

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



## LINKS TO ADDITIONAL RESOURCES



## DESCRIPTION

VSMB10941X01 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
- AEC-Q101 qualified
- Peak wavelength:  $\lambda_p = 940$  nm
- High pulse current
- High speed
- Angle of half intensity:  $\phi = \pm 75^\circ$
- Package matches with detector VEMD10940FX01
- 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)



## APPLICATIONS

- IR touch panel
- High performance transmissive or reflective sensors
- Automotive applications
- [Head-up displays](#)

## PRODUCT SUMMARY

| COMPONENT    | $I_e$ (mW/sr), 20 mA | $\phi$ (°) | $\lambda_p$ (nm) | $t_r$ (ns) |
|--------------|----------------------|------------|------------------|------------|
| VSMB10941X01 | 1                    | $\pm 75$   | 940              | 15         |

### Note

- Test conditions see table “Basic Characteristics”

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VSMB10941X01  | 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                        |                                         | $I_F$      | 100         | mA               |
| Peak forward current                   | $t_p/T = 0.5$ , $t_p = 100 \mu\text{s}$ | $I_{FM}$   | 200         | mA               |
| Surge forward current                  | $t_p = 100 \mu\text{s}$                 | $I_{FSM}$  | 1.0         | A                |
| Power dissipation                      |                                         | $P_V$      | 160         | mW               |
| Junction temperature                   |                                         | $T_j$      | 105         | $^\circ\text{C}$ |
| Operating temperature range            |                                         | $T_{amb}$  | -55 to +100 | $^\circ\text{C}$ |
| Storage temperature range              |                                         | $T_{stg}$  | -55 to +105 | $^\circ\text{C}$ |
| Soldering temperature                  | According to Fig. 9, J-STD-020          | $T_{sd}$   | 260         | $^\circ\text{C}$ |
| Thermal resistance junction to ambient | J-STD-051                               | $R_{thJA}$ | 450         | K/W              |

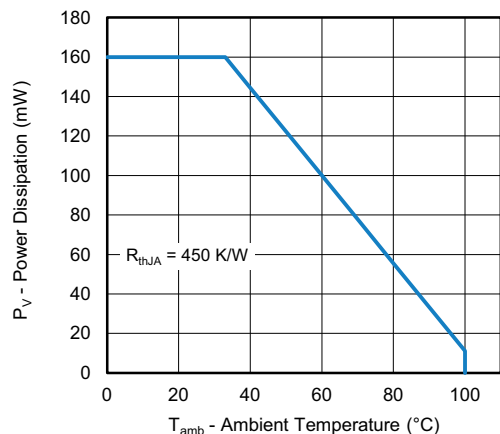


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

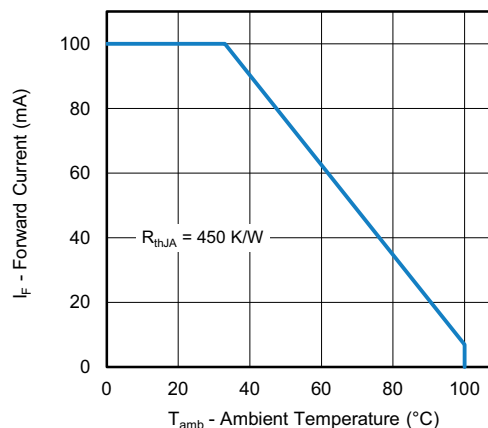


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                     |                 |      |            |      |               |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------|------|------------|------|---------------|
| PARAMETER                                                                                           | TEST CONDITION                                                      | SYMBOL          | MIN. | TYP.       | MAX. | UNIT          |
| Forward voltage                                                                                     | $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$                         | $V_F$           | 1.0  | 1.2        | 1.5  | V             |
|                                                                                                     | $I_F = 1.0\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$               | $V_F$           | -    | 2.6        | -    | V             |
| Reverse current                                                                                     | $V_R = 5\text{ V}$                                                  | $I_R$           | -    | -          | 5    | $\mu\text{A}$ |
| Junction capacitance                                                                                | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ ,<br>$E = 0\text{ mW/cm}^2$ | $C_J$           | -    | 60         | -    | pF            |
| Radiant intensity                                                                                   | $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$                         | $I_e$           | 0.5  | 1.0        | 1.5  | mW/sr         |
|                                                                                                     | $I_F = 1.0\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$               | $I_e$           | -    | 45         | -    | mW/sr         |
| Radiant power                                                                                       | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$                        | $\phi_e$        | -    | 40         | -    | mW            |
| Angle of half intensity - horizontal                                                                |                                                                     | $\phi_h$        | -    | $\pm 77.5$ | -    | $^{\circ}$    |
| Angle of half intensity - vertical                                                                  |                                                                     | $\phi_v$        | -    | $\pm 72.5$ | -    | $^{\circ}$    |
| Peak wavelength                                                                                     | $I_F = 30\text{ mA}$                                                | $\lambda_p$     | 920  | 940        | 960  | nm            |
| Spectral bandwidth                                                                                  | $I_F = 20\text{ mA}$                                                | $\Delta\lambda$ | -    | 25         | -    | 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            |

