Ambient Light Sensor

FEATURES

- Package type: surface-mount
- Package form: top view
- Dimensions (L x W x H in mm): 5 x 4 x 0.9
- Radiant sensitive area (in mm^2): 7.5
- AEC-Q102 qualified
- Adapted to human eye responsitivity
- Angle of half sensitivity: φ = ± 58°
- Floor life: 72 h, MSL 4, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

VEMD5525FX02 is a PIN photodiode ambient light sensor. The photodiode detects visible light much like the human eye and has its peak sensitivity at 530 nm.

The VEMD5525FX02 uses a low profile surface-mount QFN package with wettable flanks for optical solder joint inspection.

APPLICATIONS

- Automotive
- Ambient light sensors

PRODUCT SUMMARY

COMPONENT	I_{ra} (µA) at E_V = 100 lx, CIE Illuminant A, V_R = 5 V	φ (°)	$\lambda_{0.5}$ (nm)
VEMD5525FX02	0.11	± 58	480 to 590

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD5525FX02	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Top view
VEMD5525FX02-GS15	Tape and reel	MOQ: 5000 pcs, 5000 pcs/reel	Top view

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	15	V
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. 7	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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Forward voltage	I_F = 50 mA	V_F	-	0.8	1.3	V
Reverse dark current	V_R = 5 V, E = 0	I_{ro}	-	0.2	10	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	930	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	637	-	pF
Open circuit voltage	E_e = 1 mW/cm², λ = 530 nm	V_O	-	487	-	mV
Temperature coefficient of V_O	E_e = 1 mW/cm², λ = 530 nm	TK_{VO}	-	-2.4	-	mV/K
Short circuit current	E_e = 1 mW/cm², λ = 530 nm	I_K	-	8.8	-	µA
Temperature coefficient of I_K	E_e = 1 mW/cm², λ = 530 nm	TK_{IK}	-	0.1	-	%/K
Reverse light current	E_e = 0.25 mW/cm², λ = 530 nm, V_R = 5 V	I_{ra}	1.5	2.7	4.0	µA
	E_V = 100 lx, CIE illuminant A, V_R = 5 V	I_{ra}	-	0.11	-	µA
	E_V = 1000 lx, white LED 4300 K, V_R = 5 V	I_{ra}	0.7	1.9	3.3	µA
Temperature coefficient of I_{ra}	E_e = 1 mW/cm², λ = 530 nm, V_R = 5 V	TK_{Ira}	-	0.1	-	%/K
Angle of half sensitivity		φ	-	± 58	-	°
Wavelength of peak sensitivity		λ_p	-	530	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	480 to 590	-	nm
Rise time	V_R = 10 V, R_L = 50 Ω, λ = 530 nm	t_r	-	500	-	ns
Fall time	V_R = 10 V, R_L = 50 Ω, λ = 530 nm	t_f	-	500	-	ns

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

Basic characteristics graphs to be extended to 110 °C ambient temperatures where applicable.

