

Ambient Light Sensor



LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

VEMD4200FX01 is a high speed and high sensitive PIN photodiode. It is a miniature surface-mount device (SMD) with a 0.42 mm² sensitive area. The spectral sensitivity is matched to the human eye.

FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.7
- Radiant sensitive area (in mm²): 0.42
- Ambient temperature range: T_{amb} = -40 °C to +110 °C
- Adapted to human eye sensitivity
- Angle of half sensitivity: φ = ± 55°
- Floor life: 168 h, MSL 3, 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

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Backlight dimming
- Automatic light control
- Automotive sensors

PRODUCT SUMMARY

| COMPONENT | I _{ra} (μA) | φ (°) | λ _{0.5} (nm) |
|--------------|----------------------|-------|-----------------------|
| VEMD4200FX01 | 0.07 | ± 55 | 400 to 660 |

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VEMD4200FX01 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805 |

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 | 20 | V |
| Junction temperature | | T _j | 110 | °C |
| Ambient temperature range | | T _{amb} | -40 to +110 | °C |
| Storage temperature range | | T _{stg} | -40 to +110 | °C |
| Soldering temperature | According to reflow solder profile Fig. 8 | T _{sd} | 260 | °C |
| ESD safety HBM | ± 2000 V, 1.5 kΩ, 100 pF, 3 pulses | ESD _{HBM} | ≥ 2 | kV |

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|--|-----------------|------|------------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Breakdown voltage | $I_R = 100\text{ }\mu\text{A}$, $E = 0\text{ lx}$ | $V_{(BR)}$ | 20 | - | - | V |
| Reverse dark current | $V_R = 10\text{ V}$, $E = 0\text{ lx}$ | I_{r0} | - | 0.1 | 5 | nA |
| Diode capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ lx}$ | C_D | - | 115 | - | pF |
| | $V_R = 5\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ lx}$ | C_D | - | 45 | - | pF |
| Short circuit current | $E_v = 100\text{ lx}$, CIE illuminant A | I_K | - | 0.07 | - | μA |
| Reverse light current | $E_v = 100\text{ lx}$, CIE illuminant A, $V_R = 5\text{ V}$ | I_{ra} | - | 0.07 | - | μA |
| | $E_e = 1\text{ mW/cm}^2$, $\lambda = 530\text{ nm}$, $V_R = 5\text{ V}$ | I_{ra} | 0.95 | 1.35 | 1.85 | μA |
| Angle of half sensitivity | | ϕ | - | ± 55 | - | $^{\circ}$ |
| Wavelength of peak sensitivity | | λ_p | - | 540 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.5}$ | - | 400 to 660 | - | nm |
| Rise time | $V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 525\text{ nm}$ | t_r | - | 100 | - | ns |
| Fall time | $V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 525\text{ nm}$ | t_f | - | 100 | - | ns |

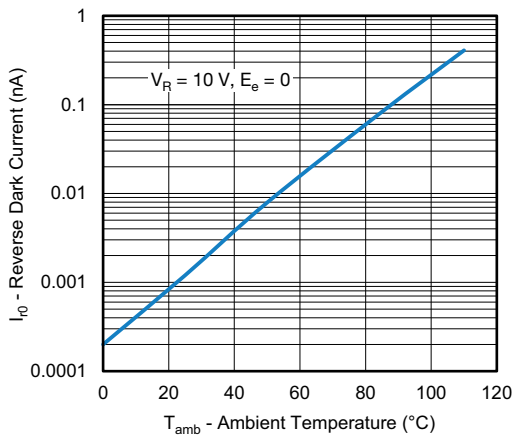
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

