

## 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)



### LINKS TO ADDITIONAL RESOURCES



### 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
- [Smart metering](#)

### 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

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		$I_F$	100	mA
Peak forward current	$t_p/T = 0.1$ , $t_p = 100\text{ }\mu\text{s}$	$I_{FM}$	200	mA
Surge forward current	$t_p = 100\text{ }\mu\text{s}$	$I_{FSM}$	500	mA
Power dissipation		$P_V$	200	mW
Junction temperature		$T_j$	110	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^{\circ}\text{C}$
Soldering temperature	According to Fig. 7, J-STD-020	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal resistance junction to ambient	EIA / JESD51	$R_{thJA}$	350	K/W

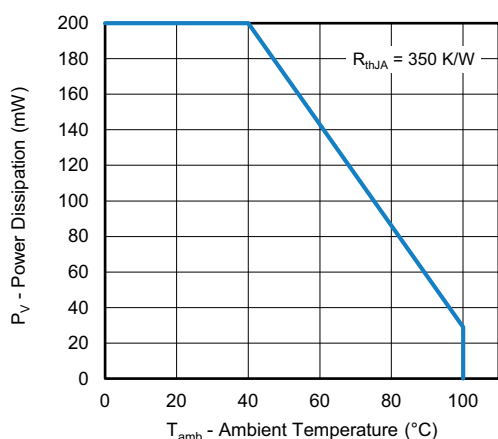


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

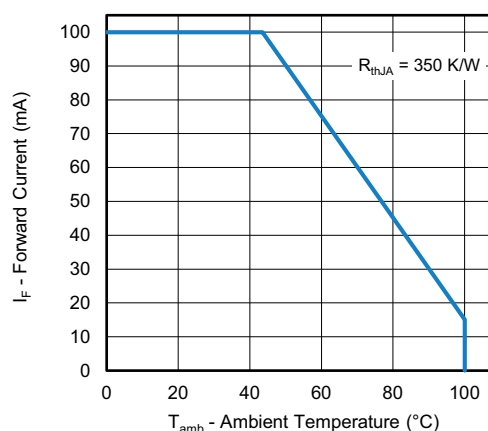


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 70\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$	-	1.6	-	V
	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$		-	1.7	2.0	
Temperature coefficient of $V_F$	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$TK_{VF}$	-	-0.7	-	mV/K
Reverse current		$I_R$	Not designed for reverse operation			$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$	-	30	-	pF
Radiant intensity	$I_F = 70\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	-	11	-	mW/sr
	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$		11	15.5	20	
Temperature coefficient of radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$TK_{\phi_e}$	-	-0.27	-	%/K
Angle of half intensity		$\phi$	-	$\pm 60$	-	$^{\circ}$
Peak wavelength	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\lambda_p$	925	940	955	nm
Spectral bandwidth	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\Delta\lambda$	-	55	-	nm
Temperature coefficient of $\lambda_p$	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$TK_{\lambda_p}$	-	0.28	-	nm/K
Rise time	$I_F = 100\text{ mA}$ , 10 % to 90 %	$t_r$	-	5	-	ns
Fall time	$I_F = 100\text{ mA}$ , 10 % to 90 %	$t_f$	-	5	-	ns

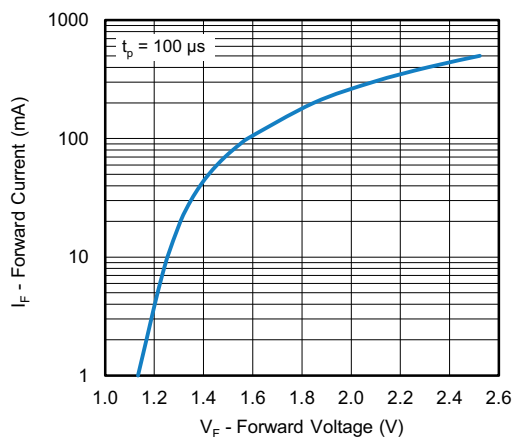
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

