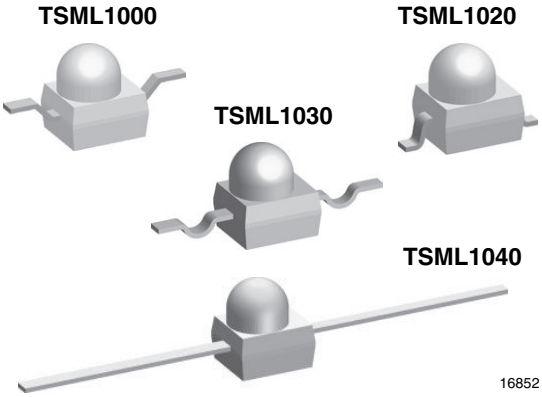
High Power Infrared Emitting Diode, 940 nm, GaAlAs, MQW



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: λ_p = 940 nm
- High radiant power
- High radiant intensity
- Angle of half intensity: φ = ± 12°
- 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, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

TSML1000 is an infrared, 940 nm emitting diode in GaAlAs multi quantum well (MQW) technology with high radiant power and high speed molded in a clear, untinted plastic package (with lens) for surface mounting (SMD).

APPLICATIONS

- For remote control
- Encoder
- Photointerrupters

PRODUCT SUMMARY

COMPONENT	I_e (mW/sr) at I_F = 20 mA	φ (°)	λ_P (nm)	t_r (ns)
TSML1000	11	± 12	940	15
TSML1020	11	± 12	940	15
TSML1030	11	± 12	940	15
TSML1040	11	± 12	940	15

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

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °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 µs	I_{FM}	200	mA
Surge forward current	t_p = 100 µs	I_{FSM}	1.0	A
Power dissipation		P_V	160	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	According to Fig. 10, J-STD-020	T_{sd}	260	°C
Thermal resistance junction to ambient	EIA / JESD51	R_{thJA}	400	K/W

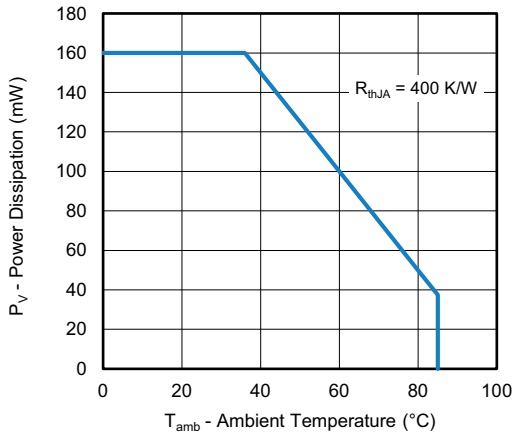


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

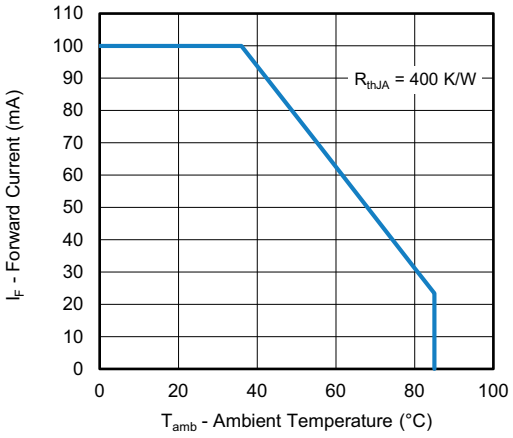


Fig. 2 - Forward Current vs. Ambient Temperature

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
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 µs	V_F	-	2.2	-	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	µA
Junction capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_j	-	40	-	pF
Radiant intensity	I_F = 20 mA, t_p = 20 ms	I_e	3	11	15	mW/sr
Radiant power	I_F = 100 mA, t_p = 20 ms	ϕ_e	-	40	-	mW
Temperature coefficient of ϕ_e	I_F = 20 mA	$TK\phi_e$	-	-0.6	-	%/K
Angle of half intensity		φ	-	± 12	-	°
Peak wavelength	I_F = 100 mA	λ_p	-	940	-	nm
Spectral bandwidth	I_F = 100 mA	$\Delta\lambda$	-	30	-	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	-	15	-	ns
Fall time	I_F = 100 mA	t_f	-	15	-	ns

