

## Ambient Light Sensor



### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

VEMD4210FX02 is a high speed and high sensitive PIN photodiode. It is a miniature surface-mount device (SMD) with a 0.42 mm<sup>2</sup> sensitive area. The spectral sensitivity is matched to the human eye with a peak wavelength of 530 nm.

### 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 mm<sup>2</sup>): 0.42
- Ambient temperature range: T<sub>amb</sub> = -40 °C to +110 °C
- Adapted to human eye sensitivity
- Angle of half sensitivity:  $\phi = \pm 52^\circ$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q102 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)



### APPLICATIONS

- Backlight dimming
- Automatic light control
- Automotive sensors

### PRODUCT SUMMARY

COMPONENT	$I_{ra}$ (μA) E <sub>v</sub> = 100 lx, CIE illuminant A, V <sub>R</sub> = 5 V	$\phi$ (°)	$\lambda_{0.5}$ (nm)
VEMD4210FX02	0.014	± 52	470 to 610

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD4210FX02	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	20	V
Junction temperature		T <sub>j</sub>	110	°C
Ambient temperature range		T <sub>amb</sub>	-40 to +110	°C
Storage temperature range		T <sub>stg</sub>	-40 to +110	°C
Soldering temperature	According to reflow solder profile Fig. 8	T <sub>sd</sub>	260	°C
ESD safety HBM	± 2000 V, 1.5 kΩ, 100 pF, 3 pulses	ESD <sub>HBM</sub>	≥ 2	kV

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$	-	0.9	1.5	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0\text{ lx}$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0\text{ lx}$	$I_{ro}$	-	0.1	5	nA
Open circuit voltage	$E_V = 100\text{ lx}$ , white LED 4300K	$V_O$	-	405	-	mV
Temperature coefficient of $V_O$	$E_V = 100\text{ lx}$ , white LED 4300K	$TK_{V_O}$	-	-2.8	-	mV/K
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ lx}$	$C_D$	-	116	-	pF
	$V_R = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ lx}$	$C_D$	-	61	-	pF
Short circuit current	$E_V = 100\text{ lx}$ , white LED 4300K	$I_K$	-	18	-	nA
Reverse light current	$E_V = 100\text{ lx}$ , white LED 4300K, $V_R = 5\text{ V}$	$I_{ra}$	6	18	35	nA
	$E_V = 100\text{ lx}$ , CIE illuminant A, $V_R = 5\text{ V}$	$I_{ra}$	-	14	-	nA
	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 530\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	300	779	1600	nA
Angle of half sensitivity		$\phi$	-	$\pm 52$	-	$^{\circ}$
Wavelength of peak sensitivity		$\lambda_p$	-	530	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	470 to 610	-	nm
Rise time	$V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 530\text{ nm}$	$t_r$	-	100	-	ns
Fall time	$V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 530\text{ nm}$	$t_f$	-	100	-	ns

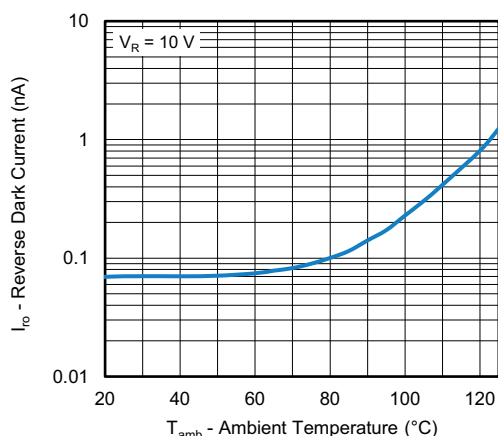
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 1 - Reverse Dark Current vs. Ambient Temperature

