



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



### FEATURES

- Package type: surface-mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.8
- Peak wavelength:  $\lambda_p = 940$  nm
- High speed
- Angle of half intensity:  $\varphi = \pm 60^\circ$
- 0805 standard surface-mountable package
- 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)



### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY5940 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, high optical power and high speed, in a low profile 0805 surface-mount (SMD) package.

### APPLICATIONS

- Miniature light barrier
- Optical switch
- IR point source
- [Wearables](#)

PRODUCT SUMMARY				
COMPONENT	$I_e$ (mW/sr) at $I_F = 100$ mA	$\varphi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMY5940	14.5	$\pm 60$	940	5

**Note**

- Test conditions see table “Basic Characteristics“

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY5940	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

**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		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>	125	°C
Operating temperature range		T <sub>amb</sub>	-40 to +110	°C
Storage temperature range		T <sub>stg</sub>	-40 to +110	°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>	240	K/W
ESD sensitivity	According to ANSI / ESDA / JEDEC JS-001	V <sub>ESD</sub>	2	kV

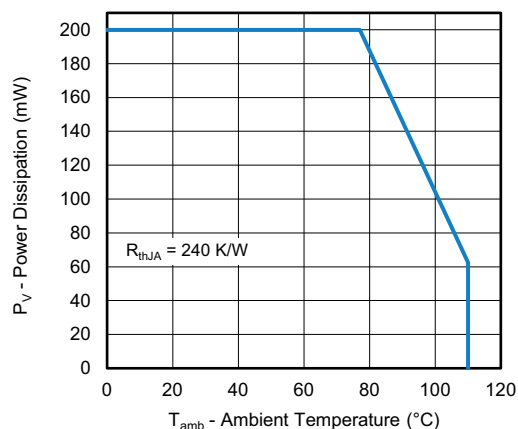


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

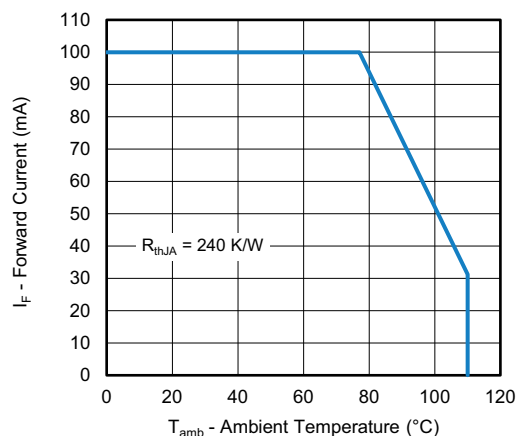


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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> = 100 mA, t <sub>p</sub> = 20 ms	V <sub>F</sub>	1.4	1.7	2.0	V
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>	-	-1.2	-	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> = 100 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	10	14.5	19	mW/sr
Temperature coefficient of radiant power	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	TK <sub>φ<sub>e</sub></sub>	-	-0.3	-	%/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>	-	940	-	nm
Spectral bandwidth	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	Δλ	-	65	-	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)

