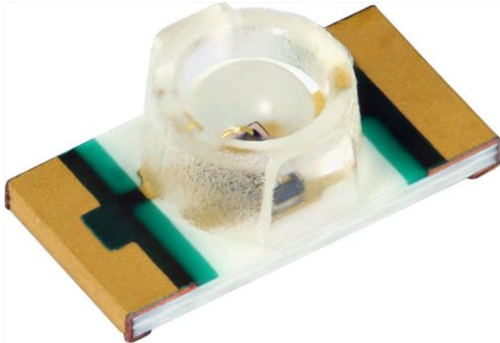


High Speed Infrared Emitting Diodes, 940 nm, Surface Emitter Technology



DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY12940 is an infrared, 940 nm, top looking emitting diode based on GaAlAs surface emitter chip technology with extreme high radiant intensities, high optical power and high speed, molded in clear, untinted PCB based package (with inner lens) for surface mounting (SMD).

APPLICATIONS

- Emitter for proximity applications
- IR touch panels
- Photointerrupters
- Optical switch

FEATURES

- Package type: surface mount
- Package form: top view
- Dimensions (L x W x H in mm): 3.2 x 1.6 x 1.1
- Peak wavelength: $\lambda_p = 940$ nm
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity: $\phi = \pm 40^\circ$
- Suitable for high pulse current operation
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



PRODUCT SUMMARY

| COMPONENT | I_e (mW/sr) | ϕ (deg) | λ_p (nm) | t_r (ns) |
|-----------|---------------|--------------|------------------|------------|
| VSMY12940 | 16 | ± 40 | 940 | 10 |

Note

- Test conditions see table “Basic Characteristics“

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VSMY12940 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | Top view |

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|-------------------------------------|----------------------------|------------|-------------|------------------|
| Reverse voltage | | V_R | 5 | V |
| Forward current | | I_F | 70 | mA |
| Surge forward current | $t_p = 100 \mu\text{s}$ | I_{FSM} | 1 | A |
| Power dissipation | | P_V | 140 | mW |
| Junction temperature | | T_j | 100 | $^\circ\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +100 | $^\circ\text{C}$ |
| Soldering temperature | acc. figure 10, J-STD-020 | T_{sd} | 260 | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | J-STD-051, soldered on PCB | R_{thJA} | 390 | K/W |

