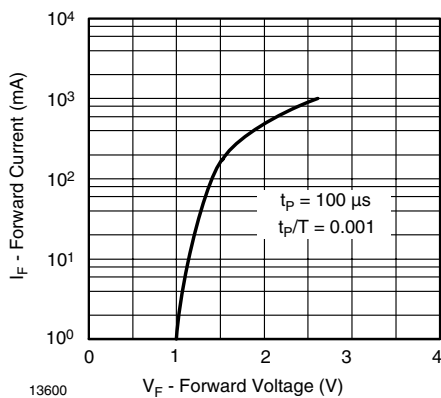


Fig. 4 - Forward Current vs. Forward Voltage

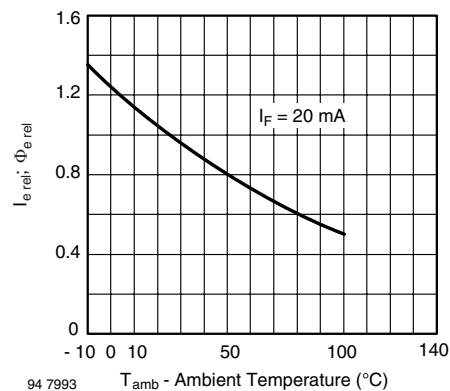


Fig. 7 - Relative Radiant Intensity/Power vs. Ambient Temperature

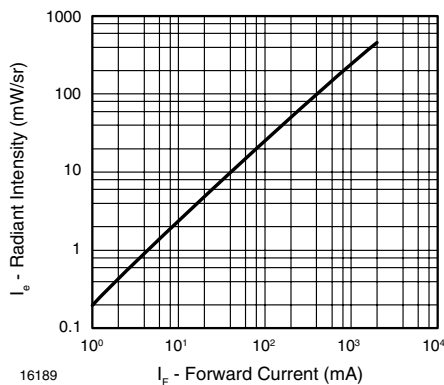


Fig. 5 - Radiant Intensity vs. Forward Current

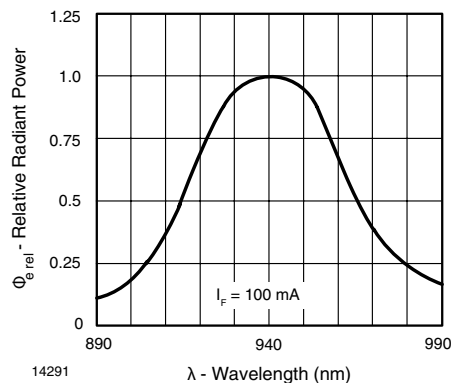


Fig. 8 - Relative Radiant Power vs. Wavelength



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REFLOW SOLDER PROFILE

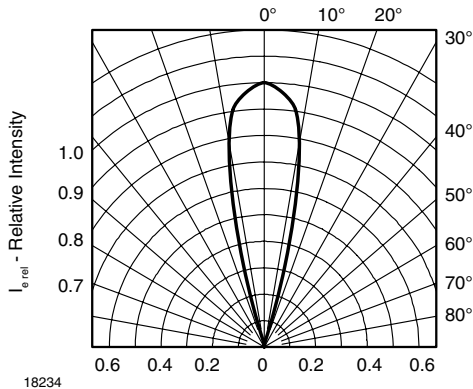


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

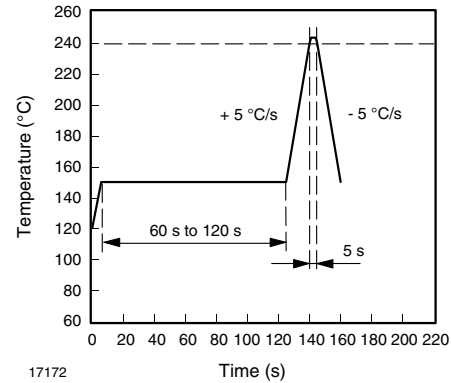


Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

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 $\pm$ 5 °C for 15 h.

