

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



21531

DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSMY1940ITX01 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, high optical power and high speed, molded in clear, untinted 0805 plastic package for surface mounting (SMD).

FEATURES

- Package type: surface mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- AEC-Q101 qualified
- Enhanced operating temperature range: -40 °C to +105 °C
- Peak wavelength: $\lambda_p = 940$ nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half sensitivity: $\phi = \pm 60^\circ$
- Suitable for high pulse current operation
- 0805 standard surface-mountable package
- Floor life: 72 h, MSL 4, 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)

APPLICATIONS

- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- Emitter for automotive applications (e.g. rain sensor)
- IR flash
- IR illumination

PRODUCT SUMMARY				
COMPONENT	I_e (mW/sr)	ϕ (deg)	λ_p (nm)	t_r (ns)
VSMY1940ITX01	10	± 60	940	10

Note

- Test conditions see table “Basic Characteristics“

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMY1940ITX01	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 = 0.5, t _p = 100 μs	I _{FM}	200	mA
Surge forward current	t _p = 100 μs	I _{FSM}	1	A
Power dissipation		P _V	180	mW
Junction temperature		T _j	110	°C
Operating temperature range		T _{amb}	-40 to +105	°C
Storage temperature range		T _{stg}	-40 to +110	°C
Soldering temperature	According to Fig. 10, J-STD-020	T _{sd}	260	°C
Thermal resistance junction / ambient	JESD 51	R _{thJA}	250	K/W

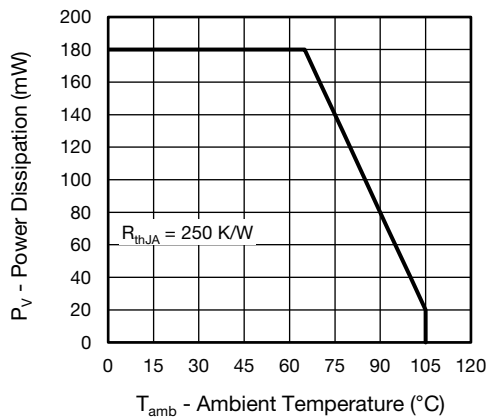


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

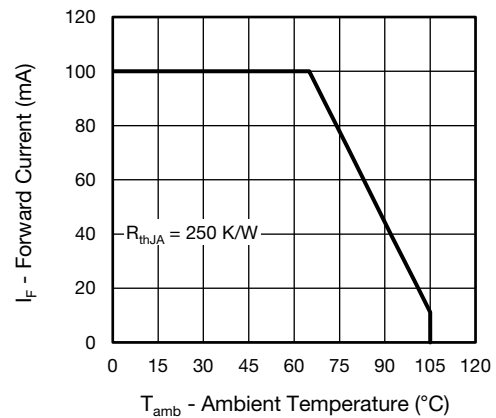


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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	-	1.45	1.8	V
	I _F = 1 A, t _p = 100 μs	V _F	-	2.2	-	V
Temperature coefficient of V _F	I _F = 100 mA	TK _{V_F}	-	-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	-	125	-	pF
Radiant intensity	I _F = 100 mA, t _p = 20 ms	I _e	5	10	15	mW/sr
	I _F = 1 A, t _p = 100 μs	I _e	-	75	-	mW/sr
Radiant power	I _F = 100 mA, t _p = 20 ms	φ _e	-	50	-	mW
Temperature coefficient of radiant power	I _F = 100 mA	TK _{φ_e}	-	-0.2	-	%/K
Angle of half intensity		φ	-	± 60	-	deg
Peak wavelength	I _F = 100 mA	λ _p	920	940	960	nm
Spectral bandwidth	I _F = 100 mA	Δλ	-	40	-	nm
Temperature coefficient of λ _p	I _F = 30 mA	TK _{λ_p}	-	0.25	-	nm/K
Rise time	I _F = 100 mA, 20 % to 80 %	t _r	-	10	-	ns
Fall time	I _F = 100 mA, 20 % to 80 %	t _f	-	10	-	ns



