

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



DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY5940 is an infrared, 940 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.

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: $\lambda_p = 940$ nm
- High speed
- Angle of half intensity: $\varphi = \pm 60^\circ$
- 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



APPLICATIONS

- Miniature light barrier
- Optical switch
- IR point source

| PRODUCT SUMMARY | | | | |
|-----------------|---------------------------------|---------------|------------------|------------|
| COMPONENT | I_e (mW/sr) at $I_F = 100$ mA | φ (°) | λ_p (nm) | t_r (ns) |
| VSMY5940 | 13 | ± 60 | 940 | 7 |

Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|--------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VSMY5940 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805 |

Note

- MOQ: minimum order quantity



| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | |
|---|--|------------|-------------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage | | V_R | 5 | V |
| Forward current | | I_F | 100 | mA |
| Peak forward current | $t_p/T = 0.1$, $t_p = 100\text{ }\mu\text{s}$ | I_{FM} | 200 | mA |
| Surge forward current | $t_p = 100\text{ }\mu\text{s}$ | I_{FSM} | 500 | mA |
| Power dissipation | | P_V | 190 | mW |
| Junction temperature | | T_j | 125 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +110 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +110 | $^{\circ}\text{C}$ |
| Soldering temperature | According to Fig. 7, J-STD-020 | T_{sd} | 260 | $^{\circ}\text{C}$ |
| Thermal resistance junction-to-ambient | EIA / JESD51 | R_{thJA} | 280 | K/W |

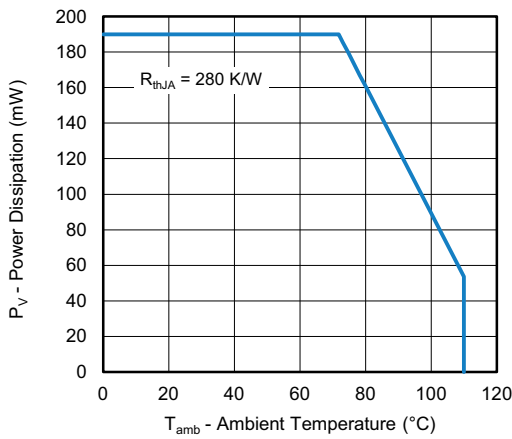


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

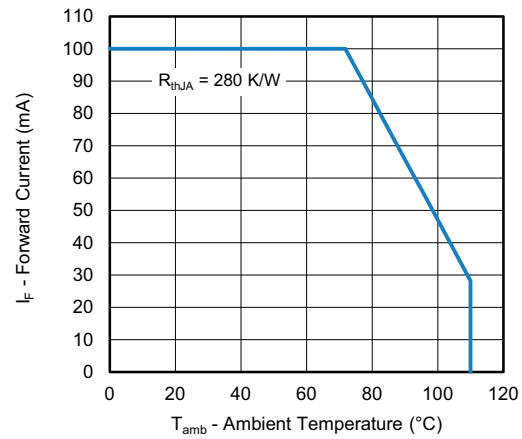


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|------------------|------------------------------------|----------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | - | 1.6 | 1.9 | V |
| Temperature coefficient of V_F | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | TK_{V_F} | - | -0.7 | - | mV/K |
| Reverse current | | I_R | Not designed for reverse operation | | | μA |
| Junction capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ mW/cm}^2$ | C_J | - | 30 | - | pF |
| Radiant intensity | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | 9 | 13 | 18 | mW/sr |
| Temperature coefficient of radiant power | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | TK_{ϕ_e} | - | -0.2 | - | %/K |
| Angle of half intensity | | ϕ | - | ± 60 | - | $^{\circ}$ |
| Peak wavelength | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | λ_p | - | 940 | - | nm |
| Spectral bandwidth | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | $\Delta\lambda$ | - | 55 | - | nm |
| Temperature coefficient of λ_p | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | TK_{λ_p} | - | 0.28 | - | nm/K |
| Rise time | $I_F = 100\text{ mA}$, 10 % to 90 % | t_r | - | 5 | - | ns |
| Fall time | $I_F = 100\text{ mA}$, 10 % to 90 % | t_f | - | 5 | - | ns |