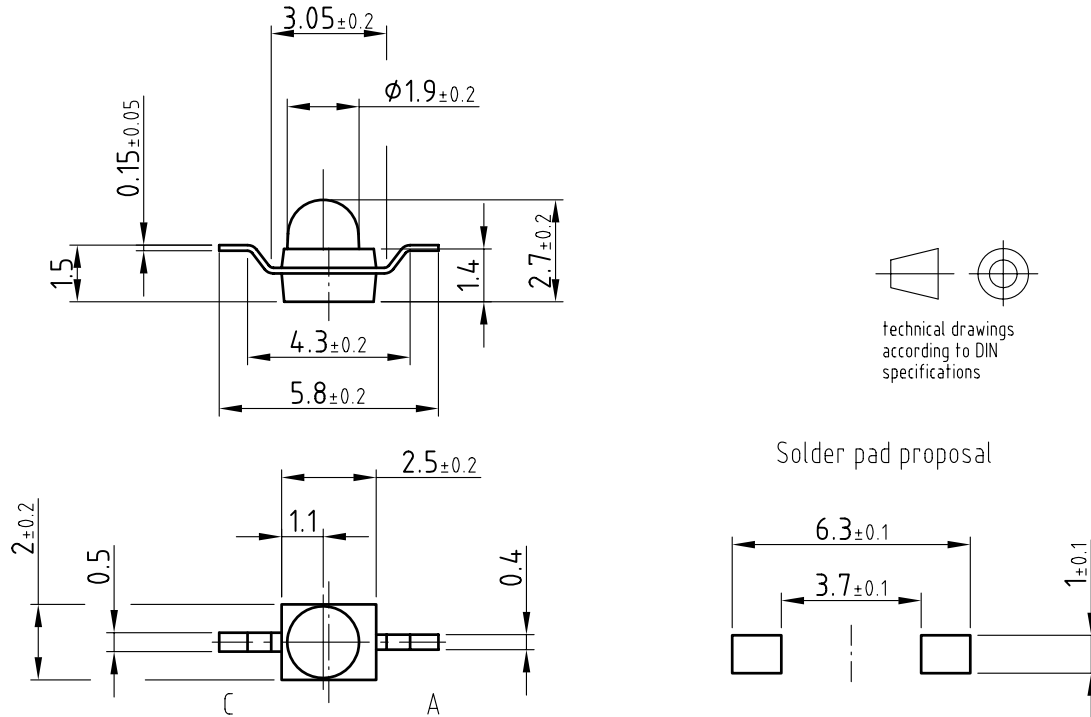
2.4 If humidity indicator in the package shows pink color (normal blue), then devices should be treated with the same conditions as 2.3.

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PACKAGE DIMENSIONS in millimeters: TSML1000

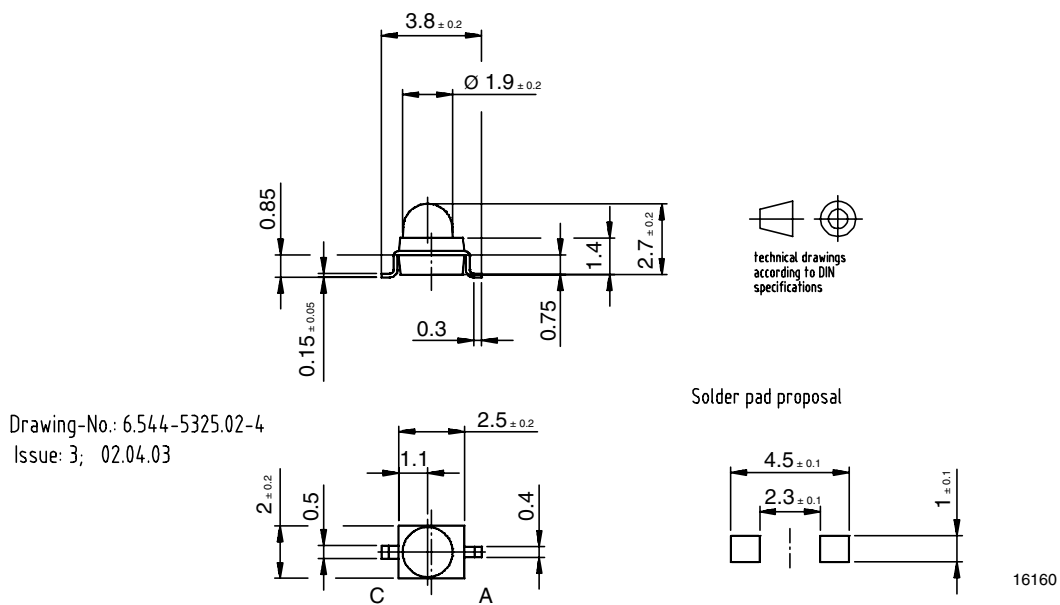


Drawing-No.: 6.544-5326.02-4

Issue: 3; 02.04.03

16159

PACKAGE DIMENSIONS in millimeters: TSML1020



Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

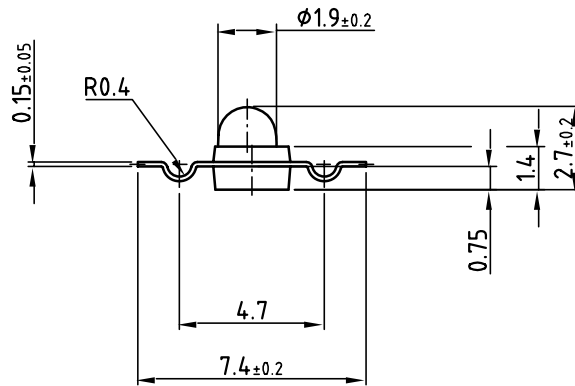
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TSML1000, TSML1020, TSML1030, TSML1040

