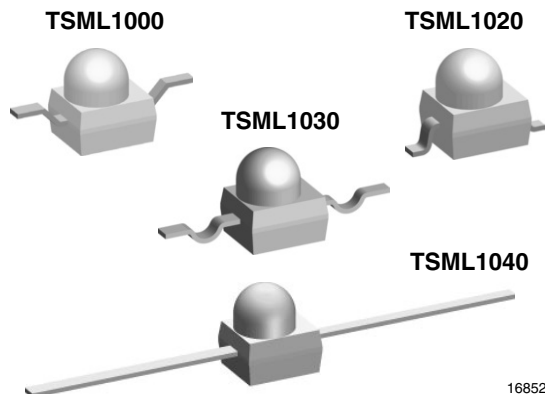


High Power Infrared Emitting Diode, RoHS Compliant, 940 nm, GaAlAs/GaAs



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	$t_p/T = 0.5$, $t_p = 100$ μ s	I_{FM}	200	mA
Surge forward current	$t_p = 100$ μ s	I_{FSM}	1.0	A



TSML1000, TSML1020, TSML1030, TSML1040

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RoHS Compliant, 940 nm, GaAlAs/GaAs

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

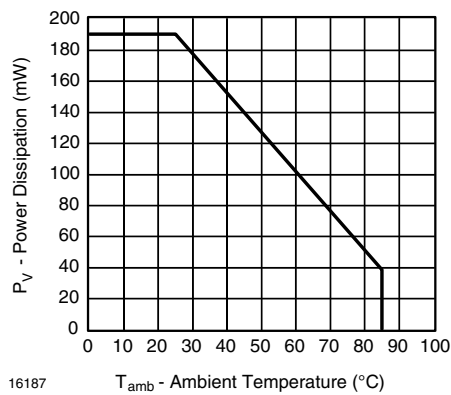


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature



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

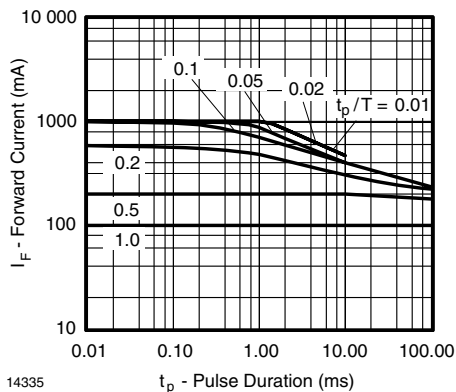


Fig. 3 - Pulse Forward Current vs. Pulse Duration

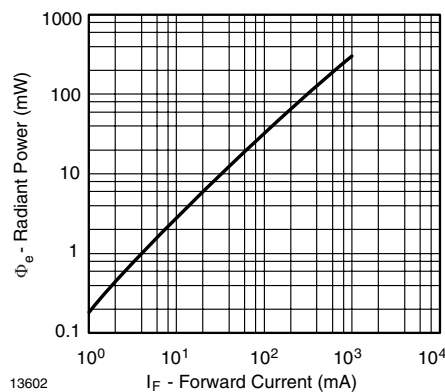


Fig. 6 - Radiant Power vs. Forward Current

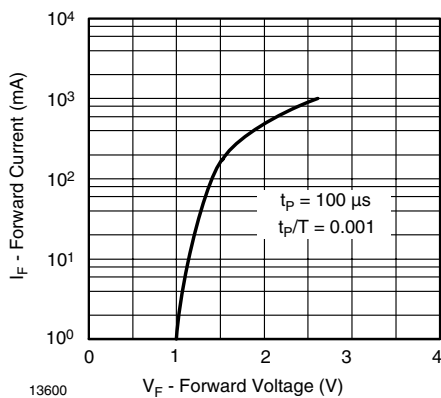


Fig. 4 - Forward Current vs. Forward Voltage

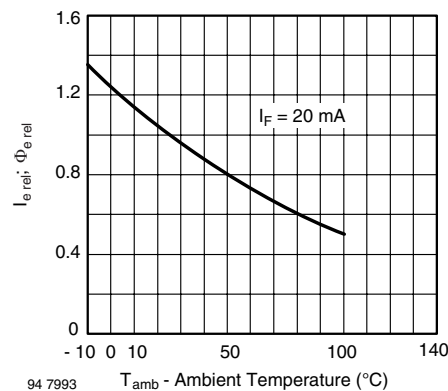


