

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 mm² 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 mm²): 0.42
- Ambient temperature range: T_{amb} = -40 °C to +110 °C
- Adapted to human eye sensitivity
- Angle of half sensitivity: φ = ± 52°
- 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/doc?99912





RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Backlight dimming
- Automatic light control
- Automotive sensors

PRODUCT SUMMARY

COMPONENT	I _{ra} (μA) E _V = 100 lx, CIE illuminant A, V _R = 5 V	φ (°)	λ _{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_{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 ($T_{amb} = 25^\circ\text{C}$, 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	$I_R = 100 \mu\text{A}, E = 0 \text{ lx}$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10 \text{ V}, E = 0 \text{ lx}$	I_{ro}	-	0.1	5	nA
Open circuit voltage	$E_V = 100 \text{ lx}, \text{white LED 4300K}$	V_O	-	405	-	mV
Temperature coefficient of V_O	$E_V = 100 \text{ lx}, \text{white LED 4300K}$	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	$E_V = 100 \text{ lx}, \text{white LED 4300K}$	I_K	-	18	-	nA
Reverse light current	$E_V = 100 \text{ lx}, \text{white LED 4300K}, V_R = 5 \text{ V}$	I_{ra}	6	18	35	nA
	$E_V = 100 \text{ lx}, \text{CIE illuminant A}, V_R = 5 \text{ V}$	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		φ	-	± 52	-	°
Wavelength of peak sensitivity		λ_p	-	530	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	470 to 610	-	nm
Rise time	$V_R = 10 \text{ V}, R_L = 50 \Omega, \lambda = 530 \text{ nm}$	t_r	-	100	-	ns
Fall time	$V_R = 10 \text{ V}, R_L = 50 \Omega, \lambda = 530 \text{ nm}$	t_f	-	100	-	ns

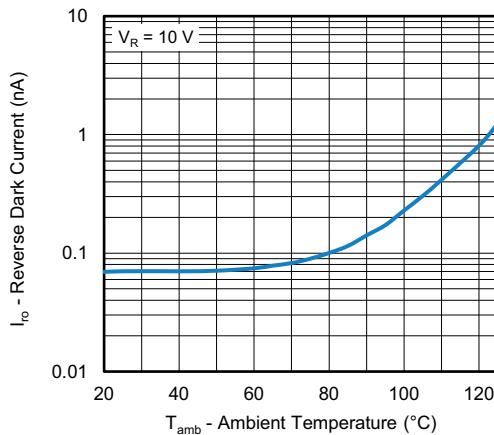
BASIC CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

