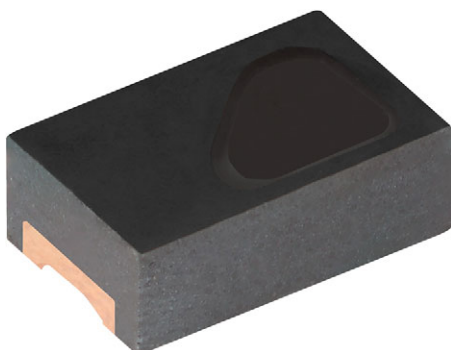


Silicon PIN Photodiode



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): 0.375
- Ambient temperature range: T_{OP} = -40 °C to +125 °C
- Angle of half sensitivity: $\phi = \pm 56^\circ$
- Floor life: 4 weeks, MSL2a, 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

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

The VEMD4160X02 is a high speed and high sensitive PIN photodiode with a highly linear photoresponse. It is a low profile surface-mount device (SMD) with a 0.375 mm² sensitive area and a daylight blocking filter matched with IR emitters operating at wavelengths of 850 nm or 950 nm.

APPLICATIONS

- High speed photo detector
- Photo interrupters
- Automotive sensors
- [Hygienic applications](#)

PRODUCT SUMMARY

COMPONENT	I _{ra} (μA)	φ (°)	λ _{0.5} (nm)
VEMD4160X02	1.4	± 56	730 to 960

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD4160X02	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
Ambient temperature range		T _{amb}	-40 to +125	°C
Storage temperature range		T _{stg}	-40 to +125	°C
Soldering temperature	According to reflow solder profile Fig. 8	T _{sd}	260	°C

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	-	1.0	1.3	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$, $E = 0\text{ mW/cm}^2$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$, $E = 0$	I_{ro}	-	-	2	nA
Diode capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ mW/cm}^2$	C_D	-	7.8	-	pF
Short circuit current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 940\text{ nm}$	I_k	-	1.5	-	μA
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$, $\lambda = 940\text{ nm}$	V_O	-	354	-	mV
Temperature coefficient of I_k	$E_e = 1\text{ mW/cm}^2$, $\lambda = 940\text{ nm}$	TK_{I_k}	-	0.37	-	%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2$, $\lambda = 850\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	1.6	2.2	2.8	μA
	$E_e = 1\text{ mW/cm}^2$, $\lambda = 940\text{ nm}$, $V_R = 5\text{ V}$	I_{ra}	1.0	1.4	1.9	μA
Angle of half sensitivity		ϕ	-	± 56	-	$^{\circ}$
Wavelength of peak sensitivity		λ_p	-	830	-	nm
Range of spectral bandwidth	$S_{rel} > 0.5$	$\lambda_{0.5}$	-	730 to 960	-	nm
Rise time	$V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 890\text{ nm}$	t_r	-	160	-	ns
Fall time	$V_R = 10\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 890\text{ nm}$	t_f	-	125	-	ns

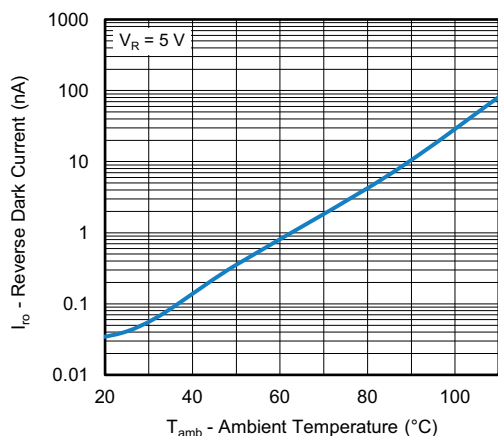
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

