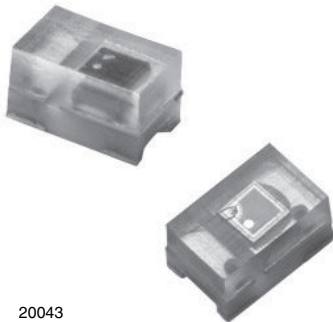


## Silicon Phototransistor in 0805 Package



20043

### DESCRIPTION

TEMT7000X01 is a high speed silicon NPN epitaxial planar phototransistor in a miniature 0805 package for surface mounting on printed boards. The device is sensitive to visible and near infrared radiation.

### FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- AEC-Q101 qualified
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity:  $\varphi = \pm 60^\circ$
- Package matched with IR emitter series VSMB1940X01
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE GRADE


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**  
**GREEN**  
 (5-2008)

### APPLICATIONS

- Detector in automotive applications
- Light sensors
- Radiation sensors

### PRODUCT SUMMARY

| COMPONENT   | $I_{ca}$ ( $\mu A$ )<br>at $E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_{CE} = 5 \text{ V}$ | $\varphi$ ( $^\circ$ ) | $\lambda_{0.1}$ (nm) |
|-------------|--|------------------------|----------------------|
| TEMT7000X01 | 225 to 675   | $\pm 60$               | 470 to 1090          |

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| TEMT7000X01   | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805         |

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified)

| PARAMETER                              | TEST CONDITION                     | SYMBOL     | VALUE       | UNIT       |
|--|------------------------------------|------------|-------------|------------|
| Collector emitter voltage              |                                    | $V_{CEO}$  | 20          | V          |
| Emitter collector voltage              |                                    | $V_{ECO}$  | 7           | V          |
| Collector current                      |                                    | $I_C$      | 20          | mA         |
| Power power dissipation                | $T_{amb} \leq 55^\circ C$          | $P_V$      | 100         | mW         |
| Junction temperature                   |                                    | $T_j$      | 100         | $^\circ C$ |
| Operating temperature range            |                                    | $T_{amb}$  | -40 to +100 | $^\circ C$ |
| Storage temperature range              |                                    | $T_{stg}$  | -40 to +100 | $^\circ C$ |
| Soldering temperature                  | According to reflow profile Fig. 8 | $T_{sd}$   | 260         | $^\circ C$ |
| Thermal resistance junction-to-ambient | According to J-STD-051             | $R_{thJA}$ | 270         | K/W        |

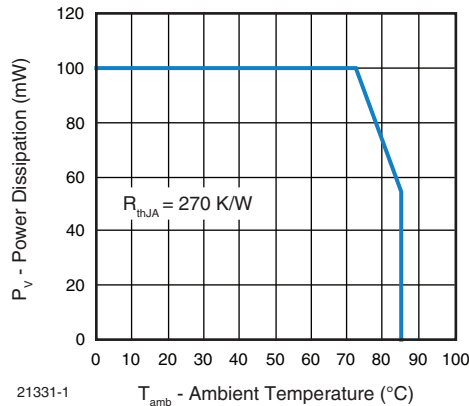


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |                 |      |             |      |               |
|---|--|-----------------|------|-------------|------|---------------|
| PARAMETER   | TEST CONDITION   | SYMBOL          | MIN. | TYP.        | MAX. | UNIT          |
| Collector emitter breakdown voltage   | $I_C = 0.1\text{ mA}$  | $V_{CEO}$       | 20   | -           | -    | V             |
| Collector dark current  | $V_{CE} = 5\text{ V}, E = 0$   | $I_{CEO}$       | -    | 1           | 100  | nA            |
| Collector emitter capacitance   | $V_{CE} = 0\text{ V}, f = 1\text{ MHz}, E = 0$                         | $C_{CEO}$       | -    | 25          | -    | pF            |
| Collector light current   | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$ | $I_{CA}$        | 225  | 450         | 675  | $\mu\text{A}$ |
| Angle of half sensitivity   |  | $\varphi$       | -    | $\pm 60$    | -    | $^{\circ}$    |
| Wavelength of peak sensitivity  |  | $\lambda_p$     | -    | 850         | -    | nm            |
| Range of spectral bandwidth   |  | $\lambda_{0.1}$ | -    | 470 to 1090 | -    | nm            |
| Collector emitter saturation voltage  | $I_C = 0.05\text{ mA}$   | $V_{CEsat}$     | -    | -           | 0.4  | V             |
| Temperature coefficient of $I_{ca}$   | $E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$ | $Tk_{Ica}$      | -    | 1.1         | -    | %/K           |

