

High Speed Infrared Emitting Diode, 940 nm, GaAlAs Double Hetero



21531

DESCRIPTION

VSMB1940X01 is an infrared, 940 nm emitting diode in GaAlAs Double Hetero technology with high radiant 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
- Peak wavelength: $\lambda_p = 940$ nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half sensitivity: $\phi = \pm 60^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- 0805 standard surface-mountable package
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- High speed IR data transmission
- High power emitter for low space applications
- High performance transmissive or reflective sensors

PRODUCT SUMMARY

COMPONENT	I_e (mW/sr)	ϕ (deg)	λ_p (nm)	t_r (ns)
VSMB1940X01	6	± 60	940	15

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMB1940X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	0805

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	5	V
Forward current		I_F	100	mA
Peak forward current	$t_p/T = 0.1, t_p = 100 \mu\text{s}$	I_{FM}	200	mA
Surge forward current	$t_p = 100 \mu\text{s}$	I_{FSM}	1	A
Power dissipation		P_V	160	mW
Junction temperature		T_j	100	$^\circ\text{C}$
Operating temperature range		T_{amb}	- 40 to + 85	$^\circ\text{C}$
Storage temperature range		T_{stg}	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5$ s, 2 mm from case	T_{sd}	260	$^\circ\text{C}$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	R_{thJA}	270	K/W

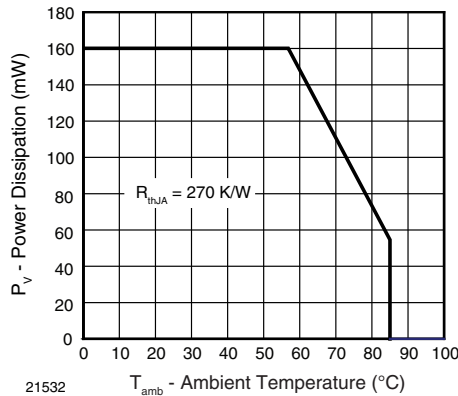


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

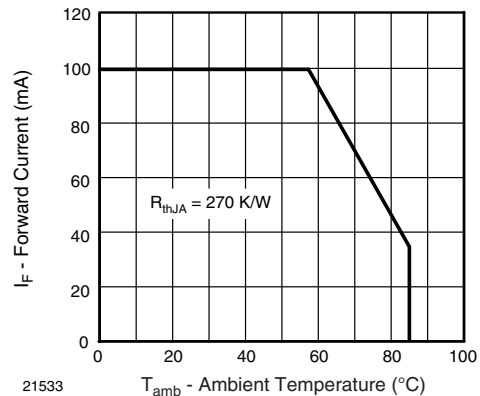
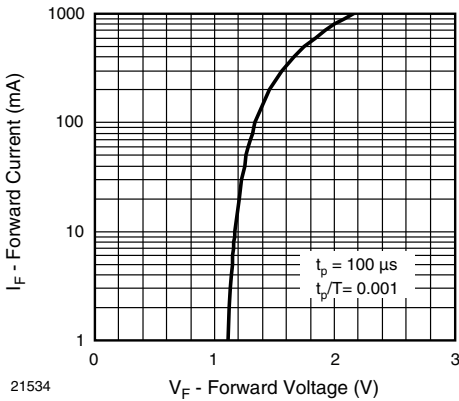


Fig. 2 - Forward Current Limit vs. Ambient Temperature

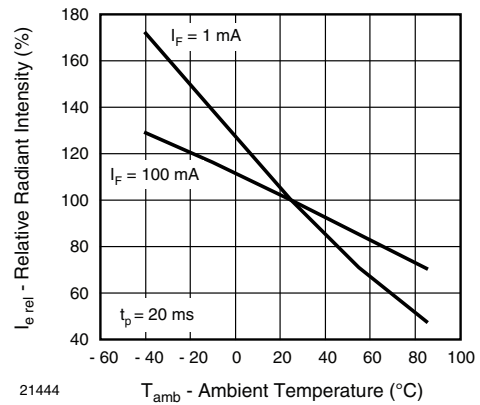
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	V_F	1.15	1.35	1.6	V
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F		2.2		V
Temperature coefficient of V_F	$I_F = 1\text{ mA}$	TK_{V_F}		-1.5		mV/K
	$I_F = 100\text{ mA}$	TK_{V_F}		-1.1		mV/K
Reverse current	$V_R = 5\text{ V}$	I_R			10	μA
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ mW/cm}^2$	C_J		70		pF
Radiant intensity	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	I_e	3	6	12	mW/sr
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	I_e		60		mW/sr
Radiant power	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	ϕ_e		40		mW
Temperature coefficient of radiant power	$I_F = 1\text{ mA}$	TK_{ϕ_e}		-1.1		%/K
	$I_F = 100\text{ mA}$	TK_{ϕ_e}		-0.51		%/K
Angle of half intensity		ϕ		± 60		deg
Peak wavelength	$I_F = 30\text{ mA}$	λ_p		940		nm
Spectral bandwidth	$I_F = 30\text{ mA}$	$\Delta\lambda$		25		nm
Temperature coefficient of λ_p	$I_F = 30\text{ mA}$	TK_{λ_p}		0.25		nm
Rise time	$I_F = 100\text{ mA}$, 20 % to 80 %	t_r		15		ns
Fall time	$I_F = 100\text{ mA}$, 20 % to 80 %	t_f		15		ns
Virtual source diameter		d		0.5		mm

