Ambient Light Sensor

DESCRIPTION
TEM6010FX01 ambient light sensor is a PIN photodiode with high speed and high photo sensitivity in a clear, surface mount plastic package. The detector chip has 0.27 mm² sensitive area. It is sensitive to visible light much like the human eye and has peak sensitivity at 540 nm.

FEATURES
- Package type: surface mount
- Package form: 1206
- Dimensions (L x W x H in mm): 4 x 2 x 1.05
- Radiant sensitive area (in mm²): 0.27
- 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 sensors
- Backlight dimming
- Mobil phones
- Notebooks
- Computers

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>I_{ra} (\mu A)</th>
<th>( \phi ) (deg)</th>
<th>( \lambda_{0.5} ) (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMD6010FX01</td>
<td>0.04</td>
<td>( \pm 60 )</td>
<td>430 to 610</td>
</tr>
</tbody>
</table>

Note
- Test conditions 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>TEMD6010FX01</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 (T_{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>Reverse voltage</td>
<td></td>
<td>V_{R}</td>
<td>16</td>
<td>V</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 solder profile fig. 7</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>
### BASIC CHARACTERISTICS (T<sub>amb</sub> = 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>Breakdown voltage</td>
<td>I&lt;sub&gt;R&lt;/sub&gt; = 100 μA, E = 0 lx</td>
<td>V&lt;sub&gt;BR&lt;/sub&gt;</td>
<td>16</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse dark current</td>
<td>V&lt;sub&gt;E&lt;/sub&gt; = 10 V, E = 0 lx</td>
<td>I&lt;sub&gt;ro&lt;/sub&gt;</td>
<td>0.1</td>
<td>5 nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diode capacitance</td>
<td>V&lt;sub&gt;B&lt;/sub&gt; = 0 V, f = 1 MHz, E = 0 lx</td>
<td>C&lt;sub&gt;D&lt;/sub&gt;</td>
<td>60</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;R&lt;/sub&gt; = 5 V, f = 1 MHz, E = 0 lx</td>
<td>C&lt;sub&gt;D&lt;/sub&gt;</td>
<td>24</td>
<td>pF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse light current</td>
<td>E&lt;sub&gt;E&lt;/sub&gt; = 1 mW/cm&lt;sup&gt;2&lt;/sup&gt;, λ = 550 nm, V&lt;sub&gt;R&lt;/sub&gt; = 5 V</td>
<td>I&lt;sub&gt;ra&lt;/sub&gt;</td>
<td>1</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E&lt;sub&gt;E&lt;/sub&gt; = 100 lx, CIE illuminant A, V&lt;sub&gt;R&lt;/sub&gt; = 5 V</td>
<td>I&lt;sub&gt;ra&lt;/sub&gt;</td>
<td>0.03</td>
<td>0.04</td>
<td>0.09</td>
<td>μA</td>
</tr>
<tr>
<td>Temperature coefficient of I&lt;sub&gt;ra&lt;/sub&gt;</td>
<td>E&lt;sub&gt;E&lt;/sub&gt; = 100 lx, CIE illuminant A, V&lt;sub&gt;R&lt;/sub&gt; = 5 V</td>
<td>T&lt;sub&gt;Kra&lt;/sub&gt;</td>
<td>0.2</td>
<td>%/K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td></td>
<td>ϕ</td>
<td>± 60</td>
<td>deg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>λ&lt;sub&gt;p&lt;/sub&gt;</td>
<td>540</td>
<td>nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>λ&lt;sub&gt;0.5&lt;/sub&gt;</td>
<td>430 to 610</td>
<td>nm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Fig. 1 - Reverse Dark Current vs. Ambient Temperature

#### Fig. 2 - Reverse Light Current vs. Illuminance

#### Fig. 3 - Diode Capacitance vs. Reverse Voltage

#### Fig. 4 - 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: $T_{\text{amb}} < 30 \degree C, \text{RH} < 60 \%$

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

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**PACKAGE DIMENSIONS** in millimeters

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For technical questions, contact: detectortechsupport@vishay.com

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BLISTER TAPE DIMENSIONS in millimeters

Volume: 3000 pcs/reel

REEL DIMENSIONS in millimeters

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