



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



### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY99445DS is an infrared, 940 nm emitting diode based on surface emitter technology with high radiant power and high speed, molded in low thermal resistance SMD package with lens. A 42 mil chip provides outstanding radiant intensity and allows DC operation of the device up to 1 A. Superior ESD characteristics are ensured by an integrated Zener diode.

### FEATURES

- Package type: surface-mount
- Double stack technology
- Package form: high power SMD with lens
- Dimensions (L x W x H in mm): 3.85 x 3.85 x 2.24
- Peak wavelength:  $\lambda_p = 940$  nm
- Zener diode for ESD protection up to 2 kV
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 45^\circ$
- Designed for high drive currents: up to 1 A (DC) and up to 5 A pulses
- Low thermal resistance:  $R_{thJP} = 10$  K/W
- 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](http://www.vishay.com/doc?99912)



### APPLICATIONS

- Infrared illumination for CMOS cameras (CCTV)
- Illumination for cameras (3D gaming)
- Machine vision

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\phi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMY99445DS	500	$\pm 45$	940	15

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY99445DS	Tape and reel	MOQ: 600 pcs, 600 pcs/reel	High power with lens

#### 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		$I_F$	1	A
Peak forward current	$t_p/T = 0.5$ , $t_p = 100$ $\mu$ s	$I_{FM}$	2	A
Surge forward current	$t_p = 100$ $\mu$ s	$I_{FSM}$	5	A
Power dissipation		$P_V$	3.4	W
Junction temperature		$T_J$	145	°C
Operating temperature range		$T_{amb}$	-40 to +125	°C
Storage temperature range		$T_{stg}$	-55 to +125	°C
Soldering temperature	According to fig. 10, J-STD-20	$T_{sd}$	260	°C
Thermal resistance junction-to-pin	According to J-STD-051, soldered on PCB	$R_{thJP}$	10	K/W

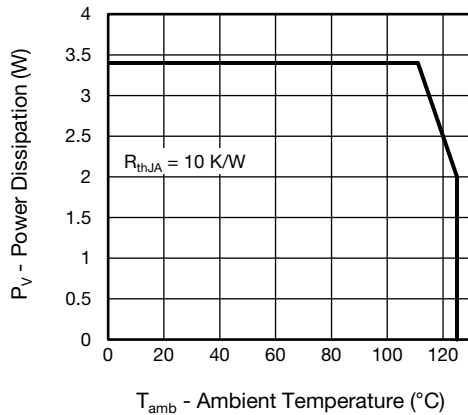


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

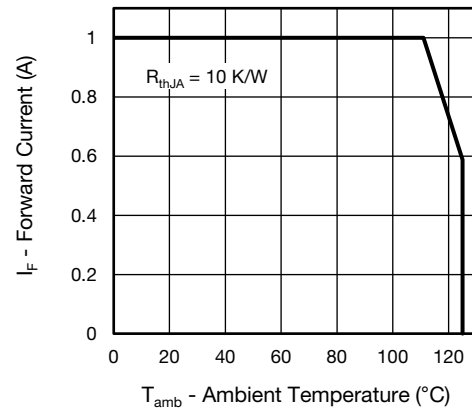


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 1\text{ A}$ , $t_p = 20\text{ ms}$	$V_F$	-	2.9	3.4	V
	$I_F = 5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$	-	4.6	-	V
Temperature coefficient of $V_F$	$I_F = 1\text{ A}$	$TK_{V_F}$	-	-2.5	-	mV/K
Reverse current	$V_R = 5\text{ V}$	$I_R$	Not designed for reverse operation			$\mu\text{A}$
Radiant intensity	$I_F = 1\text{ A}$ , $t_p = 20\text{ ms}$	$I_e$	320	500	900	mW/sr
	$I_F = 5\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$	-	2790	-	mW/sr
Radiant power	$I_F = 1\text{ A}$ , $t_p = 20\text{ ms}$	$\phi_e$	-	935	-	mW
Temperature coefficient of $\phi_e$	$I_F = 1\text{ A}$	$TK_{\phi_e}$	-	-0.2	-	%/K
Angle of half intensity		$\phi$	-	$\pm 45$	-	$^{\circ}$
Peak wavelength	$I_F = 1\text{ A}$	$\lambda_p$	920	940	960	nm
Spectral bandwidth	$I_F = 1\text{ A}$	$\Delta\lambda$	-	50	-	nm
Temperature coefficient of $\lambda_p$	$I_F = 1\text{ A}$	$TK_{\lambda_p}$	-	0.3	-	nm/K
Rise time	$I_F = 1\text{ A}$	$t_r$	-	15	-	ns
Fall time	$I_F = 1\text{ A}$	$t_f$	-	18	-	ns