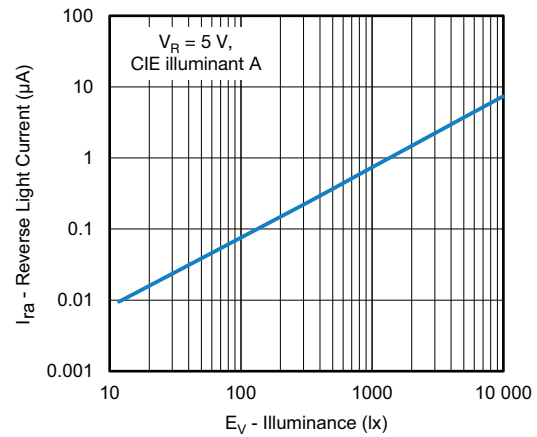


Fig. 3 - Reverse Light Current vs. Irradiance

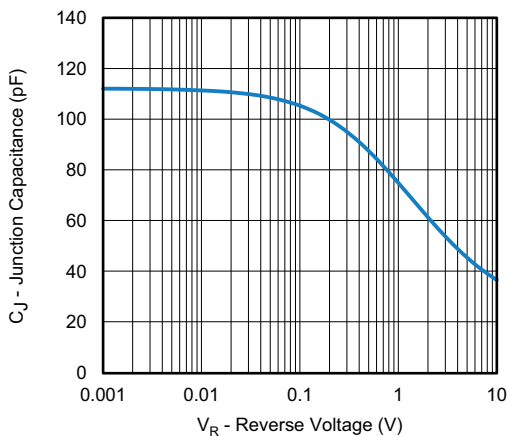


Fig. 2 - Diode Capacitance vs. Reverse Voltage

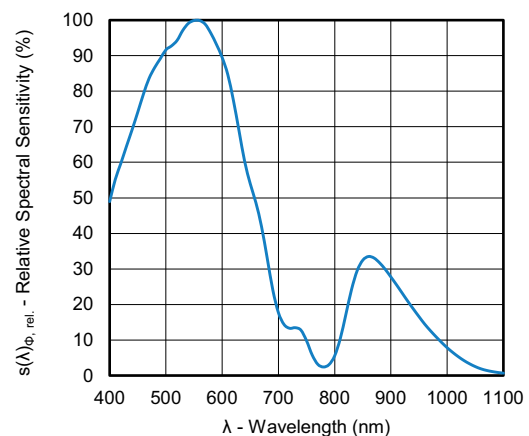


Fig. 4 - Relative Spectral Sensitivity vs. Wavelength

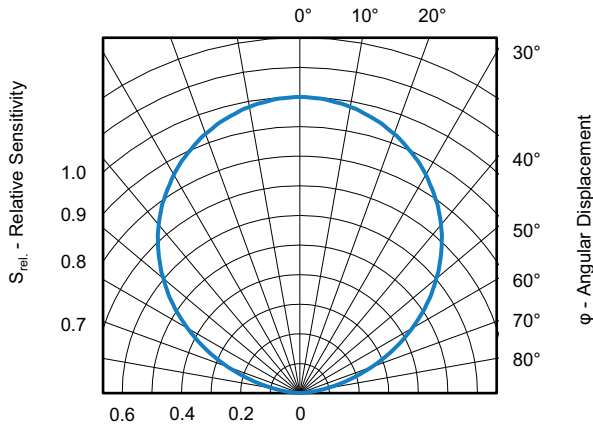


Fig. 5 - Relative Radiant Sensitivity vs. Angular Displacement

REFLOW SOLDER PROFILE

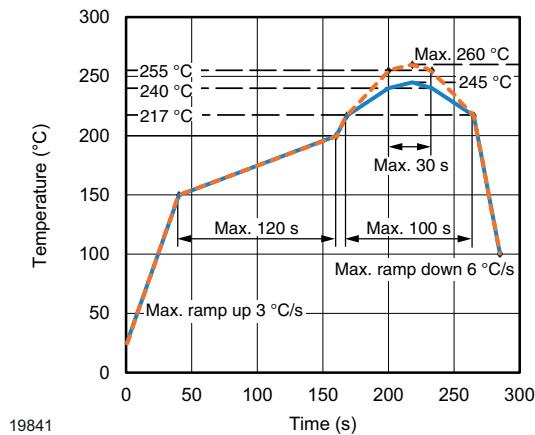


Fig. 6 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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: 168 h

