

Silicon PIN Photodiode



DESCRIPTION

VEMD8080 is a high speed and high sensitive PIN photodiode with enhanced sensitivity for visible light. It is a low profile surface-mount device (SMD) including the chip with a 4.5 mm² sensitive area detecting visible and near infrared radiation.

FEATURES

- Package type: surface-mount
- Package form: top view
- Dimensions (L x W x H in mm): 4.8 x 2.5 x 0.48
- Radiant sensitive area (in mm²): 4.5
- 0.48 mm low profile package
- Enhanced sensitivity for visible light
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\phi = \pm 65^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- High speed photo detector
- Wearables

PRODUCT SUMMARY

| COMPONENT | I_{ra} (μA) | ϕ (deg) | $\lambda_{0.1}$ (nm) |
|-----------|----------------------|--------------|----------------------|
| VEMD8080 | 28 | ± 65 | 350 to 1100 |

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD8080 | Tape and reel | MOQ: 5000 pcs, 5000 pcs/reel | Top view |

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 |
| Junction temperature | | T_j | 85 | $^\circ C$ |
| Operating temperature range | | T_{amb} | -40 to +85 | $^\circ C$ |
| Storage temperature range | | T_{stg} | -40 to +85 | $^\circ C$ |
| Soldering temperature | According to reflow solder profile Fig. 8 | T_{sd} | 260 | $^\circ C$ |
| Thermal resistance junction-to-ambient | | R_{thJA} | 350 | K/W |
| ESD safety HBM | ± 2000 V, 1.5 k Ω , 100 pF, 3 pulses | ESD_{HBM} | ≥ 2 | kV |

| 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 | - | 1.2 | 1.6 | 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} | - | 0.2 | 10 | nA |
| Diode capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 47 | - | pF |
| | $V_R = 3\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 17 | 40 | pF |
| Open circuit voltage | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | V_o | - | 320 | - | mV |
| Temperature coefficient of V_o | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | TK_{V_o} | - | -3.0 | - | mV/K |
| Short circuit current | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | I_k | - | 32 | - | μA |
| Temperature coefficient of I_k | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$ | TK_{I_k} | - | 0.1 | - | %/K |
| Reverse light current | $E_e = 1\text{ mW/cm}^2$, $\lambda = 850\text{ nm}$, $V_R = 5\text{ V}$ | I_{ra} | 23 | 28 | 33 | μA |
| | $E_e = 0.25\text{ mW/cm}^2$, $\lambda = 525\text{ nm}$, $V_R = 5\text{ V}$ | I_{ra} | 3.4 | 4.4 | 5.3 | μA |
| Angle of half sensitivity | | ϕ | - | ± 65 | - | deg |
| Wavelength of peak sensitivity | | λ_p | - | 850 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | - | 350 to 1100 | - | nm |
| Rise time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 830\text{ nm}$ | t_r | - | 70 | - | ns |
| Fall time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 830\text{ nm}$ | t_f | - | 70 | - | ns |

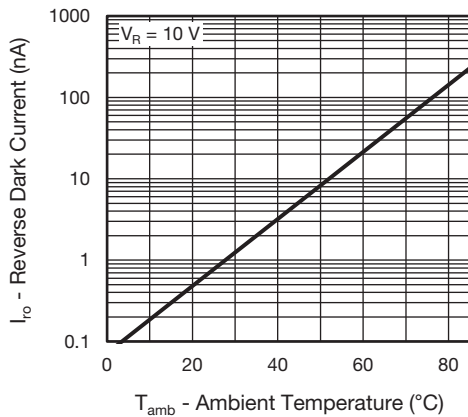
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

