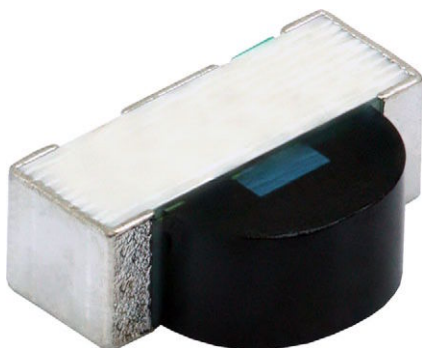


Silicon PIN Photodiode



DESCRIPTION

VEMD10940FX01 is a high speed and high sensitive PIN photodiode in a miniature side looking, surface mount package (SMD) with daylight blocking filter. Filter is matched with IR emitters operating at wavelength of 830 nm to 950 nm. The photo sensitive area of the chip is 0.23 mm².

FEATURES

- Package type: surface mount
- Package form: Side view
- Dimensions (L x W x H in mm): 3 x 2 x 1
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- Fast response times
- Angle of half sensitivity: $\phi = \pm 75^\circ$
- Package matched with IR emitter VSMB10940X01
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- High speed photo detector
- Infrared remote control
- Infrared data transmission
- Photo interrupters
- IR touch panels
- Automotive applications

PRODUCT SUMMARY

| COMPONENT | I_{ra} (μA) | ϕ (°) | $\lambda_{0.5}$ (nm) |
|---------------|---------------|------------|----------------------|
| VEMD10940FX01 | 3 | ± 75 | 780 to 1050 |

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD10940FX01 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | Side view |

Note

- MOQ: minimum order quantity

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

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|--|---|------------|-------------|------------------|
| Reverse voltage | | V_R | 60 | V |
| Power dissipation | $T_{amb} \leq 25^\circ\text{C}$ | P_V | 104 | mW |
| Junction temperature | | T_j | 100 | $^\circ\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +100 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +100 | $^\circ\text{C}$ |
| Soldering temperature | According to reflow solder profile Fig. 8 | T_{sd} | 260 | $^\circ\text{C}$ |
| Thermal resistance junction-to-ambient | According to J-STD-051 | R_{thJA} | 450 | K/W |

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

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--|-----------------|------|-------------|------|---------------|
| Forward voltage | $I_F = 50\text{ mA}$ | V_F | - | 1.56 | - | V |
| Breakdown voltage | $I_R = 100\text{ }\mu\text{A}$, $E = 0$ | $V_{(BR)}$ | 32 | - | - | V |
| Reverse dark current | $V_R = 10\text{ V}$, $E = 0$ | I_{r0} | - | 1 | 10 | nA |
| Diode capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 3.3 | - | pF |
| | $V_R = 3\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 1.5 | - | pF |
| Open circuit voltage | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | V_o | - | 350 | - | mV |
| Temperature coefficient of V_o | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | TK_{V_o} | - | -2.7 | - | mV/K |
| Short circuit current | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | I_k | - | 2.8 | - | μA |
| Temperature coefficient of I_k | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | TK_{I_k} | - | 0.4 | - | %/K |
| Reverse light current | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$, $V_R = 5\text{ V}$ | I_{ra} | 2 | 3 | 4 | μA |
| Angle of half sensitivity | | ϕ | - | ± 75 | - | $^{\circ}$ |
| Wavelength of peak sensitivity | | λ_p | - | 950 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.5}$ | - | 780 to 1050 | - | nm |
| Rise time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$ | t_r | - | 100 | - | ns |
| Fall time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$ | t_f | - | 100 | - | ns |

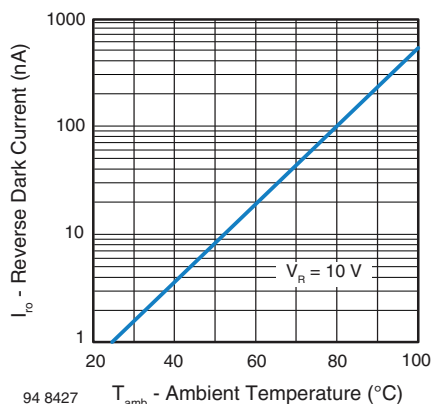
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Fig. 1 - Reverse Dark Current vs. Ambient Temperature

