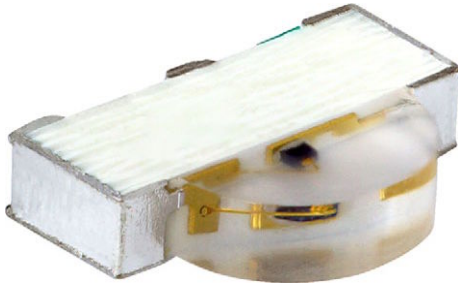


# High Speed Infrared Emitting Diode, 940 nm, GaAlAs, MQW



## DESCRIPTION

VSMB11940X01 is an infrared, 940 nm side looking emitting diode in GaAlAs multi quantum well (MQW) technology with high radiant power and high speed, molded in clear, untinted plastic package (with lens) for surface mounting (SMD).

## 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
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half intensity:  $\phi = \pm 75^\circ$
- Low forward voltage
- Package matches with detector VEMD11940FX01
- 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](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## APPLICATIONS

- IR touch panel
- High power emitter for low space applications
- High performance transmissive or reflective sensors

## PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr), 20 mA	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMB11940X01	1	$\pm 75$	940	15

### Note

- Test conditions see table “Basic Characteristics“

## ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMB11940X01	Tape and reel	MOQ: 4000 pcs, 4000 pcs/reel	side 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		$V_R$	5	V
Forward current		$I_F$	65	mA
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu\text{s}$	$I_{FM}$	130	mA
Surge forward current	$t_p = 100 \mu\text{s}$	$I_{FSM}$	500	mA
Power dissipation		$P_V$	104	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	-40 to +85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^\circ\text{C}$
Soldering temperature	According to Fig. 9, J-STD-020	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction / ambient	JESD 51	$R_{thJA}$	580	K/W

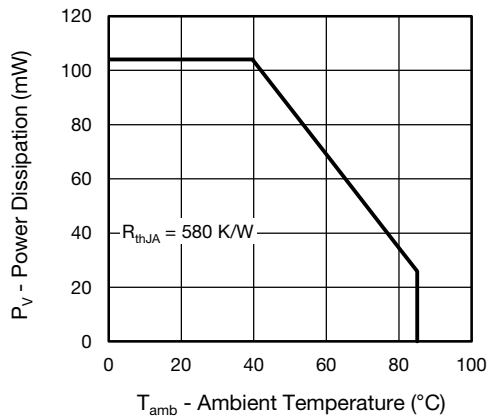


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

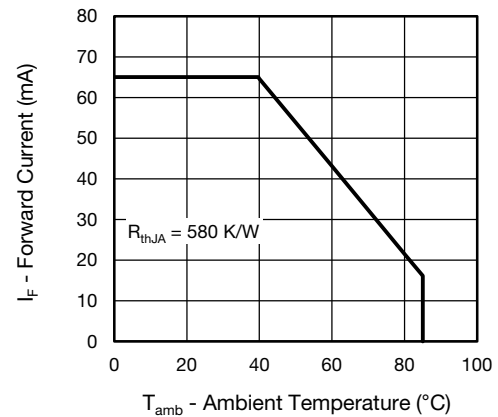


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$	1.1	1.24	1.5	V
	$I_F = 65\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$	-	1.35	-	V
	$I_F = 500\text{ mA}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$	-	1.8	-	V
Temperature coefficient of $V_F$	$I_F = 1\text{ mA}$	$TK_{V_F}$	-	-1.5	-	mV/K
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$	-	21	-	pF
Radiant intensity	$I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	0.5	1.0	1.5	mW/sr
	$I_F = 65\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	-	3.2	-	mW/sr
	$I_F = 500\text{ mA}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$	-	20	-	mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\phi_e$	-	35	-	mW
Temperature coefficient of radiant power	$I_F = 100\text{ mA}$	$TK_{\phi_e}$	-	-0.47	-	%/K
Angle of half intensity - horizontal		$\phi_h$	-	$\pm 77.5$	-	deg
Angle of half intensity - vertical		$\phi_v$	-	$\pm 72.5$	-	deg
Peak wavelength	$I_F = 30\text{ mA}$	$\lambda_p$	-	940	-	nm
Spectral bandwidth	$I_F = 30\text{ mA}$	$\Delta\lambda$	-	25	-	nm
Temperature coefficient of $\lambda_p$	$I_F = 30\text{ mA}$	$TK_{\lambda_p}$	-	0.3	-	nm
Rise time	$I_F = 100\text{ mA}$ , 20 % to 80 %	$t_r$	-	15	-	ns
Fall time	$I_F = 100\text{ mA}$ , 20 % to 80 %	$t_f$	-	15	-	ns