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BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

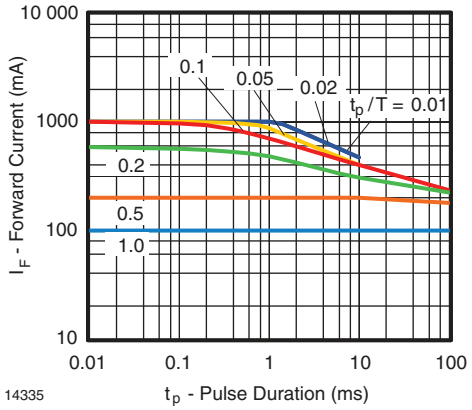


Fig. 3 - Pulse Forward Current vs. Pulse Duration

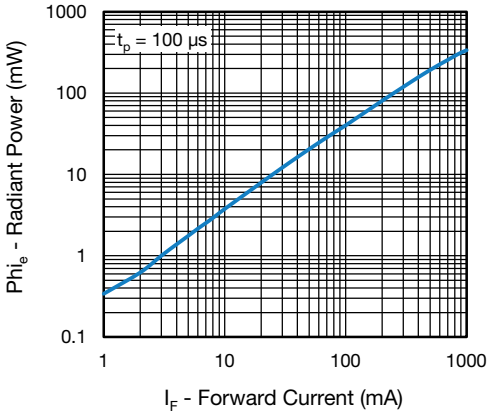


Fig. 6 - Radiant Power vs. Forward Current

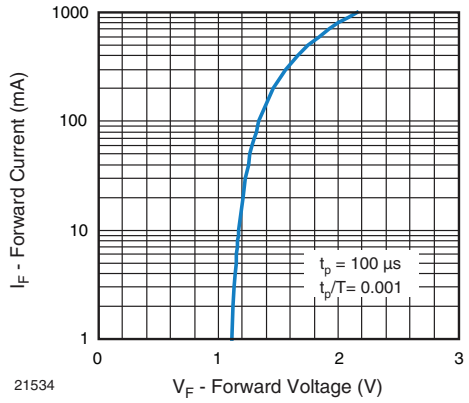


Fig. 4 - Forward Current vs. Forward Voltage

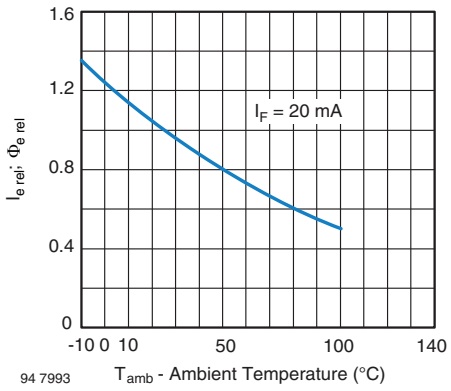


Fig. 7 - Relative Radiant Intensity/Power vs. Ambient Temperature

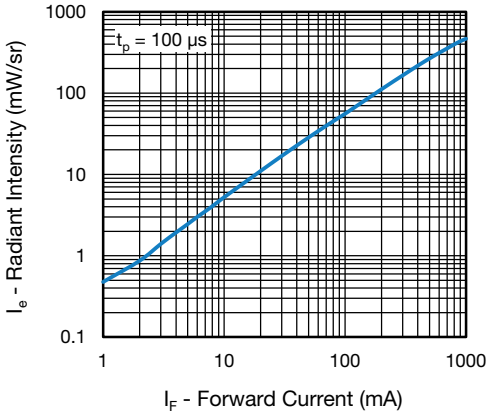


Fig. 5 - Radiant Intensity vs. Forward Current

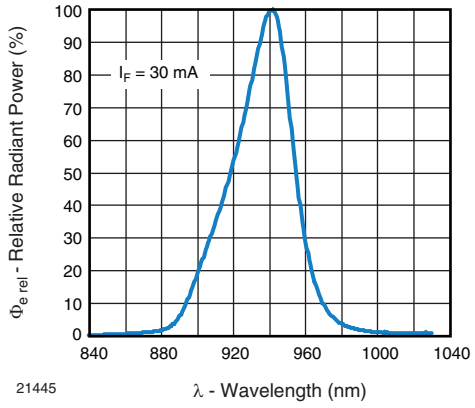