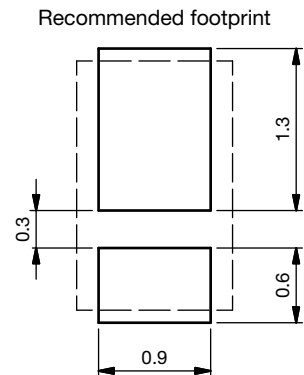
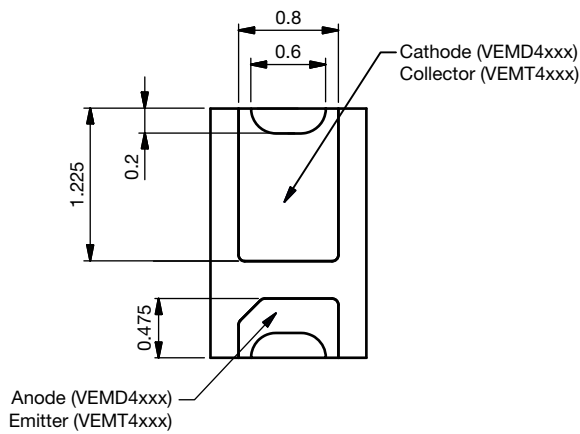
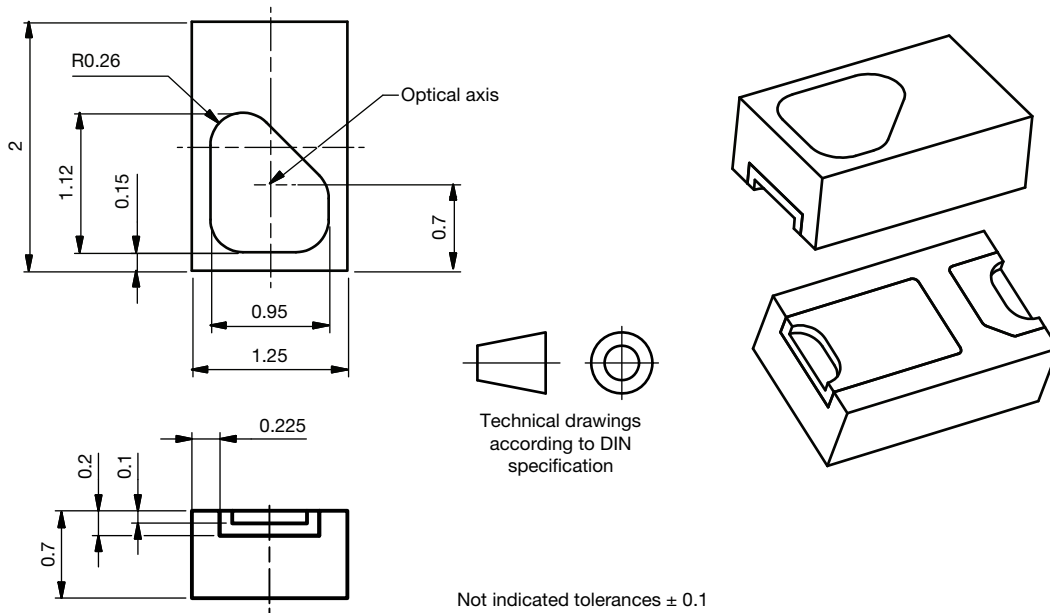
Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, $RH < 60\%$

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

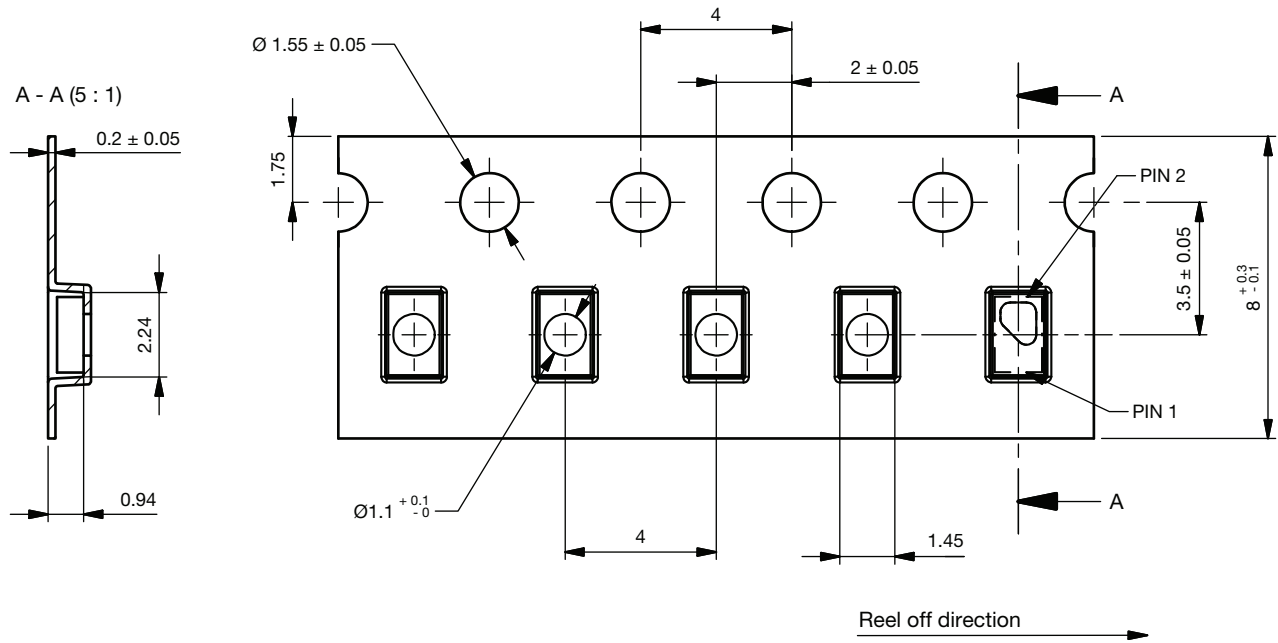
PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5363.01-4
Issue: 2; 01.07.2020



