

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



### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY294310SL 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 plastic packages (with lens) for surface mounting (SMD).

### APPLICATIONS

- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- IR illumination
- Remote control

### FEATURES

- Package type: surface mount
- Package form: side view
- Dimensions (L x W x H in mm): 2.3 x 2.55 x 2.3
- Peak wavelength:  $\lambda_p = 940 \text{ nm}$
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity:  $\phi = \pm 25^\circ$
- Suitable for high pulse current operation
- Package matches with detector VEMD2xx3SLX01 and VEMT2xx3SLX01 series
- Floor life: 4 weeks, MSL 2a, acc. 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)
VSMY294310SL	25	$\pm 25$	940	10

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY294310SL	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Side view

#### Note

- MOQ: minimum order quantity



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	70	mA
Surge forward current	$t_p = 100\text{ }\mu\text{s}$	$I_{FSM}$	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	$R_{thJA}$	250	K/W

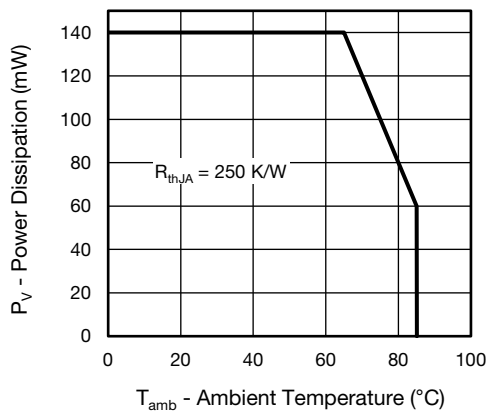


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

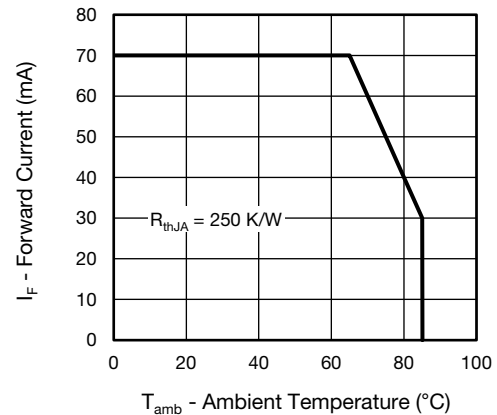


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 70\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$	-	1.5	2.0	V
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$	-	2.5	-	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			$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$	-	5	-	pF
Radiant intensity	$I_F = 70\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	12	25	45	mW/sr
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$	-	260	-	mW/sr
Radiant power	$I_F = 70\text{ mA}$ , $t_p = 20\text{ ms}$	$\phi_e$	-	40	-	mW
Temperature coefficient of radiant power	$I_F = 70\text{ mA}$	$TK_{\phi_e}$	-	-0.2	-	%/K
Angle of half intensity		$\phi$	-	$\pm 25$	-	deg
Peak wavelength	$I_F = 20\text{ mA}$	$\lambda_p$	920	940	960	nm
Spectral bandwidth	$I_F = 20\text{ mA}$	$\Delta\lambda$	-	35	-	nm
Temperature coefficient of $\lambda_p$	$I_F = 20\text{ mA}$	$TK_{\lambda_p}$	-	0.25	-	nm/K
Rise time	$I_F = 70\text{ mA}$ , 20 % to 80 %	$t_r$	-	10	-	ns
Fall time	$I_F = 70\text{ mA}$ , 20 % to 80 %	$t_f$	-	10	-	ns

