Ambient Light Sensor in 0805 Package

DESCRIPTION

TEMT6200FX01 ambient light sensor is a silicon NPN epitaxial planar phototransistor in a miniature transparent 0805 package for surface mounting. It is sensitive to visible light much like the human eye and has peak sensitivity at 550 nm.

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
- Adapted to human eye responsivity
- Suppression filter for near infrared radiation
- Angle of half sensitivity: $\phi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Automotive sensors
- Ambient light sensor for display backlight dimming in:
  - Mobile phones
  - Notebook computers
  - PDAs
  - Cameras
  - Dashboards

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>$I_{PCE}$ ($\mu$A)</th>
<th>$\phi$ (deg)</th>
<th>$\lambda_{0.5}$ (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMT6200FX01</td>
<td>23</td>
<td>$\pm 60$</td>
<td>450 to 610</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>TEMT6200FX01</td>
<td>Tape and reel</td>
<td>MOQ: 3000 pcs, 3000 pcs/reel. Label with $I_{PCE}$ group on each reel. Specifications of group A/B/C see table “Type Dedicated Characteristics”</td>
<td>0805</td>
</tr>
</tbody>
</table>

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25 \, ^\circ C$, 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>$V_{CE0}$</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>Power dissipation</td>
<td></td>
<td>$P_{V}$</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>$T_{amb}$</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>$T_{stg}$</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>Acc. reflow profile fig. 9</td>
<td>$T_{sd}$</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction/ambient</td>
<td>Soldered on PCB with pad dimensions: 4 mm x 4 mm</td>
<td>$R_{thJA}$</td>
<td>450</td>
<td>K/W</td>
</tr>
</tbody>
</table>
Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

### Basic Characteristics (T_{amb} = 25 °C, 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 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 V, E = 0 lx</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 V, f = 1 MHz, E = 0 lx</td>
<td>C_{CEO}</td>
<td>16</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Photo current</td>
<td>E_V = 20 lx, CIE illuminant A, V_{CE} = 5 V</td>
<td>I_{PCE}</td>
<td>4.6</td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>E_V = 100 lx, CIE illuminant A, V_{CE} = 5 V</td>
<td>I_{PCE}</td>
<td>7.5</td>
<td>23</td>
<td>39</td>
<td>μA</td>
</tr>
<tr>
<td>Temperature coefficient of I_{PCE}</td>
<td>CIE illuminant A</td>
<td>T_{K_{IPCE}}</td>
<td>1.18</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td>LED, white</td>
<td>T_{K_{IPCE}}</td>
<td>0.9</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>ϕ</td>
<td>± 60</td>
<td></td>
<td></td>
<td>deg</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>λ_p</td>
<td>550</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Collector emitter saturation voltage</td>
<td>E_V = 20 lx, 0.45 μA</td>
<td>V_{CE_{sat}}</td>
<td>0.1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>

### Type Dedicated Characteristics (T_{amb} = 25 °C, unless otherwise specified)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Condition</th>
<th>Binned Group</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo current</td>
<td>E_V = 100 lx, CIE illuminant A, V_{CE_{tz51}} = 5 V</td>
<td>A</td>
<td>I_{PCE}</td>
<td>7.5</td>
<td>15</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>I_{PCE}</td>
<td>12</td>
<td>24</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>I_{PCE}</td>
<td>19.5</td>
<td>39</td>
<td>μA</td>
</tr>
</tbody>
</table>

**Note**

- Each 3000 piece packing unit will contain a single group. The label on the bag will indicate which binned group is in the bag. A specific group cannot be ordered. Production shipments containing multiple bags will likely include multiple groups. Please design accordingly.
BASIC CHARACTERISTICS (T_{amb} = 25 °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 - Photo Current vs. Collector Emitter Voltage

Fig. 6 - Collector Emitter Capacitance vs. Collector Emitter Voltage

Fig. 7 - Relative Spectral Sensitivity vs. Wavelength
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: $T_{amb} < 30 \, ^\circ C$, $RH < 60 \%$

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 $40 \, ^\circ C (\pm 5 \, ^\circ C)$, $RH < 5 \%$. 

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**Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement**

**Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020**
**BLISTER TAPE DIMENSIONS** in millimeters

**Dimensions:**
- **Width:** 8 mm
- **Height:** 17.5 mm
- **Spacing:** 3.5 mm
- **Center-to-center distance:** 2 mm
- **Inner circle diameter:** 1.55 mm ± 0.05
- **Outer circle diameter:** 1.1 mm ± 0.1
- **Reel off direction:** Not indicated tolerances ±0.1

**Quantity per reel:** 3000 pcs

**Drawing-No.:** 9.700-5310.01-4
**Issue:** 2, 14.08.07

**Technical drawings according to DIN specifications**

For technical questions, contact: detectortechsupport@vishay.com

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**REEL DIMENSIONS** in millimeters

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

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