

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



21531

ADDITIONAL RESOURCES



DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY1943X01 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, high optical power and high speed, molded in clear, untinted 0805 plastic package for surface mounting (SMD).

FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- AEC-Q101 qualified
- Operating temperature range: -40 °C to +105 °C
- Peak wavelength: $\lambda_p = 940$ nm
- Angle of half sensitivity: $\phi = \pm 60^\circ$
- 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

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Miniature light barrier
- Photointerrupters
- Emitter source for proximity sensors

PRODUCT SUMMARY

| COMPONENT | I_e (mW/sr) at $I_F = 50$ mA | ϕ (°) | λ_p (nm) | t_r (ns) |
|-------------|--------------------------------|------------|------------------|------------|
| VSMY1943X01 | 6 | ± 60 | 940 | 5 |

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VSMY1943X01 | 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 |
|--|--|------------|-------------|--------------------|
| Forward current | | I_F | 70 | mA |
| Peak forward current | $t_p/T = 0.5$, $t_p = 100\text{ }\mu\text{s}$ | I_{FM} | 140 | mA |
| Surge forward current | $t_p = 100\text{ }\mu\text{s}$ | I_{FSM} | 500 | mA |
| Power dissipation | | P_V | 120 | mW |
| Junction temperature | | T_j | 110 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +105 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +110 | $^{\circ}\text{C}$ |
| Soldering temperature | According to Fig. 10, J-STD-020 | T_{sd} | 260 | $^{\circ}\text{C}$ |
| Thermal resistance junction-to-ambient | EIA / JESD 51 | R_{thJA} | 280 | K/W |

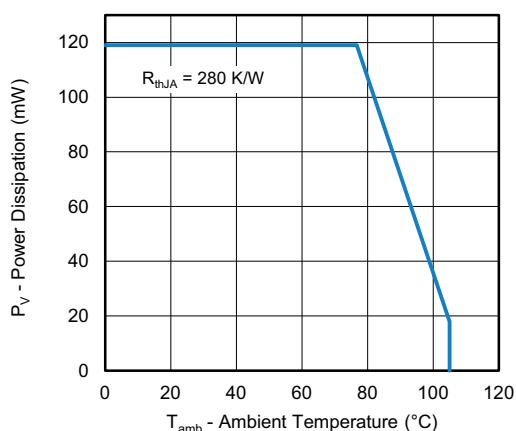


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

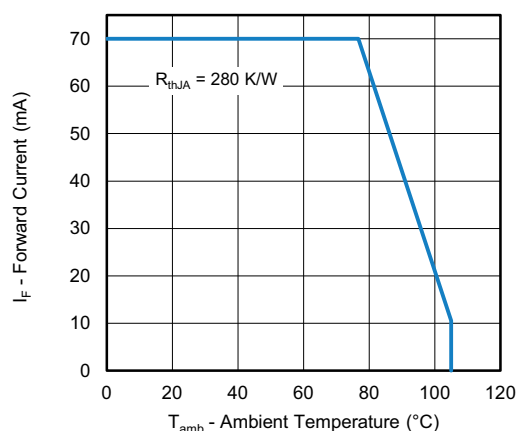


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-------------------------|---|-----------------|------------------------------------|----------|------|---------------|
| Forward voltage | $I_F = 50\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | - | 1.4 | 1.7 | V |
| | $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | - | 1.5 | - | V |
| | $I_F = 500\text{ mA}$, $t_p = 100\text{ }\mu\text{s}$ | V_F | - | 2.5 | - | V |
| 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 | $I_F = 50\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | 4 | 6 | 8 | mW/sr |
| | $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | I_e | - | 80 | - | mW/sr |
| Radiant power | $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | ϕ_e | - | 40 | - | mW |
| Angle of half intensity | | ϕ | - | ± 60 | - | $^{\circ}$ |
| Peak wavelength | $I_F = 70\text{ mA}$ | λ_p | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F = 70\text{ mA}$ | $\Delta\lambda$ | - | 55 | - | nm |
| Rise time | $I_F = 70\text{ mA}$, 10 % to 90 % | t_r | - | 5 | - | ns |
| Fall time | $I_F = 70\text{ mA}$, 10 % to 90 % | t_f | - | 6 | - | ns |