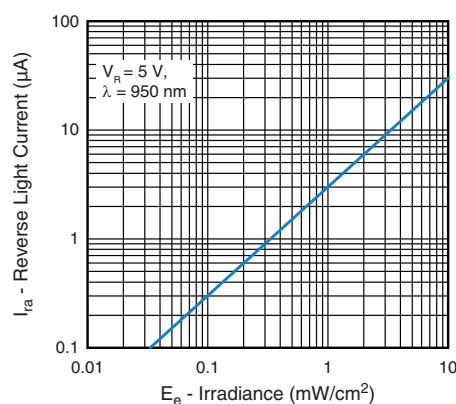


Fig. 3 - Reverse Light Current vs. Irradiance

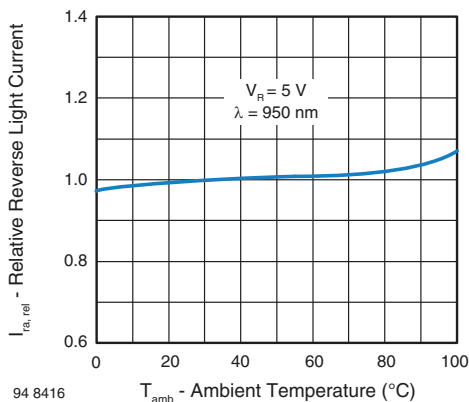


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

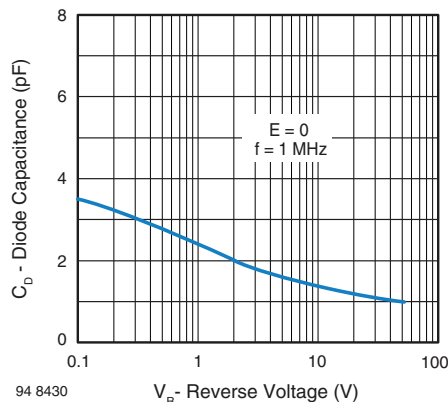


Fig. 4 - Diode Capacitance vs. Reverse Voltage

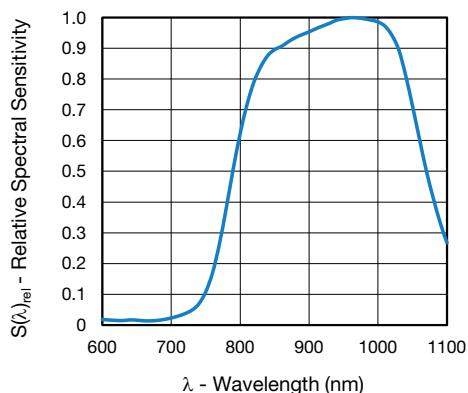


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

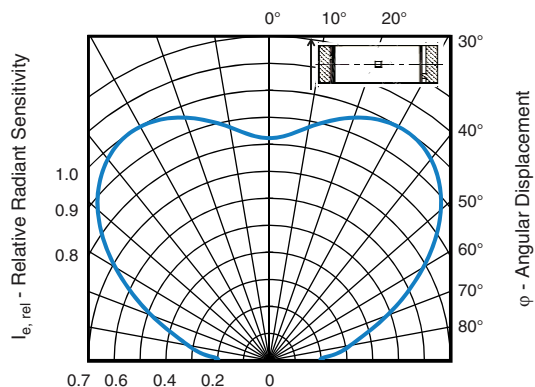


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement - Vertical

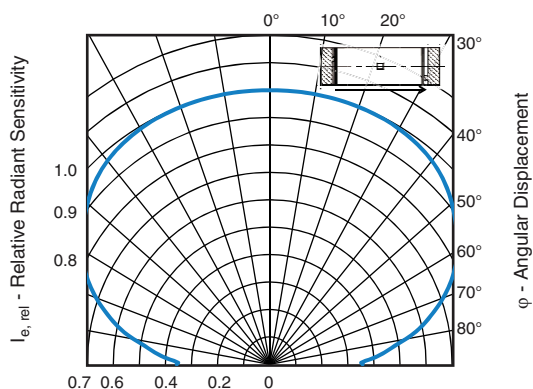


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement - Horizontal

REFLOW SOLDER PROFILE

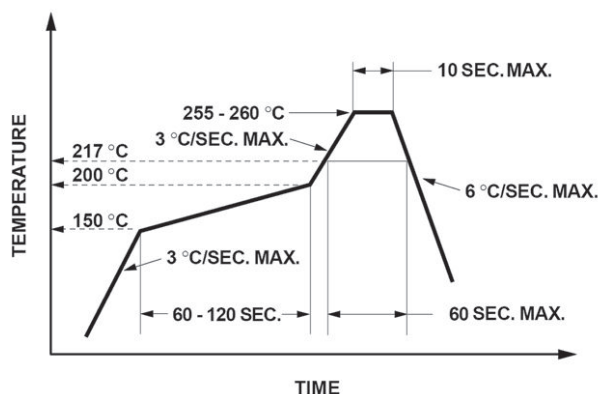


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

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:

