# High Speed Infrared Emitting Diode, 940 nm, Surface Emitter Technology

22114

## FEATURES

- Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- Leads with stand-off
- Peak wavelength: $\lambda_p$ = 940 nm
- High reliability
- High radiant power
- High radiant intensity
- Narrow angle of half intensity: $\varphi$ = ± 3°
- Suitable for high pulse current operation
- Good spectral matching with CMOS cameras
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

## DESCRIPTION

As part of the SurfLight™ portfolio, the VSLY5940 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with extreme high radiant intensity, high optical power and high speed, molded in a clear, untinted plastic package, with a parabolic lens.

## APPLICATIONS

- Infrared radiation source for operation with CMOS cameras
- High speed IR data transmission
- Smoke-automatic fire detectors
- IR Flash

## PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|---|---|---|---|---|
| VSLY5940 | 600 | ± 3 | 940 | 10 |

**Note**

- Test conditions see table “Basic Characteristics”

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---|---|---|---|
| VSLY5940 | Bulk | MOQ: 4000 pcs, 4000 pcs/bulk | T-1¾ |
| VSLY5940-CS21 | Reel | MOQ: 5000 pcs, 1000 pcs/bulk | T-1¾ |

**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 | $t_p/T$ = 0.5, $t_p$ = 100 µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 1 | A |
| Power dissipation | | $P_V$ | 190 | 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 | $R_{thJA}$ | 230 | K/W |

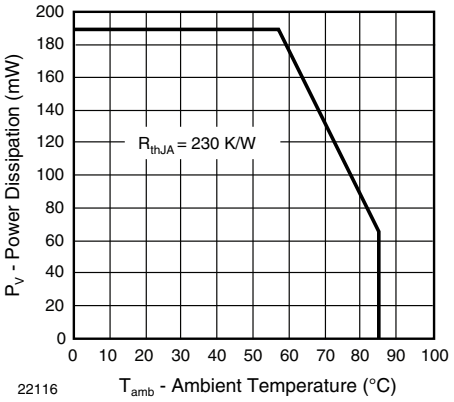



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

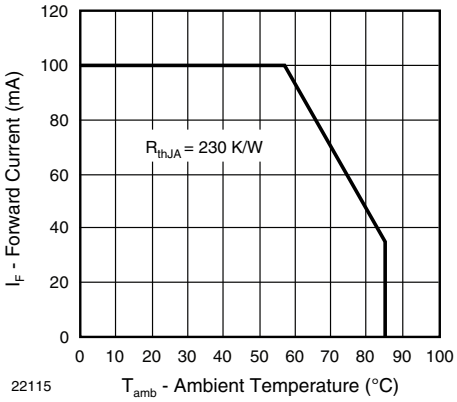



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| **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 | $V_F$ | | 1.65 | 1.9 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | | 2.9 | | V |
| Temperature coefficient of $V_F$ | $I_F$ = 1 mA | $TK_{VF}$ | | -1.45 | | mV/K |
| | $I_F$ = 10 mA | $TK_{VF}$ | | -1.25 | | mV/K |
| Reverse current | | $I_R$ | not designed for reverse operation | | | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | | 125 | | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 300 | 600 | 900 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | | 5100 | | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | | 55 | | mW |
| Temperature coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | | -0.35 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 3 | | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | | 35 | | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 100 mA | $TK\lambda_p$ | | 0.25 | | nm/K |
| Rise time | $I_F$ = 100 mA | $t_r$ | | 10 | | ns |
| Fall time | $I_F$ = 100 mA | $t_f$ | | 10 | | ns |