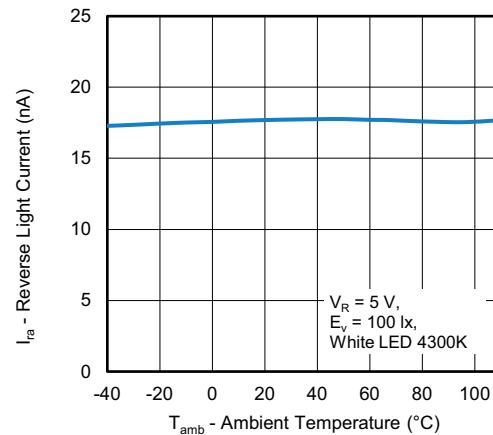


Fig. 2 - Reverse Light Current vs. Ambient Temperature

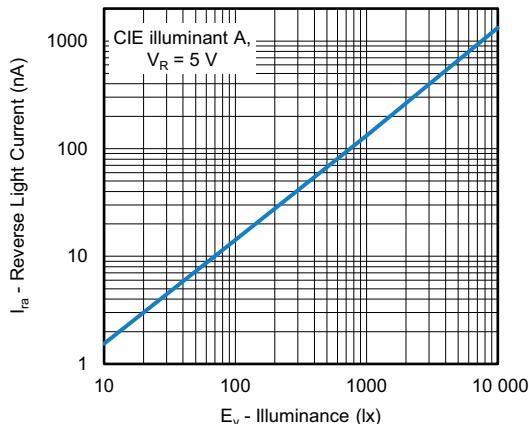


Fig. 3 - Reverse Light Current vs. Illuminance

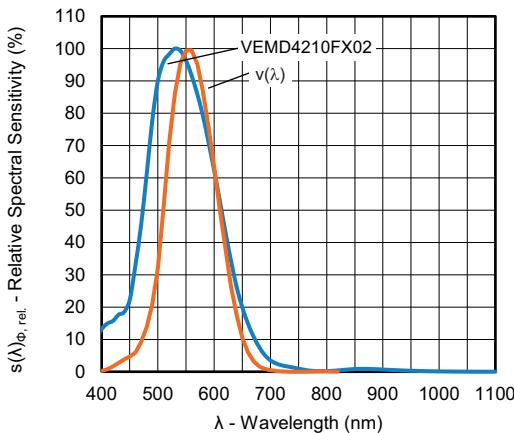


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

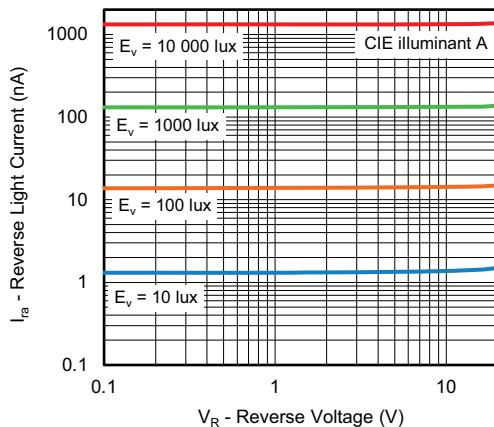


Fig. 4 - Reverse Light Current vs. Reverse Voltage

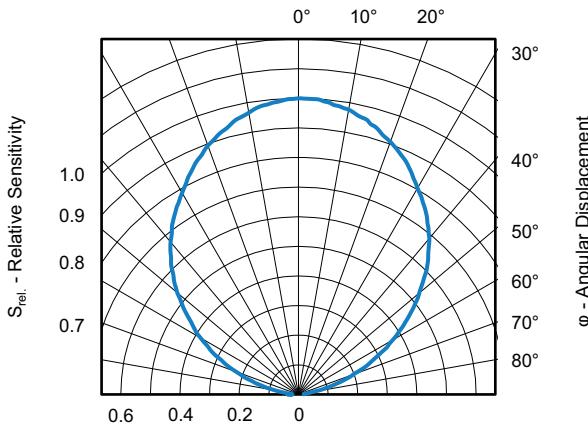


Fig. 7 - Relative Sensitivity vs. Angular Displacement

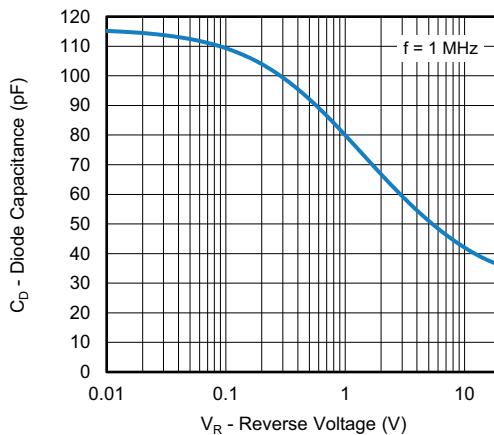
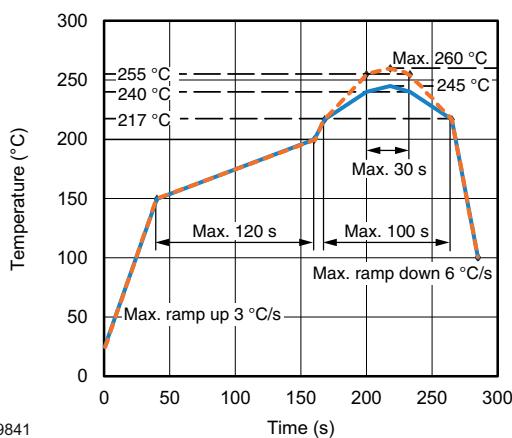


