Silicon Phototransistor in 0805 Package

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, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

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.

APPLICATIONS
- Detector in automotive applications
- Light sensors
- Radiation sensors

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>$I_{\text{caE}}$ (µA)</th>
<th>$\varphi$ (deg)</th>
<th>$\lambda_{0.1}$ (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMT7000X01</td>
<td>225 to 675</td>
<td>$\pm 60$</td>
<td>470 to 1090</td>
</tr>
</tbody>
</table>

Note
- Test condition see table “Basic Characteristics”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>PACKAGING</th>
<th>REMARKS</th>
<th>PACKAGE FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMT7000X01</td>
<td>Tape and reel</td>
<td>MOQ: 3000 pcs, 3000 pcs/reel</td>
<td>0805</td>
</tr>
</tbody>
</table>

Note
- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{\text{amb}} = 25$ °C, unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector emitter voltage</td>
<td>$V_{\text{CEO}}$</td>
<td>20</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Emitter collector voltage</td>
<td>$V_{\text{EO}}$</td>
<td>7</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Collector current</td>
<td>$I_{\text{C}}$</td>
<td>20</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Power power dissipation</td>
<td>$T_{\text{amb}} \leq 55$ °C</td>
<td>$P_{\text{V}}$</td>
<td>100</td>
<td>mW</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>$T_{\text{j}}$</td>
<td>100</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>$T_{\text{amb}}$</td>
<td>- 40 to + 100</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>$T_{\text{stg}}$</td>
<td>- 40 to + 100</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>Acc. reflow profile fig. 8</td>
<td>$T_{\text{sd}}$</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction/ambient</td>
<td>Acc. J-STD-051</td>
<td>$R_{\text{thJA}}$</td>
<td>270</td>
<td>K/W</td>
</tr>
</tbody>
</table>

For technical questions, contact: detectortechsupport@vishay.com

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Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector emitter breakdown voltage</td>
<td>(I_C = 0.1 , \text{mA})</td>
<td>(V_{CEO})</td>
<td>20</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Collector dark current</td>
<td>(V_{CE} = 5 , \text{V}, E = 0)</td>
<td>(I_{CEO})</td>
<td>1</td>
<td>100</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>Collector emitter capacitance</td>
<td>(V_{CE} = 0 , \text{V}, f = 1 , \text{MHz}, E = 0)</td>
<td>(C_{CEO})</td>
<td>25</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Collector light current</td>
<td>(E_e = 1 , \text{mW/cm}^2, \lambda = 950 , \text{nm}, V_{CE} = 5 , \text{V})</td>
<td>(I_{CA})</td>
<td>225</td>
<td>450</td>
<td>675</td>
<td>µA</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td>(\varphi)</td>
<td>(\varphi)</td>
<td>±60</td>
<td></td>
<td></td>
<td>deg</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td>(\lambda_p)</td>
<td>(\lambda_p)</td>
<td>850</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td>(\lambda_{0,1})</td>
<td>(\lambda_{0,1})</td>
<td>470</td>
<td>1090</td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Collector emitter saturation voltage</td>
<td>(I_C = 0.05 , \text{mA})</td>
<td>(V_{CE_{sat}})</td>
<td></td>
<td>0.4</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Temperature coefficient of (I_{ca})</td>
<td>(E_e = 1 , \text{mW/cm}^2, \lambda = 950 , \text{nm}, V_{CE} = 5 , \text{V})</td>
<td>(T_{Ica})</td>
<td>1.1</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
</tbody>
</table>

\(R_{thJA} = 270 \, \text{K/W}\)

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

**Fig. 2 - Collector Dark Current vs. Ambient Temperature**

**Fig. 3 - Collector Light Current vs. Irradiance**
Fig. 4 - Rise/Fall Time vs. Collector Current

Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

Fig. 7 - Relative Collector Current vs. Ambient Temperature

REFLOW SOLDER PROFILE

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 °C, RH < 60 %

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 %.
BLISTER TAPE DIMENSIONS in millimeters

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**Dimensions**

- Emitter: 2 ±0.05
- Collector: 1.45
- Quantity per reel: 3000 pcs

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**Technical Details**

- Drawing No.: 9.700-5310.01-4
- Issue: 2; 14.08.07
- Not indicated tolerances ±0.1
- Quantity per reel: 3000 pcs

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**Contact Information**

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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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