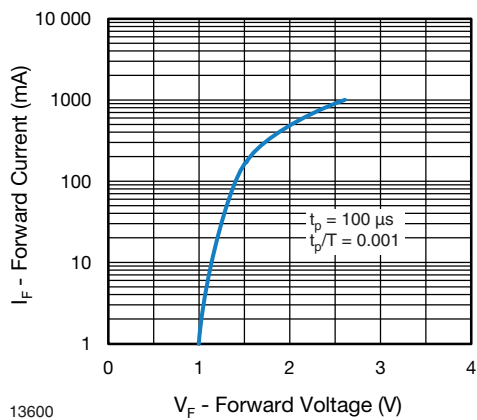
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

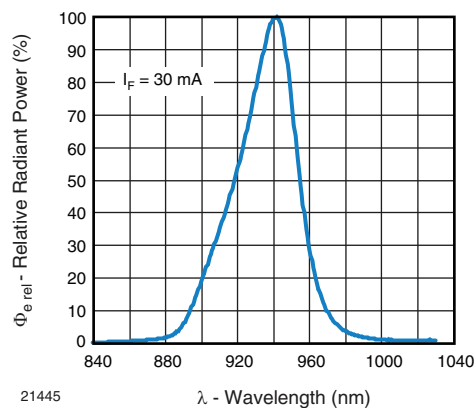


Fig. 5 - Relative Radiant Power vs. Wavelength

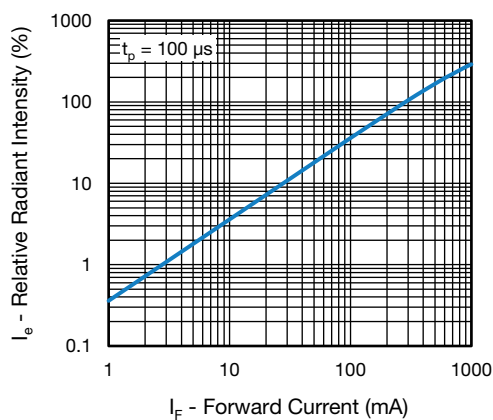


Fig. 4 - Relative Radiant Intensity vs. Forward Current

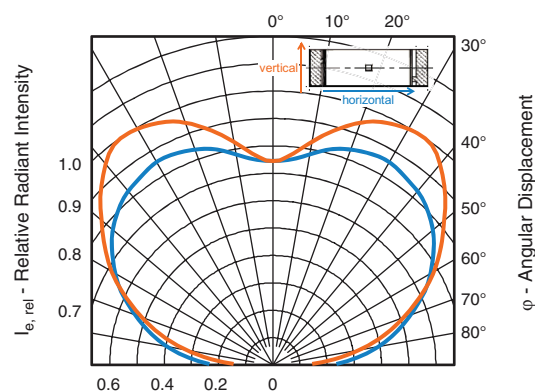


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

## REFLOW SOLDER PROFILE

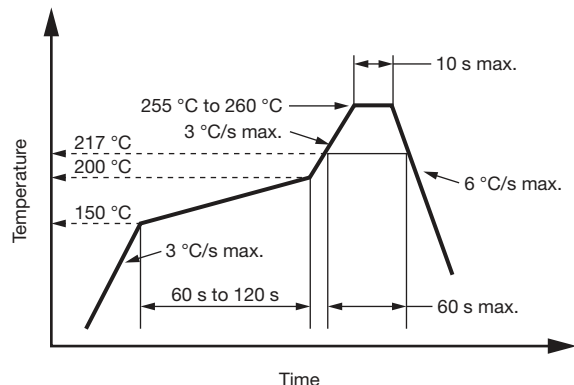


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## 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

