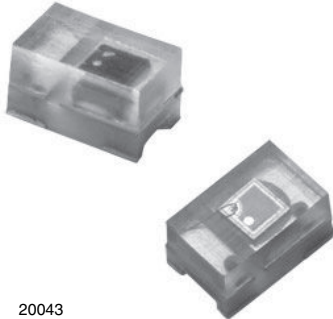


Silicon Phototransistor in 0805 Package



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

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Detector in automotive applications
- Light sensors
- Radiation sensors

PRODUCT SUMMARY

| COMPONENT | I_{ca} (μA) at $E_e = 1 \text{ mW/cm}^2$, $\lambda = 950 \text{ nm}$, $V_{CE} = 5 \text{ V}$ | φ ($^\circ$) | $\lambda_{0.1}$ (nm) |
|-------------|--|------------------------|----------------------|
| TEMT7000X01 | 225 to 675 | ± 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 |

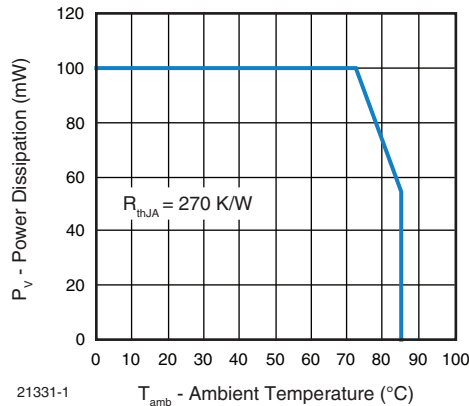


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 | μA |
| Angle of half sensitivity | | φ | - | ± 60 | - | $^{\circ}$ |
| Wavelength of peak sensitivity | | λ_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 |

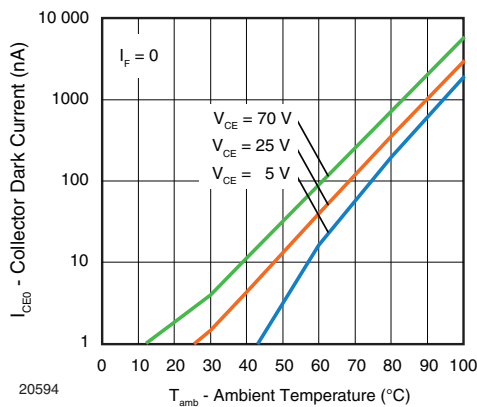
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 2 - Collector Dark Current vs. Ambient Temperature

