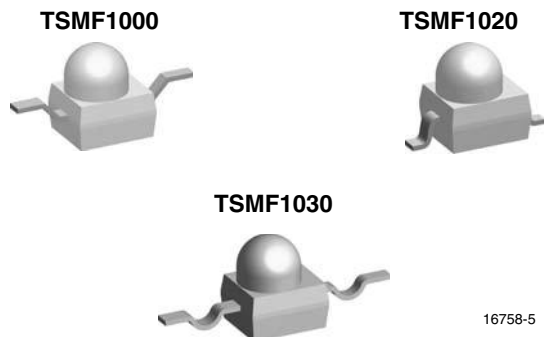


High Speed Infrared Emitting Diode, RoHS Compliant, 890 nm, GaAIAs Double Hetero



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
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



RoHS
COMPLIANT

DESCRIPTION

TSMF1000 series are infrared, 890 nm emitting diodes in GaAIAs 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				
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}	0.8	A
Power dissipation		P_V	180	mW



TSMF1000, TSMF1020, TSMF1030

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

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
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	K/W

Note

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

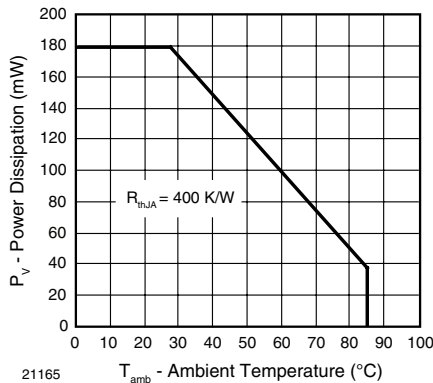


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

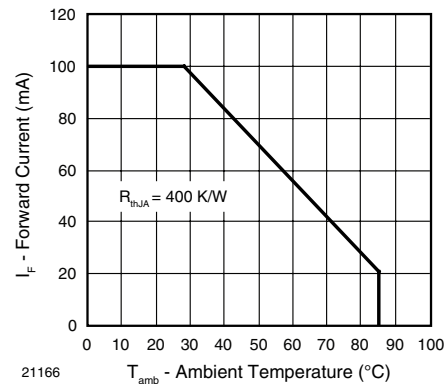


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 20$ mA	V_F		1.3	1.5	V
	$I_F = 1$ A, $t_p = 100$ μ s	V_F		2.4		V
Temperature coefficient of V_F	$I_F = 1$ mA	TK_{V_F}		- 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		160		pF
Radiant intensity	$I_F = 20$ mA	I_e	2.5	5	13	mW/sr
	$I_F = 100$ mA, $t_p = 100$ μ s	I_e		25		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_{ϕ_e}		- 0.6		%/K
Angle of half intensity		φ		± 17		deg
Peak wavelength	$I_F = 20$ mA	λ_p		890		nm
Spectral bandwidth	$I_F = 20$ mA	$\Delta\lambda$		40		nm
Temperature coefficient of λ_p	$I_F = 20$ mA	TK_{λ_p}		0.2		nm/K
Rise time	$I_F = 20$ mA	t_r		30		ns
Fall time	$I_F = 20$ mA	t_f		30		ns
Cut-off frequency	$I_{DC} = 70$ mA, $I_{AC} = 30$ mA pp	f_c		12		MHz
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

