

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



22114

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.

FEATURES

- Package type: leaded
- Package form: T-1¼
- 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: $\phi = \pm 3^\circ$
- 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



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) | ϕ (deg) | λ_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-1¼ |
| VSLY5940-CS21 | Reel | MOQ: 5000 pcs, 1000 pcs/bulk | T-1¼ |

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 | A |
| Power dissipation | | P_V | 190 | 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} | 230 | K/W |

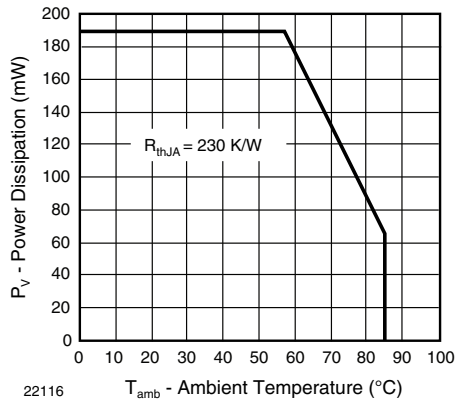


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

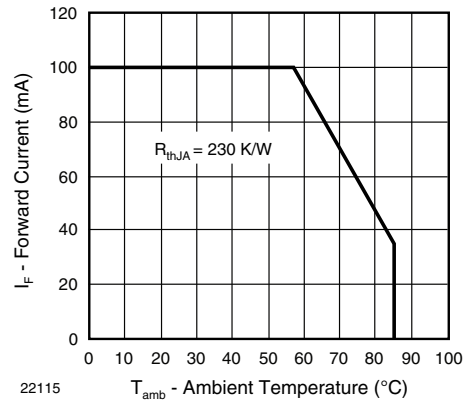


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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 _{V_F} | | -1.45 | | mV/K |
| | I _F = 10 mA | TK _{V_F} | | -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 | φ _e | | 55 | | mW |
| Temperature coefficient of φ _e | I _F = 100 mA | TKφ _e | | -0.35 | | %/K |
| Angle of half intensity | | φ | | ± 3 | | deg |
| Peak wavelength | I _F = 100 mA | λ _p | 920 | 940 | 960 | nm |
| Spectral bandwidth | I _F = 100 mA | Δλ | | 35 | | nm |
| Temperature coefficient of λ _p | I _F = 100 mA | TKλ _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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