Fig. 7 - Relative Radiant Intensity/Power vs. Ambient Temperature

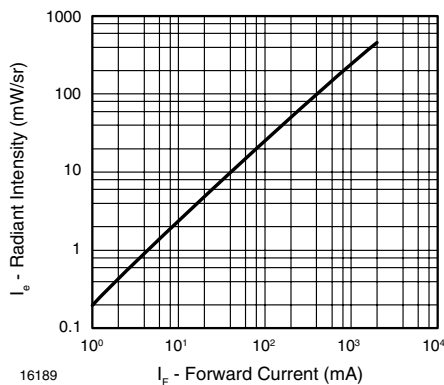


Fig. 5 - Radiant Intensity vs. Forward Current

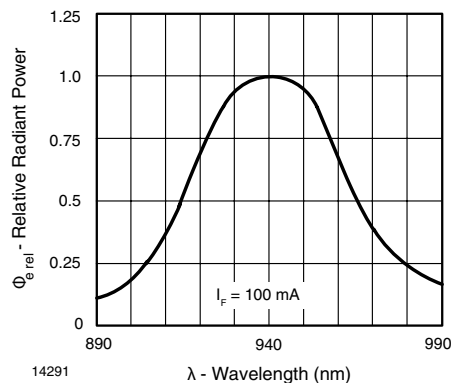


Fig. 8 - Relative Radiant Power vs. Wavelength



TSML1000, TSML1020, TSML1030, TSML1040

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REFLOW SOLDER PROFILE

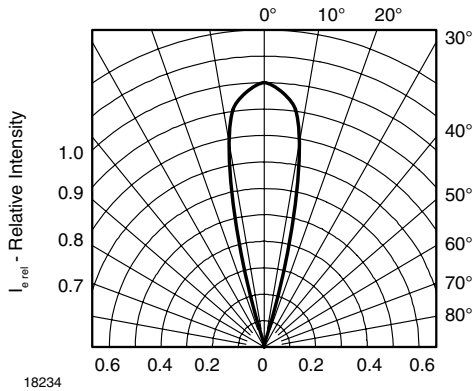


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

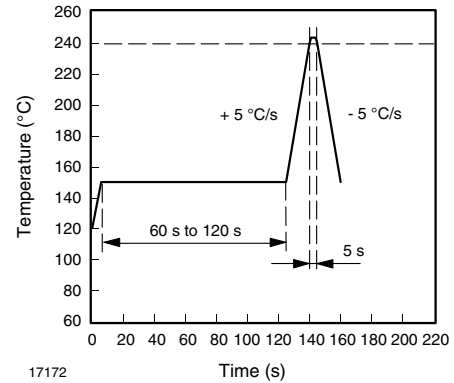


Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

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

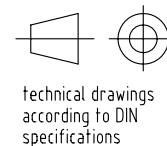
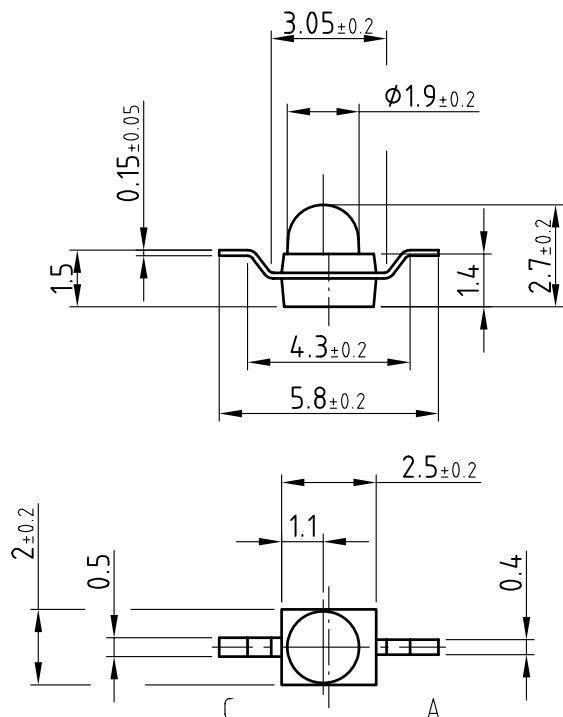
- 2.1 Storage temperature and rel. humidity conditions are: 5 °C to 35 °C, R.H. 60 %.
- 2.2 Floor life must not exceed 168 h, acc. to JEDEC level 3, J-STD-020.
Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp proof box with desiccant.
