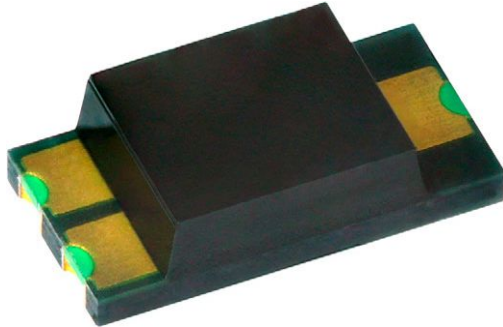




# Silicon PIN Photodiode



## DESCRIPTION

VEMD6160X01 is a high speed and high sensitive PIN photodiode with excellent  $I_{ra}$  linearity. It is a small surface mount device (SMD) including the chip with a 0.85 mm<sup>2</sup> sensitive area and a daylight blocking filter.

## 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 mm<sup>2</sup>): 0.85
- Daylight blocking filter
- High photo sensitivity
- High radiant sensitivity
- Excellent  $I_{ra}$  linearity
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 70^\circ$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## APPLICATIONS

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

| PRODUCT SUMMARY |                      |              |                      |
|-----------------|----------------------|--------------|----------------------|
| COMPONENT       | $I_{ra}$ ( $\mu A$ ) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
| VEMD6160X01     | 5                    | $\pm 70$     | 700 to 1070          |

### Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |               |                              |              |
|----------------------|---------------|------------------------------|--------------|
| ORDERING CODE        | PACKAGING     | REMARKS                      | PACKAGE FORM |
| VEMD6160X01          | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 1206         |

### Note

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified) |   |            |             |            |
|---|---|------------|-------------|------------|
| PARAMETER   | TEST CONDITION                            | SYMBOL     | VALUE       | UNIT       |
| Reverse voltage   |   | $V_R$      | 20          | V          |
| Power dissipation   | $T_{amb} \leq 25^\circ C$                 | $P_V$      | 215         | mW         |
| Junction temperature  |   | $T_j$      | 110         | $^\circ C$ |
| Operating temperature range   |   | $T_{amb}$  | -40 to +110 | $^\circ C$ |
| Storage temperature range   |   | $T_{stg}$  | -40 to +110 | $^\circ C$ |
| Soldering temperature   | According to reflow solder profile fig. 8 | $T_{sd}$   | 260         | $^\circ C$ |
| Thermal resistance junction / ambient   | According to EIA / JESD51                 | $R_{thJA}$ | 270         | K/W        |

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |  |                 |      |             |      |               |
|---|--|-----------------|------|-------------|------|---------------|
| PARAMETER   | TEST CONDITION   | SYMBOL          | MIN. | TYP.        | MAX. | UNIT          |
| Forward voltage   | $I_F = 50\text{ mA}$   | $V_F$           | -    | 0.85        | 1.1  | V             |
| Breakdown voltage   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                   | $V_{(BR)}$      | 20   | -           | -    | V             |
| Reverse dark current  | $V_R = 10\text{ V}$ , $E = 0$  | $I_{ro}$        | -    | 0.03        | 5    | nA            |
| Diode capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                          | $C_D$           | -    | 11          | -    | pF            |
|   | $V_R = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                          | $C_D$           | -    | 4.6         | -    | pF            |
| Open circuit voltage  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                       | $V_o$           | -    | 360         | -    | mV            |
| Temperature coefficient of $V_o$  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                       | $TK_{V_o}$      | -    | -3.1        | -    | mV/K          |
| Short circuit current   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                       | $I_k$           | -    | 5           | -    | $\mu\text{A}$ |
| Temperature coefficient of $I_k$  | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 835\text{ nm}$                       | $TK_{I_k}$      | -    | 0.1         | -    | %/K           |
| Reverse light current   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | 3.5  | 5           | 6.5  | $\mu\text{A}$ |
|   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 890\text{ nm}$ , $V_R = 5\text{ V}$  | $I_{ra}$        | -    | 7           | -    | $\mu\text{A}$ |
| Angle of half sensitivity   |  | $\phi$          | -    | $\pm 70$    | -    | deg           |
| Wavelength of peak sensitivity  |  | $\lambda_p$     | -    | 840         | -    | nm            |
| Range of spectral bandwidth   |  | $\lambda_{0.1}$ | -    | 700 to 1070 | -    | nm            |
| Rise time   | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$ | $t_r$           | -    | 60          | -    | ns            |
| Fall time   | $V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$ | $t_f$           | -    | 50          | -    | ns            |

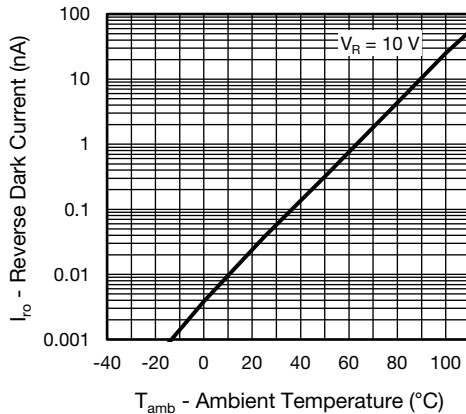
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

