# High Speed Infrared Emitting Diodes, 890 nm, Surface Emitter Technology

## 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: $\lambda_p$ = 890 nm
- AEC-Q101 qualified
- High speed
- Angle of half intensity: φ = ± 60°
- 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 VSMY5890X01 is an infrared, 890 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 | φ (°) | $\lambda_p$ (nm) | $t_r$ (ns) |
| VSMY5890X01 | 15 | ± 60 | 890 | 5 |

**Note**

- Test conditions see table “Basic Characteristics“

| ORDERING INFORMATION | | | |
|---|---|---|---|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VSMY5890X01 | 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 | $t_p/T$ = 0.1, $t_p$ = 100 µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 500 | mA |
| Power dissipation | | $P_V$ | 200 | mW |
| Junction temperature | | $T_j$ | 125 | °C |
| Operating temperature range | | $T_{amb}$ | -40 to +110 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +110 | °C |
| Soldering temperature | According to Fig. 7, J-STD-020 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction to ambient | EIA / JESD51 | $R_{thJA}$ | 240 | K/W |
| ESD sensitivity | According to ANSI / ESDA / JEDEC JS-001 | $V_{ESD}$ | 2 | kV |

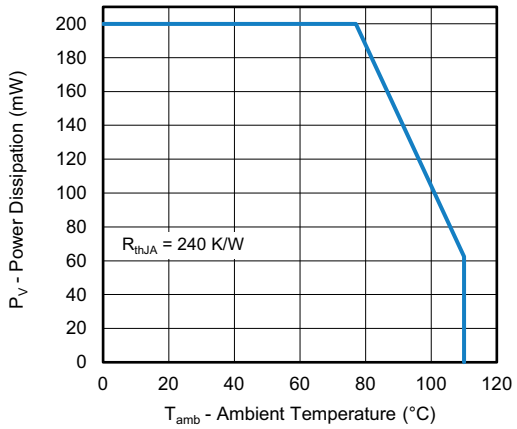



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

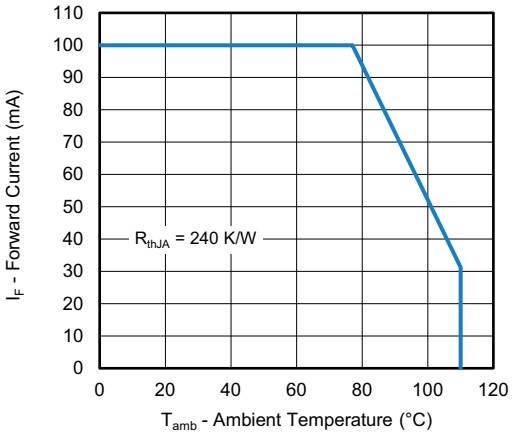



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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 | $V_F$ | 1.5 | 1.9 | 2.3 | V |
| Temperature coefficient of $V_F$ | $I_F$ = 100 mA, $t_p$ = 20 ms | $TK_{VF}$ | - | -1.8 | - | 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 | $C_J$ | - | 30 | - | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 10 | 15 | 20 | mW/sr |
| Temperature coefficient of radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $TK\phi_e$ | - | -0.3 | - | %/K |
| Angle of half intensity | | φ | - | ± 60 | - | ° |
| Peak wavelength | $I_F$ = 100 mA, $t_p$ = 20 ms | $\lambda_p$ | - | 890 | - | nm |
| Spectral bandwidth | $I_F$ = 100 mA, $t_p$ = 20 ms | $\Delta\lambda$ | - | 40 | - | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 100 mA, $t_p$ = 20 ms | $TK_{\lambda p}$ | - | 0.28 | - | nm/K |
| Rise time | $I_F$ = 100 mA, 10 % to 90 % | $t_r$ | - | 5 | - | ns |
| Fall time | $I_F$ = 100 mA, 10 % to 90 % | $t_f$ | - | 5 | - | ns |

