

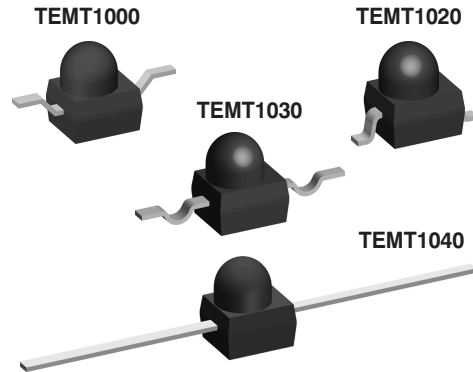
## Silicon Phototransistor

### Description

TEMT1000 series are high speed and high sensitive silicon NPN epitaxial planar phototransistors in SMD package with dome lens. Due to integrated Daylight filter devices are sensitive for IR radiation only.

### Features

- High photo sensitivity
- Fast response times
- Angle of half sensitivity  $\phi = \pm 15^\circ$
- Daylight filter matched to IR Emitters ( $\lambda = 870 \text{ nm to } 950 \text{ nm}$ )
- Versatile terminal configurations
- Matched IR Emitter series: TSML1000
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



16757

### Applications

Detector in electronic control and drive circuits  
 IR Detector for Daylight application  
 Photo interrupters  
 Counter  
 Encoder

### Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Emitter Collector Voltage		$V_{ECO}$	5	V
Collector current		$I_C$	50	mA
Collector peak current	$t_p/T = 0.5, t_p \leq 10 \text{ ms}$	$I_{CM}$	100	mA
Total Power Dissipation	$T_{amb} \leq 55^\circ\text{C}$	$P_{tot}$	100	mW
Junction Temperature		$T_j$	100	$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	- 40 to + 100	$^\circ\text{C}$
Operating Temperature Range		$T_{amb}$	- 40 to + 85	$^\circ\text{C}$
Soldering Temperature	$t \leq 5 \text{ s}$	$T_{sd}$	< 260	$^\circ\text{C}$
Thermal Resistance Junction/ Ambient		$R_{thJA}$	400	K/W

### Basic Characteristics

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

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Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector Emitter Voltage	$I_C = 1 \text{ mA}$	$V_{CEO}$	70			V
Collector-emitter dark current	$V_{CE} = 20 \text{ V}, E = 0$	$I_{CEO}$		1	200	nA
Collector-emitter capacitance	$V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}, E = 0$	$C_{CEO}$		3		pF
Angle of Half Sensitivity		$\phi$		$\pm 15$		deg
Wavelength of Peak Sensitivity		$\lambda_p$		950		nm

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Range of Spectral Bandwidth		$\lambda_{0.5}$		750 to 980		nm
Collector Emitter Saturation Voltage	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $I_C = 0.1 \text{ mA}$	$V_{CEsat}$			0.3	V
Turn-On Time	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$t_{on}$		2.0		$\mu\text{s}$
Turn-Off Time	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$t_{off}$		2.3		$\mu\text{s}$
Cut-Off Frequency	$V_S = 5 \text{ V}$ , $I_C = 5 \text{ mA}$ , $R_L = 100 \Omega$	$f_c$		180		kHz
Collector Light Current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_{CE} = 5 \text{ V}$	$I_{ca}$	2	7.0		mA

