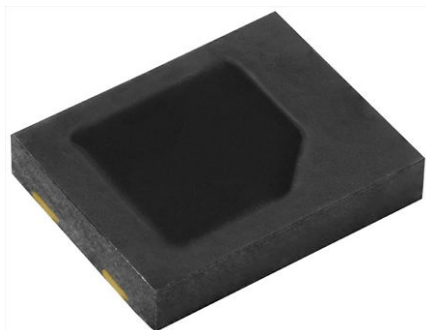


Silicon PIN Photodiode



DESCRIPTION

VEMD5160X01 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface mount device (SMD) including the chip with a 7.5 mm² sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength 850 nm or 890 nm.

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 mm²): 7.5
- AEC-Q101 qualified
- Daylight blocking filter matched with 850 nm to 890 nm emitters
- High radiant sensitivity
- Excellent I_{ra} linearity
- Fast response times
- Angle of half sensitivity: $\phi = \pm 65^\circ$
- 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

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- High speed photo detector
- Small signal detection
- Proximity sensors

PRODUCT SUMMARY

COMPONENT	I_{ra} (μA)	ϕ (deg)	$\lambda_{0.1}$ (nm)
VEMD5160X01	26	± 65	700 to 1070

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD5160X01	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Top view
VEMD5160X01-GS15	Tape and reel	MOQ: 5000 pcs, 5000 pcs/reel	Top view

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	20	V
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_V	240	mW
Junction temperature		T_j	110	$^\circ\text{C}$
Operating temperature range		T_{amb}	-40 to +110	$^\circ\text{C}$
Storage temperature range		T_{stg}	-40 to +110	$^\circ\text{C}$
Soldering temperature	According to reflow solder profile fig. 8	T_{sd}	260	$^\circ\text{C}$
Thermal resistance junction / ambient	According to EIA / JESD51	R_{thJA}	350	K/W
ESD safety HBM	$\pm 2000\text{ V}$, 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
Forward voltage	$I_F = 50\text{ mA}$	V_F	-	0.8	1.0	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$, $E = 0$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$, $E = 0$	I_{r0}	-	0.2	10	nA
Diode capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_D	-	80	-	pF
	$V_R = 3\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_D	-	35	40	pF
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$	V_o	-	350	-	mV
Temperature coefficient of V_o	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$	TK_{V_o}	-	-2.6	-	mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$	I_k	-	26	-	μA
Temperature coefficient of I_k	$E_e = 1\text{ mW/cm}^2$, $\lambda = 835\text{ nm}$	TK_{I_k}	-	0.1	-	%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	20	26	31	μA
	$E_e = 1\text{ mW/cm}^2$, $\lambda = 890\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	-	38	-	μA
Angle of half sensitivity		ϕ	-	± 65	-	deg
Wavelength of peak sensitivity		λ_p	-	840	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	700 to 1070	-	nm
Rise time	$V_R = 5\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 820\text{ nm}$	t_r	-	30	-	ns
Fall time	$V_R = 5\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 820\text{ nm}$	t_f	-	30	-	ns

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

Basic characteristics graphs to be extended to $110\text{ }^{\circ}\text{C}$ ambient temperatures where applicable.

