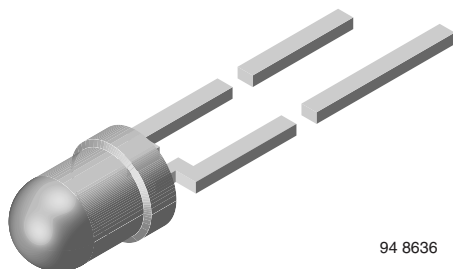


# High Speed Infrared Emitting Diode, 940 nm, GaAlAs, MQW



94 8636

## DESCRIPTION

VSLB3940 is a high speed infrared emitting diode in GaAlAs, MQW technology, molded in a clear plastic package.

## FEATURES

- Package type: leaded
- Package form: T-1, clear epoxy
- Dimensions: Ø 3 mm
- Peak wavelength:  $\lambda_p = 940$  nm
- High speed
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 22^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching to Si photodetectors
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## APPLICATIONS

- Infrared remote control units
- Free air transmission systems
- Infrared source for optical counters and card readers

## PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\phi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|---------------|--------------|------------------|------------|
| VSLB3940  | 65            | $\pm 22$     | 940              | 15         |

### Note

- Test conditions see table "Basic Characteristics"

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                        | PACKAGE FORM |
|---------------|---------------|--------------------------------|--------------|
| VSLB3940      | Bulk          | MOQ: 5000 pcs, 5000 pcs/bulk   | T-1          |
| VSLB3940-MSZ  | Ammopack      | MOQ: 10 000 pcs, 2000 pcs/box  | T-1          |
| VSLB3940-QS21 | Tape and reel | MOQ: 10 000 pcs, 2000 pcs/reel | T-1          |

### 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                  | $t_p/T = 0.1, t_p = 100 \mu\text{s}$   | $I_{FM}$   | 1           | A                |
| Surge forward current                 | $t_p = 100 \mu\text{s}$                | $I_{FSM}$  | 1.5         | A                |
| Power dissipation                     |                                        | $P_V$      | 160         | 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                 | $t \leq 5$ s, 2 mm from case           | $T_{sd}$   | 260         | $^\circ\text{C}$ |
| Thermal resistance junction / ambient | J-STD-051, leads 7 mm, soldered on PCB | $R_{thJA}$ | 300         | K/W              |