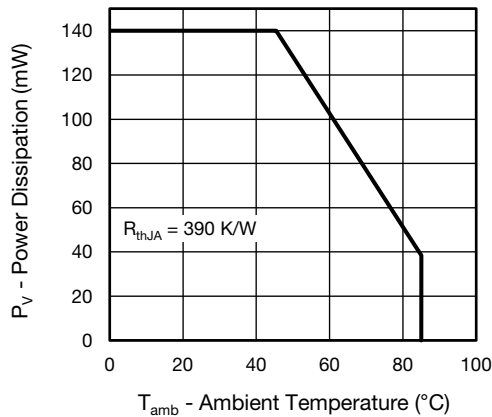


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

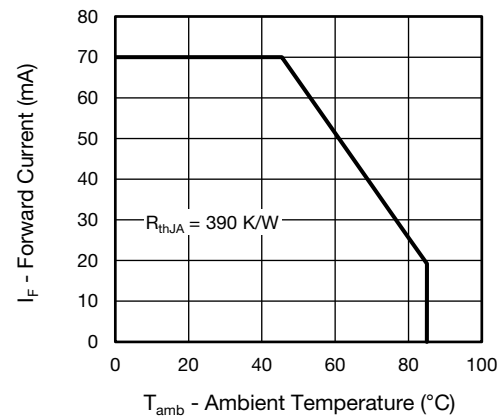


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|--|------------------|------------------------------------|----------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Forward voltage | $I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | 1.1 | 1.4 | 1.9 | V |
| | $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | | 1.6 | | V |
| | $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | V_F | | 2.8 | | V |
| Temperature coefficient of V_F | $I_F = 20\text{ mA}$ | TK_{V_F} | | -1.7 | | 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 | | 5 | | pF |
| Radiant intensity | $I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | 2.3 | 4.7 | | mW/sr |
| | $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | | 16 | | mW/sr |
| | $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | I_e | | 130 | | mW/sr |
| Radiant power | $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ | ϕ_e | | 40 | | mW |
| Temperature coefficient of radiant power | $I_F = 20\text{ mA}$ | TK_{ϕ_e} | | -0.19 | | %/K |
| Angle of half intensity | | ϕ | | ± 40 | | deg |
| Peak wavelength | $I_F = 20\text{ mA}$ | λ_p | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F = 20\text{ mA}$ | $\Delta\lambda$ | | 35 | | nm |
| Temperature coefficient of λ_p | $I_F = 20\text{ mA}$ | TK_{λ_p} | | 0.25 | | nm/K |
| Rise time | $I_F = 100\text{ mA}$, 20 % to 80 % | t_r | | 10 | | ns |
| Fall time | $I_F = 100\text{ mA}$, 20 % to 80 % | t_f | | 10 | | ns |

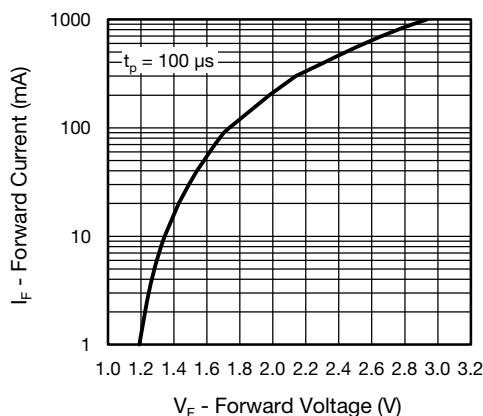
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