Fig. 8 - Relative Radiant Power vs. Wavelength

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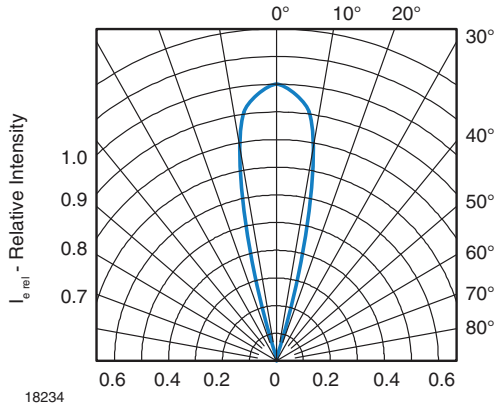


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

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

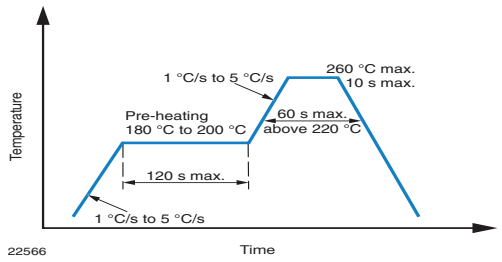
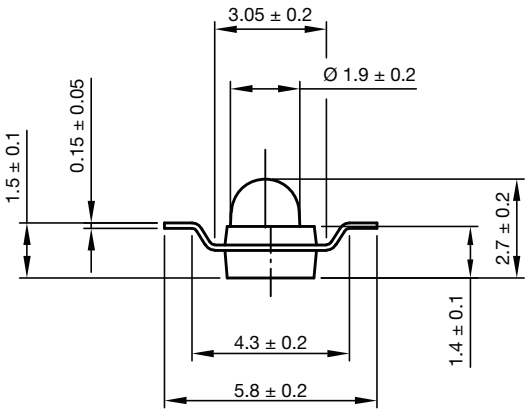
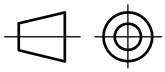


Fig. 10 - Lead (Pb)-Free Reflow Solder Profile
According to J-STD-020

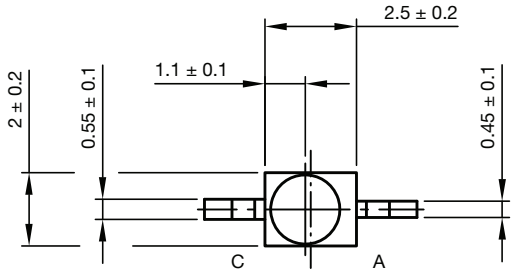
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PACKAGE DIMENSIONS in millimeters: **TSML1000**