Fig. 5 - Diode Capacitance vs. Reverse Voltage

REFLOW SOLDER PROFILE



19841

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

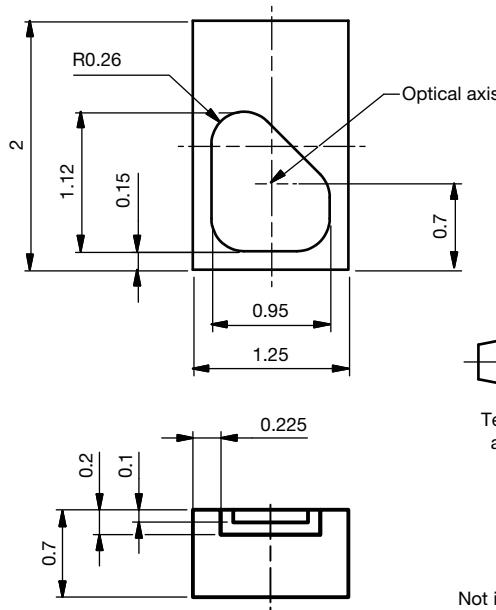
Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Moisture sensitivity: level 4

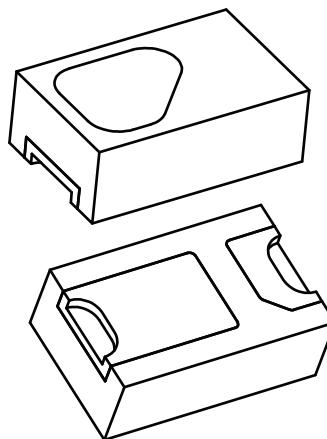
Floor life: 72 h

DRYING

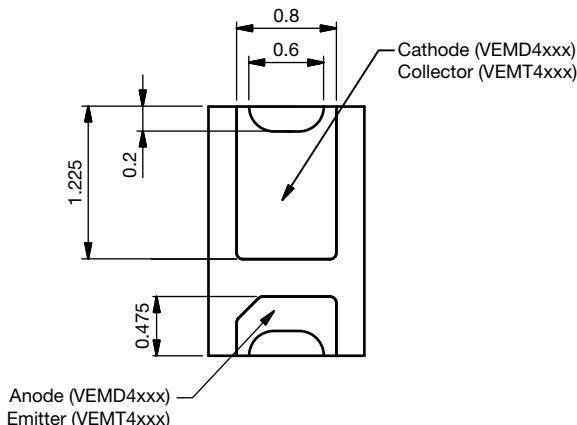
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

PACKAGE DIMENSIONS in millimeters


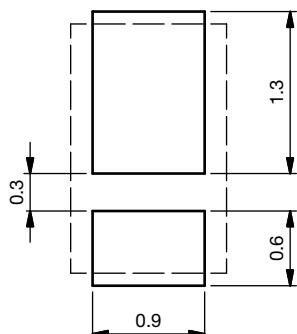
Technical drawings
according to DIN
specification



