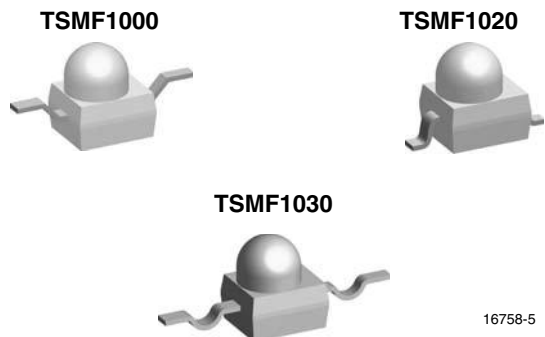


## High Speed Infrared Emitting Diode, RoHS Compliant, 890 nm, GaAIAs Double Hetero



### 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)	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
TSMF1000	5	$\pm 17$	890	30
TSMF1020	5	$\pm 17$	890	30
TSMF1030	5	$\pm 17$	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  
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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

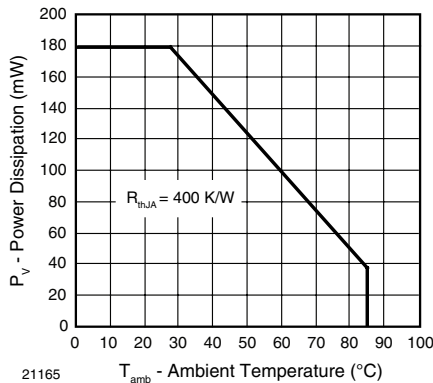


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

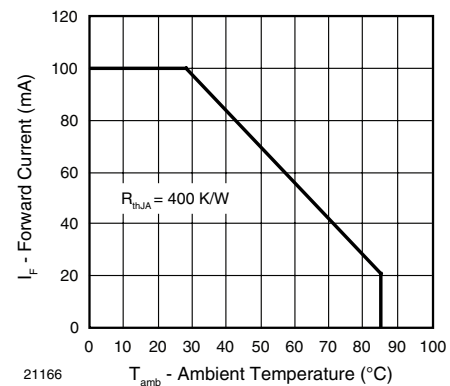


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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, $t_p = 100$ $\mu$ 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	$\mu$ 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, $t_p = 100$ $\mu$ s	$I_e$		25		mW/sr
Radiant power	$I_F = 100$ mA, $t_p = 20$ ms	$\phi_e$		35		mW
Temperature coefficient of $\phi_e$	$I_F = 20$ mA	$TK_{\phi_e}$		- 0.6		%/K
Angle of half intensity		$\varphi$		$\pm 17$		deg
Peak wavelength	$I_F = 20$ mA	$\lambda_p$		890		nm
Spectral bandwidth	$I_F = 20$ mA	$\Delta\lambda$		40		nm
Temperature coefficient of $\lambda_p$	$I_F = 20$ mA	$TK_{\lambda_p}$		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