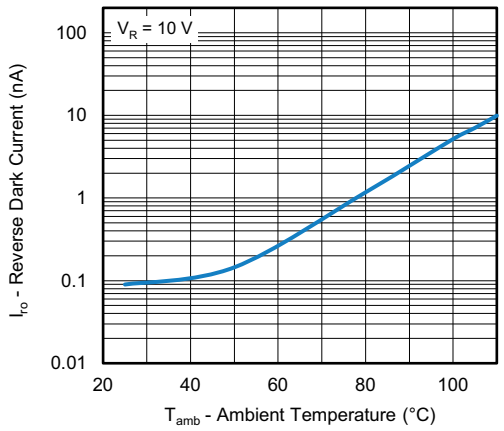


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

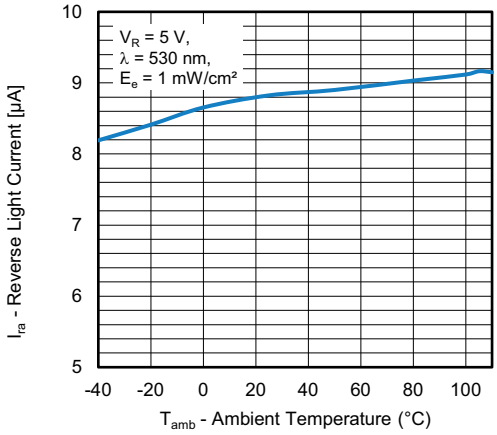


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

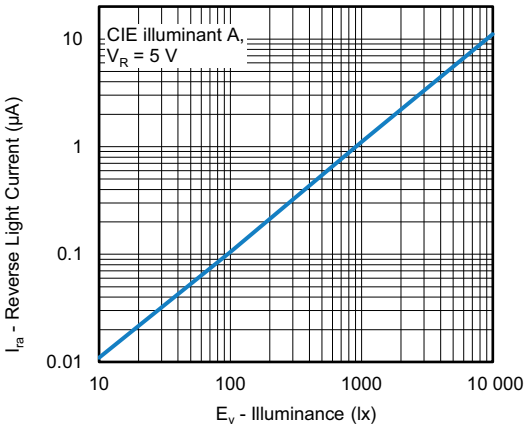


Fig. 3 - Reverse Light Current vs. Illuminance