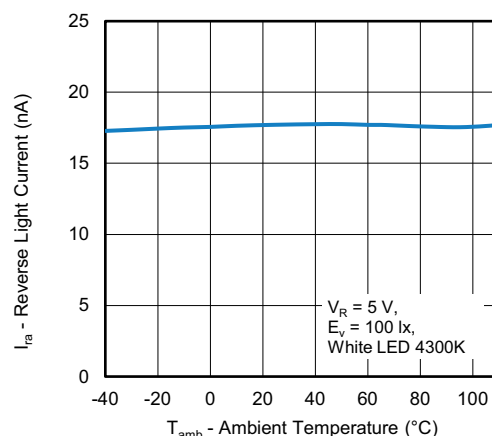


Fig. 2 - Reverse Light Current vs. Ambient Temperature

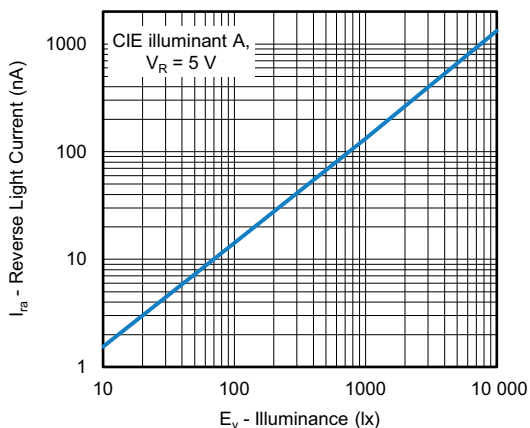


Fig. 3 - Reverse Light Current vs. Illuminance

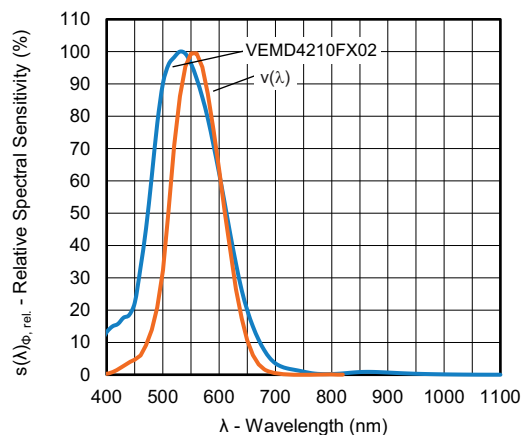


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

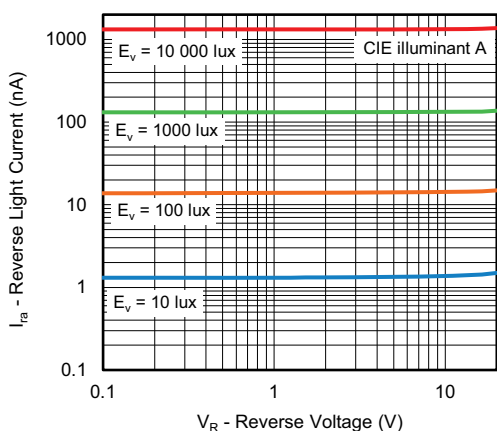


Fig. 4 - Reverse Light Current vs. Reverse Voltage

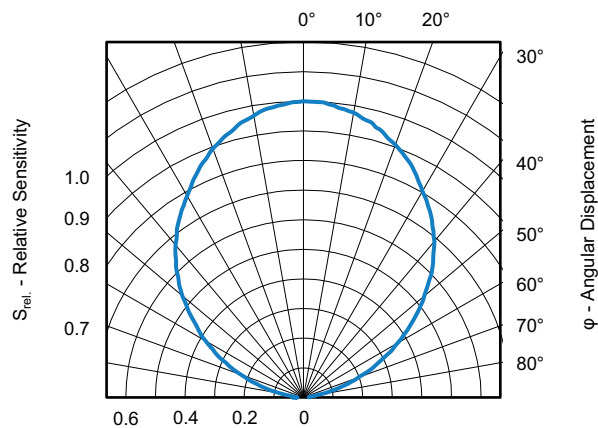