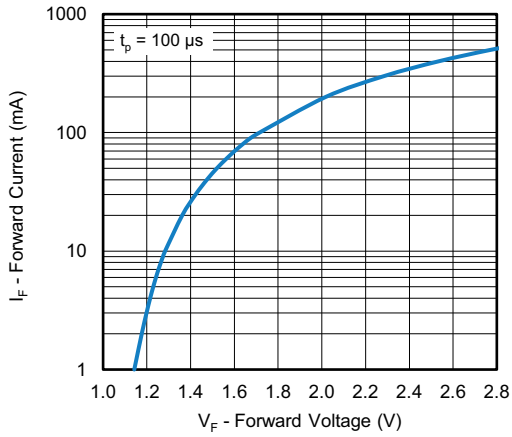


Fig. 3 - Forward Current vs. Forward Voltage

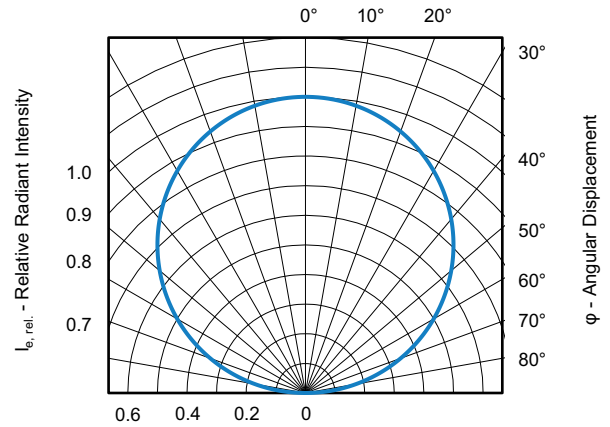


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

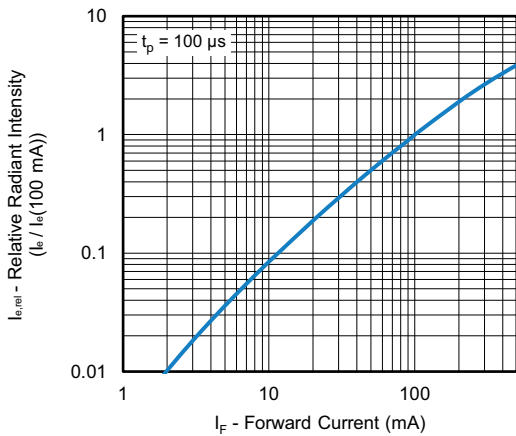


Fig. 4 - Relative Radiant Intensity vs. Forward Current

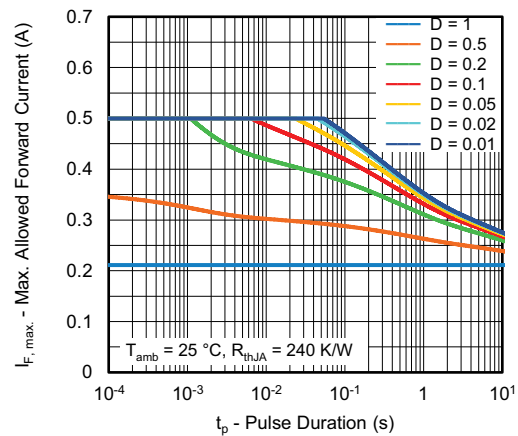


Fig. 7 - Max. Allowed Forward Current vs. Pulse Duration

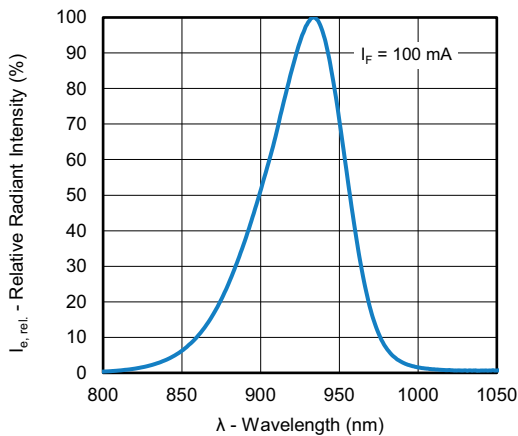


Fig. 5 - Relative Radiant Intensity vs. Wavelength

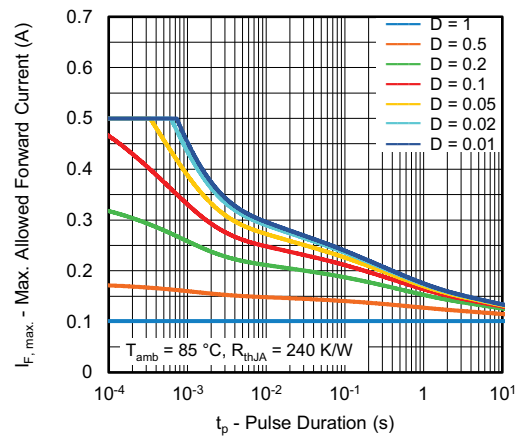
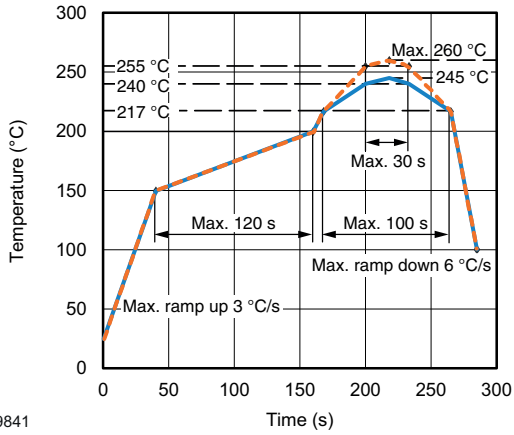