Considering 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.

TSML1000, TSML1020, TSML1030, TSML1040

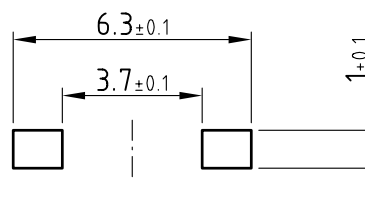
Vishay Semiconductors High Power Infrared Emitting Diode,
RoHS Compliant, 940 nm, GaAlAs/GaAs



PACKAGE DIMENSIONS in millimeters: TSML1000



Solder pad proposal

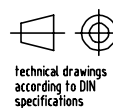
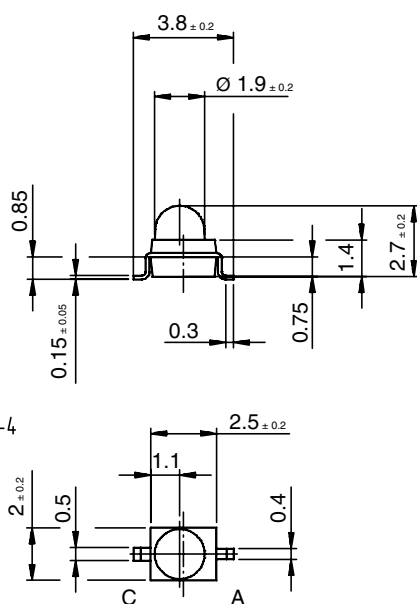


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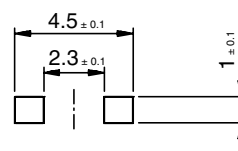
Issue: 3; 02.04.03

16159

PACKAGE DIMENSIONS in millimeters: TSML1020



Solder pad proposal



Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

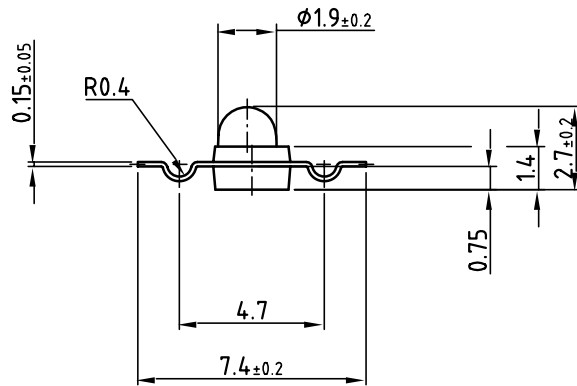
16160



TSML1000, TSML1020, TSML1030, TSML1040

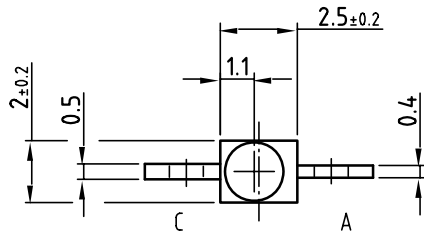
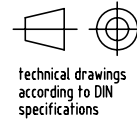
High Power Infrared Emitting Diode, Vishay Semiconductors
RoHS Compliant, 940 nm, GaAlAs/GaAs

