

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



## DESCRIPTION

VSMB10940 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 1
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half sensitivity:  $\phi = \pm 75^\circ$
- Low forward voltage
- Package matches with detector VEMD10940F
- Floor life: 168 h, MSL 3, acc. 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)



## 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	$\phi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMB10940	1	$\pm 75$	940	15

### Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMB10940	Tape and reel	MOQ: 3000 pcs, 3000 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	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	450	K/W

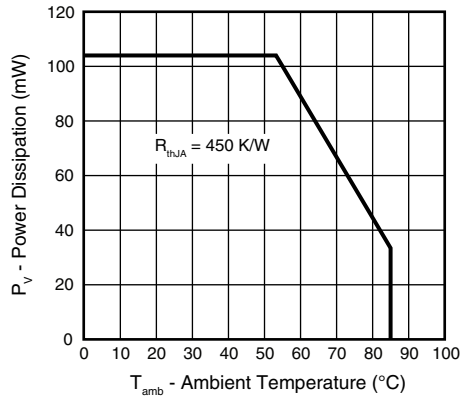


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

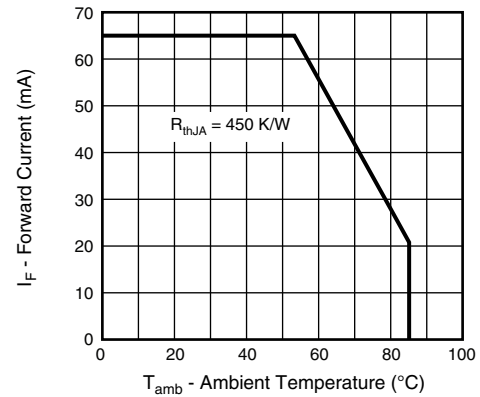


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<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	1.3	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	1.5	mW/sr
	$I_F = 65\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$		3.05		mW/sr
	$I_F = 500\text{ mA}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$		13		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		$\phi_h$		$\pm 77.5$		$^{\circ}$
Angle of half intensity - vertical		$\phi_v$		$\pm 72.5$		$^{\circ}$
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)