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

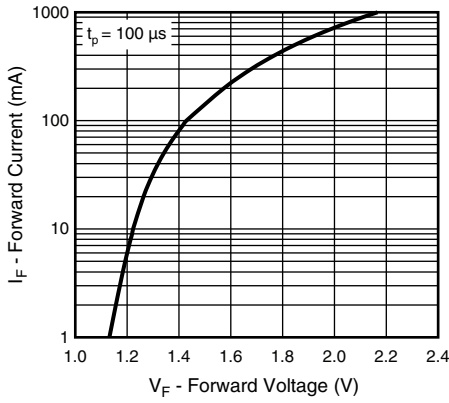


Fig. 3 - Forward Current vs. Forward Voltage

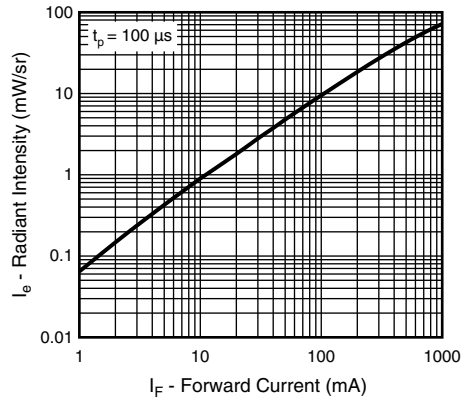


Fig. 6 - Radiant Intensity vs. Forward Current

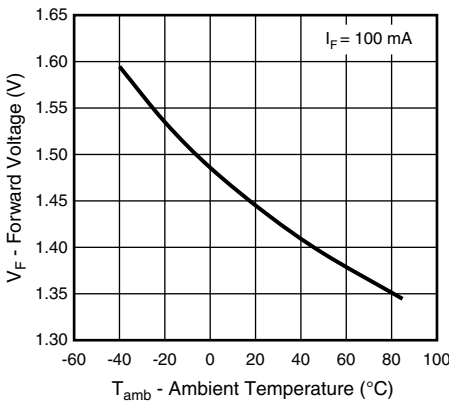


Fig. 4 - Forward Voltage vs. Ambient Temperature

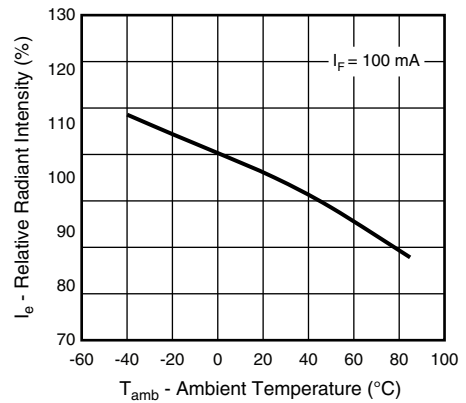


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

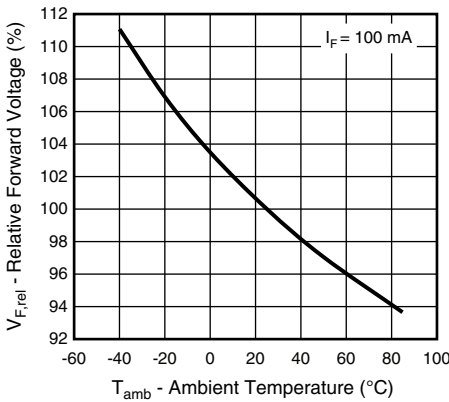


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

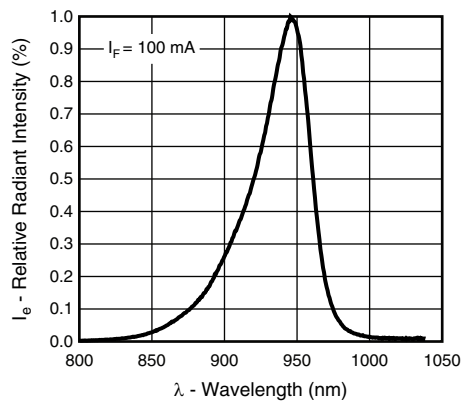


Fig. 8 - Relative Radiant Intensity vs. Wavelength

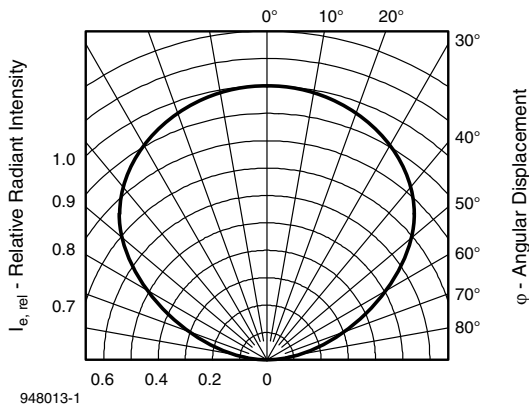


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

REFLOW SOLDER PROFILE

