



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
- AEC-Q101 qualified
- High speed
- Angle of half intensity: $\phi = \pm 60^\circ$
- 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

AUTOMOTIVE GRADE



RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY5940X01 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
- Automotive sensors
- Optical switch
- IR point source

PRODUCT SUMMARY				
COMPONENT	I_e (mW/sr) at $I_F = 100$ mA	ϕ (°)	λ_p (nm)	t_r (ns)
VSMY5940X01	14.5	± 60	940	5

Note

- Test conditions see table “Basic Characteristics“

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY5940X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

Note

- MOQ: minimum order quantity



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V _R	5	V
Forward current		I _F	100	mA
Peak forward current	t _p /T = 0.1, t _p = 100 μs	I _{FM}	200	mA
Surge forward current	t _p = 100 μs	I _{FSM}	500	mA
Power dissipation		P _V	200	mW
Junction temperature		T _j	125	°C
Operating temperature range		T _{amb}	-40 to +110	°C
Storage temperature range		T _{stg}	-40 to +110	°C
Soldering temperature	According to Fig. 7, J-STD-020	T _{sd}	260	°C
Thermal resistance junction to ambient	EIA / JESD51	R _{thJA}	240	K/W
ESD sensitivity	According to ANSI / ESDA / JEDEC JS-001	V _{ESD}	2	kV

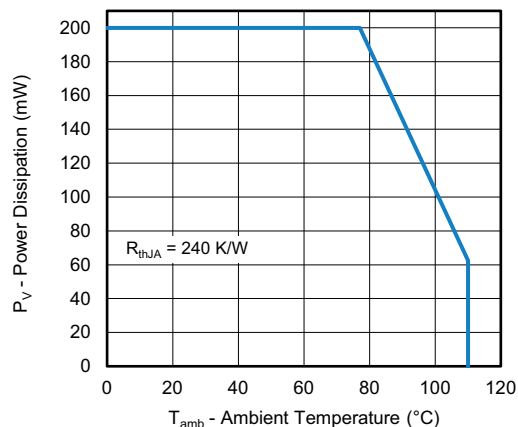


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

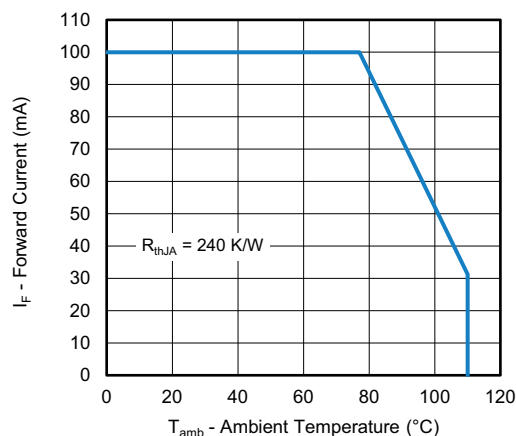


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I _F = 100 mA, t _p = 20 ms	V _F	1.4	1.7	2.0	V
Temperature coefficient of V _F	I _F = 100 mA, t _p = 20 ms	TK _{V_F}	-	-1.2	-	mV/K
Reverse current		I _R	Not designed for reverse operation			μA
Junction capacitance	V _R = 0 V, f = 1 MHz, E = 0 mW/cm ²	C _J	-	30	-	pF
Radiant intensity	I _F = 100 mA, t _p = 20 ms	I _e	10	14.5	19	mW/sr
Temperature coefficient of radiant power	I _F = 100 mA, t _p = 20 ms	TK _{φ_e}	-	-0.3	-	%/K
Angle of half intensity		φ	-	± 60	-	°
Peak wavelength	I _F = 100 mA, t _p = 20 ms	λ _p	-	940	-	nm
Spectral bandwidth	I _F = 100 mA, t _p = 20 ms	Δλ	-	65	-	nm
Temperature coefficient of λ _p	I _F = 100 mA, t _p = 20 ms	TK _{λ_p}	-	0.28	-	nm/K
Rise time	I _F = 100 mA, 10 % to 90 %	t _r	-	5	-	ns
Fall time	I _F = 100 mA, 10 % to 90 %	t _f	-	5	-	ns