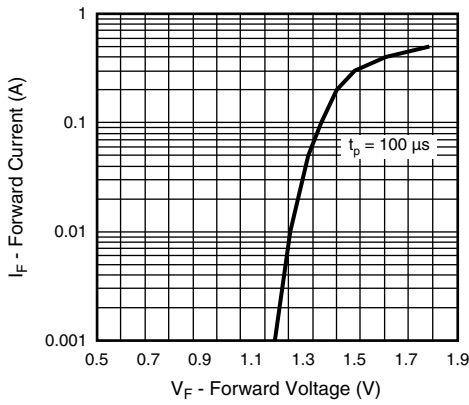


Fig. 3 - Forward Current vs. Forward Voltage

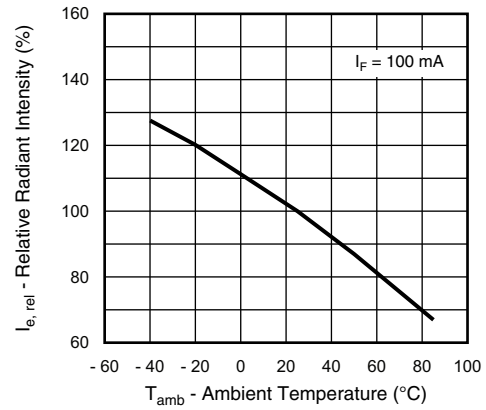


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

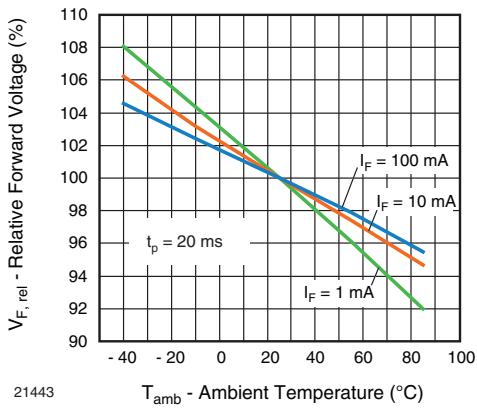


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

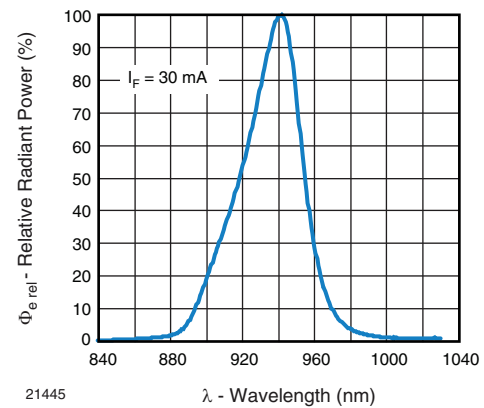


Fig. 7 - Relative Radiant Power vs. Wavelength

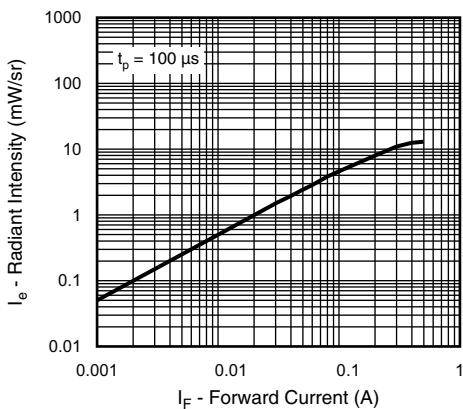


Fig. 5 - Radiant Intensity vs. Forward Current

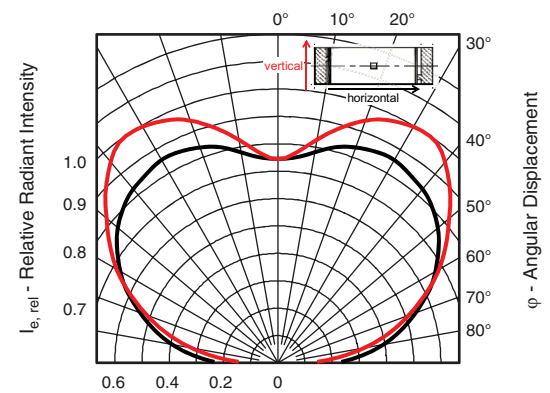


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**REFLOW SOLDER PROFILE**



Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. 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

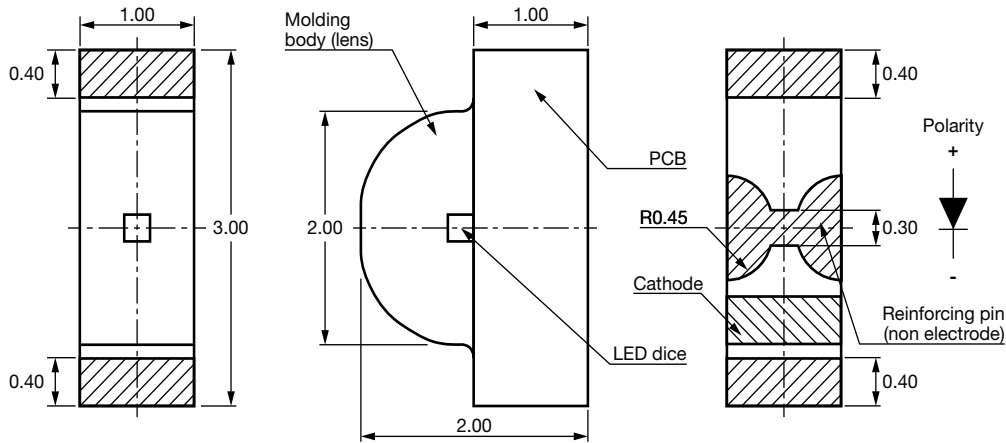
Floor life: 168 h

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

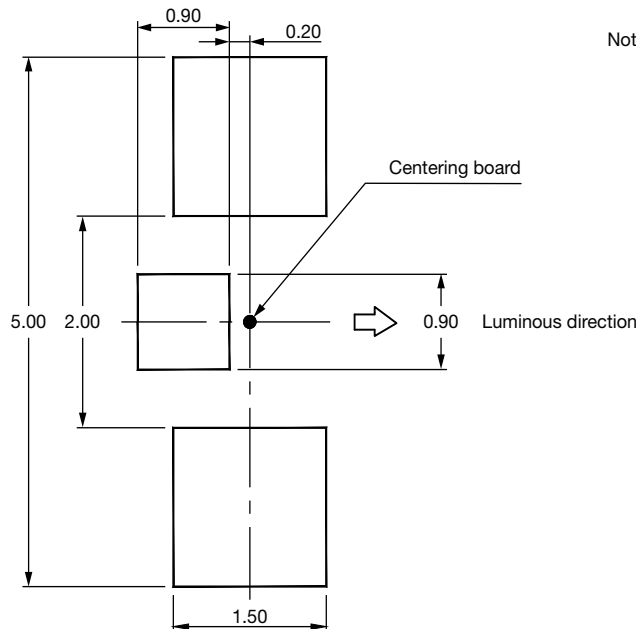
**DRYING**

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 °C (+ 5 °C), RH < 5 %.

