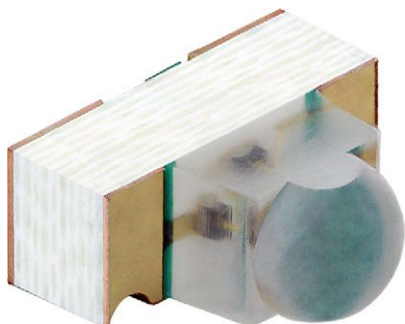


## High Speed Infrared Emitting Diodes, 940 nm, Surface Emitter Technology



### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY14940 is an infrared, 940 nm, side 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 lens) for surface mounting (SMD).

### APPLICATIONS

- Emitter for remote control (38 kHz)
- Learning remote control
- Photointerrupters
- Optical switch

### FEATURES

- Package type: surface-mount
- Package form: side view
- Dimensions (L x W x H in mm): 3.0 x 2.51 x 1.2
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity:  $\phi = \pm 9^\circ$
- 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](http://www.vishay.com/doc?99912)



### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMY14940	90	$\pm 9$	940	5

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY14940	Tape and reel	MOQ: 1500 pcs, 1500 pcs/reel	Side 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	$t_p = 100 \mu\text{s}$	$I_{FSM}$	0.7	A
Power dissipation		$P_V$	119	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	-40 to +85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to +100	$^\circ\text{C}$
Soldering temperature	According to Fig. 10, J-STD-020	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction-to-ambient	J-STD-051, soldered on PCB	$R_{thJA}$	390	K/W

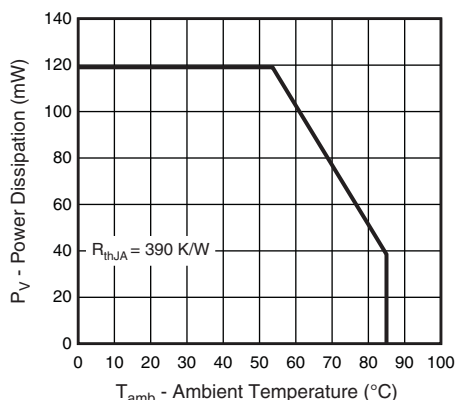


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

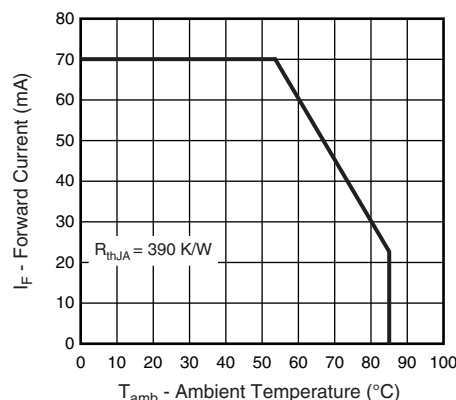


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I <sub>F</sub> = 20 mA, t <sub>p</sub> = 20 ms	V <sub>F</sub>	1.1	1.3	1.5	V
	I <sub>F</sub> = 70 mA, t <sub>p</sub> = 20 ms	V <sub>F</sub>	-	1.5	-	V
	I <sub>F</sub> = 0.7 A, t <sub>p</sub> = 100 μs	V <sub>F</sub>	-	3.0	-	V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 20 mA	TK <sub>V<sub>F</sub></sub>	-	-0.9	-	mV/K
Reverse current		I <sub>R</sub>	Not designed for reverse operation			nA
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz, E = 0 mW/cm <sup>2</sup>	C <sub>J</sub>	-	30	-	pF
Radiant intensity	I <sub>F</sub> = 20 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	15	25	-	mW/sr
	I <sub>F</sub> = 70 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	-	90	-	mW/sr
	I <sub>F</sub> = 0.7 A, t <sub>p</sub> = 100 μs	I <sub>e</sub>	-	560	-	mW/sr
Reverse light current	E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>R</sub> = 5 V	I <sub>ra</sub>	-	0.5	-	μA
Radiant power	I <sub>F</sub> = 70 mA, t <sub>p</sub> = 20 ms	φ <sub>e</sub>	-	40	-	mW
Temperature coefficient of radiant power	I <sub>F</sub> = 70 mA	TKφ <sub>e</sub>	-	-0.21	-	%/K
Angle of half intensity		φ	-	± 9	-	deg
Peak wavelength	I <sub>F</sub> = 70 mA	λ <sub>p</sub>	920	940	960	nm
Spectral bandwidth	I <sub>F</sub> = 70 mA	Δλ	-	55	-	nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 70 mA	TKλ <sub>p</sub>	-	0.28	-	nm/K
Rise time	I <sub>F</sub> = 70 mA, 10 % to 90 %	t <sub>r</sub>	-	5	-	ns
Fall time	I <sub>F</sub> = 70 mA, 10 % to 90 %	t <sub>f</sub>	-	6	-	ns

