

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



### FEATURES

- Package type: surface-mount
- Package form: MiniLED
- Dimensions (L x W x H in mm): 2.3 x 1.3 x 1.4
- Peak wavelength:  $\lambda_p = 940$  nm
- Angle of half intensity:  $\phi = \pm 60^\circ$
- Floor life: 672 h, MSL 2a, 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)



### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY23941 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, in a small white surface-mount (SMD) package.

### APPLICATIONS

- Miniature light barrier
- Optical switch
- IR point source

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr) at $I_F = 100$ mA	$\phi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMY23941	15.5	$\pm 60$	940	5

#### Note

- Test conditions see table “Basic Characteristics“

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY23941	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	MiniLED

#### Note

- MOQ: minimum order quantity



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		I <sub>F</sub>	100	mA
Peak forward current	t <sub>p</sub> /T = 0.1, t <sub>p</sub> = 100 μs	I <sub>FM</sub>	200	mA
Surge forward current	t <sub>p</sub> = 100 μs	I <sub>FSM</sub>	500	mA
Power dissipation		P <sub>V</sub>	200	mW
Junction temperature		T <sub>j</sub>	110	°C
Operating temperature range		T <sub>amb</sub>	-40 to +100	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Soldering temperature	According to Fig. 7, J-STD-020	T <sub>sd</sub>	260	°C
Thermal resistance junction to ambient	EIA / JESD51	R <sub>thJA</sub>	350	K/W

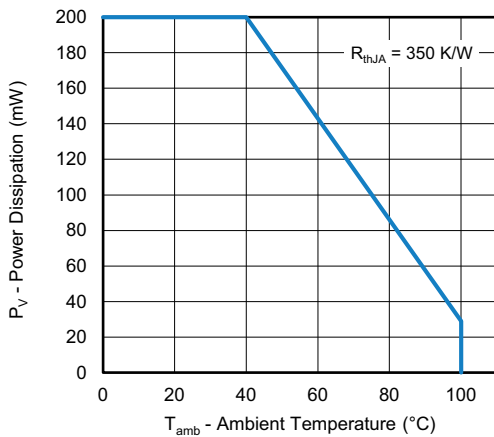


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

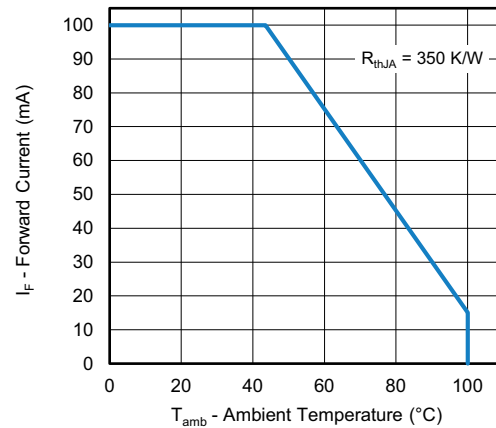


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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> = 70 mA, t <sub>p</sub> = 20 ms	V <sub>F</sub>	-	1.6	-	V
	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms		-	1.7	2.0	
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TK <sub>V<sub>F</sub></sub>	-	-0.7	-	mV/K
Reverse current		I <sub>R</sub>	Not designed for reverse operation			μA
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> = 70 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	-	11	-	mW/sr
	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms		11	15.5	20	
Temperature coefficient of radiant power	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TK <sub>φ<sub>e</sub></sub>	-	-0.27	-	%/K
Angle of half intensity		φ	-	± 60	-	°
Peak wavelength	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	λ <sub>p</sub>	925	940	955	nm
Spectral bandwidth	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	Δλ	-	55	-	nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TK <sub>λ<sub>p</sub></sub>	-	0.28	-	nm/K
Rise time	I <sub>F</sub> = 100 mA, 10 % to 90 %	t <sub>r</sub>	-	5	-	ns
Fall time	I <sub>F</sub> = 100 mA, 10 % to 90 %	t <sub>f</sub>	-	5	-	ns

