Ambient Light Sensor

Description
TEMT6000 ambient light sensor plays a key role in power savings strategies by controlling LCD display intensity and keypad backlighting of mobile devices and in industrial on/off-lighting operation. It is sensitive to visible light much like the human eye and has peak sensitivity at 570 nm. TEMT6000 has analog output and is packaged in a small surface mount package.

Features
- High sensitivity, $I_{PCE} = 50 \mu \text{A}$ ($E_V = 100 \text{ lx}$)
- Adapted to human eye responsivity
- Wide angle of half sensitivity $\phi = \pm 60^\circ$
- Surface mount package: H 1 mm x L 4 mm x W 2 mm
- Suitable for IR reflow soldering (Sn or SnPb)
- Lead (Pb)-free component
- Component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC

Applications
- Mobile phones
- Notebook computers
- PDA’s
- Cameras
- Dashboards

Absolute Maximum Ratings
$T_{\text{amb}} = 25^\circ \text{C}$, 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></td>
<td>$V_{CEO}$</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Emitter collector voltage</td>
<td></td>
<td>$V_{ECO}$</td>
<td>1.5</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td></td>
<td>$I_C$</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>Total power dissipation</td>
<td>$T_{\text{amb}} \leq 55^\circ \text{C}$</td>
<td>$P_{\text{tot}}$</td>
<td>100</td>
<td>mW</td>
</tr>
<tr>
<td>Junction temperature</td>
<td></td>
<td>$T_J$</td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td></td>
<td>$T_{\text{amb}}$</td>
<td>- 40 to + 85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>$T_{\text{stg}}$</td>
<td>- 40 to + 85</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>Reflow Profile Figure 7</td>
<td>$T_{sd}$</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction/ambient</td>
<td></td>
<td>$R_{tJA}$</td>
<td>450</td>
<td>K/W</td>
</tr>
</tbody>
</table>
## Basic Characteristics

**T_{\text{amb}} = 25 ^\circ 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>6</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>3</td>
<td>50</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>16</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Collector light current</td>
<td>(E_v = 20 \text{ lx}, \text{CIE illuminant } A, V_{CE} = 5 \text{ V})</td>
<td>(I_{PCE})</td>
<td>3.5</td>
<td>10</td>
<td>16</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td>(E_v = 100 \text{ lx}, \text{CIE illuminant } A, V_{CE} = 5 \text{ V})</td>
<td>(I_{PCE})</td>
<td></td>
<td>50</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td></td>
<td>(\psi)</td>
<td>± 60</td>
<td></td>
<td></td>
<td>deg</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>(\lambda_p)</td>
<td>570</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>(\lambda_{0.1})</td>
<td>360 to 970</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Collector emitter saturation voltage</td>
<td>(E_v = 20 \text{ lx}, \text{standard light } A, I_{PCE} = 1.2 \text{ µA})</td>
<td>(V_{CE\text{sat}})</td>
<td>0.1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>

## Typical Characteristics

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

![Figure 1. Collector Dark Current vs. Ambient Temperature](image1)

![Figure 3. Photo Current vs. Illuminance](image3)

![Figure 2. Relative Photo Current vs. Ambient Temperature](image2)

![Figure 4. Collector Emitter Capacitance vs. Collector Emitter Voltage](image4)
Reflow Solder Profiles

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 in J-STD-020. TEMT6000 is released for: Moisture Sensitivity Level 4, according to JEDEC, J-STD-020
Floor Life: 72 h
Conditions: $T_{\text{amb}} < 30 \degree\text{C}, RH < 60\%$

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 $40 \degree\text{C} (+5 \degree\text{C}), RH < 5\%$
Package Dimensions

Technical drawings according to DIN specifications

All dimensions in mm
Not indicated tolerances ±0.1

Emitter

Collector

Recommended solder pad

Footprint

Drawing-No.: 6.541-5053.01-4
Issue: 2; 21.06.04
Ozone Depleting Substances Policy Statement

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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.

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

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