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



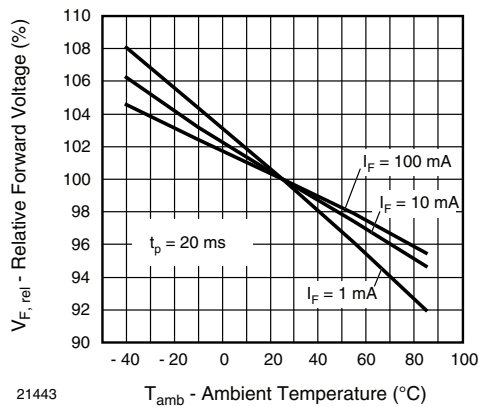
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Fig. 3 - Forward Current vs. Forward Voltage



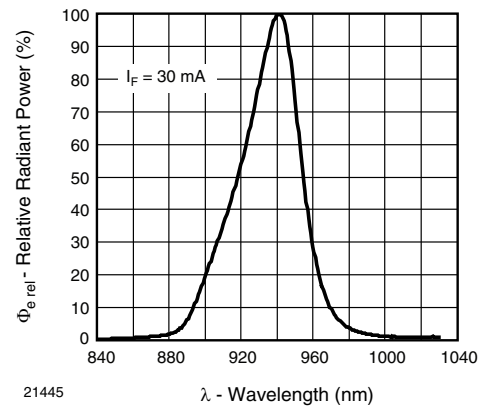
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Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature



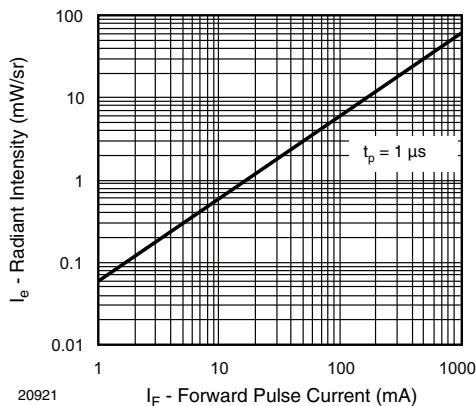
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Fig. 4 - Relative Forward Voltage vs. Ambient Temperature



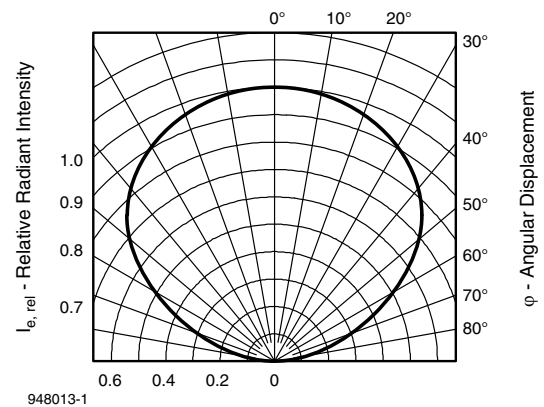
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Fig. 7 - Relative Radiant Power vs. Wavelength



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Fig. 5 - Radiant Intensity vs. Forward Current



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Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

REFLOW SOLDER PROFILE

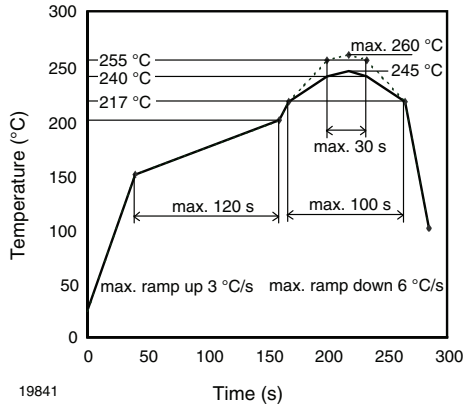


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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.