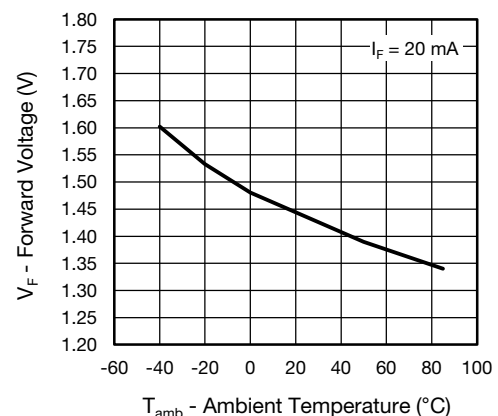


Fig. 4 - Forward Voltage vs. Ambient Temperature

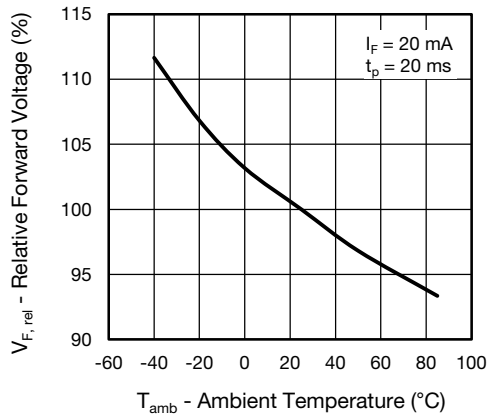


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

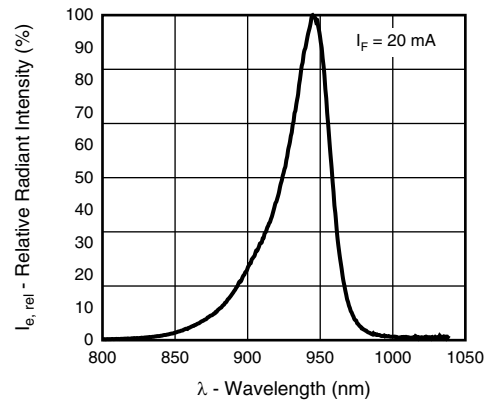


Fig. 8 - Relative Radiant Intensity vs. Wavelength

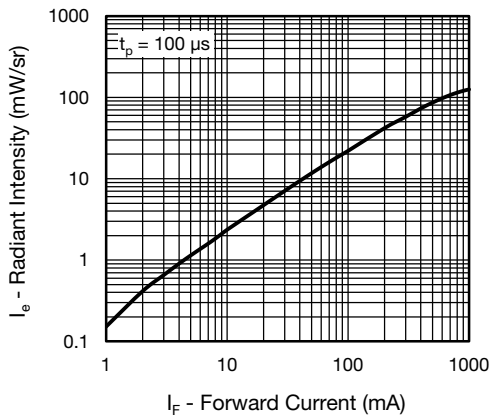


Fig. 6 - Radiant Intensity vs. Forward Current

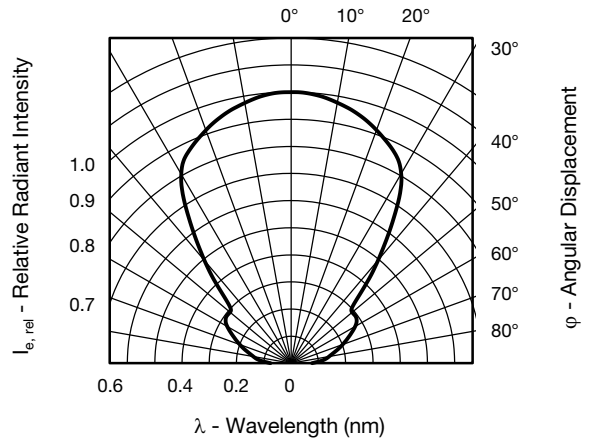


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

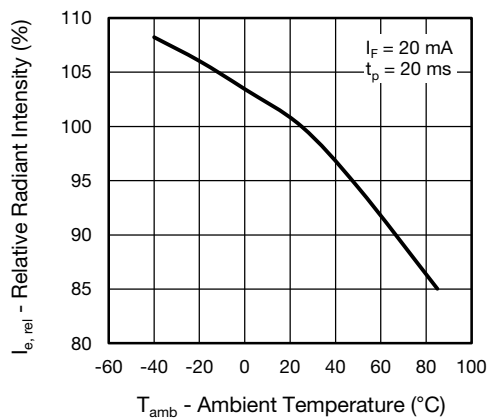


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

SOLDER PROFILE

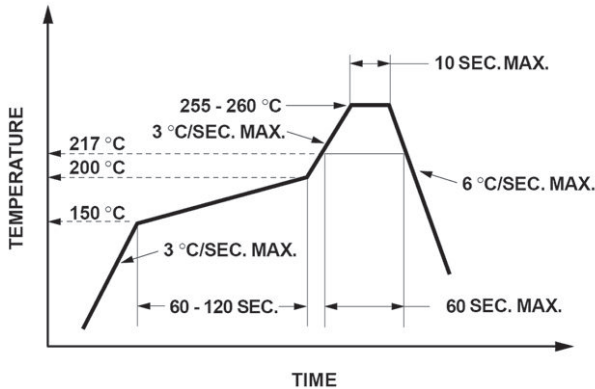


Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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.