BLISTER TAPE DIMENSIONS in millimeters

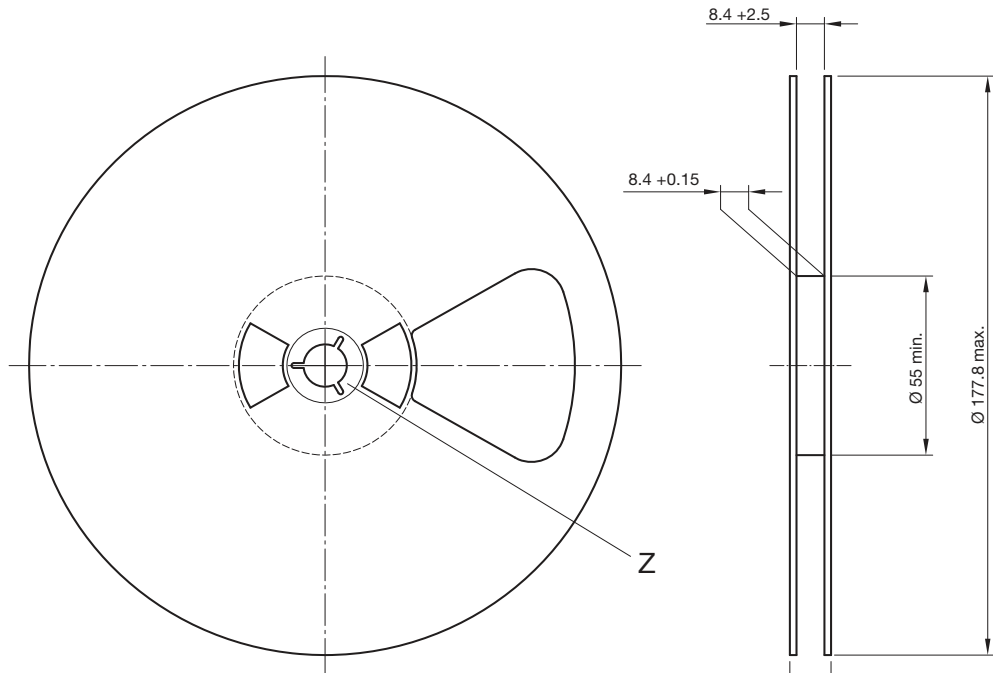


| TYPE | PIN 1 | PIN 2 |
|----------|-------|---------|
| VEMD4xxx | Anode | Cathode |

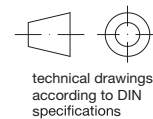
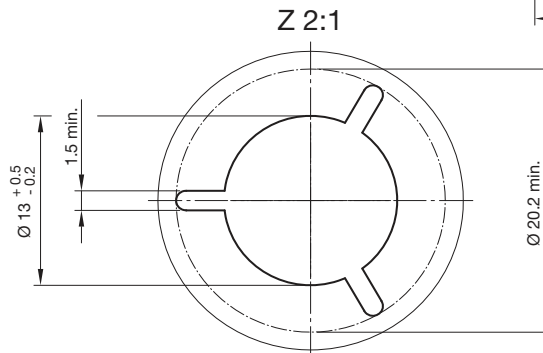
Drawing-No.: 9.700-5411.0-4
Issue: 1_A; 11.10.2022



REEL DIMENSIONS in millimeters



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



Drawing-No.: 9.800-5096.01-4
Issue: 2; 26.04.10
20875



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