Fig. 7 - Relative Sensitivity vs. Angular Displacement

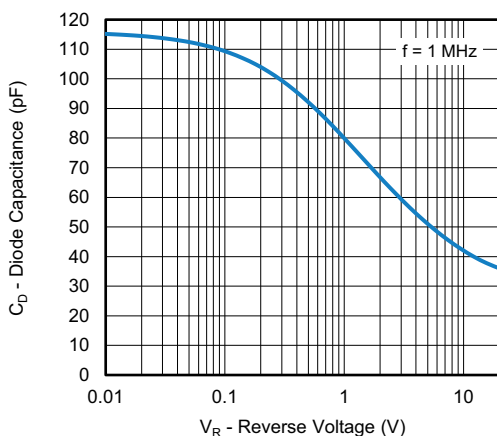


Fig. 5 - Diode Capacitance vs. Reverse Voltage



## REFLOW SOLDER PROFILE

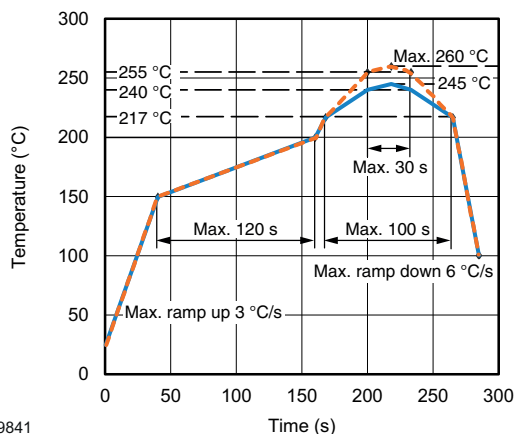


Fig. 8 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## 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

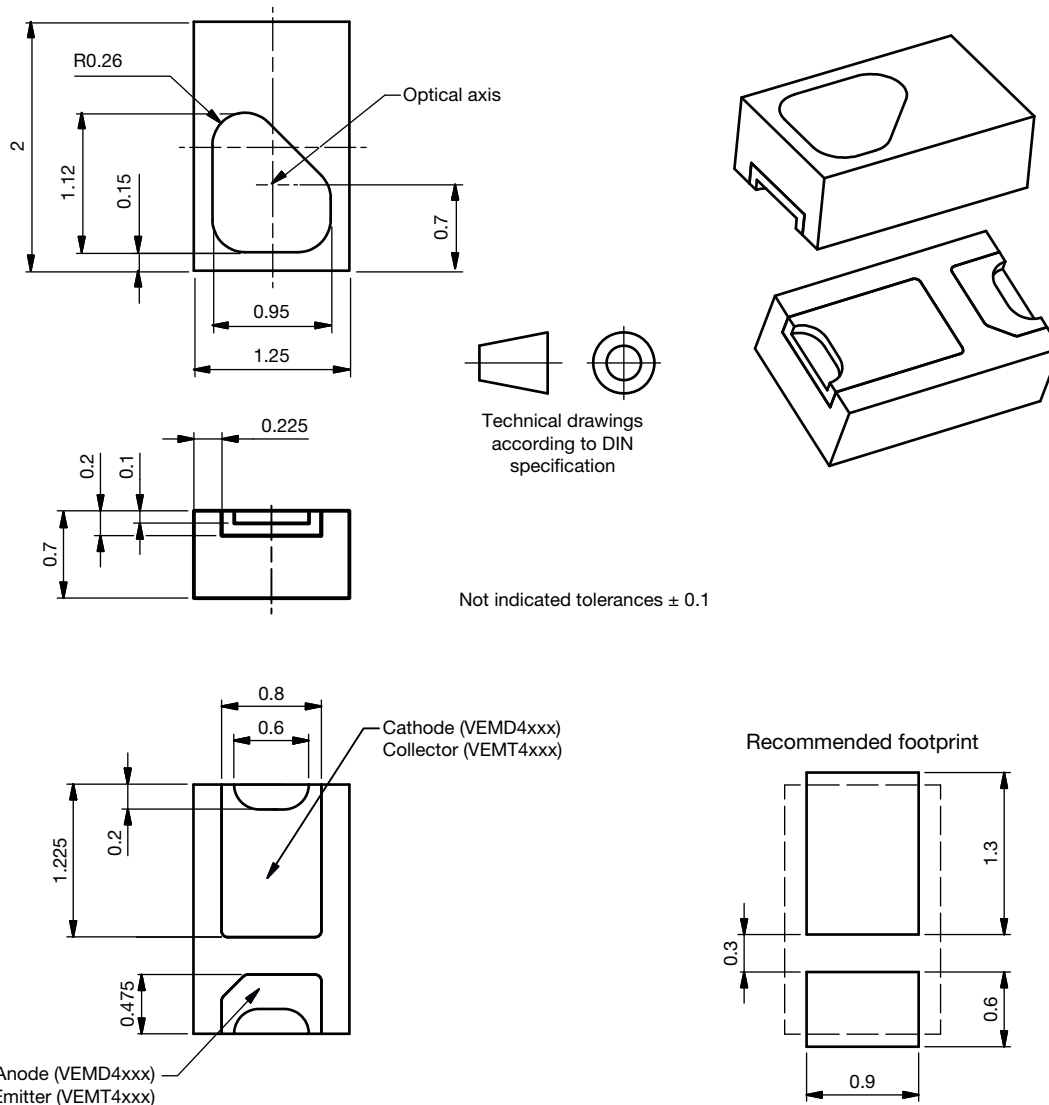
Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Moisture sensitivity: level 4

