High Speed Infrared Emitting Diode, RoHS-Compliant, 890 nm, Surface Emitter Technology

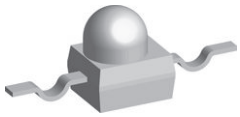
TSMF1000



TSMF1020



TSMF1030



16758-5

FEATURES

- Package type: surface-mount
- Package form: GW, RGW, yoke
- Dimensions (L x W x H in mm): 2.5 x 2 x 2.7
- Peak wavelength: λ_p = 890 nm
- High radiant power
- Angle of half intensity: φ = ± 11°
- Low forward voltage
- Suitable for high pulse current operation
- Package matches with detector TEMD1000
- 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

TSMF1000 series are infrared, 890 nm emitting diodes based on surface emitter chip technology with high radiant power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

APPLICATIONS

- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Control and drive circuits
- Shaft encoders

PRODUCT SUMMARY

COMPONENT	I_e (mW/sr)	φ (°)	λ_P (nm)	t_r (ns)
TSMF1000	27	± 11	890	15
TSMF1020	27	± 11	890	15
TSMF1030	27	± 11	890	15

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSMF1000	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Reverse gullwing
TSMF1020	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Gullwing
TSMF1030	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Yoke

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	A
Power dissipation		P_V	190	mW
Junction temperature		T_j	100	°C
Ambient temperature range		T_{amb}	-40 to +85	°C
Storage temperature range		T_{stg}	-40 to +100	°C
Soldering temperature	t ≤ 5 s	T_{sd}	260	°C
Thermal resistance junction to ambient	JESD51	R_{thJA}	250	K/W

