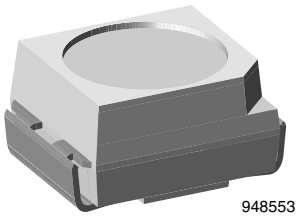
# High Speed Infrared Emitting Diode, 940 nm, Surface Emitter Technology



948553

## FEATURES

- Package type: surface mount
- Package form: PLCC-2
- Dimensions (L x W x H in mm): 3.5 x 2.8 x 1.75
- AEC-Q101 qualified
- Peak wavelength: $\lambda_p$ = 940 nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: φ = ± 60°
- Suitable for high pulse current operation
- Floor life: 168 h, MSL 3, acc. 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

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## DESCRIPTION

As part of the SurfLight™ portfolio, the VSMY3940X01 is an infrared, 940 nm emitting diode based on surface emitter technology with high radiant intensity, high optical power and high speed, molded in a PLCC-2 package for surface mounting (SMD).

## RELEASED FOR APPLICATIONS

Infrared radiation source for operation with CMOS cameras (illumination)

- High speed IR data transmission
- IR touch panels
- 3D TV
- Light curtain

**PRODUCT SUMMARY**

| COMPONENT | $I_e$ (mW/sr) | φ (deg) | $\lambda_P$ (nm) | $t_r$ (ns) |
|---|---|---|---|---|
| VSMY3940X01 | 15 | ± 60 | 940 | 10 |

**Note**

- Test conditions see table “Basic Characteristics”

**ORDERING INFORMATION**

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---|---|---|---|
| VSMY3940X01-GS08 | Tape and reel | MOQ: 7500 pcs, 1500 pcs/reel | PLCC-2 |
| VSMY3940X01-GS18 | Tape and reel | MOQ: 8000 pcs, 8000 pcs/reel | PLCC-2 |

**Note**

- MOQ: minimum order quantity



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| 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 |
| Pulse 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 | | $P_V$ | 190 | 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 | acc. figure 10, J-STD-020 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | J-STD-051, soldered on PCB | $R_{thJA}$ | 250 | K/W |

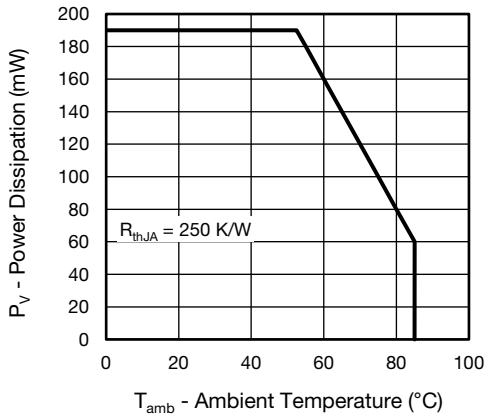



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

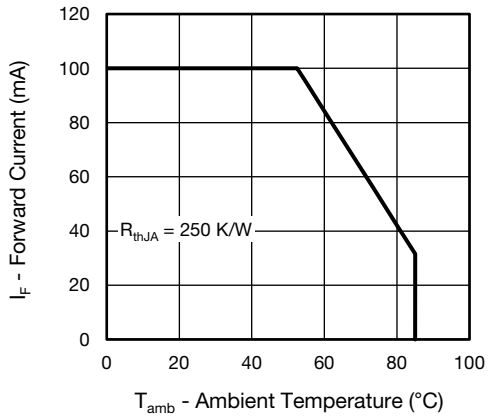



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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 | $V_F$ | | 1.44 | 1.9 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | | 2.2 | | V |
| Temperature coefficient of $V_F$ | $I_F$ = 100 mA | $TK_{VF}$ | | -1.6 | | mV/K |
| Reverse current | | $I_R$ | not designed for reverse operation | | | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_j$ | | 125 | | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 8 | 15 | 24 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | | 120 | | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | | 55 | | mW |
| Temperature coefficient of $\phi_e$ | $I_F$ = 100 mA | $TK\phi_e$ | | -0.25 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 60 | | deg |
| Peak wavelength | $I_F$ = 20 mA | $\lambda_p$ | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F$ = 30 mA | $\Delta\lambda$ | | 40 | | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 100 mA | $TK\lambda_p$ | | 0.25 | | nm/K |
| Rise time | $I_F$ = 100 mA | $t_r$ | | 10 | | ns |
| Fall time | $I_F$ = 100 mA | $t_f$ | | 10 | | ns |