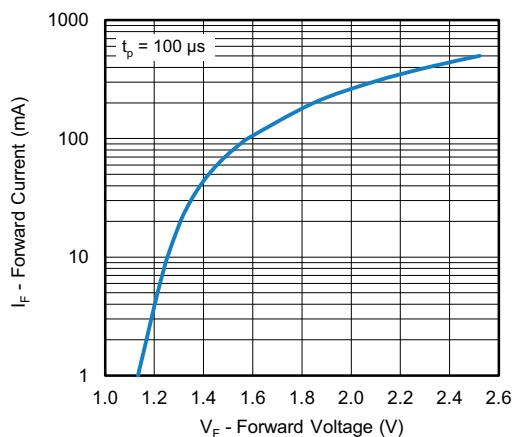
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

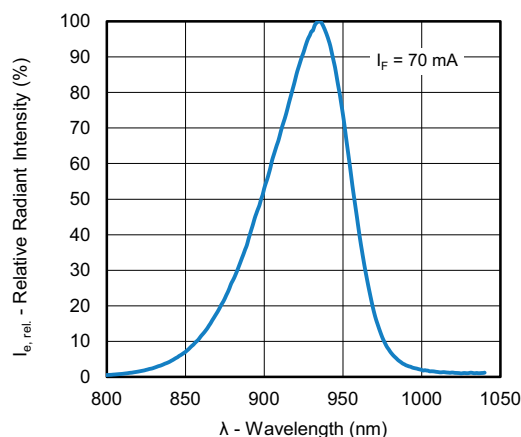


Fig. 5 - Relative Radiant Intensity vs. Wavelength

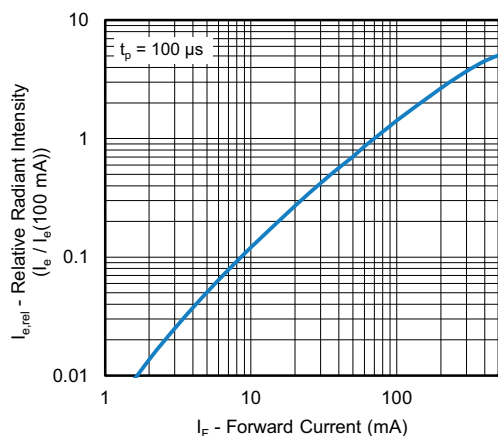
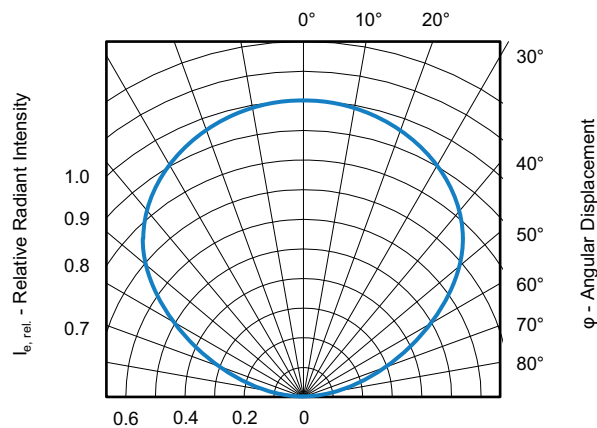
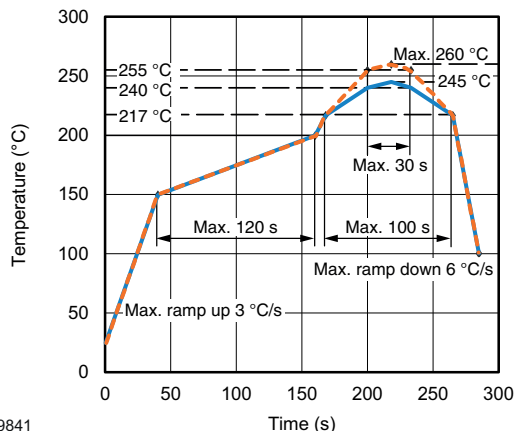