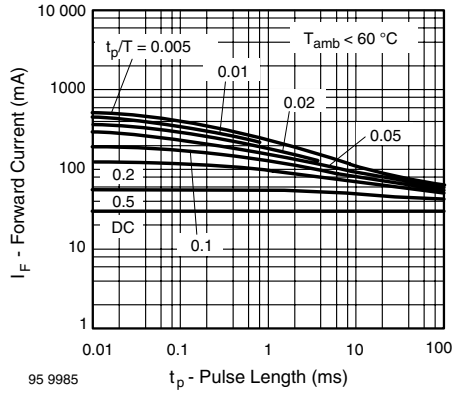


Fig. 3 - Pulse Forward Current vs. Pulse Duration

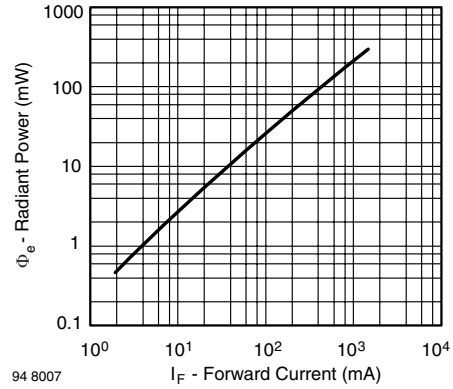


Fig. 6 - Radiant Power vs. Forward Current

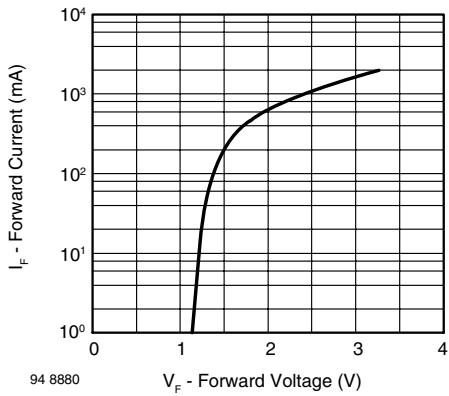


Fig. 4 - Forward Current vs. Forward Voltage

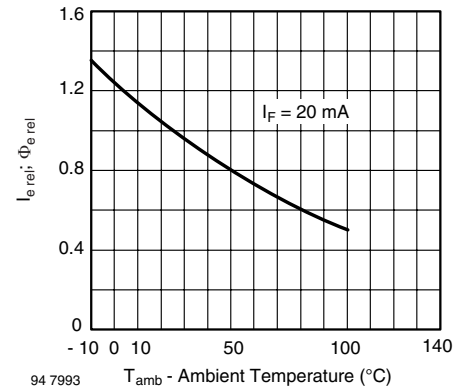


Fig. 7 - Rel. Radiant Intensity/Power vs. Ambient Temperature

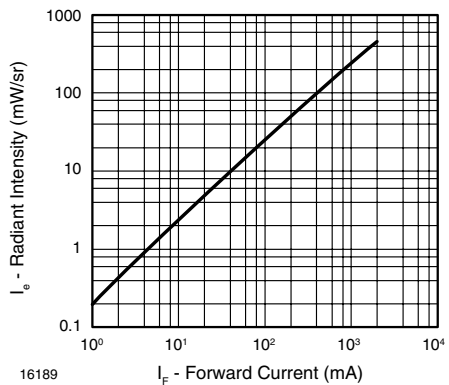


Fig. 5 - Radiant Intensity vs. Forward Current

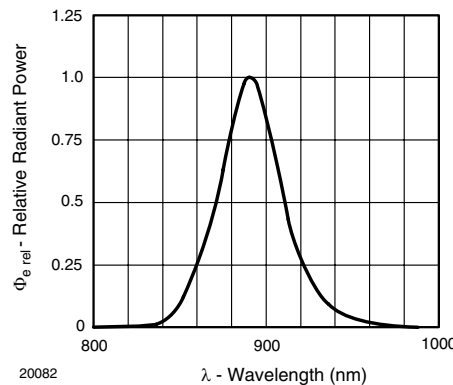


Fig. 8 - Relative Radiant Power vs. Wavelength



TSMF1000, TSMF1020, TSMF1030

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

REFLOW SOLDER PROFILE

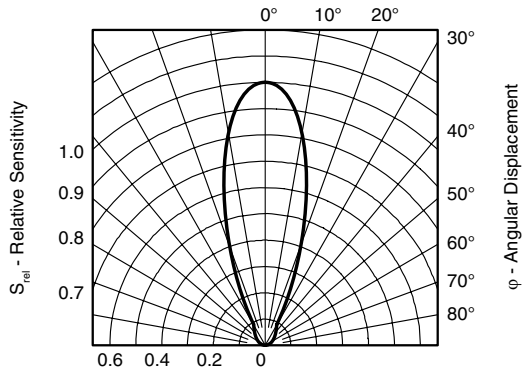


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

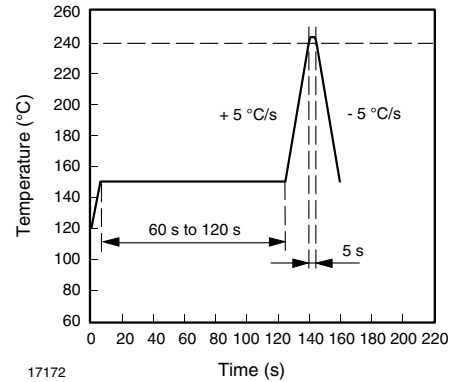


Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

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.