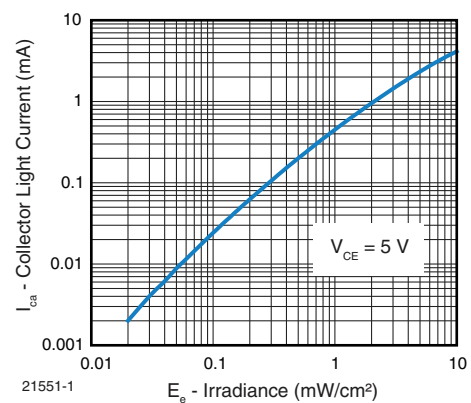


Fig. 3 - Collector Light Current vs. Irradiance

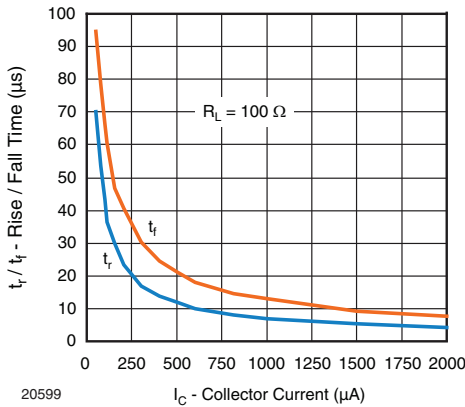


Fig. 4 - Rise/Fall Time vs. Collector Current

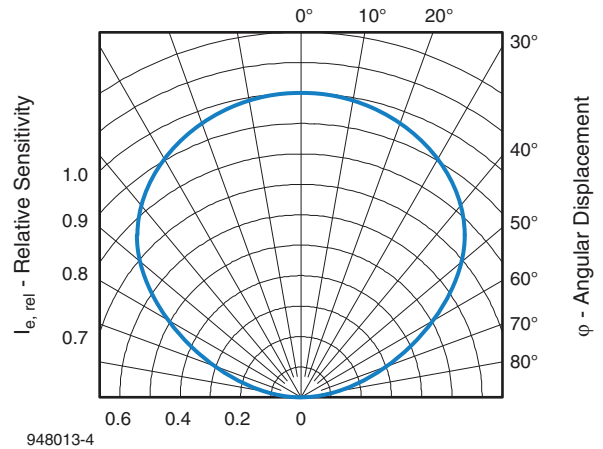


Fig. 6 - Relative Sensitivity vs. Angular Displacement

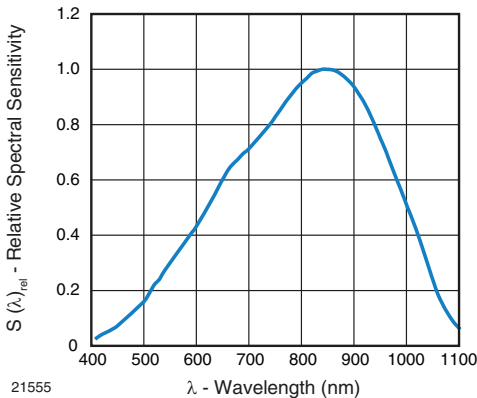


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

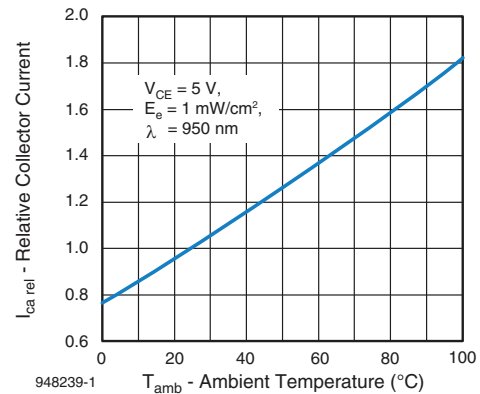


Fig. 7 - Relative Collector Current vs. Ambient Temperature

REFLOW SOLDER PROFILE

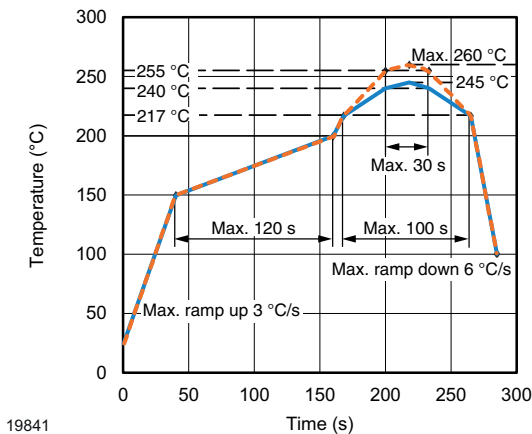


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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

