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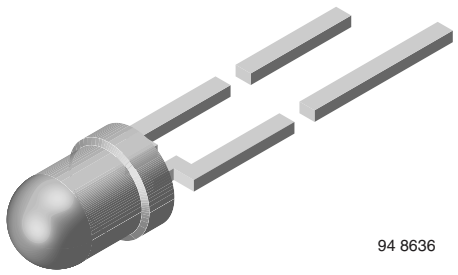
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

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



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## 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: φ = ± 22°
- 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

Pb-free

e2

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## DESCRIPTION

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

## APPLICATIONS

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

| PRODUCT SUMMARY | | | | |
|---|---|---|---|---|
| COMPONENT | $I_e$ (mW/sr) | φ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
| VSLB3940 | 65 | ± 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 °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 µs | $I_{FM}$ | 1 | A |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 1.5 | A |
| Power dissipation | | $P_V$ | 160 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | -40 to +85 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +100 | °C |
| Soldering temperature | t ≤ 5 s, 2 mm from case | $T_{sd}$ | 260 | °C |
| Thermal resistance junction / ambient | J-STD-051, leads 7 mm, soldered on PCB | $R_{thJA}$ | 300 | K/W |

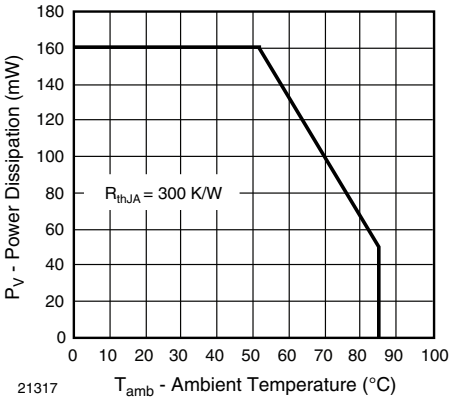



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

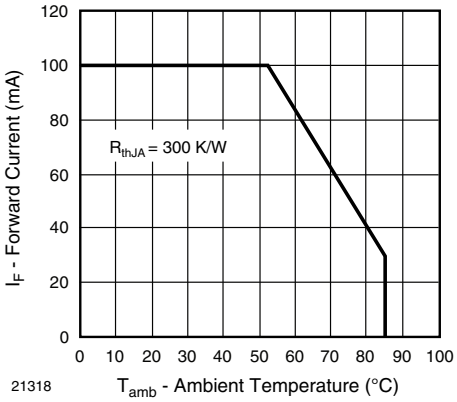



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| **BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Forward voltage | $I_F$ = 100 mA, $t_p$ = 20 ms | $V_F$ | 1.15 | 1.35 | 1.6 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | - | 2.2 | - | V |
| Temperature coefficient of $V_F$ | $I_F$ = 1 mA | $TK_{VF}$ | - | -1.5 | - | mV/K |
| | $I_F$ = 100 mA | $TK_{VF}$ | - | -1.1 | - | mV/K |
| Reverse current | $V_R$ = 5 V | $I_R$ | - | - | 10 | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 mW/cm$^2$ | $C_J$ | - | 70 | - | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 32 | 65 | 110 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | - | 650 | - | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi e$ | - | 40 | - | mW |
| Temperature coefficient of radiant power | $I_F$ = 1 mA | $TK_{\phi e}$ | - | -1.1 | - | %/K |
| | $I_F$ = 100 mA | $TK_{\phi e}$ | - | -0.51 | - | %/K |
| Angle of half intensity | | $\varphi$ | - | ± 22 | - | deg |
| Peak wavelength | $I_F$ = 30 mA | $\lambda_p$ | - | 940 | - | nm |
| Spectral bandwidth | $I_F$ = 30 mA | $\Delta\lambda$ | - | 25 | - | nm |
| Temperature coefficient of $I_p$ | $I_F$ = 30 mA | $TK_{\lambda p}$ | - | 0.25 | - | nm |
| Rise time | $I_F$ = 100 mA, 20 % to 80 % | $t_r$ | - | 15 | - | ns |
| Fall time | $I_F$ = 100 mA, 20 % to 80 % | $t_f$ | - | 15 | - | ns |
| Virtual source diameter | | d | - | 2 | - | mm |