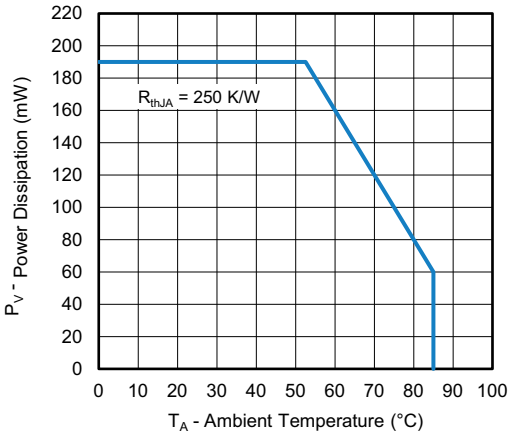


Fig. 1 - Power Dissipation vs. Ambient Temperature

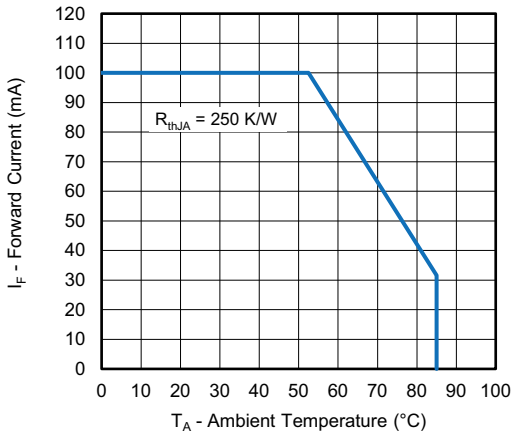


Fig. 2 - Forward Current vs. Ambient Temperature

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Forward voltage	I_F = 20 mA	V_F	-	1.3	1.5	V
	I_F = 100 mA, t_p = 100 µs	V_F	-	1.5	-	V
	I_F = 1 A, t_p = 100 µs	V_F	-	2.6	-	V
Temperature coefficient of V_F	I_F = 20 mA	TK_{VF}	-	-1.4	-	mV/K
Reverse current		I_R	Not designed for reverse operation			µA
Junction capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_j	-	56	-	pF
Radiant intensity	I_F = 20 mA	I_e	15	27	40	mW/sr
	I_F = 100 mA, t_p = 100 µs	I_e	-	155	-	mW/sr
Radiant power	I_F = 20 mA, t_p = 20 ms	ϕ_e	-	10	-	mW
Temperature coefficient of ϕ_e	I_F = 20 mA	$TK\phi_e$	-	-0.3	-	%/K
Angle of half intensity		φ	-	± 11	-	°
Peak wavelength	I_F = 20 mA	λ_p	-	890	-	nm
Spectral bandwidth	I_F = 20 mA	$\Delta\lambda$	-	35	-	nm
Temperature coefficient of λ_p	I_F = 20 mA	$TK\lambda_p$	-	0.3	-	nm/K
Rise time	I_F = 20 mA	t_r	-	15	-	ns
Fall time	I_F = 20 mA	t_f	-	15	-	ns

