Ambient Light Sensor

DESCRIPTION

TEMT6000X01 ambient light sensor is a silicon NPN epitaxial planar phototransistor in a miniature transparent 1206 package for surface mounting. It is sensitive to visible light much like the human eye and has peak sensitivity at 570 nm.

FEATURES

- Package type: surface mount
- Package form: 1206
- Dimensions (L x W x H in mm): 4 x 2 x 1.05
- AEC-Q101 qualified
- High photo sensitivity
- Adapted to human eye responsivity
- Angle of half sensitivity: \( \phi = \pm 60^\circ \)
- 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

APPLICATIONS

Ambient light sensor for control of display backlight dimming in LCD displays and keypad backlighting of mobile devices and in industrial on/off-lighting operation.

- Automotive sensors
- Mobile phones
- Notebook computers
- PDA’s
- Cameras
- Dashboards

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>IPCE ((\mu)A)</th>
<th>(\phi) (deg)</th>
<th>(\lambda_{0.5}) (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMT6000X01</td>
<td>50</td>
<td>(\pm 60)</td>
<td>440 to 800</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>TEMT6000X01</td>
<td>Tape and reel</td>
<td>MOQ: 3000 pcs, 3000 pcs/reel</td>
<td>1206</td>
</tr>
</tbody>
</table>

Note
MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS

<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></td>
<td>VCEO</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Emitter collector voltage</td>
<td></td>
<td>VECO</td>
<td>1.5</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td></td>
<td>IC</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>Power dissipation</td>
<td></td>
<td>PV</td>
<td>100</td>
<td>mW</td>
</tr>
</tbody>
</table>
TEMT6000X01
Vishay Semiconductors Ambient Light Sensor

ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction temperature</td>
<td></td>
<td>T&lt;sub&gt;j&lt;/sub&gt;</td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td></td>
<td>T&lt;sub&gt;amb&lt;/sub&gt;</td>
<td>- 40 to + 100</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>T&lt;sub&gt;stg&lt;/sub&gt;</td>
<td>- 40 to + 100</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>Acc. reflow solder profile fig. 8</td>
<td>T&lt;sub&gt;sd&lt;/sub&gt;</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction/ambient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soldered on PCB with pad dimensions: 4 mm x 4 mm</td>
<td>R&lt;sub&gt;thJA&lt;/sub&gt;</td>
<td>450</td>
<td>K/W</td>
</tr>
</tbody>
</table>

Note

T<sub>amb</sub> = 25 °C, unless otherwise specified

Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS

<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&lt;sub&gt;C&lt;/sub&gt; = 0.1 mA</td>
<td>V&lt;sub&gt;CEO&lt;/sub&gt;</td>
<td>6</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Collector dark current</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 5 V, E = 0</td>
<td>I&lt;sub&gt;CEO&lt;/sub&gt;</td>
<td>3</td>
<td>50</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>Collector emitter capacitance</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 0 V, f = 1 MHz, E = 0</td>
<td>C&lt;sub&gt;CEO&lt;/sub&gt;</td>
<td>16</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Collector light current</td>
<td>E&lt;sub&gt;V&lt;/sub&gt; = 20 lx, CIE illuminant A, V&lt;sub&gt;CE&lt;/sub&gt; = 5 V</td>
<td>I&lt;sub&gt;PCE&lt;/sub&gt;</td>
<td>3.5</td>
<td>10</td>
<td>16</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td>E&lt;sub&gt;V&lt;/sub&gt; = 100 lx, CIE illuminant A, V&lt;sub&gt;CE&lt;/sub&gt; = 5 V</td>
<td>I&lt;sub&gt;PCE&lt;/sub&gt;</td>
<td></td>
<td>50</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>Temperature coefficient of I&lt;sub&gt;PCE&lt;/sub&gt;</td>
<td>CIE illuminant A</td>
<td>TK&lt;sub&gt;PCE&lt;/sub&gt;</td>
<td>1.18</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td></td>
<td>LED, white</td>
<td>TK&lt;sub&gt;PCE&lt;/sub&gt;</td>
<td>0.9</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td></td>
<td>θ</td>
<td>± 60</td>
<td></td>
<td></td>
<td>deg</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>λ&lt;sub&gt;p&lt;/sub&gt;</td>
<td>570</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>λ&lt;sub&gt;0.5&lt;/sub&gt;</td>
<td>440 to 800</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Collector emitter saturation voltage</td>
<td>E&lt;sub&gt;V&lt;/sub&gt; = 20 lx, CIE illuminant A, I&lt;sub&gt;PCE&lt;/sub&gt; = 1.2 µA</td>
<td>V&lt;sub&gt;CEsat&lt;/sub&gt;</td>
<td>0.1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>

Note

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

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

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

**Fig. 3** - Relative Photo Current vs. Ambient Temperature

**Fig. 4** - Photo Current vs. Illuminance

**Fig. 5** - Collector Emitter Capacitance vs. Collector Emitter Voltage

**Fig. 6** - Relative Spectral Sensitivity vs. Wavelength

**Fig. 7** - Relative Radiant Sensitivity vs. Angular Displacement
**TEMT6000X01**

**Vishay Semiconductors**  
Ambient Light Sensor

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**REFLOW SOLDER PROFILE**

![Graph showing the reflow solder profile according to J-STD-020D]

**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**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

- Moisture sensitivity: level 3
- Floor life: 168 h
- Conditions: $T_{amb} < 30 \degree C$, $RH < 60 \%$

**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 $\degree C$ (+ 5 $\degree C$), $RH < 5 \%$
- or
- 96 h at 60 $\degree C$ (+ 5 $\degree C$), $RH < 5 \%$.

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**PACKAGE DIMENSIONS** in millimeters

[Diagram showing the package dimensions with tolerances and footprints]
Ambient Light Sensor

BLISTER TAPE DIMENSIONS in millimeters

REEL DIMENSIONS in millimeters

Volume: 3000 pcs/reel
Disclaimer

All product specifications and data are subject to change without notice.

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