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

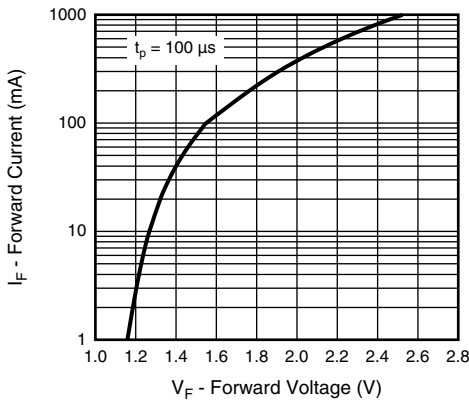


Fig. 3 - Forward Current vs. Forward Voltage

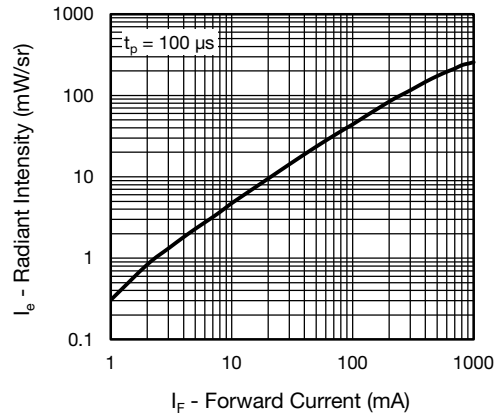


Fig. 6 - Radiant Intensity vs. Forward Current

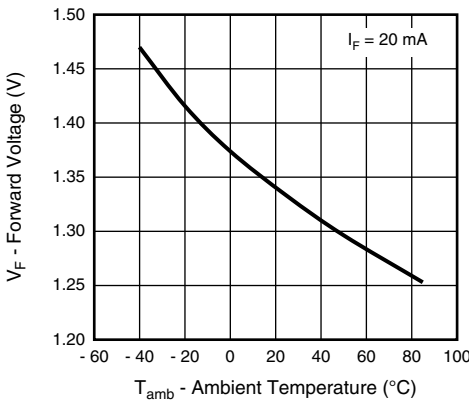


Fig. 4 - Forward Voltage vs. Ambient Temperature

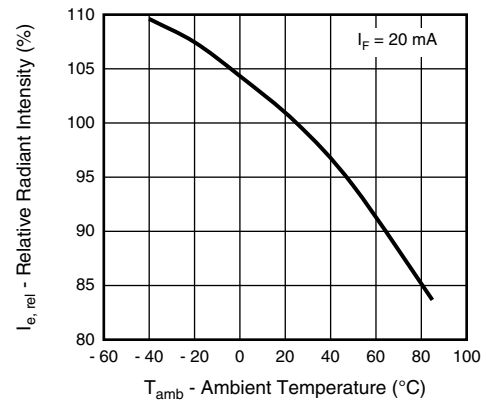


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

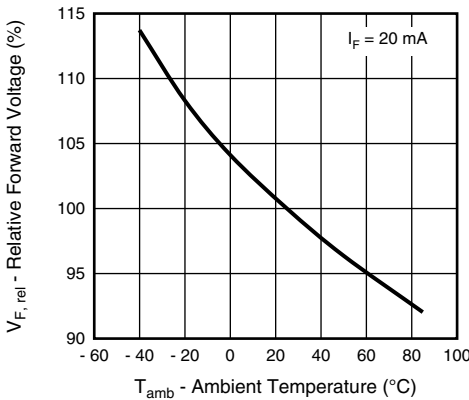


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

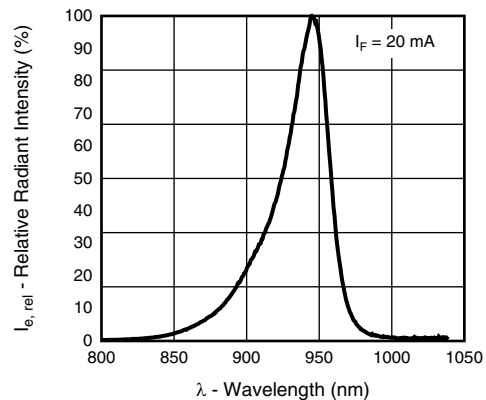


Fig. 8 - Relative Radiant Intensity vs. Wavelength

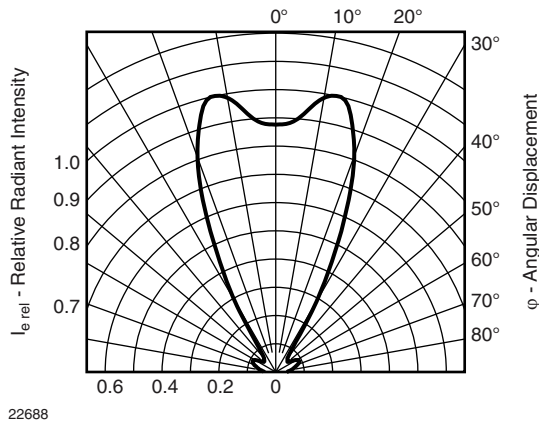


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

**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: 4 weeks

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

Moisture sensitivity level 2a, 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  $40\text{ }^{\circ}\text{C}$  (+  $5\text{ }^{\circ}\text{C}$ ),  $RH < 5\%$ .

