

# High Speed Infrared Emitting Diode, 850 nm, Surface Emitter Technology



22114

## FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 850$  nm
- High reliability
- High radiant power
- High radiant intensity
- Narrow angle of half intensity:  $\varphi = \pm 3^\circ$
- 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](http://www.vishay.com/doc?99912)



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

## DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSLY5850 is an infrared, 850 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) |
|-----------|---------------|-----------------|------------------|------------|
| VSLY5850  | 600           | $\pm 3$         | 850              | 10         |

### Note

- Test conditions see table “Basic Characteristics”

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM      |
|---------------|-----------|------------------------------|-------------------|
| VSLY5850      | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1 $\frac{3}{4}$ |

### 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              |

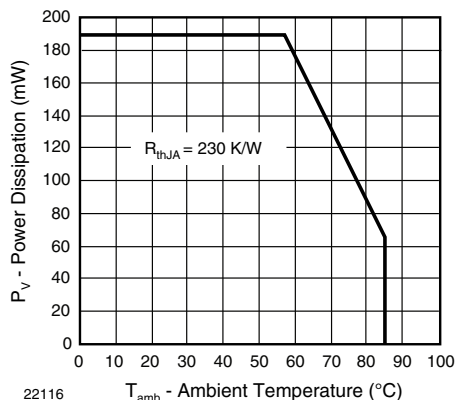


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

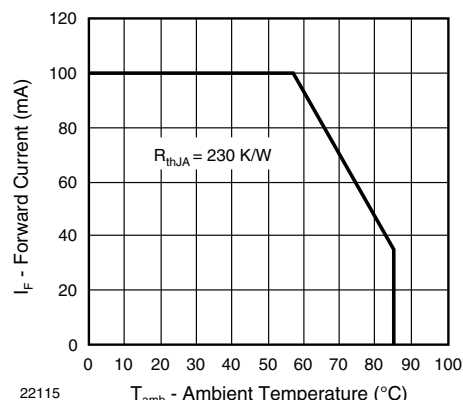


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                                 |                             |                                    |        |      |       |
|------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------|------------------------------------|--------|------|-------|
| PARAMETER                                                                    | TEST CONDITION                                  | SYMBOL                      | MIN.                               | TYP.   | MAX. | UNIT  |
| Forward voltage                                                              | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | V <sub>F</sub>              |                                    | 1.65   | 1.9  | V     |
|                                                                              | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs   | V <sub>F</sub>              |                                    | 2.9    |      | V     |
| Temperature coefficient of V <sub>F</sub>                                    | I <sub>F</sub> = 1 mA                           | TK <sub>V<sub>F</sub></sub> |                                    | - 1.45 |      | mV/K  |
|                                                                              | I <sub>F</sub> = 10 mA                          | TK <sub>V<sub>F</sub></sub> |                                    | - 1.25 |      | mV/K  |
| Reverse current                                                              |                                                 | I <sub>R</sub>              | not designed for reverse operation |        |      | μA    |
| Junction capacitance                                                         | V <sub>R</sub> = 0 V, f = 1 MHz, E = 0          | C <sub>j</sub>              |                                    | 125    |      | pF    |
| Radiant intensity                                                            | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | I <sub>e</sub>              | 300                                | 600    | 900  | mW/sr |
|                                                                              | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs   | I <sub>e</sub>              |                                    | 5100   |      | mW/sr |
| Radiant power                                                                | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | φ <sub>e</sub>              |                                    | 55     |      | mW    |
| Temperature coefficient of φ <sub>e</sub>                                    | I <sub>F</sub> = 100 mA                         | TKφ <sub>e</sub>            |                                    | - 0.35 |      | %/K   |
| Angle of half intensity                                                      |                                                 | φ                           |                                    | ± 3    |      | deg   |
| Peak wavelength                                                              | I <sub>F</sub> = 100 mA                         | λ <sub>p</sub>              | 840                                | 850    | 870  | nm    |
| Spectral bandwidth                                                           | I <sub>F</sub> = 100 mA                         | Δλ                          |                                    | 30     |      | nm    |
| Temperature coefficient of λ <sub>p</sub>                                    | I <sub>F</sub> = 100 mA                         | TKλ <sub>p</sub>            |                                    | 0.25   |      | nm/K  |
| Rise time                                                                    | I <sub>F</sub> = 100 mA                         | t <sub>r</sub>              |                                    | 10     |      | ns    |
| Fall time                                                                    | I <sub>F</sub> = 100 mA                         | t <sub>f</sub>              |                                    | 10     |      | ns    |