### Typical Characteristics ( $T_{amb} = 25 \text{ }^\circ\text{C}$ unless otherwise specified)

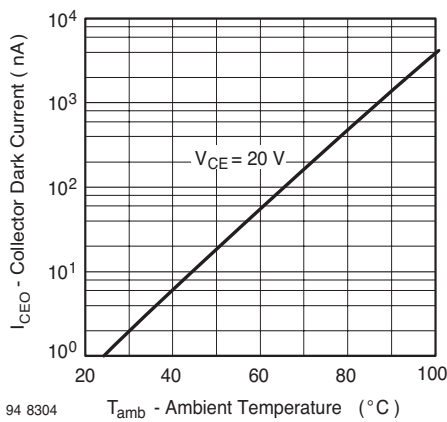


Figure 1. Collector Dark Current vs. Ambient Temperature

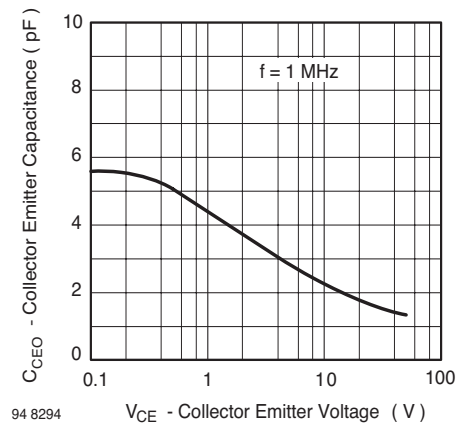


Figure 3. Collector Emitter Capacitance vs. Collector Emitter Voltage

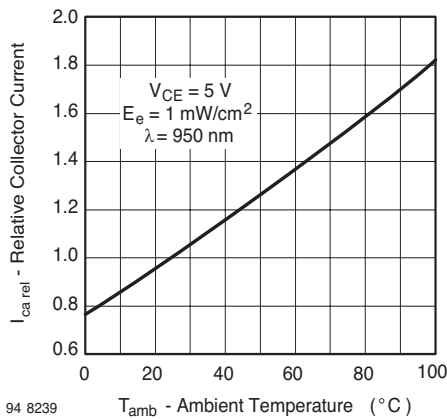


Figure 2. Relative Collector Current vs. Ambient Temperature

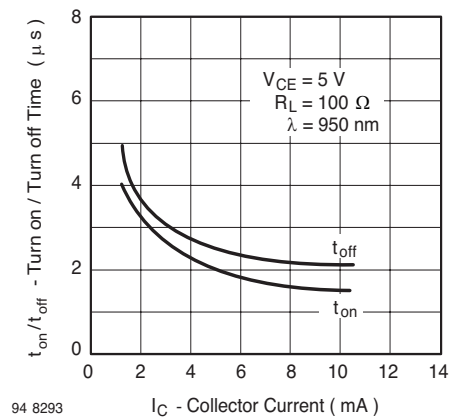
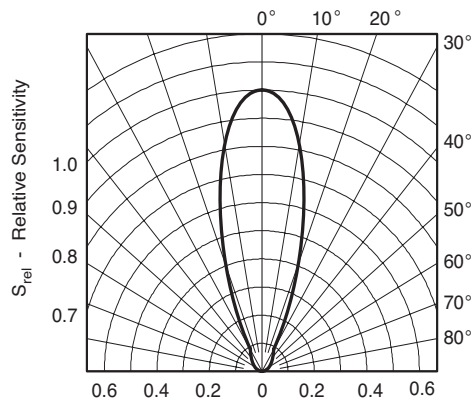


Figure 4. Turn On/Turn Off Time vs. Collector Current



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Figure 5. Relative Radiant Sensitivity vs. Angular Displacement

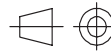
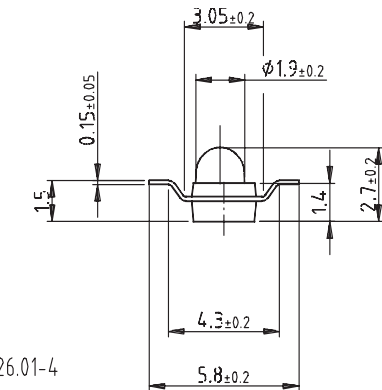
# TEMT1000 / 1020 / 1030 / 1040



Vishay Semiconductors

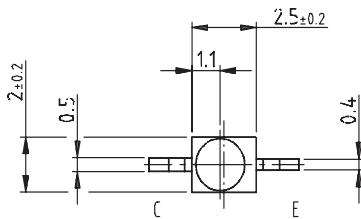
## Package Dimensions in mm TEMT1000

Drawing-No.: 6.544-5326.01-4  
Issue: 4; 02.04.03

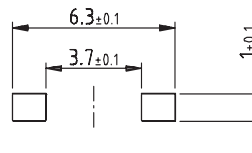


Technical drawings  
according to DIN  
specifications

All dimensions in mm



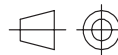
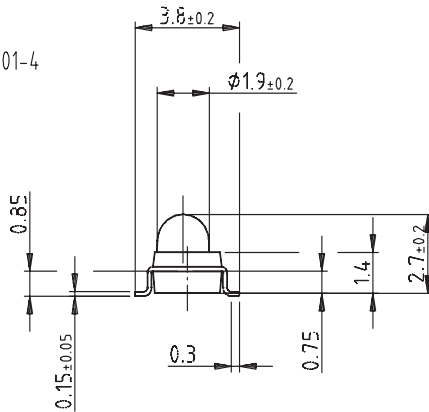
Solder pad proposal