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

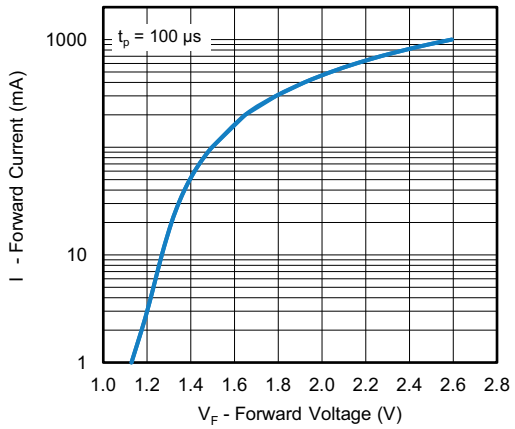


Fig. 3 - Forward Current vs. Forward Voltage

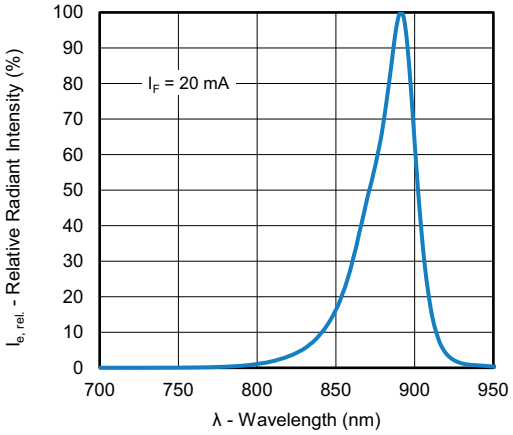


Fig. 6 - Relative Radiant Intensity vs. Wavelength

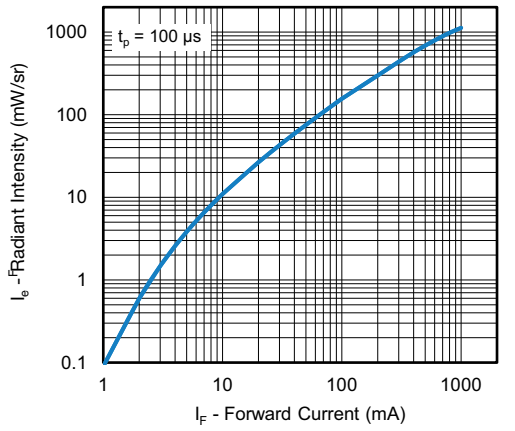


Fig. 4 - Radiant Intensity vs. Forward Current

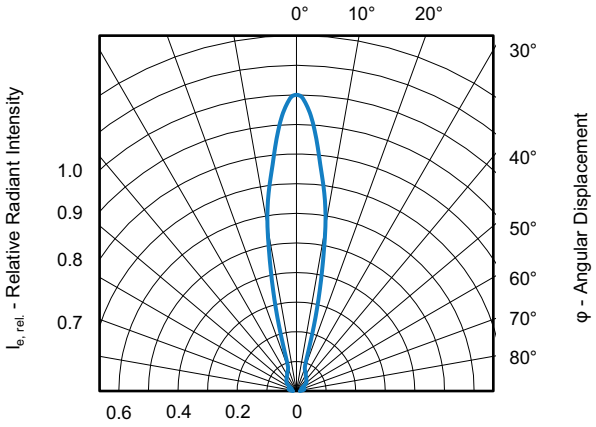


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

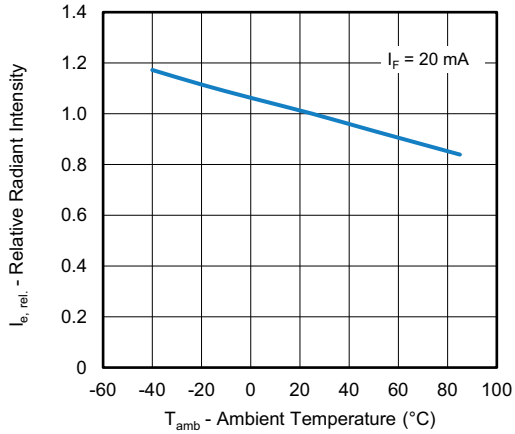


Fig. 5 - Relative Radiant Intensity vs. Ambient Temperature

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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

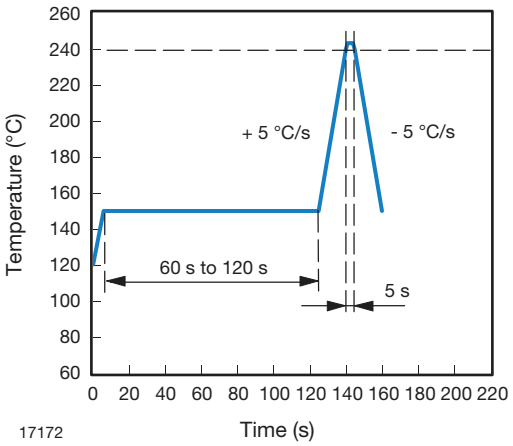


Fig. 8 - Lead Tin (SnPb) Reflow Solder Profile

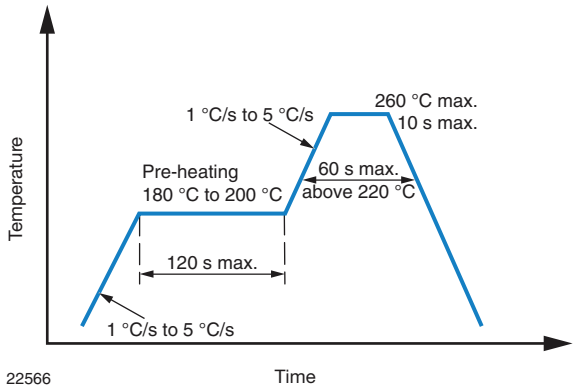
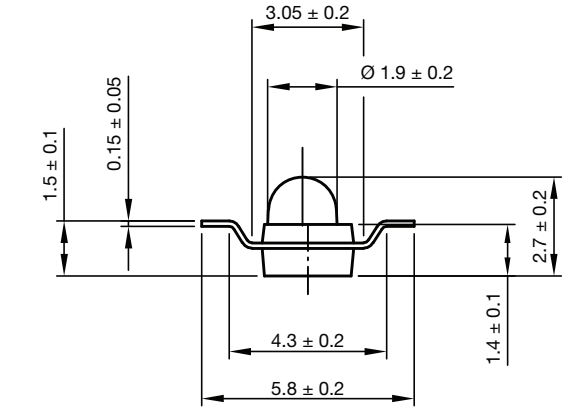
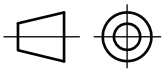