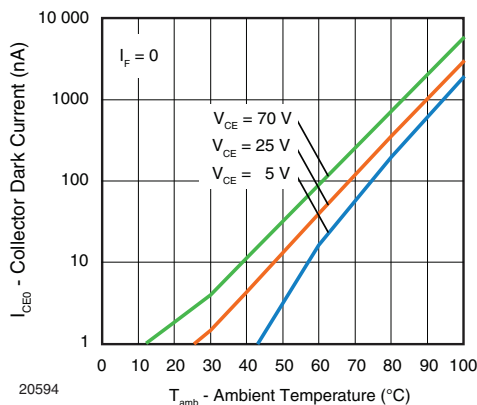
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 2 - Collector Dark Current vs. Ambient Temperature

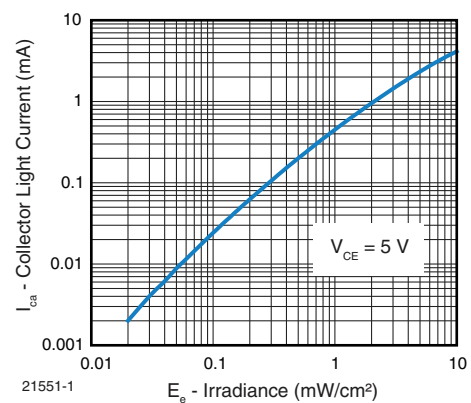


Fig. 3 - Collector Light Current vs. Irradiance

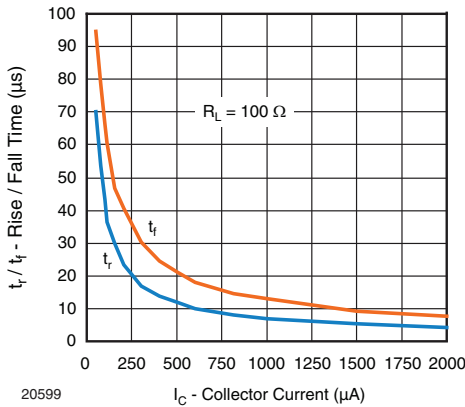


Fig. 4 - Rise/Fall Time vs. Collector Current

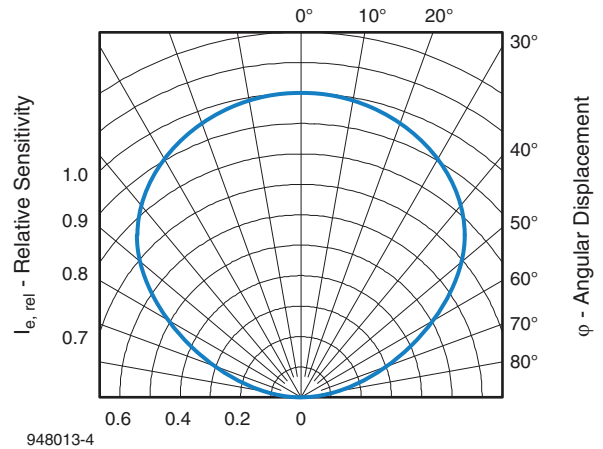


Fig. 6 - Relative Sensitivity vs. Angular Displacement

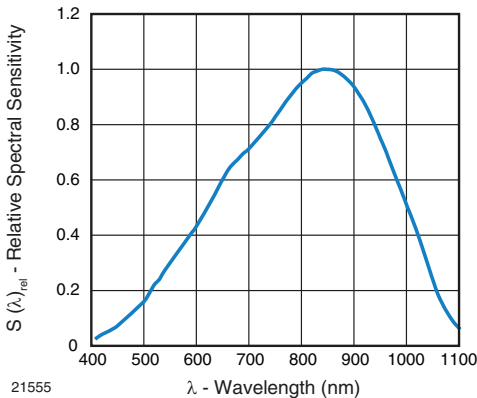


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

