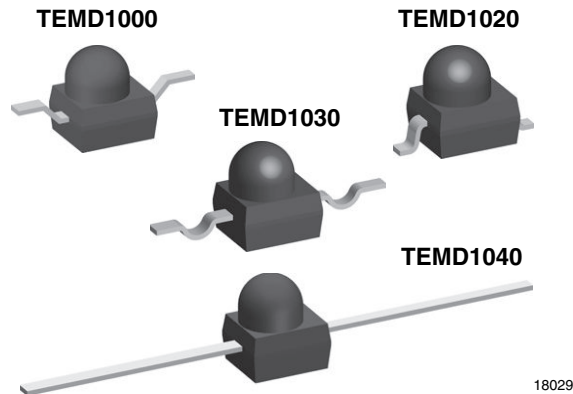


## Silicon PIN Photodiode, RoHS-Compliant



### 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
- Radiant sensitive area (in mm<sup>2</sup>): 0.23
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 15^\circ$
- Package matches with IR emitter series TSML1000
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS  
COMPLIANT

### DESCRIPTION

TEMD1000 series are PIN photodiodes with high speed and high radiant sensitivity in black, surface-mount plastic packages with lens and daylight blocking filter. Filter bandwidth is matched with 870 nm to 950 nm IR emitters.

### APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmission systems, e.g. in combination with TSMLxxxx series IR emitters

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ ( $^\circ$ )	$\lambda_{0.5}$ (nm)
TEMD1000	10	$\pm 15$	790 to 1050
TEMD1020	10	$\pm 15$	790 to 1050
TEMD1030	10	$\pm 15$	790 to 1050
TEMD1040	10	$\pm 15$	790 to 1050

#### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TEMD1000	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Reverse gullwing
TEMD1020	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Gullwing
TEMD1030	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Yoke
TEMD1040	Bulk	MOQ: 1000 pcs, 1000 pcs/bulk	Axial leads

#### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	60	V
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_V$	75	mW
Junction temperature		$T_j$	100	$^\circ C$
Operating temperature range		$T_{amb}$	-40 to +85	$^\circ C$
Storage temperature range		$T_{stg}$	-40 to +100	$^\circ C$
Soldering temperature	$t \leq 5$ s	$T_{sd}$	< 260	$^\circ C$



BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I <sub>F</sub> = 50 mA	V <sub>F</sub>	-	1	1.3	V
Breakdown voltage	I <sub>R</sub> = 100 μA, E = 0	V <sub>(BR)</sub>	60	-	-	V
Reverse dark current	V <sub>R</sub> = 10 V, E = 0	I <sub>ro</sub>	-	1	10	nA
Diode capacitance	V <sub>R</sub> = 5 V, f = 1 MHz, E = 0	C <sub>D</sub>	-	1.8	-	pF
Reverse light current	E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 870 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>	6.0	10	13.0	μA
	E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>	-	12	-	μA
Temperature coefficient of I <sub>ra</sub>	V <sub>R</sub> = 5 V, λ = 870 nm,	TK <sub>Ira</sub>	-	0.2	-	%/K
Absolute spectral sensitivity	V <sub>R</sub> = 5 V, λ = 870 nm	s(λ)	-	0.60	-	A/W
	V <sub>R</sub> = 5 V, λ = 950 nm	s(λ)	-	0.55	-	A/W
Angle of half sensitivity		φ	-	± 15	-	°
Wavelength of peak sensitivity		λ <sub>p</sub>	-	940	-	nm
Range of spectral bandwidth		λ <sub>0.5</sub>	-	790 to 1050	-	nm
Rise time	V <sub>R</sub> = 10 V, R <sub>L</sub> = 50 Ω, λ = 820 nm	t <sub>r</sub>	-	4	-	ns
Fall time	V <sub>R</sub> = 10 V, R <sub>L</sub> = 50 Ω, λ = 820 nm	t <sub>f</sub>	-	4	-	ns

BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

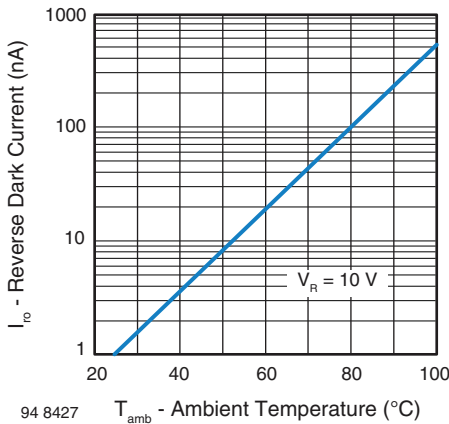


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

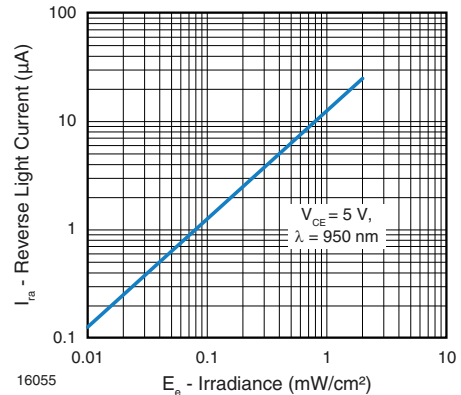


Fig. 3 - Reverse Light Current vs. Irradiance

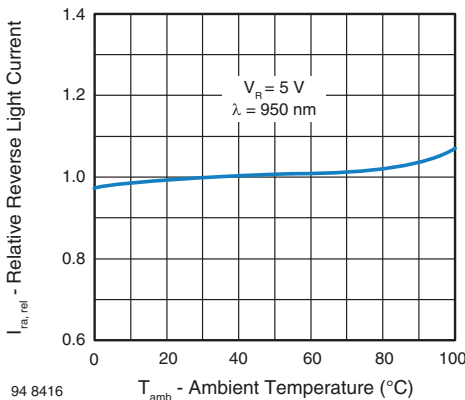


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

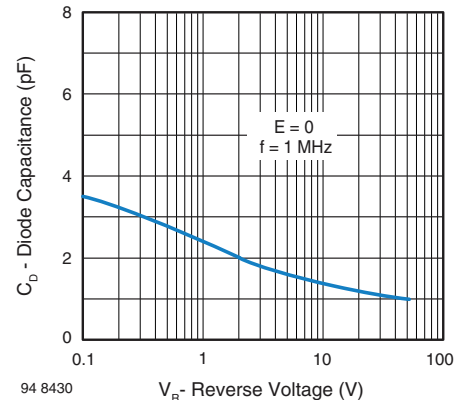


Fig. 4 - Diode Capacitance vs. Reverse Voltage