PACKAGE DIMENSIONS in millimeters: TSML1030

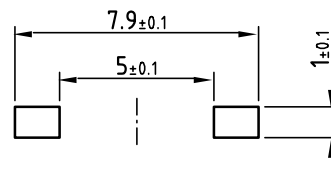


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Issue: 4; 08.05.03

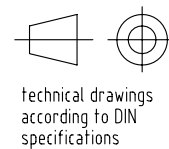
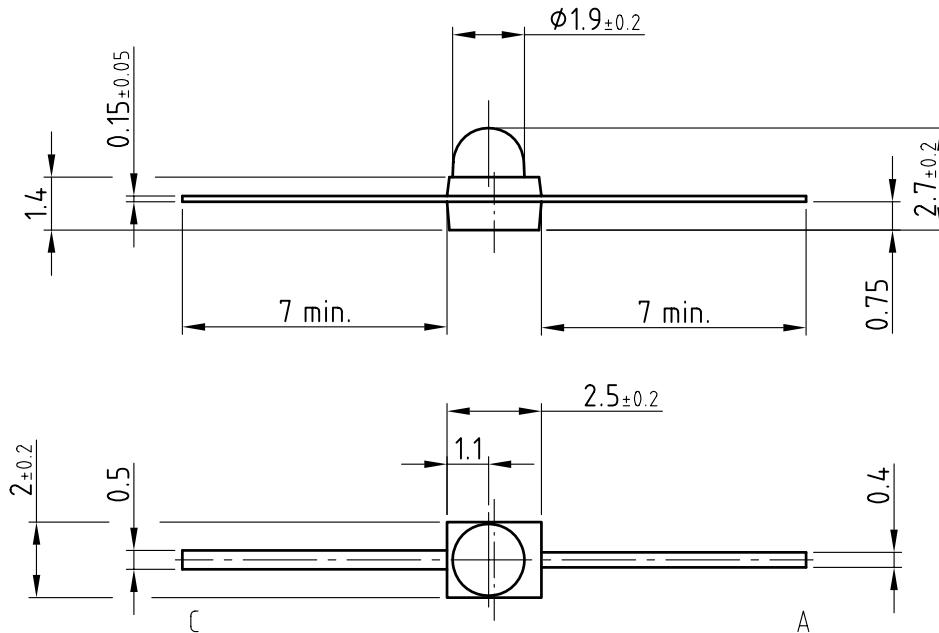