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

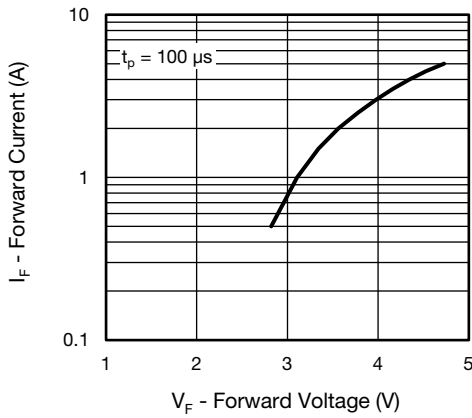


Fig. 3 - Forward Current vs. Forward Voltage

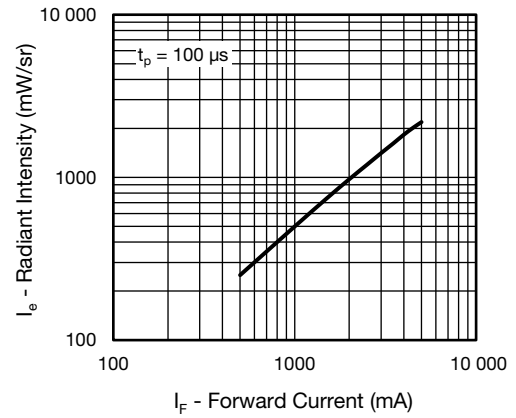


Fig. 6 - Radiant Intensity vs. Forward Current

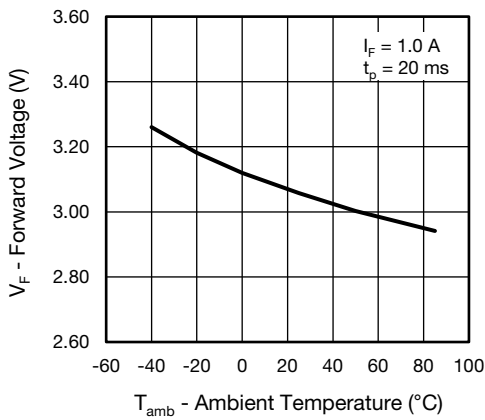


Fig. 4 - Forward Voltage vs. Ambient Temperature

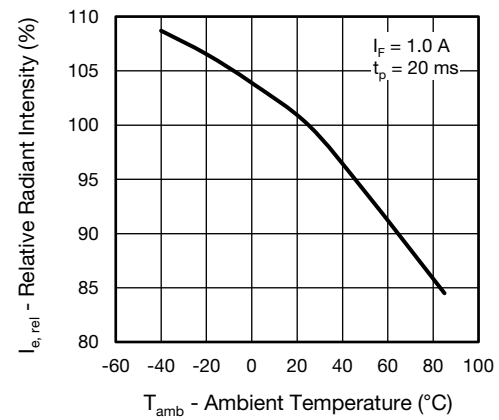


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