Floor life: 72 h

## 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 °C (+ 5 °C), RH < 5 %.

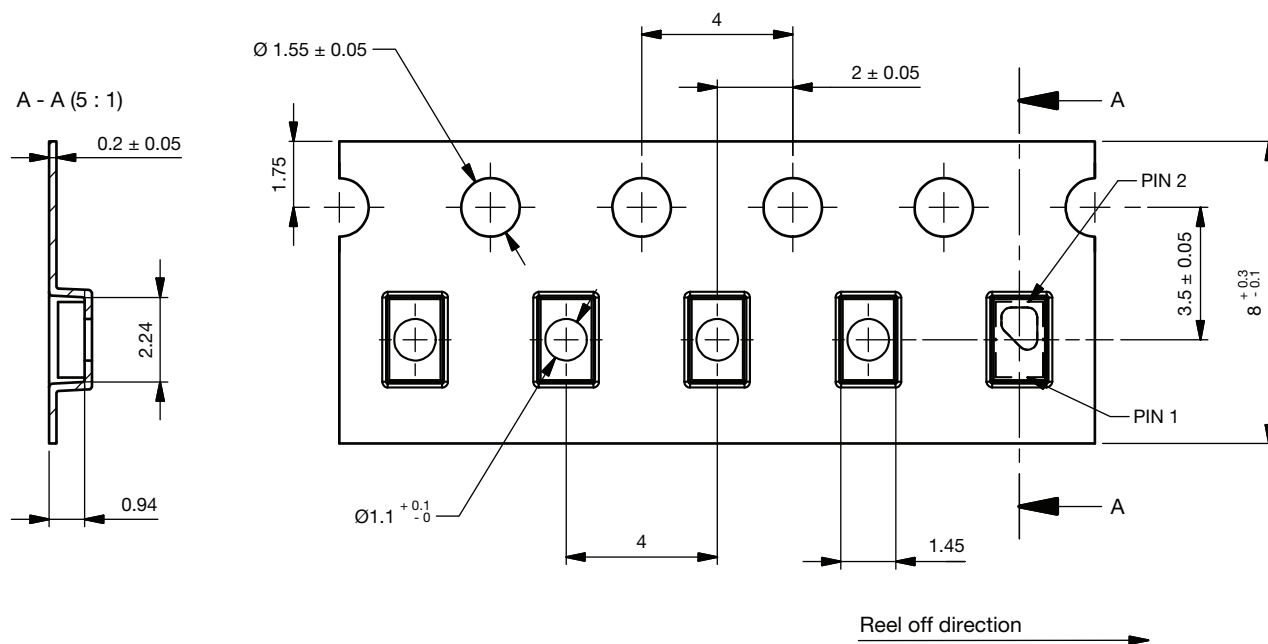
**PACKAGE DIMENSIONS** in millimeters


Drawing-No.: 6.550-5363.01-4

Issue: 2; 01.07.2020



**BLISTER TAPE DIMENSIONS** in millimeters

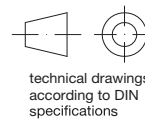