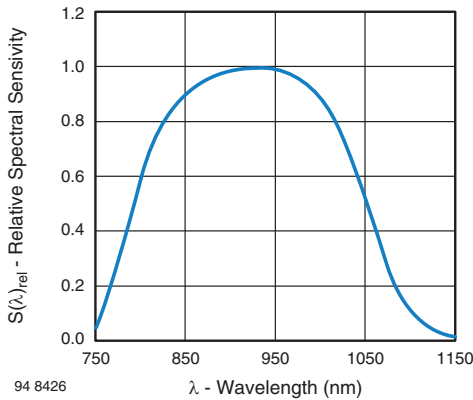


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

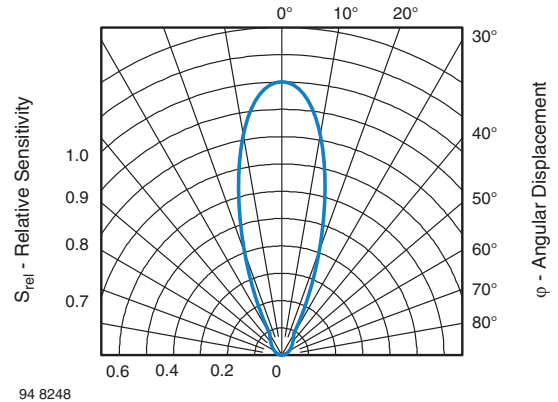


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

## 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

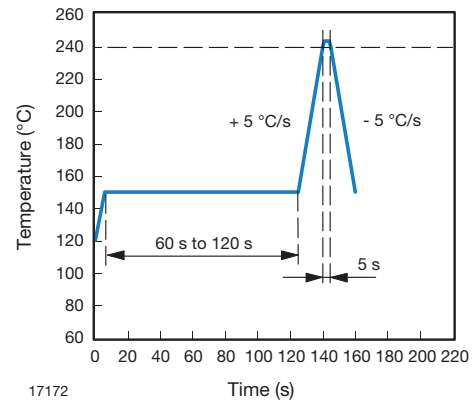


Fig. 7 - Lead Tin (SnPb) Reflow Solder Profile

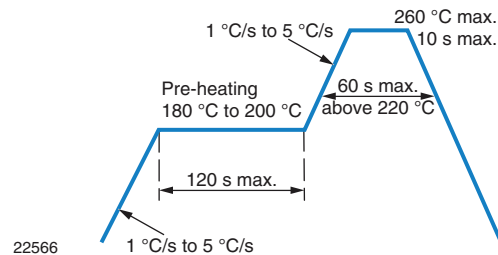
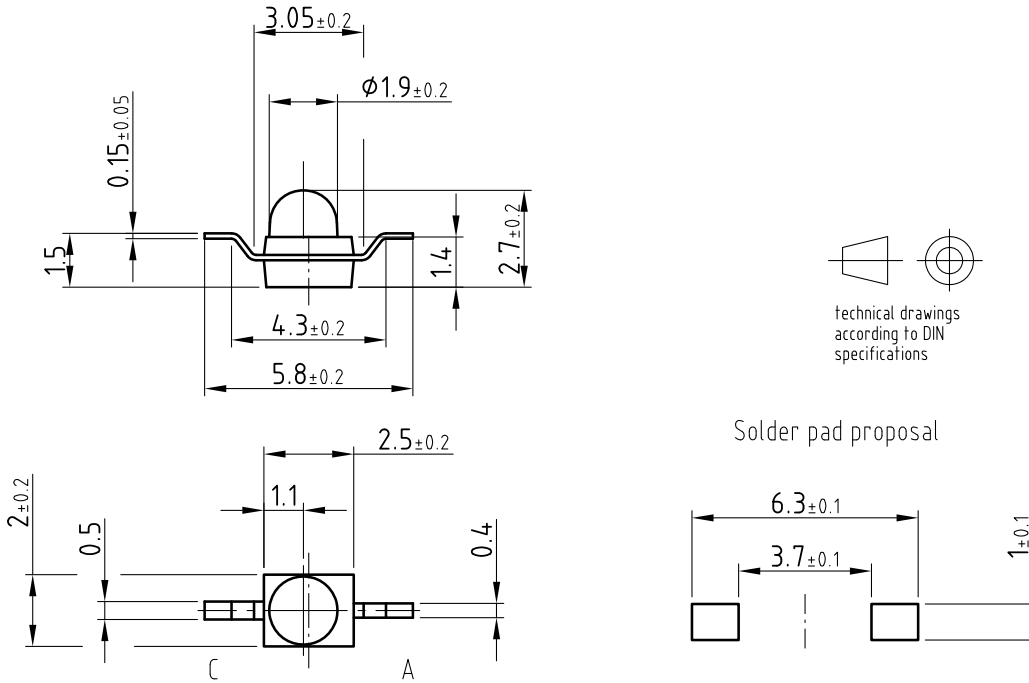


