

AUTOMOTIVI GRADE

HALOGEN

FREE GREEN



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Vishay Semiconductors

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: λ_p = 940 nm

AEC-Q101 qualified

· 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 <u>www.vishay.com/doc?99912</u>

DESCRIPTION

As part of the <u>SurfLightTM</u> 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 (°)	$\lambda_{\mathbf{p}}$ (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

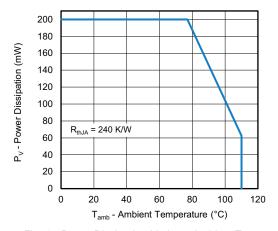
• MOQ: minimum order quantity



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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	$t_p/T = 0.1$, $t_p = 100 \mu s$	I _{FM}	200	mA	
Surge forward current	t _p = 100 μs	I _{FSM}	500	mA	
Power dissipation		P _V	200	mW	
Junction temperature		Tj	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	



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Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

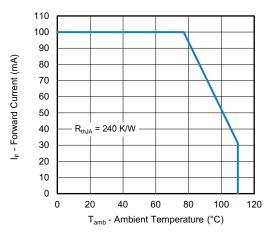


Fig. 2 - Forward Current Limit vs. Ambient Temperature

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	V _F	1.4	1.7	2.0	V
Temperature coefficient of V _F	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	TK _{VF}	-	-1.2	-	mV/K
Reverse current		I _R	Not designed for reverse operation			μΑ
Junction capacitance	$V_R = 0 \text{ V, f} = 1 \text{ MHz,}$ $E = 0 \text{ mW/cm}^2$	CJ	-	30	-	pF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l _e	10	14.5	19	mW/sr
Temperature coefficient of radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	TKφ _e	-	-0.3	-	%/K
Angle of half intensity		φ	-	± 60	-	0
Peak wavelength	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	λ_{p}	=	940	-	nm
Spectral bandwidth	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	Δλ	=	65	-	nm
Temperature coefficient of λ_p	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	TK_{\lambdap}	-	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

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BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

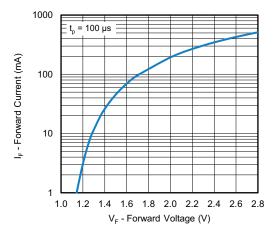


Fig. 3 - Forward Current vs. Forward Voltage

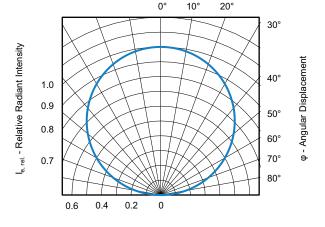


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

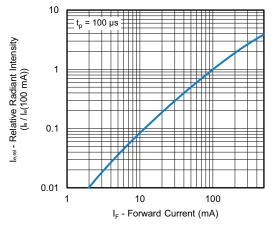


Fig. 4 - Relative Radiant Intensity vs. Forward Current

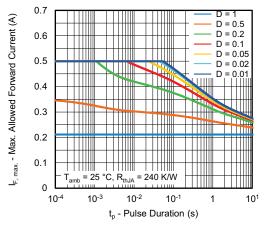


Fig. 7 - Max. Allowed Forward Current vs. Pulse Duration

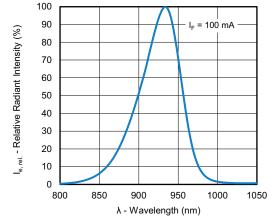


Fig. 5 - Relative Radiant Intensity vs. Wavelength

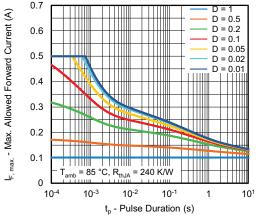


Fig. 8 - Max. Allowed Forward Current vs. Pulse Duration



VSMY5940X01

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REFLOW SOLDER PROFILE

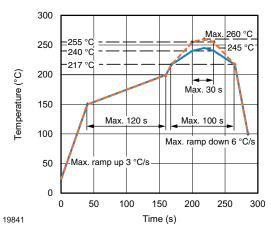


Fig. 9 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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 °C, RH < 60 %

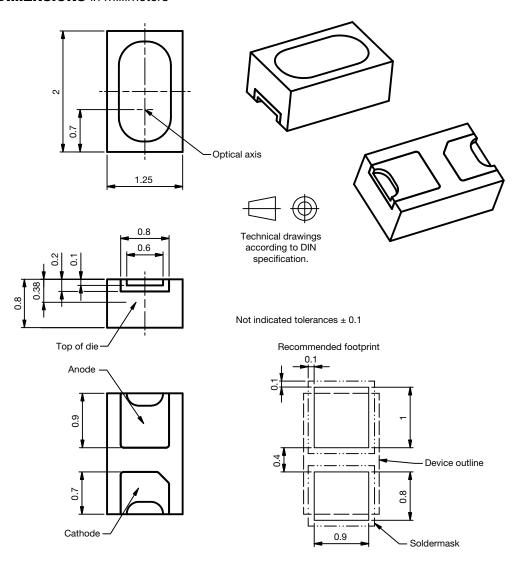
DRYING

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



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PACKAGE DIMENSIONS in millimeters



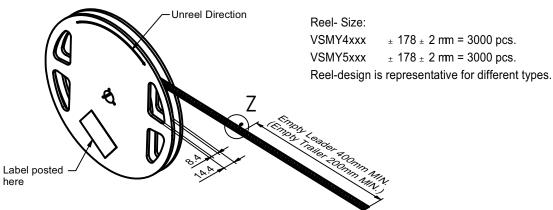
Drawing- No.: 6.550-5352.01-4 Issue: 2_A; prelim. 05.12.2024

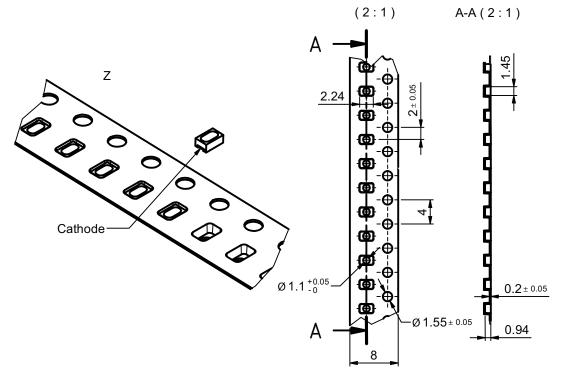


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TAPE AND REEL DIMENSIONS in millimeters

Non tolerated dimensions ± 0.1 mm





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



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