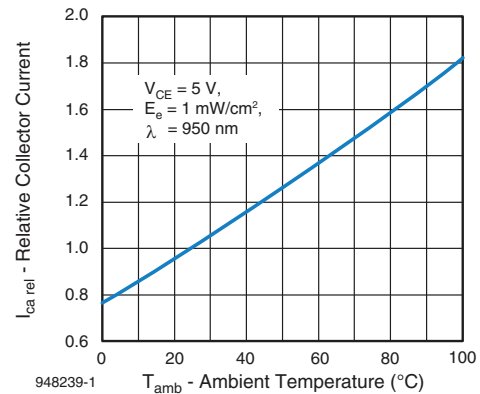


Fig. 7 - Relative Collector Current vs. Ambient Temperature

**REFLOW SOLDER PROFILE**

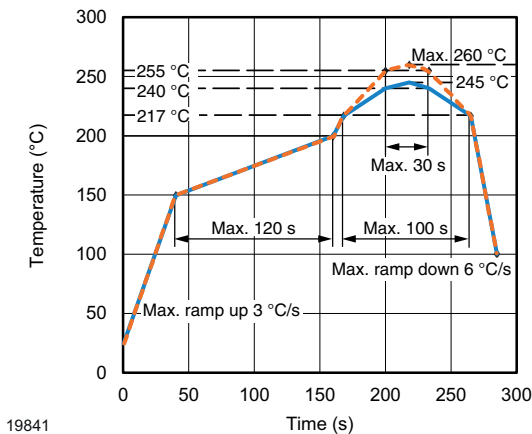


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

**DRYPACK**

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

**FLOOR LIFE**

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 168 h

Conditions:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

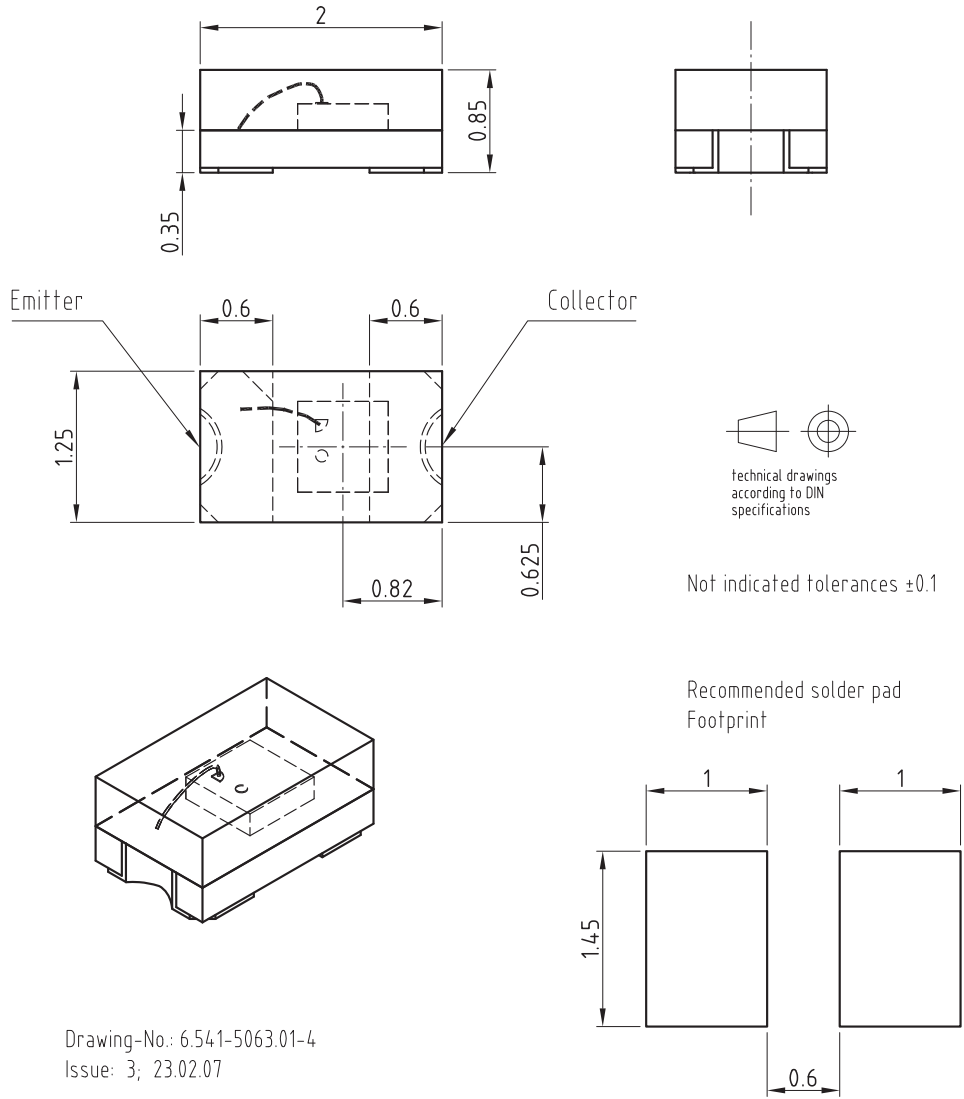
Moisture sensitivity level 3, acc. to J-STD-033D.