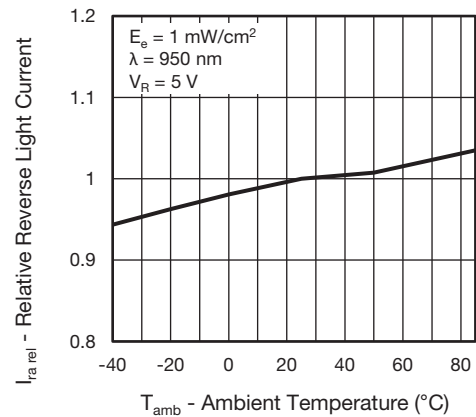


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

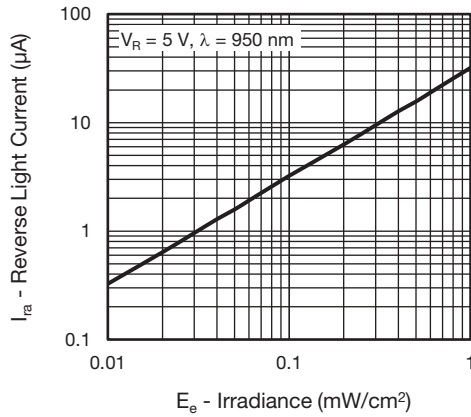


Fig. 3 - Reverse Light Current vs. Irradiance

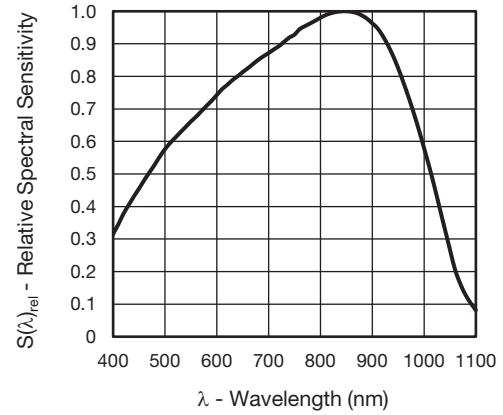


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

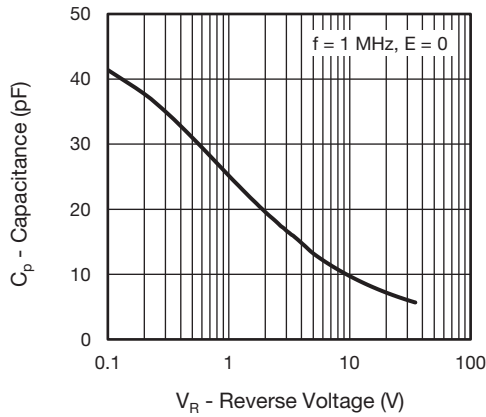


Fig. 4 - Diode Capacitance vs. Reverse Voltage

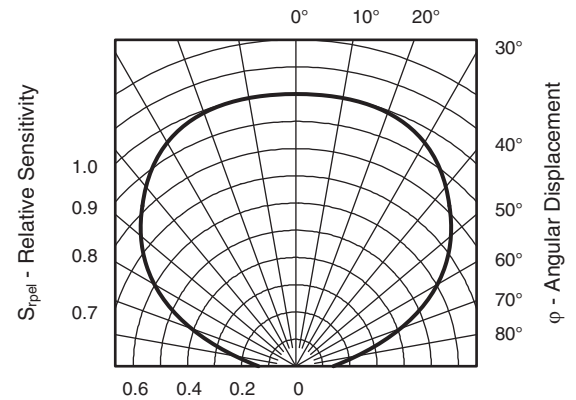