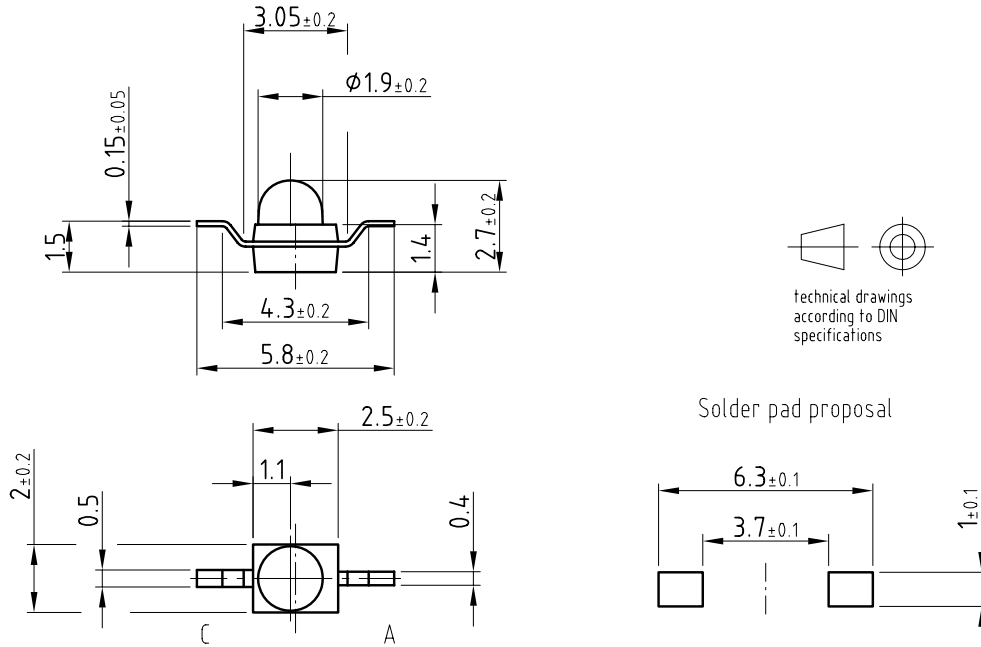
2.4 If humidity indicator in the package shows pink color (normal blue), then devices should be treated with the same conditions as 2.3.