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ °C}$  (+  $5\text{ °C}$ ),  $RH < 5\%$ .



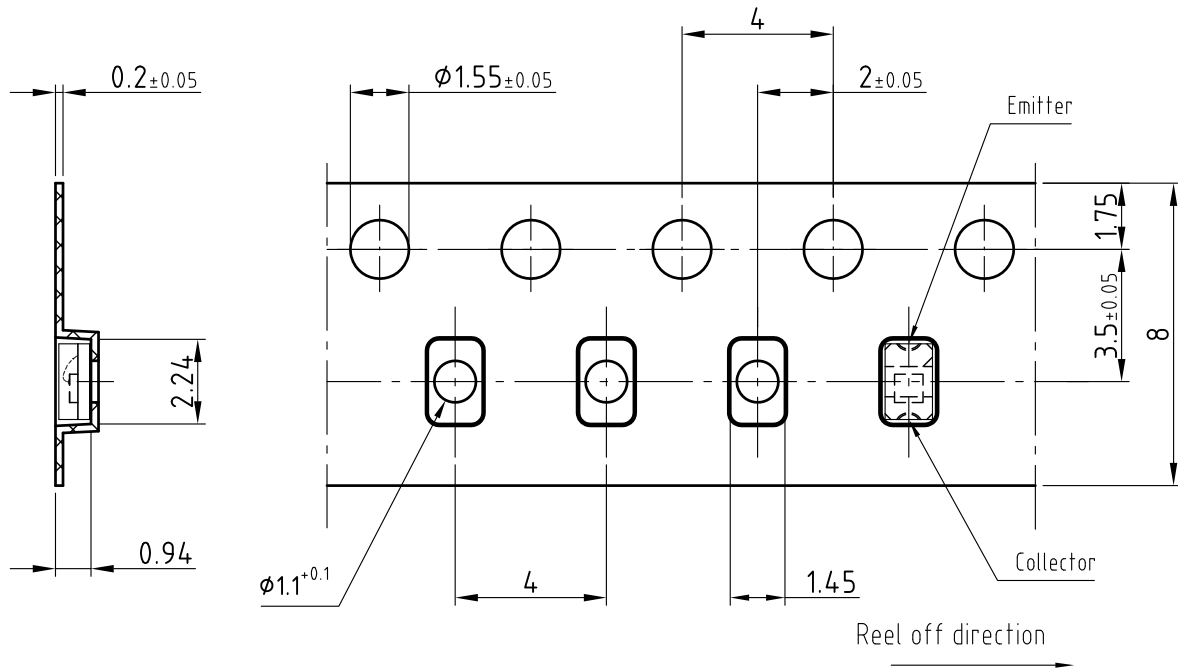
PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5063.01-4  
Issue: 3; 23.02.07  
19757