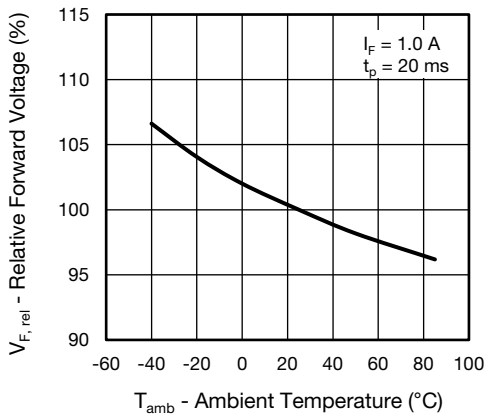


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

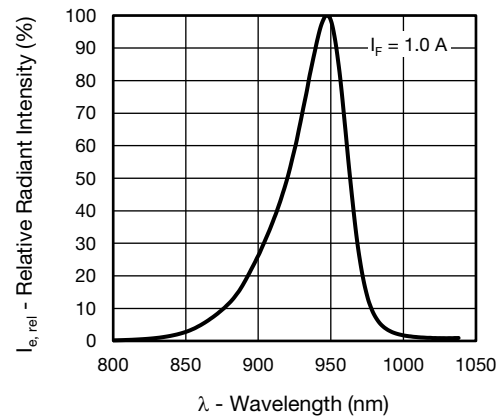


Fig. 8 - Relative Radiant Intensity vs. Wavelength

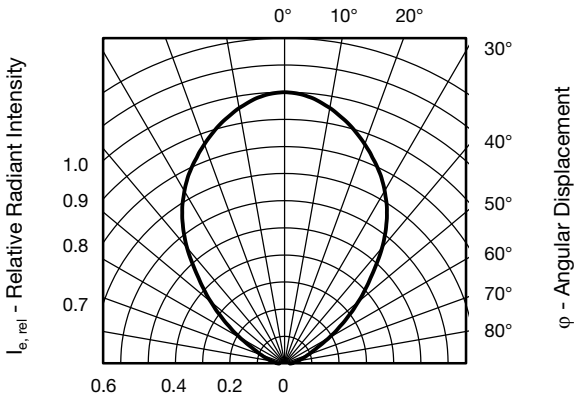
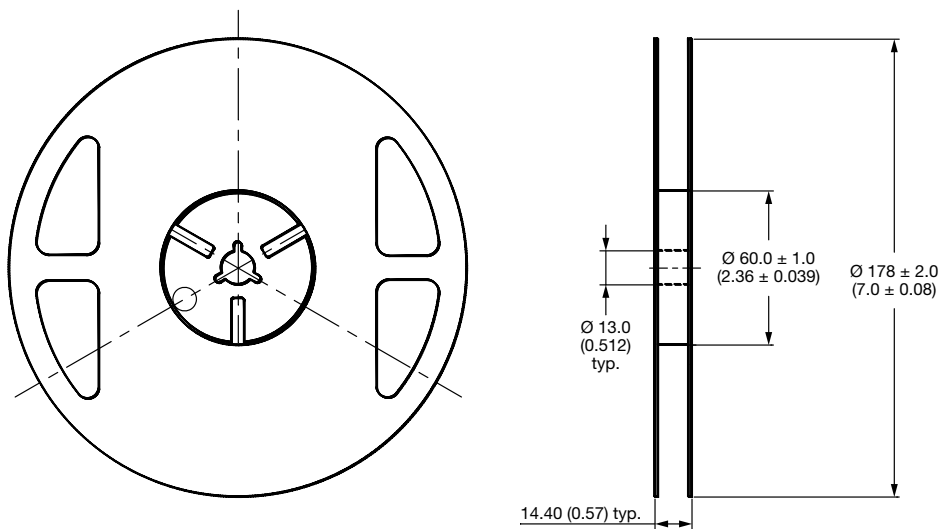


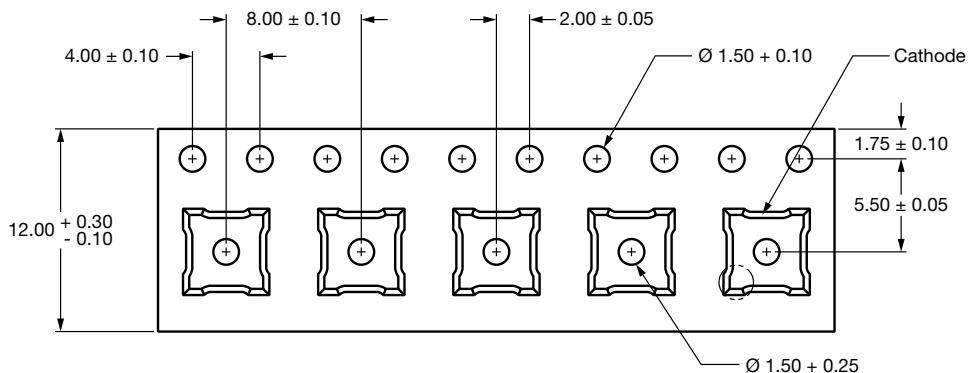
Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