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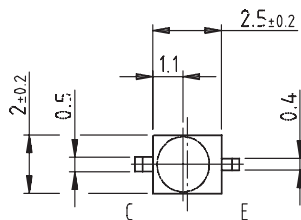
## Package Dimensions in mm TEMT1020

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Issue: 4; 02.04.03

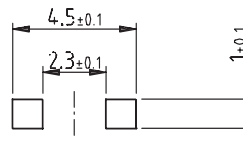


Technical drawings  
according to DIN  
specifications

All dimensions in mm

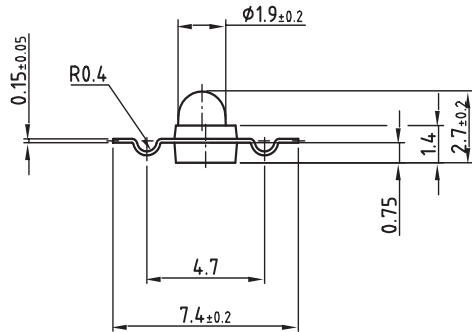


Solder pad proposal



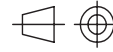
16105

**Package Dimensions in mm**  
**TEMT1030**



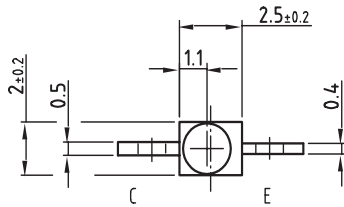
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Issue: 3; 08.05.03

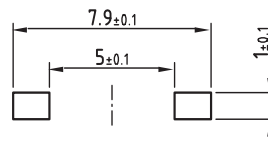


Technical drawings according to DIN specifications

All dimensions in mm

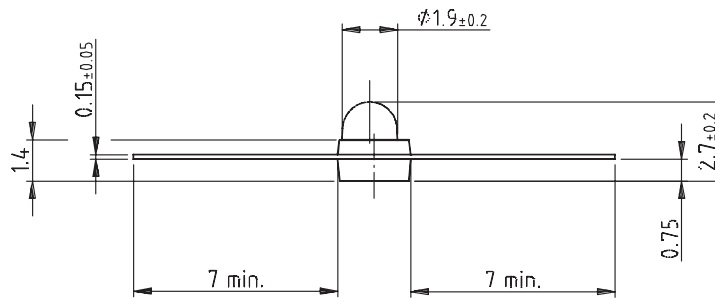


Solder pad proposal



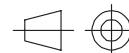
16756

**Package Dimensions in mm**  
**TEMT1040**



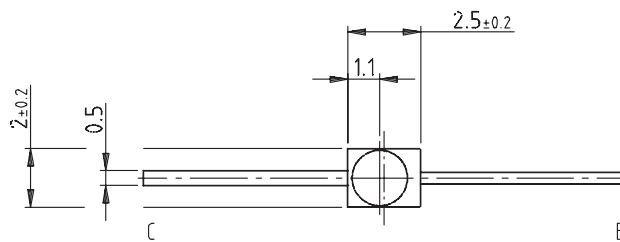
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Issue: 2; 02.04.03



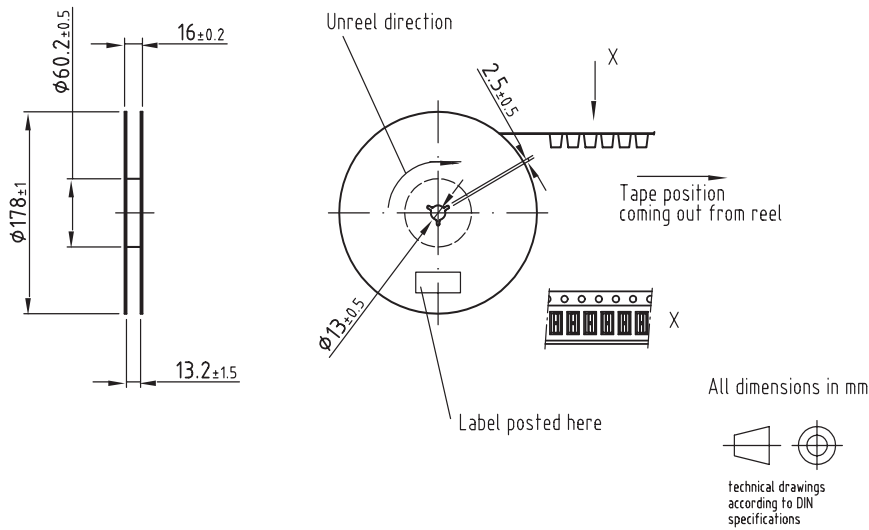
Technical drawings according to DIN specifications