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

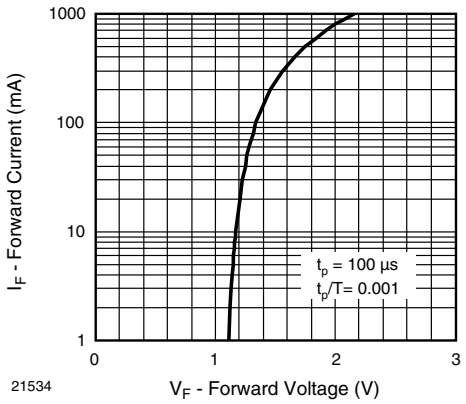



Fig. 3 - Forward Current vs. Forward Voltage

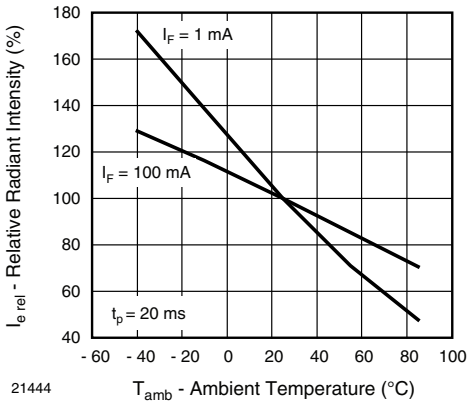



Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

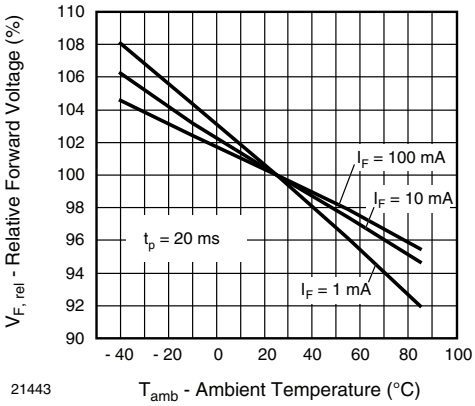



Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

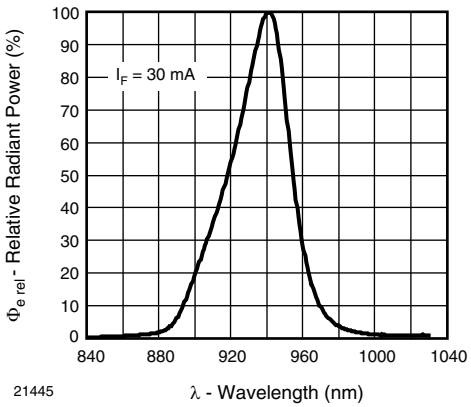



Fig. 7 - Relative Radiant Power vs. Wavelength

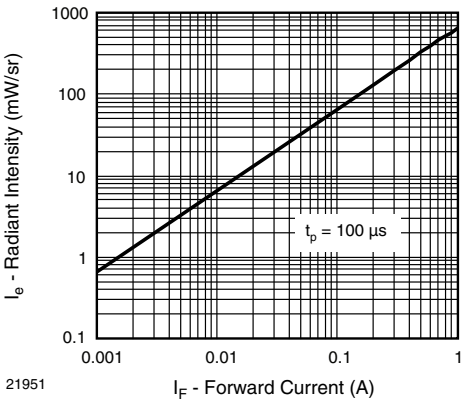



Fig. 5 - Radiant Intensity vs. Forward Current

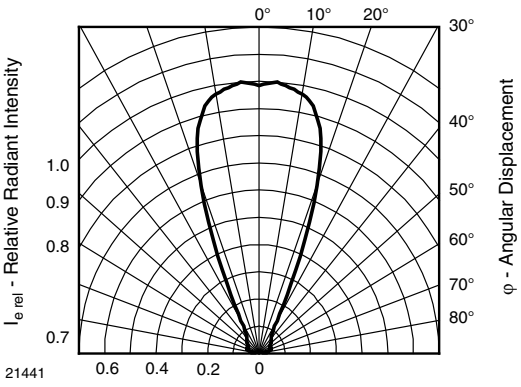
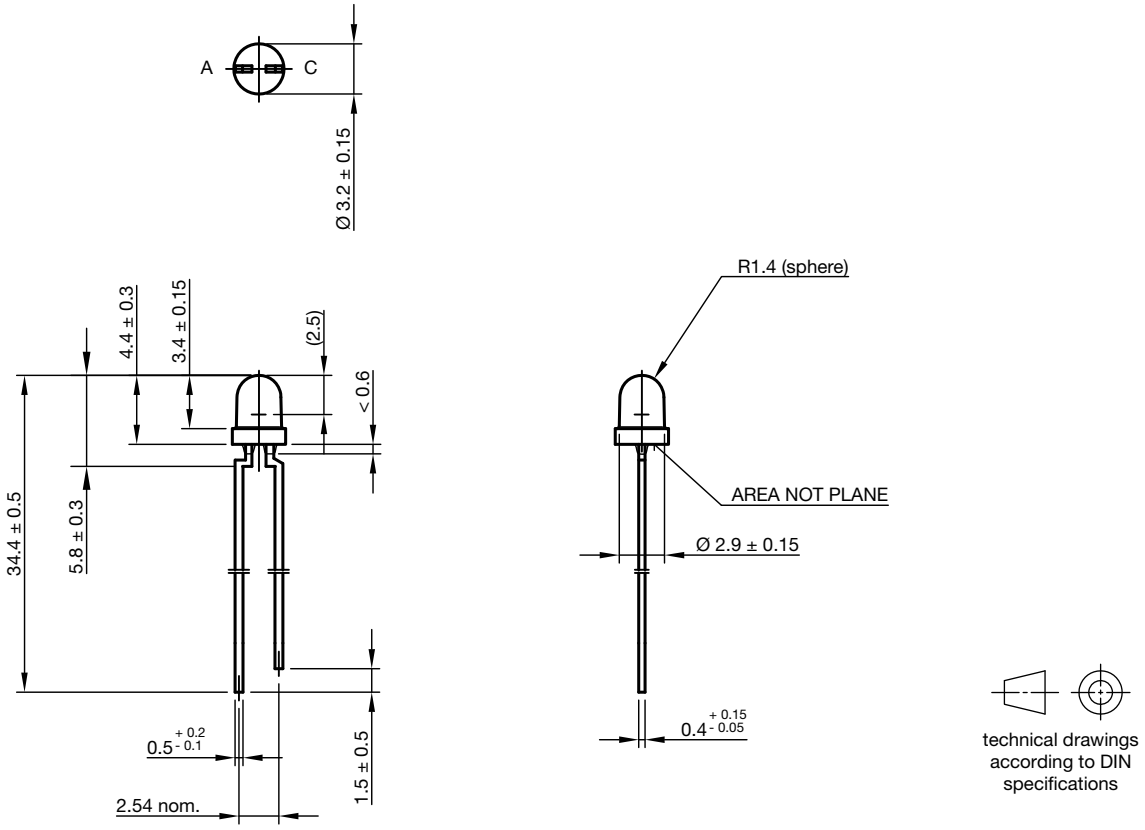



Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters




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

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