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

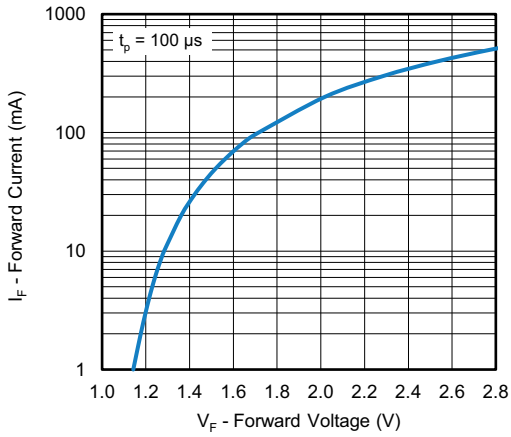


Fig. 3 - Forward Current vs. Forward Voltage

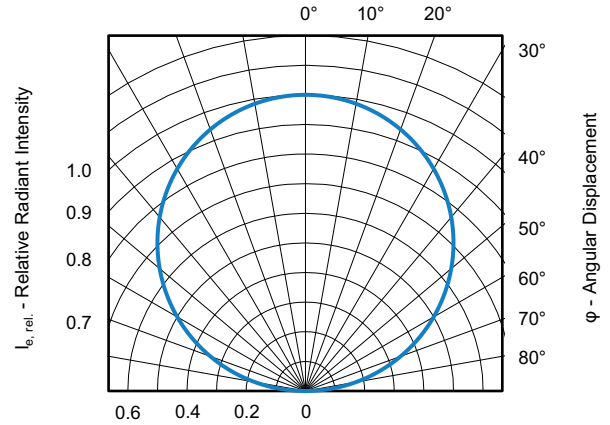


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

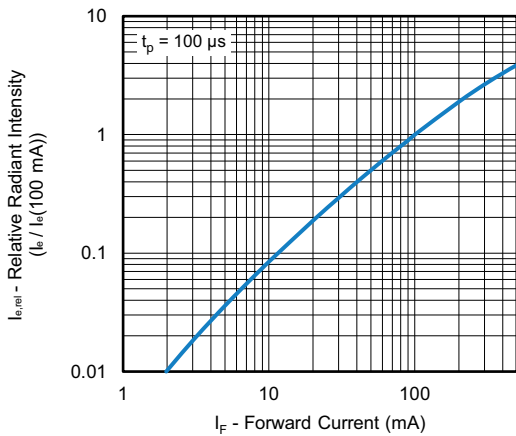


Fig. 4 - Relative Radiant Intensity vs. Forward Current

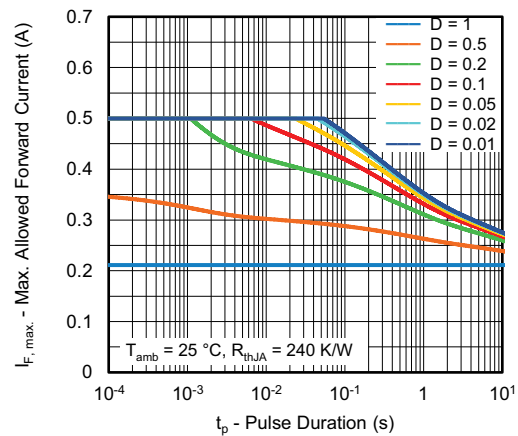


Fig. 7 - Max. Allowed Forward Current vs. Pulse Duration

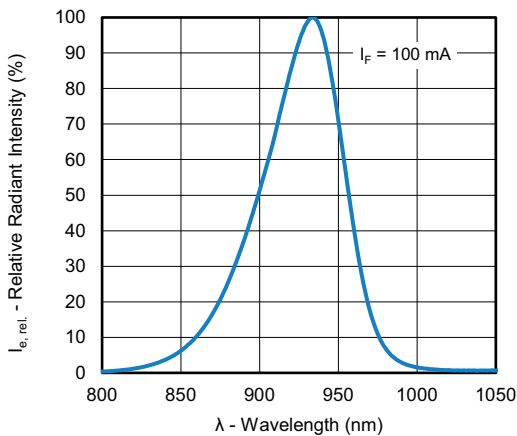