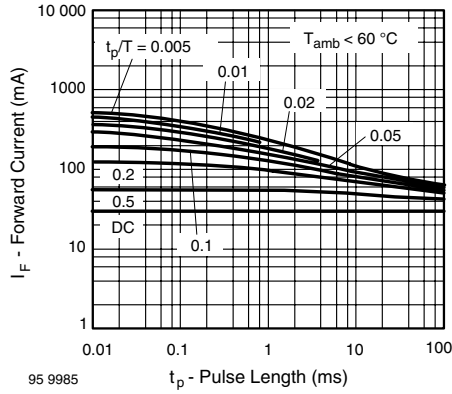


Fig. 3 - Pulse Forward Current vs. Pulse Duration

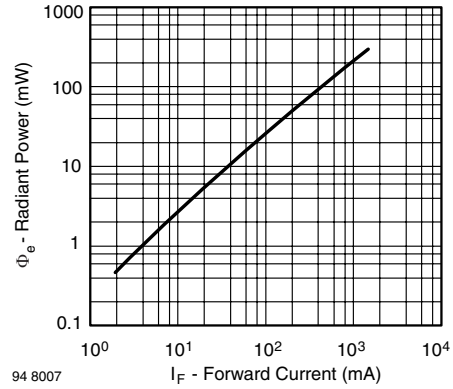


Fig. 6 - Radiant Power vs. Forward Current

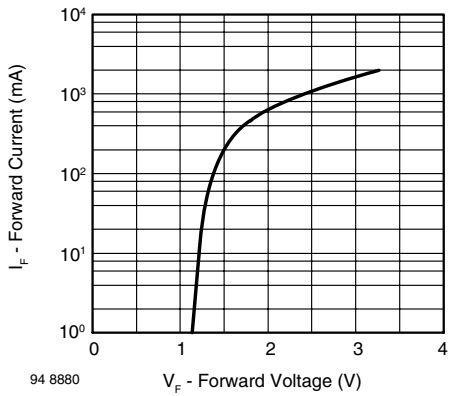


Fig. 4 - Forward Current vs. Forward Voltage

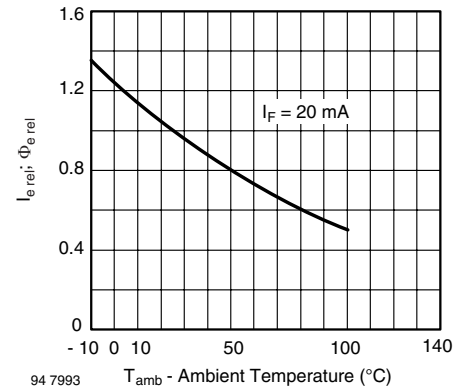


Fig. 7 - Rel. Radiant Intensity/Power vs. Ambient Temperature

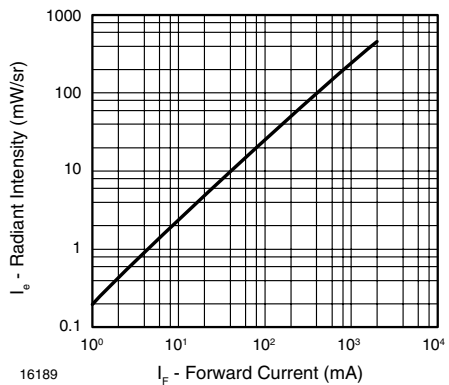


Fig. 5 - Radiant Intensity vs. Forward Current

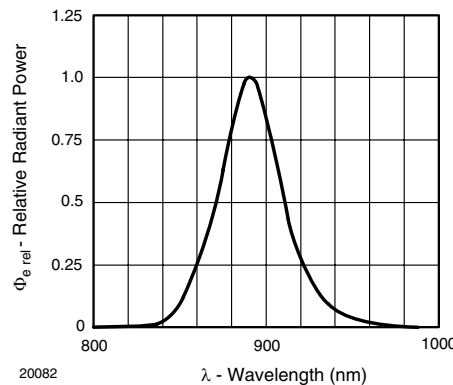


Fig. 8 - Relative Radiant Power vs. Wavelength