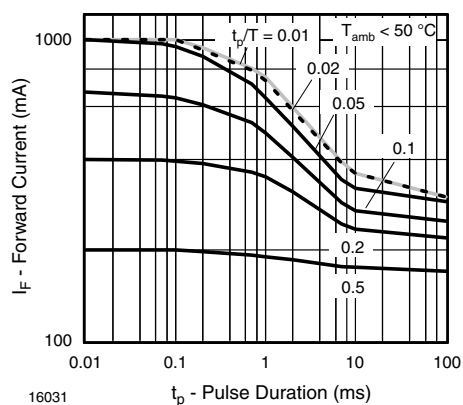
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Pulse Forward Current vs. Pulse Duration

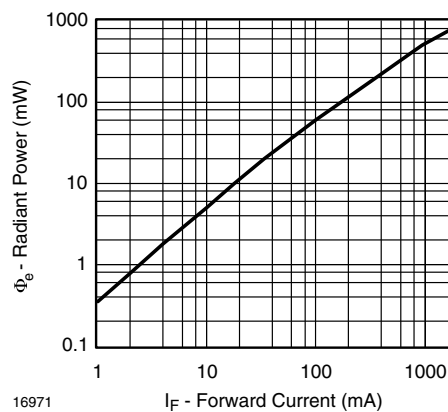


Fig. 6 - Radiant Power vs. Forward Current

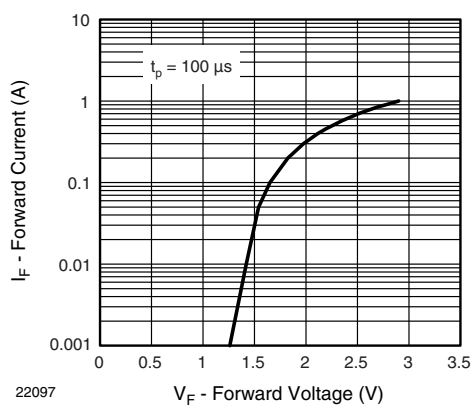


Fig. 4 - Forward Current vs. Forward Voltage

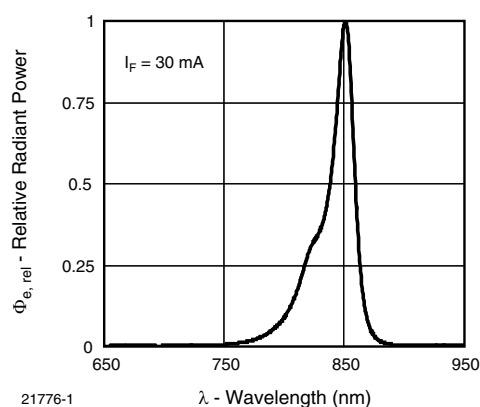


Fig. 7 - Relative Radiant Power vs. Wavelength