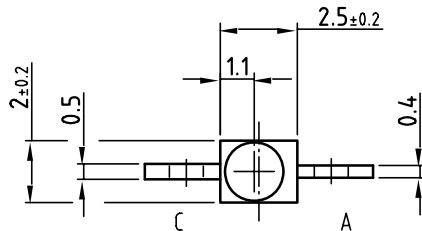
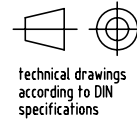
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RoHS Compliant, 940 nm, GaAlAs/GaAs

PACKAGE DIMENSIONS in millimeters: TSML1030

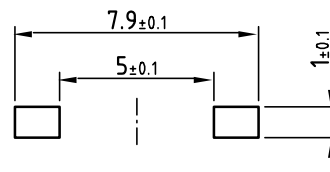


Drawing-No.: 6.544-5329.01-4

Issue: 4; 08.05.03

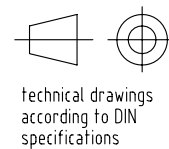
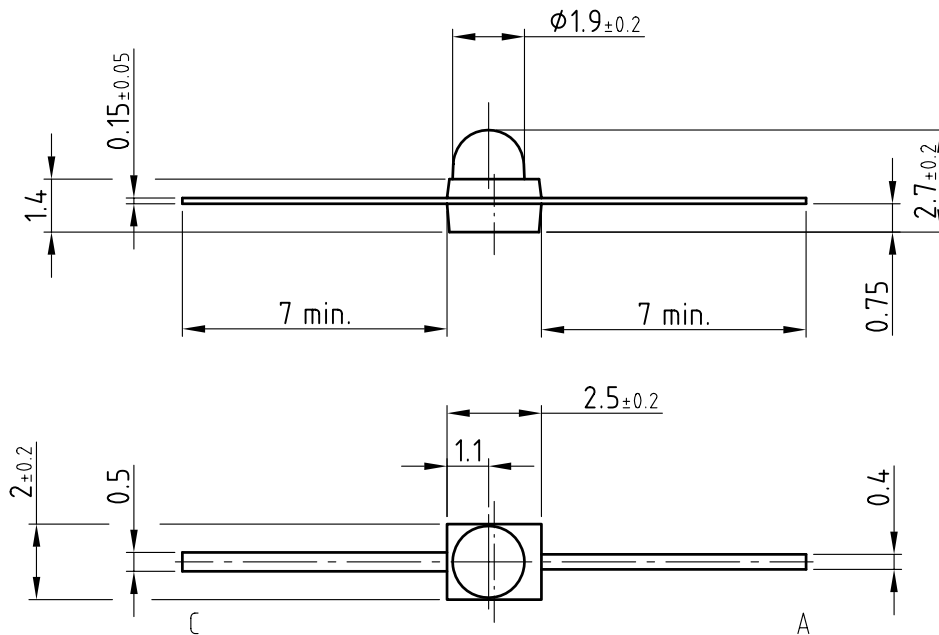


Solder pad proposal



16228

PACKAGE DIMENSIONS in millimeters: TSML1040



Drawing-No.: 6.544-5339.02-4

Issue: 3; 02.04.03

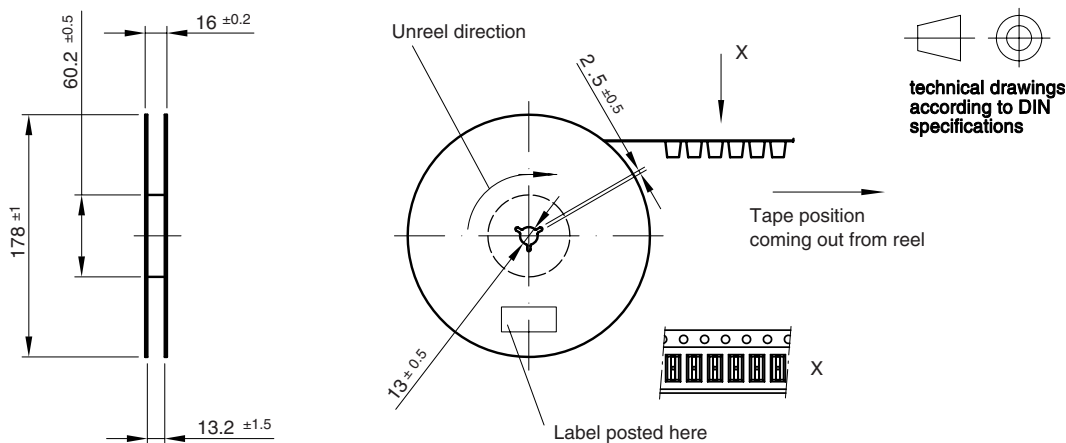
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TSML1000, TSML1020, TSML1030, TSML1040

