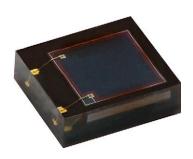


Silicon PIN Photodiode



DESCRIPTION

VEMD2704 is a high speed and high sensitive PIN photodiode with enhanced sensitivity for visible light. It is optimized for heart rate monitoring and pulse oximetry applications.

FEATURES

- Package type: surface-mount
- · Package form: top view



- Radiant sensitive area (in mm²): 1.51
- · Clear epoxy for maximum sensitivity
- Suitable for visible and near infrared radiation
- Angle of half sensitivity: $\varphi = \pm 67^{\circ}$
- Floor life: 168 h, MSL 3, according to J-STD-020









FREE GREEN

APPLICATIONS

- · Heart rate monitoring and pulse oximetry
- Wearables

| PRODUCT SUMMARY | | | | |
|-----------------|---|----------|--------------------------|--|
| COMPONENT | I_{ra} (μA) at E_e = 0.1 mW/cm ² , λ = 530 nm, V_R = 5.0 V | φ (°) | λ _{0.1} (nm) | |
| VEMD2704 | 0.48 | ± 67 | 350 to 1100 | |

| ORDERING INFORMATION | | | | | |
|----------------------|---------------|-----------|--------------|--|--|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM | | |
| VEMD2704 | Tape and reel | MOQ: 4000 | Top view | | |

Note

• MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|---|--------------------|------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage | | V_R | 6 | V |
| Ambient temperature range | | T _{amb} | -40 to +85 | °C |
| Storage temperature range | | T _{stg} | -40 to +85 | °C |
| Soldering temperature | According to reflow solder profile Fig. 7 | T _{sd} | 260 | °C |
| ESD safety HBM | ± 2000 V, 1.5 kΩ, 100 pF, 3 pulses | ESD _{HBM} | ≥2 | kV |

| BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | |
|---|--|------------------|------|-------------|------|------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | I _F = 50 mA | V _F | 1.0 | 1.2 | 1.3 | V |
| Reverse dark current | V _R = 10 V, E = 0 | I _{ro} | - | 0.03 | 40 | nA |
| Diode capacitance | $V_R = 0 V, f = 1 MHz, E = 0$ | C _D | - | 17.6 | - | pF |
| Reverse light current (1) | $E_e = 0.1 \text{ mW/cm}^2, \lambda = 530 \text{ nm}, V_R = 5 \text{ V}$ | I _{ra} | 0.35 | 0.48 | 0.65 | μΑ |
| | $E_e = 0.1 \text{ mW/cm}^2, \lambda = 660 \text{ nm}, V_R = 5 \text{ V}$ | I _{ra} | - | 0.77 | - | μΑ |
| | $E_e = 0.1 \text{ mW/cm}^2, \lambda = 850 \text{ nm}, V_R = 5 \text{ V}$ | I _{ra} | 0.75 | 1.13 | 1.40 | μΑ |
| | $E_e = 0.1 \text{ mW/cm}^2, \lambda = 940 \text{ nm}, V_R = 5 \text{ V}$ | I _{ra} | 0.85 | 1.17 | 1.50 | μΑ |
| Angle of half sensitivity | | φ | - | ± 67 | - | 0 |
| Wavelength of peak sensitivity | | λ_{p} | - | 940 | - | nm |
| Range of spectral bandwidth | | λ _{0.1} | - | 350 to 1100 | - | nm |
| Rise time | $V_R = 5 \text{ V}, \ R_L = 50 \ \Omega, \ \lambda = 530 \ \text{nm}$ | t _r | - | 70 | - | ns |
| Fall time | $V_R = 5 \text{ V}, R_L = 50 \Omega, \lambda = 530 \text{ nm}$ | t _f | - | 70 | - | ns |