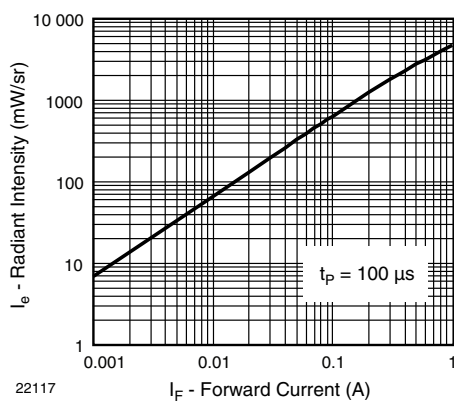


Fig. 5 - Radiant Intensity vs. Forward Current

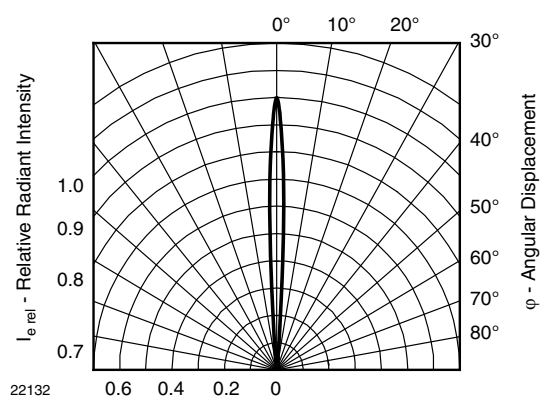
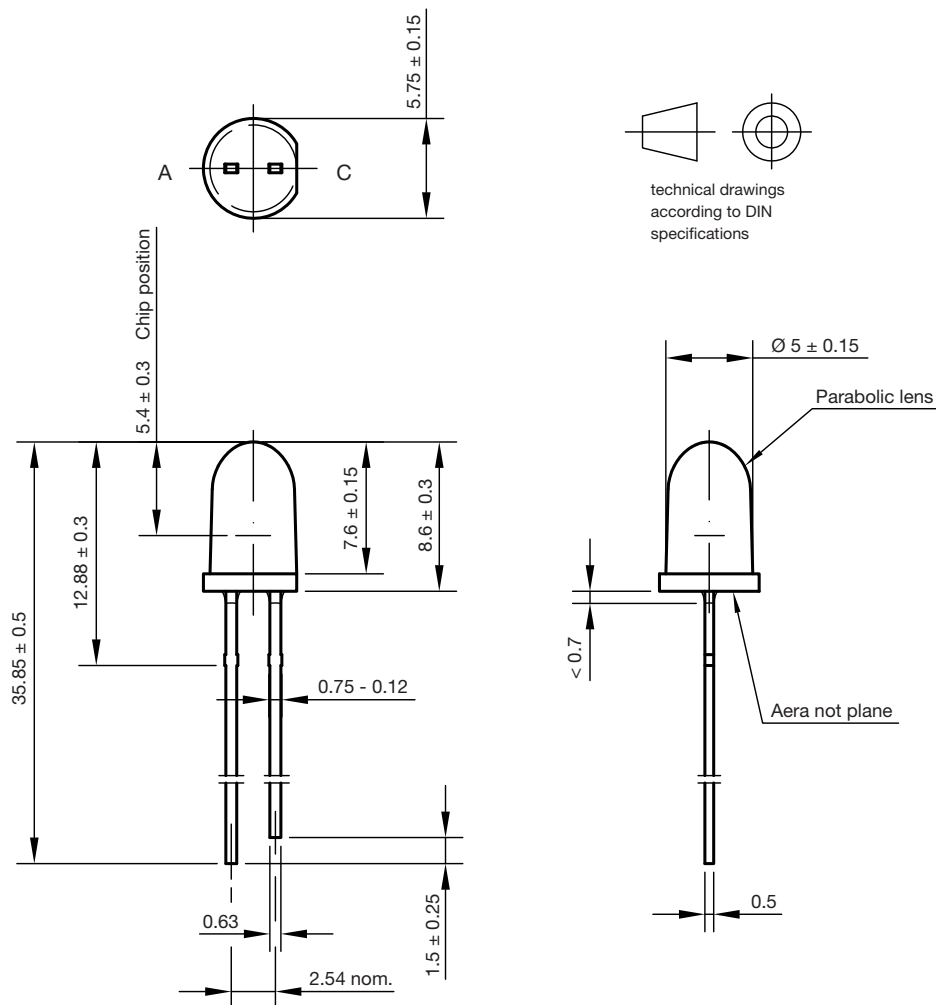


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters


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 20531

Not indicated tolerances  $\pm 0.1$



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