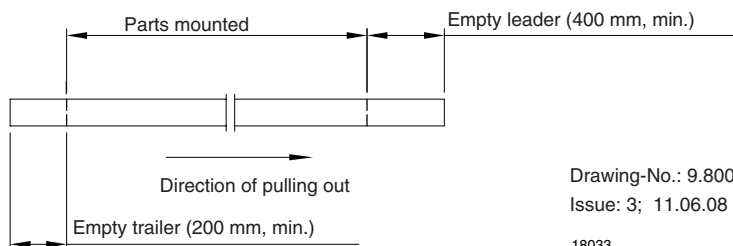
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RoHS Compliant, 940 nm, GaAlAs/GaAs



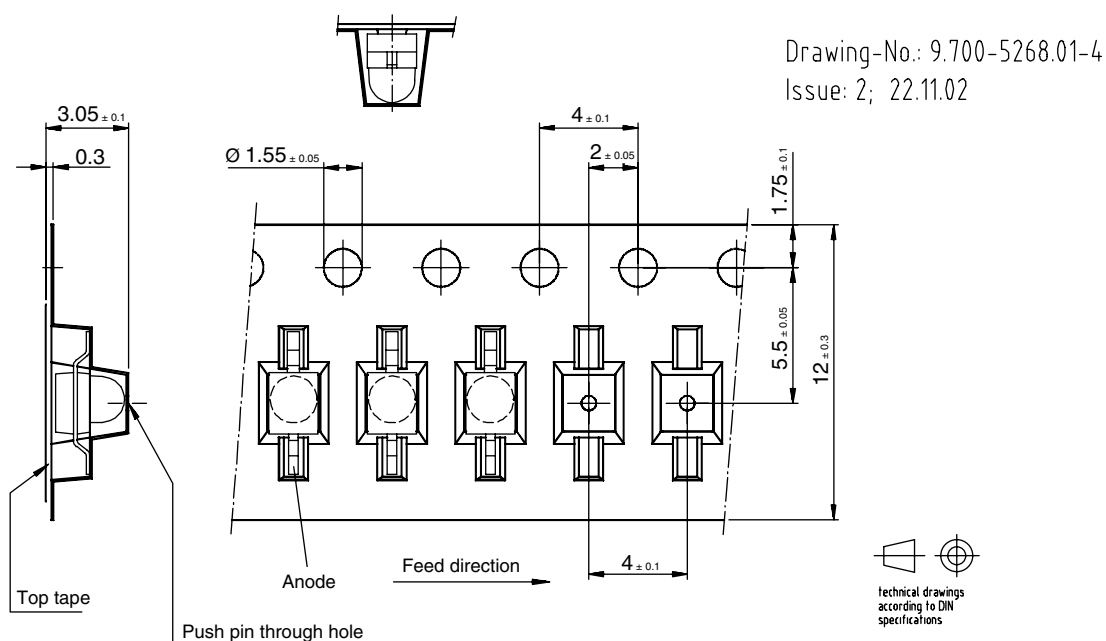
REEL DIMENSIONS in millimeters



Leader and trailer tape:



TAPING DIMENSIONS in millimeters: TSML1000



Quantity per reel: 1000 pcs or 5000 pcs

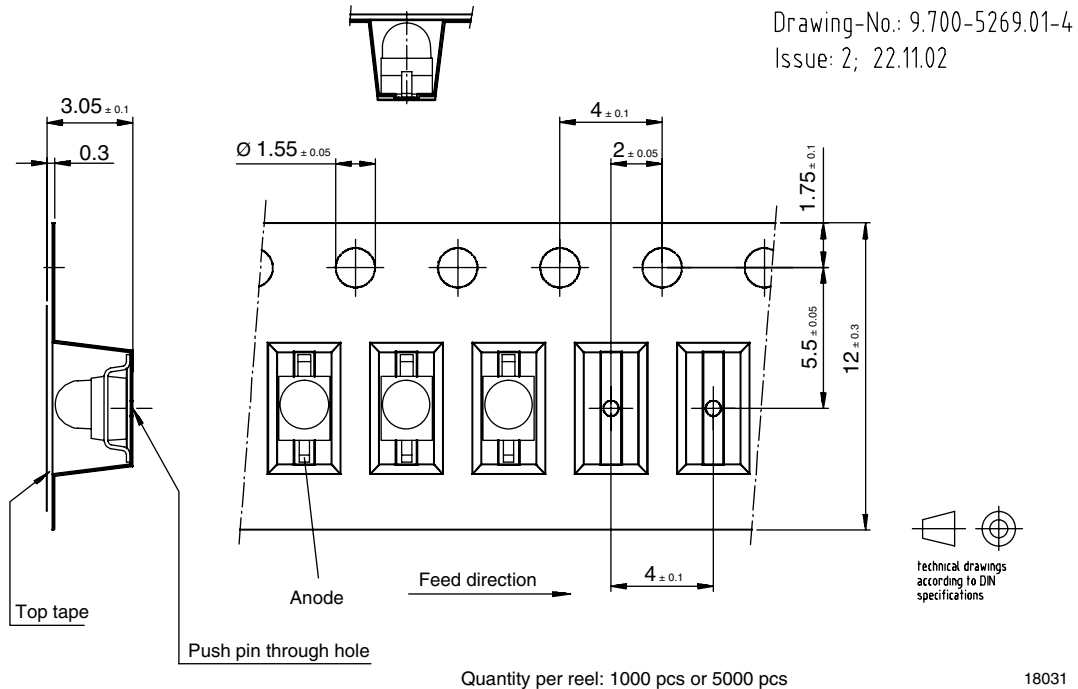
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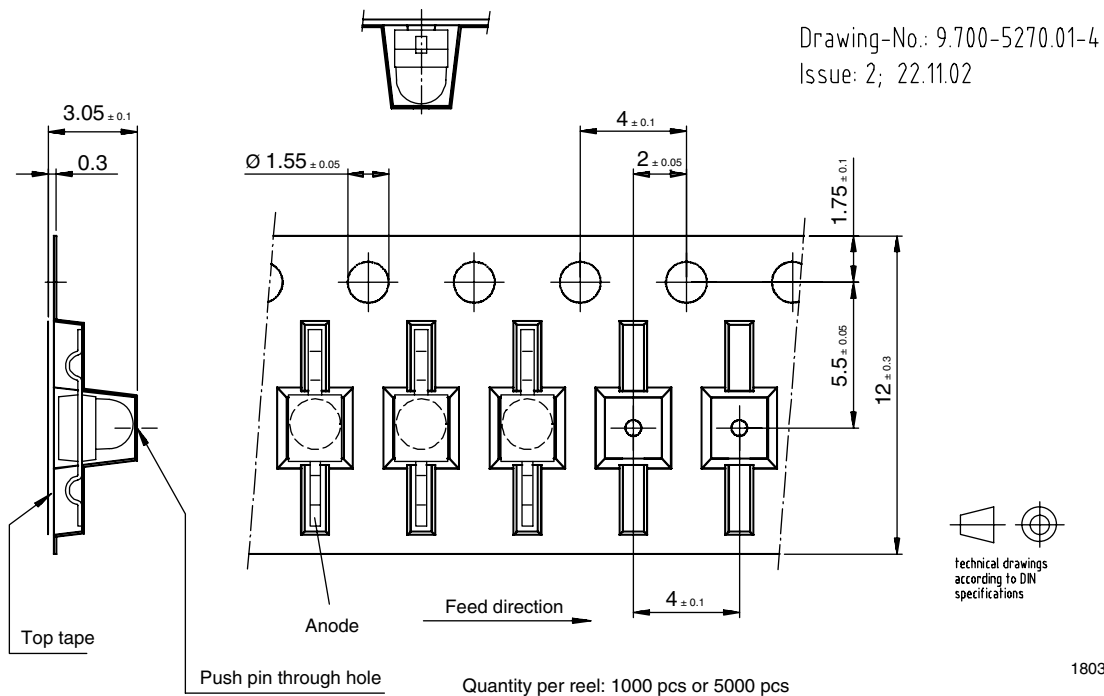
TSML1000, TSML1020, TSML1030, TSML1040

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

TAPING DIMENSIONS in millimeters: TSML1020



TAPING DIMENSIONS in millimeters: TSML1030





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