All dimensions in mm

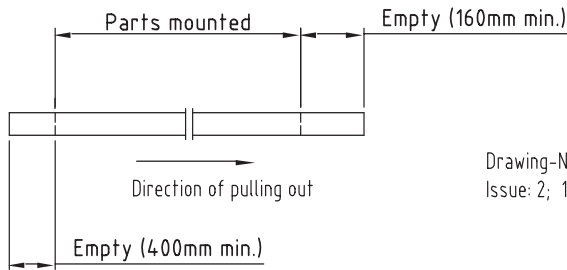


16500

## Reel Dimensions



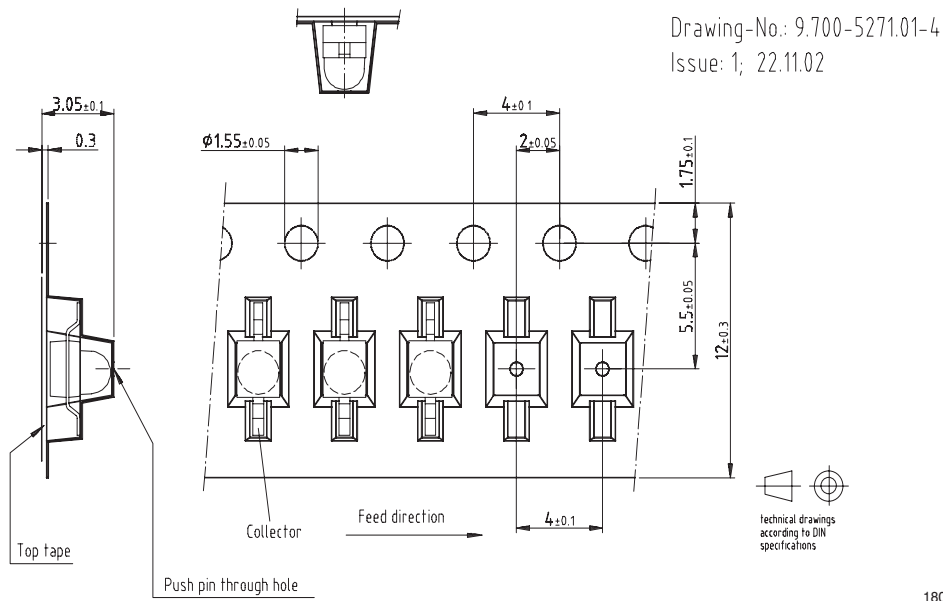
Leader and trailer tape:



Drawing-No.: 9.800-5080.01-4  
Issue: 2; 18.11.02

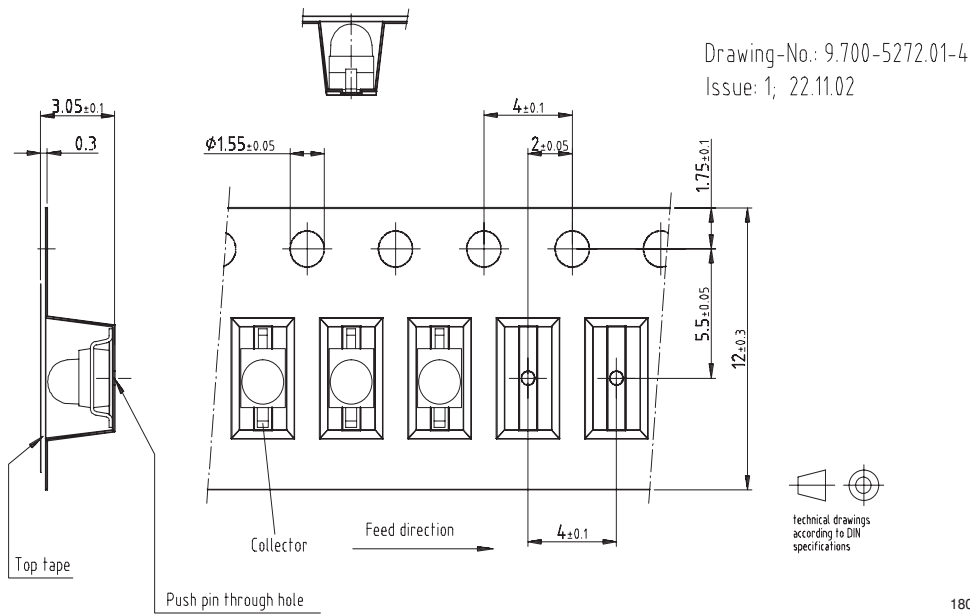
18033

## Taping TEMT1000



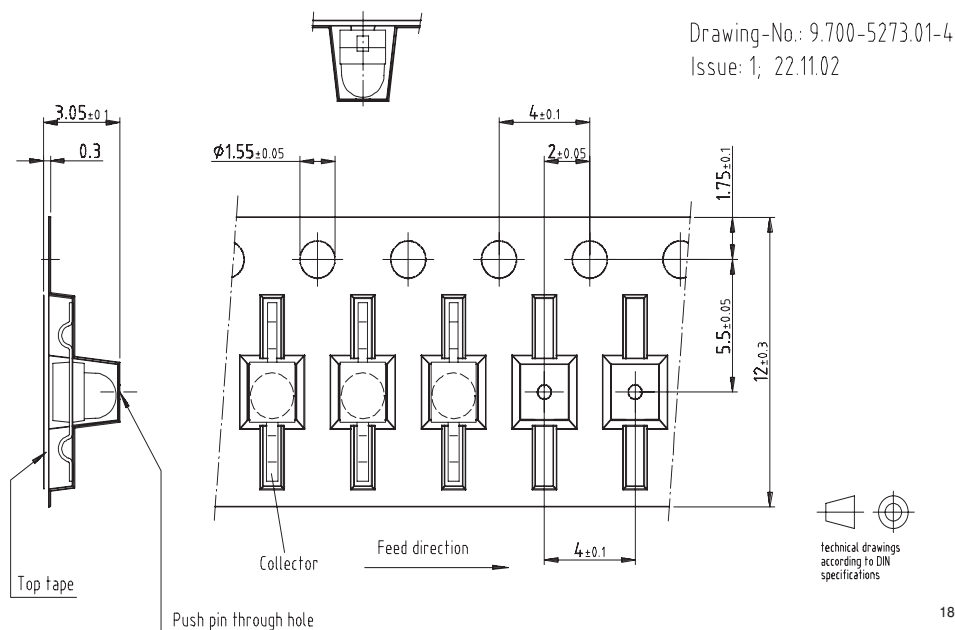
18089

## Taping TEMT1020



18090

## Taping TEMT1030



## 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:  $5\text{ }^{\circ}\text{C}$  to  $35\text{ }^{\circ}\text{C}$ , R.H. 60 %

2.2 Floor life must not exceed 168 h, acc. to JEDEC level 3, J-STD-020.

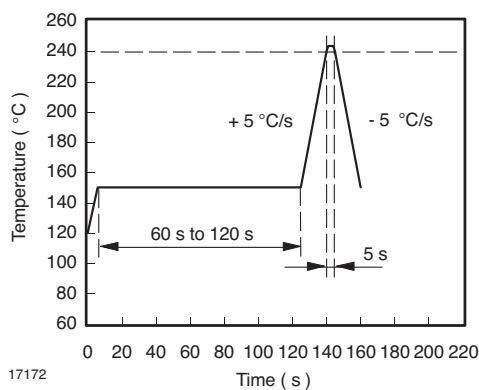
Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp proof box with desiccant.

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  $5\text{ }^{\circ}\text{C}$  to  $35\text{ }^{\circ}\text{C}$ , R.H. 60 %, devices should be treated at  $60\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  for 15 hrs.

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

## Reflow Solder Profile







## Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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