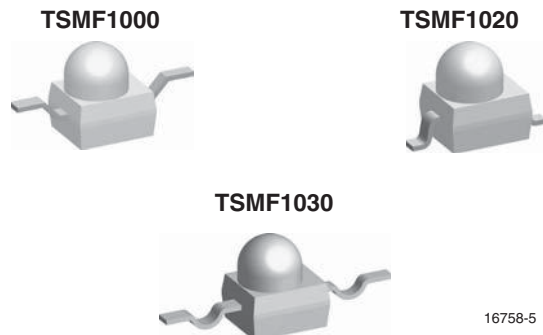



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TSMF1000, TSMF1020, TSMF1030

Vishay Semiconductors

High Speed Infrared Emitting Diode, RoHS Compliant, 890 nm, GaAlAs Double Hetero



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: $\lambda_p = 890$ nm
- High radiant power
- Angle of half intensity: $\phi = \pm 17^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Versatile terminal configurations
- Package matches with detector TEMD1000
- 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

TSMF1000 series are infrared, 890 nm emitting diodes in GaAlAs double hetero (DH) 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 (deg)	λ_p (nm)	t_r (ns)
TSMF1000	5	± 17	890	30
TSMF1020	5	± 17	890	30
TSMF1030	5	± 17	890	30

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

**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}	0.8	A
Power dissipation		P_V	180	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	K/W

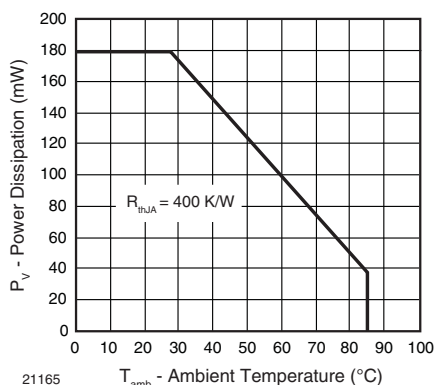


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

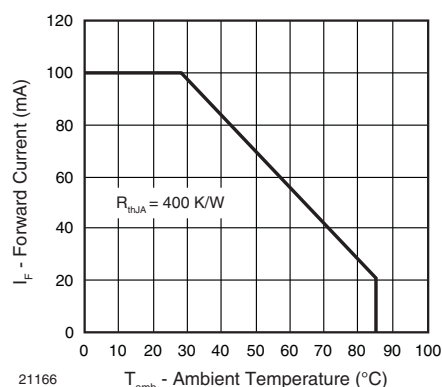


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 20\text{ mA}$	V_F		1.3	1.5	V
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F		2.4		V
Temperature coefficient of V_F	$I_F = 1\text{ mA}$	TK_{VF}		- 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		160		pF
Radiant intensity	$I_F = 20\text{ mA}$	I_e	2.5	5	13	mW/sr
	$I_F = 100\text{ mA}$, $t_p = 100\text{ }\mu\text{s}$	I_e		25		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		± 17		deg
Peak wavelength	$I_F = 20\text{ mA}$	λ_p		890		nm
Spectral bandwidth	$I_F = 20\text{ mA}$	$\Delta\lambda$		40		nm
Temperature coefficient of λ_p	$I_F = 20\text{ mA}$	TK_{λ_p}		0.2		nm/K
Rise time	$I_F = 20\text{ mA}$	t_r		30		ns
Fall time	$I_F = 20\text{ mA}$	t_f		30		ns
Cut-off frequency	$I_{DC} = 70\text{ mA}$, $I_{AC} = 30\text{ mA pp}$	f_c		12		MHz
Virtual source diameter		d		1.2		mm

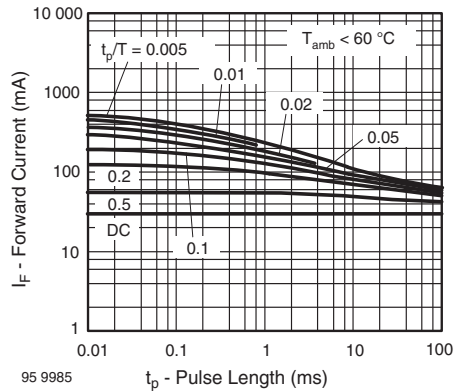
**BASIC CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Fig. 3 - Pulse Forward Current vs. Pulse Duration