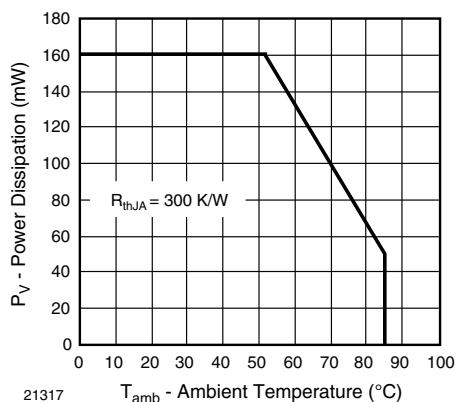


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

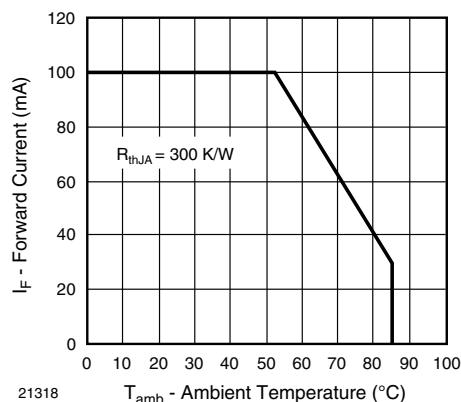


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified) |                                                                     |                  |      |          |      |               |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------|------|----------|------|---------------|
| PARAMETER                                                                            | TEST CONDITION                                                      | SYMBOL           | MIN. | TYP.     | MAX. | UNIT          |
| Forward voltage                                                                      | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$                        | $V_F$            | 1.15 | 1.35     | 1.6  | V             |
|                                                                                      | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$                 | $V_F$            | -    | 2.2      | -    | V             |
| Temperature coefficient of $V_F$                                                     | $I_F = 1\text{ mA}$                                                 | $TK_{VF}$        | -    | -1.5     | -    | mV/K          |
|                                                                                      | $I_F = 100\text{ mA}$                                               | $TK_{VF}$        | -    | -1.1     | -    | mV/K          |
| Reverse current                                                                      | $V_R = 5\text{ V}$                                                  | $I_R$            | -    | -        | 10   | $\mu\text{A}$ |
| Junction capacitance                                                                 | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ ,<br>$E = 0\text{ mW/cm}^2$ | $C_J$            | -    | 70       | -    | pF            |
| Radiant intensity                                                                    | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$                        | $I_e$            | 32   | 65       | 110  | mW/sr         |
|                                                                                      | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$                 | $I_e$            | -    | 650      | -    | mW/sr         |
| Radiant power                                                                        | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$                        | $\phi_e$         | -    | 40       | -    | mW            |
| Temperature coefficient of radiant power                                             | $I_F = 1\text{ mA}$                                                 | $TK_{\phi_e}$    | -    | -1.1     | -    | %/K           |
|                                                                                      | $I_F = 100\text{ mA}$                                               | $TK_{\phi_e}$    | -    | -0.51    | -    | %/K           |
| Angle of half intensity                                                              |                                                                     | $\phi$           | -    | $\pm 22$ | -    | 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 $I_p$                                                     | $I_F = 30\text{ mA}$                                                | $TK_{\lambda_p}$ | -    | 0.25     | -    | 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            |
| Virtual source diameter                                                              |                                                                     | $d$              | -    | 2        | -    | mm            |

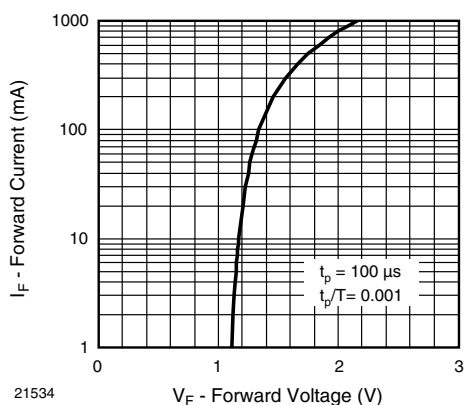
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

