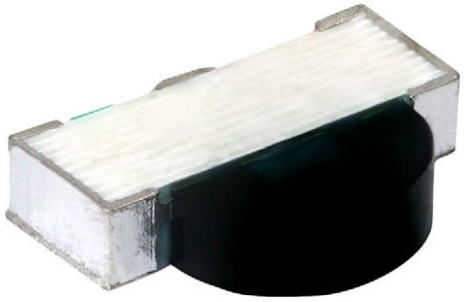
Silicon PIN Photodiode



FEATURES

- Package type: surface mount
- Package form: Side view
- Dimensions (L x W x H in mm): 3 x 2 x 0.6
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- Angle of half sensitivity: φ = ± 75°
- Package matched with IR emitter VSMB11940X01
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

VEMD11940FX01 is a high speed and high sensitive PIN photodiode in a miniature side looking, surface mount package (SMD) with daylight blocking filter. Filter is matched with IR emitters operating at wavelength of 830 nm to 950 nm. The photo sensitive area of the chip is 0.053 mm^2.

APPLICATIONS

- High speed photo detector
- Infrared remote control
- Infrared data transmission
- Photo interrupters
- IR touch panels

PRODUCT SUMMARY			
COMPONENT	**I_{ra} (µA)**	**φ (deg)**	**$\lambda_{0.5}$ (nm)**
VEMD11940FX01	1.13	± 75	780 to 1050

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	**PACKAGING**	**REMARKS**	**PACKAGE FORM**
VEMD11940FX01	Tape and reel	MOQ: 4000 pcs, 4000 pcs/reel	Side 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	60	V
Power dissipation	$T_{amb} \leq 25$ °C	P_V	104	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg}	-40 to +100	°C
Soldering temperature	According to reflow solder profile fig. 8	T_{sd}	260	°C
Thermal resistance junction / ambient	According to J-STD-051	R_{thJA}	580	K/W

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	-	1.7	-	V
Breakdown voltage	I_R = 100 µA, E = 0	$V_{(BR)}$	32	-	-	V
Reverse dark current	V_R = 10 V, E = 0	I_{ro}	-	< 1	10	nA
Diode capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D	-	1.1	-	pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D	-	0.5	-	pF
Open circuit voltage	E_e = 1 mW/cm², λ = 950 nm	V_o	-	350	-	mV
Temperature coefficient of V_o	E_e = 1 mW/cm², λ = 950 nm	TK_{Vo}	-	-2.7	-	mV/K
Short circuit current	E_e = 1 mW/cm², λ = 950 nm	I_k	-	1.13	-	µA
Temperature coefficient of I_k	E_e = 1 mW/cm², λ = 950 nm	TK_{Ik}	-	0.1	-	%/K
Reverse light current	E_e = 1 mW/cm², λ = 950 nm, V_R = 5 V	I_{ra}	0.8	1.13	1.8	µA
Angle of half sensitivity		φ	-	± 75	-	deg
Wavelength of peak sensitivity		λ_p	-	950	-	nm
Range of spectral bandwidth		$\lambda_{0.5}$	-	780 to 1050	-	nm
Rise time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_r	-	100	-	ns
Fall time	V_R = 10 V, R_L = 1 kΩ, λ = 820 nm	t_f	-	100	-	ns

