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
- Supression 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\text{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>
</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>
</tr>
</tbody>
</table>

Note
- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (\( T_{amb} = 25 \degree \text{C}, \) 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>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>\degree C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td></td>
<td>( T_{amb} )</td>
<td>-40 to +100</td>
<td>\degree C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>( T_{stg} )</td>
<td>-40 to +100</td>
<td>\degree C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td></td>
<td>( T_{sd} )</td>
<td>260</td>
<td>\degree C</td>
</tr>
<tr>
<td>Thermal resistance junction/ambient</td>
<td></td>
<td>( R_{thJA} )</td>
<td>450</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** (\(T_{\text{amb}} = 25^\circ \text{C}\), 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 \text{ 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 \text{ V}, f = 1 \text{ MHz}, E = 0 \text{ 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 \text{ lx}, \text{ CIE illuminant A}, V_{CE} = 5 \text{ 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 \text{ lx}, \text{ CIE illuminant A}, V_{CE} = 5 \text{ 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>(\text{CIE illuminant A})</td>
<td>(T_{K_{PCE}})</td>
<td>1.18</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td>(\phi)</td>
<td>(T_{K_{PCE}})</td>
<td>0.9</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td>(\lambda)</td>
<td></td>
<td>550</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td>(\lambda_{0.5})</td>
<td></td>
<td>450 to 610</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Collector emitter saturation voltage</td>
<td>(E_V = 20 \text{ lx}, 0.45 \mu\text{A})</td>
<td>(V_{CESat})</td>
<td>0.1</td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>

**TYPE DEDICATED CHARACTERISTICS** (\(T_{\text{amb}} = 25^\circ \text{C}\), 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 \text{ lx}, \text{ CIE illuminant A}, V_{CE\text{t}z51} = 5 \text{ 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 ($T_{amb} = 25 \, ^\circ C$, 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
Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement

**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**

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 °C (+ 5 °C), RH < 5 %. 

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

Drawing-No.: 9.700-5310.01-4
Issue: 2; 14.08.07
20090

Quantity per reel: 3000 pcs

Not indicated tolerances ±0.1

technical drawings according to DIN specifications
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

Z 2:1

Ø 20.2 min.
Ø 177.8 max.
14.4 max.
0.56 min.
8.4 +0.15
8.4 +2.5

Ø 13 ± 0.5
1.5 min.

technical drawings according to DIN specifications
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