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

21531

## 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
- Peak wavelength: $\lambda_p$ = 940 nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half sensitivity: φ = ± 60°
- Suitable for high pulse current operation
- 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

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## DESCRIPTION

As part of the SurfLight™ portfolio, the VSMY1940X01 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).

## APPLICATIONS

- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- IR touch panels
- IR flash
- IR illumination
- 3D TV

| PRODUCT SUMMARY | | | | |
|---|---|---|---|---|
| COMPONENT | $I_e$ (mW/sr) | φ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
| VSMY1940X01 | 10 | ± 60 | 940 | 10 |

**Note**

- Test conditions see table “Basic Characteristics“

| ORDERING INFORMATION | | | |
|---|---|---|---|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VSMY1940X01 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | 0805 |

**Note**

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °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 µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 1 | A |
| Power dissipation | | $P_V$ | 180 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | -40 to +85 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +100 | °C |
| Soldering temperature | According to Fig. 10, J-STD-020 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction / ambient | JESD 51 | $R_{thJA}$ | 250 | K/W |

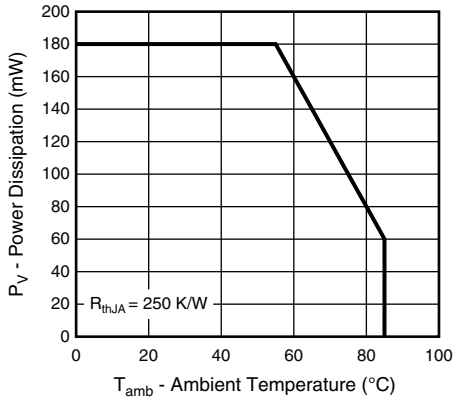



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

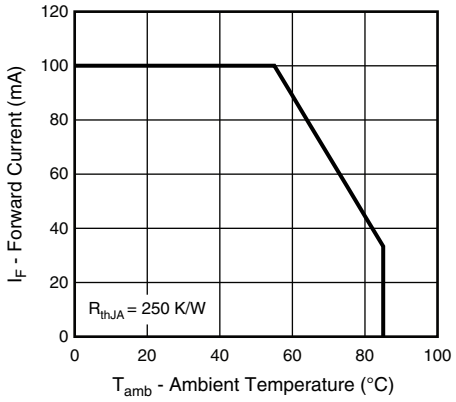



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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 | $V_F$ | - | 1.45 | 1.8 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | - | 2.2 | - | V |
| Temperature coefficient of $V_F$ | $I_F$ = 100 mA | $TK_{VF}$ | - | -2 | - | mV/K |
| Reverse current | | $I_R$ | Not designed for reverse operation | | | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 mW/cm² | $C_J$ | - | 125 | - | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 5 | 10 | 15 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | - | 75 | - | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi e$ | - | 50 | - | mW |
| Temperature coefficient of radiant power | $I_F$ = 100 mA | $TK\phi_e$ | - | -0.2 | - | %/K |
| Angle of half intensity | | $\varphi$ | - | ± 60 | - | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F$ = 100 mA | $\Delta\lambda$ | - | 40 | - | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 30 mA | $TK_{\lambda p}$ | - | 0.25 | - | nm/K |
| Rise time | $I_F$ = 100 mA, 20 % to 80 % | $t_r$ | - | 10 | - | ns |
| Fall time | $I_F$ = 100 mA, 20 % to 80 % | $t_f$ | - | 10 | - | ns |

**BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

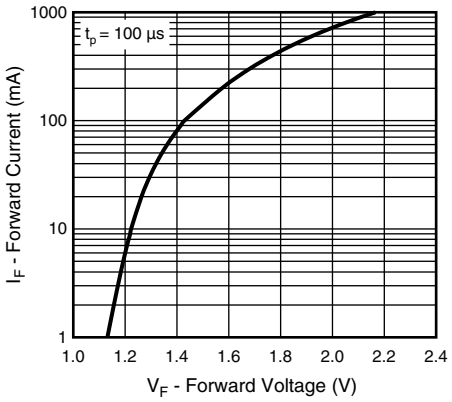



Fig. 3 - Forward Current vs. Forward Voltage

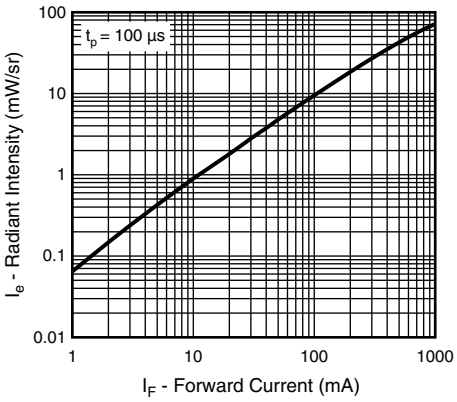



Fig. 6 - Radiant Intensity vs. Forward Current

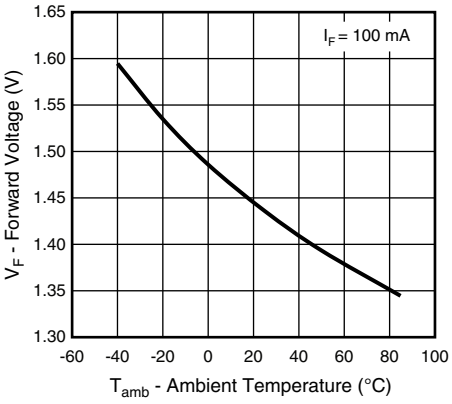



Fig. 4 - Forward Voltage vs. Ambient Temperature

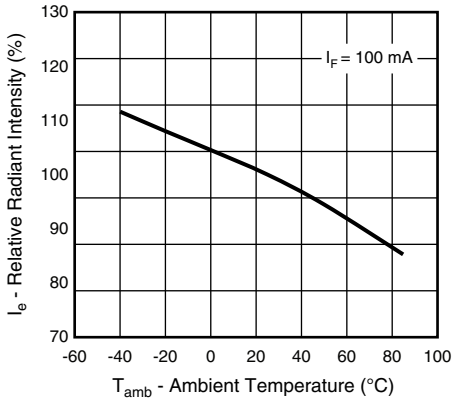



Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

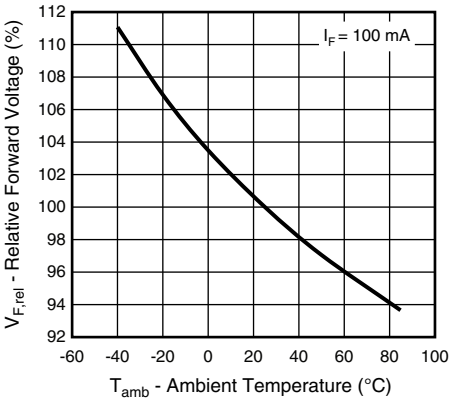



Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

