

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: $\phi = \pm 55^\circ$
- 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



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)

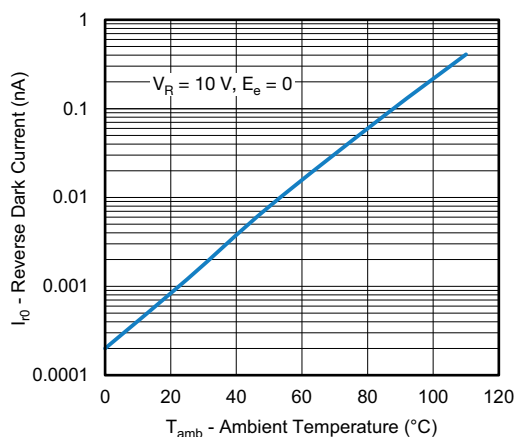


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

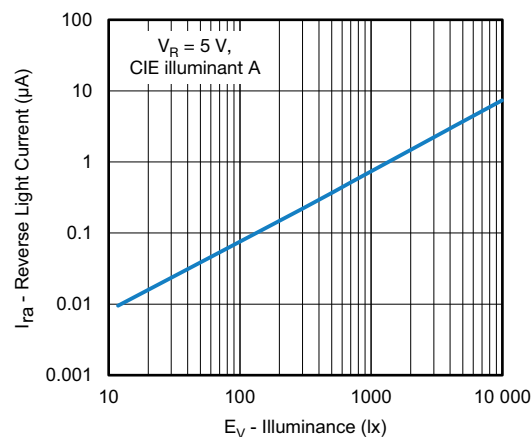


Fig. 3 - Reverse Light Current vs. Irradiance

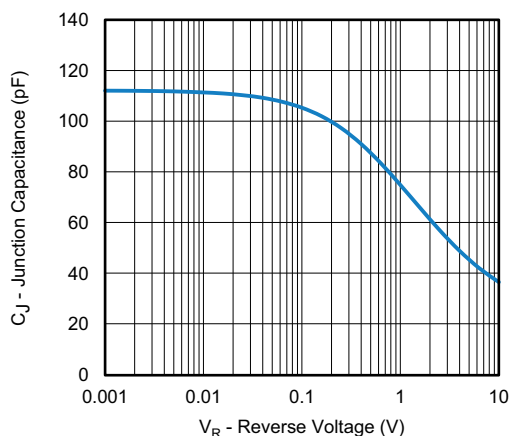


Fig. 2 - Diode Capacitance vs. Reverse Voltage

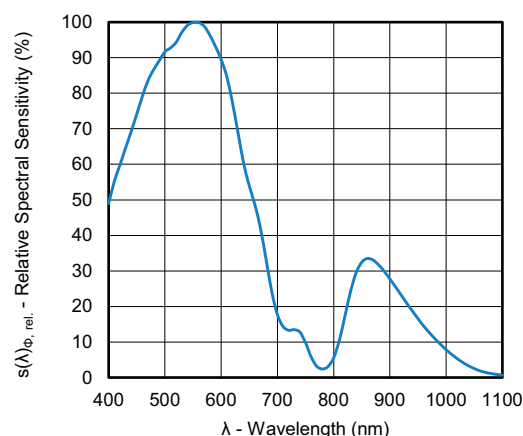


Fig. 4 - Relative Spectral Sensitivity vs. Wavelength

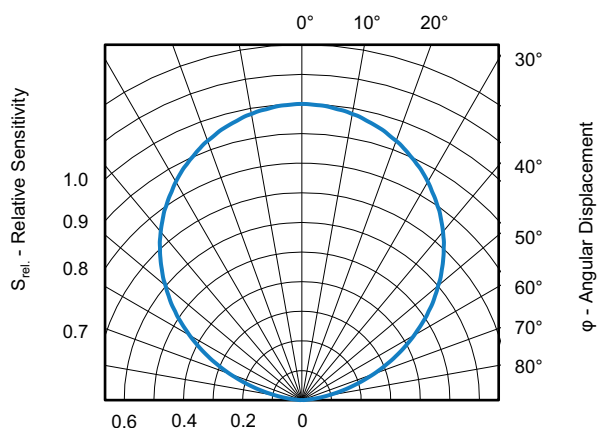


Fig. 5 - Relative Radiant Sensitivity vs. Angular Displacement

REFLOW SOLDER PROFILE

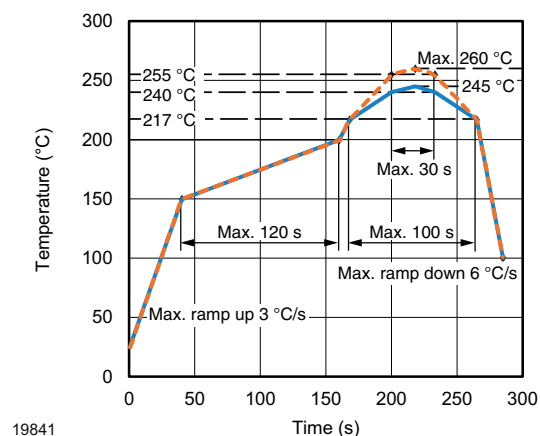


Fig. 6 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

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:

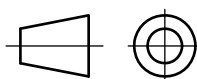
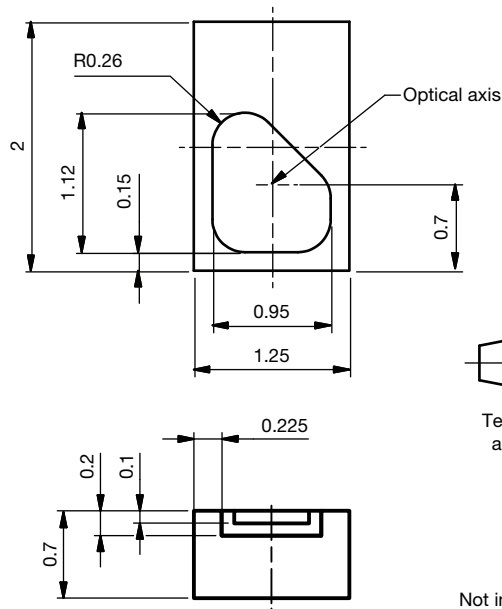
Floor life: 168 h

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

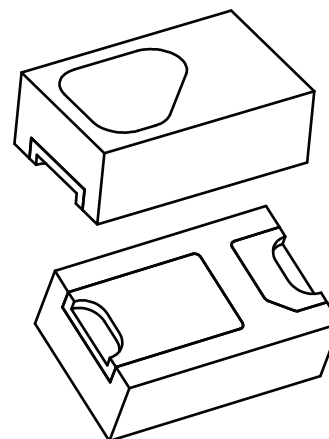
Moisture sensitivity level 3, according to J-STD-020.

DRYING

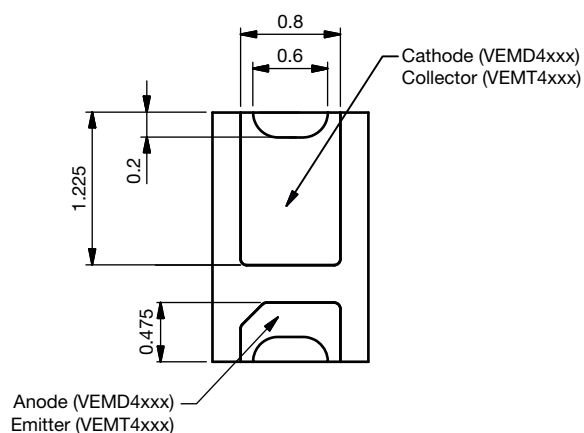
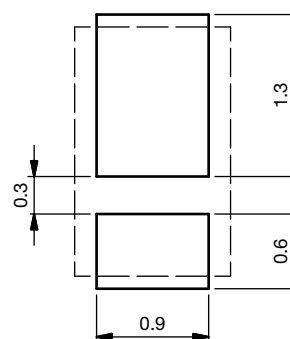
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40°C (+ 5°C), $RH < 5\%$.