TSMF1000, TSMF1020, TSMF1030



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

PACKAGE DIMENSIONS in millimeters: TSMF1000

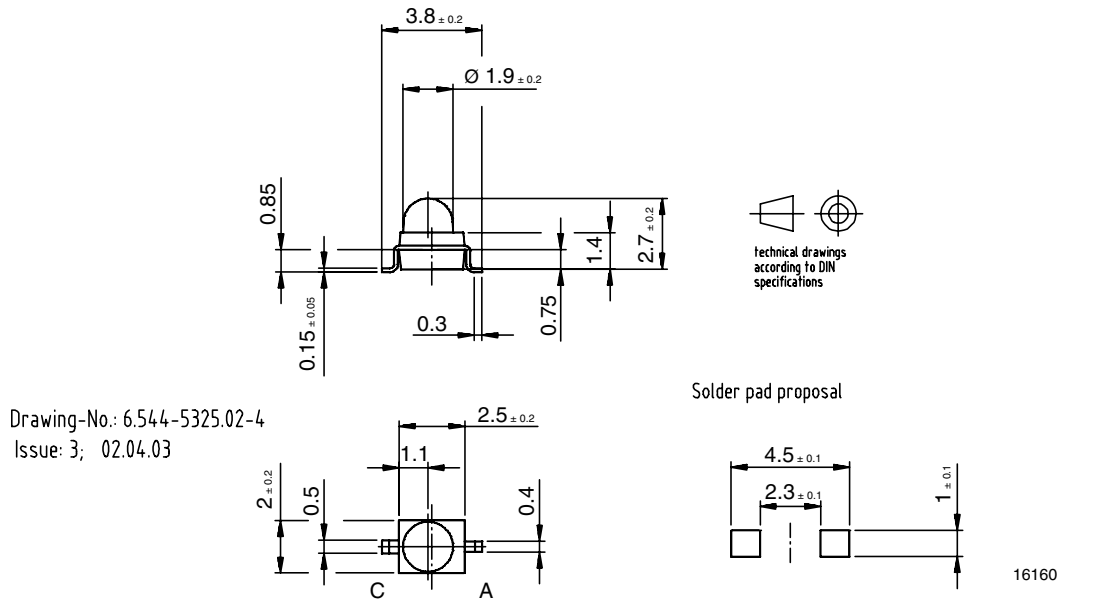


Drawing-No.: 6.544-5326.02-4

Issue: 3; 02.04.03

16159

PACKAGE DIMENSIONS in millimeters: TSMF1020



Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

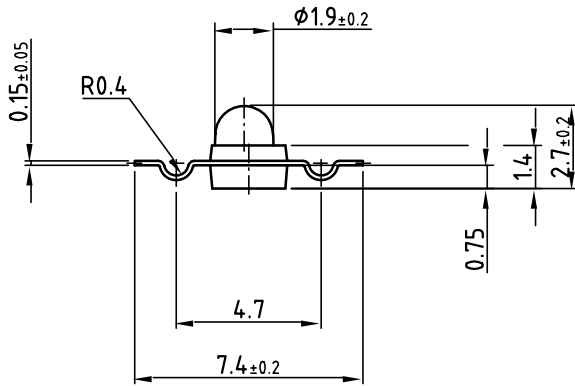
16160



TSMF1000, TSMF1020, TSMF1030

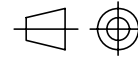
High Speed Infrared Emitting Diode, RoHS Vishay Semiconductors
Compliant, 890 nm, GaAlAs Double Hetero

PACKAGE DIMENSIONS in millimeters: TSMF1030

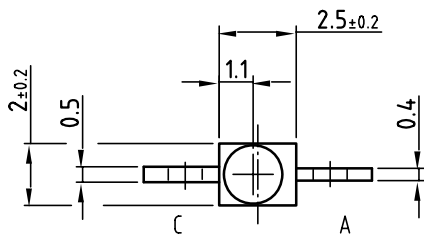


Drawing-No.: 6.544-5329.01-4

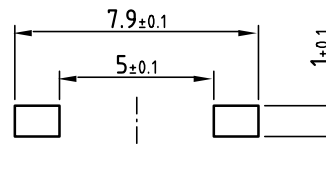
Issue: 4; 08.05.03



technical drawings
according to DIN
specifications

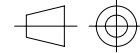
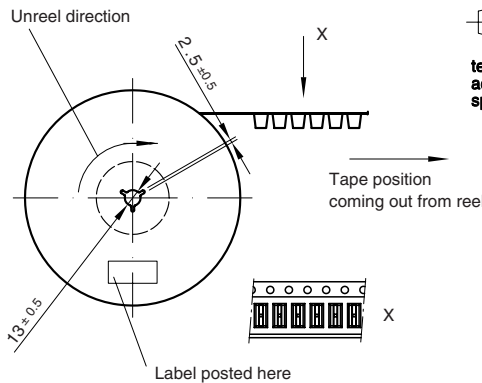
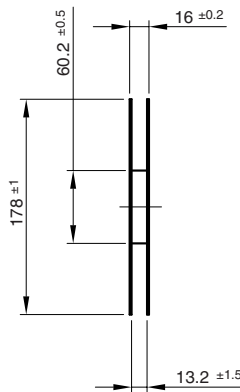