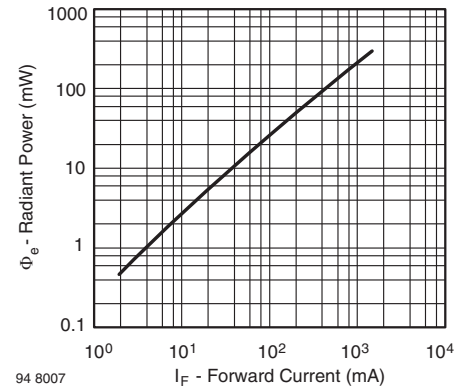


Fig. 6 - Radiant Power vs. Forward Current

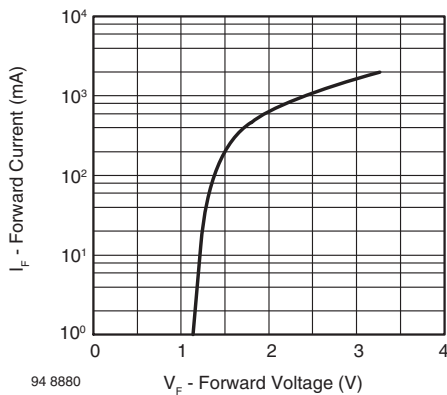


Fig. 4 - Forward Current vs. Forward Voltage

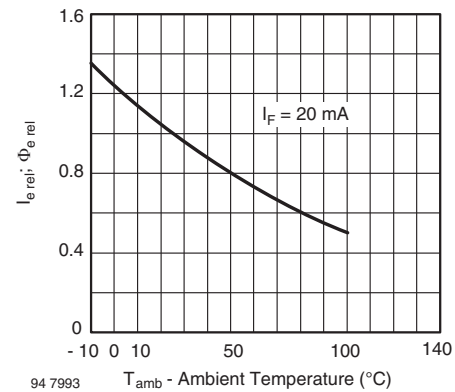


Fig. 7 - Rel. Radiant Intensity/Power vs. Ambient Temperature

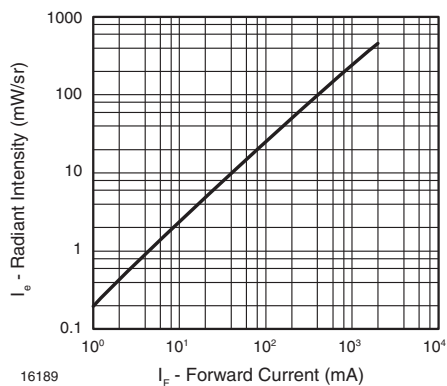


Fig. 5 - Radiant Intensity vs. Forward Current

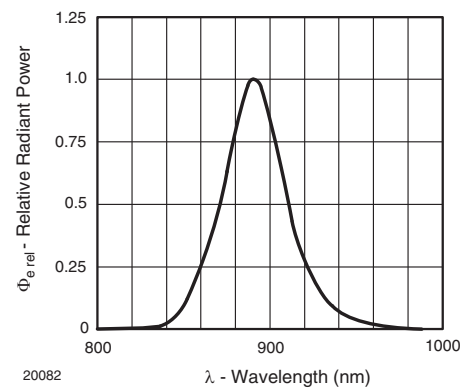


Fig. 8 - Relative Radiant Power vs. Wavelength

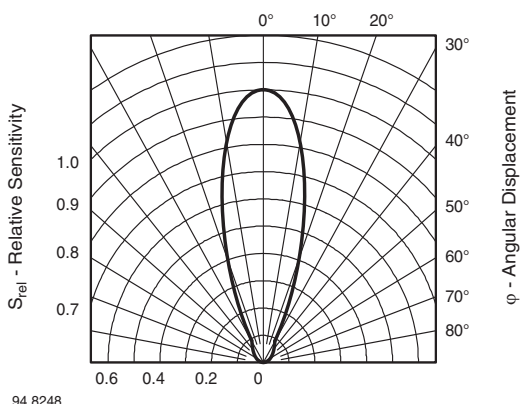
**REFLOW SOLDER PROFILE**

Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

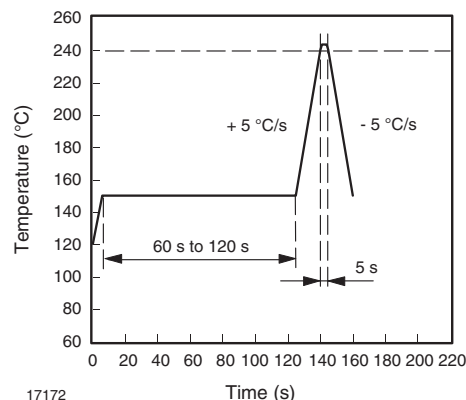


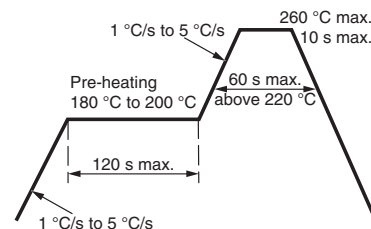
Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

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

- 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.