Note

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

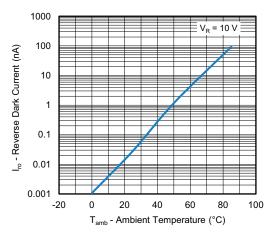


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

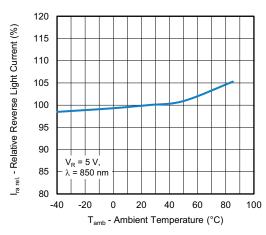


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

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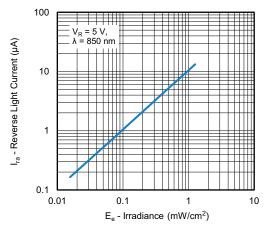


Fig. 3 - Reverse Light Current vs. Irradiance

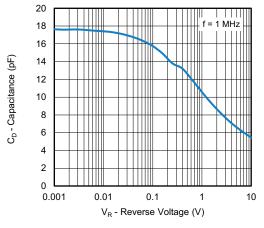


Fig. 4 - Diode Capacitance vs. Reverse Voltage

⁽¹⁾ The reverse light current for other irradiances can be estimated by linear extrapolation



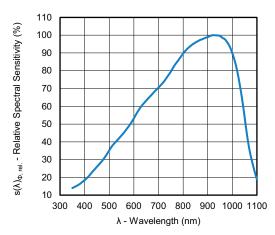


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

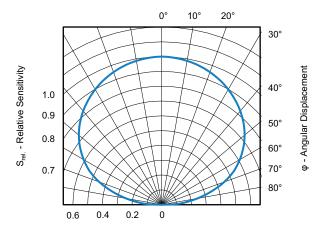
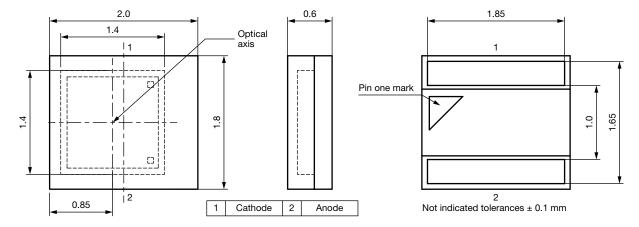
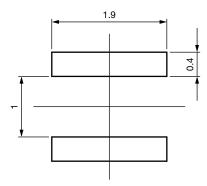


Fig. 6 - Relative Sensitivity vs. Angular Displacement

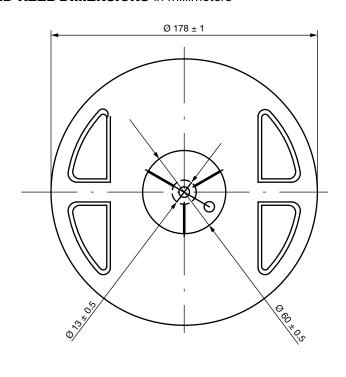
PACKAGE DIMENSIONS in millimeters

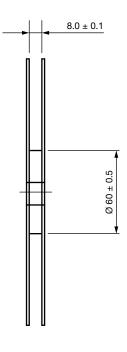


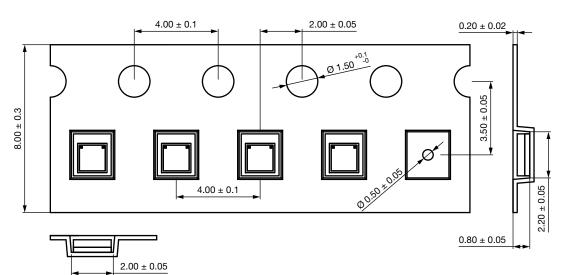
RECOMMENDED FOOTPRINT in millimeters



TAPE AND REEL DIMENSIONS in millimeters









SOLDER PROFILE

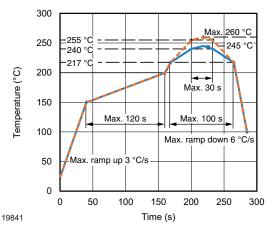


Fig. 7 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020D

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

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_{amb} < 30 °C, 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 %

or

96 h at 60 °C (+ 5 °C), RH < 5 %



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Vishay

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