Fig. 9 - Lead (Pb)-Free Reflow Solder Profile
According to J-STD-020

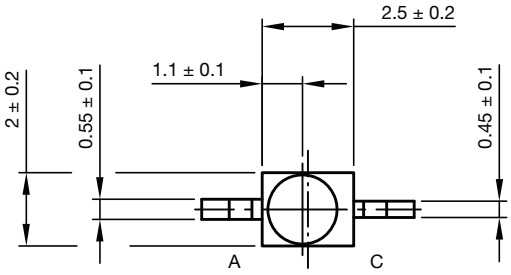
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PACKAGE DIMENSIONS in millimeters: **TSMF1000**

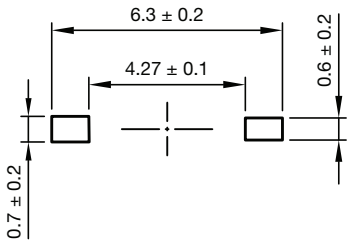




Technical drawings according to DIN specifications

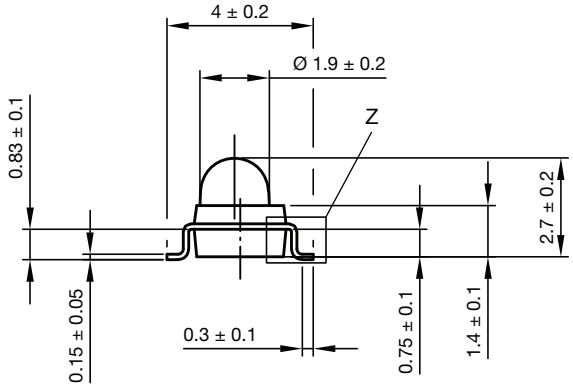


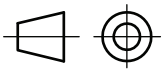
Solder pad proposal



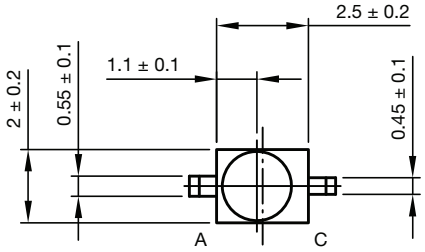
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Issue: 1; 15.09.2021

PACKAGE DIMENSIONS in millimeters: **TSMF1020**

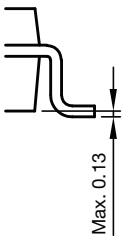




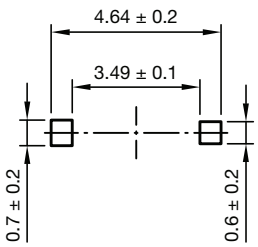
Technical drawings according to DIN specifications



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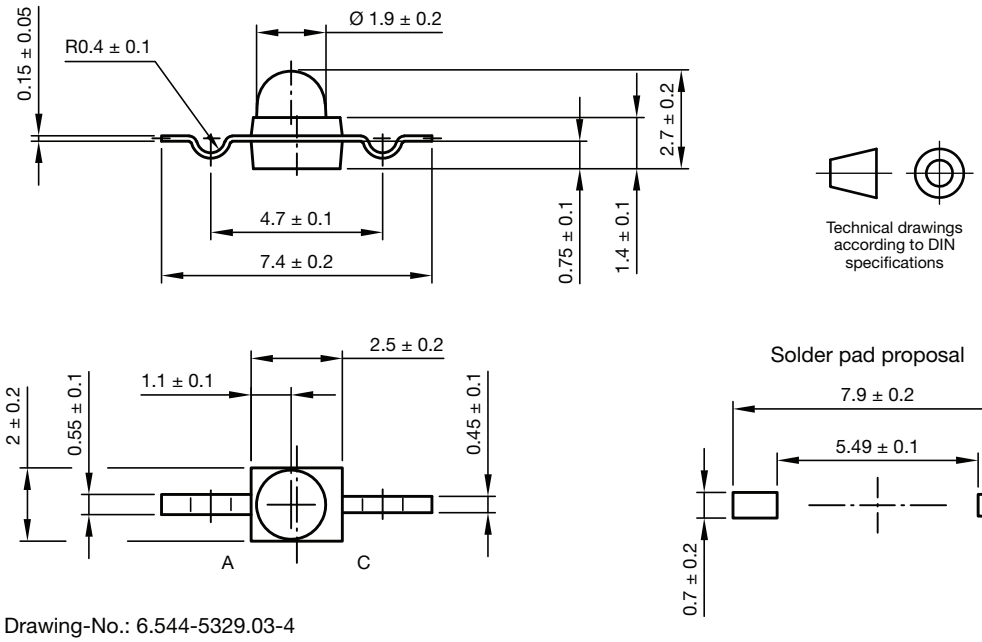
Solder pad proposal