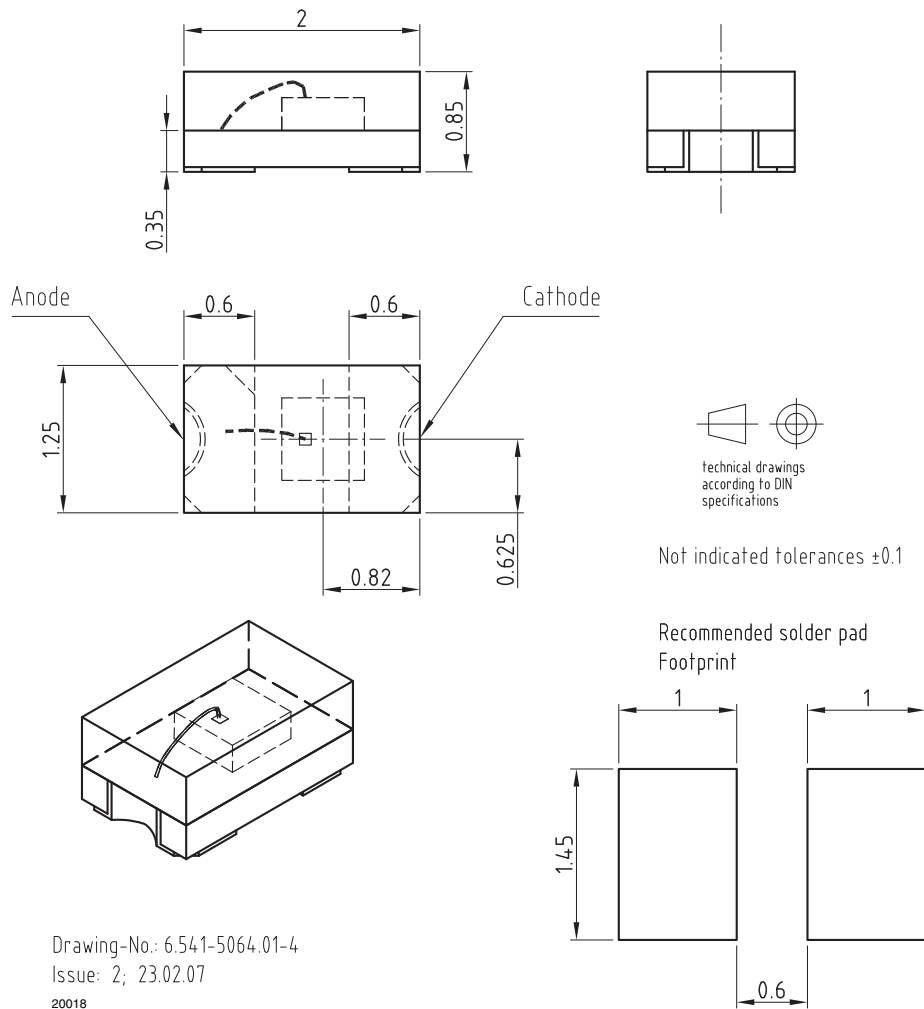
FLOOR LIFE

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

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

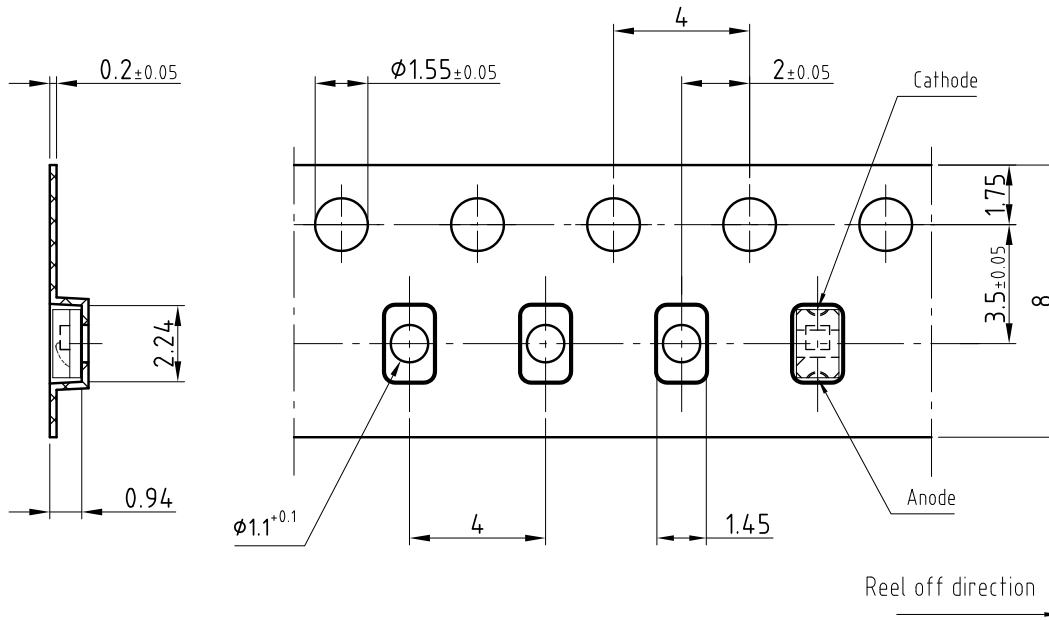
PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5064.01-4
 Issue: 2; 23.02.07
 20018



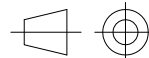
BLISTER TAPE DIMENSIONS in millimeters



Drawing-No.: 9.700-5311.01-4