Fig. 5 - Relative Radiant Intensity vs. Wavelength

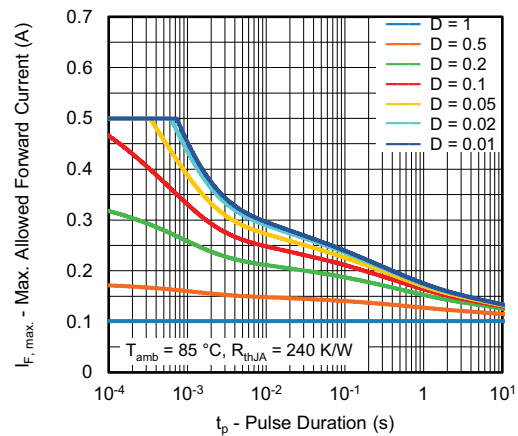


Fig. 8 - Max. Allowed Forward Current vs. Pulse Duration



REFLOW SOLDER PROFILE

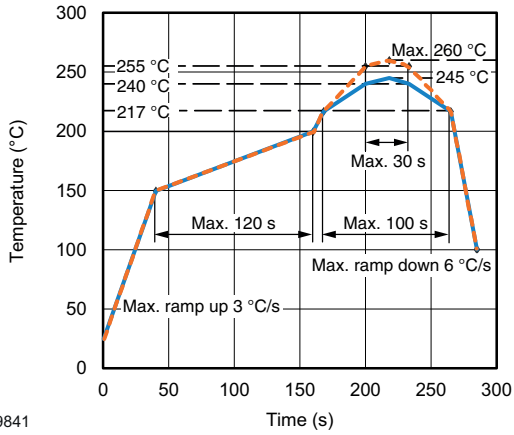


Fig. 9 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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

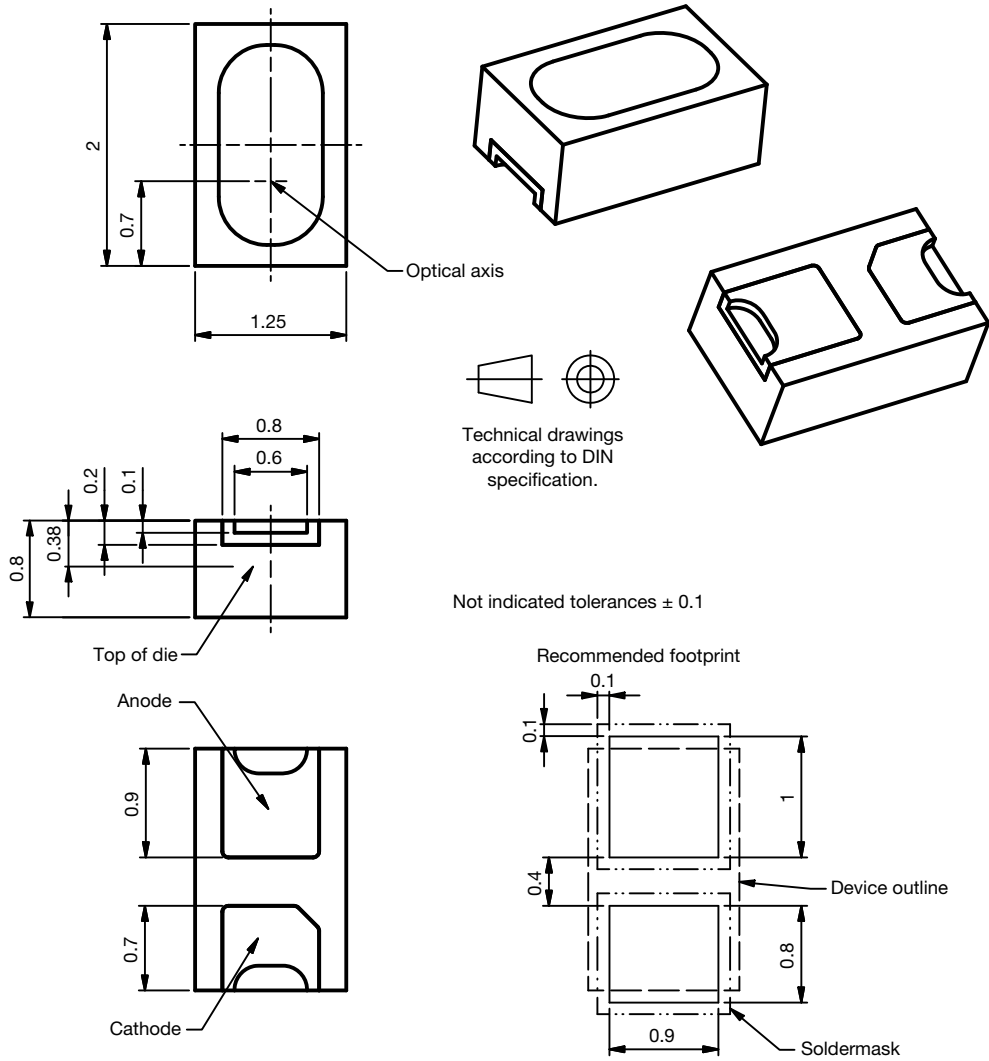
DRYING

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

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PACKAGE DIMENSIONS in millimeters