Drawing-No.: 6.544-5325.03-4
Issue: 1; 15.09.2021

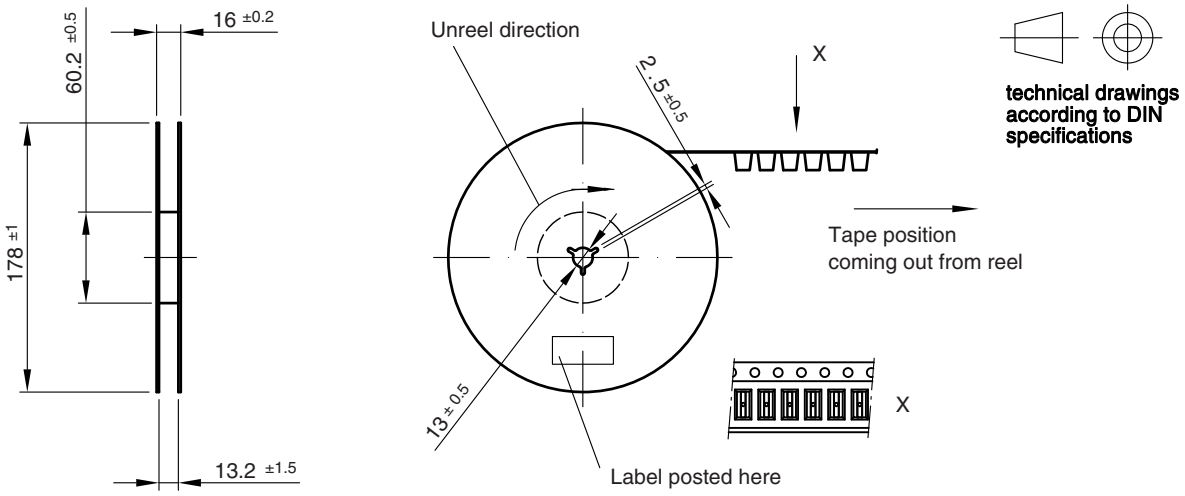
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PACKAGE DIMENSIONS in millimeters: **TSMF1030**

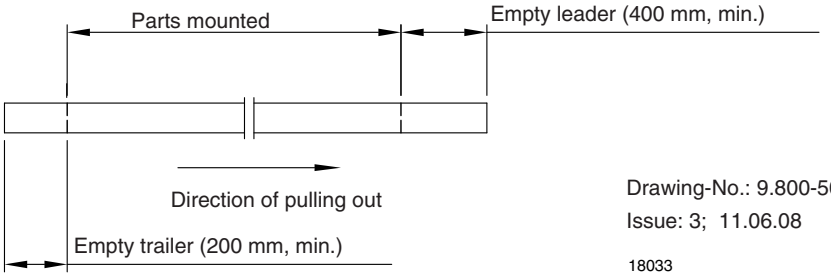


Drawing-No.: 6.544-5329.03-4
Issue: 1; 15.09.2021

REEL DIMENSIONS in millimeters



Leader and trailer tape:



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

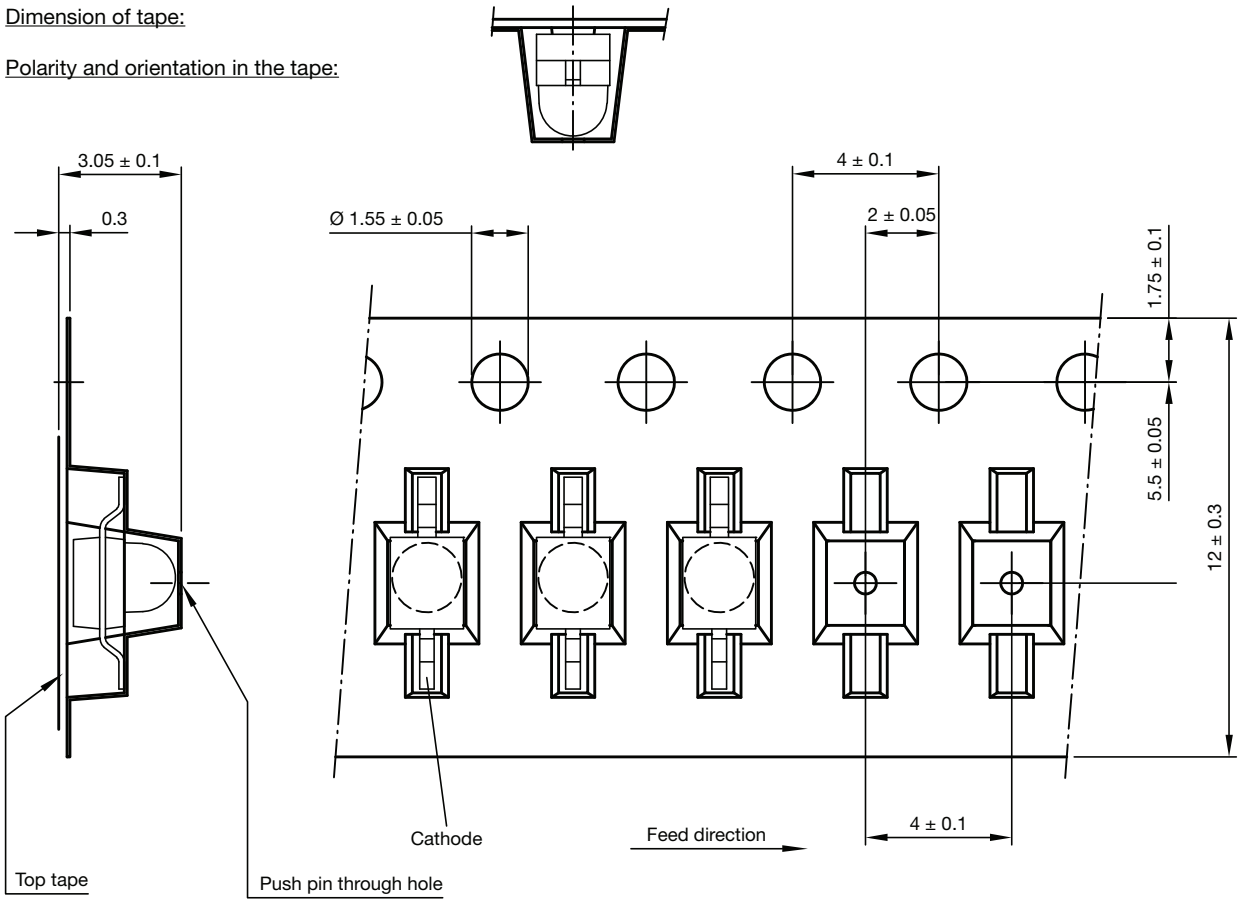
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TAPING DIMENSIONS in millimeters: **TSMF1000**

Dimension of tape:

Polarity and orientation in the tape:



Quantity per reel: 1000 pieces

Drawing-No.: 9.700-5268.02-4
Issue: 1; 28.09.2021

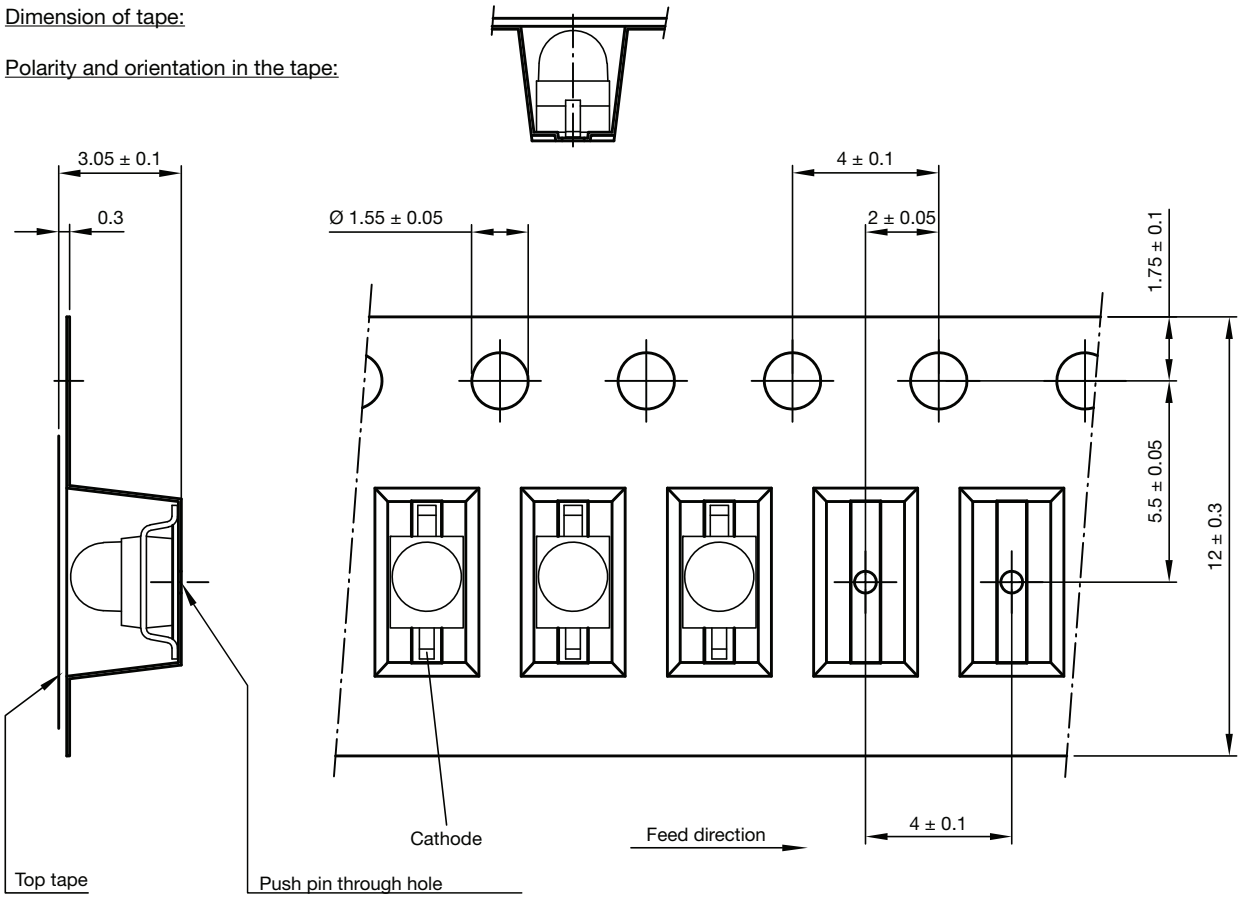
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TAPING DIMENSIONS in millimeters: **TSMF1020**

Dimension of tape:

Polarity and orientation in the tape:



Quantity per reel: 1000 pieces

Drawing-No.: 9.700-5269.02-4
Issue: 1; 28.09.2021

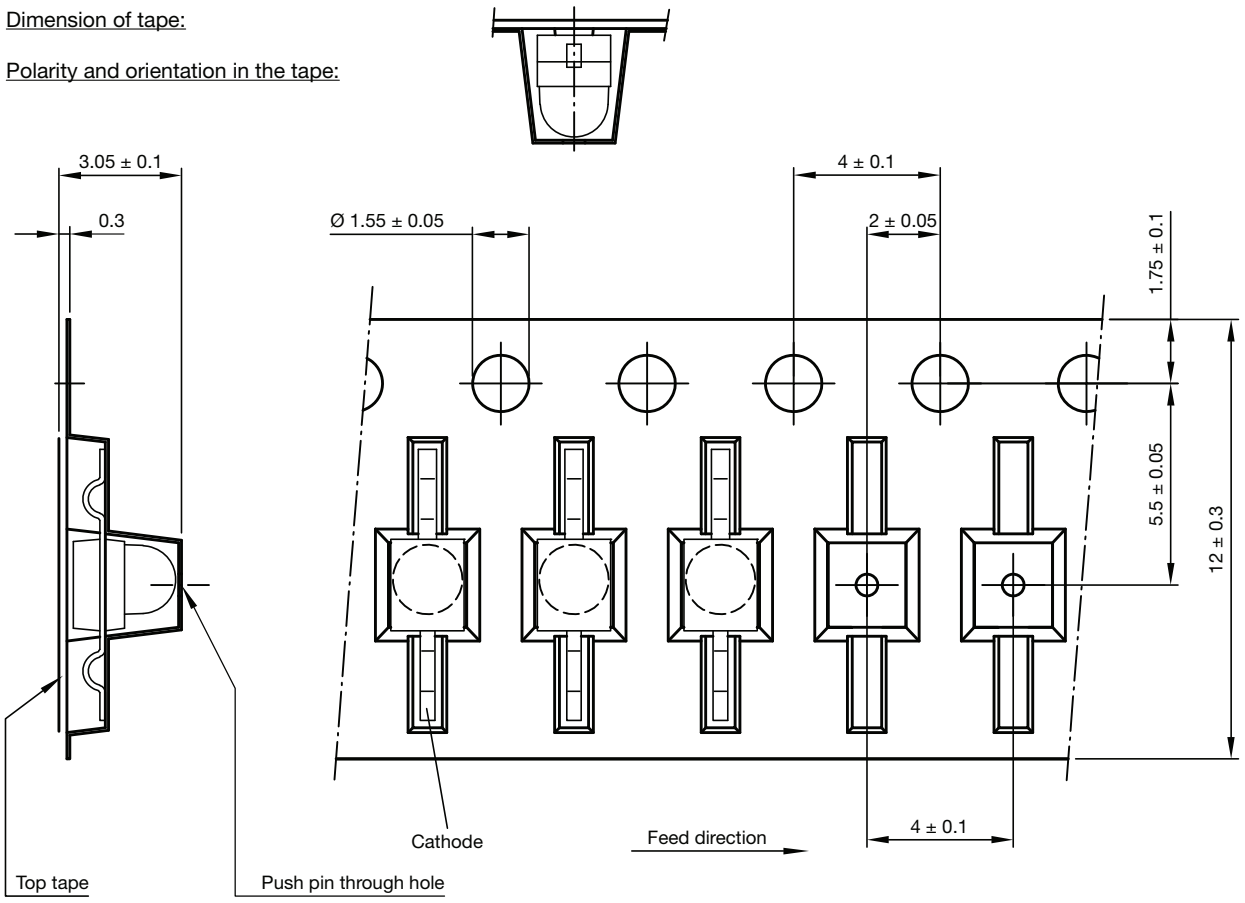
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TAPING DIMENSIONS in millimeters: **TSMF1030**

Dimension of tape:

Polarity and orientation in the tape:



Quantity per reel: 1000 pieces

Drawing-No.: 9.700-5270.02-4
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