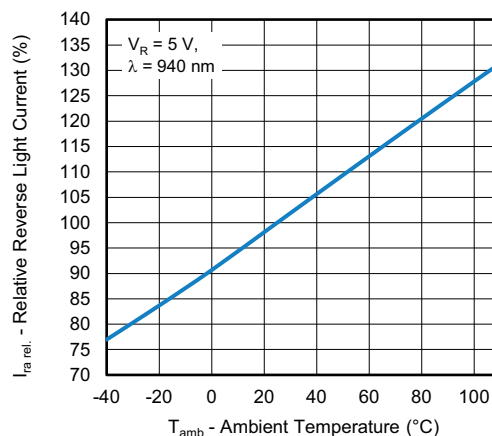


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

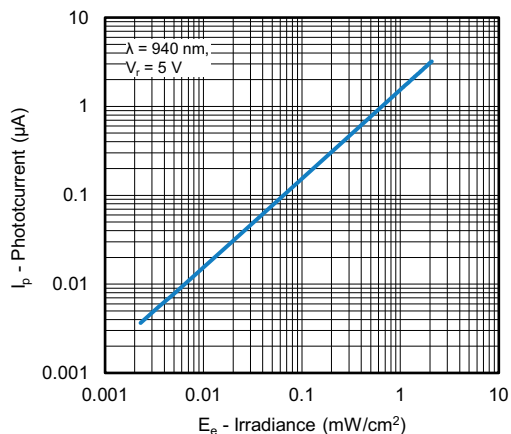


Fig. 3 - Reverse Light Current vs. Irradiance

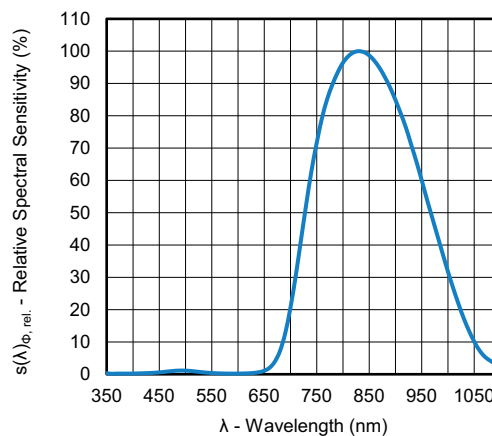


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

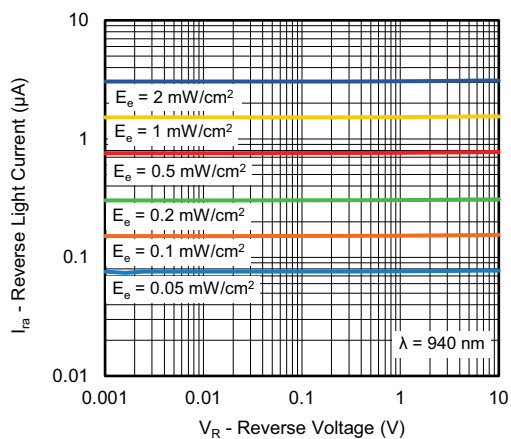


Fig. 4 - Reverse Light Current vs. Reverse Voltage

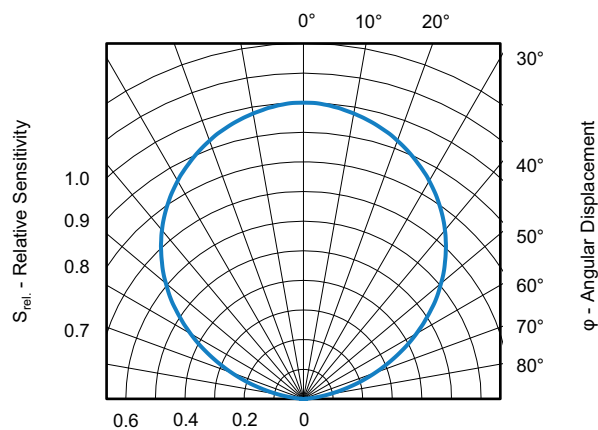


Fig. 7 - Relative Sensitivity vs. Angular Displacement

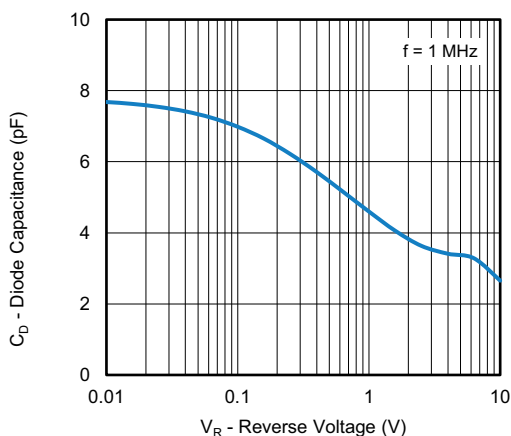


Fig. 5 - Diode Capacitance vs. Reverse Voltage

REFLOW SOLDER PROFILE

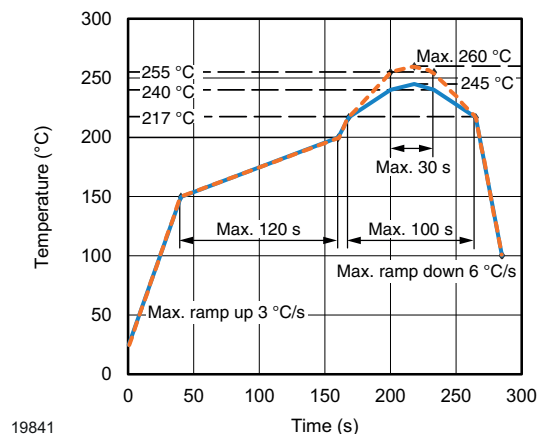


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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:

Floor life: 4 weeks

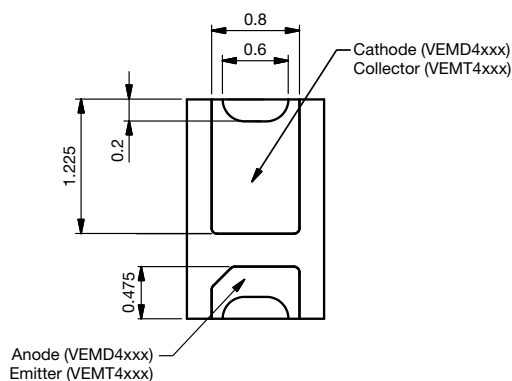
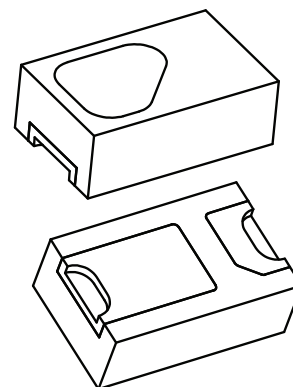
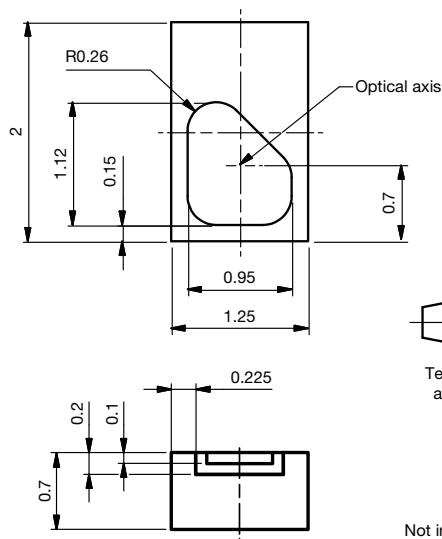
Conditions: $T_{amb} < 30\text{ °C}$, $RH < 60\%$

Moisture sensitivity level 2a, according to J-STD-020.

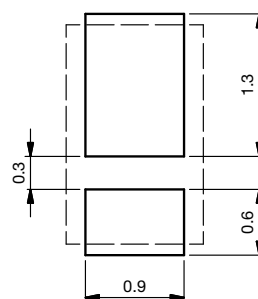
DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C ($+5\text{ °C}$), $RH < 5\%$.