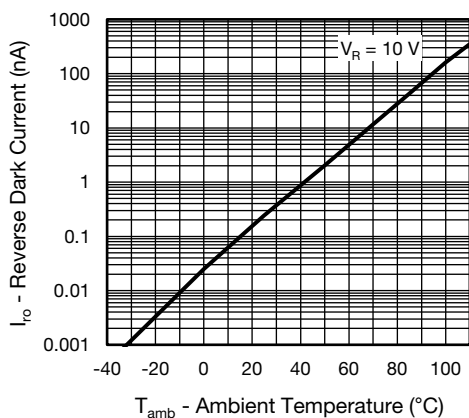


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

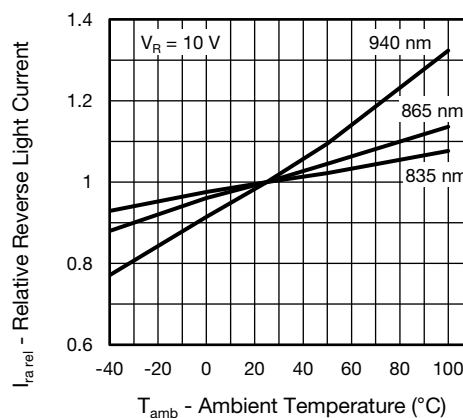


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

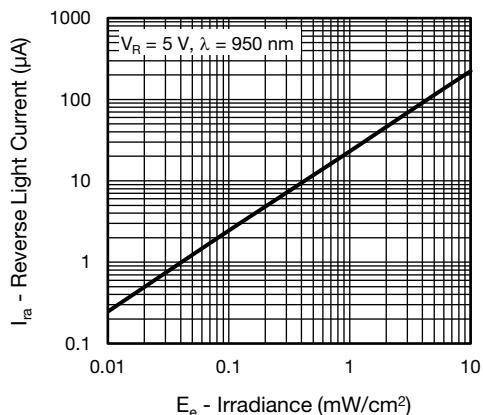


Fig. 3 - Reverse Light Current vs. Irradiance

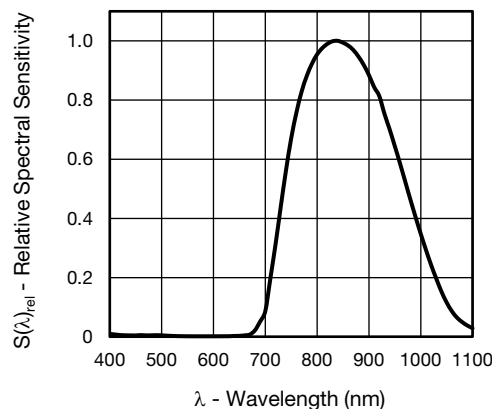