# TSMF1000, TSMF1020, TSMF1030

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## REFLOW SOLDER PROFILE

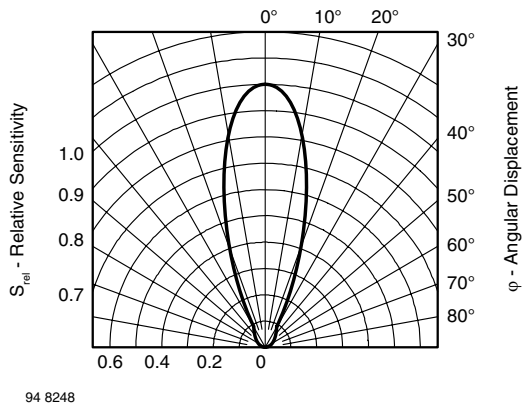


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

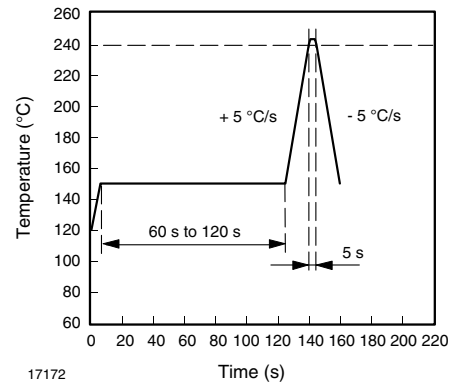


Fig. 10 - Lead Tin (SnPb) Reflow Solder Profile

## 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.

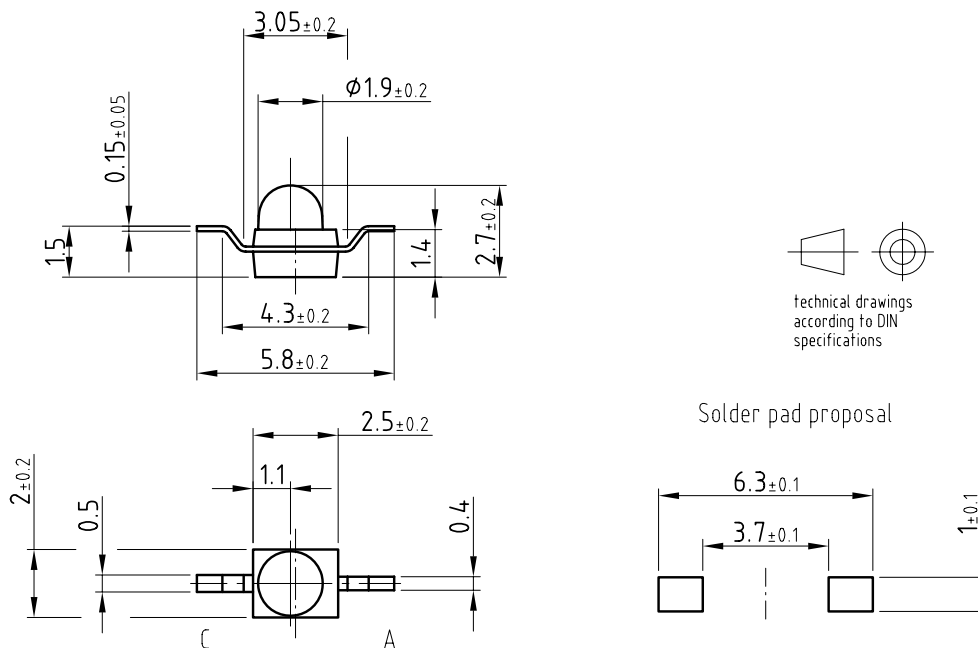
2.4 If humidity indicator in the package shows pink color (normal blue), then devices should be treated with the same conditions as 2.3.