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

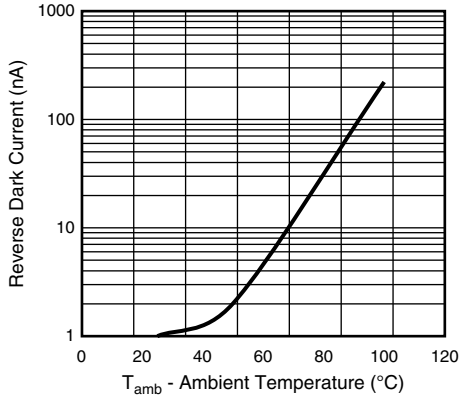


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

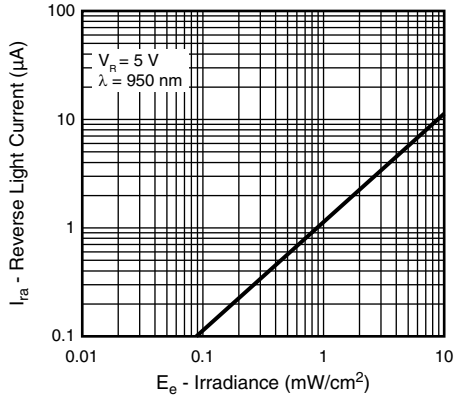


Fig. 3 - Reverse Light Current vs. Irradiance

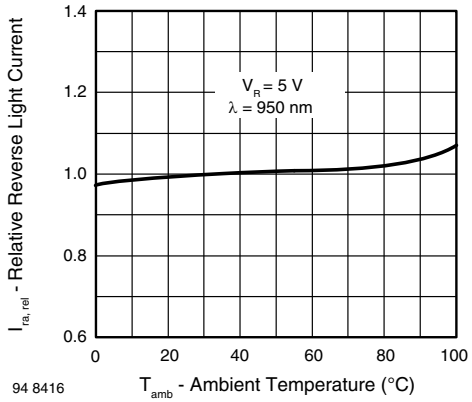


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

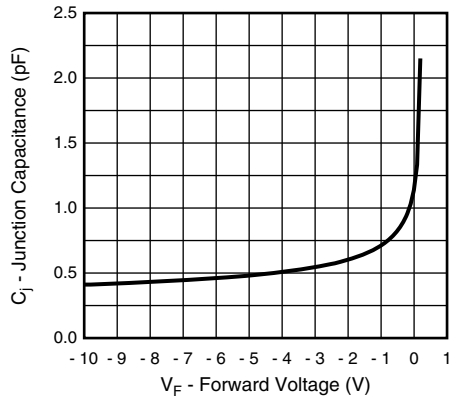


Fig. 4 - Diode Capacitance vs. Reverse Voltage

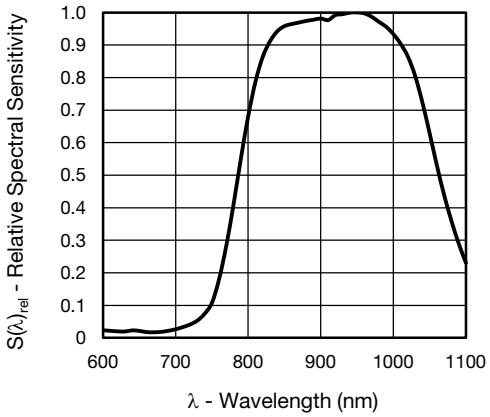


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

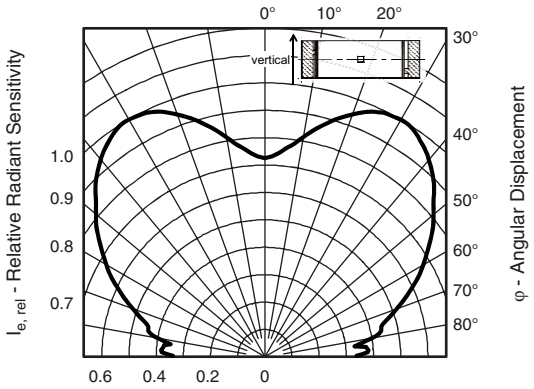