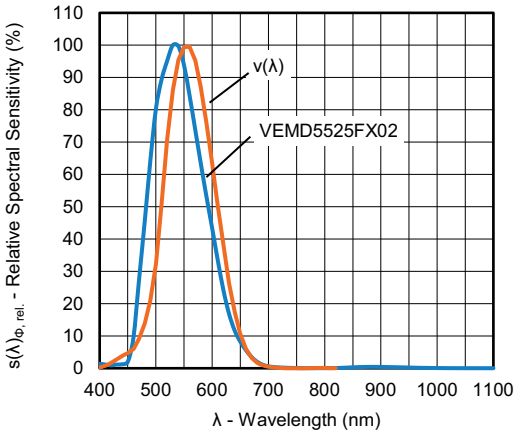


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

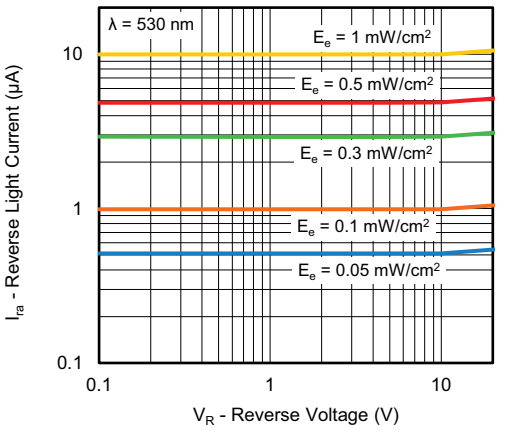


Fig. 4 - Reverse Light Current vs. Reverse Voltage

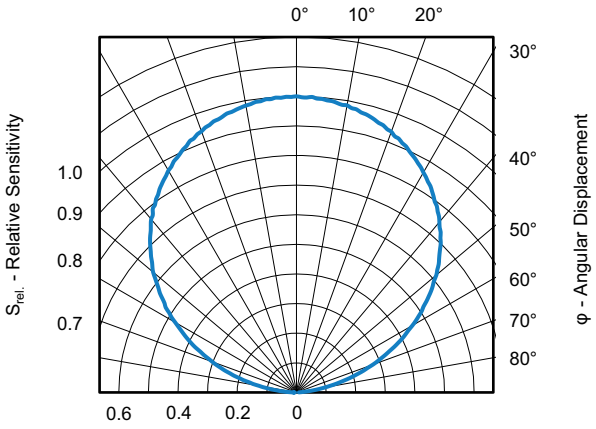
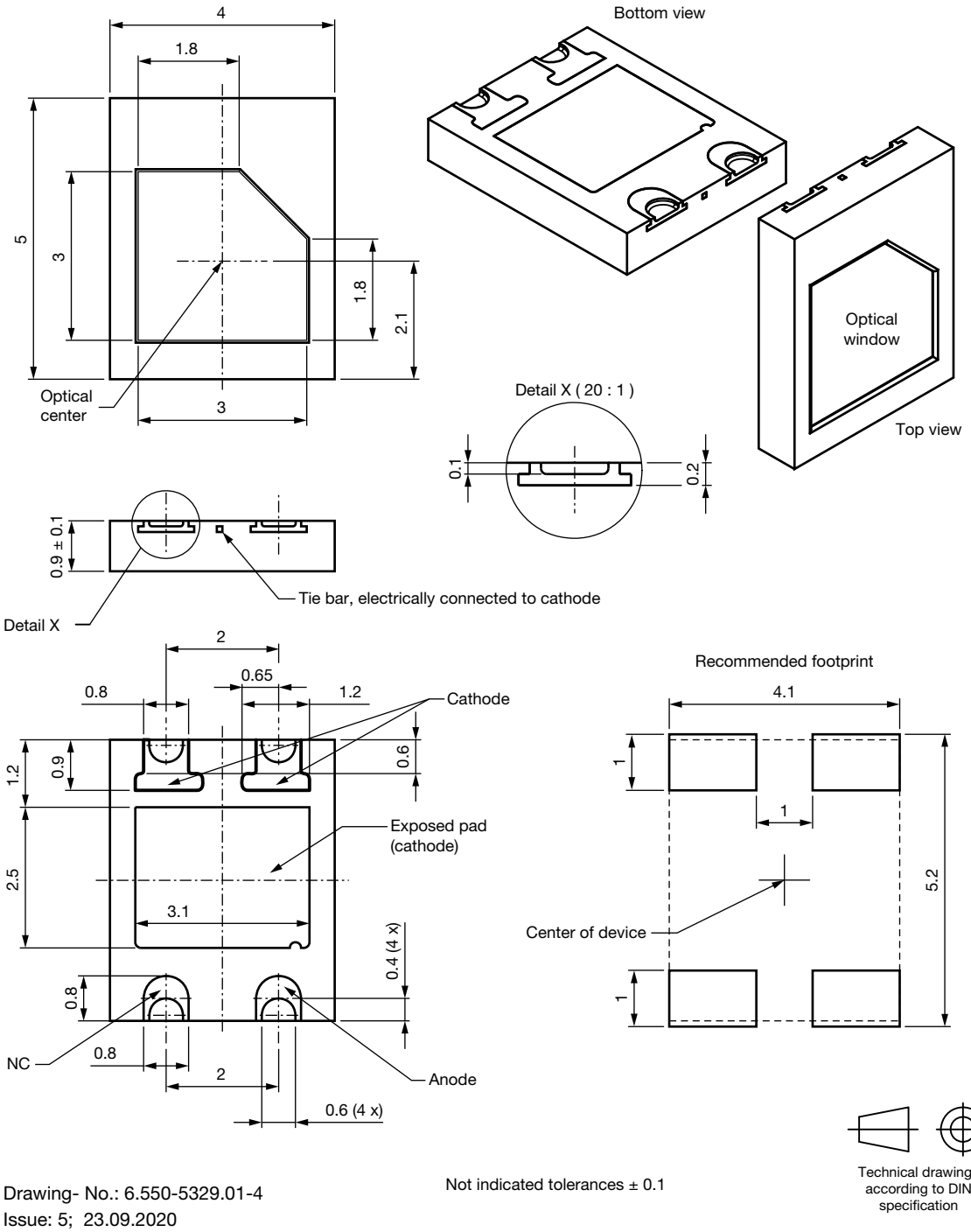