22566

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

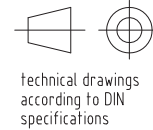
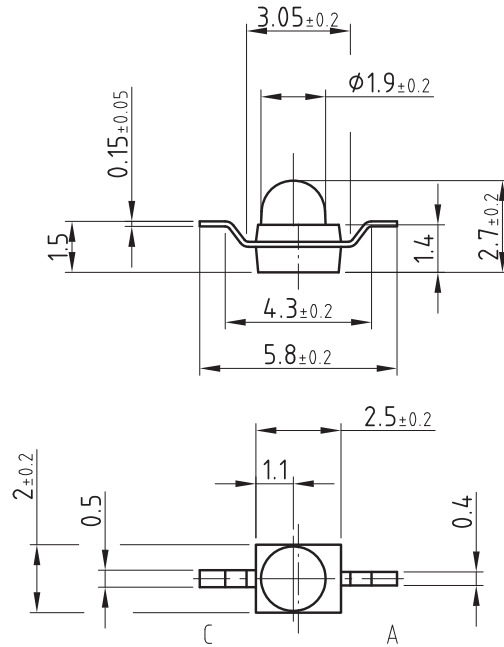


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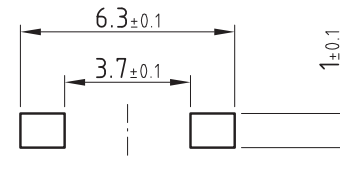
TSMF1000, TSMF1020, TSMF1030

Vishay Semiconductors

PACKAGE DIMENSIONS in millimeters: TSMF1000



Solder pad proposal

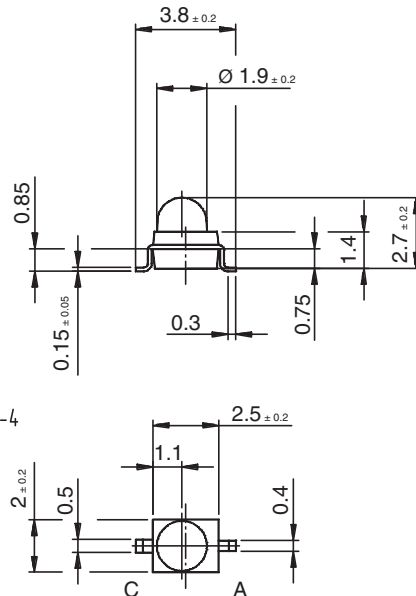


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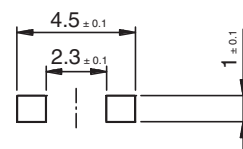
Issue: 3; 02.04.03

16159

PACKAGE DIMENSIONS in millimeters: TSMF1020



Solder pad proposal



Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

16160

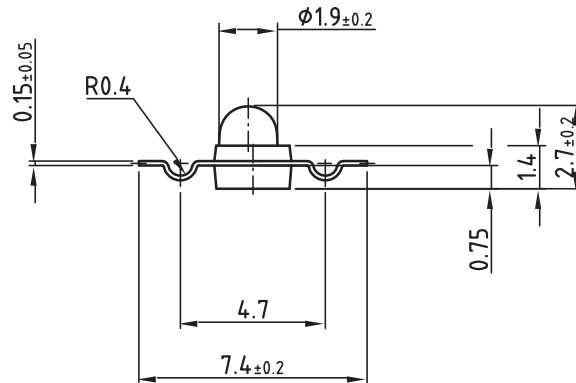


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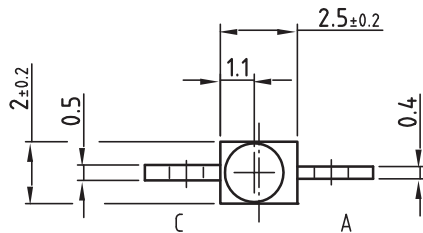
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PACKAGE DIMENSIONS in millimeters: TSMF1030