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

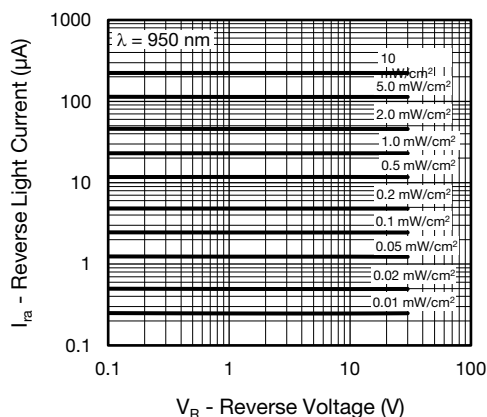


Fig. 4 - Reverse Light Current vs. Reverse Voltage

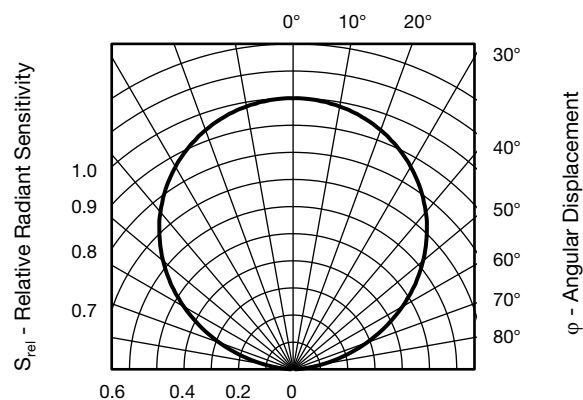


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

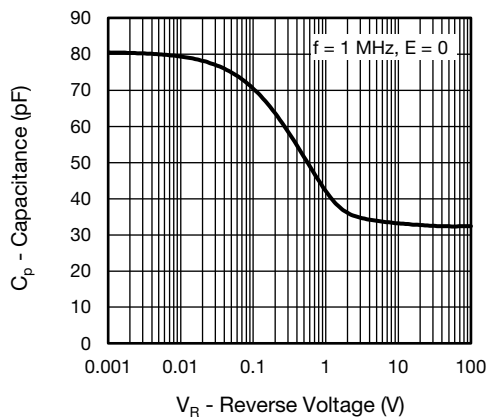
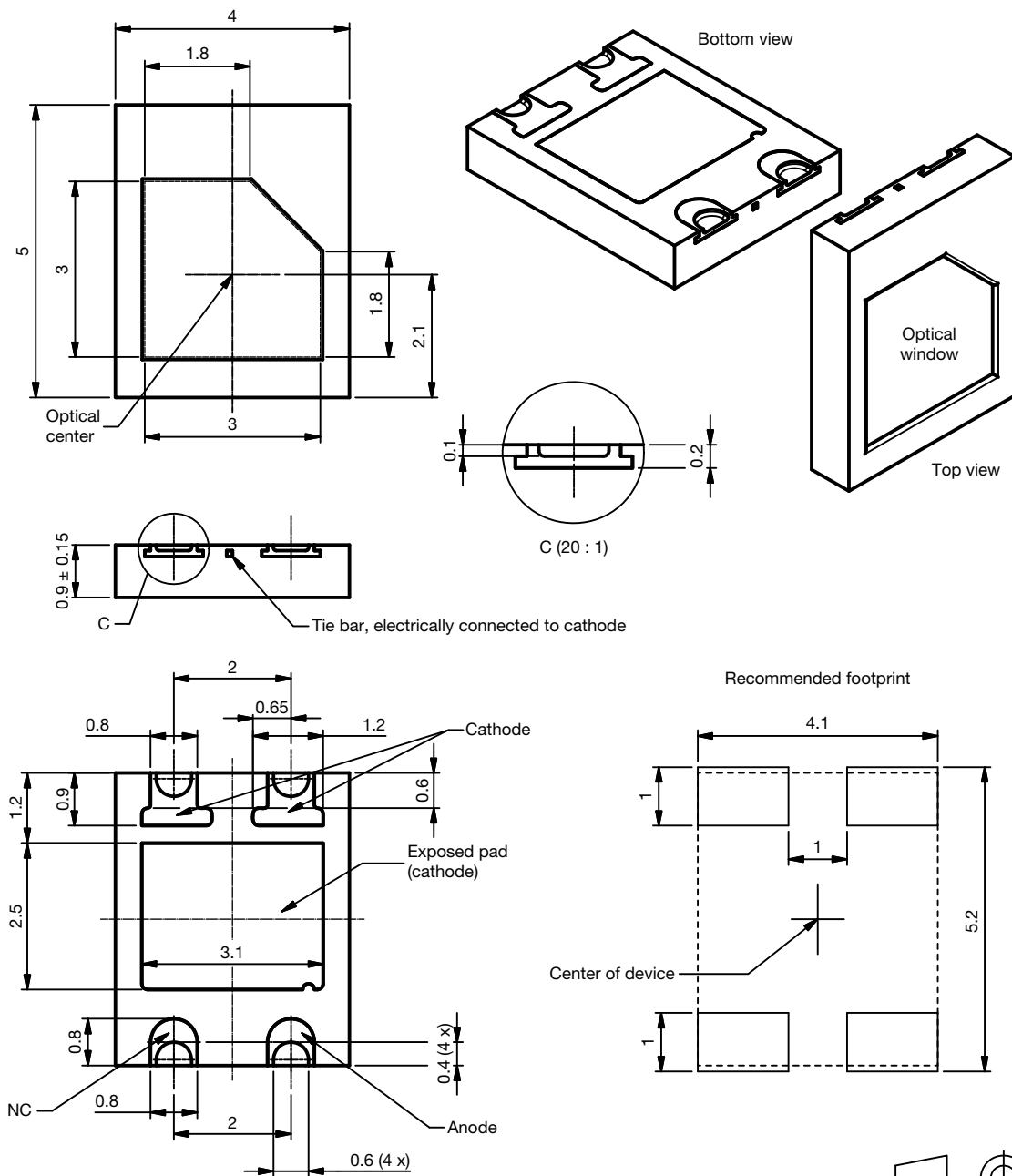
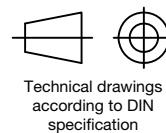