Fig. 4 - Relative Radiant Intensity vs. Ambient Temperature



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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:

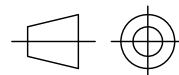
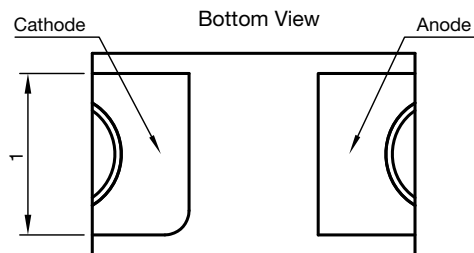
Moisture sensitivity: level 3

Floor life: 168 h

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

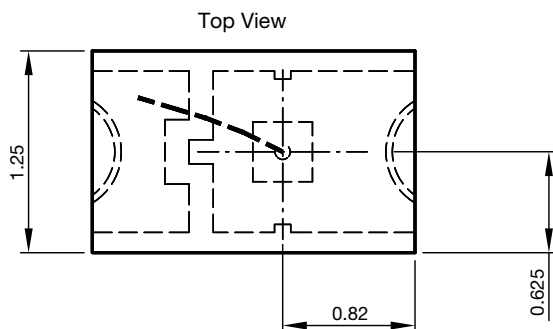
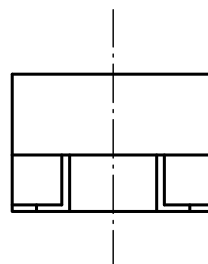
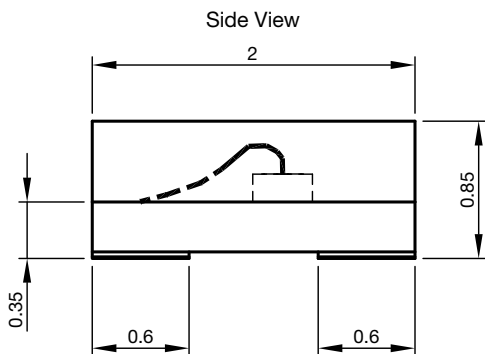
DRYING

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 $40\text{ }^{\circ}\text{C} (+ 5\text{ }^{\circ}\text{C})$, $RH < 5\%$.

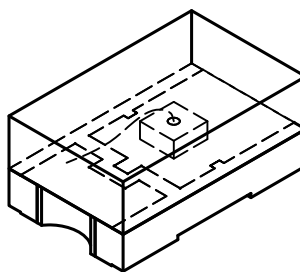
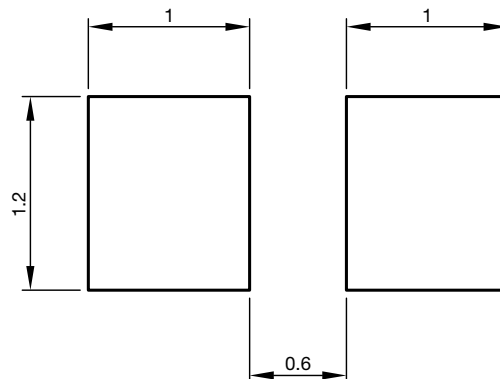
PACKAGE DIMENSIONS in millimeters