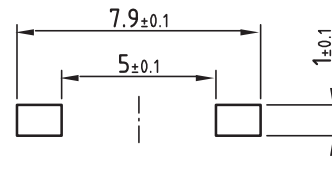


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Issue: 4; 08.05.03

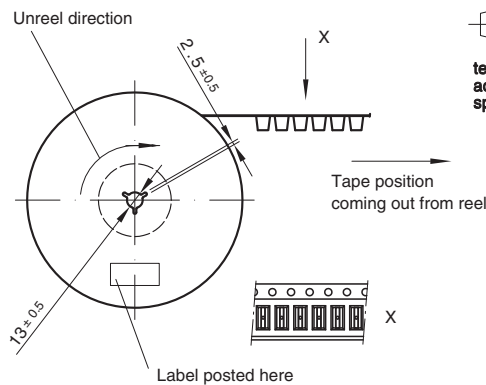
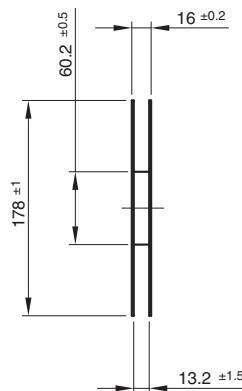


Solder pad proposal

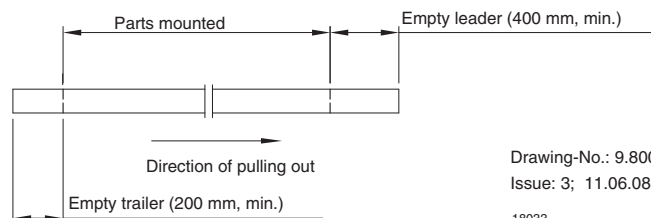


16228

REEL DIMENSIONS in millimeters



Leader and trailer tape:



Drawing-No.: 9.800-5080.01-4

Issue: 3; 11.06.08

18033

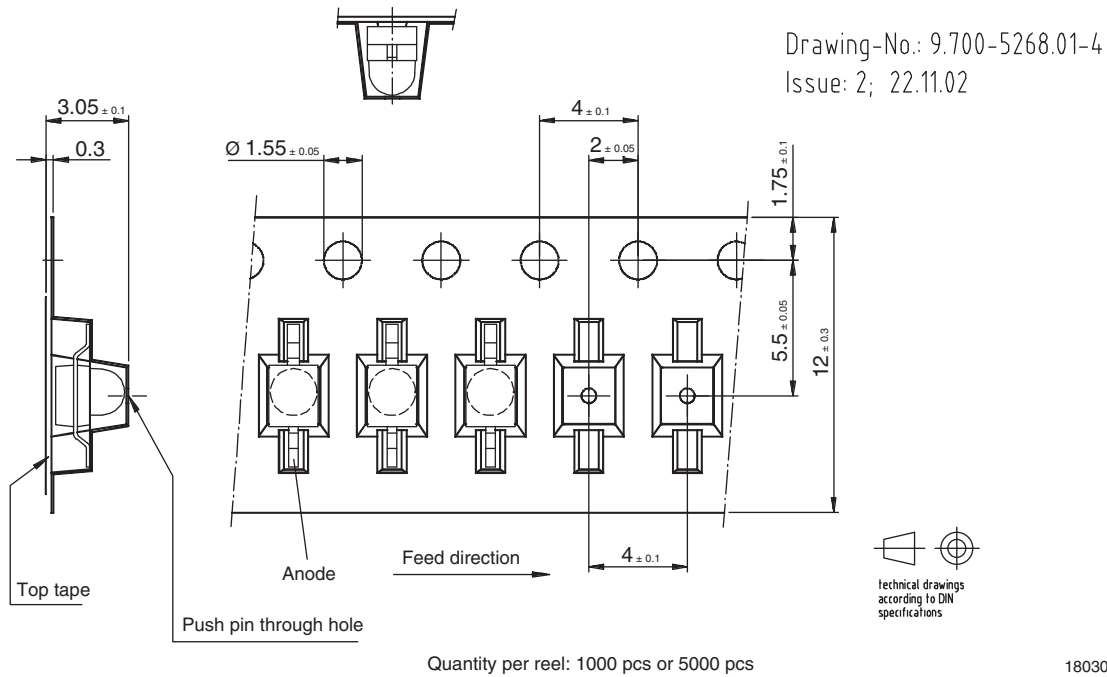


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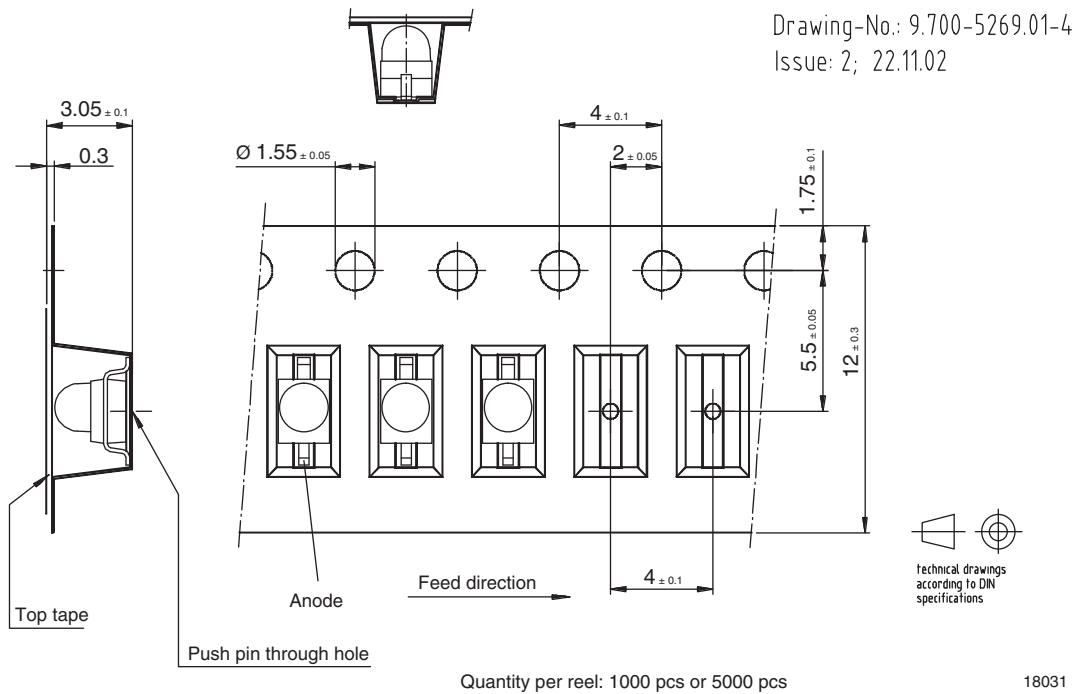
TSMF1000, TSMF1020, TSMF1030

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TAPING DIMENSIONS in millimeters: TSMF1000



TAPING DIMENSIONS in millimeters: TSMF1020



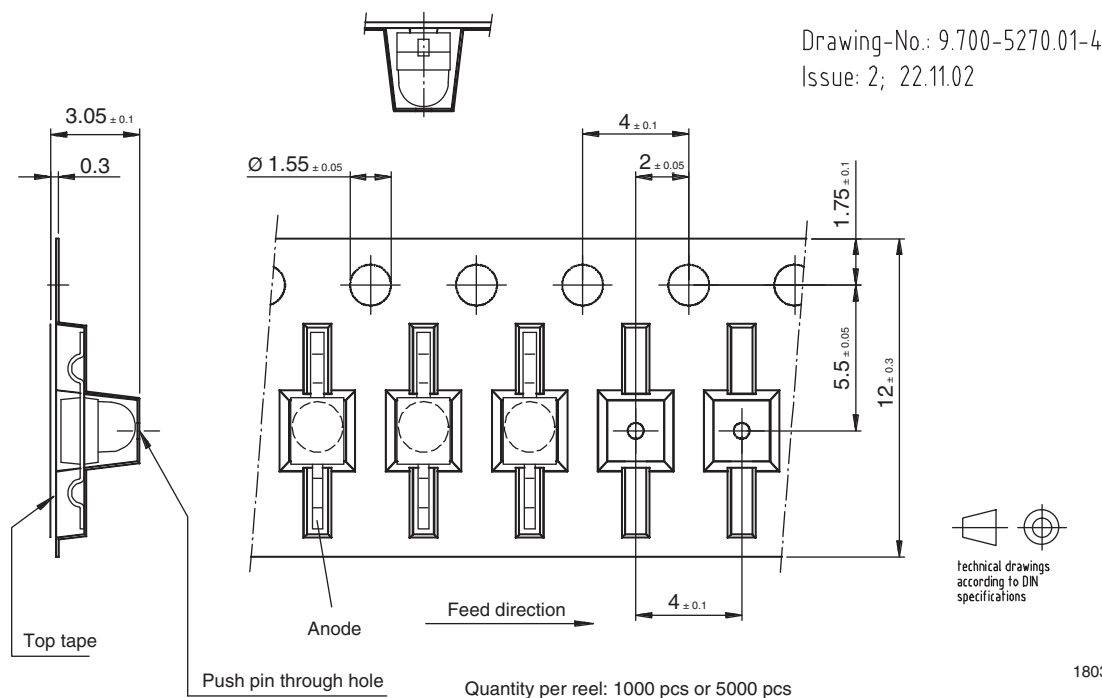


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TSMF1000, TSMF1020, TSMF1030

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TAPING DIMENSIONS in millimeters: TSMF1030





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