PACKAGE DIMENSIONS in millimeters


Technical drawings
according to DIN
specification



Not indicated tolerances ± 0.1

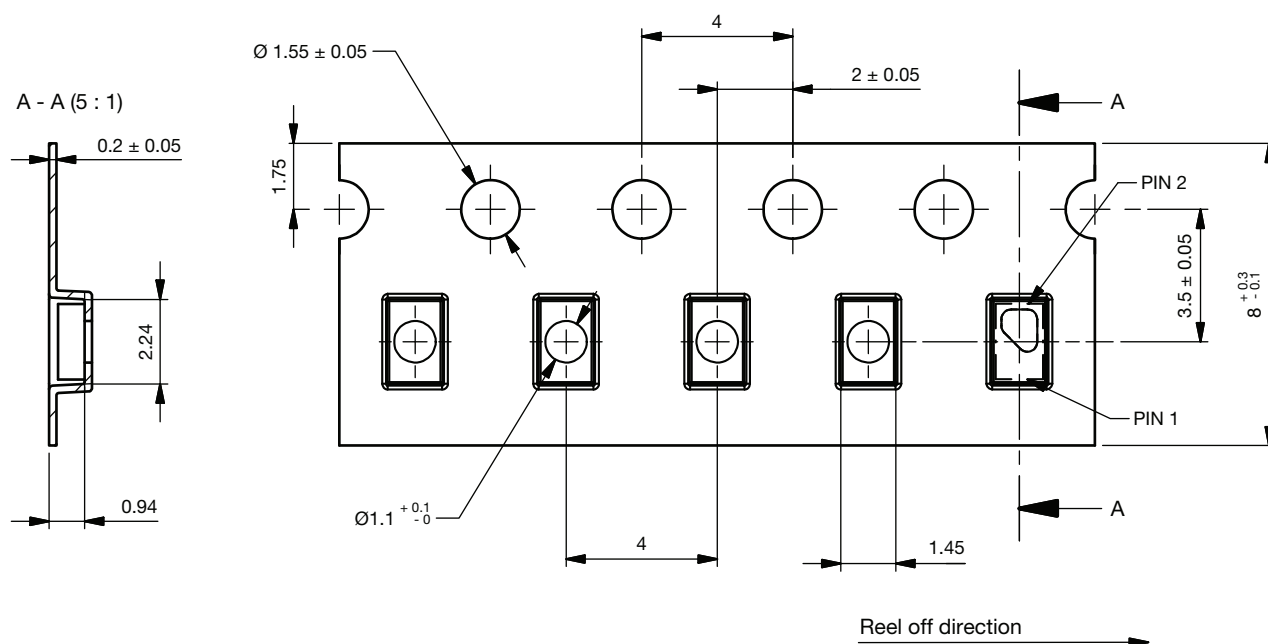

Recommended footprint


Drawing-No.: 6.550-5363.01-4

Issue: 2; 01.07.2020



BLISTER TAPE DIMENSIONS in millimeters

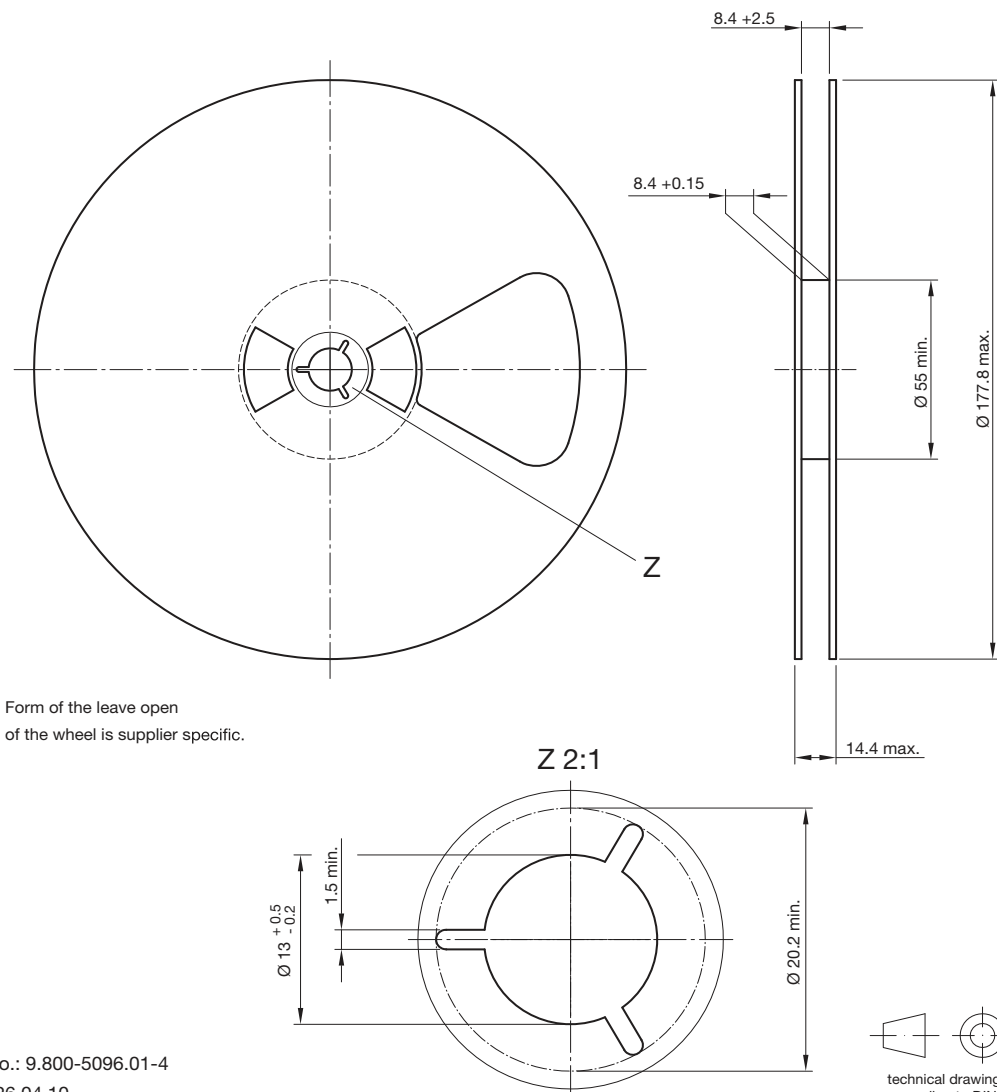


TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode

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

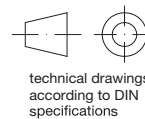


REEL DIMENSIONS in millimeters



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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