technical drawings
according to DIN
specifications

Not indicated tolerances ± 0.1

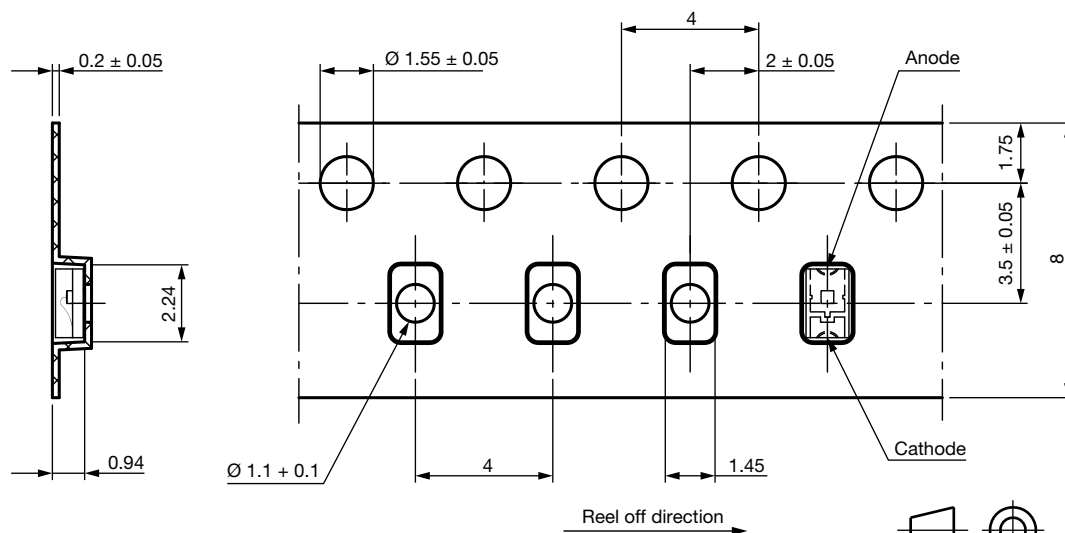


Recommended solder pad
Footprint



Drawing-No.: 6.541-5083.01-4

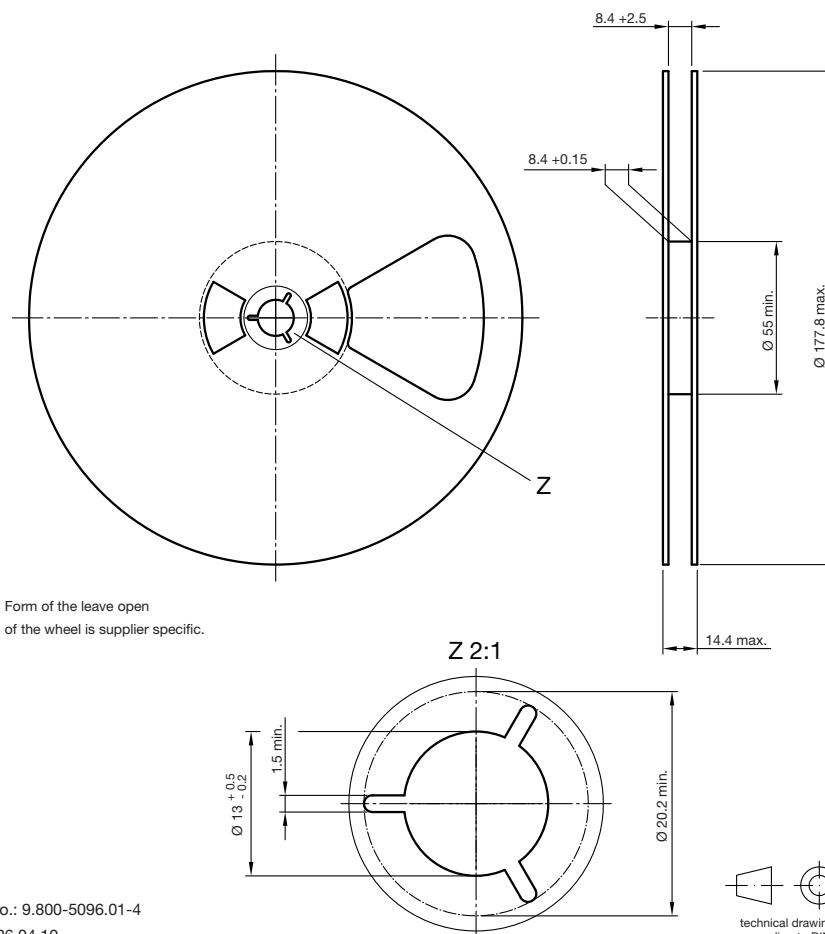
Issue: 2; 10.09.2013

BLISTER TAPE DIMENSIONS in millimeters


Drawing-No.: 9.700-5352.01-4
Issue: 2; 10.09.13

Not indicated tolerances ± 0.1

Technical drawings
according to DIN
specifications

REEL DIMENSIONS in millimeters


Drawing-No.: 9.800-5096.01-4
Issue: 2; 26.04.10
20875

technical drawings
according to DIN
specifications



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