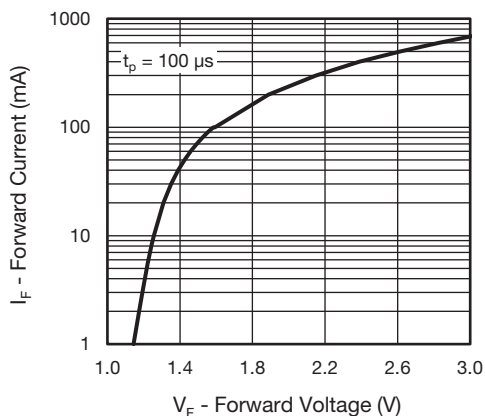
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

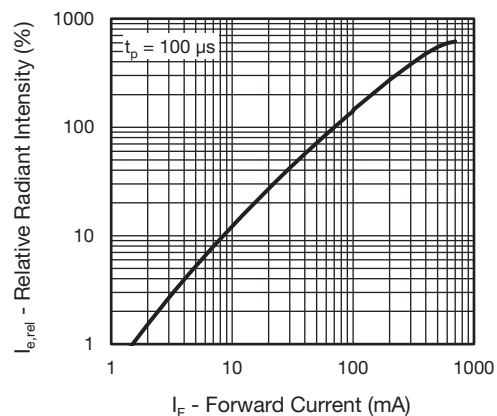


Fig. 6 - Relative Radiant Intensity vs. Forward Current

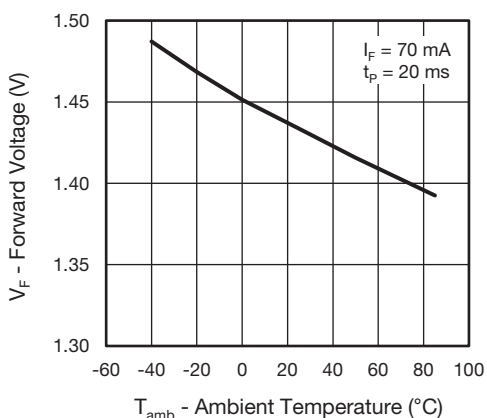


Fig. 4 - Forward Voltage vs. Ambient Temperature

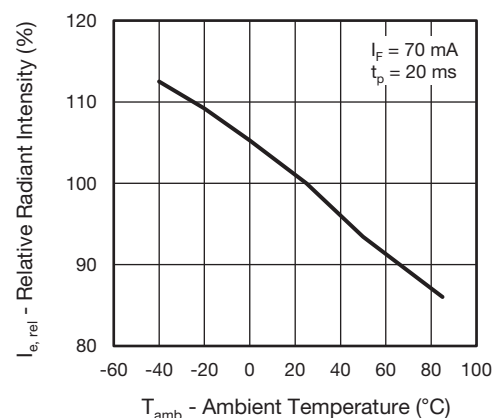


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

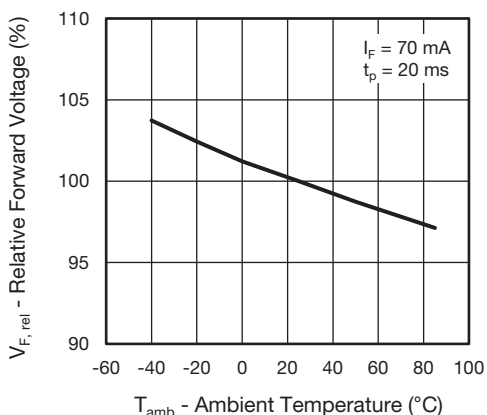


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

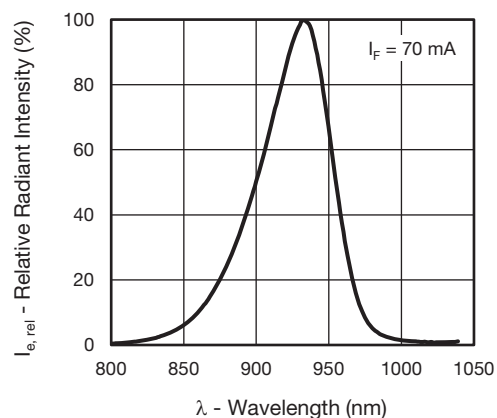