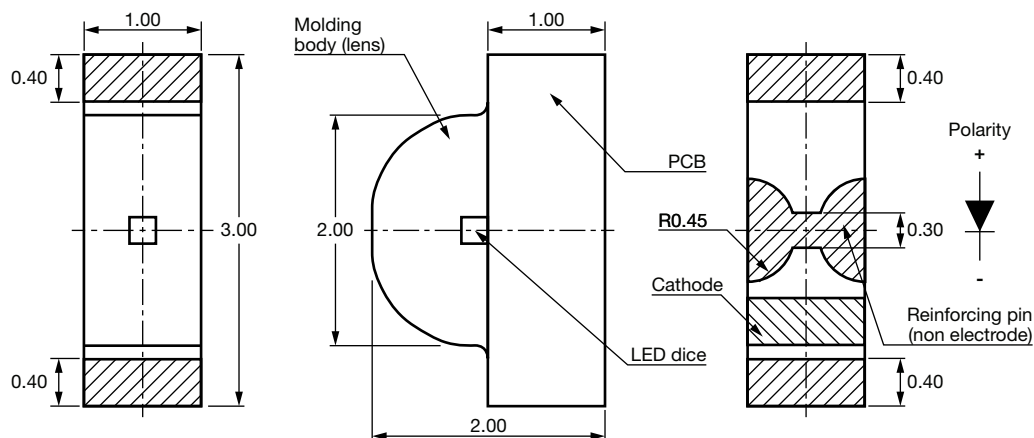
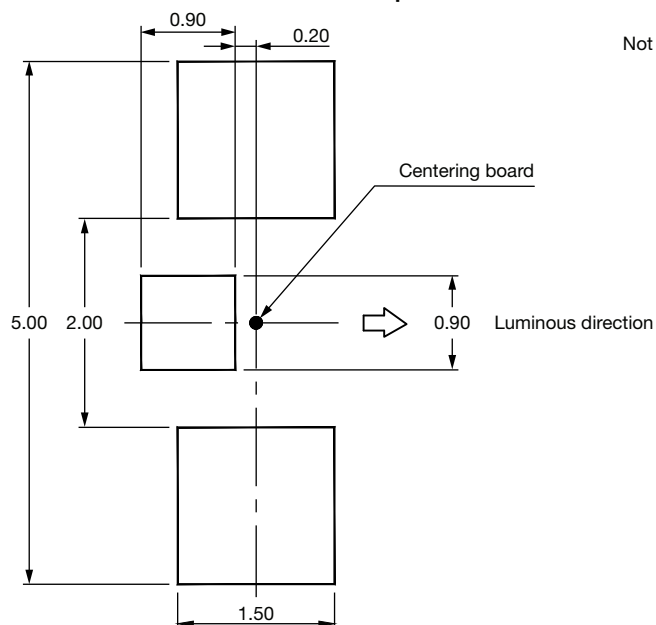
Floor life: 168 h

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

Moisture sensitivity level 3, according to J-STD-020.