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

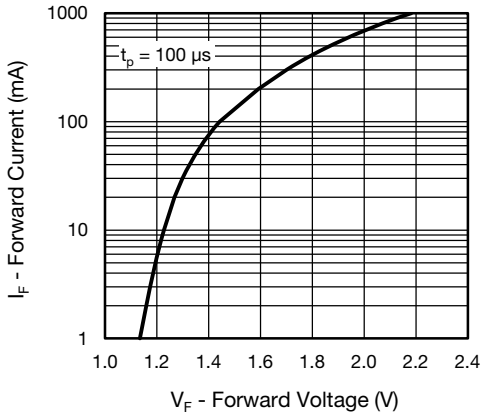



Fig. 3 - Forward Current vs. Forward Voltage

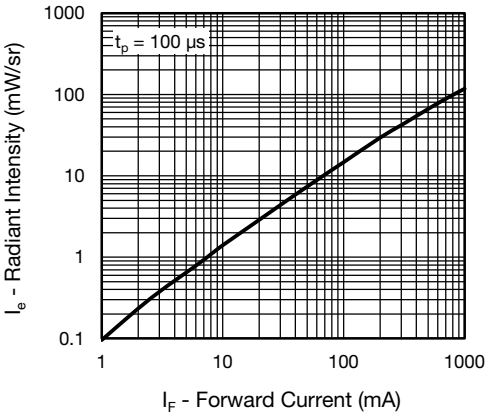



Fig. 6 - Radiant Intensity vs. Forward Current

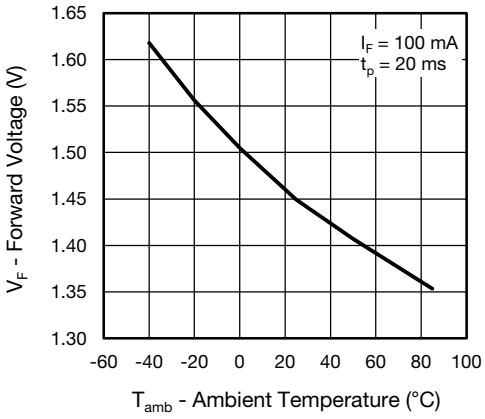



Fig. 4 - Forward Voltage vs. Ambient Temperature

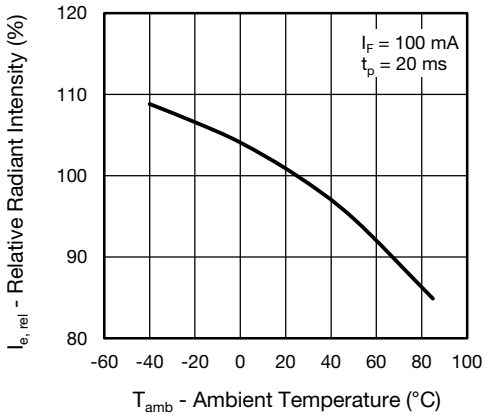



Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

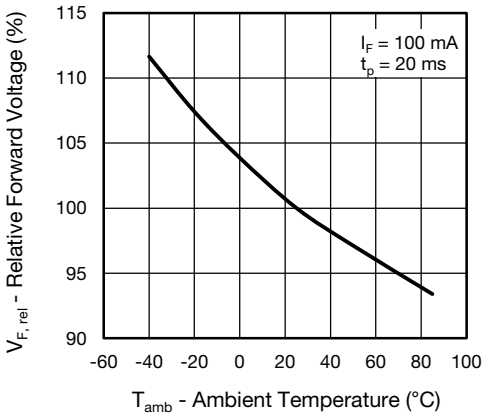



Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

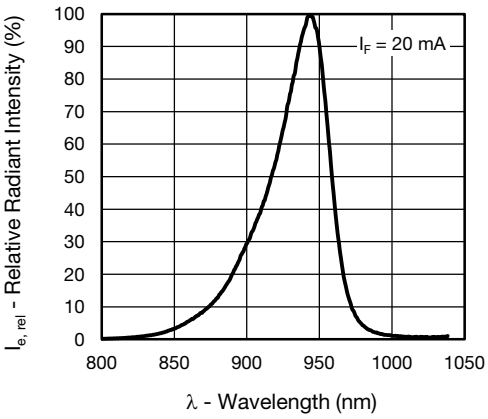