**SOLDER PROFILE**

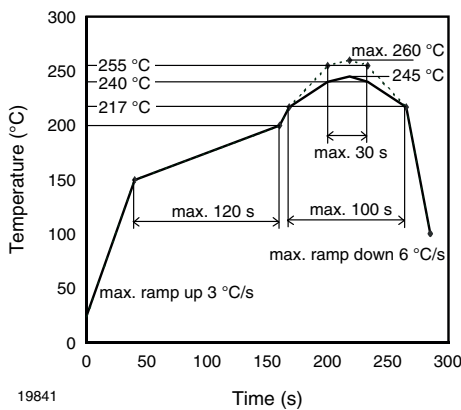
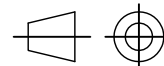
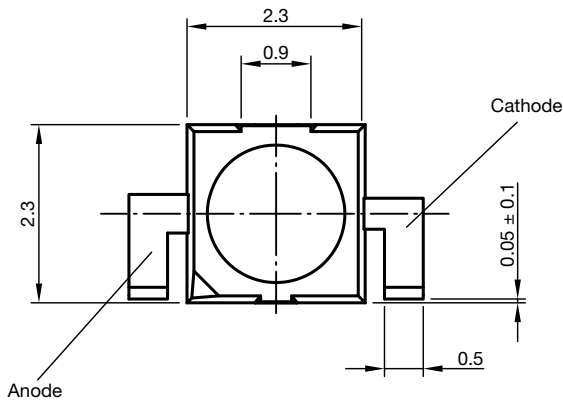
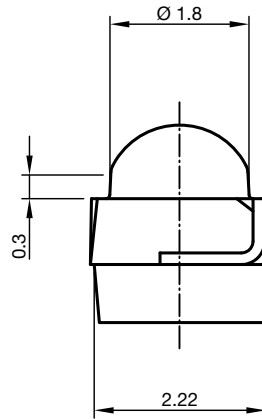
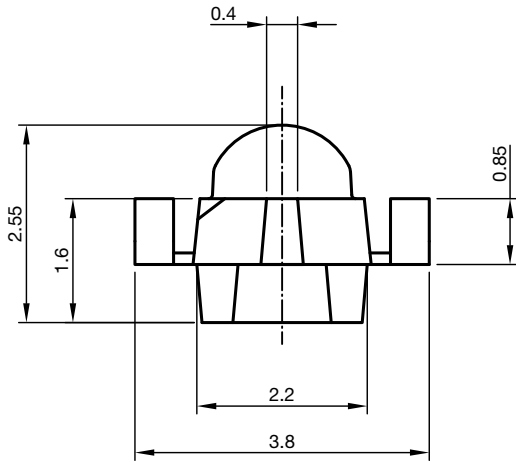


Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

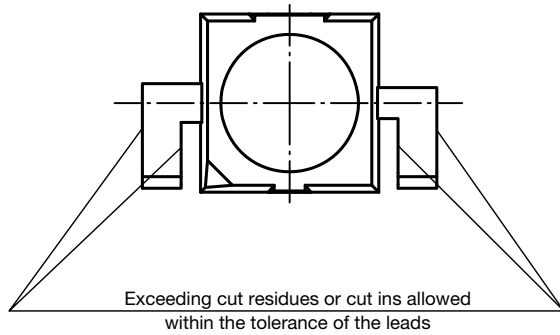


PACKAGE DIMENSIONS in millimeters: VSMY294310SL

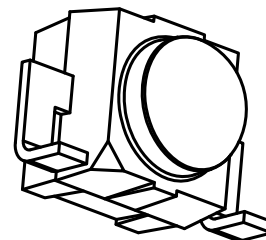
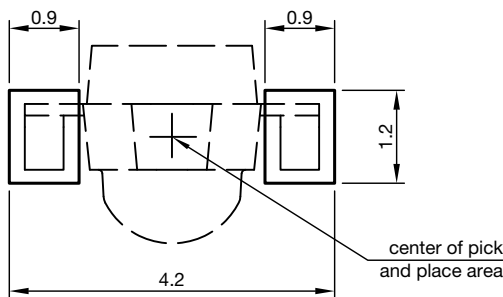