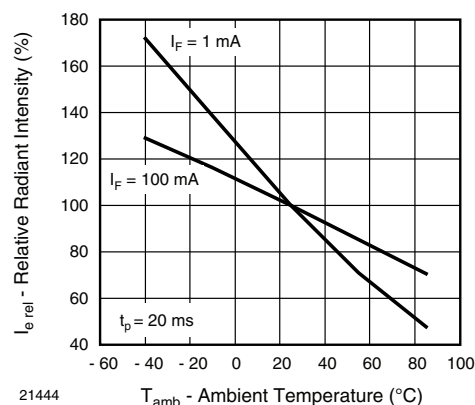


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

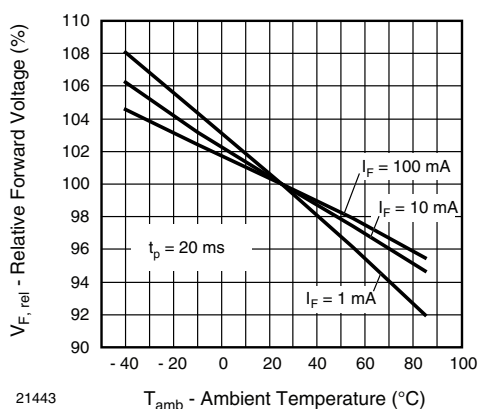


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

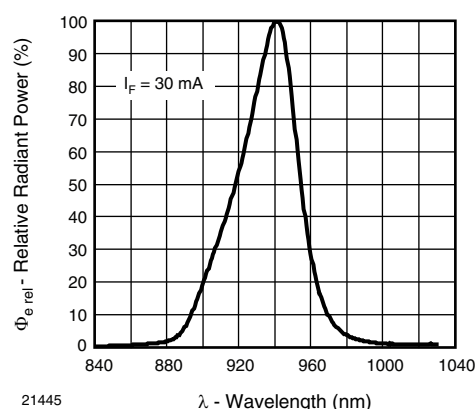


Fig. 7 - Relative Radiant Power vs. Wavelength

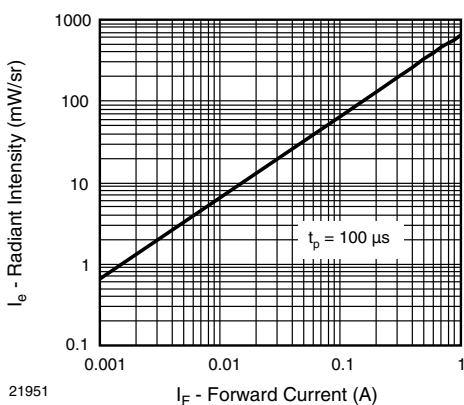


Fig. 5 - Radiant Intensity vs. Forward Current

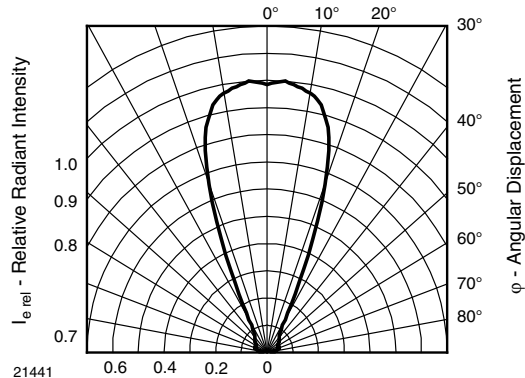
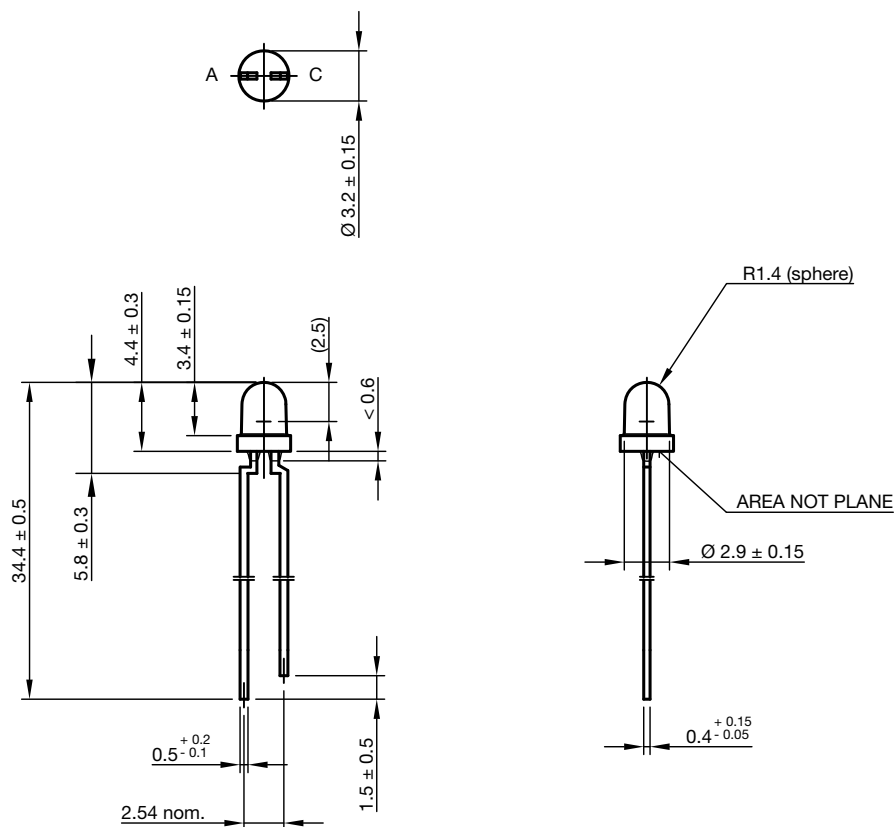


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

### PACKAGE DIMENSIONS in millimeters



technical drawings  
according to DIN  
specifications

Drawing-No.: 6.544-5255.01-4  
Issue: 9; 28.07.14



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