

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


 AUTOMOTIVE  
GRADE

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

### FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.8
- Peak wavelength:  $\lambda_p = 850$  nm
- AEC-Q101 qualified
- High speed
- Angle of half intensity:  $\phi = \pm 60^\circ$
- 0805 standard surface-mountable package
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY5850X01 is an infrared, 850 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, high optical power and high speed, in a low profile 0805 surface mount (SMD) package.

### APPLICATIONS

- Miniature light barrier
- Automotive sensors
- Optical switch
- IR point source

### PRODUCT SUMMARY

| COMPONENT   | $I_e$ (mW/sr) at $I_F = 100$ mA | $\phi$ (°) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-------------|---------------------------------|------------|------------------|------------|
| VSMY5850X01 | 13                              | $\pm 60$   | 850              | 7          |

#### Note

- Test conditions see table “Basic Characteristics“

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VSMY5850X01   | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805         |

#### Note

- MOQ: minimum order quantity



| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |  |                   |             |      |
|---|--|-------------------|-------------|------|
| PARAMETER   | TEST CONDITION                                   | SYMBOL            | VALUE       | UNIT |
| Reverse voltage   |  | V <sub>R</sub>    | 5           | V    |
| Forward current   |  | I <sub>F</sub>    | 100         | mA   |
| Peak forward current  | t <sub>p</sub> /T = 0.1, t <sub>p</sub> = 100 μs | I <sub>FM</sub>   | 200         | mA   |
| Surge forward current   | t <sub>p</sub> = 100 μs                          | I <sub>FSM</sub>  | 500         | mA   |
| Power dissipation   |  | P <sub>V</sub>    | 210         | mW   |
| Junction temperature  |  | T <sub>j</sub>    | 125         | °C   |
| Operating temperature range   |  | T <sub>amb</sub>  | -40 to +110 | °C   |
| Storage temperature range   |  | T <sub>stg</sub>  | -40 to +110 | °C   |
| Soldering temperature   | According to Fig. 7, J-STD-020                   | T <sub>sd</sub>   | 260         | °C   |
| Thermal resistance junction-to-ambient  | EIA / JESD51                                     | R <sub>thJA</sub> | 280         | K/W  |