# TSMF1000, TSMF1020, TSMF1030



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

## PACKAGE DIMENSIONS in millimeters: TSMF1000

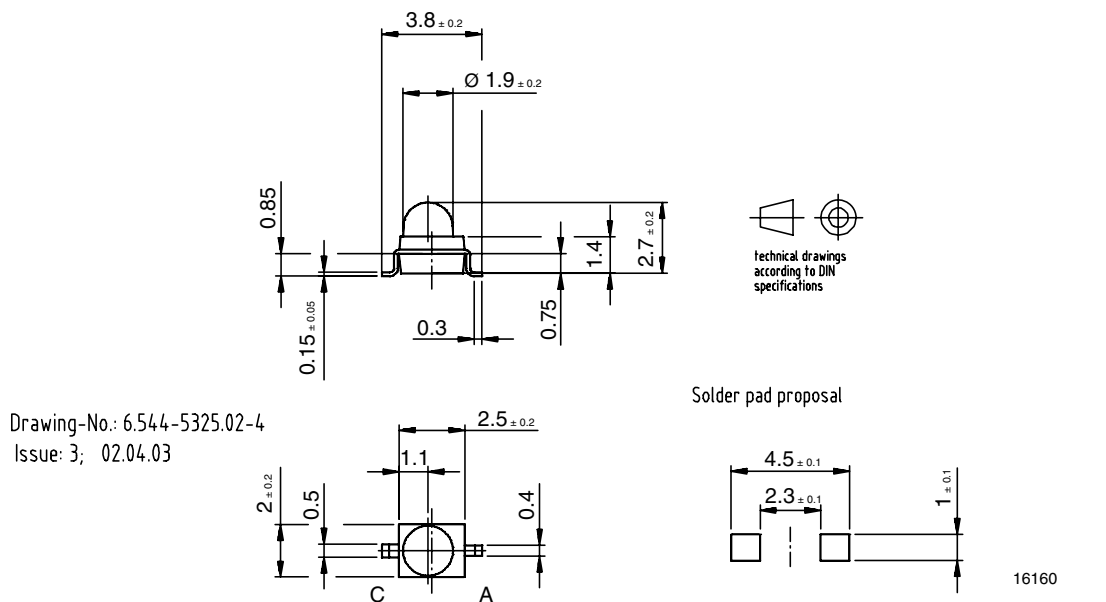


Drawing-No.: 6.544-5326.02-4

Issue: 3; 02.04.03

16159

## PACKAGE DIMENSIONS in millimeters: TSMF1020



Drawing-No.: 6.544-5325.02-4

Issue: 3; 02.04.03

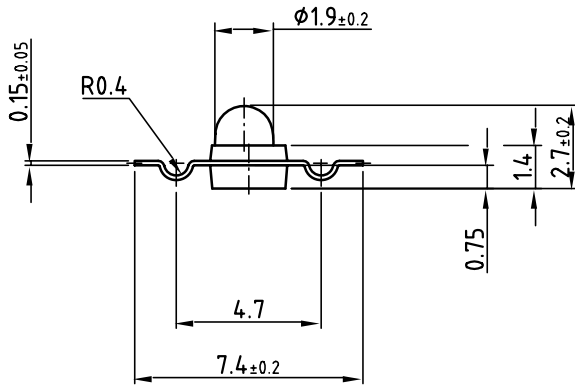
16160



# TSMF1000, TSMF1020, TSMF1030

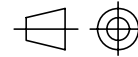
High Speed Infrared Emitting Diode, RoHS Vishay Semiconductors  
Compliant, 890 nm, GaAlAs Double Hetero

## PACKAGE DIMENSIONS in millimeters: TSMF1030

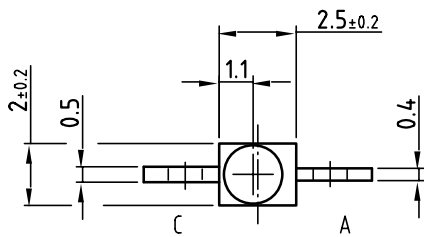


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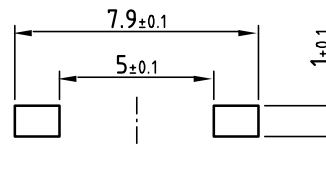
Issue: 4; 08.05.03



technical drawings  
according to DIN  
specifications

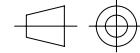
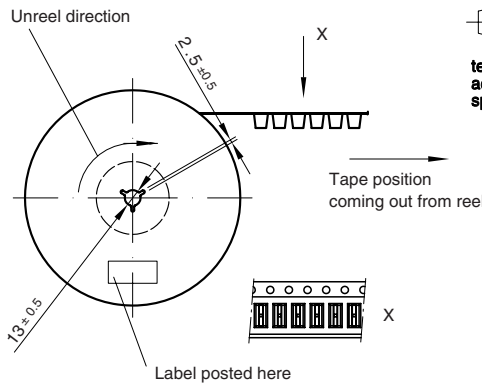
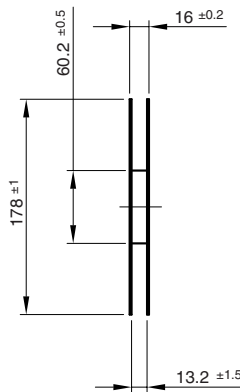