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

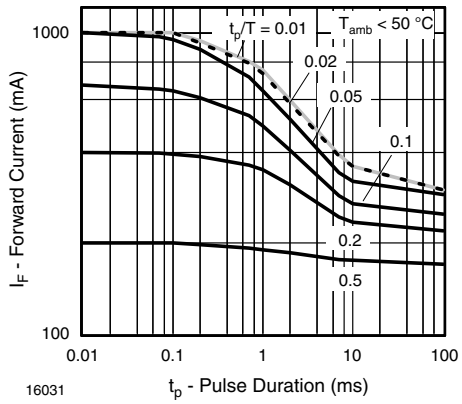



Fig. 3 - Pulse Forward Current vs. Pulse Duration

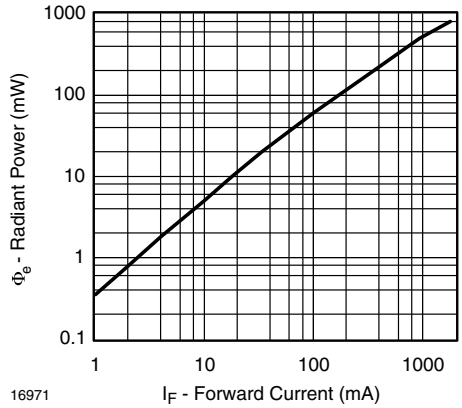



Fig. 6 - Radiant Power vs. Forward Current

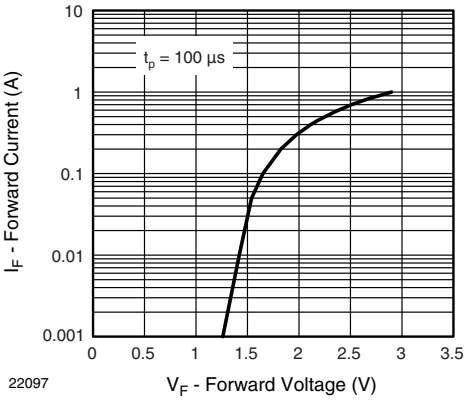



Fig. 4 - Forward Current vs. Forward Voltage

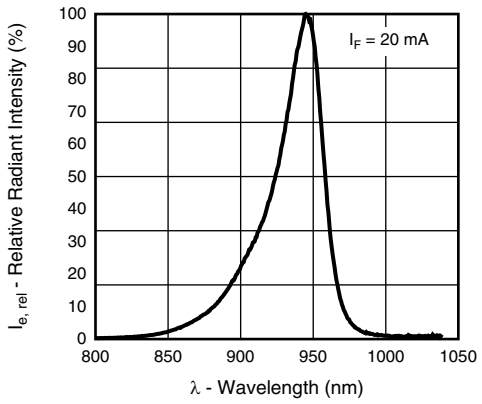



Fig. 7 - Relative Radiant Power vs. Wavelength

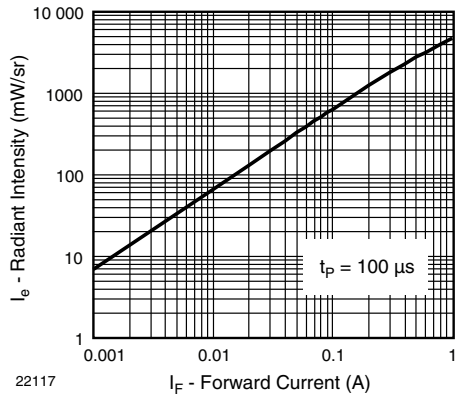



Fig. 5 - Radiant Intensity vs. Forward Current

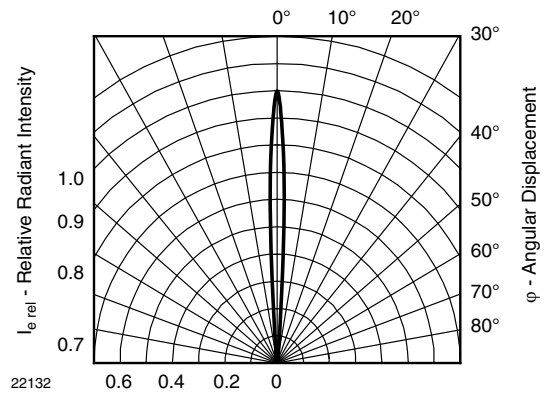
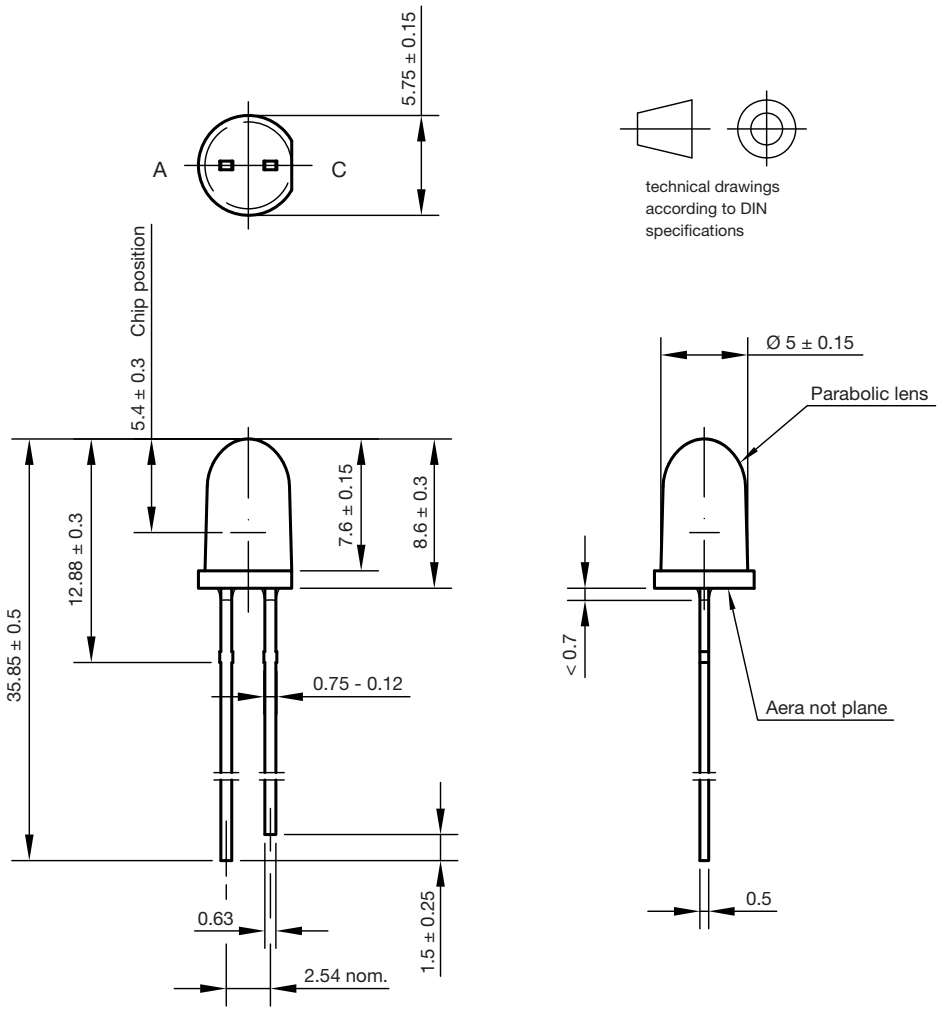



Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters

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Not indicated tolerances ± 0.1

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