Fig. 8 - Lead (Pb)-Free Reflow Solder Profile According to J-STD-020

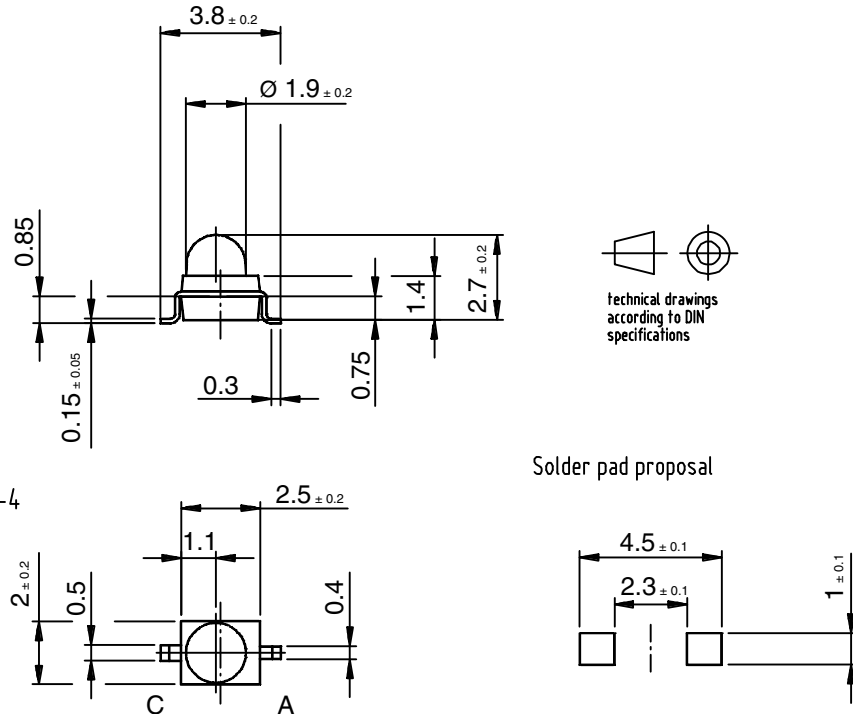


## PACKAGE DIMENSIONS in millimeters: TEMD1000



Drawing-No.: 6.544-5326.02-4  
 Issue: 3; 02.04.03  
 16159

## PACKAGE DIMENSIONS in millimeters: TEMD1020

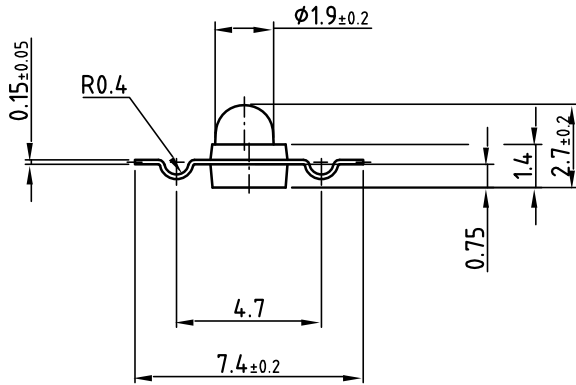


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 Issue: 3; 02.04.03

16160

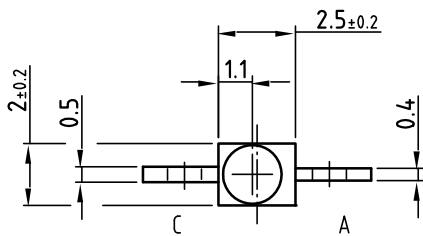
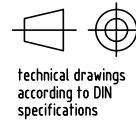


## PACKAGE DIMENSIONS in millimeters: TEMD1030

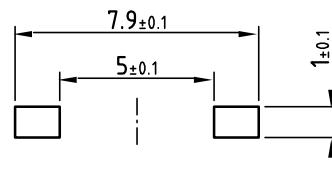


Drawing-No.: 6.544-5329.01-4

Issue: 4; 08.05.03

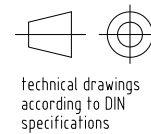
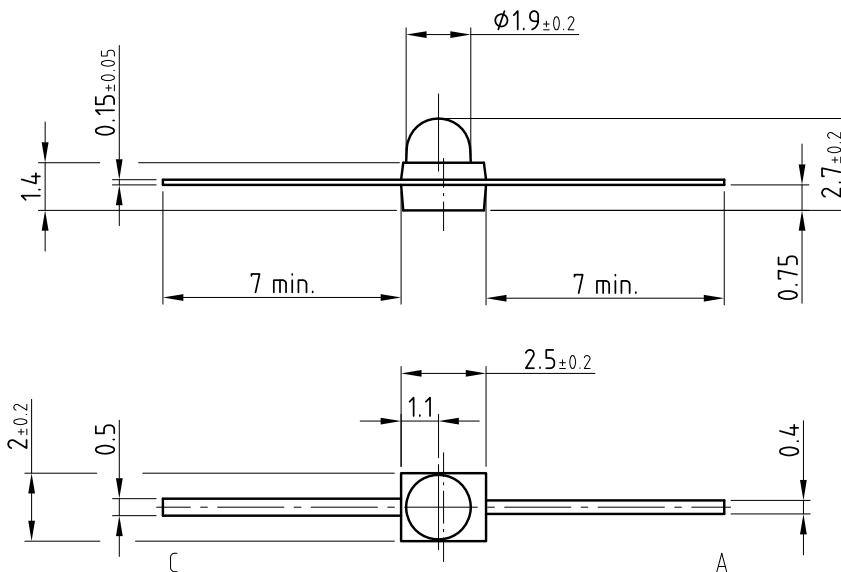