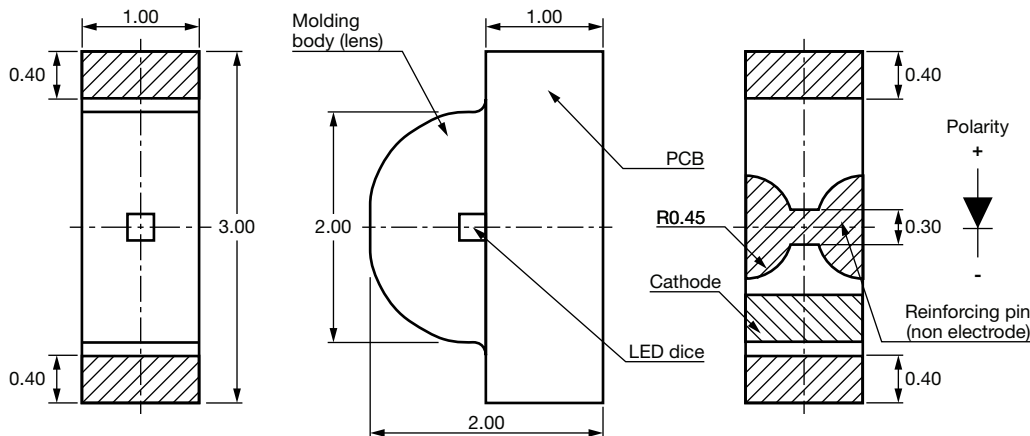
Floor life: 168 h

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

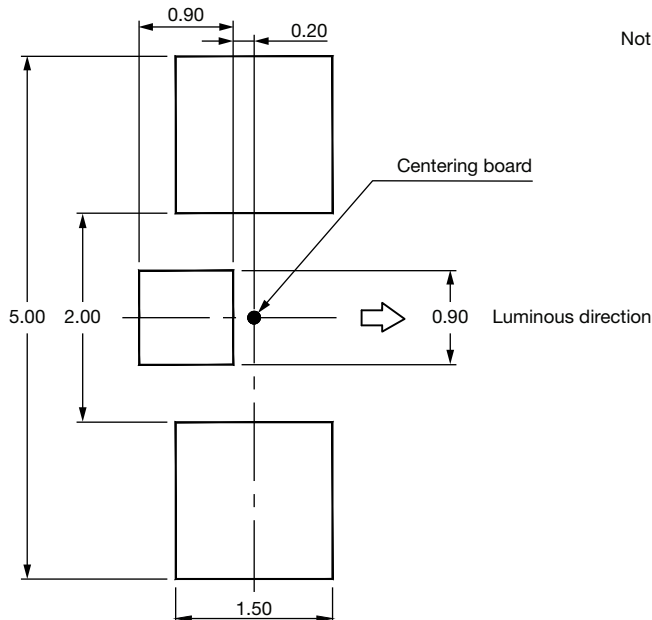
## DRYING

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

## PACKAGE DIMENSIONS in millimeters

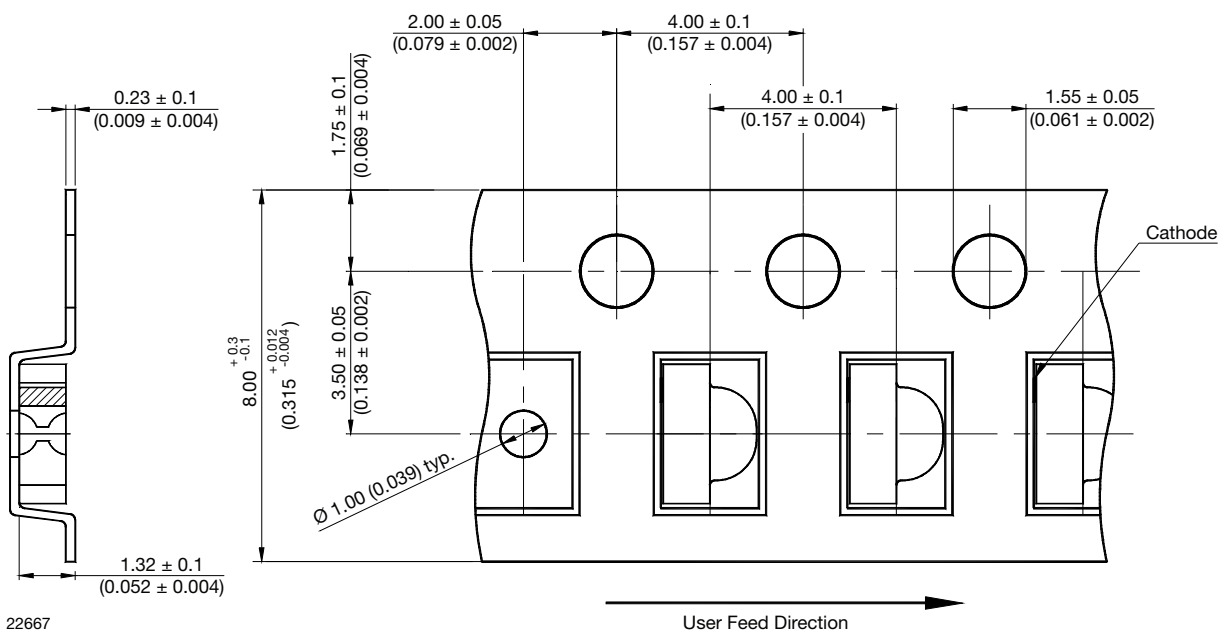