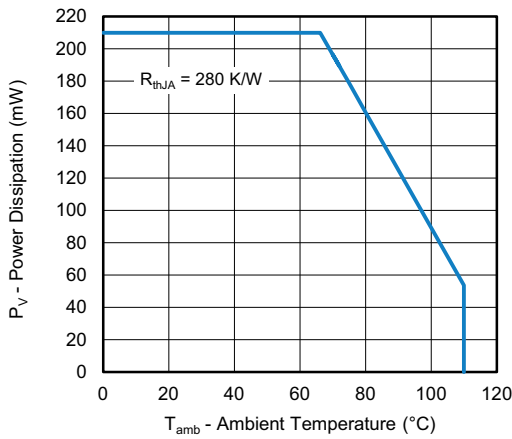


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

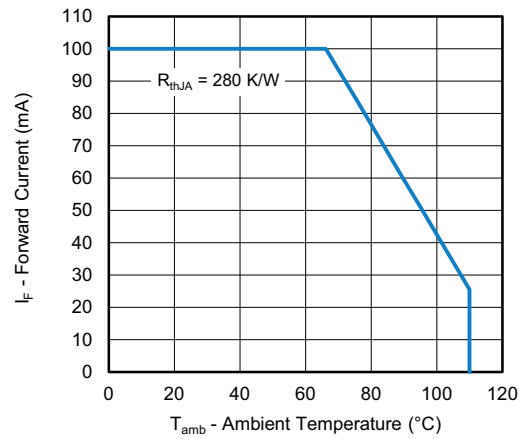


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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>              | -                                  | 1.8   | 2.1  | V     |
| Temperature coefficient of V <sub>F</sub>                                    | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | TK <sub>V<sub>F</sub></sub> | -                                  | -1.8  | -    | 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 mW/cm <sup>2</sup> | C <sub>J</sub>              | -                                  | 30    | -    | pF    |
| Radiant intensity  | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | I <sub>e</sub>              | 9                                  | 13    | 18   | mW/sr |
| Temperature coefficient of radiant power                                     | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | TK <sub>φ<sub>e</sub></sub> | -                                  | -0.16 | -    | %/K   |
| Angle of half intensity  |   | φ                           | -                                  | ± 60  | -    | °     |
| Peak wavelength  | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | λ <sub>p</sub>              | -                                  | 850   | -    | nm    |
| Spectral bandwidth   | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | Δλ                          | -                                  | 35    | -    | nm    |
| Temperature coefficient of λ <sub>p</sub>                                    | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms           | TK <sub>λ<sub>p</sub></sub> | -                                  | 0.25  | -    | nm/K  |
| Rise time  | I <sub>F</sub> = 100 mA, 10 % to 90 %                     | t <sub>r</sub>              | -                                  | 7     | -    | ns    |
| Fall time  | I <sub>F</sub> = 100 mA, 10 % to 90 %                     | t <sub>f</sub>              | -                                  | 7     | -    | ns    |

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

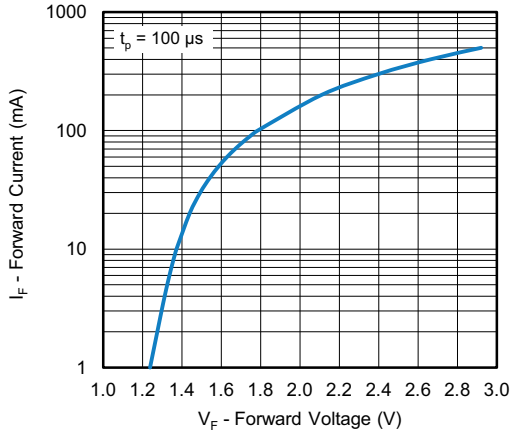


Fig. 3 - Forward Current vs. Forward Voltage

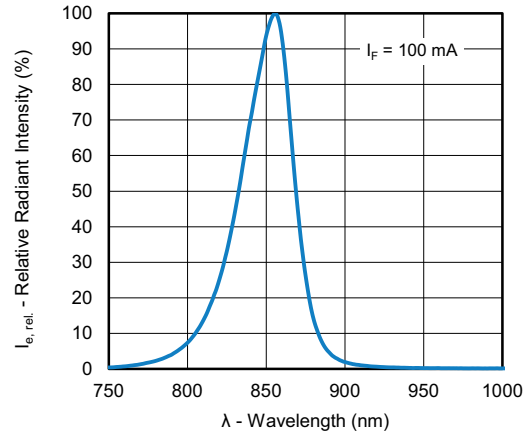


Fig. 5 - Relative Radiant Power vs. Wavelength

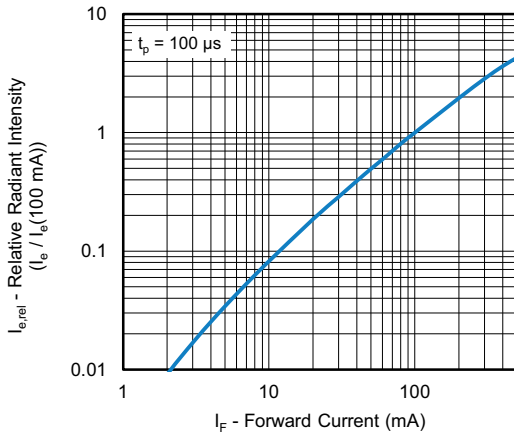


Fig. 4 - Relative Radiant Intensity vs. Forward Current

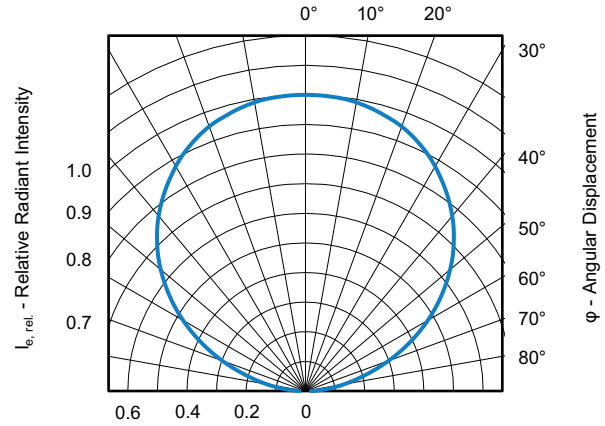
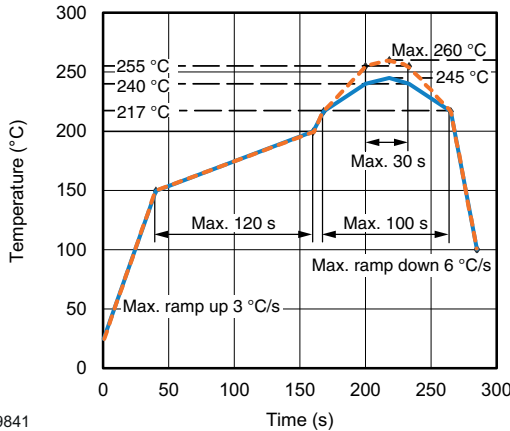