Solder pad proposal



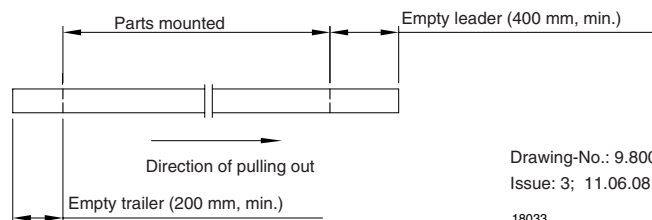
16228

REEL DIMENSIONS in millimeters



technical drawings
according to DIN
specifications

Leader and trailer tape:



Drawing-No.: 9.800-5080.01-4

Issue: 3; 11.06.08

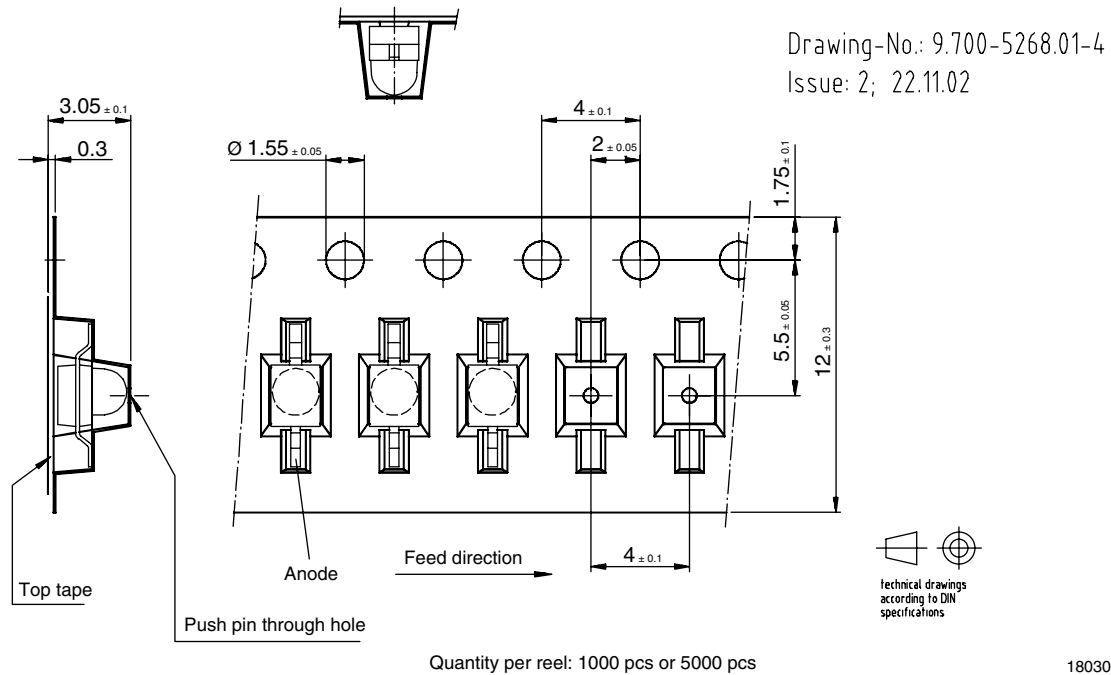
18033

TSMF1000, TSMF1020, TSMF1030

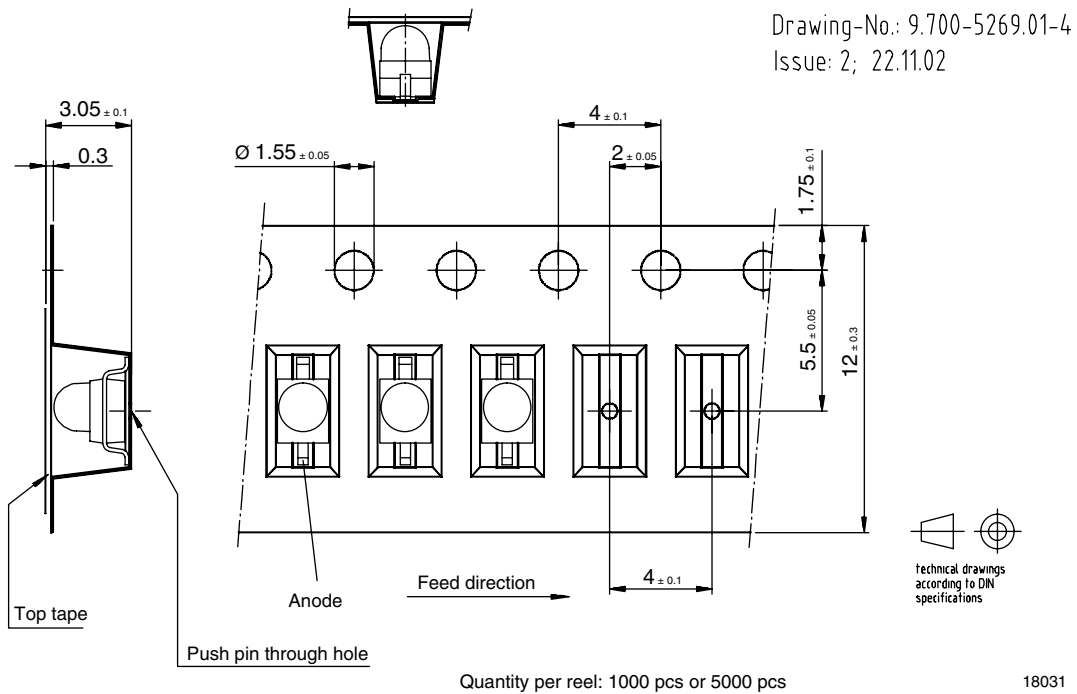