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

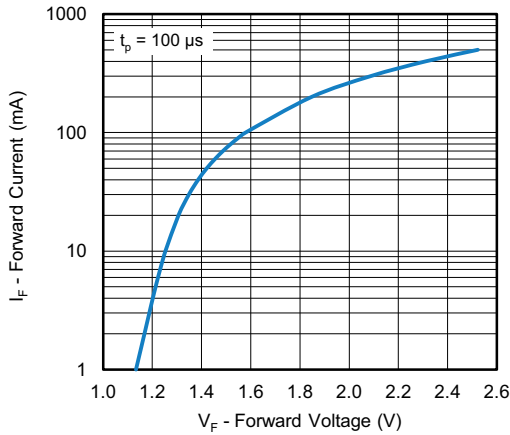


Fig. 3 - Forward Current vs. Forward Voltage

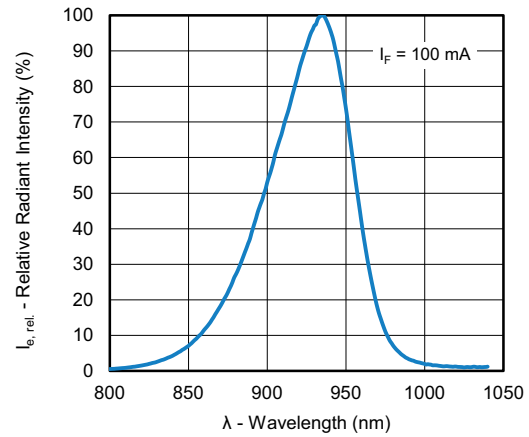


Fig. 5 - Relative Radiant Power vs. Wavelength

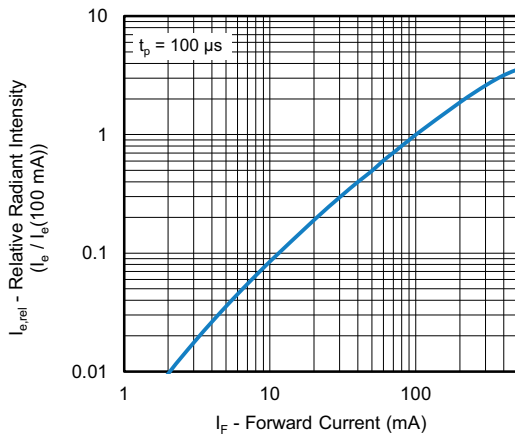


Fig. 4 - Relative Radiant Intensity vs. Forward Current



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



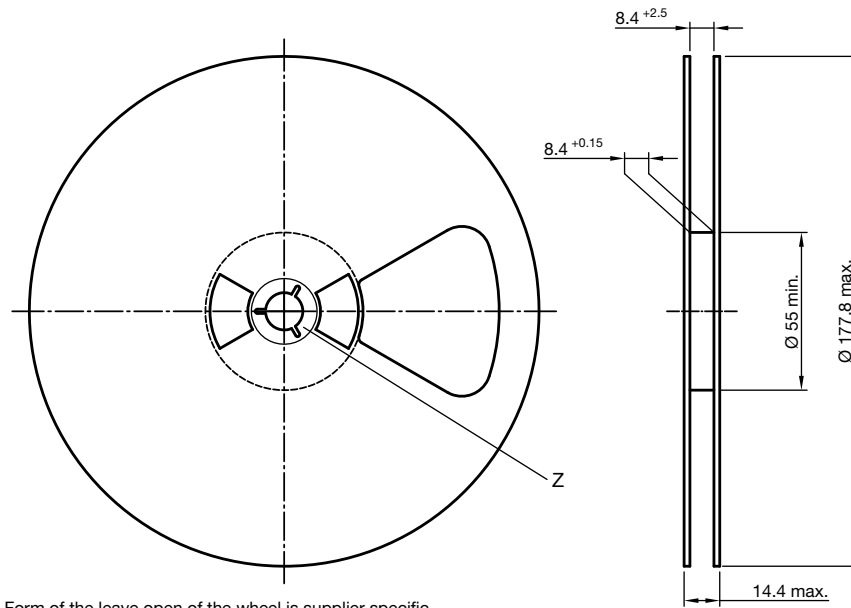
Not indicated tolerances ± 0.1



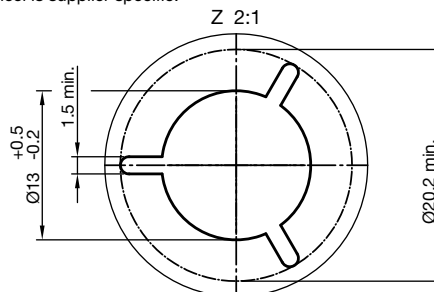
Technical drawings according to DIN specification.

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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