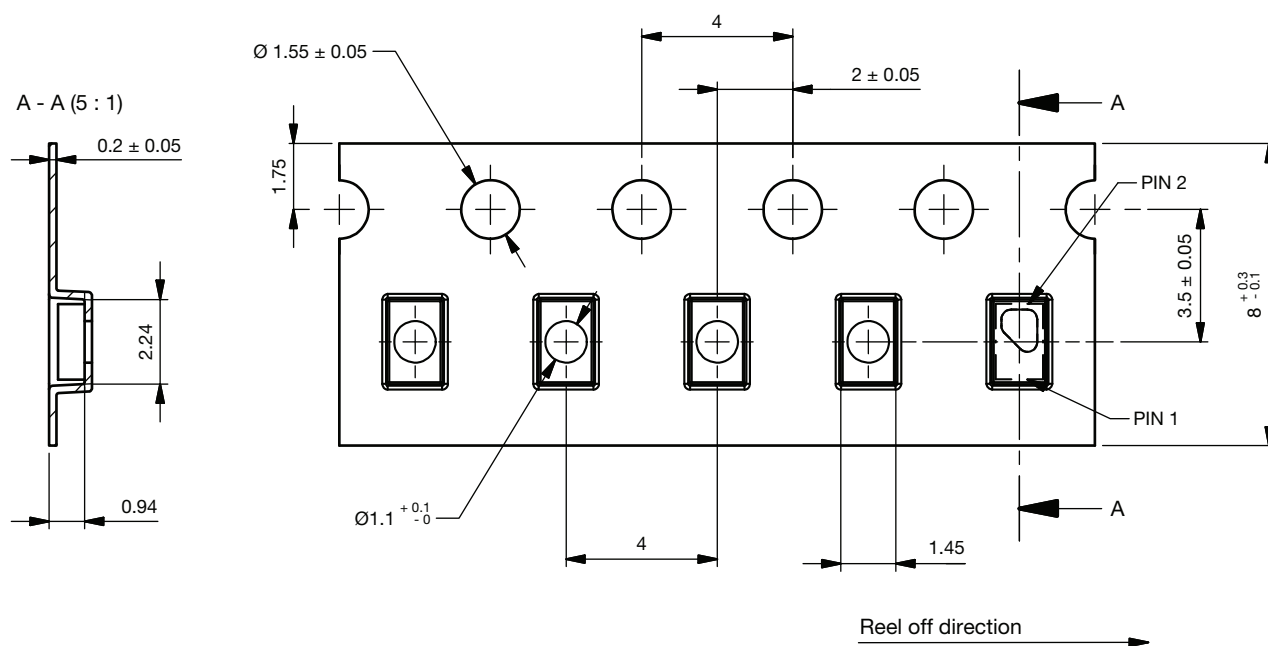
PACKAGE DIMENSIONS in millimeters



Recommended footprint



Drawing-No.: 6.550-5363.01-4
Issue: 2; 01.07.2020

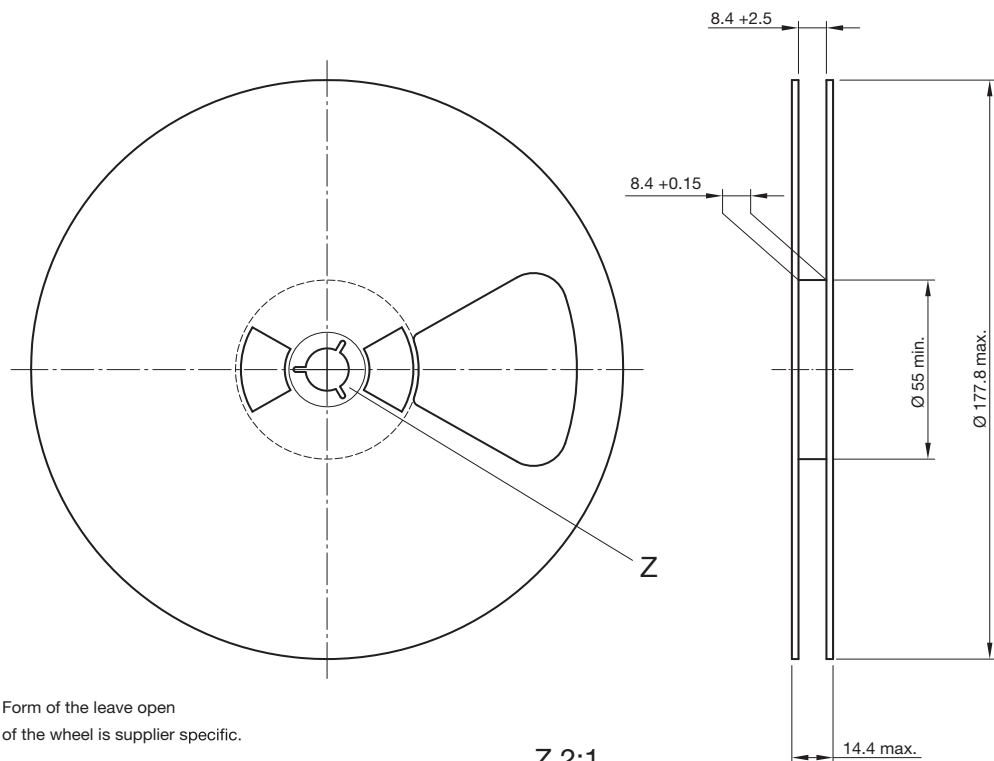
BLISTER TAPE DIMENSIONS in millimeters

TYPE	PIN 1	PIN 2
VEMD4xxx	Anode	Cathode

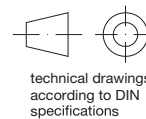
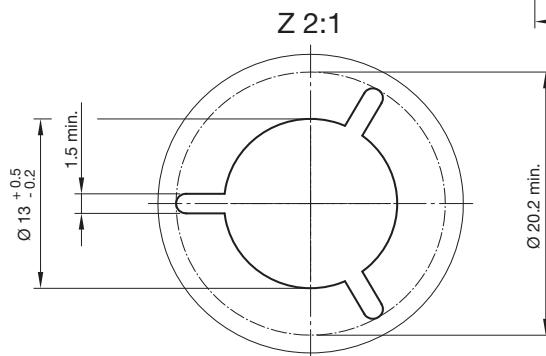
Drawing-No.: 9.700-5411.0-4
Issue: 1_A; 11.10.2022



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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