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

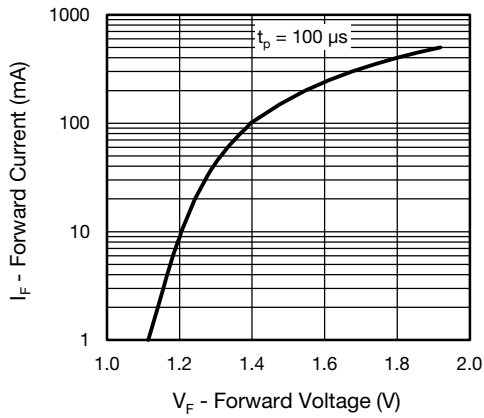


Fig. 3 - Forward Current vs. Forward Voltage

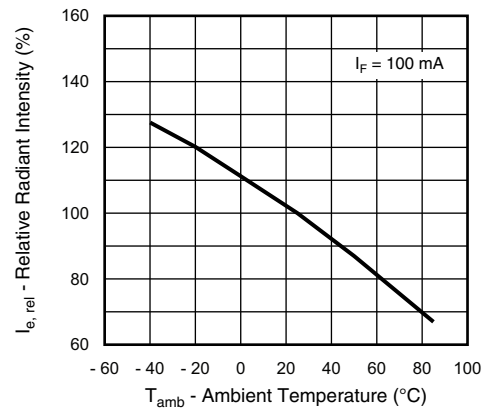


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

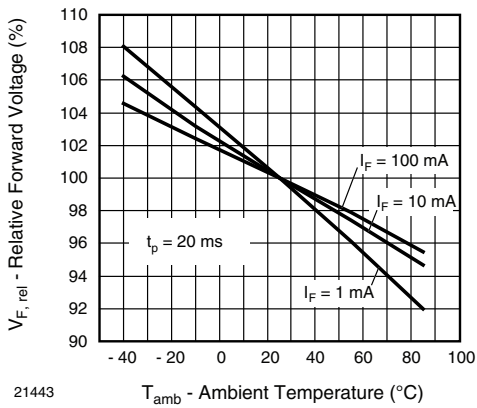


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

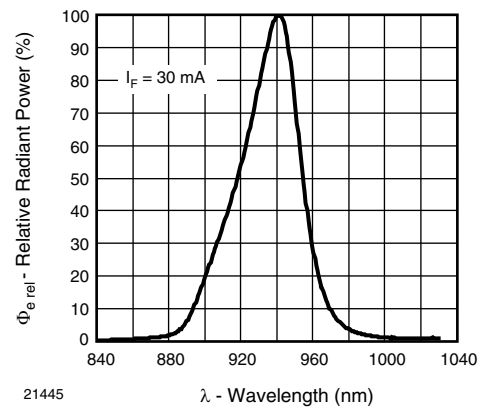


Fig. 7 - Relative Radiant Power vs. Wavelength

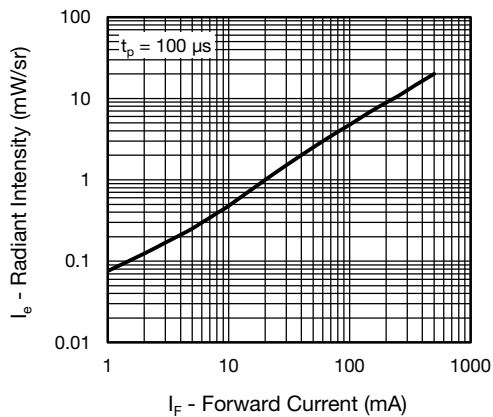


Fig. 5 - Radiant Intensity vs. Forward Current

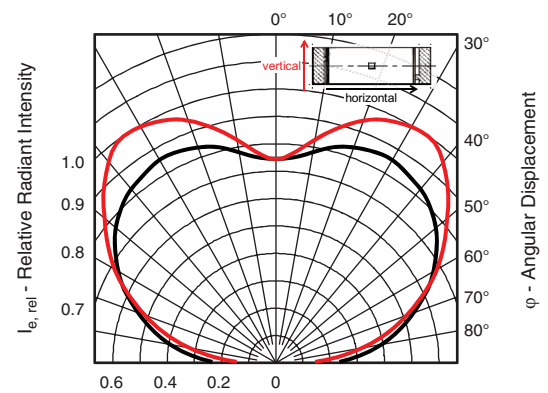


