Silicon PIN Photodiode

DESCRIPTION
VEMD1060X01 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface mount device (SMD) including the chip with a 0.23 mm² sensitive area detecting visible and near infrared radiation.

FEATURES
- Package type: surface mount
- Package form: 0805 top view
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- Radiant sensitive area (in mm²): 0.23
- AEC-Q101 qualified
- High photo sensitivity
- High radiant sensitivity
- Excellent Ira linearity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: ϕ = ± 70°
- Floor life: 72 h, MSL 4, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS
- High speed photo detector
- Small signal detection
- Proximity sensors

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>Ira (μA)</th>
<th>ϕ (deg)</th>
<th>λₐ,₁ (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEMD1060X01</td>
<td>1.8</td>
<td>± 70</td>
<td>350 to 1070</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>VEMD1060X01</td>
<td>Tape and reel</td>
<td>MOQ: 3000 pcs, 3000 pcs/reel</td>
<td>0805 top view</td>
</tr>
</tbody>
</table>

Note
- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (Tamb = 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>20</td>
<td>V</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>Tamb ≤ 25 °C</td>
<td>P_V</td>
<td>215</td>
<td>mW</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>Tamb ≤ 25 °C</td>
<td>T_J</td>
<td>110</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>Tamb</td>
<td>T_amb</td>
<td>-40 to +110</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>Tamb</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. 6</td>
<td>T_sd</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction / ambient</td>
<td>According to EIA / JESD 51</td>
<td>RθJA</td>
<td>270</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>Forward voltage</td>
<td>I_F = 50 mA</td>
<td>V_F</td>
<td>0.9</td>
<td>1.1</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Breakdown voltage</td>
<td>I_R = 100 μA, E = 0</td>
<td>V_(BR)</td>
<td>20</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_Ro</td>
<td>0.01</td>
<td>5</td>
<td></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>3.8</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>1.7</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Open circuit voltage</td>
<td>E_e = 1 mW/cm^2, λ = 950 nm</td>
<td>V_o</td>
<td>-</td>
<td>350</td>
<td>-</td>
<td>mV</td>
</tr>
<tr>
<td>Temperature coefficient of V_o</td>
<td>E_e = 1 mW/cm^2, λ = 950 nm</td>
<td>T_K_vo</td>
<td>-</td>
<td>-2.6</td>
<td>-</td>
<td>mV/K</td>
</tr>
<tr>
<td>Short circuit current</td>
<td>E_e = 1 mW/cm^2, λ = 950 nm</td>
<td>I_k</td>
<td>-</td>
<td>1.8</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td>Temperature coefficient of I_k</td>
<td>E_e = 1 mW/cm^2, λ = 950 nm</td>
<td>T_K_k</td>
<td>-</td>
<td>0.1</td>
<td>-</td>
<td>%/K</td>
</tr>
<tr>
<td>Reverse light current</td>
<td>E_e = 1 mW/cm^2, λ = 950 nm, V_R = 5 V</td>
<td>I_r_a</td>
<td>1.4</td>
<td>1.8</td>
<td>3</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td>E_e = 1 mW/cm^2, λ = 890 nm, V_R = 5 V</td>
<td>I_r_a</td>
<td>-</td>
<td>2.6</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td>φ</td>
<td>±70</td>
<td>-</td>
<td></td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>Wavelength of peak sensitivity</td>
<td>λ_p</td>
<td>820</td>
<td>-</td>
<td></td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Range of spectral bandwidth</td>
<td>λ_p,1</td>
<td>350 to 1070</td>
<td>-</td>
<td></td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Rise time</td>
<td>V_R = 5 V, R_L = 50 Ω, λ = 830 nm</td>
<td>t_r</td>
<td>-</td>
<td>60</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Fall time</td>
<td>V_R = 5 V, R_L = 50 Ω, λ = 830 nm</td>
<td>t_f</td>
<td>-</td>
<td>80</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

Basic characteristics graphs to be extended to 110 °C ambient temperatures where applicable.

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Fig. 1 - Reverse Dark Current vs. Ambient Temperature

Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature
**Fig. 3 - Reverse Light Current vs. Irradiance**

**Fig. 4 - Reverse Light Current vs. Reverse Voltage**

**Fig. 5 - Diode Capacitance vs. Reverse Voltage**

**Fig. 6 - Relative Spectral Sensitivity vs. Wavelength**

**Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement**
**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**

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 72 h

Conditions: $T_{\text{amb}} < 30 \, ^\circ \text{C}$, RH < 60 %

Moisture sensitivity level 4, according to J-STD-020.

**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 %.

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**PACKAGE DIMENSIONS** in millimeters

![Package Dimensions Diagram]

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19841
**BLISTER TAPE DIMENSIONS** in millimeters

```
0.2 ± 0.05

Ø 1.55 ± 0.05

2 ± 0.05

Not indicated tolerances ± 0.1

Technical drawings according to DIN specifications

Reel off direction
```

**REEL DIMENSIONS** in millimeters

```
8.4 ± 2.5

8.4 ± 0.15

Ø 0.7 mm

Ø 1.1 ± 0.5

1.5 mm

ø 0.5 mm

14.4 mm

Z 2:1
```

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

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Issue: 1; 23.02.09

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

20875
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