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

**REFLOW SOLDER PROFILE**



19841

Fig. 7 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

**DRYPACK**

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

**FLOOR LIFE**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

Floor life: 168 h

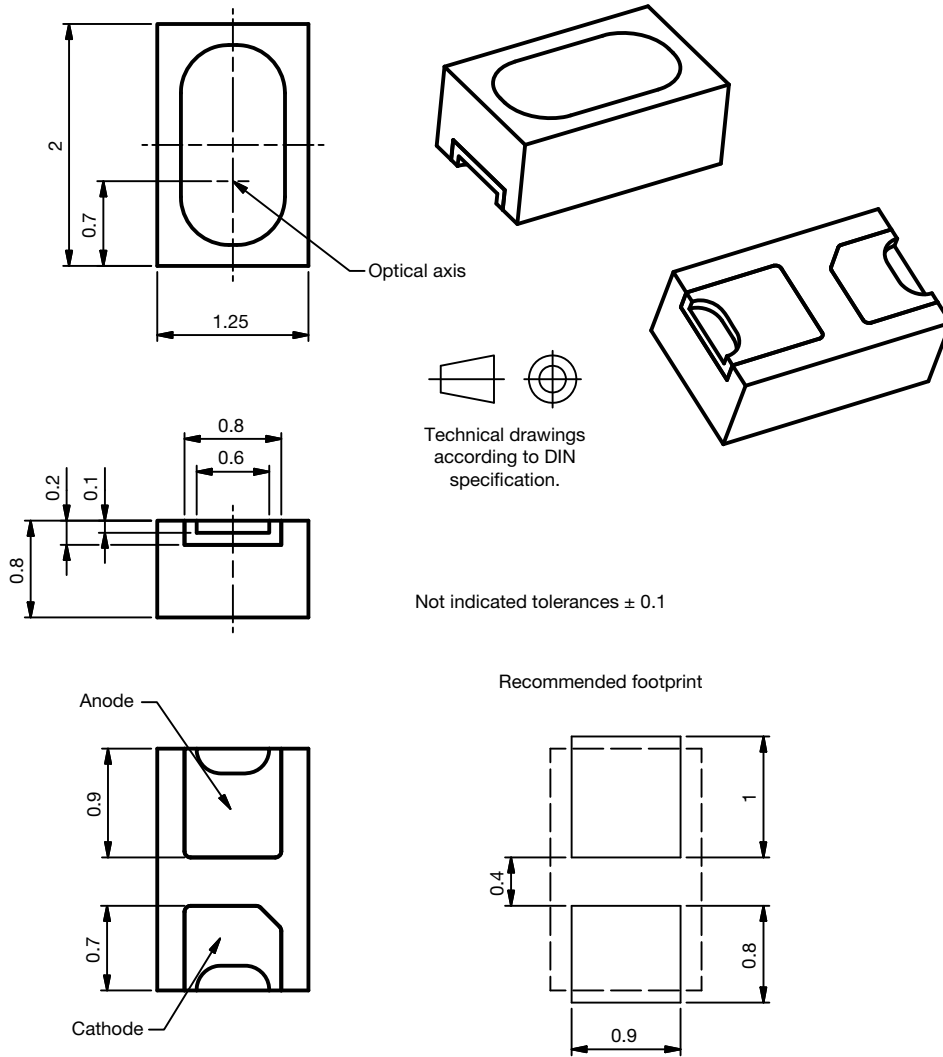
Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , RH < 60 %