Technical drawings according to DIN specifications

Not indicated tolerances ± 0.2

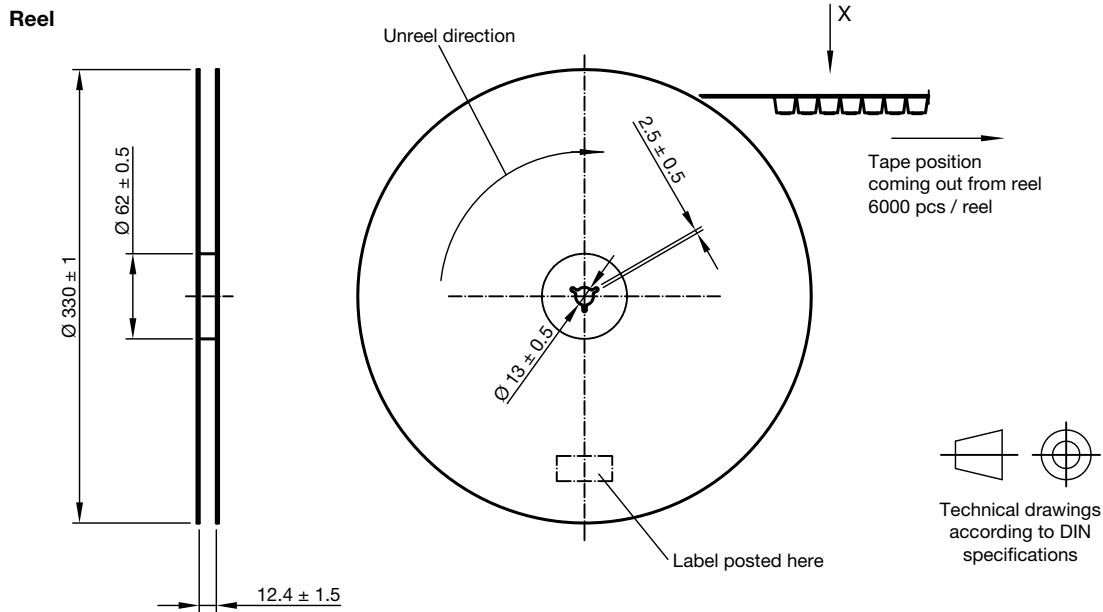


Solder pad proposal acc. IPC 7351

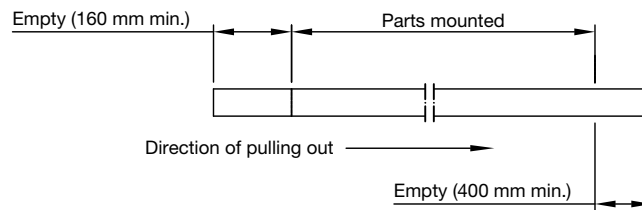


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Issue: 3; 02.10.15

**TAPING AND REEL DIMENSIONS** in millimeters: **VSMY294310SL**

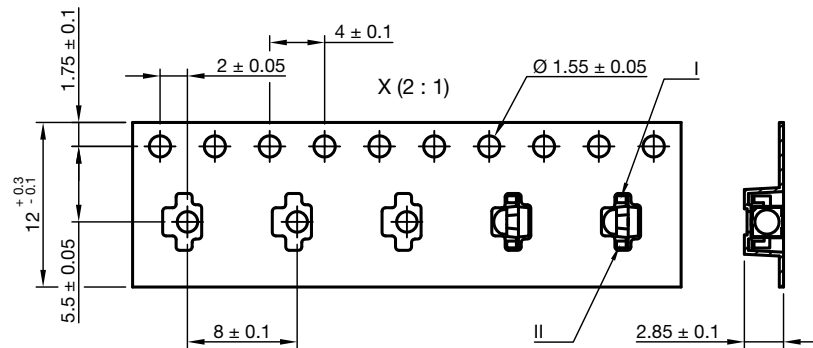


**Leader and trailer tape**



**Terminal position in tape**

Device	Lead I	Lead II
VSMB2943SLX01	Cathode	Anode
VSMF2893SLX01		
VSMB2948SL		
VEMD2023SLX01		
VEMD2523SLX01	Collector	Emitter
VEMT2023SLX01		
VEMT2523SLX01	Anode	Cathode
VSMY2853SL		
VSMY2943SL		
VSMY294310SL		



Drawing-No.: 9.800-5123.01-4  
Issue: 4; 02.10.15