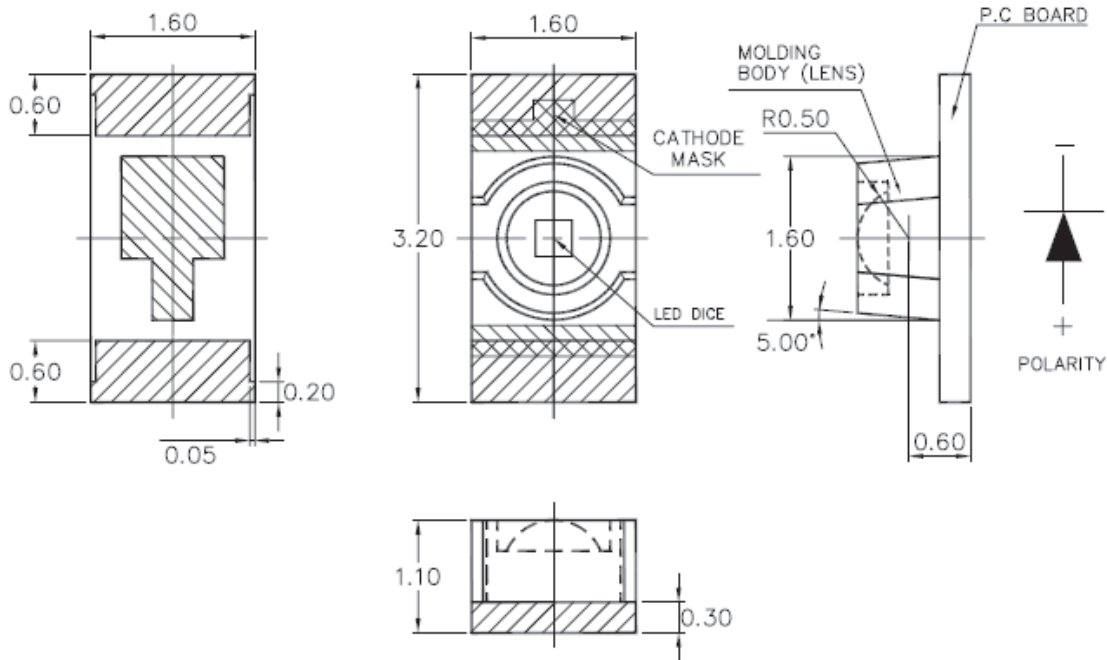
FLOOR LIFE

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

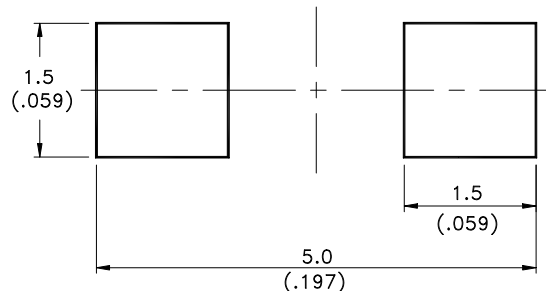
DRYING

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

PACKAGE DIMENSIONS in millimeters: **VSMY12940**