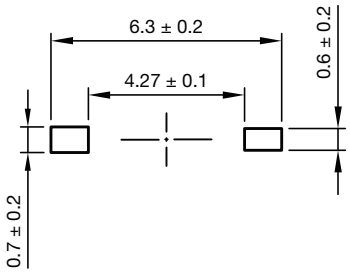




Technical drawings according to DIN specifications

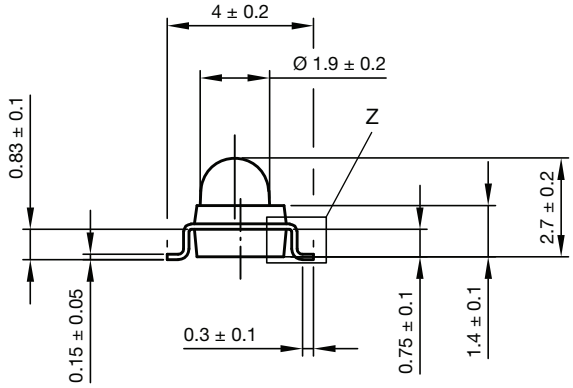


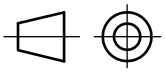
Solder pad proposal



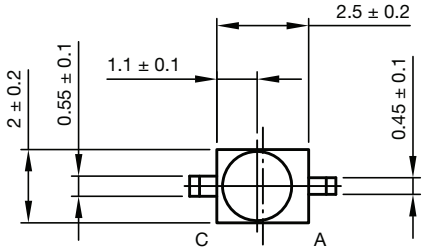
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Issue: 5; 15.09.2021

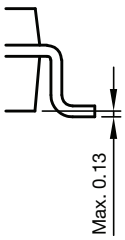
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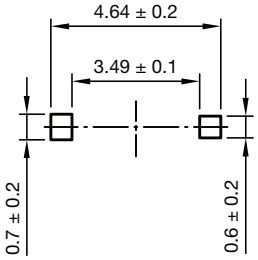


Technical drawings according to DIN specifications





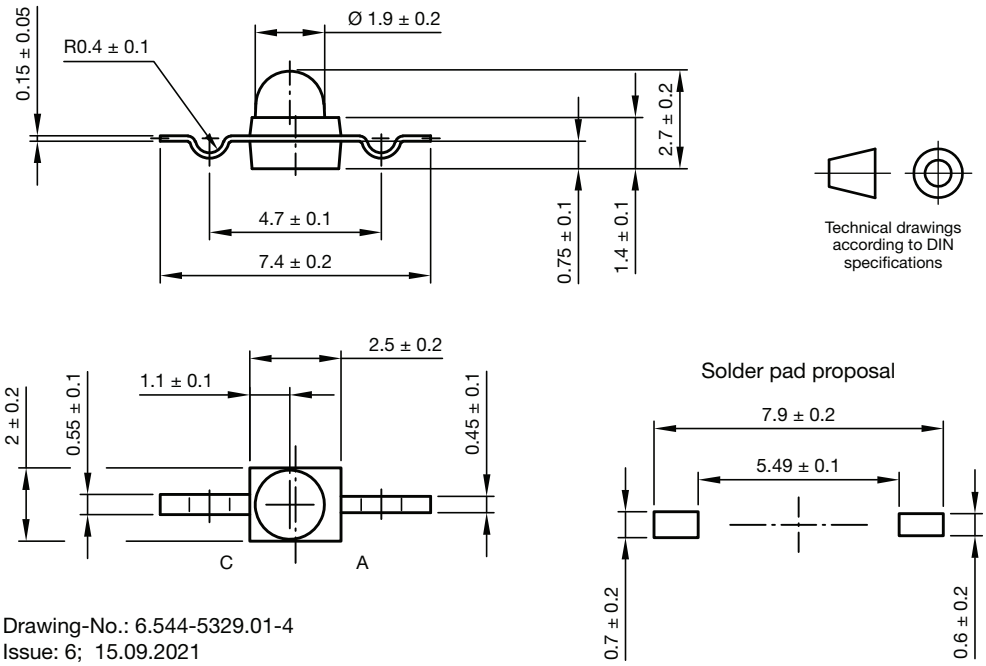
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Issue: 5; 15.09.2021