Fig. 8 - Relative Radiant Intensity vs. Wavelength


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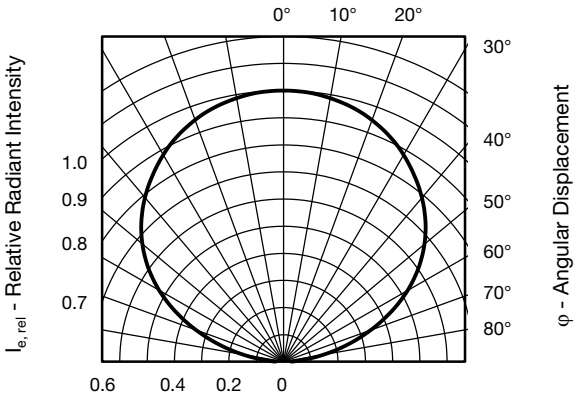
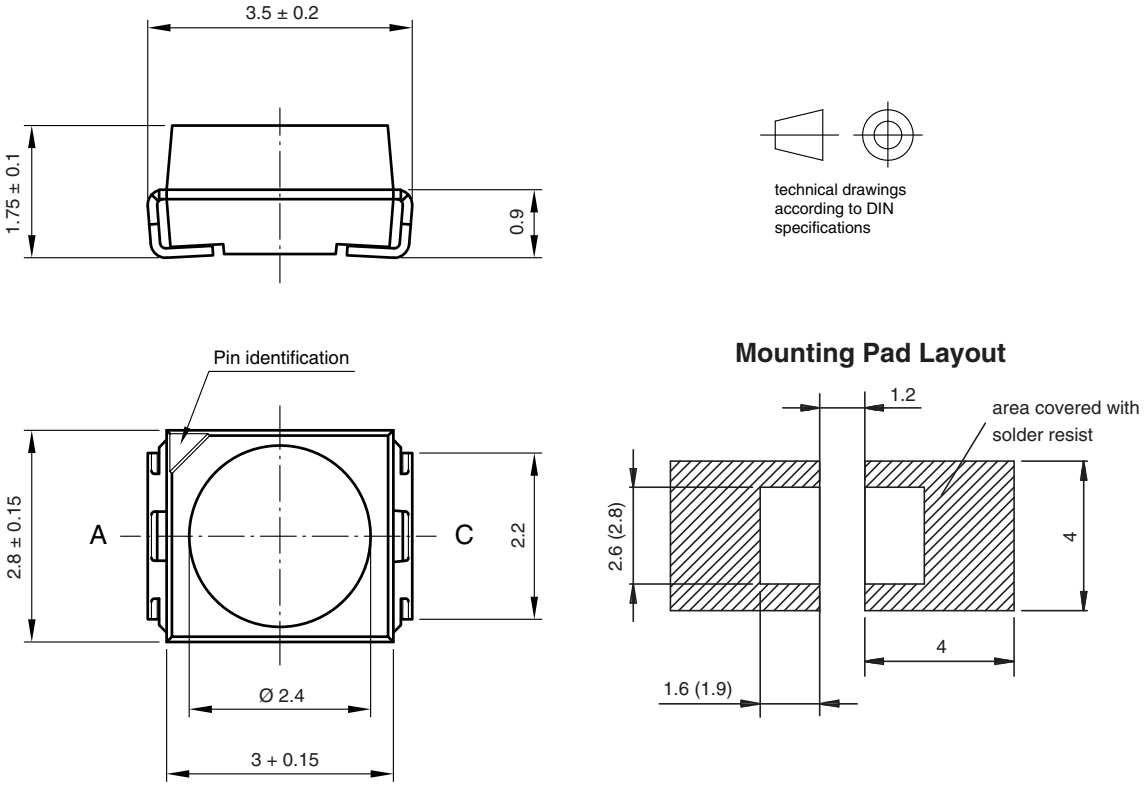



Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## **PACKAGE DIMENSIONS** in millimeters




Drawing-No.: 6.541-5067.02-4
Issue: 4; 19.07.10
20767


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## SOLDER PROFILE

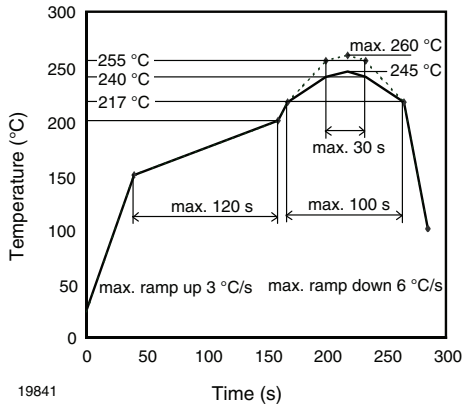



Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:
Floor life: 168 h
Conditions: $T_{amb}$ < 30 °C, RH < 60 %
Moisture sensitivity level 3, acc. to J-STD-020.