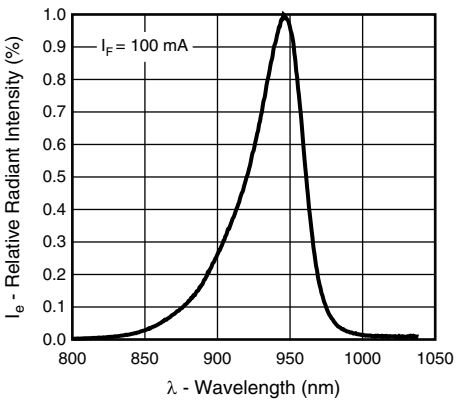



Fig. 8 - Relative Radiant Intensity vs. Wavelength

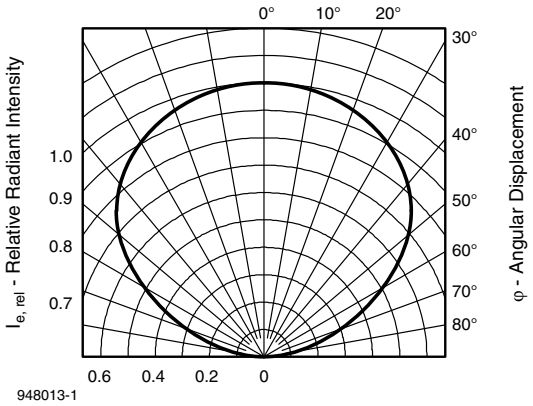



Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## REFLOW SOLDER PROFILE

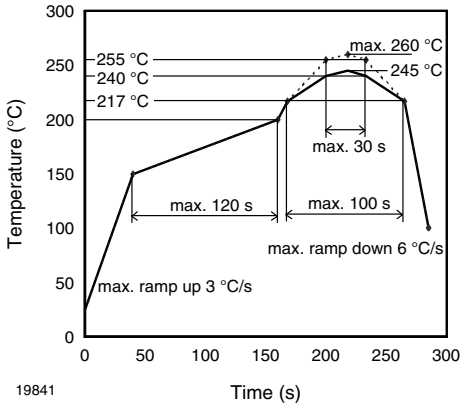



Fig. 10 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

## 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

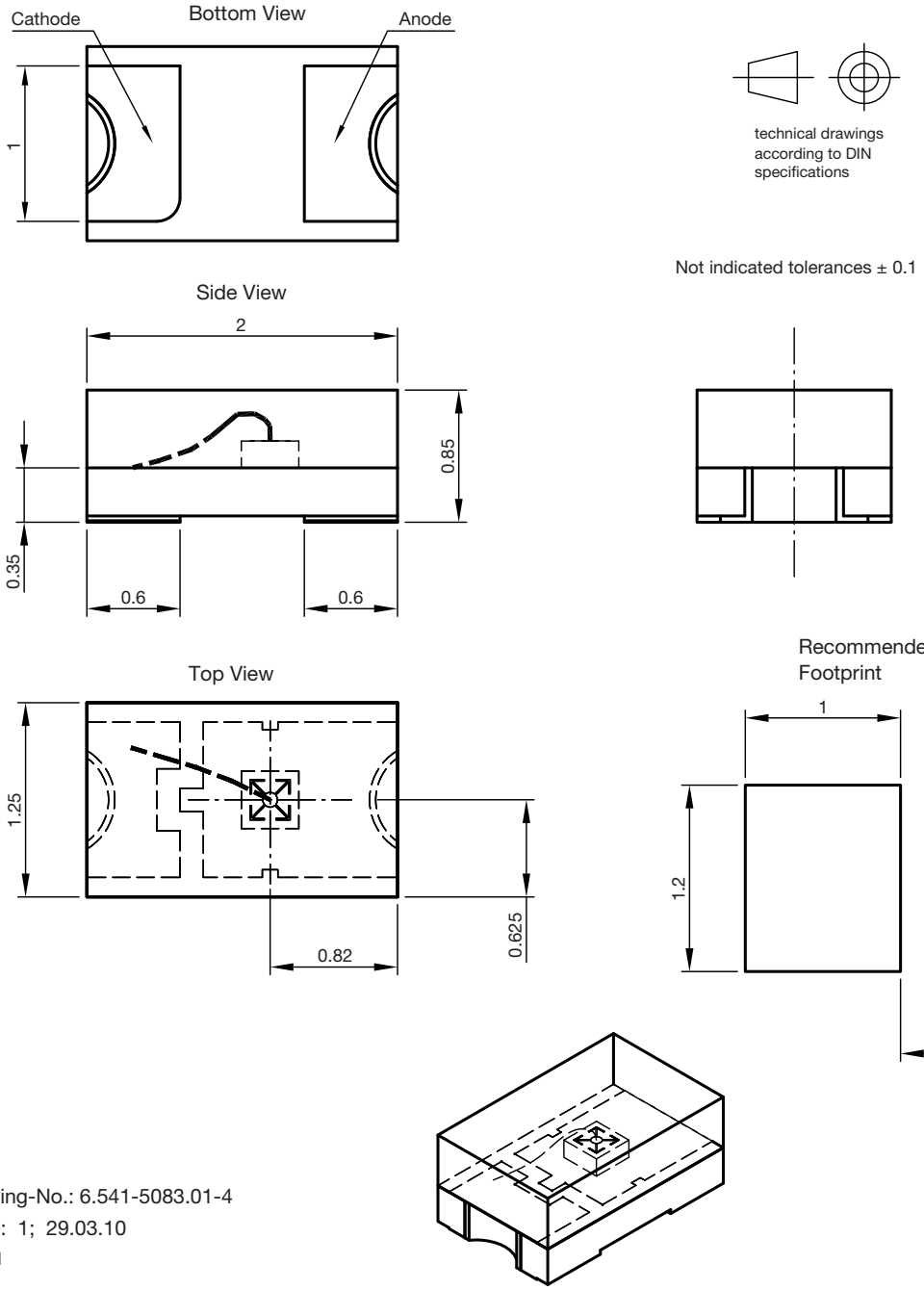
Floor life: 168 h

Conditions: $T_{amb}$ < 30 °C, RH < 60 %