## Recommended Solder Pad Footprint

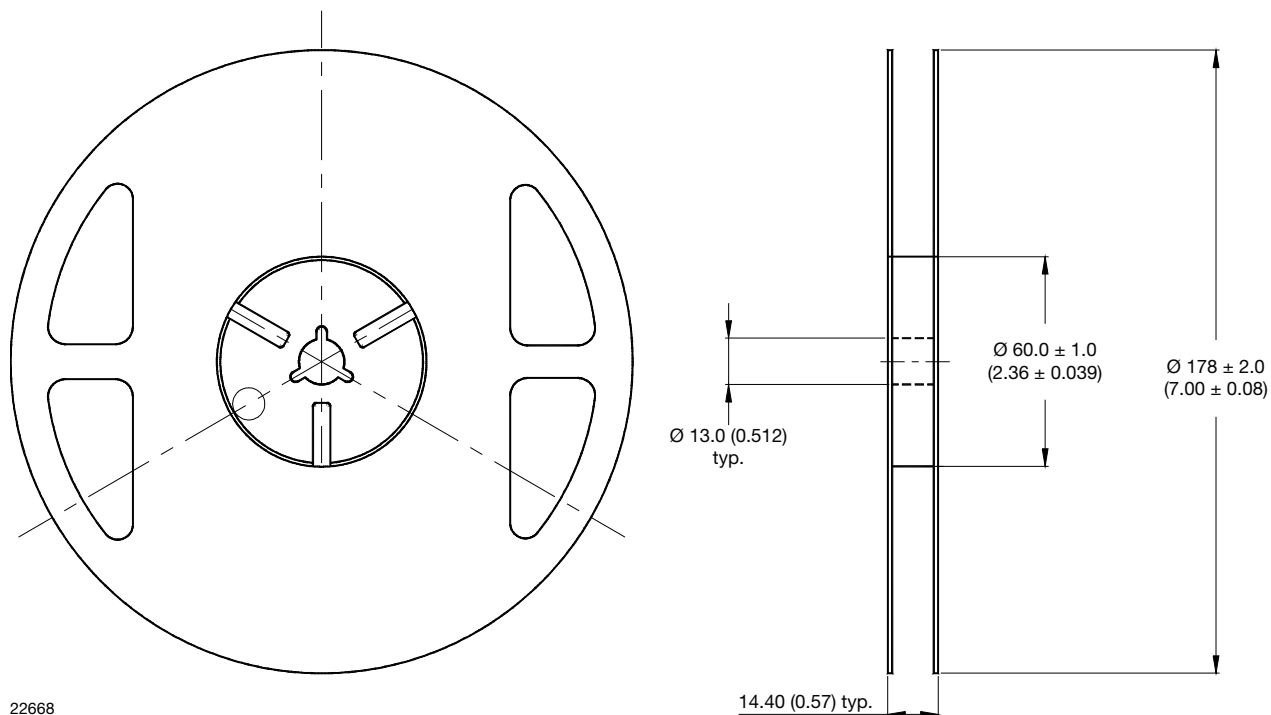


Not indicated tolerances:  $\pm 0.1\text{ mm}$

22701

**BLISTER TAPE DIMENSIONS** in millimeters

### REEL DIMENSIONS in millimeters





## Disclaimer

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