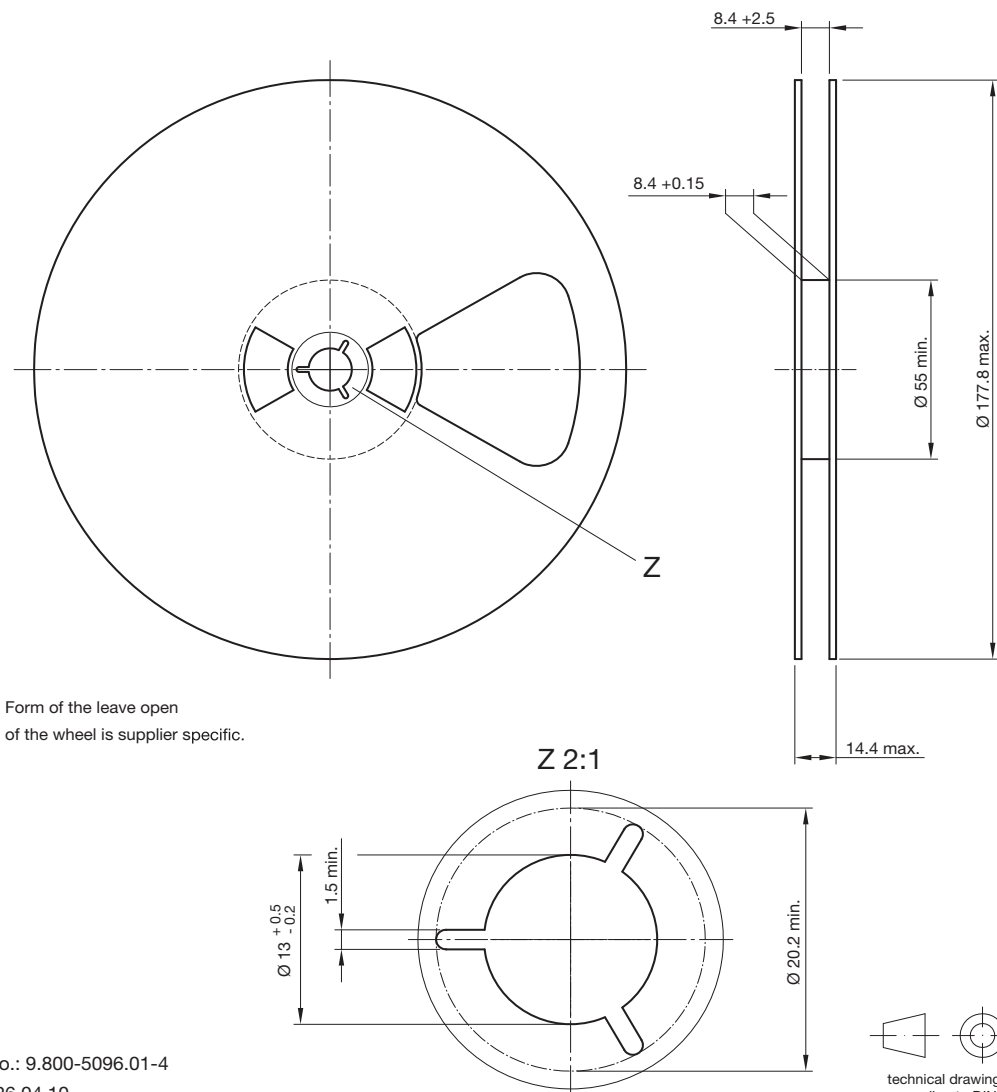


TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode

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



**REEL DIMENSIONS** in millimeters



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



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