Solder pad proposal



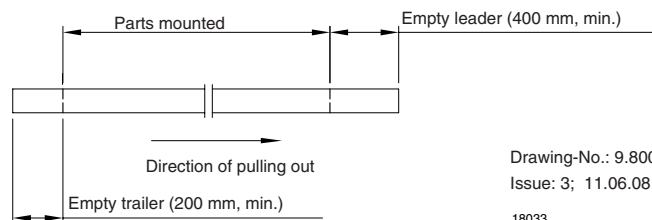
16228

## 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

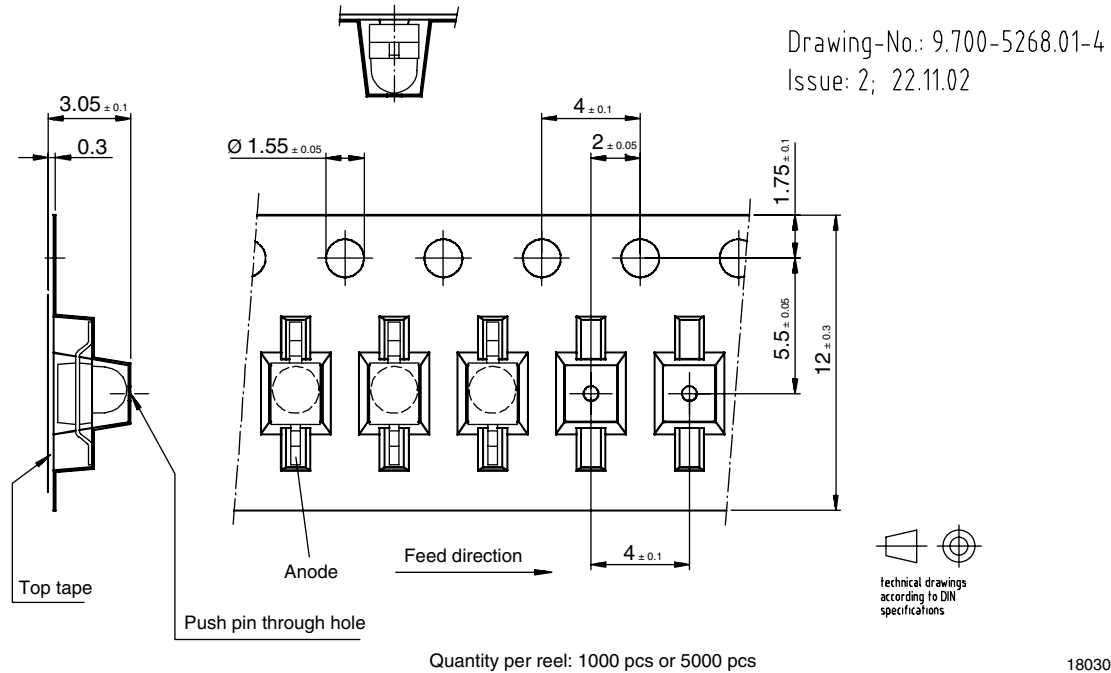
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# TSMF1000, TSMF1020, TSMF1030