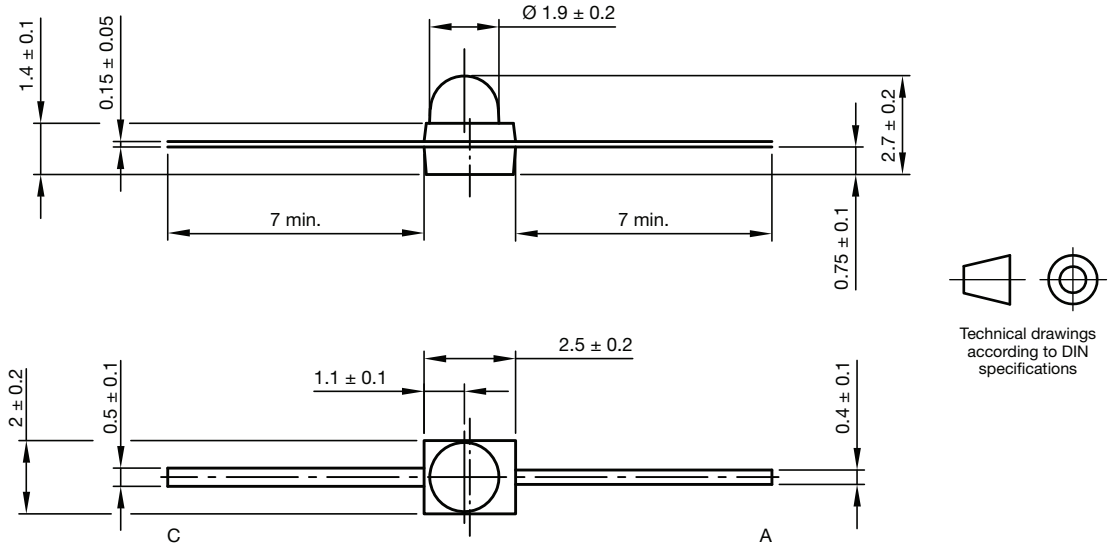
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PACKAGE DIMENSIONS in millimeters: **TSML1030**



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Issue: 6; 15.09.2021

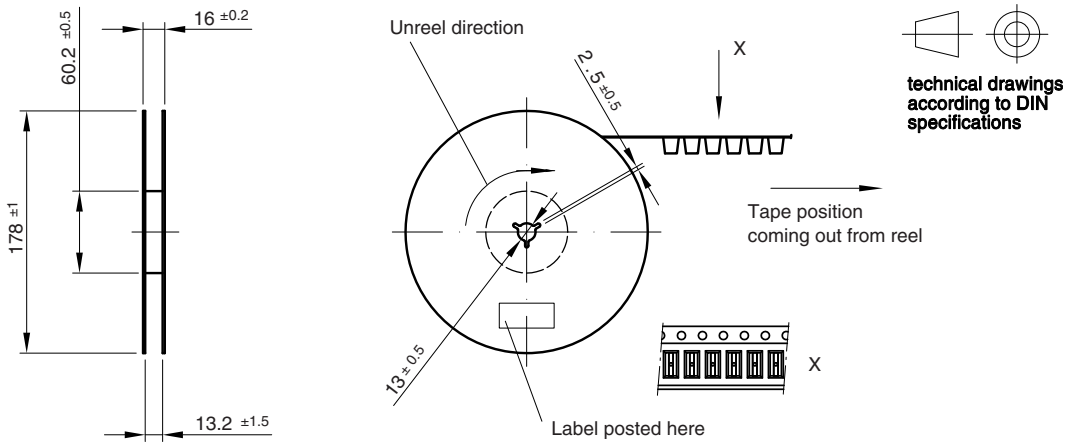
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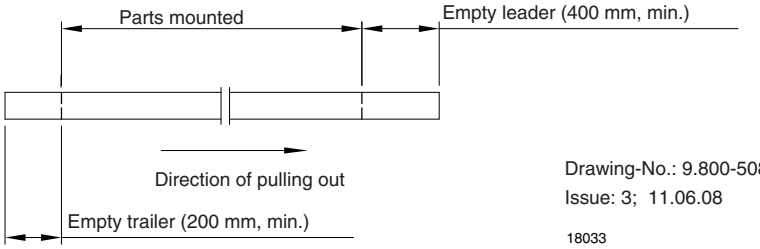
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Issue: 4; 04.08.2021

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REEL DIMENSIONS in millimeters