Solder pad proposal



16228

## PACKAGE DIMENSIONS in millimeters: TEMD1040



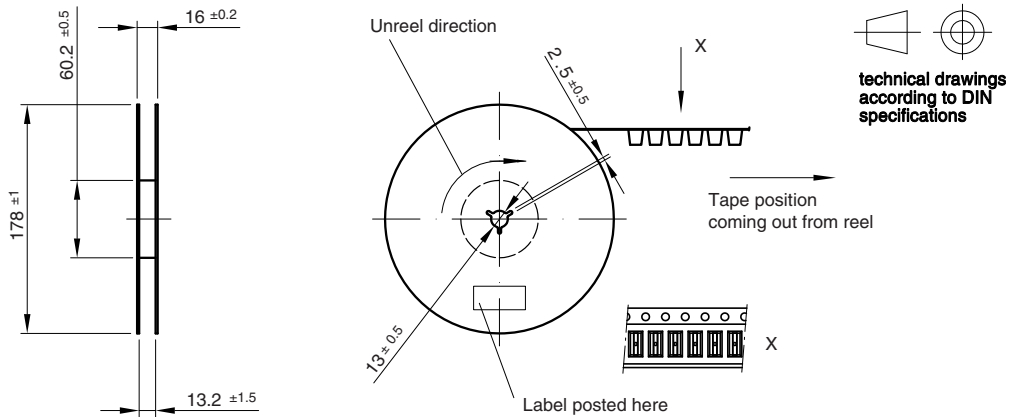
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Issue: 3; 02.04.03

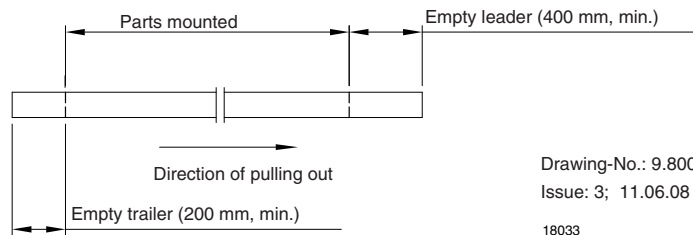
16760



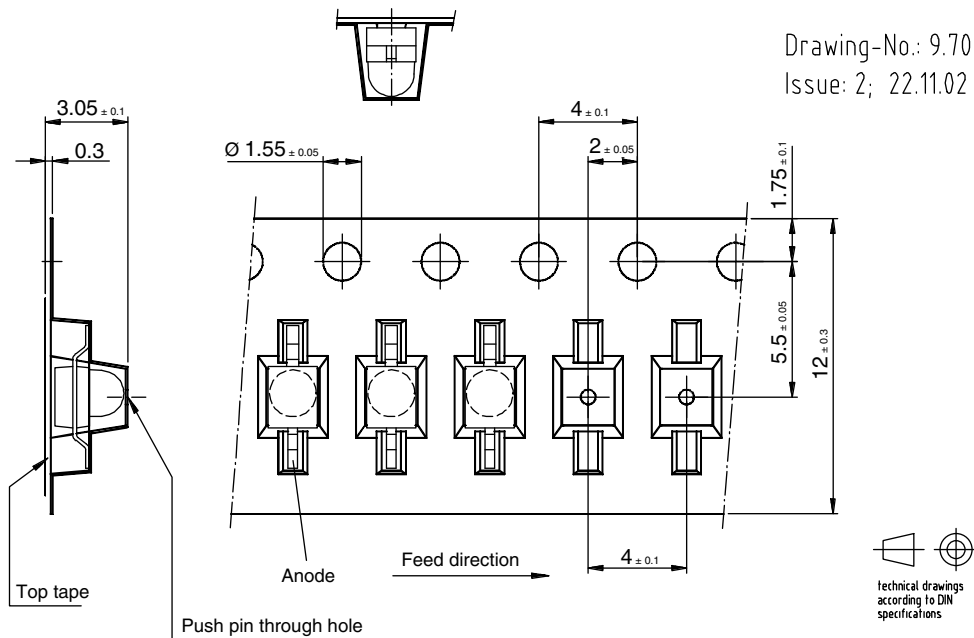
## REEL DIMENSIONS in millimeters



Leader and trailer tape:



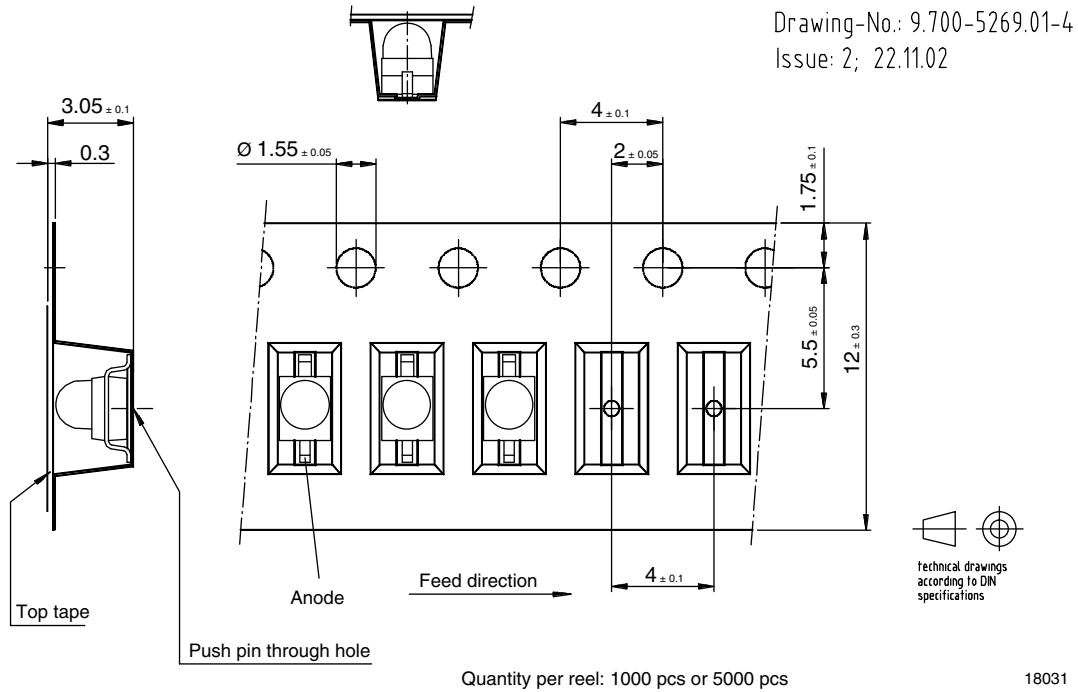
## TAPING DIMENSIONS in millimeters: TEMD1000



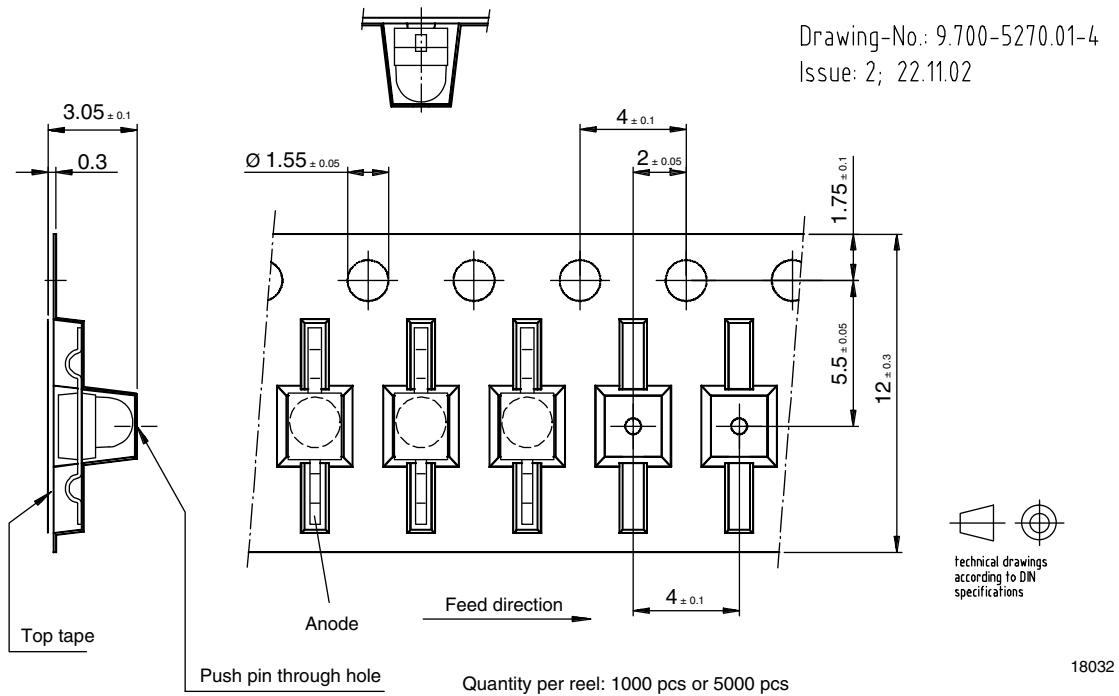
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Issue: 2; 22.11.02



## TAPING DIMENSIONS in millimeters: TEMD1020



## TAPING DIMENSIONS in millimeters: TEMD1030





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