Not indicated tolerances ± 0.1



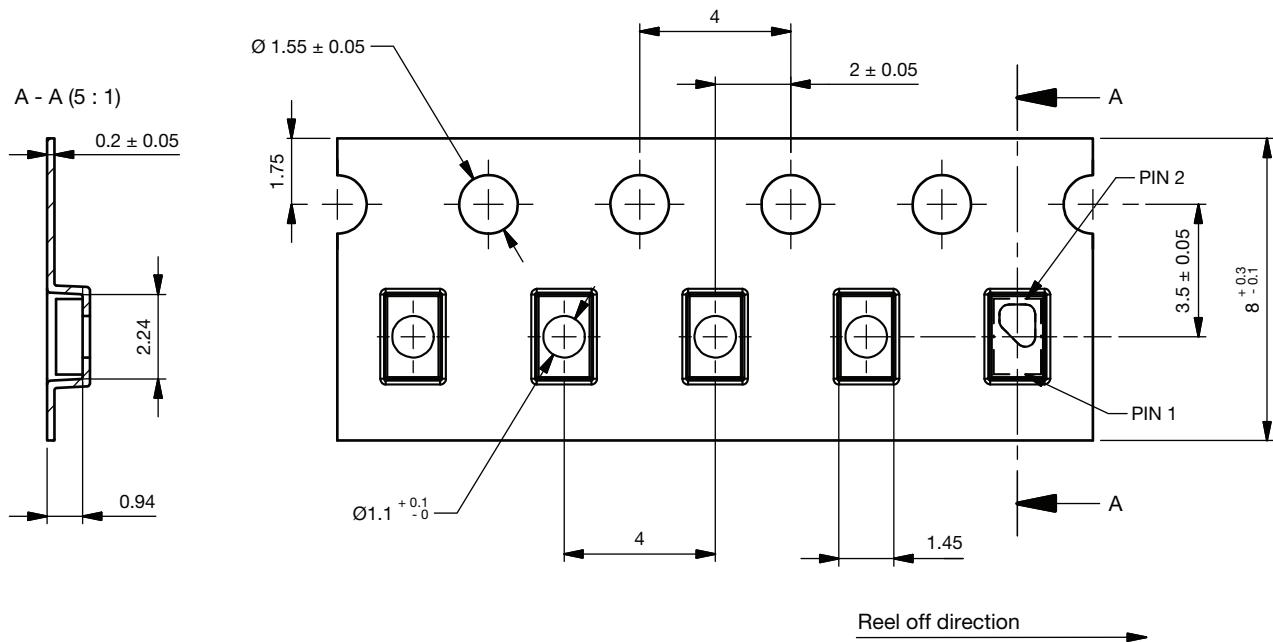
Recommended footprint



Drawing-No.: 6.550-5363.01-4

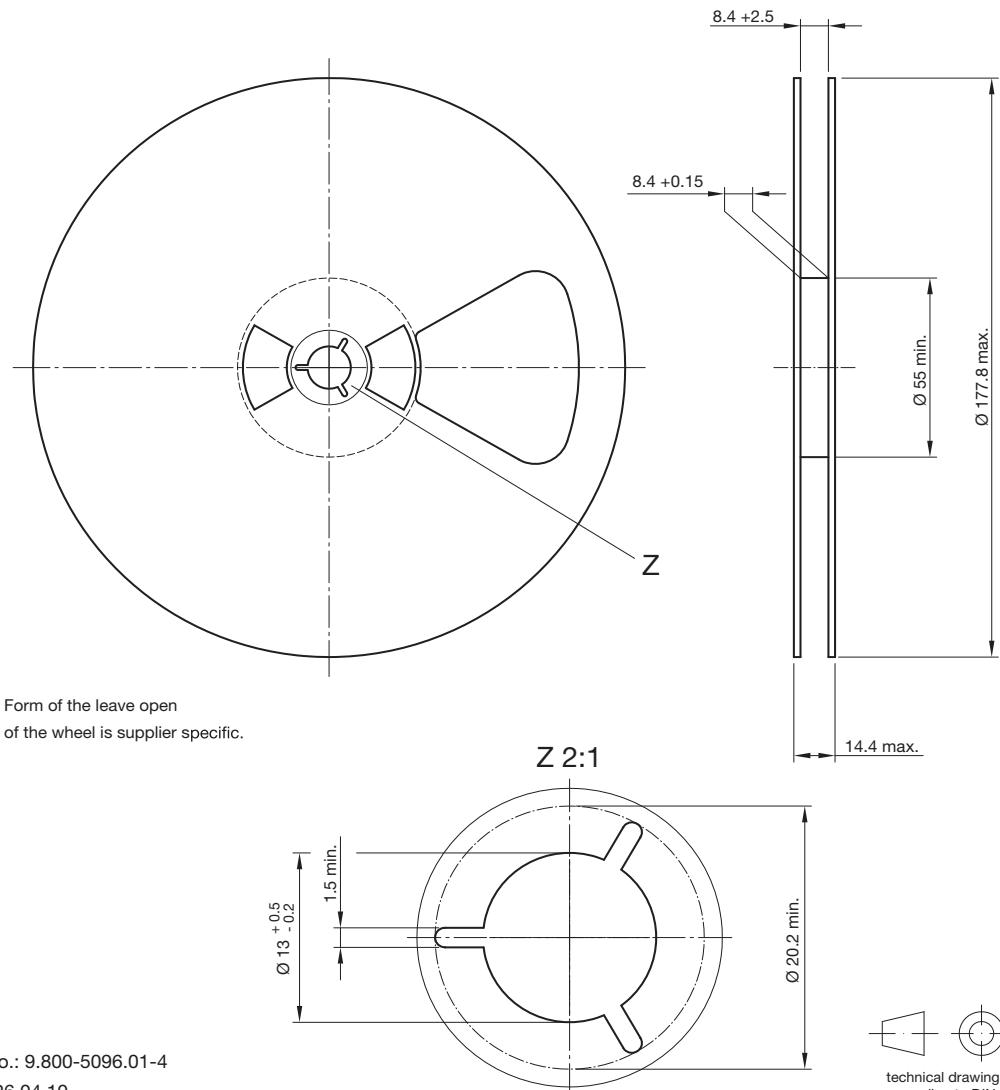
Issue: 2; 01.07.2020

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


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