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement - Vertical

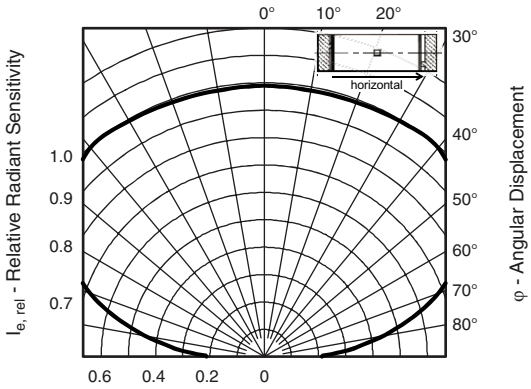


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement - Horizontal

REFLOW SOLDER PROFILE

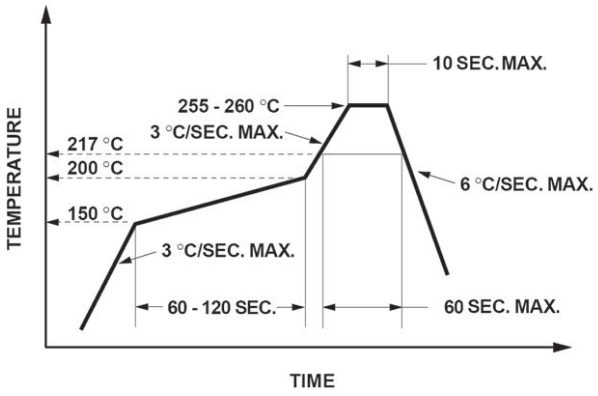


Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020D

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

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

Floor life: 168 h

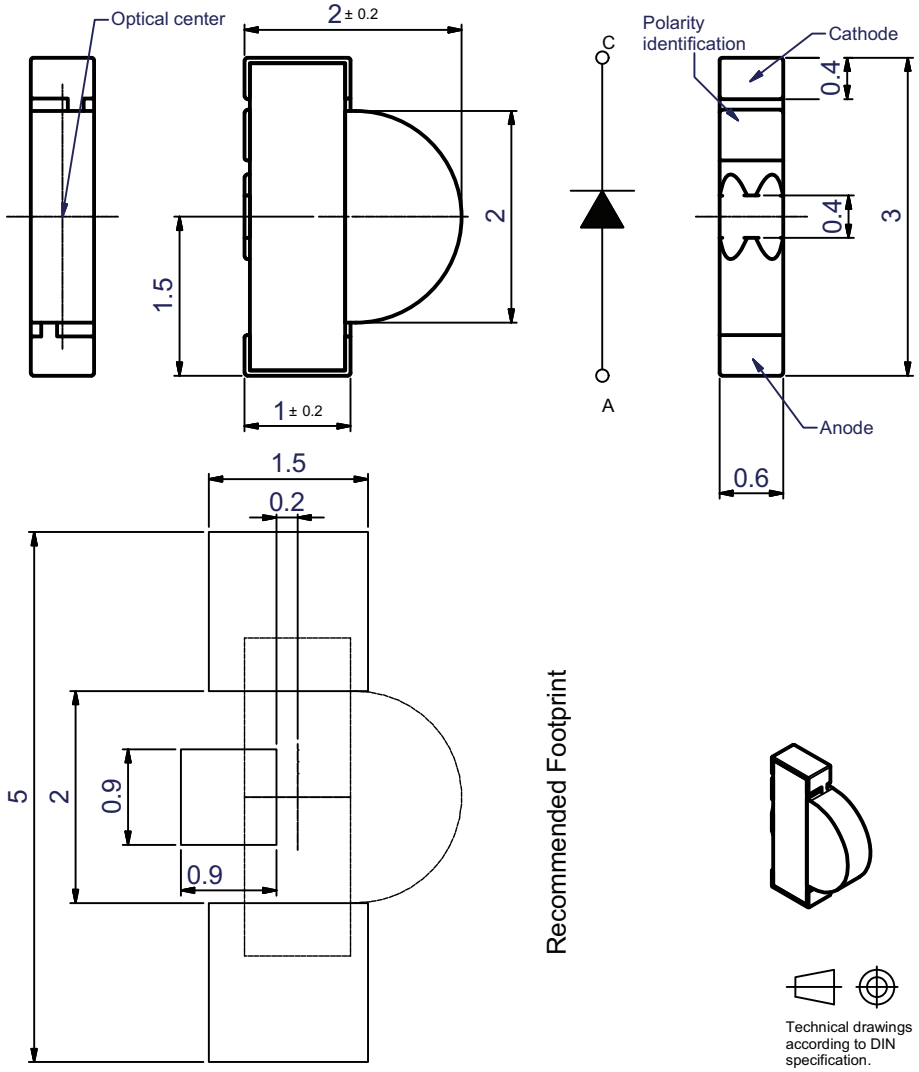
Conditions: T_{amb} < 30 °C, RH < 60 %

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 %.