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**REFLOW SOLDER PROFILE**

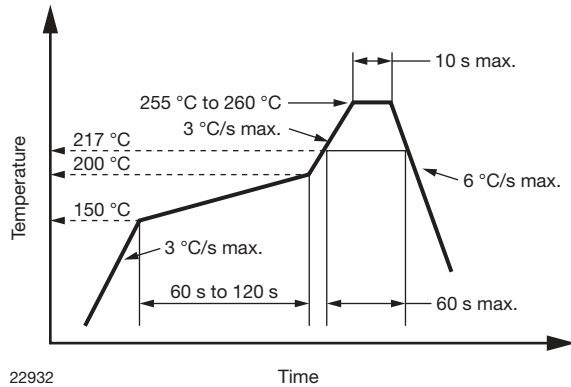


Fig. 9 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

**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**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

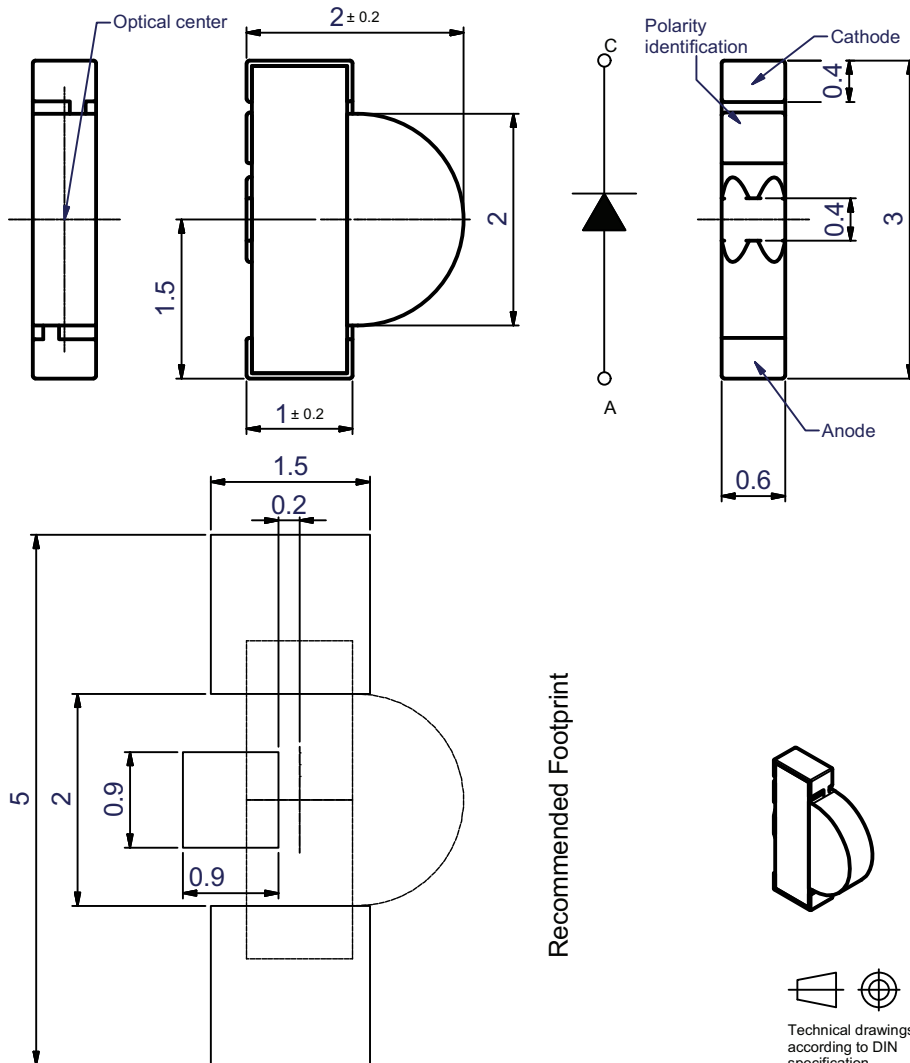
Floor life: 168 h

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

**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  $40\text{ }^{\circ}\text{C}$  ( $+ 5\text{ }^{\circ}\text{C}$ ),  $\text{RH} < 5\%$ .