**PACKAGE DIMENSIONS** in millimeters



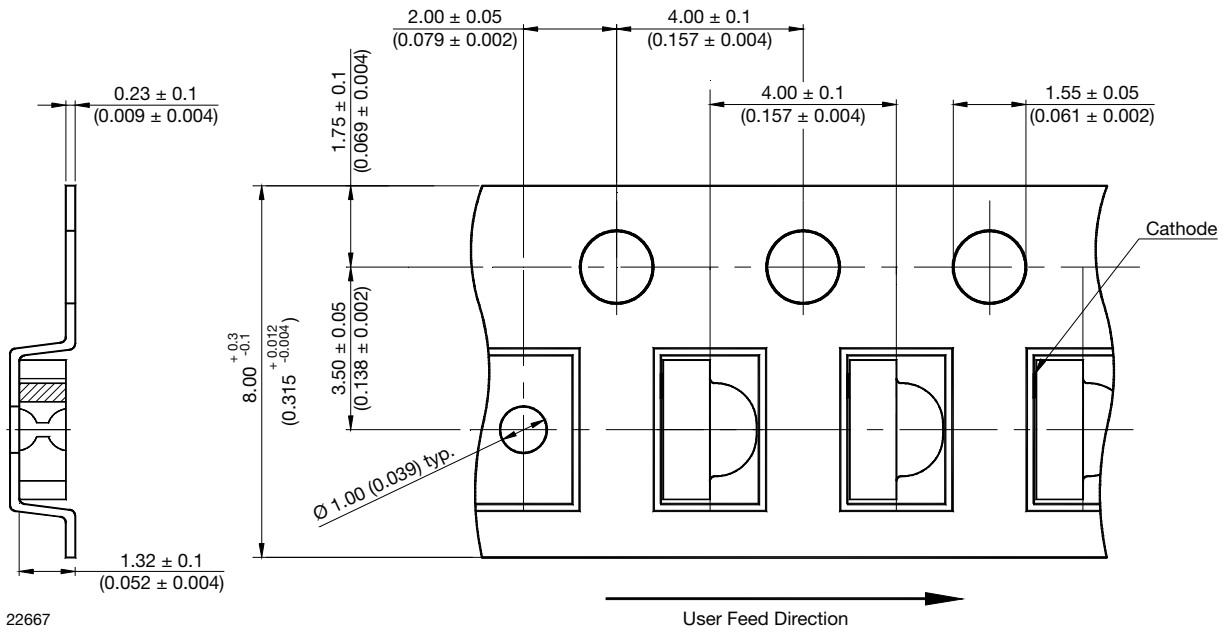
**Recommended Solder Pad Footprint**



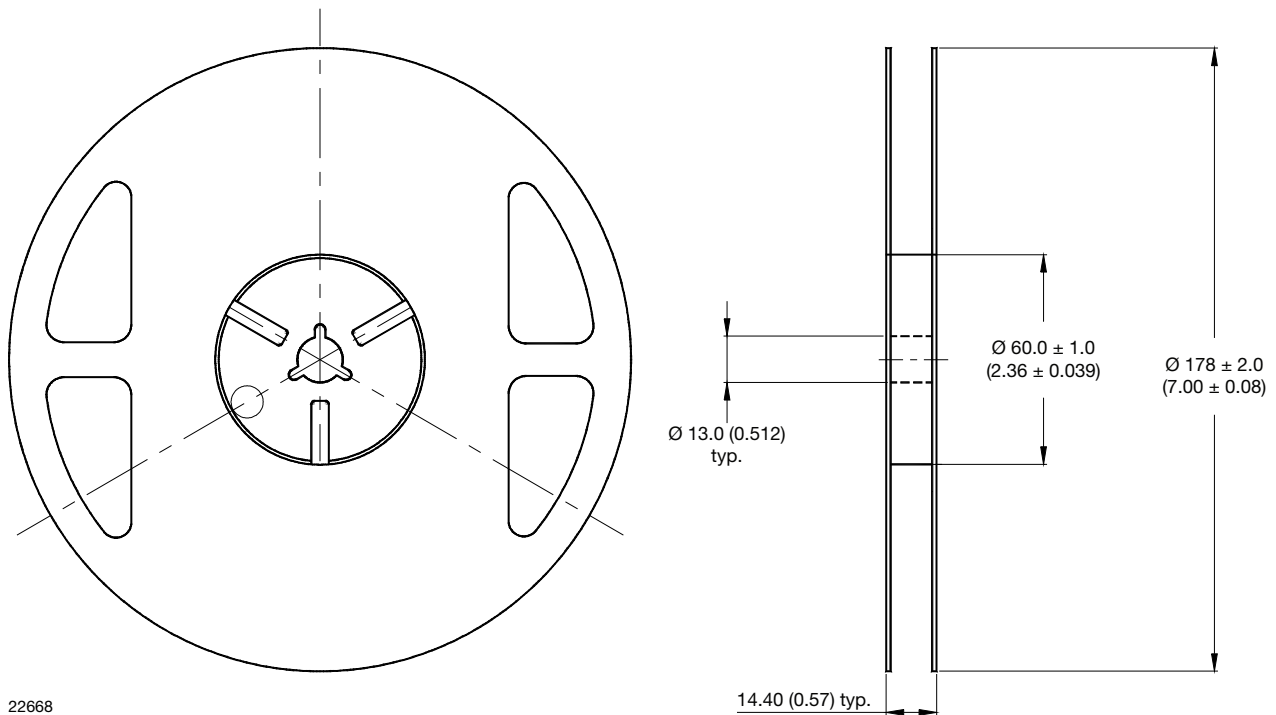
Not indicated tolerances: ± 0.1 mm

22701

**BLISTER TAPE DIMENSIONS** in millimeters



**REEL DIMENSIONS** in millimeters





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