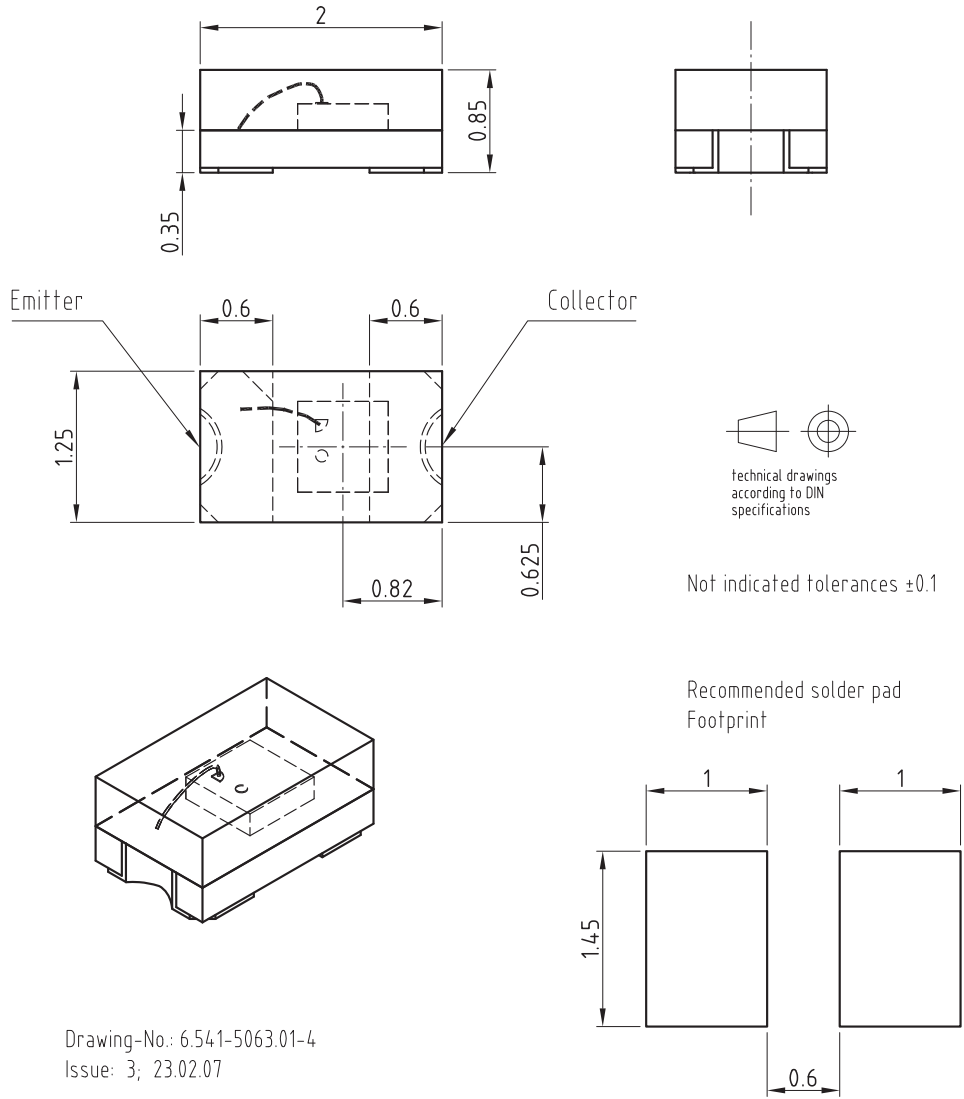
Moisture sensitivity level 3, acc. to J-STD-033D.

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 °C (+ 5 °C), $RH < 5\%$.



