Ambient Light Sensor

**DESCRIPTION**

TEMD5510FX01 ambient light sensor is a PIN photodiode with high photo sensitivity in a miniature surface mount device (SMD). The detector chip has 7.5 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: top view
- Dimensions (L x W x H in mm): 5 x 4.24 x 1.12
- Radiant sensitive area (in mm²): 7.5
- AEC-Q101 qualified
- High photo sensitivity
- Adapted to human eye responsivity
- Suppression filter for near infrared radiation
- Angle of half sensitivity: \( \phi = \pm 65^\circ \)
- Floor life: 72 h, MSL 4, according to 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 dimmers
- Notebooks
- Computers

**PRODUCT SUMMARY**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>( I_{ra} ) (µA)</th>
<th>( \phi ) (°)</th>
<th>( \lambda_{0.5} ) (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMD5510FX01</td>
<td>1</td>
<td>± 65</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>TEMD5510FX01</td>
<td>Tape and reel</td>
<td>MOQ: 1500 pcs, 1500 pcs/reel</td>
<td>Top view</td>
</tr>
<tr>
<td>TEMD5510FX01-GS15</td>
<td>Tape and reel</td>
<td>MOQ: 5000 pcs, 5000 pcs/reel</td>
<td>Top view</td>
</tr>
</tbody>
</table>

**Note**

- MOQ: minimum order quantity

**ABSOLUTE MAXIMUM RATINGS** \( (T_{amb} = 25 \, ^\circ C, \text{unless otherwise specified})\)

<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>( T_{amb} \leq 25 , ^\circ C )</td>
<td>( P_V )</td>
<td>215</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 +110</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>According to reflow solder profile Fig. 5</td>
<td>( T_{sd} )</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction-to-ambient</td>
<td></td>
<td>( R_{thJA} )</td>
<td>350</td>
<td>K/W</td>
</tr>
</tbody>
</table>

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For technical questions, contact: detectortechsupport@vishay.com

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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>Breakdown voltage</td>
<td>I_R = 100 μA, E = 0</td>
<td>V_{BR}</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Reverse dark current</td>
<td>V_R = 10 V, E = 0</td>
<td>I_{RD}</td>
<td>-</td>
<td>2</td>
<td>30</td>
<td>nA</td>
</tr>
<tr>
<td>Diode capacitance</td>
<td>V_R = 0 V, f = 1 MHz, E = 0</td>
<td>C_D</td>
<td>-</td>
<td>1600</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td>V_R = 3 V, f = 1 MHz, E = 0</td>
<td>C_D</td>
<td>-</td>
<td>730</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Reverse light current</td>
<td>E_v = 1 mW/cm², λ = 550 nm, V_R = 5 V</td>
<td>I_{RL}</td>
<td>-</td>
<td>26</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>E_v = 100 lx, CIE illuminant A, V_R = 5 V</td>
<td>I_{RL}</td>
<td>0.8</td>
<td>1</td>
<td>1.4</td>
<td>μA</td>
</tr>
<tr>
<td>Temperature coefficient of I_{RL}</td>
<td>E_v = 100 lx, CIE illuminant A, V_R = 5 V</td>
<td>T_{K_{RL}}</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td></td>
<td>φ</td>
<td>-</td>
<td>± 65</td>
<td>-</td>
<td>°</td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td></td>
<td>λ_p</td>
<td>-</td>
<td>540</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td></td>
<td>λ_{0.5}</td>
<td>-</td>
<td>430 to 610</td>
<td>-</td>
<td>nm</td>
</tr>
</tbody>
</table>

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

Fig. 1 - Reverse Dark Current vs. Ambient Temperature

Fig. 2 - Reverse Light Current vs. Irradiance

Fig. 3 - Relative Spectral Sensitivity vs. Wavelength

Fig. 4 - Relative Radiant Sensitivity vs. Angular Displacement
PACKAGE DIMENSIONS in millimeters

Cathode mark

Recommended PCB Footprint

Technical drawings according to DIN specifications

Not indicated tolerances ± 0.1

Drawing-No.: 6.541-5060.01-4
Issue: 3; 05.02.08

20536

Downloaded from Arrow.com.
TAPING DIMENSIONS in millimeters

REEL DIMENSIONS in millimeters

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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 4
- Floor life: 72 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-033D or recommended conditions:

- 192 h at 40 °C (+ 5 °C), RH < 5 %
- 96 h at 60 °C (+ 5 °C), RH < 5 %.
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