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# Vishay Semiconductors

# High Speed Infrared Emitting Diode, 850 nm, Surface Emitter Technology



#### **DESCRIPTION**

As part of the <u>SurfLight</u><sup>TM</sup> portfolio, the VSMY2853SL is an infrared, 850 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 touch panels
- IR illumination

#### **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: λ<sub>p</sub> = 850 nm

· High reliability

High radiant power

· Very high radiant intensity

• Angle of half intensity:  $\varphi = \pm 28^{\circ}$ 

· Suitable for high pulse current operation

 Package matches with detector VEMD2xx3SLX01 and VEMT2xx3SLX01 series

• Floor life: 4 weeks, MSL 2a, according to J-STD-020

 Material categorization: for definitions of compliance please see <a href="https://www.vishav.com/doc?99912">www.vishav.com/doc?99912</a>

PRODUCT SUMMARY				
COMPONENT	I <sub>e</sub> (mW/sr)	φ (deg)	$\lambda_{\mathbf{p}}$ (nm)	t <sub>r</sub> (ns)
VSMY2853SL	50	± 28	850	10

#### Note

• Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
VSMY2853SL	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Side view	

#### Note

• MOQ: minimum order quantity



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage		V <sub>R</sub>	5	V	
Forward current		l <sub>F</sub>	100	mA	
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	I <sub>FM</sub>	200	mA	
Surge forward current	t <sub>p</sub> = 100 μs	I <sub>FSM</sub>	1	Α	
Power dissipation		$P_V$	190	mW	
Junction temperature		Tj	100	°C	
Operating temperature range		T <sub>amb</sub>	-40 to +85	°C	
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C	
Soldering temperature	Accordung to Fig. 7, J-STD-020	T <sub>sd</sub>	260	°C	
Thermal resistance junction-to-ambient	EIA / JESD51	$R_{thJA}$	250	K/W	

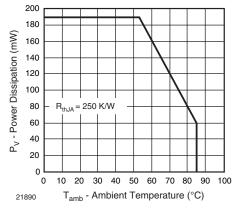


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

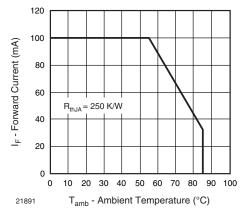


Fig. 2 - Forward Current Limit vs. Ambient Temperature

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
E	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	V <sub>F</sub>	-	1.6	1.9	V
Forward voltage	$I_F = 1 \text{ A, } t_p = 100  \mu\text{s}$	V <sub>F</sub>	-	2.8	-	V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 100 mA	TK <sub>VF</sub>	-	-1.5	-	mV/K
Reverse current		I <sub>R</sub>	Not designed for reverse operation		μΑ	
Junction capacitance	$V_R = 0 \text{ V}, f = 1 \text{ MHz}, E = 0 \text{ mW/cm}^2$	CJ	-	50	-	рF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l <sub>e</sub>	27	50	75	mW/sr
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	l <sub>e</sub>	-	350	-	mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	фe	-	55	-	mW
Temperature coefficient of radiant power	I <sub>F</sub> = 100 mA	ΤΚφ <sub>e</sub>	-	-0.12	-	%/K
Angle of half intensity		φ	-	± 28	-	deg
Peak wavelength	I <sub>F</sub> = 100 mA	$\lambda_{p}$	840	850	870	nm
Spectral bandwidth	I <sub>F</sub> = 30 mA	Δλ	-	30	-	nm
Temperature coefficient of $\lambda_p$	I <sub>F</sub> = 30 mA	TKλ <sub>p</sub>	-	0.25	-	nm/K
Rise time	I <sub>F</sub> = 100 mA, 10 % to 90 %	t <sub>r</sub>	-	10	-	ns
Fall time	I <sub>F</sub> = 100 mA, 10 % to 90 %	t <sub>f</sub>	-	10	_	ns