Issue: 1; 23.02.07

21501

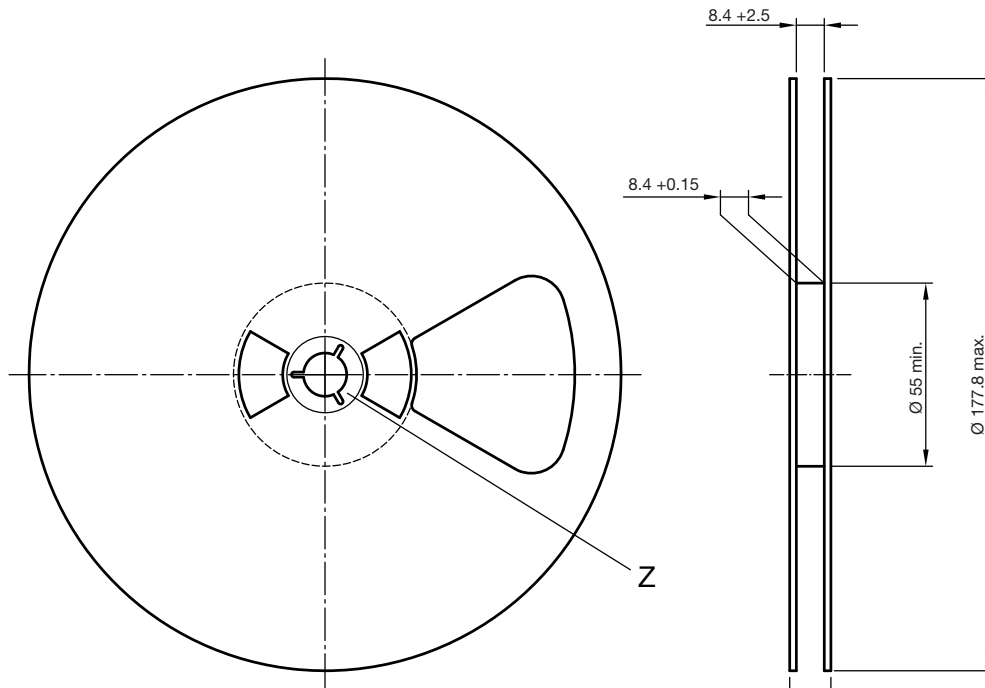


technical drawings
according to DIN
specifications

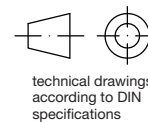
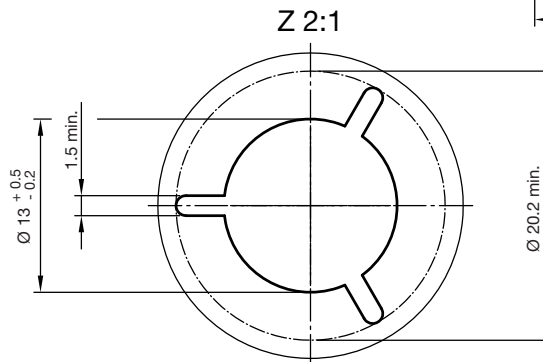
Not indicated tolerances ±0.1



REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.



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



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