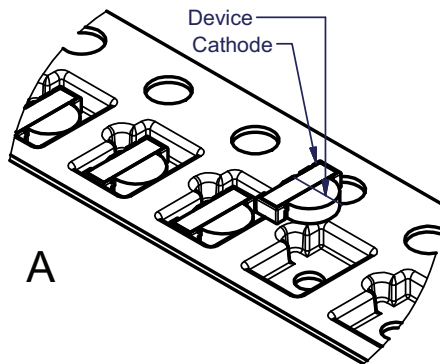
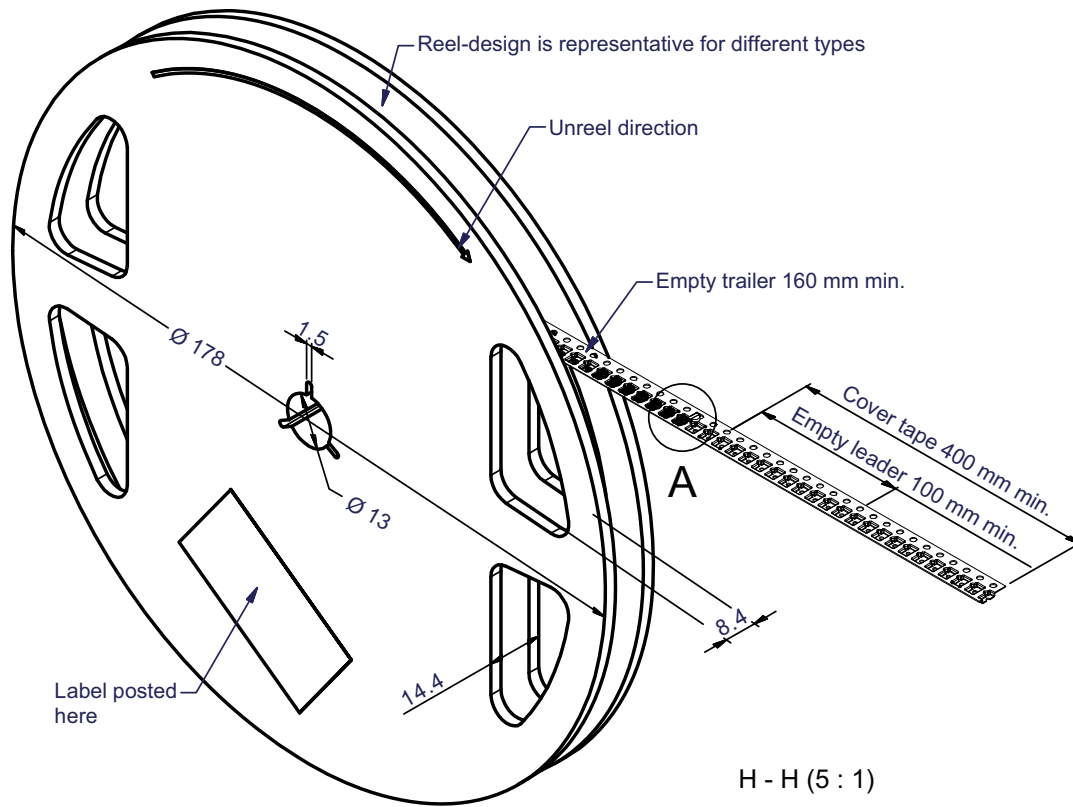
**PACKAGE DIMENSIONS** in millimeters



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

Not indicated tolerances  $\pm 0.1\text{ mm}$

**TAPING AND REEL DIMENSIONS** in millimeters



Drawing refers to following types: VSMB11940  
VEMD11940F

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



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