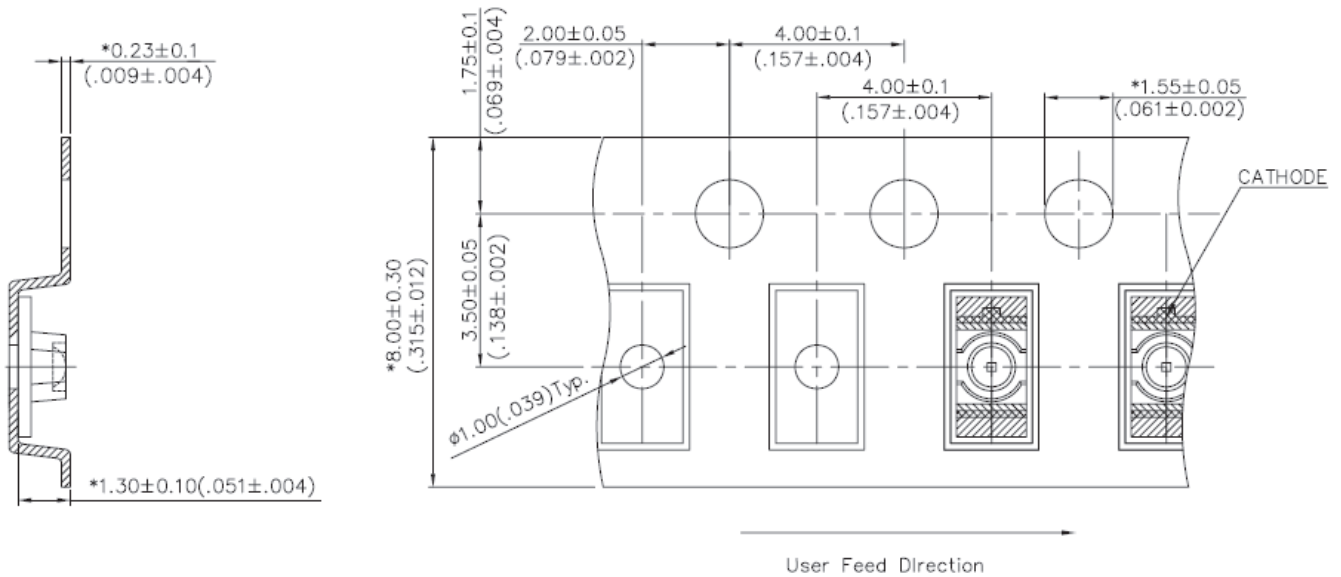
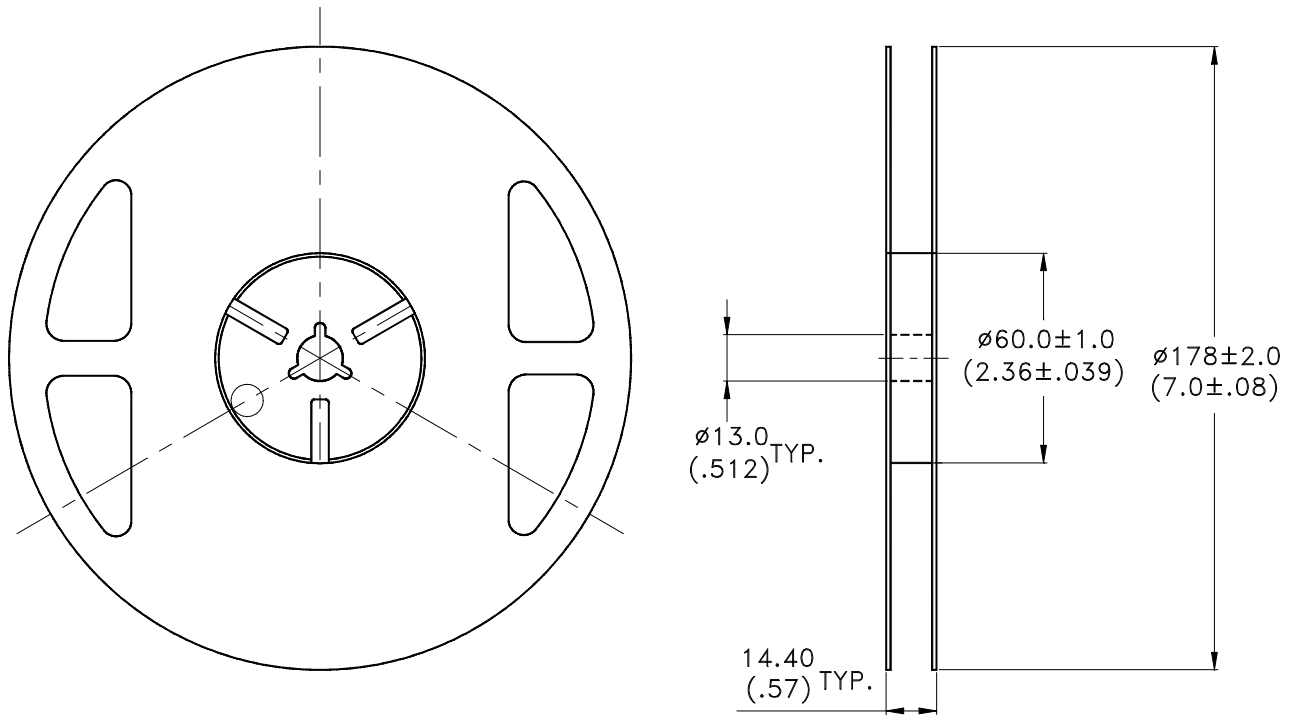


Recommended Solder Pad





TAPING AND REEL DIMENSIONS in millimeters: VSMY12940





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