**BLISTER TAPE DIMENSIONS** in millimeters



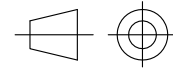
Drawing-No.: 9.700-5310.01-4

Issue: 2; 14.08.07

20690

Not indicated tolerances ±0.1

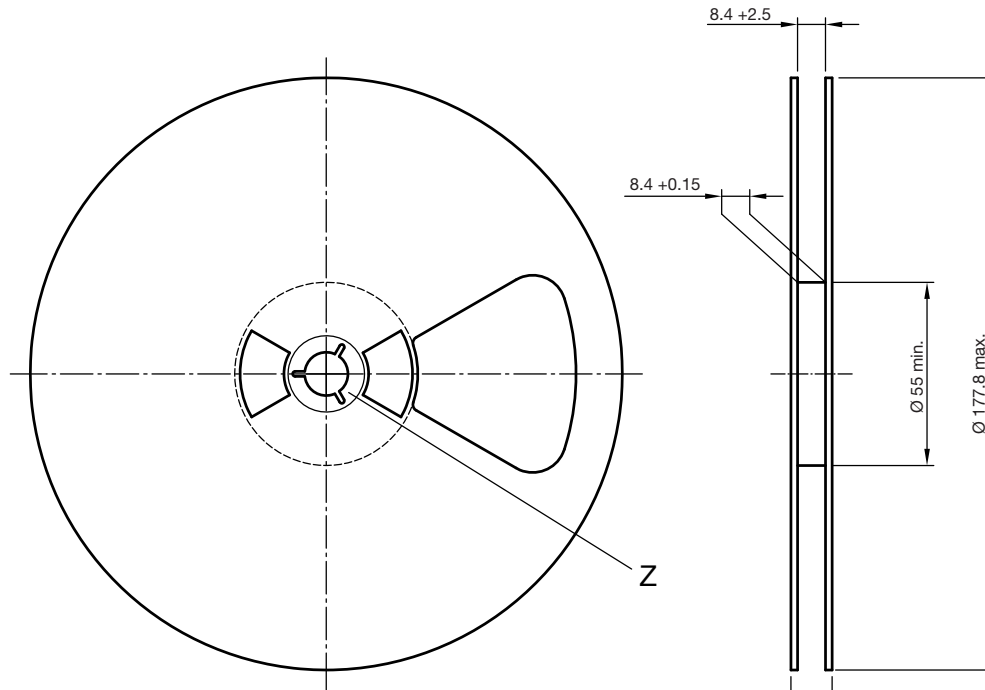
Quantity per reel: 3000 pcs



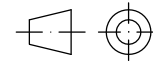
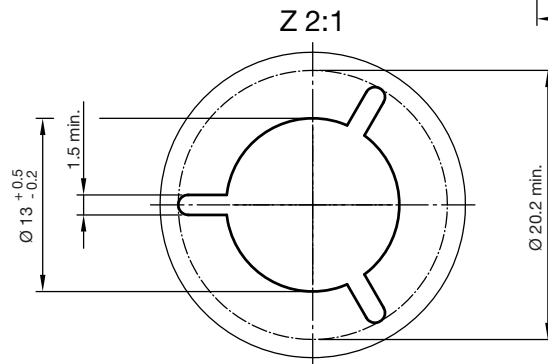
technical drawings according to DIN specifications



REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.



technical drawings according to DIN specifications

Drawing-No.: 9.800-5096.01-4  
Issue: 2; 26.04.10  
20875



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