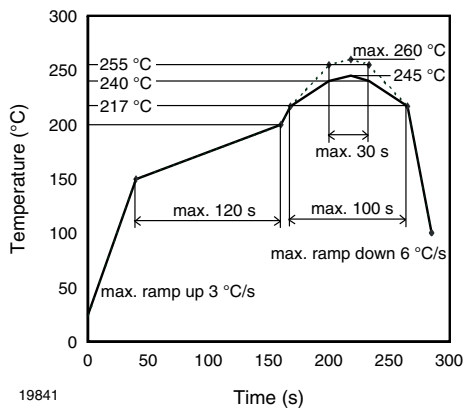


Fig. 10 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

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 4

Floor life: 72 h

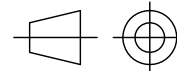
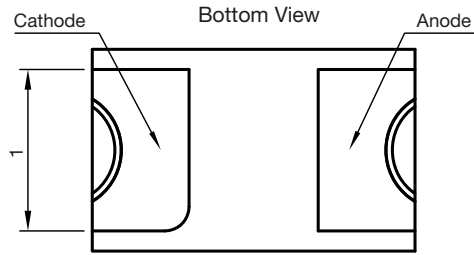
Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, $\text{RH} < 60\text{ }\%$

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at $40\text{ }^{\circ}\text{C}$ ($+ 5\text{ }^{\circ}\text{C}$), $\text{RH} < 5\text{ }\%$.

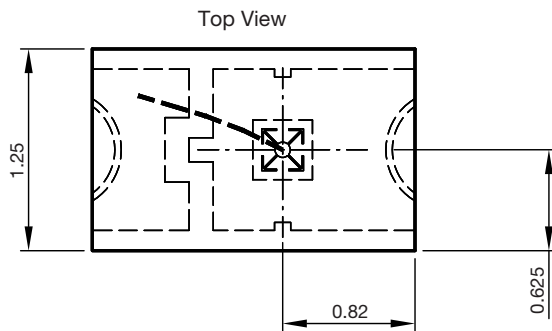
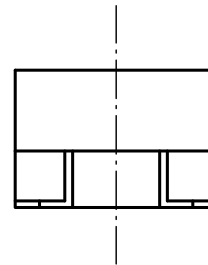
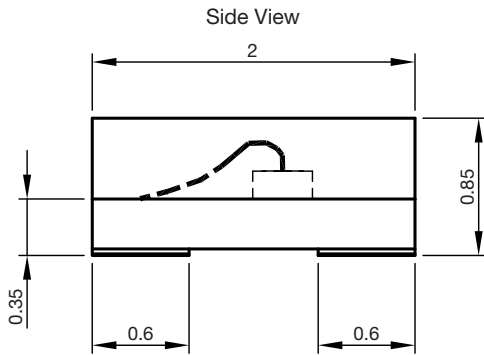


PACKAGE DIMENSIONS in millimeters

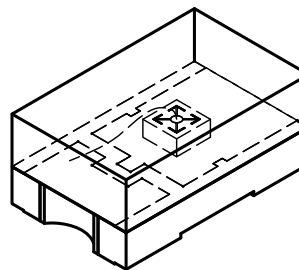
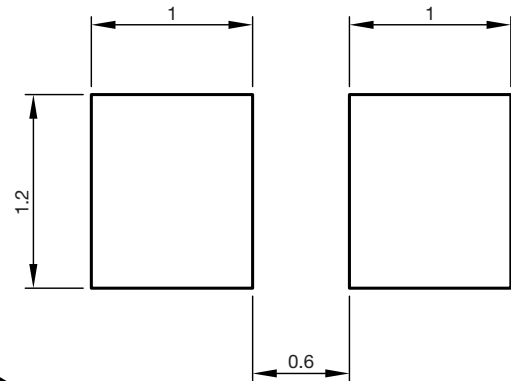