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

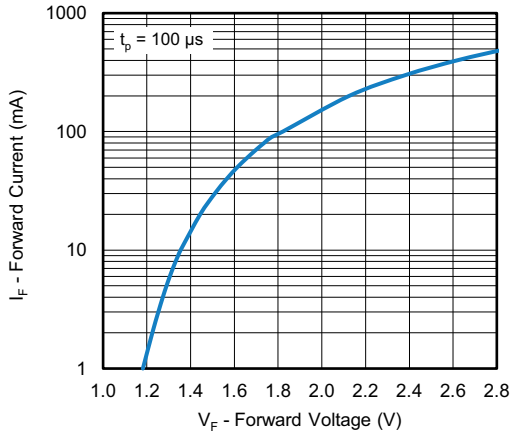



Fig. 3 - Forward Current vs. Forward Voltage

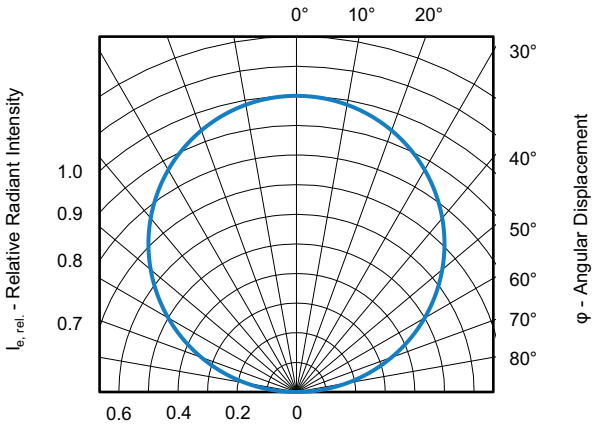



Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

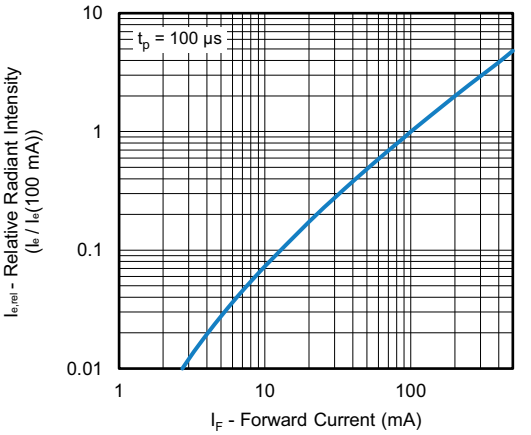



Fig. 4 - Relative Radiant Intensity vs. Forward Current

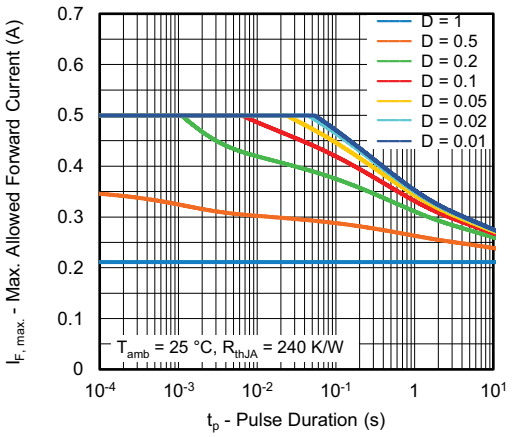



Fig. 7 - Max. Allowed Forward Current vs. Pulse Duration

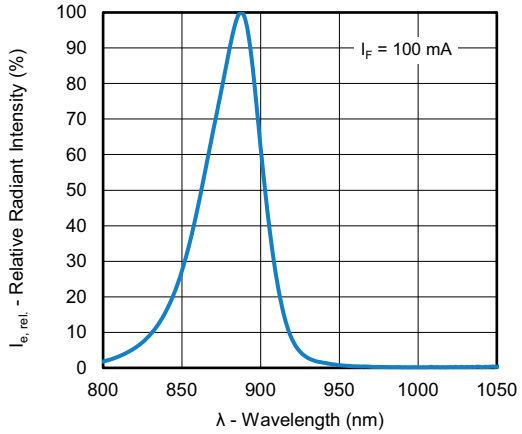



