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
- 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 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_{th,JA} )</td>
<td>450</td>
<td>K/W</td>
</tr>
</tbody>
</table>
BASIC CHARACTERISTICS ( Tamb = 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>IR = 100 μA, E = 0 lx</td>
<td>V(BR)</td>
<td>16</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Reverse dark current</td>
<td>VCE = 10 V, E = 0 lx</td>
<td>I(ro)</td>
<td>0.1</td>
<td>5</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>Diode capacitance</td>
<td>VD = 0 V, f = 1 MHz, E = 0 lx</td>
<td>C(D)</td>
<td>60</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td>VR = 5 V, f = 1 MHz, E = 0 lx</td>
<td>C(D)</td>
<td>24</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>Reverse light current</td>
<td>E = 1 mW/cm², λ = 550 nm, VR = 5 V</td>
<td>I(ra)</td>
<td>1</td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>EV = 100 lx, CIE illuminant A, VR = 5 V</td>
<td>I(ra)</td>
<td>0.03</td>
<td>0.04</td>
<td>0.09</td>
<td>μA</td>
</tr>
<tr>
<td>Temperature coefficient of Ira</td>
<td>EV = 100 lx, CIE illuminant A, VR = 5 V</td>
<td>TKIra</td>
<td>0.2</td>
<td></td>
<td></td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td></td>
<td>ϕ</td>
<td>± 60</td>
<td></td>
<td></td>
<td>deg</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>λp</td>
<td>540</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>λ0.5</td>
<td>430 to 610</td>
<td></td>
<td></td>
<td>nm</td>
</tr>
</tbody>
</table>

BASIC CHARACTERISTICS ( Tamb = 25 °C, unless otherwise specified)

![Fig. 1 - Reverse Dark Current vs. Ambient Temperature](image1)

![Fig. 3 - Diode Capacitance vs. Reverse Voltage](image3)

![Fig. 2 - Reverse Light Current vs. Illuminance](image2)

![Fig. 4 - Relative Spectral Sensitivity vs. Wavelength](image4)
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: \( T_{\text{amb}} < 30 ^\circ \text{C}, \text{RH} < 60 \% \)

DRIEDING

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 %
96 h at 60 °C (+ 5 °C), RH < 5 %.

PACKAGE DIMENSIONS in millimeters

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For technical questions, contact: detectortechsupport@vishay.com

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**BLISTER TAPE DIMENSIONS** in millimeters

![Blister Tape Dimensions Diagram](image)

**REEL DIMENSIONS** in millimeters

Volume: 3000 pcs/reel

![Reel Dimensions Diagram](image)
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