## 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 %.

## TAPE AND REEL

PLCC-2 components are packed in antistatic blister tape (DIN IEC (CO) 564) for automatic component insertion. Cavities of blister tape are covered with adhesive tape.

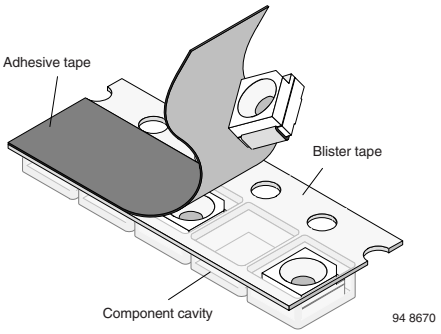



Fig. 11 - Blister Tape

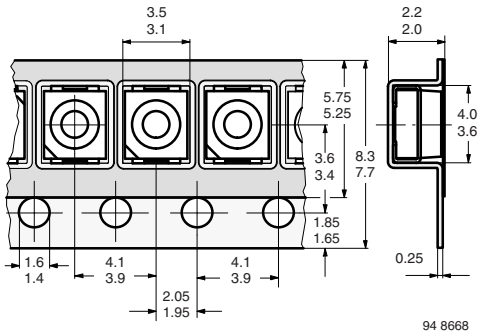



Fig. 12 - Tape Dimensions in mm for PLCC-2

## MISSING DEVICES

A maximum of 0.5 % of the total number of components per reel may be missing, exclusively missing components at the beginning and at the end of the reel. A maximum of three consecutive components may be missing, provided this gap is followed by six consecutive components.

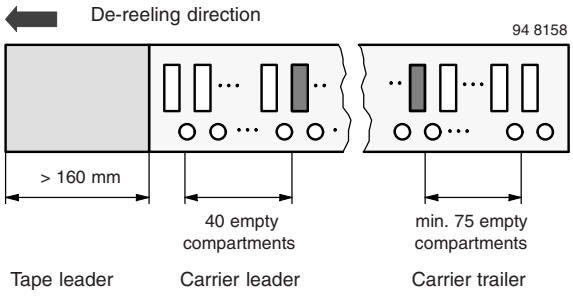



Fig. 13 - Beginning and End of Reel

The tape leader is at least 160 mm and is followed by a carrier tape leader with at least 40 empty compartments. The tape leader may include the carrier tape as long as the cover tape is not connected to the carrier tape. The least component is followed by a carrier tape trailer with a least 75 empty compartments and sealed with cover tape.

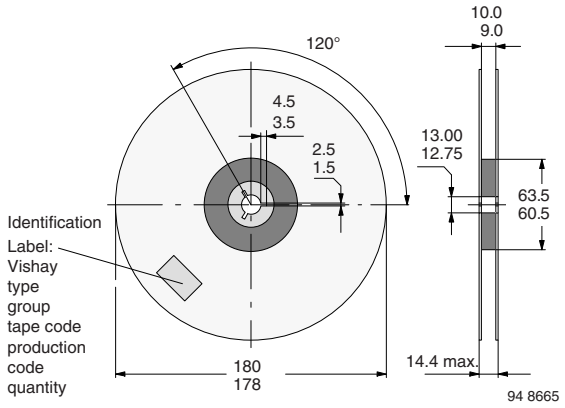



Fig. 14 - Dimensions of Reel-GS08


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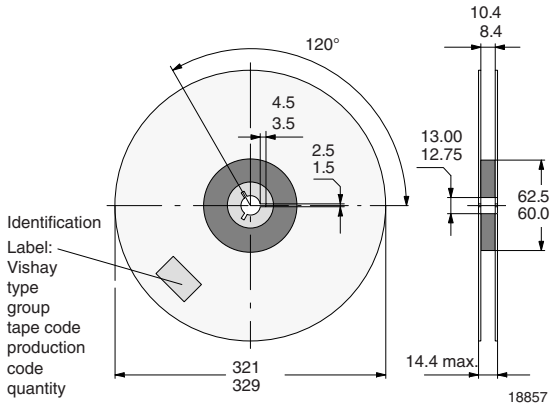



Fig. 15 - Dimensions of Reel-GS18

## COVER TAPE REMOVAL FORCE

The removal force lies between 0.1 N and 1.0 N at a removal speed of 5 mm/s. In order to prevent components from popping out of the blisters, the cover tape must be pulled off at an angle of 180° with regard to the feed direction.


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