**TAPING DIMENSIONS** in millimeters



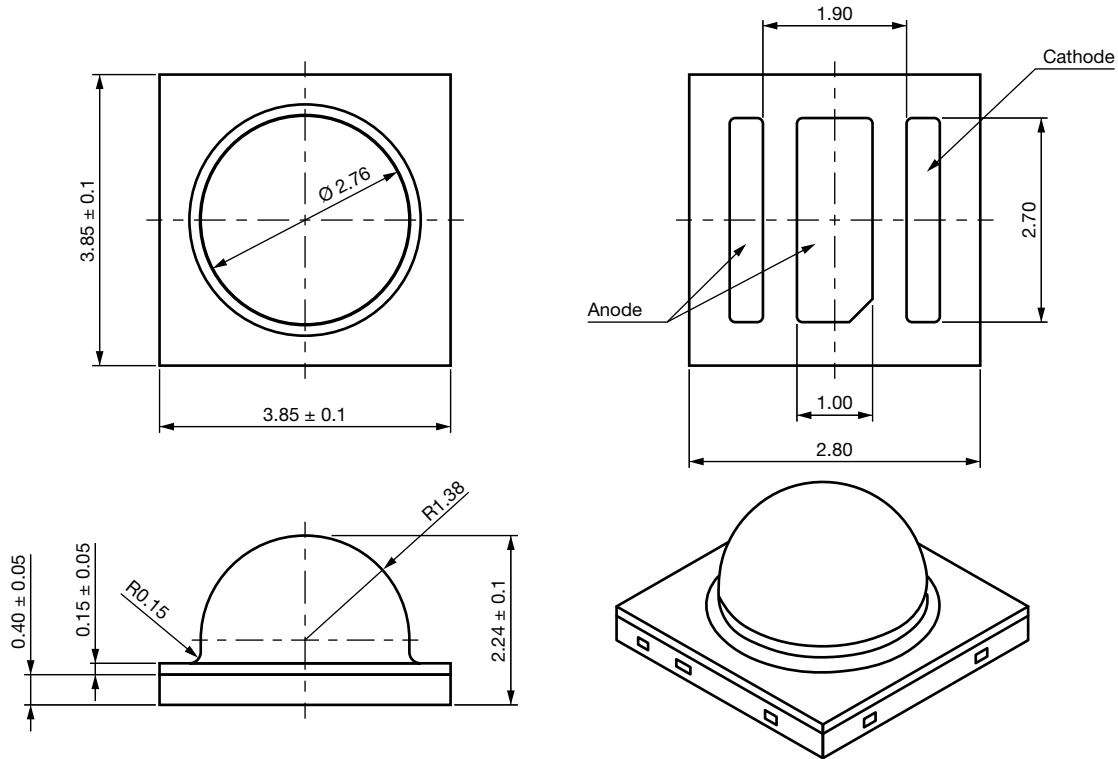
**Notes**

- Empty component pockets sealed with top cover tape
- 7 inch reel - 600 pieces per reel
- The maximum number of consecutive missing lamps is two
- In accordance with ANSI/EIA 481-1-A-1994 specifications



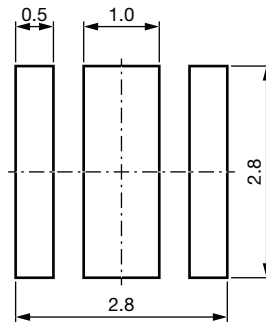


**PACKAGE DIMENSIONS** in millimeters



**Notes**

- Tolerance is  $\pm 0.10$  mm (0.004") unless otherwise noted
- Specifications are subject to change without notice



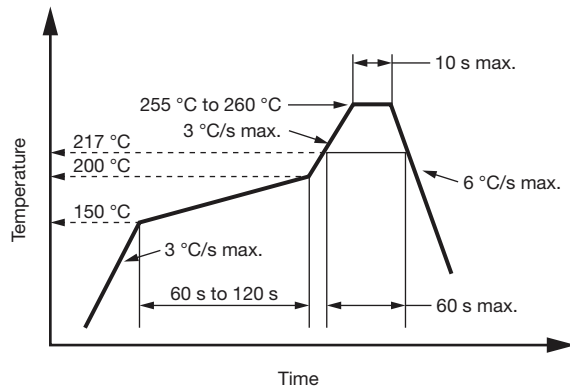
**SOLDER PROFILE**

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

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

**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),  $RH < 5\%$ .



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