Vishay Semiconductors High Speed Infrared Emitting Diode, RoHS Compliant, 890 nm, GaAlAs Double Hetero

TAPING DIMENSIONS in millimeters: TSMF1000



TAPING DIMENSIONS in millimeters: TSMF1020

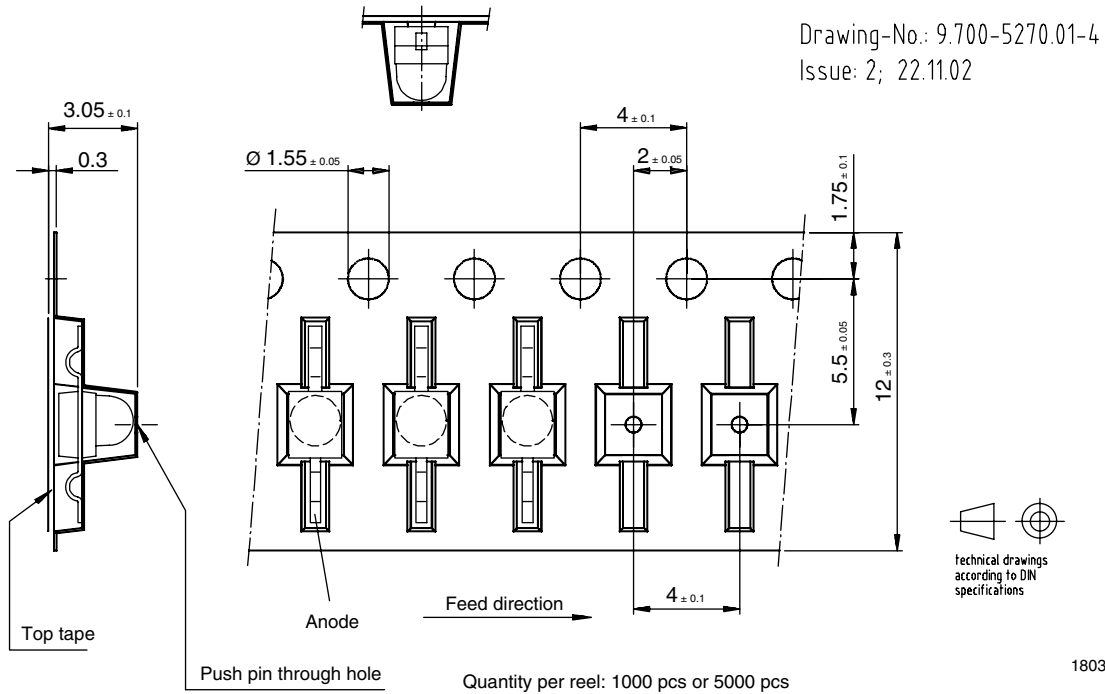




TSMF1000, TSMF1020, TSMF1030

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

TAPING DIMENSIONS in millimeters: TSMF1030





Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.