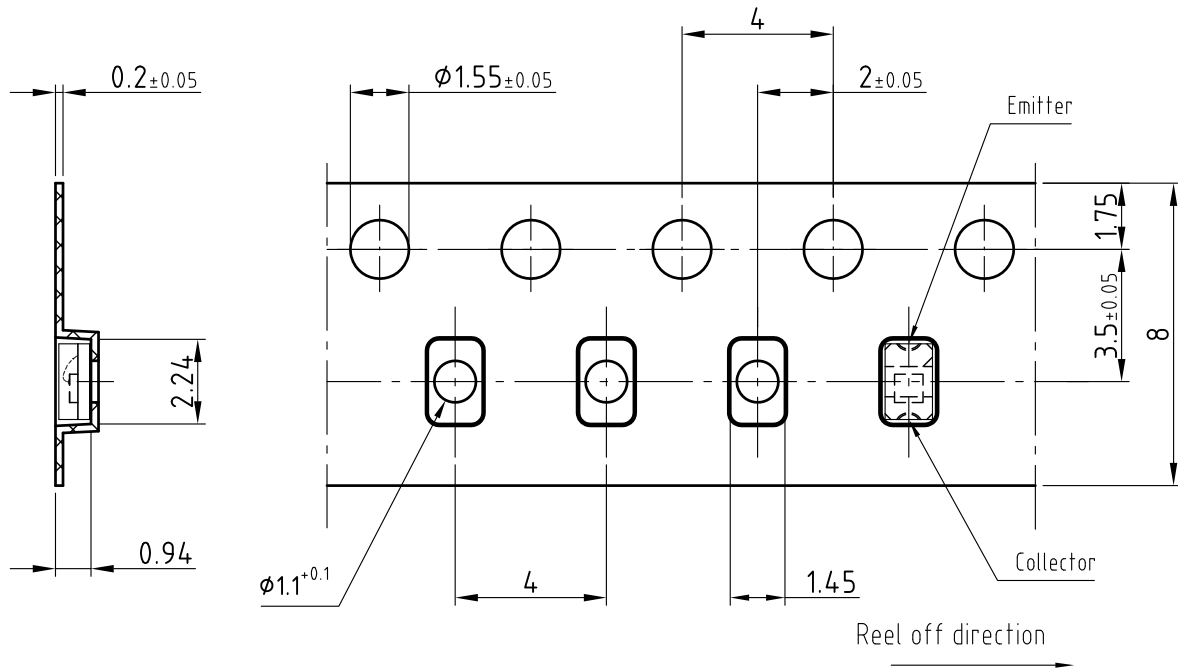
PACKAGE DIMENSIONS in millimeters



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



BLISTER TAPE DIMENSIONS in millimeters



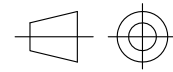
Drawing-No.: 9.700-5310.01-4

Issue: 2; 14.08.07

20690

Not indicated tolerances ±0.1

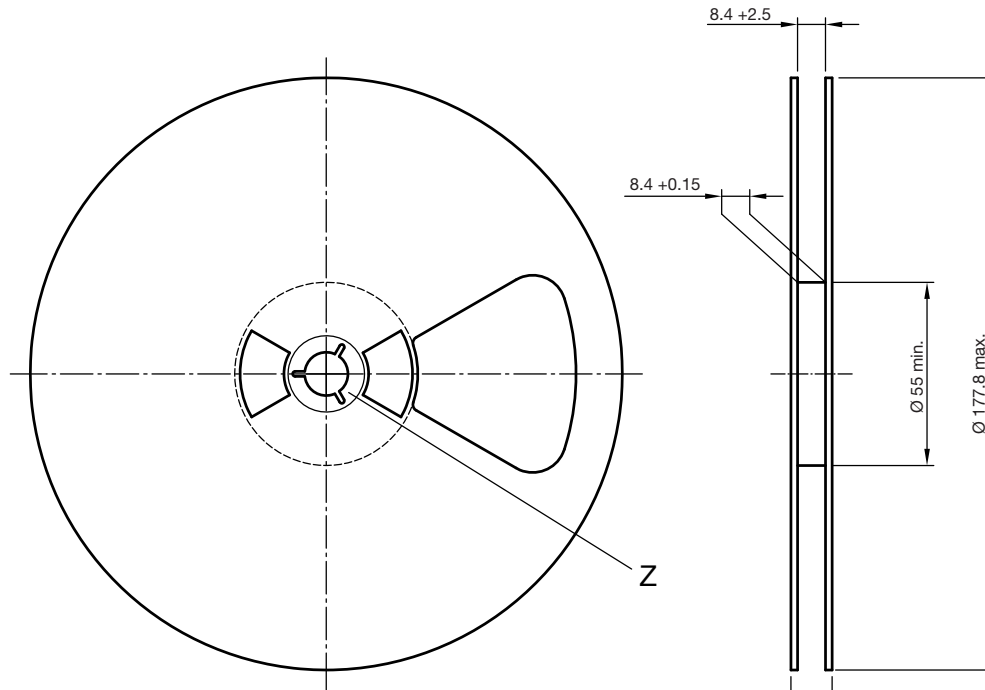
Quantity per reel: 3000 pcs



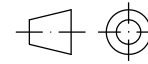
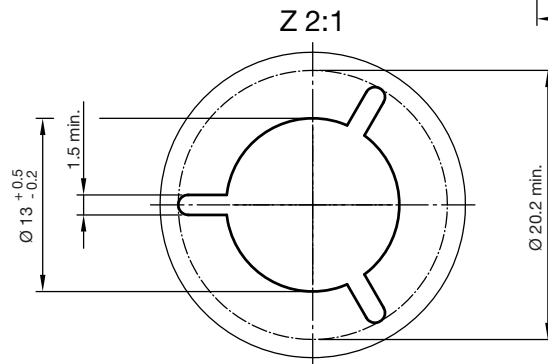
technical drawings according to DIN specifications



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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