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

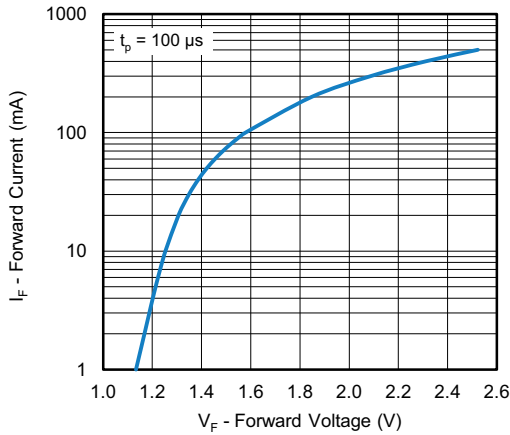


Fig. 3 - Forward Current vs. Forward Voltage

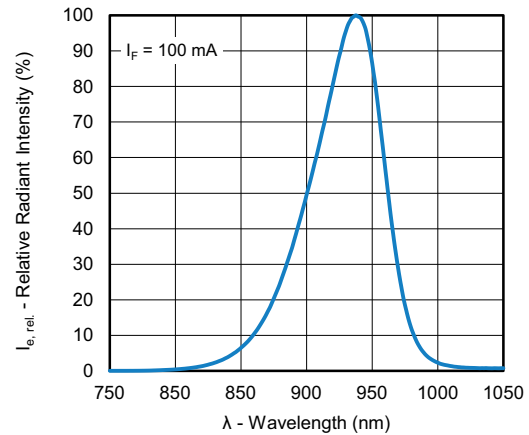


Fig. 5 - Relative Radiant Power vs. Wavelength

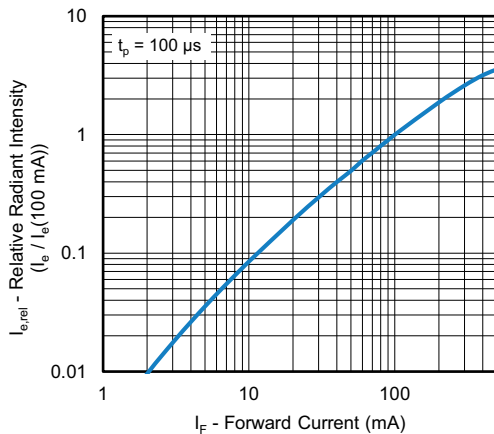


Fig. 4 - Relative Radiant Intensity vs. Forward Current



Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

**REFLOW SOLDER PROFILE**



19841

Fig. 7 - 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**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 2a

Floor life: 672 h

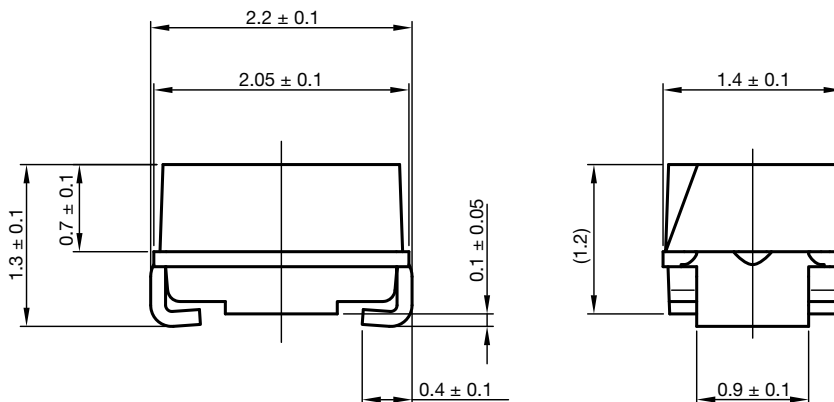
Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , RH < 60 %

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-033D or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

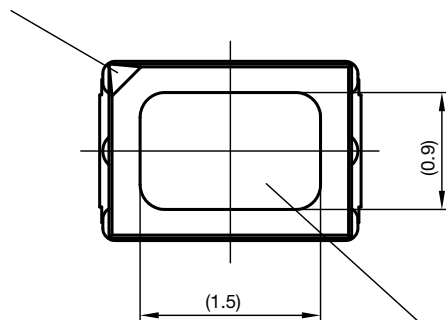


PACKAGE DIMENSIONS in millimeters

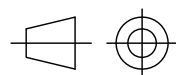
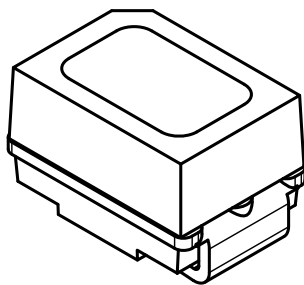