Fig. 8 - Relative Radiant Intensity vs. Wavelength

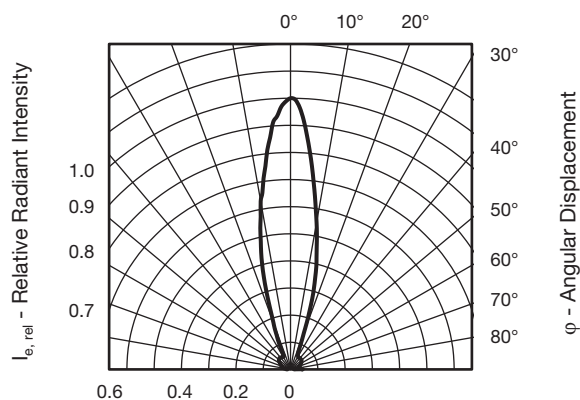


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## SOLDER PROFILE

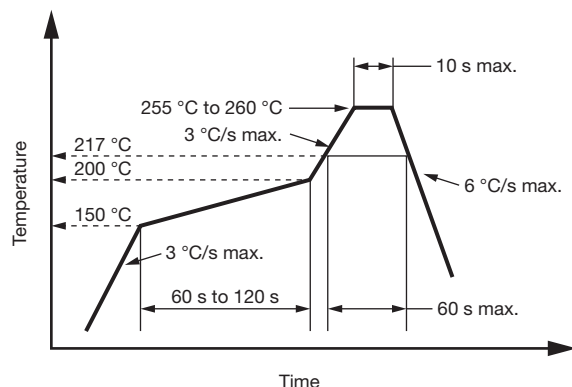


Fig. 10 - Lead (Pb)-free Reflow Solder Profile  
According to J-STD-020

## 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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

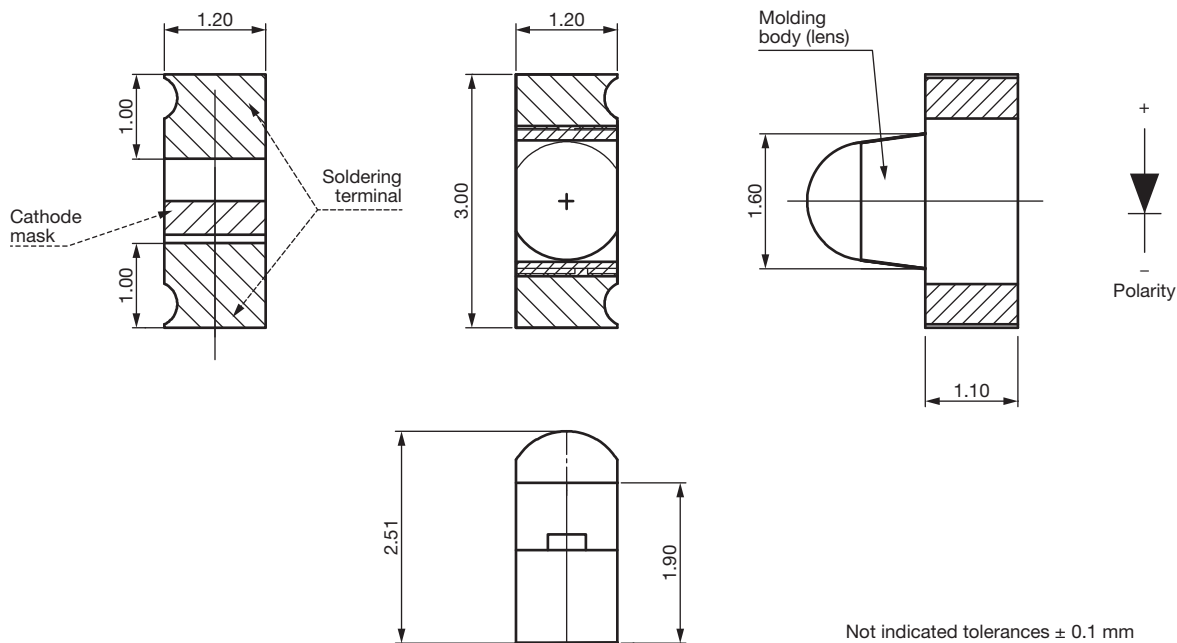
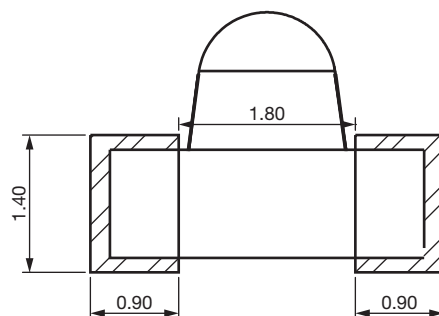
Floor life: 168 h