Solder pad proposal



16228

PACKAGE DIMENSIONS in millimeters: TSML1040



Drawing-No.: 6.544-5339.02-4

Issue: 3; 02.04.03

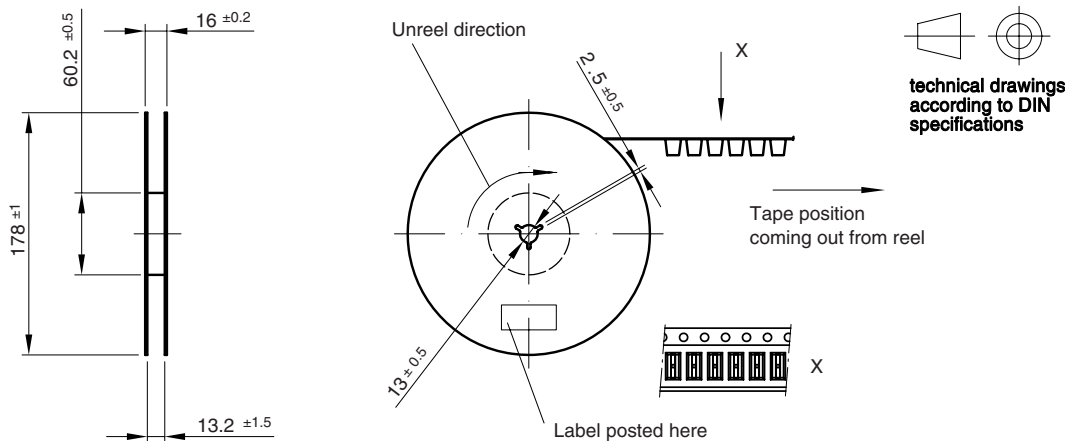
16760

TSML1000, TSML1020, TSML1030, TSML1040

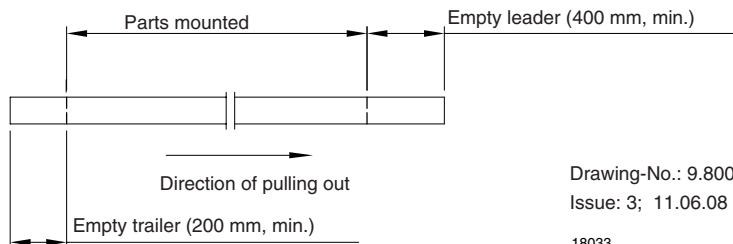
Vishay Semiconductors High Power Infrared Emitting Diode,
RoHS Compliant, 940 nm, GaAlAs/GaAs



REEL DIMENSIONS in millimeters



Leader and trailer tape:

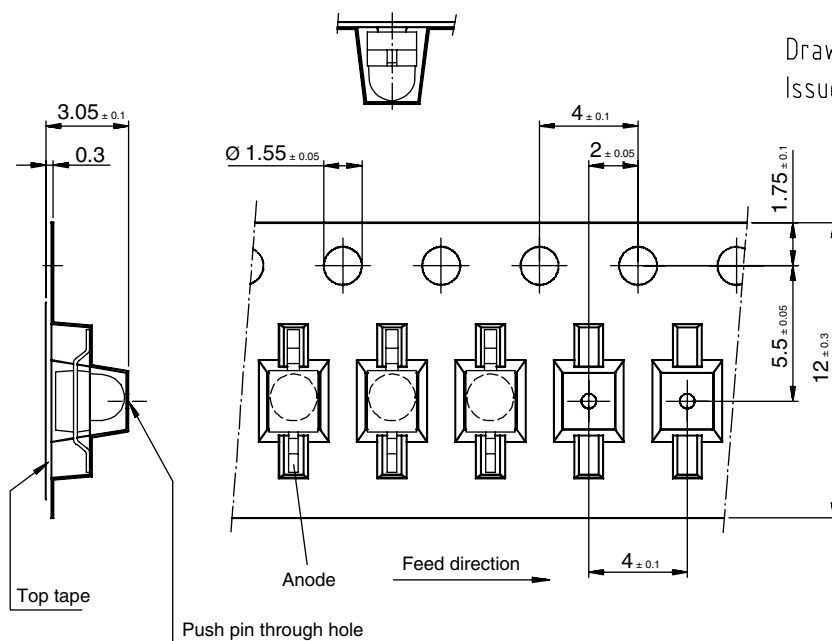


Drawing-No.: 9.800-5080.01-4

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

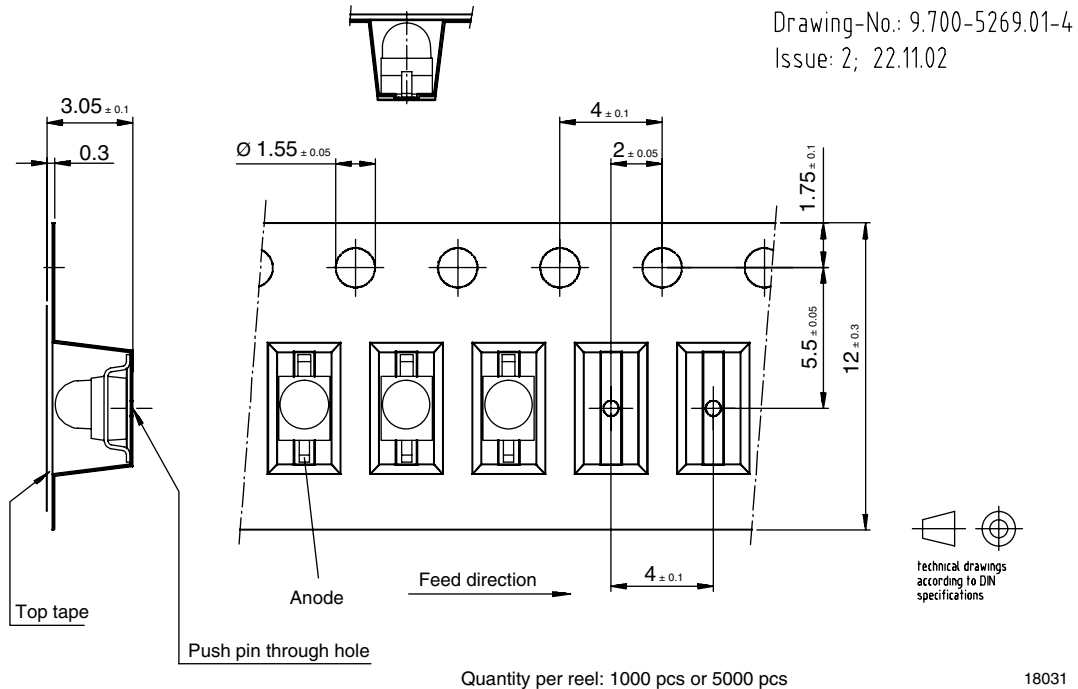
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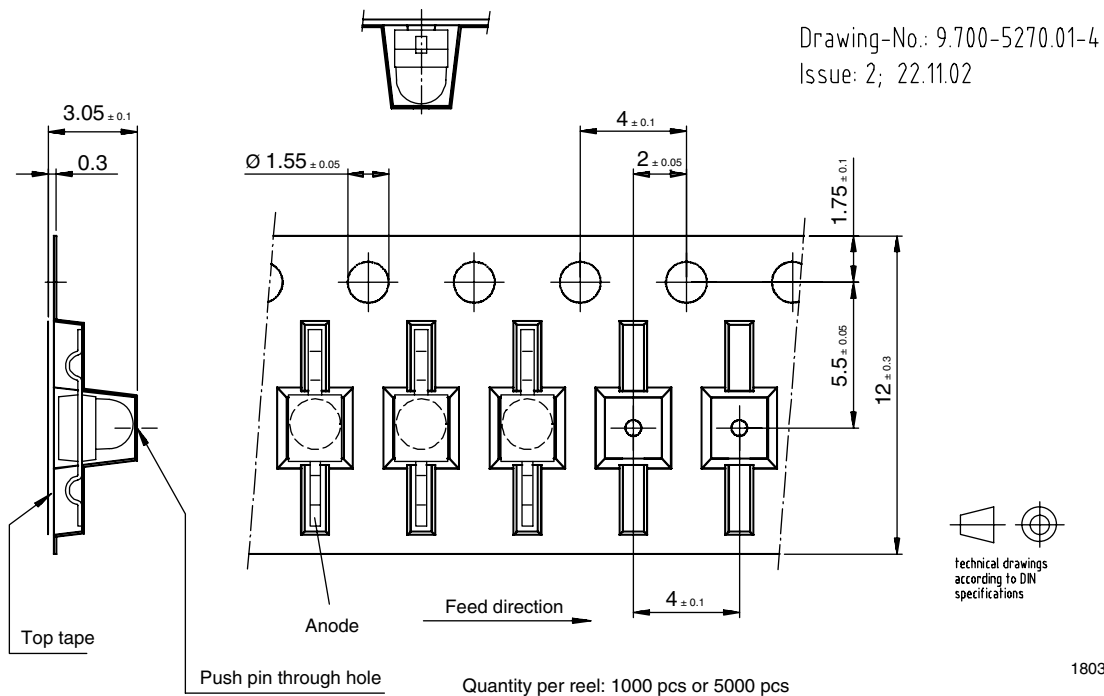
TSML1000, TSML1020, TSML1030, TSML1040

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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