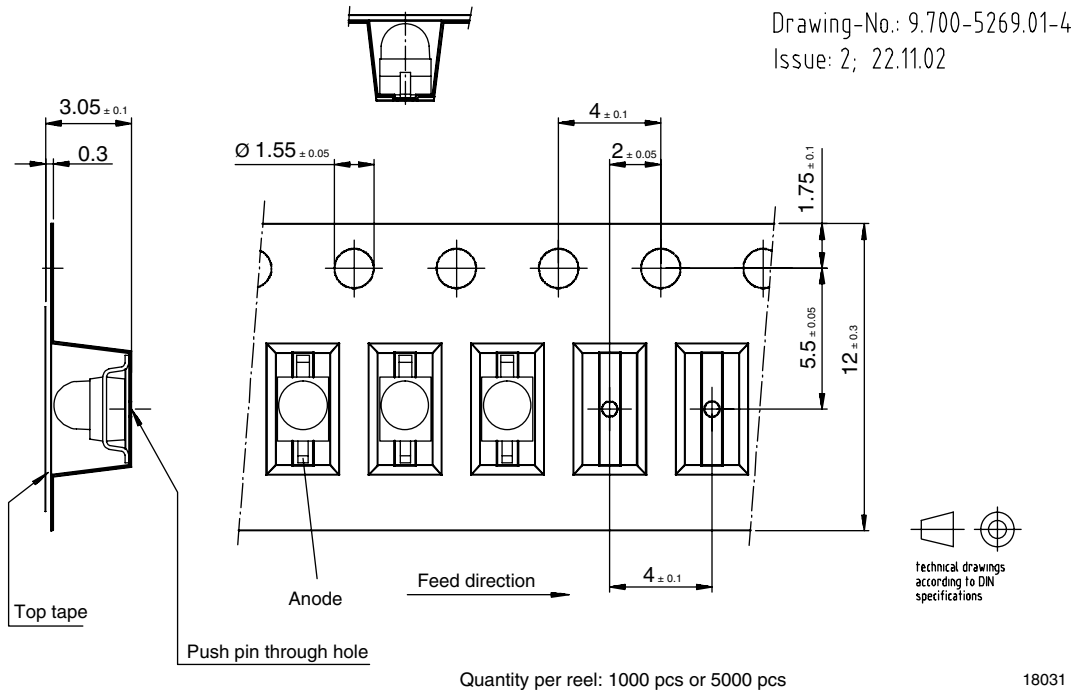


Vishay Semiconductors High Speed Infrared Emitting Diode, RoHS Compliant, 890 nm, GaAlAs Double Hetero

## TAPING DIMENSIONS in millimeters: TSMF1000



## TAPING DIMENSIONS in millimeters: TSMF1020

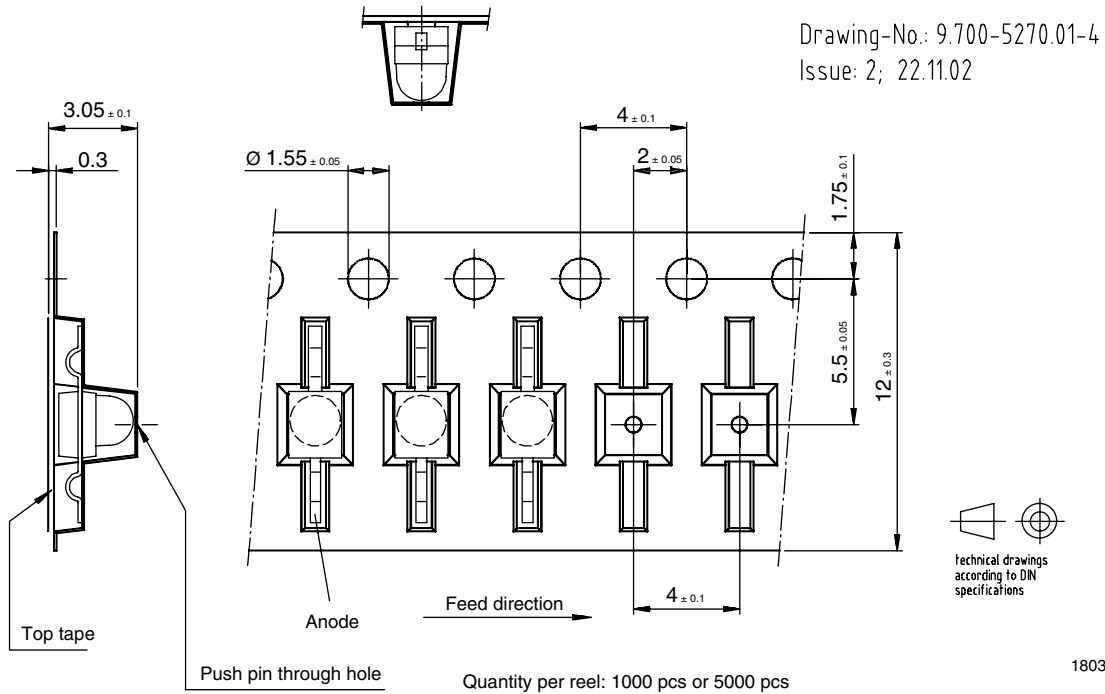




# TSMF1000, TSMF1020, TSMF1030

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

## TAPING DIMENSIONS in millimeters: TSMF1030



18032





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