technical drawings
according to DIN
specifications

Not indicated tolerances ± 0.1

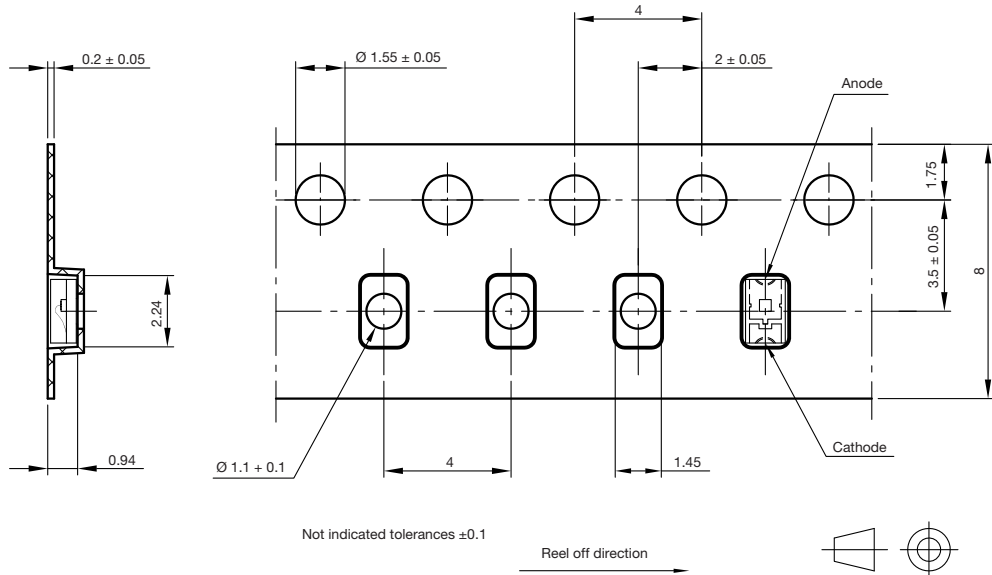


Recommended solder pad
Footprint



Drawing-No.: 6.541-5083.01-4
Issue: 1; 29.03.10
22111

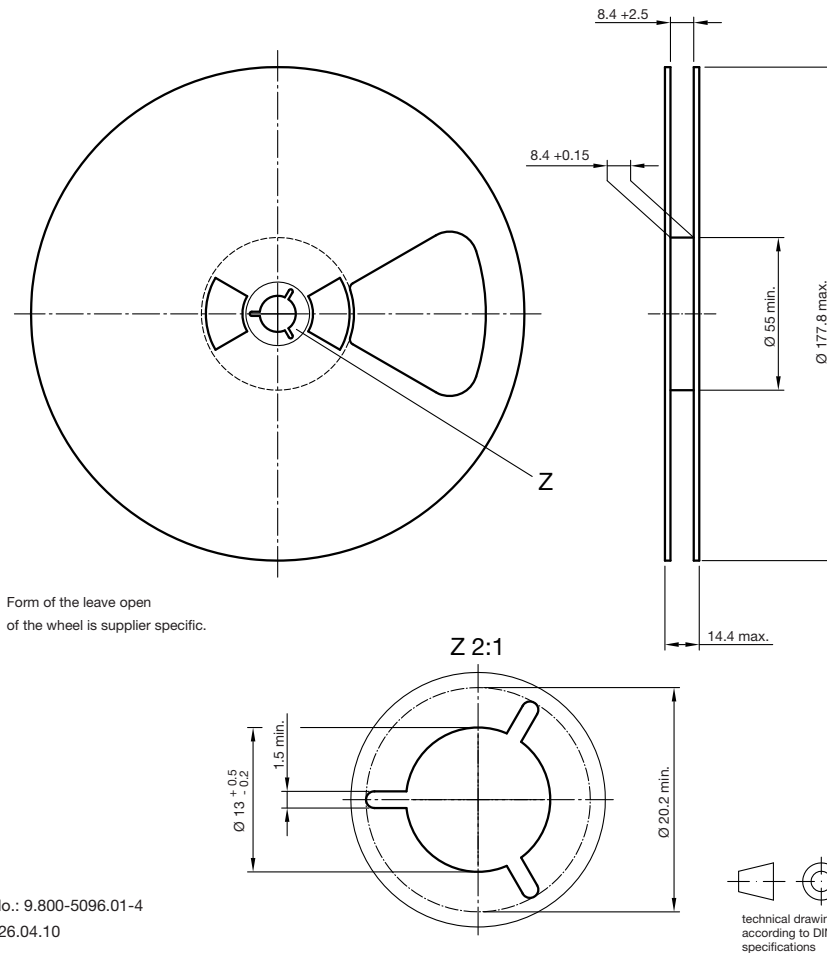
BLISTER TAPE DIMENSIONS in millimeters



Drawing-No.: 9.700-5352.01-4
Issue: 1; 13.04.10
22112

technical drawings
according to DIN
specifications

REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5096.01-4
Issue: 2; 26.04.10
20875

technical drawings
according to DIN
specifications



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