#### **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

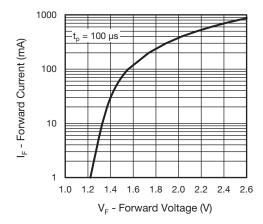


Fig. 3 - Forward Current vs. Forward Voltage

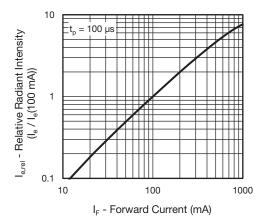


Fig. 4 - Relative Radiant Intensity vs. Forward Current

#### 300 260 °C 250 245 240 217 remperature (°C) 200 Max. 30 s 150 Max. 120 s Max. 100 s 100 Max. ramp down 6 °C/s Max. ramp up 3 °C/s 50 0 50 100 150 200 250 300 19841-1 Time (s)

**SOLDER PROFILE** 

Fig. 7 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

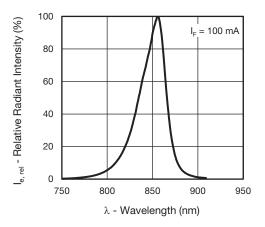


Fig. 5 - Relative Radiant Power vs. Wavelength

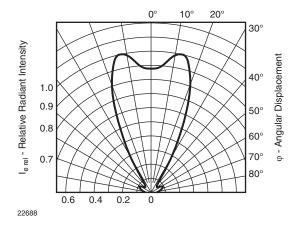


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

#### **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 °C, RH < 60 %

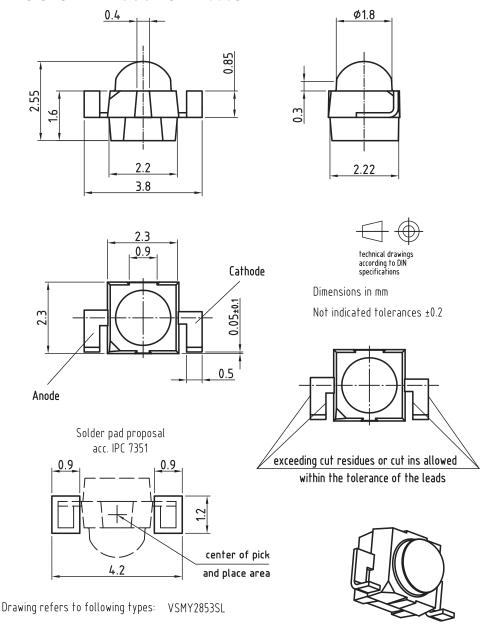
Moisture sensitivity level 2a, according to J-STD-020.

#### **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  $^{\circ}$ C (+ 5  $^{\circ}$ C), RH < 5  $^{\circ}$ M.



#### PACKAGE DIMENSIONS in millimeters: VSMY2853SL

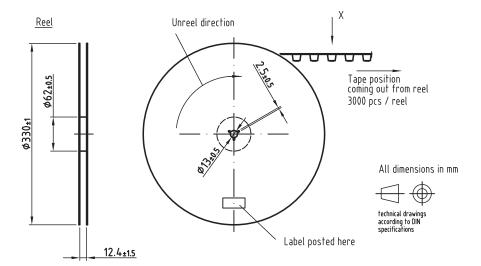


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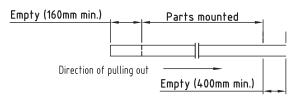
Issue: prel. 03.08.12



#### TAPING AND REEL DIMENSIONS in millimeters: VSMY2853SL

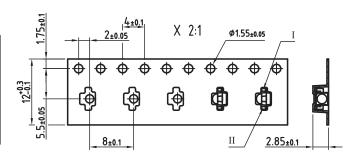


#### Leader and trailer tape:



	_	ermina	position	in	tape	
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Device	Lead I	Lead II	
VSMB2943SLX01		Anode	
VSMF2893SLX01			
VSMB2948SL	Cathode	Anode	
VEMD2023SLX01			
VEMD2523SLX01			
VEMT2023SLX01	C.11	F-144	
VEMT2523SLX01	Collector	Emitter	
VSMY2853SL	Anode	Cathode	



Drawing refers to following types: see table Reel dimensions and tape

Drawing-No.: 9.800-5123.01-4 Issue: prel; 01.02.13



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