Fig. 6 - Relative Sensitivity vs. Angular Displacement

PACKAGE DIMENSIONS in millimeters

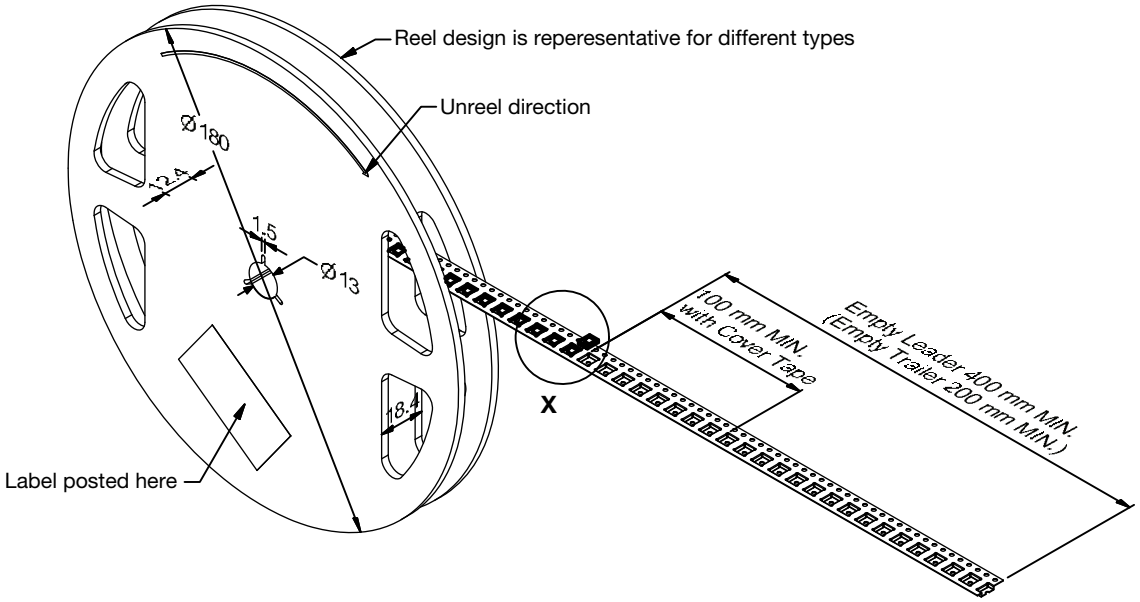


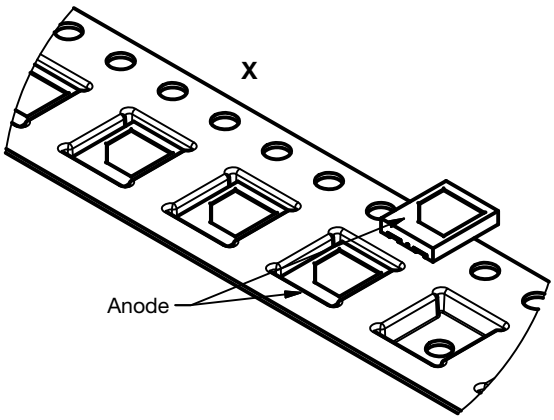
Drawing- No.: 6.550-5329.01-4
Issue: 5; 23.09.2020

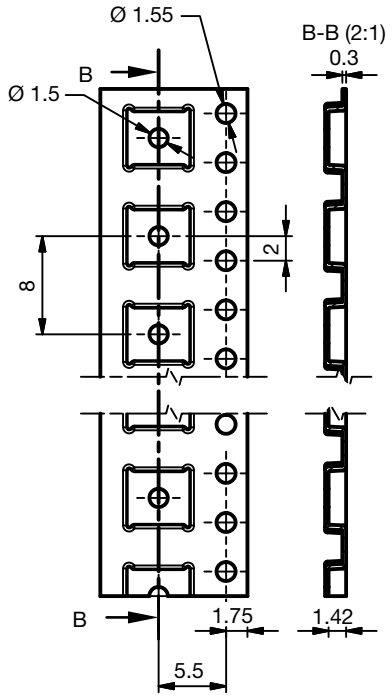
Not indicated tolerances ± 0.1

Technical drawings according to DIN specification

TAPE AND REEL DIMENSIONS in millimeters







Drawing-No.: 9.800-5129.01-4;
Issue: 2; 23.09.2020

SOLDER PROFILE

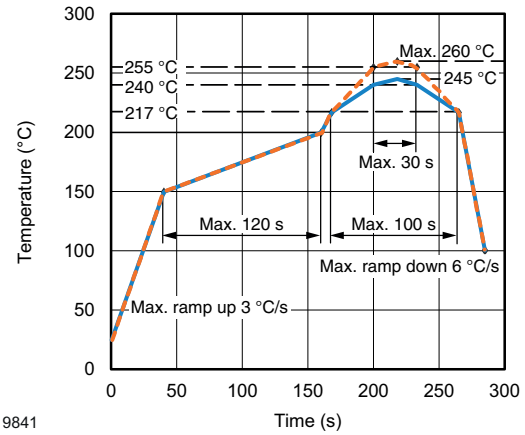


Fig. 7 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020D

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 4

Floor life: 72 h

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

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or recommended conditions:

192 h at 40 °C (+ 5 °C), RH < 5 %
or
96 h at 60 °C (+ 5 °C), RH < 5 %

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