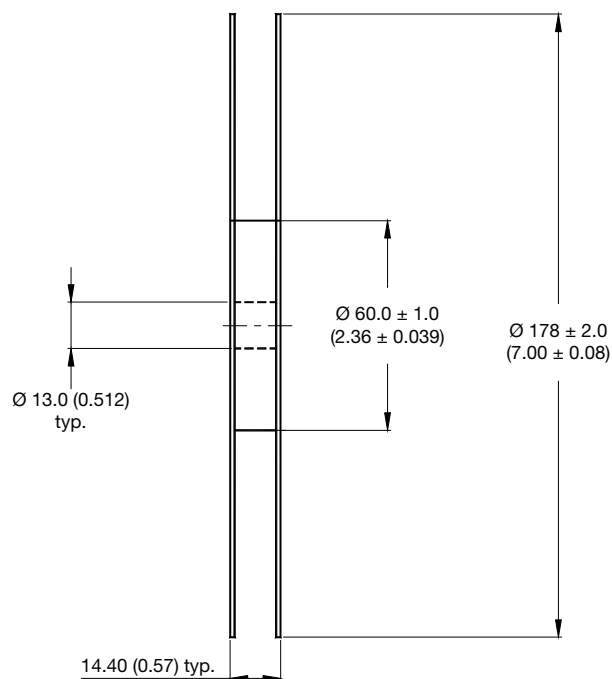
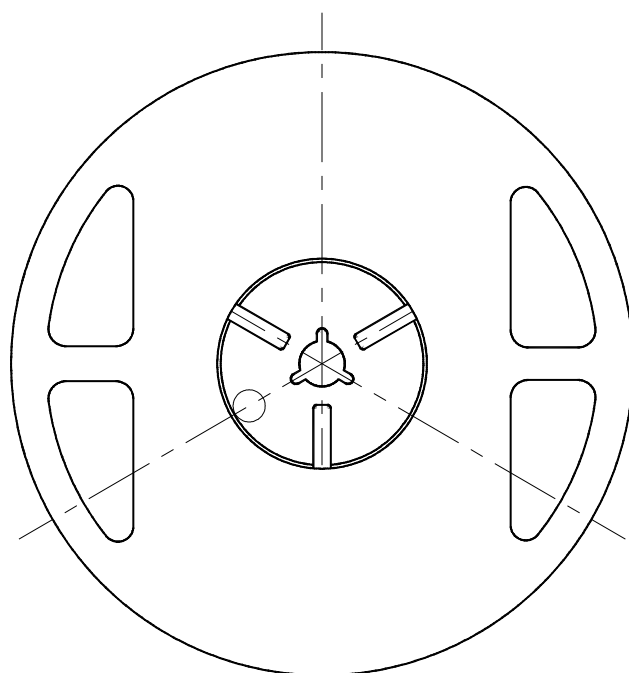
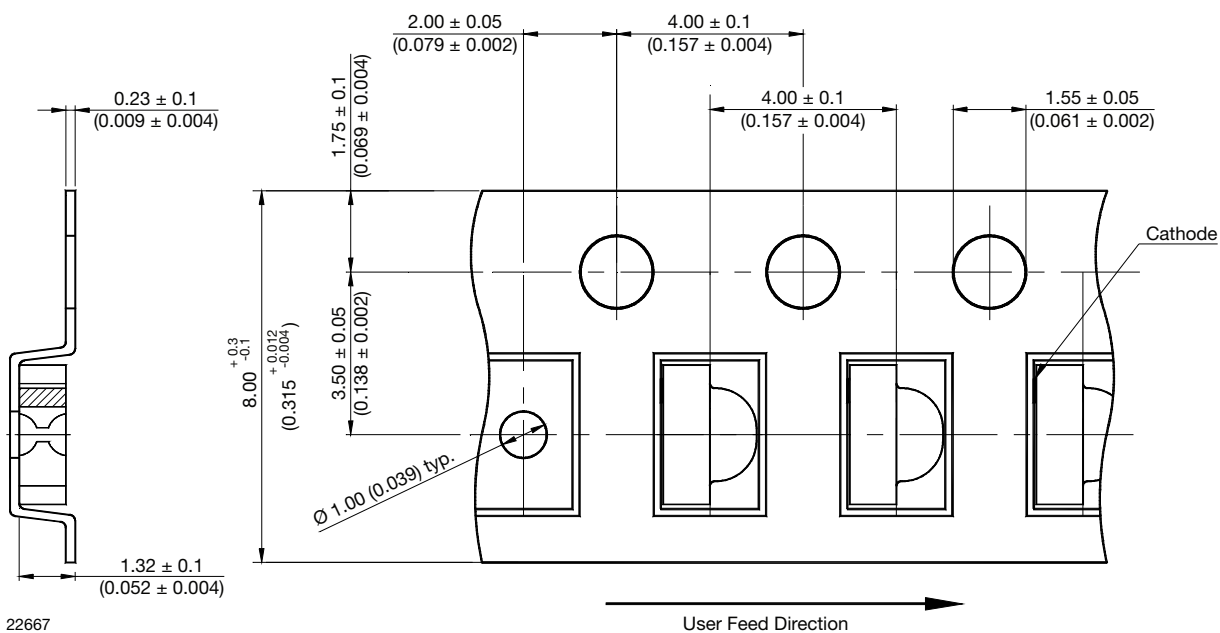
DRYING

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 $40\text{ }^{\circ}\text{C}$ ($+5\text{ }^{\circ}\text{C}$), $RH < 5\%$.

PACKAGE DIMENSIONS in millimeters: **VEMD10940F**

Recommended Solder Pad Footprint

Not indicated tolerances: ± 0.1 mm

22701

TAPING AND REEL DIMENSIONS in millimeters: **VEMD10940F**





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