Not indicated tolerances ± 0.2

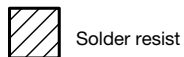
Anode mark



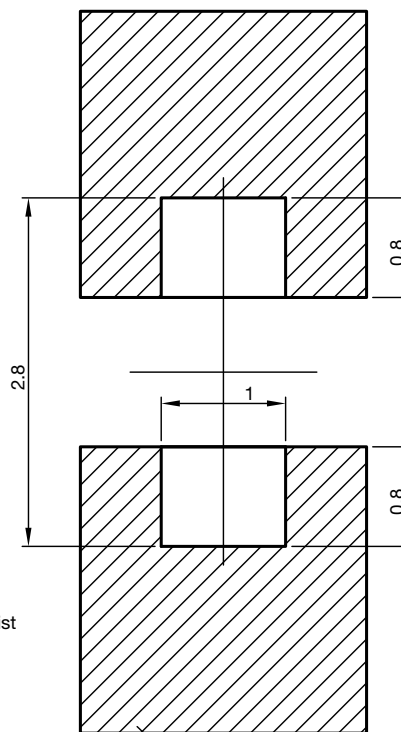
Area not flat



technical drawings according to DIN specifications



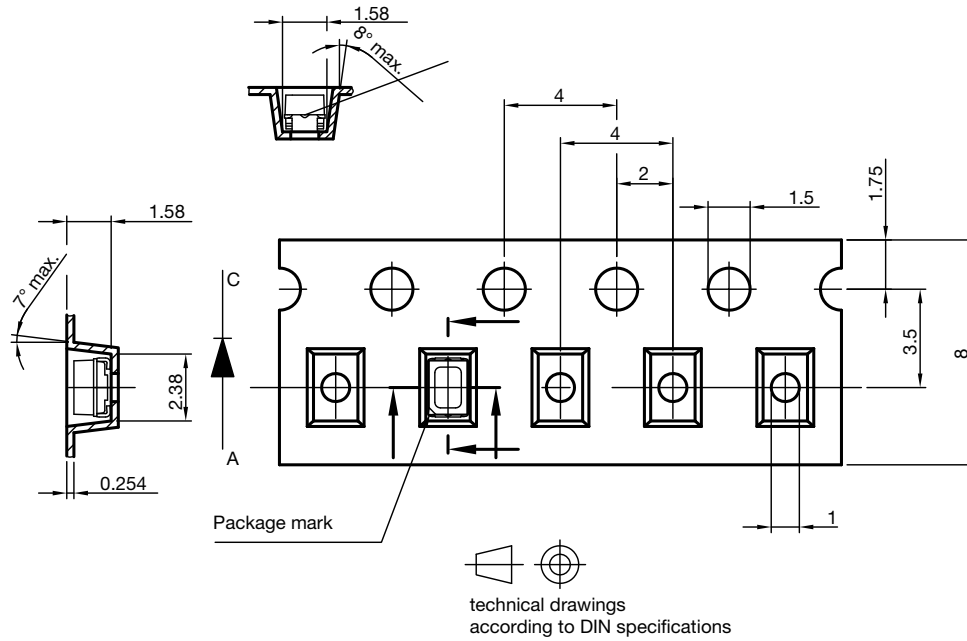
Proposed pad layout (for reference only)



Cu-area > 5 mm<sup>2</sup>

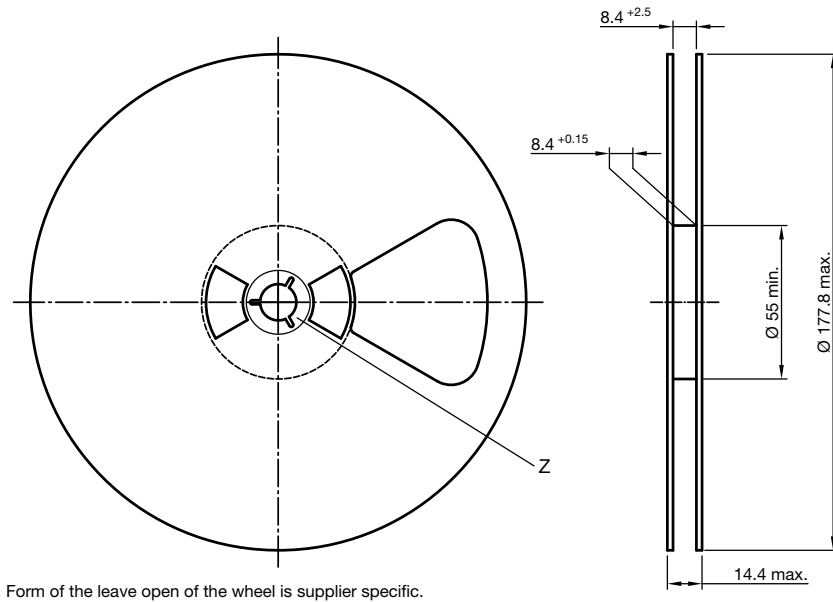
Drawing refers to following types:  
Drawing-No.: 6.541-5090.01-4  
Issue: 4; 20.07.17

**BLISTER TAPE DIMENSIONS** in millimeters

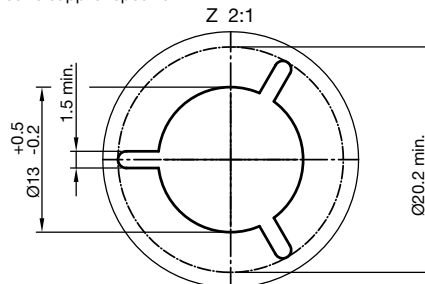


Drawing refers to following types: Mini - SMD - LED with reverse polarity: VLM. 233..., VLM. 235...  
 Drawing-No.: 9.700-5381.01-4  
 Issue: 2; 20.07.17

**REEL DIMENSIONS** in millimeters



Form of the leave open of the wheel is supplier specific.



Technical drawings according to DIN specification.

Drawing-No.: 9.800-5096.01-4  
 Issue: 5; 20.12.2016



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