Fig. 8 - Max. Allowed Forward Current vs. Pulse Duration



**REFLOW SOLDER PROFILE**



19841

Fig. 9 - 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 3

Floor life: 168 h

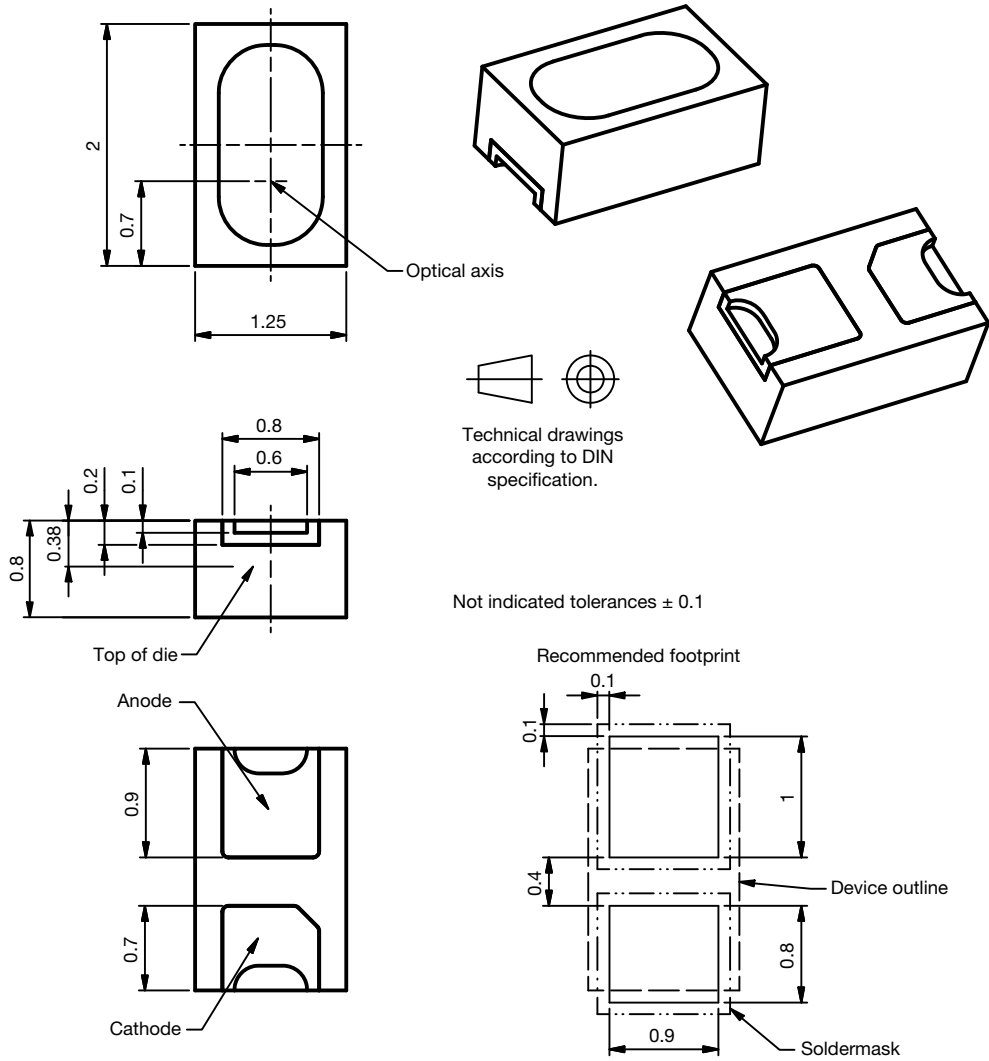
Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ ,  $\text{RH} < 60\%$