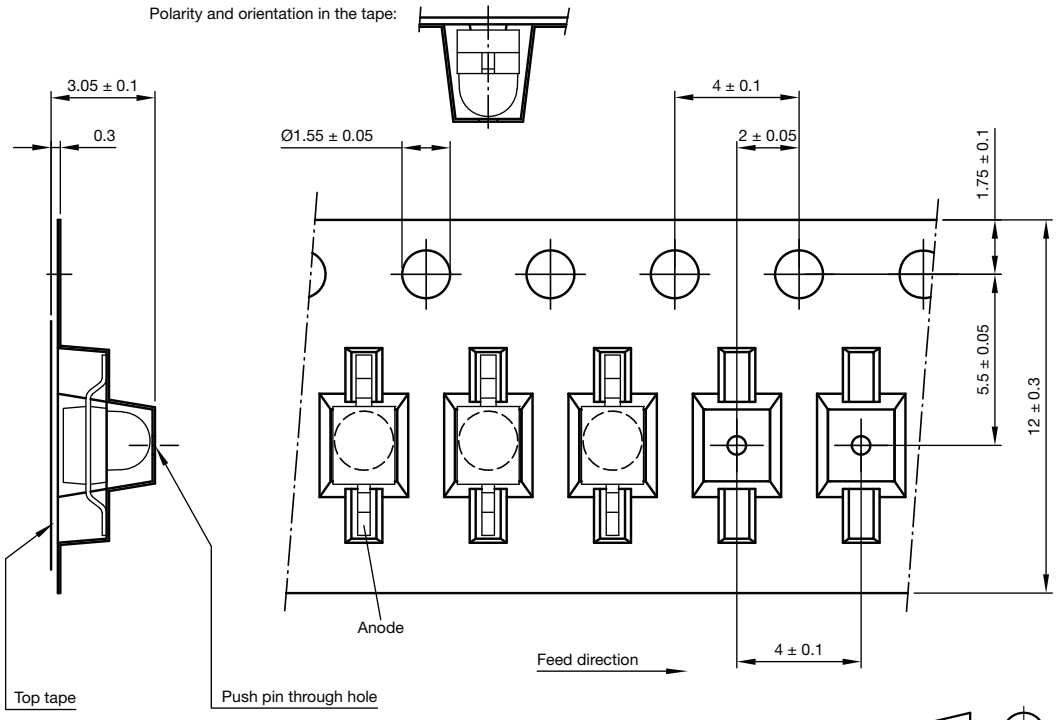
Leader and trailer tape:



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

18033

TAPING DIMENSIONS in millimeters: **TSML1000**



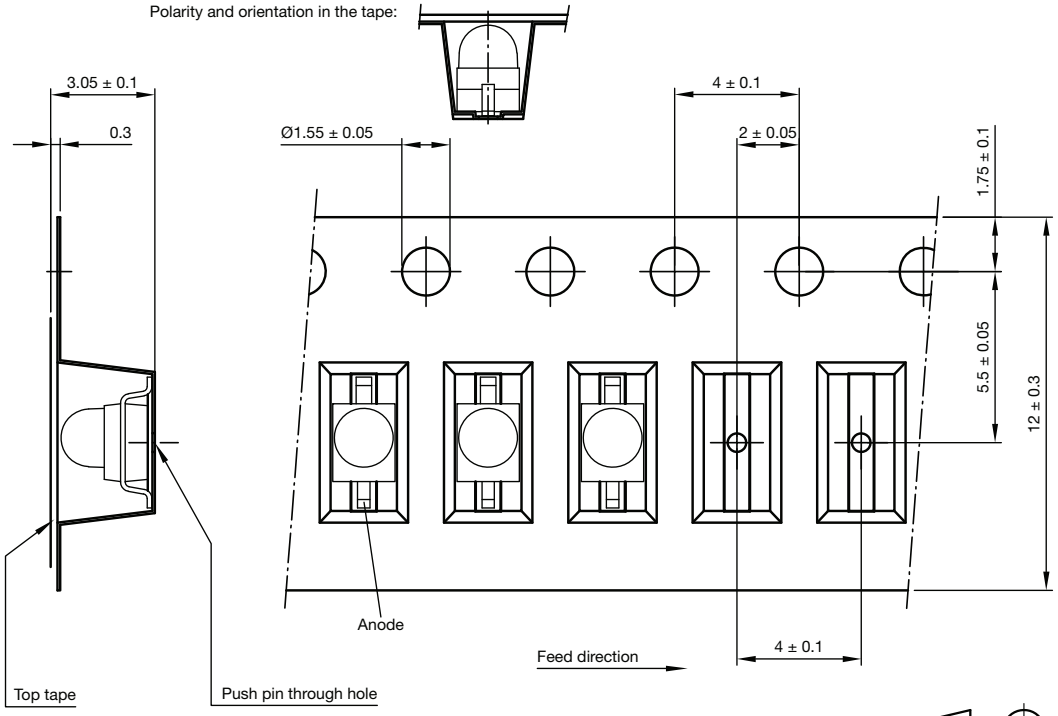
Quantity per reel: 1000 pcs.