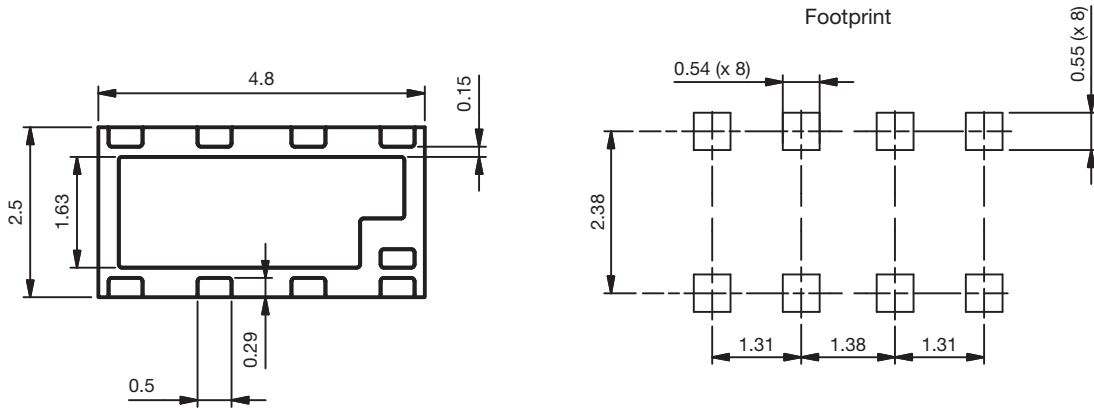
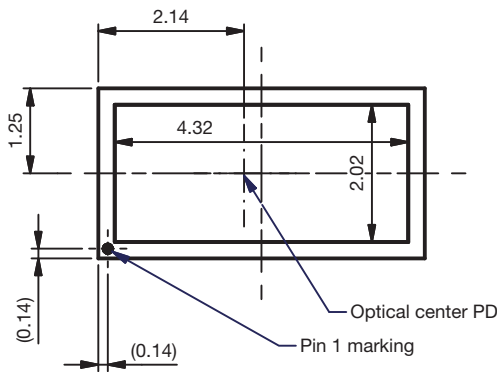
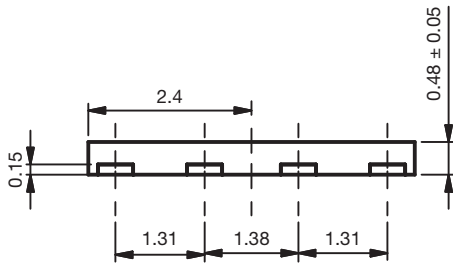


Fig. 6 - Relative Sensitivity vs. Angular Displacement

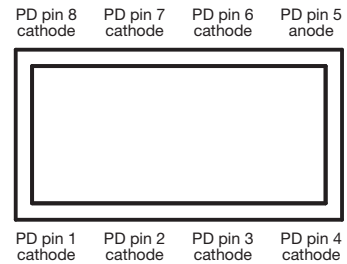
PACKAGE DIMENSIONS in millimeters



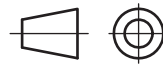
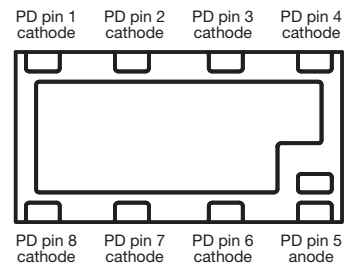
Not indicated tolerances ± 0.1 mm