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



**PACKAGE DIMENSIONS** in millimeters

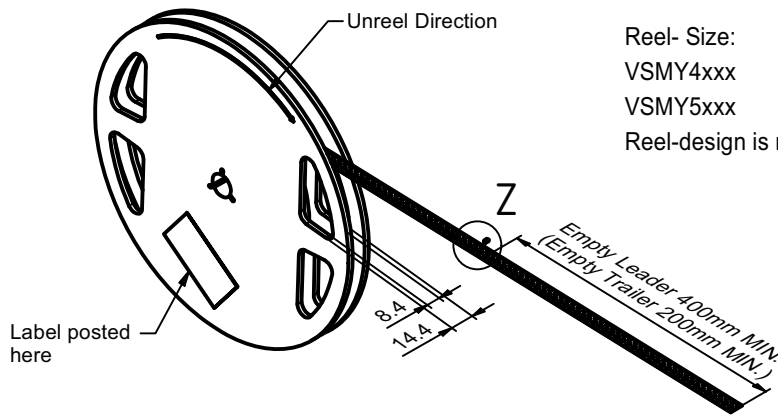


Drawing- No.: 6.550-5352.01-4  
Issue: 2\_A; prelim. 05.12.2024

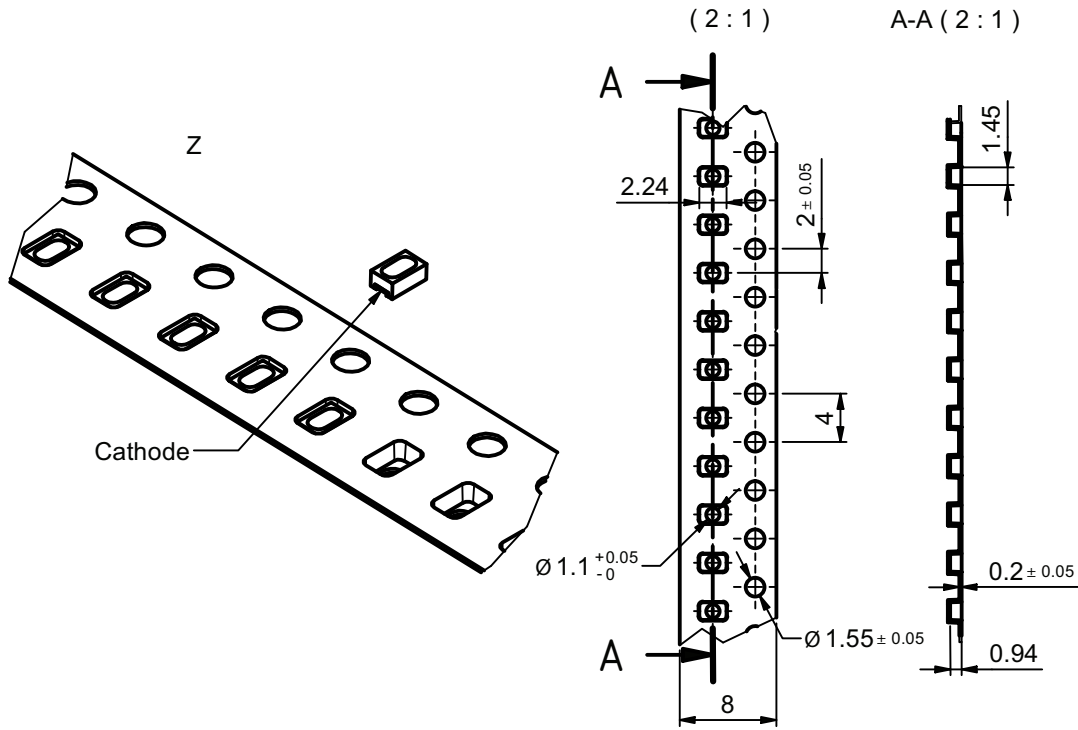


**TAPE AND REEL DIMENSIONS** in millimeters

Non tolerated dimensions  $\pm 0.1$  mm



Reel- Size:  
 VSMY4xxx  $\pm 178 \pm 2$  mm = 3000 pcs.  
 VSMY5xxx  $\pm 178 \pm 2$  mm = 3000 pcs.  
 Reel-design is representative for different types.



Drawing-No.: PM-10035.100-000  
 Issue: 0\_A; preliminary 10.12.2024



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