Drawing-No.: 9.700-5268.01-4
Issue: 3; 28.09.2021

Technical drawings
according to DIN
specifications

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TAPING DIMENSIONS in millimeters: **TSML1020**

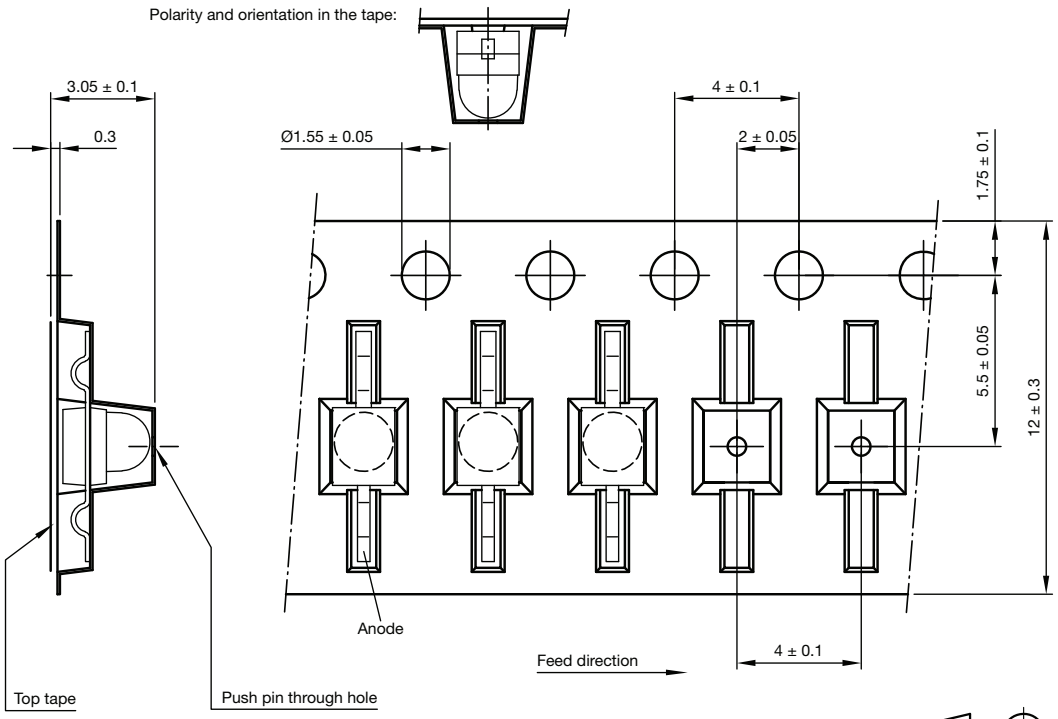


Quantity per reel: 1000 pcs.

Drawing-No.: 9.700-5269.01-4
Issue: 3; 28.09.2021

Technical drawings according to DIN specifications

TAPING DIMENSIONS in millimeters: **TSML1030**



Quantity per reel: 1000 pcs.

Drawing-No.: 9.700-5270.01-4
Issue: 3; 28.09.2021

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