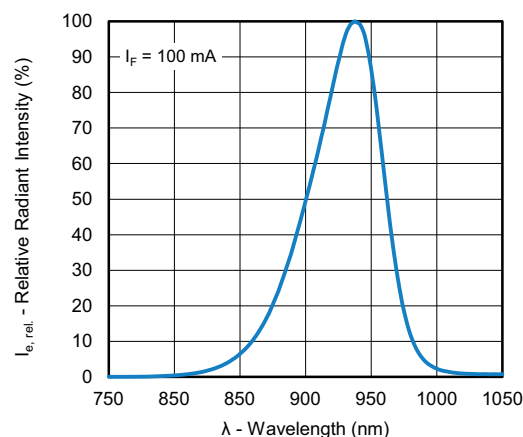


Fig. 5 - Relative Radiant Power vs. Wavelength

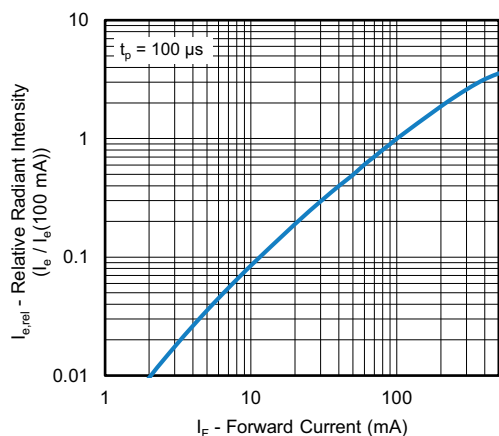


Fig. 4 - Relative Radiant Intensity vs. Forward Current

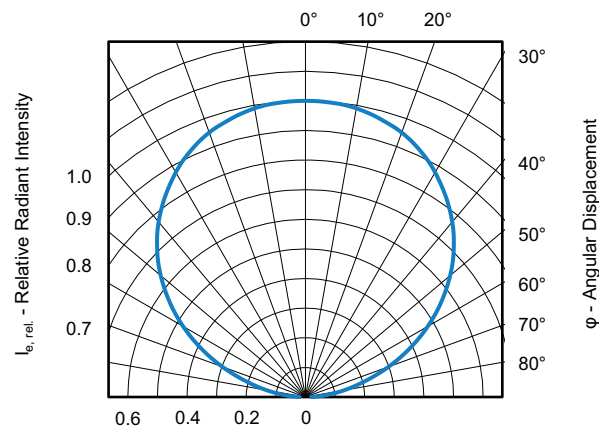
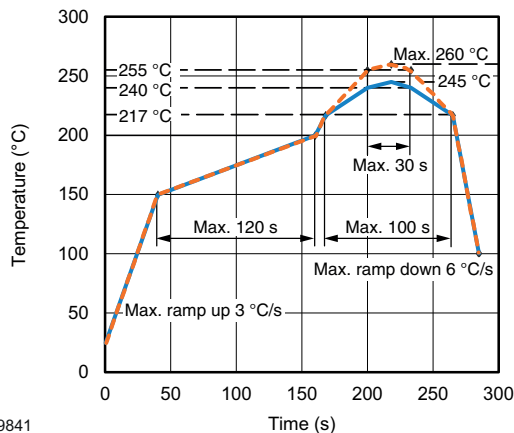


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

**REFLOW SOLDER PROFILE**

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:

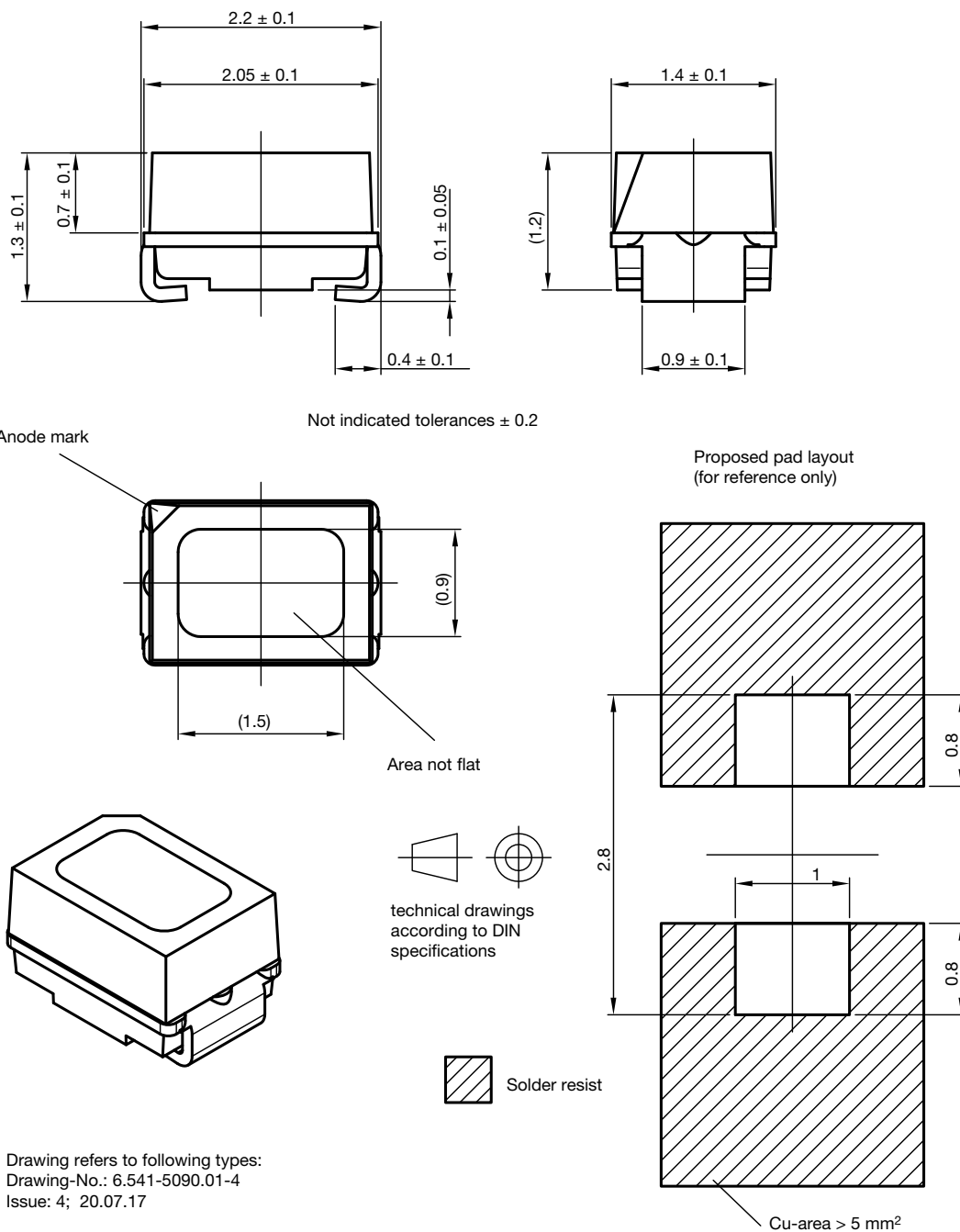
Moisture sensitivity: level 2a

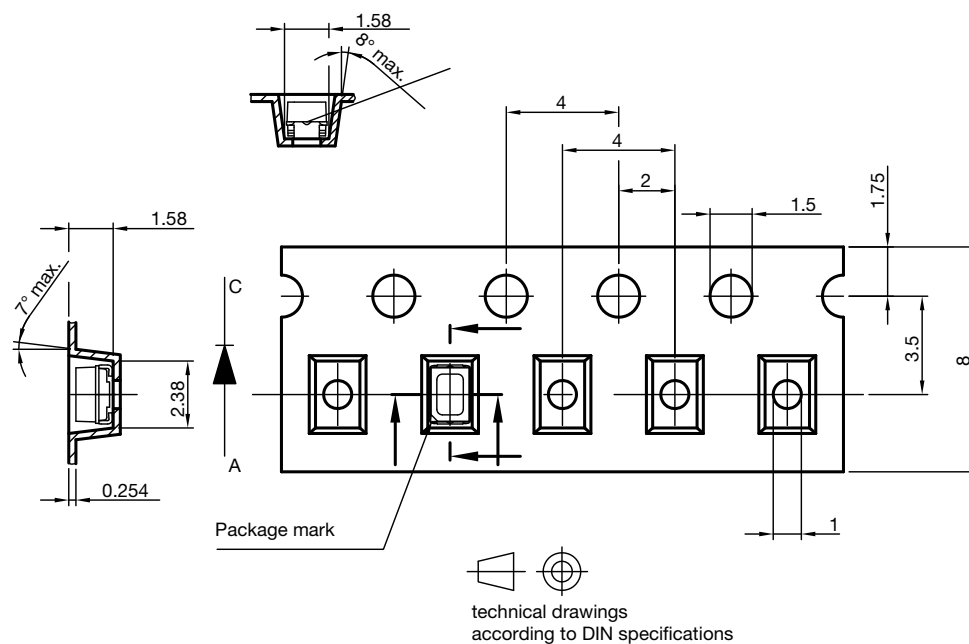
Floor life: 672 h

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

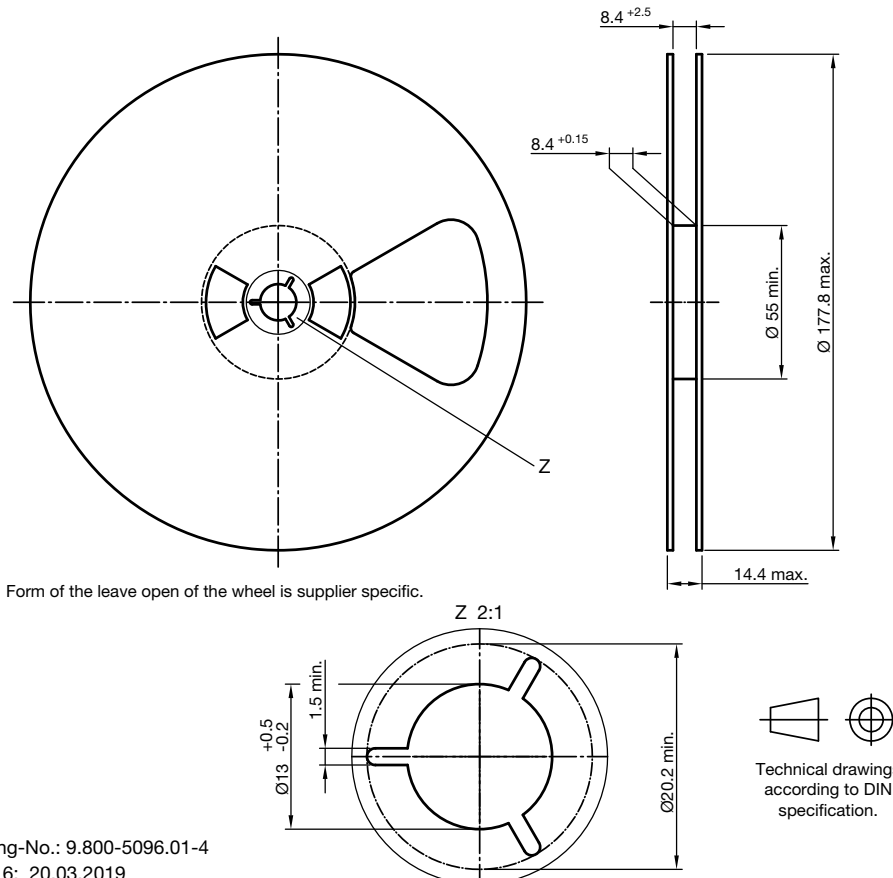
**DRYING**

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  $40\text{ }^{\circ}\text{C}$  (+ 5 °C), RH < 5 %.

**PACKAGE DIMENSIONS** in millimeters


**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


Drawing-No.: 9.800-5096.01-4  
Issue: 6; 20.03.2019



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