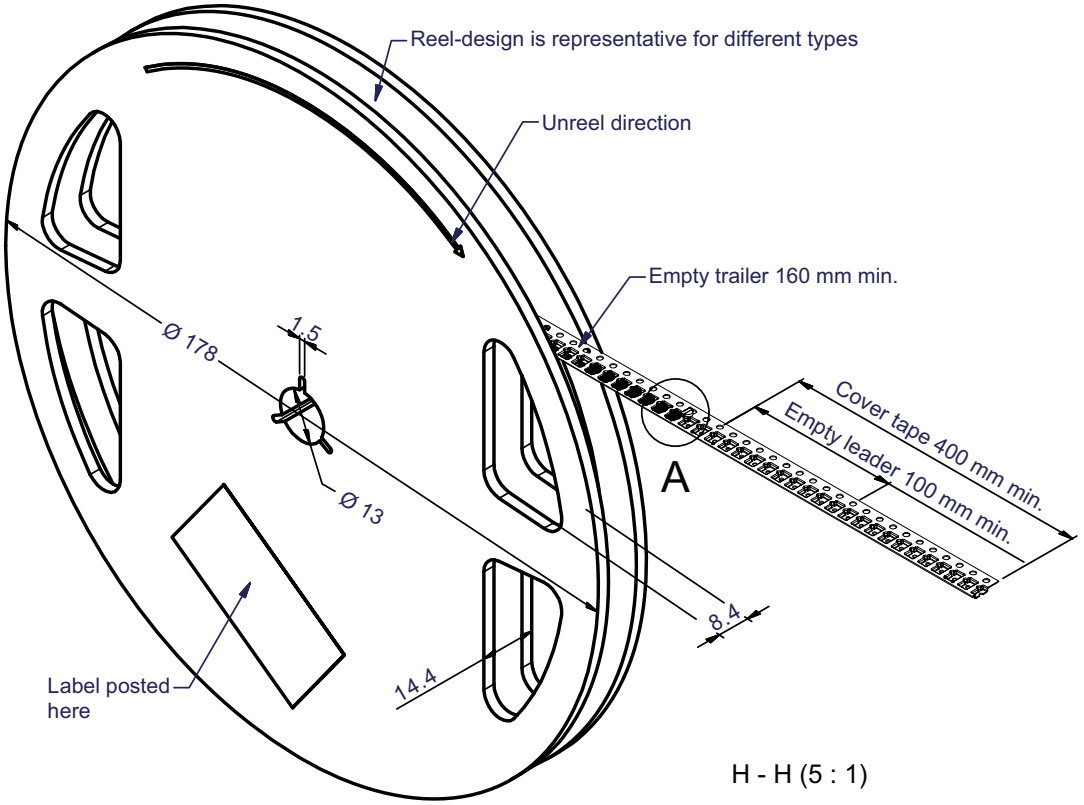
PACKAGE DIMENSIONS in millimeters



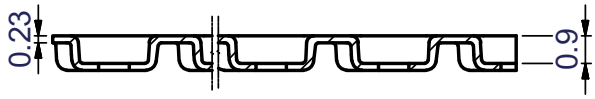
Drawing- No: 6.550-5327.01-4
Issue: Prel. 26.11.2013

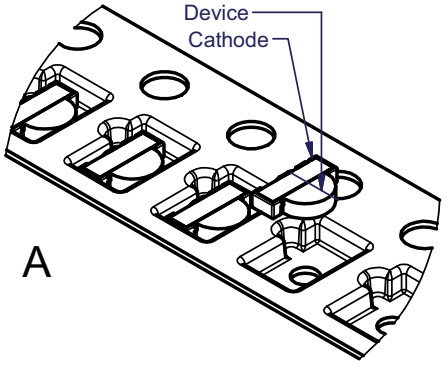
Not indicated tolerances ± 0.1 mm

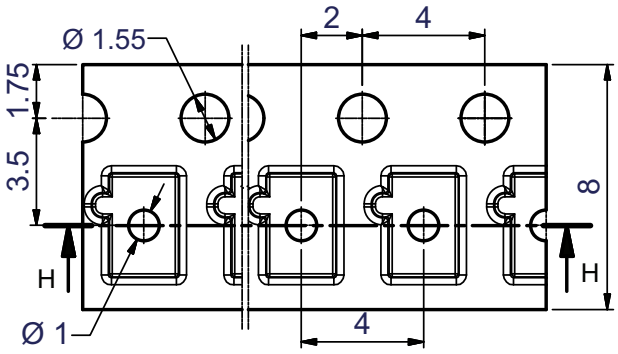
TAPING AND REEL DIMENSIONS in millimeters



H - H (5 : 1)







Drawing refers to following types: VSMB11940
VEMD11940F

Drawing No. 9.800-5126.01-4; Issue: Prel. 23.05.2013

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