Pinning top view



Pinning bottom view



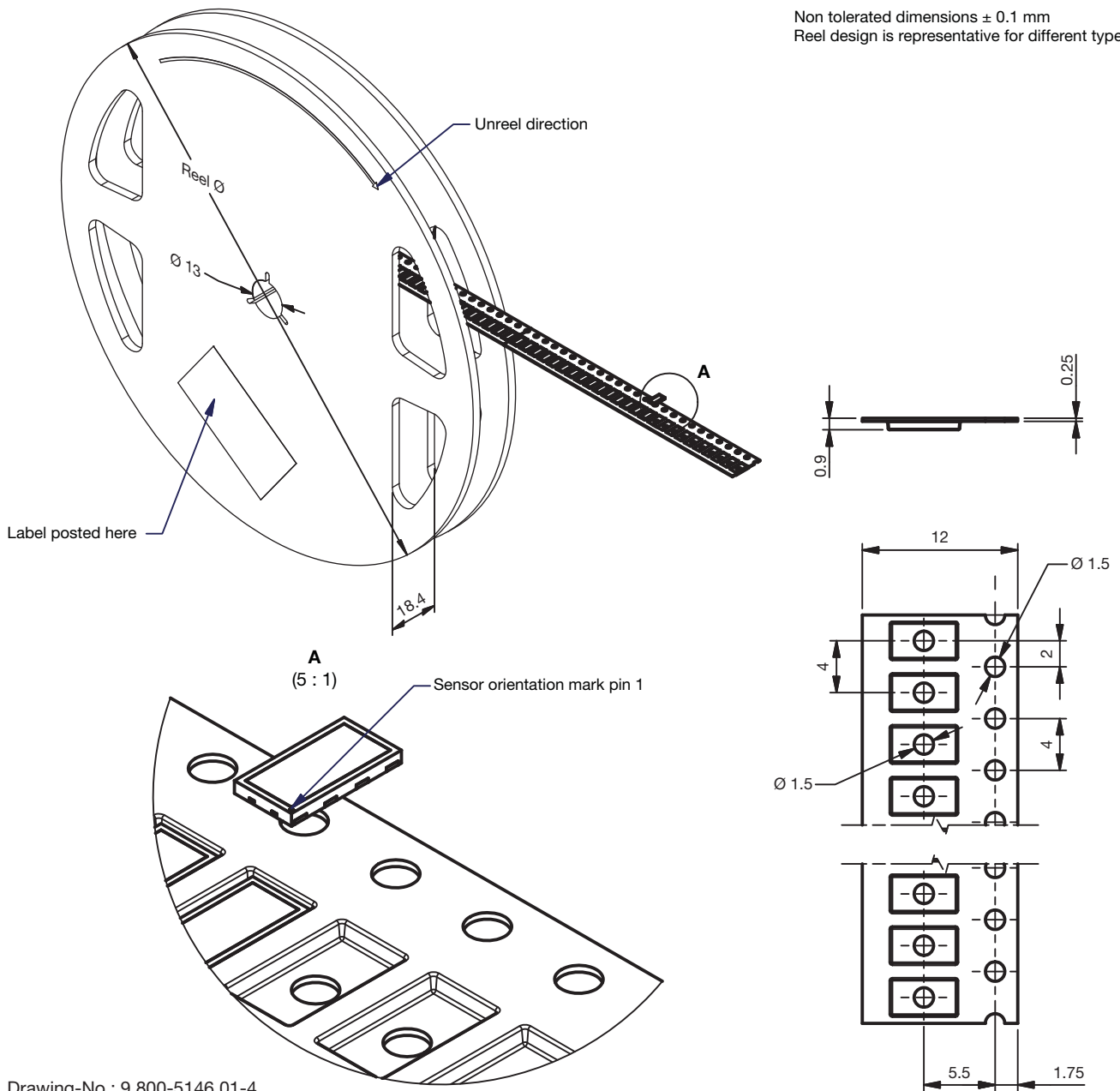
Technical drawings according to DIN specification.

Drawing number: 6.550-5354.01-4
Issue: 1; 20.04.2018



TAPE AND REEL DIMENSIONS in millimeters

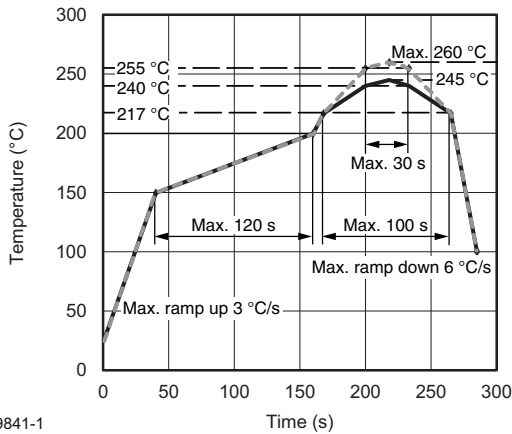
Non tolerated dimensions ± 0.1 mm
Reel design is representative for different types



Drawing-No.: 9.800-5146.01-4
Issue: 1; 20.04.2018



SOLDER PROFILE



19841-1

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

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at $40\text{ °C} (+ 5\text{ °C})$, $RH < 5\%$

or

96 h at $60\text{ °C} (+ 5\text{ °C})$, $RH < 5\%$



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