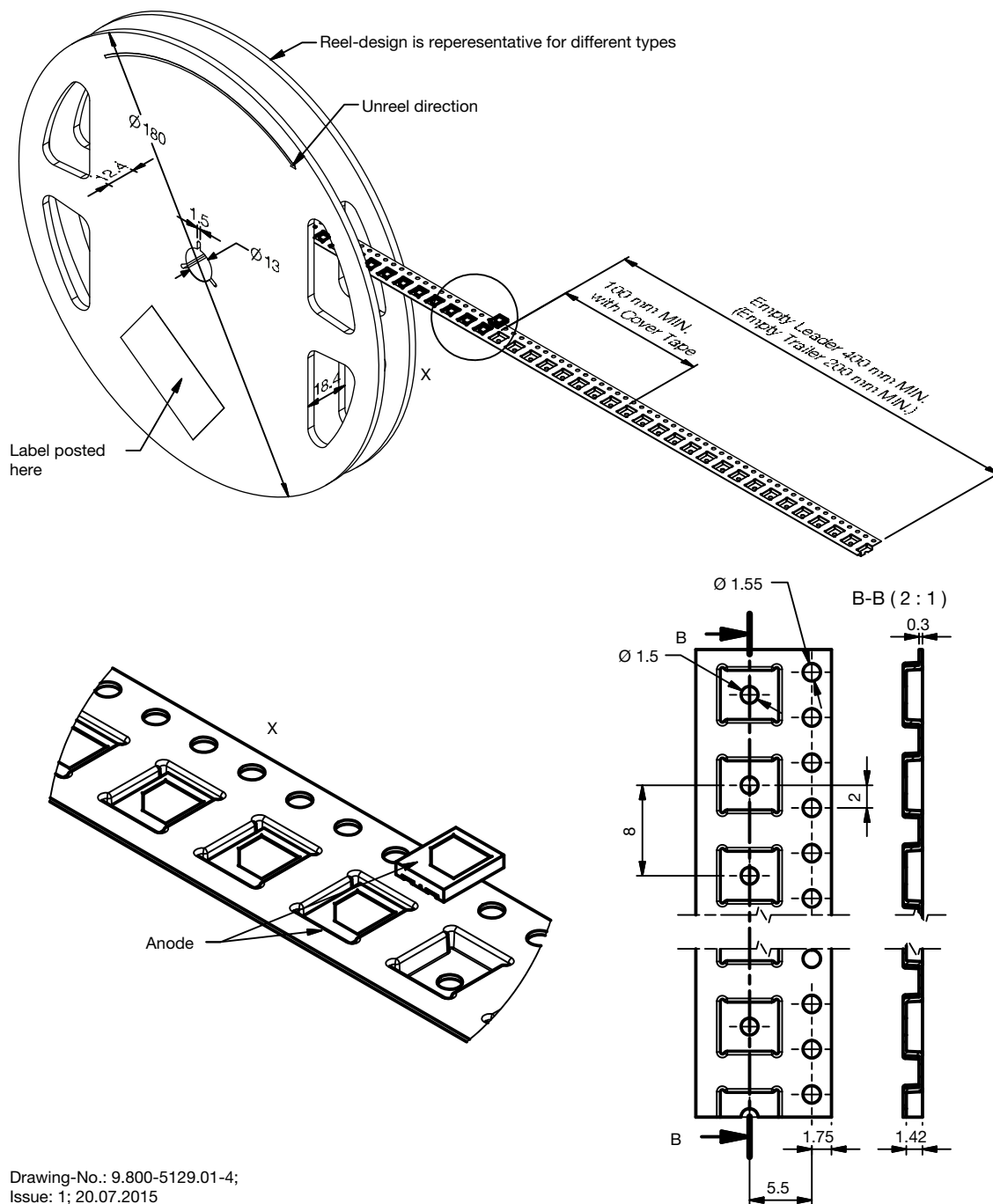
Fig. 5 - Diode Capacitance vs. Reverse Voltage

PACKAGE DIMENSIONS in millimeters


Drawing- No.: 6.550-5329.01-4

Issue: 2; 03.03.2016

Not indicated tolerances ± 0.1


TAPE AND REEL DIMENSIONS in millimeters


Drawing-No.: 9.800-5129.01-4;
Issue: 1; 20.07.2015

SOLDER PROFILE

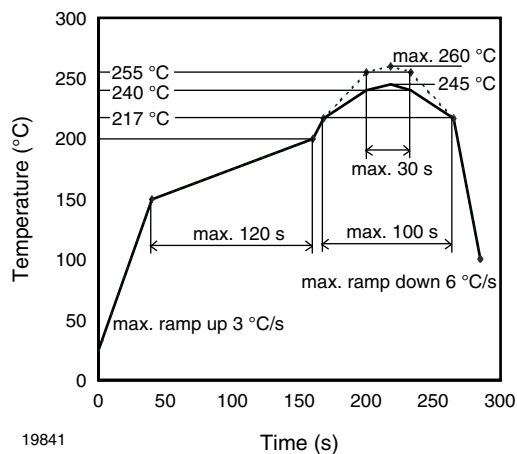


Fig. 8 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020D

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

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

192 h at $40\text{ °C} (+ 5\text{ °C})$, $RH < 5\%$

or

96 h at $60\text{ °C} (+ 5\text{ °C})$, $RH < 5\%$.



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