Fig. 5 - Relative Radiant Intensity vs. Wavelength

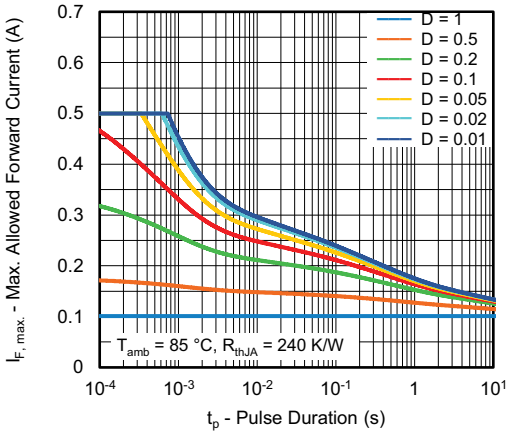



Fig. 8 - Max. Allowed Forward Current vs. Pulse Duration

## REFLOW SOLDER PROFILE

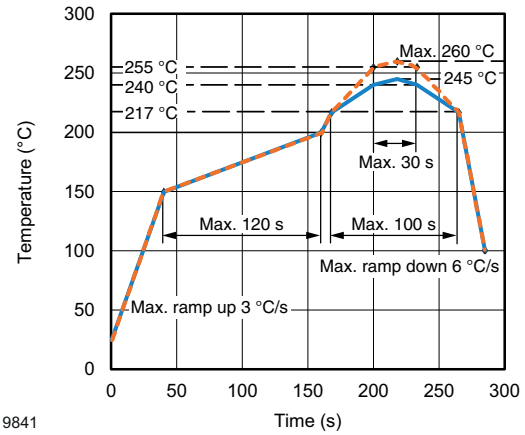



Fig. 9 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

## 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

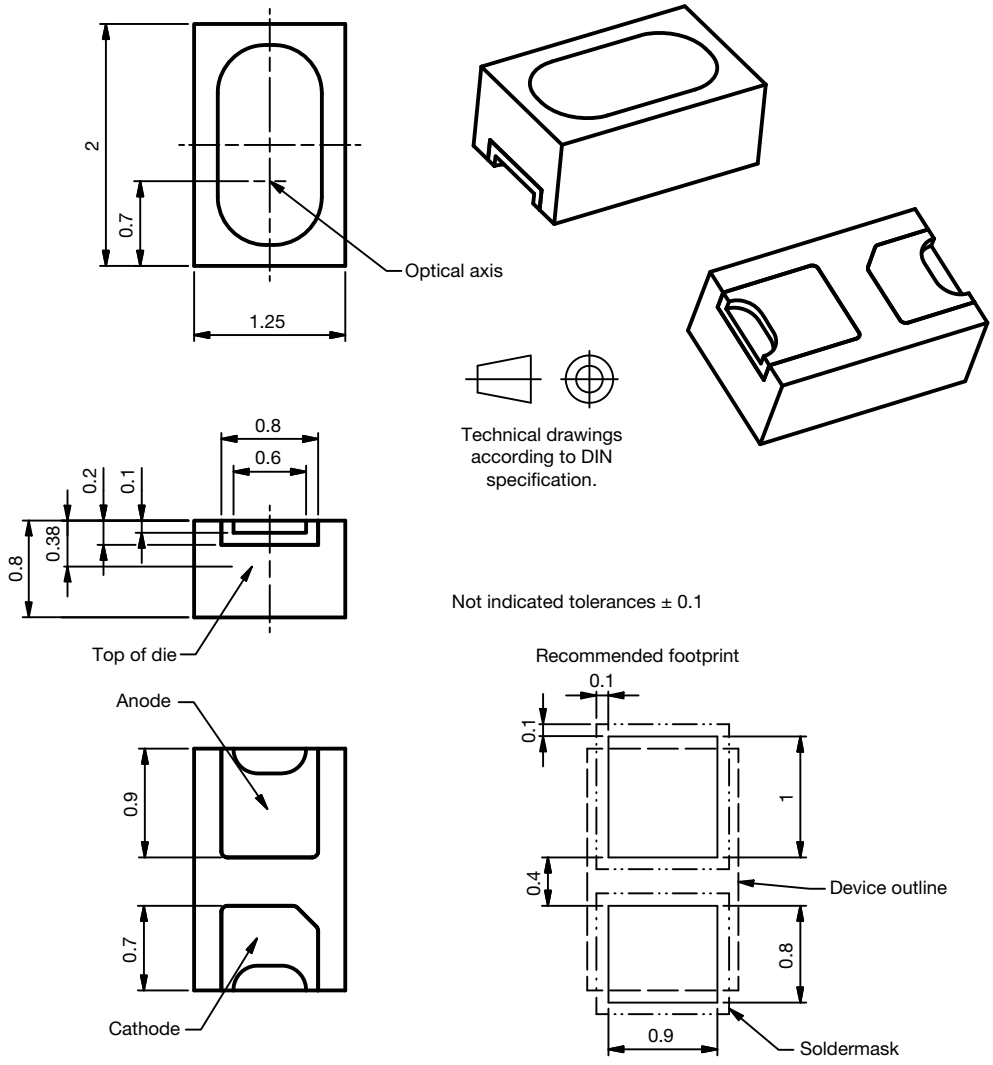
Floor life: 168 h

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

## DRYING

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