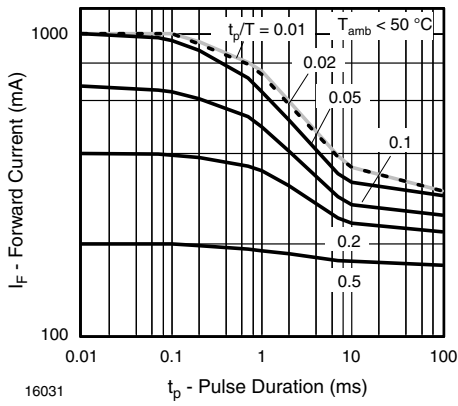


Fig. 3 - Pulse Forward Current vs. Pulse Duration

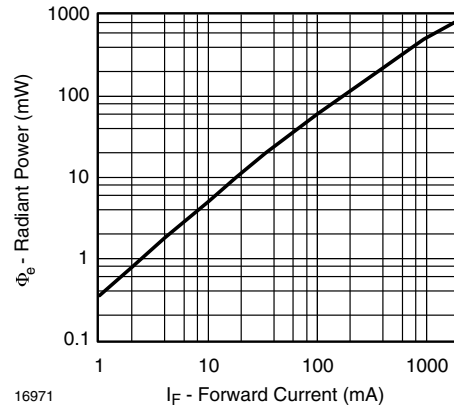


Fig. 6 - Radiant Power vs. Forward Current

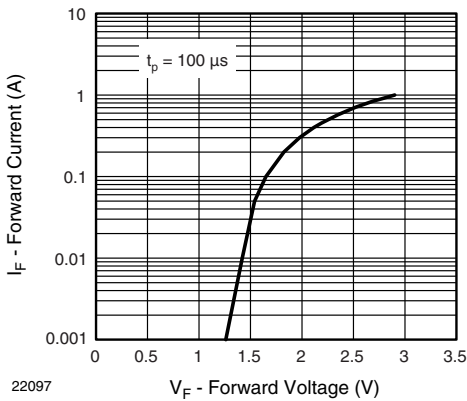


Fig. 4 - Forward Current vs. Forward Voltage

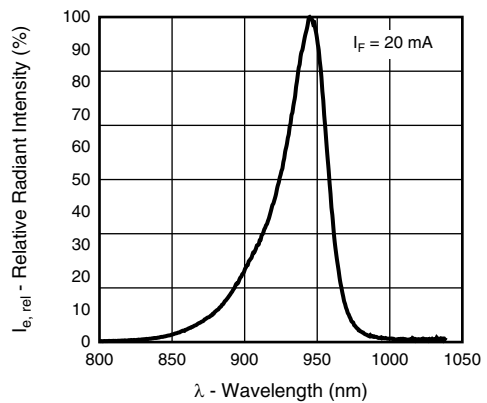


Fig. 7 - Relative Radiant Power vs. Wavelength

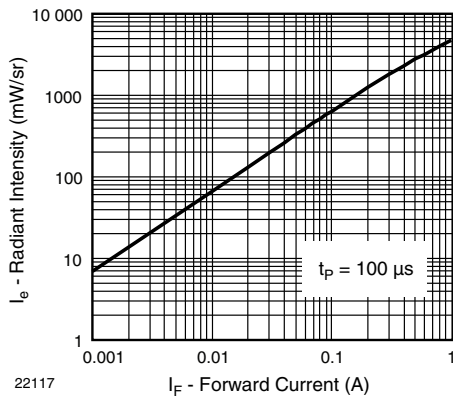


Fig. 5 - Radiant Intensity vs. Forward Current

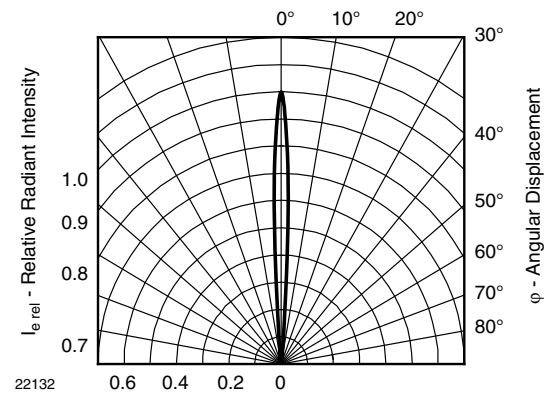
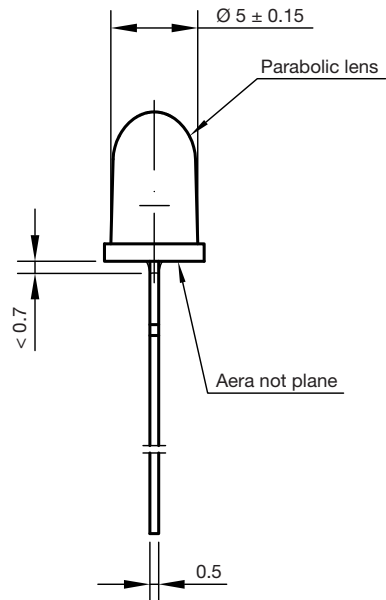
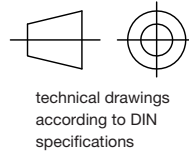
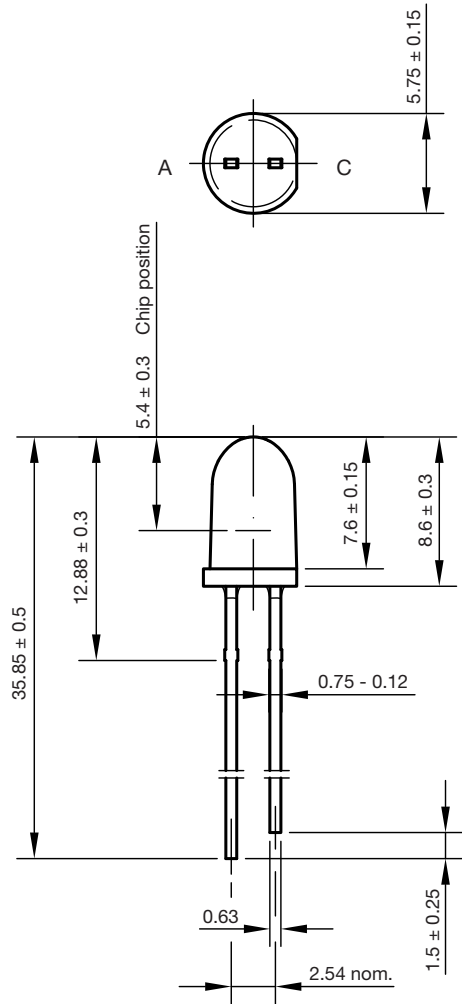


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement



PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.1

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