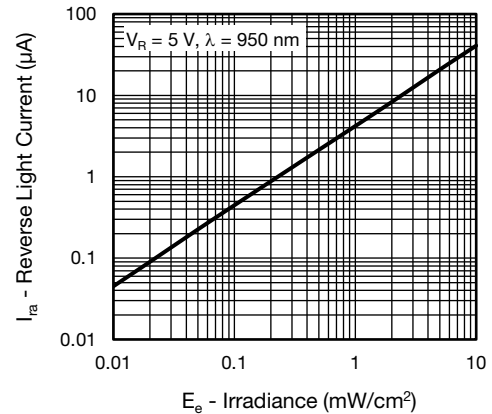


Fig. 3 - Reverse Light Current vs. Irradiance

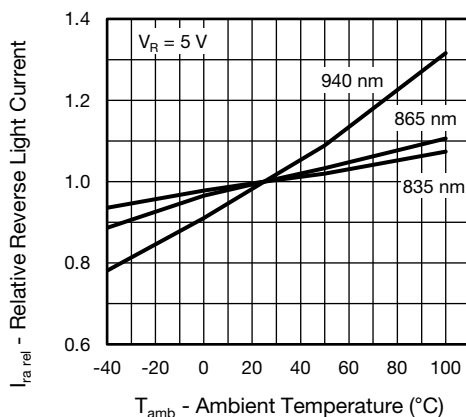


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

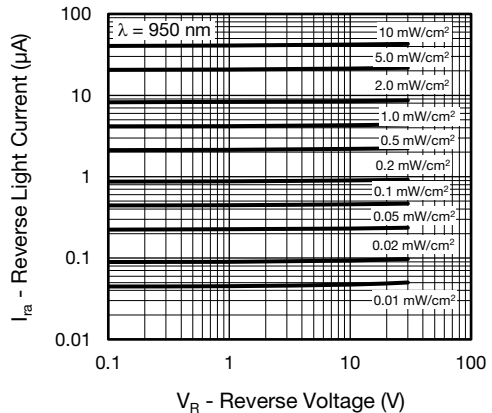


Fig. 4 - Reverse Light Current vs. Reverse Voltage



Fig. 5 - Diode Capacitance vs. Reverse Voltage



Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

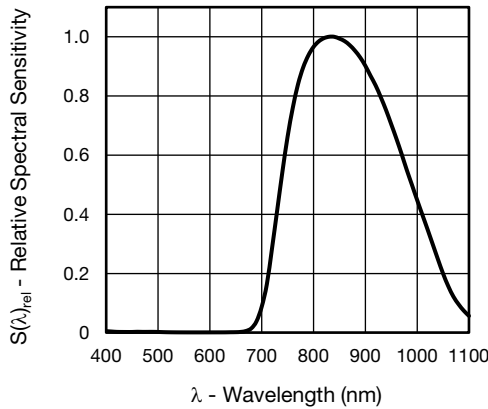


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

**REFLOW SOLDER PROFILE**

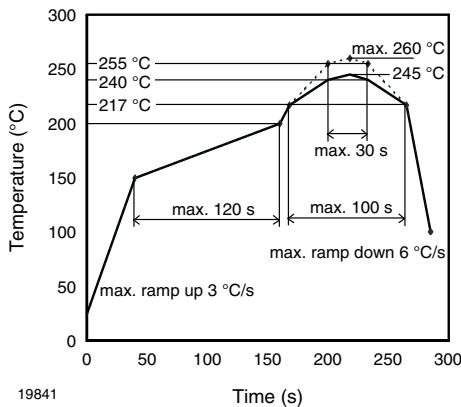


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

**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:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

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

**DRYING**

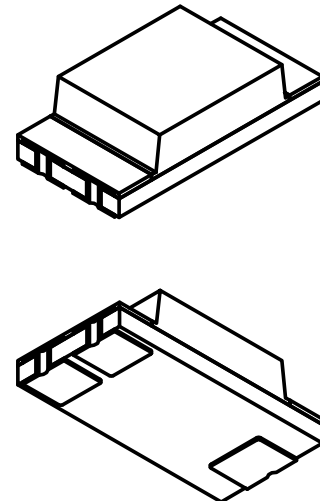
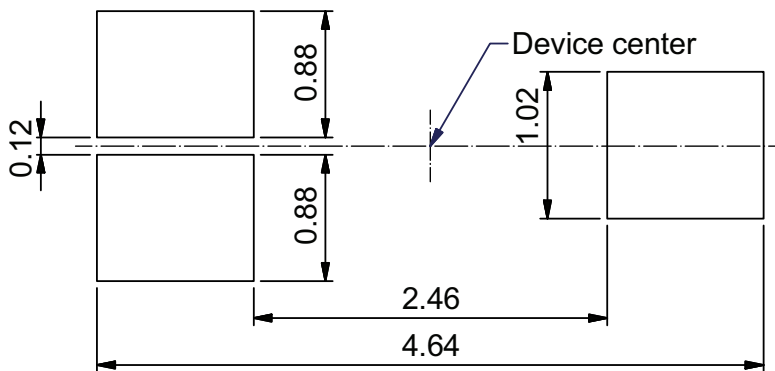
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$ .



PACKAGE DIMENSIONS in millimeters



Recommended solder pad footprint



Drawing-No. 6.541-5100.01-4  
Preliminary issue 04.07.2013



Technical drawings according to DIN specification.

Not indicated tolerances  $\pm 0.1$ mm



**BLISTER TAPE DIMENSIONS** in millimeters



Not indicated tolerances ±0.1

All dimensions in mm

Drawing refers to following Types: TEMD6010FX01

VEMD6x10X01

Drawing-No.: 9.700-5329.02-4

VEMD6x15X01

Prel Issue: 16.07.2013



REEL DIMENSIONS in millimeters



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



technical drawings according to DIN specifications

Drawing-No.: 9.800-5097.01-4

Issue: 1; 05.05.08

20874



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