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

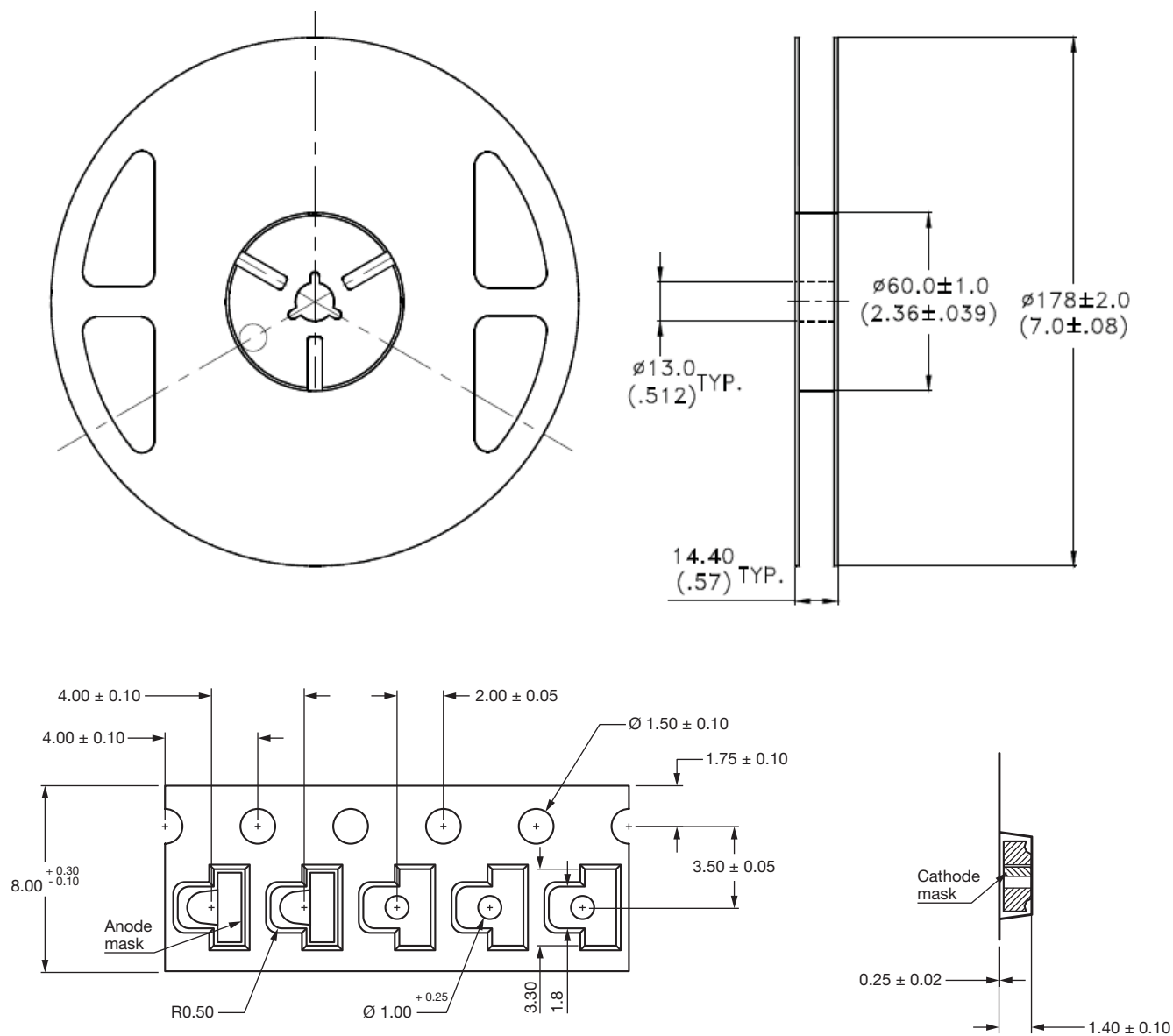
Moisture sensitivity level 3, according to J-STD-020.

## 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: **VSMY14940**

**Recommended Solder Pad**


**TAPING AND REEL DIMENSIONS** in millimeters: **VSMY14940**





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