## DRYING

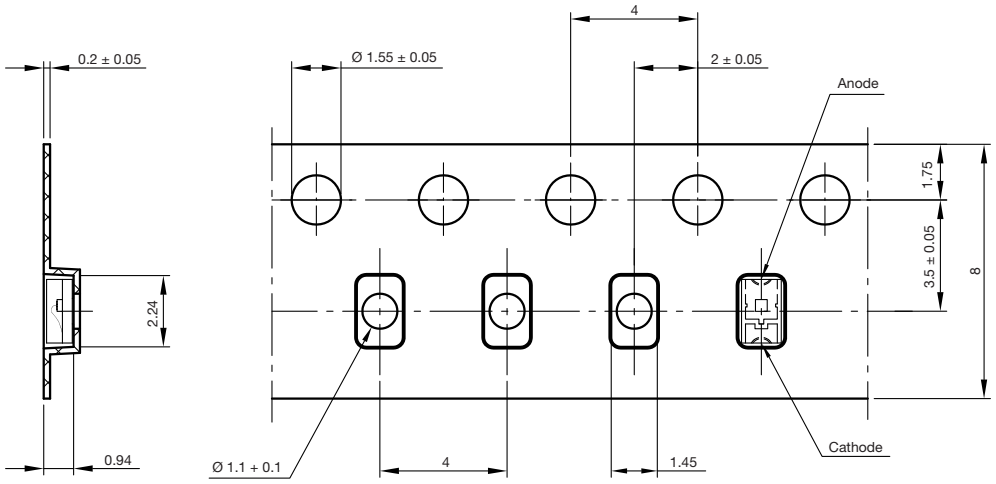
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

**PACKAGE DIMENSIONS** in millimeters



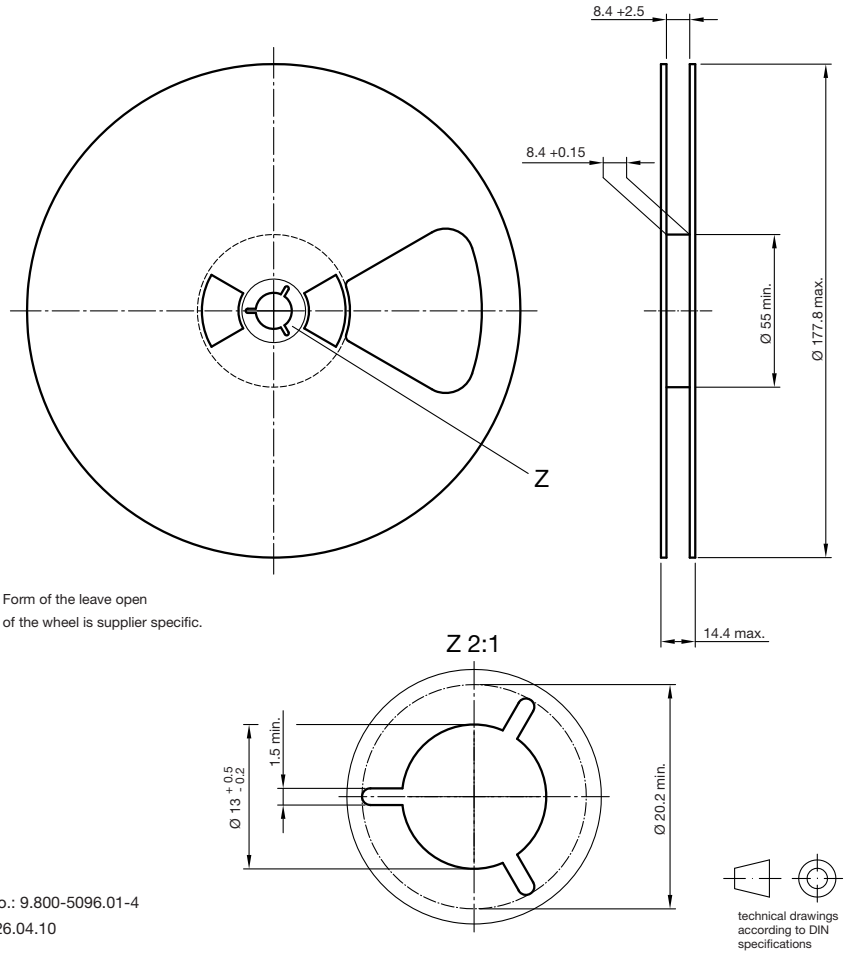

Drawing-No.: 6.541-5083.01-4
Issue: 1; 29.03.10
22111

## **BLISTER TAPE DIMENSIONS** in millimeters




Drawing-No.: 9.700-5352.01-4
Issue: 1; 13.04.10
22112

## **REEL DIMENSIONS** in millimeters




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

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