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

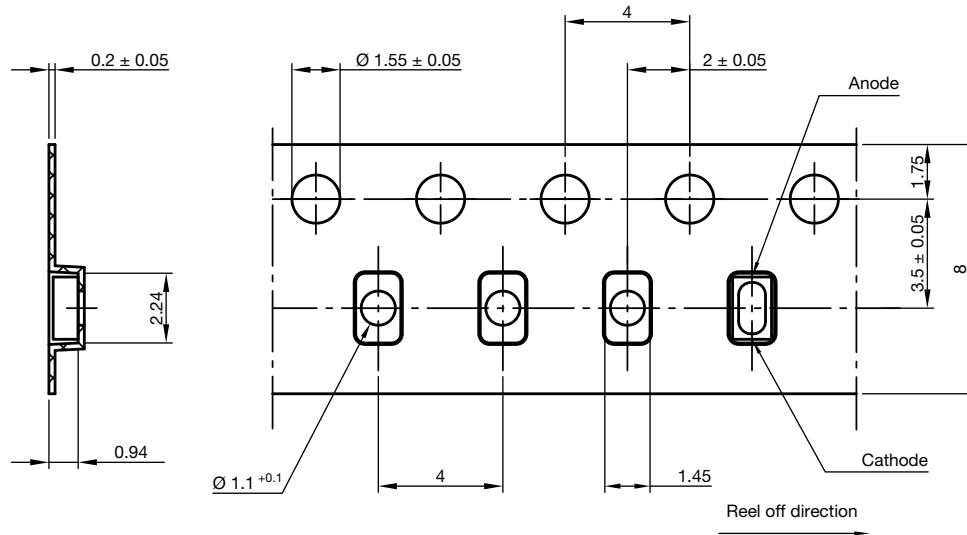


**PACKAGE DIMENSIONS** in millimeters

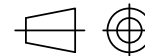


Drawing- No.: 6.550-5352.01-4  
Issue: 1; 20.12.2016

**BLISTER TAPE DIMENSIONS** in millimeters



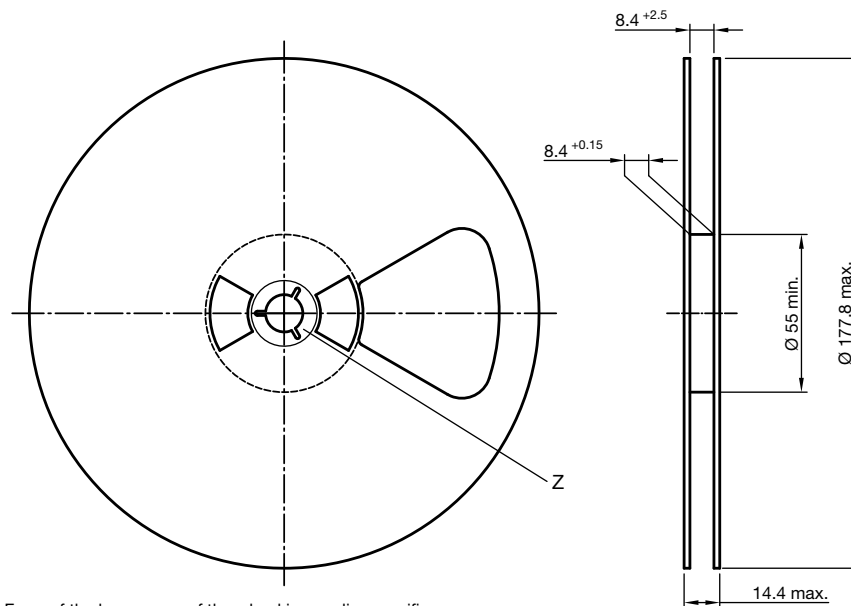
Not indicated tolerances ± 0.1



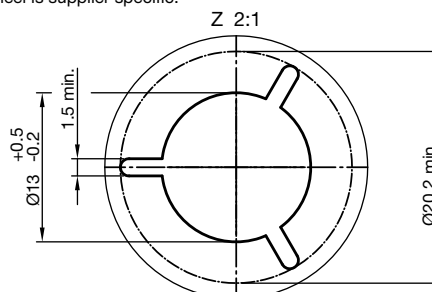
Technical drawings according to DIN specification.

Drawing-No.: 9.700-5352.02-4  
Issue: 1; 20.12.2016

**REEL DIMENSIONS** in millimeters



Form of the leave open of the wheel is supplier specific.



Technical drawings according to DIN specification.

Drawing-No.: 9.800-5096.01-4  
Issue: 5; 20.12.2016



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