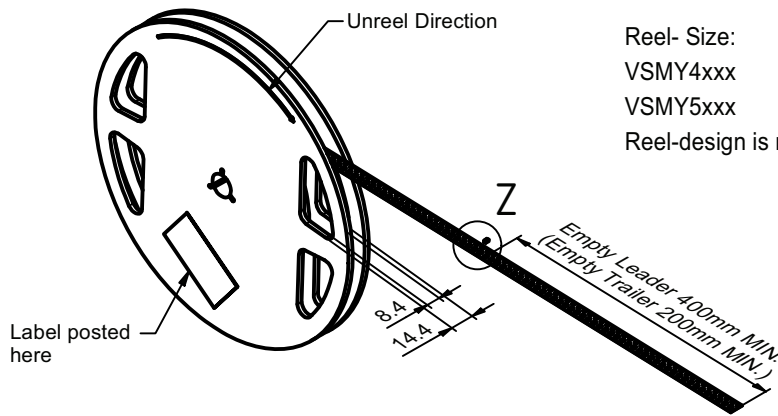


Drawing- No.: 6.550-5352.01-4
Issue: 2_A; prelim. 05.12.2024

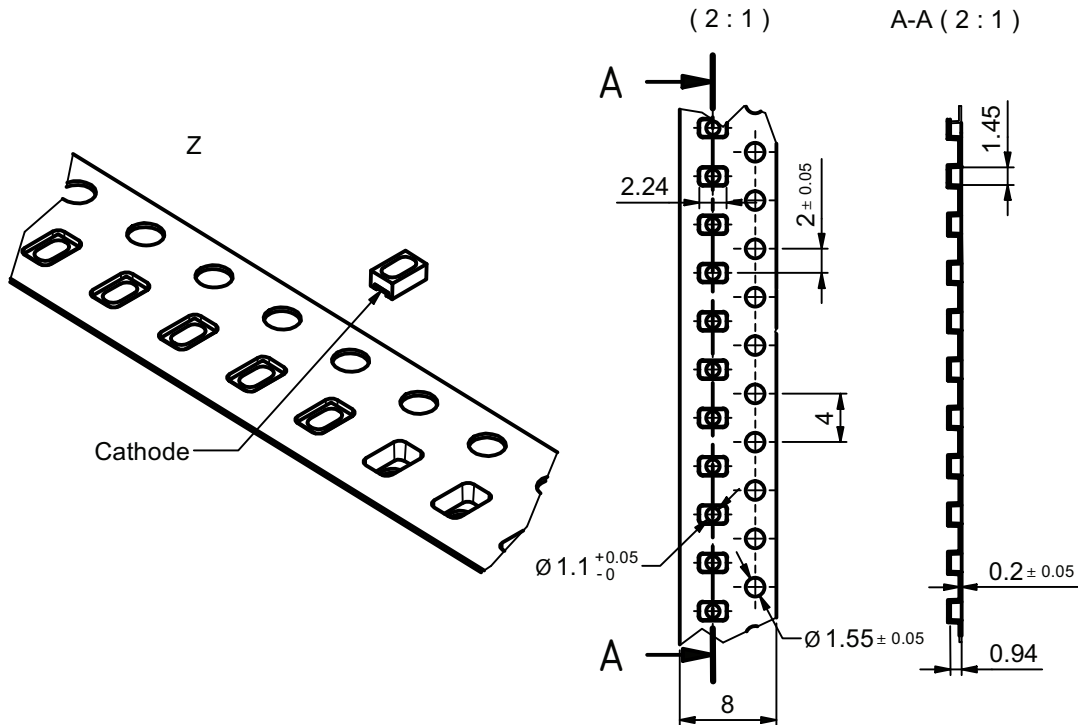


TAPE AND REEL DIMENSIONS in millimeters

Non tolerated dimensions ± 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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