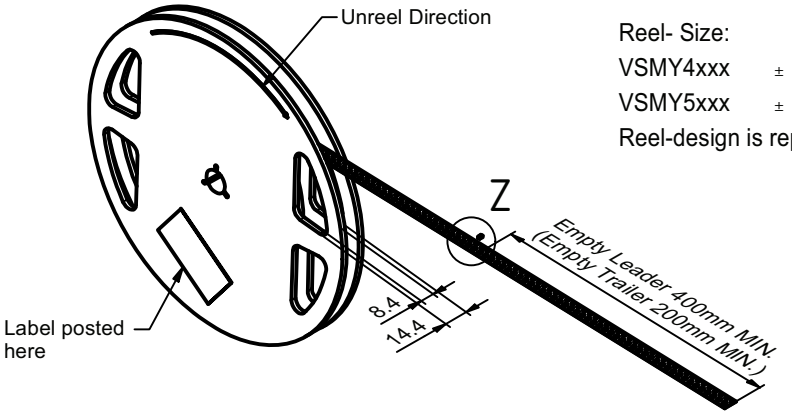
**PACKAGE DIMENSIONS** in millimeters



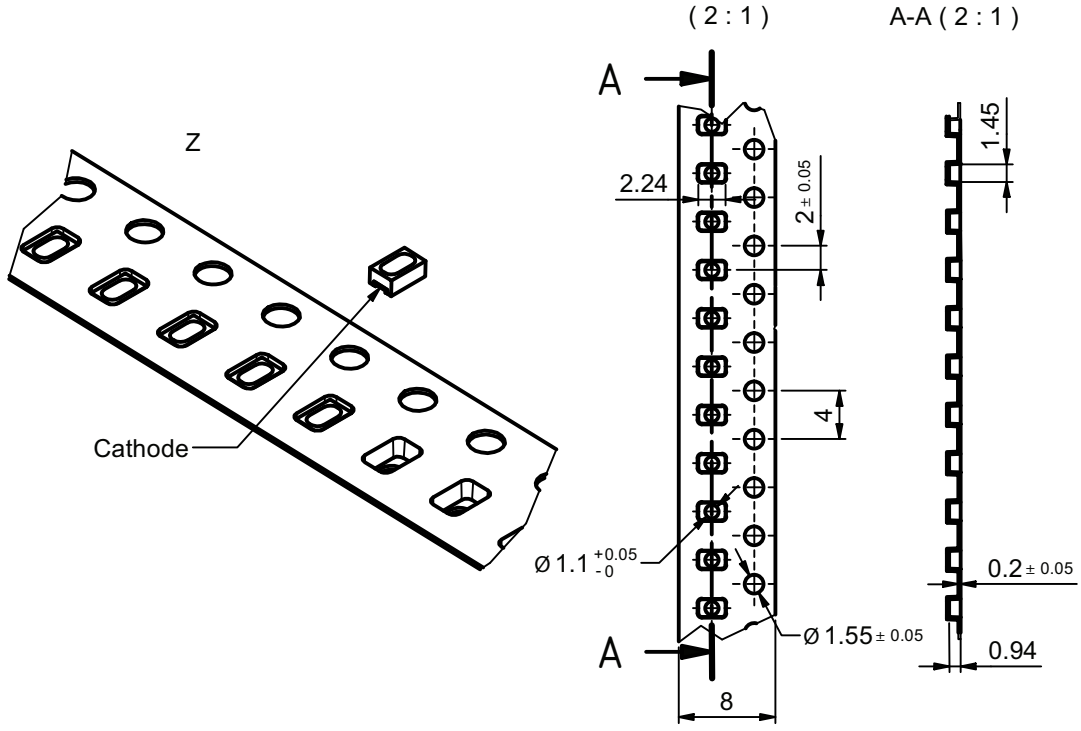

Drawing- No.: 6.550-5352.01-4
Issue: 2_A; prelim. 05.12.2024

## TAPE AND REEL DIMENSIONS in millimeters

Non tolerated dimensions ± 0.1 mm




Reel- Size:
VSMY4xxx ± 178 ± 2 mm = 3000 pcs.
VSMY5xxx ± 178 ± 2 mm = 3000 pcs.
Reel-design is representative for different types.




Drawing-No.: PM-10035.100-000
Issue: 0_A; preliminary 10.12.2024

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