



DESCRIPTION

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High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero



VSMF4720 is an infrared, 870 nm emitting diode in GaAlAs

double hetero (DH) technology with high radiant power and

high speed, molded in a PLCC-2 package for surface

mounting (SMD). A 19" chip provides outstanding low

forward voltage and radiant intensity even at 1 A pulse

FEATURES

• Package type: surface-mount

• Package form: PLCC-2

• Dimensions (L x W x H in mm): 3.5 x 2.8 x 1.75

Peak wavelength: λ_p = 870 nm

High reliability

· High radiant power

· High radiant intensity

• Angle of half intensity: $\varphi = \pm 60^{\circ}$

· Low forward voltage

• Suitable for high pulse current operation

• High modulation band width: f_c = 24 MHz

· Good spectral matching with Si photodetectors

Floor life: 168 h, MSL 3, acc. J-STD-020

· Lead (Pb)-free reflow soldering

AEC-Q101 qualified

 Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

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 (°)	$\lambda_{\mathbf{p}}$ (nm)	t _r (ns)
VSMF4720	16	± 60	870	15

Note

current.

Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
VSMF4720-GS08	Tape and reel	MOQ: 7500 pcs, 1500 pcs/reel	PLCC-2	
VSMF4720-GS18	Tape and reel	MOQ: 8000 pcs, 8000 pcs/reel	PLCC-2	

Note

· MOQ: minimum order quantity



AUTOMOTIVE GRADE





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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		l _F	100	mA	
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	I _{FM}	200	mA	
Surge forward current	t _p = 100 μs	I _{FSM}	1	Α	
Power dissipation		P _V	160	mW	
Junction temperature		T _j	100	°C	
Operating temperature range		T _{amb}	-40 to +85	°C	
Storage temperature range		T _{stg}	-40 to +100	°C	
Soldering temperature	According to Fig. 8, J-STD-020	T _{sd}	260	°C	
Thermal resistance junction-to-ambient	J-STD-051, soldered on PCB	R _{thJA}	250	K/W	

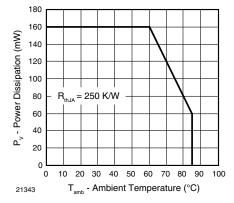


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

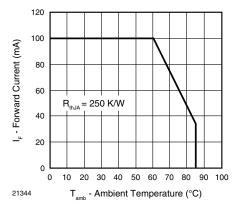


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	V _F	-	1.45	1.6	V
	I _F = 1 A, t _p = 100 μs	V _F	-	2.1	-	V
Temperature coefficient of V _F	I _F = 1 mA	TK _{VF}	-	-1.8	-	mV/K
Reverse current	V _R = 5 V	I _R	-	-	10	μΑ
Junction capacitance	V _R = 0 V, f = 1 MHz, E = 0	Cj	-	125	-	pF
D !! !!	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	I _e	10	16	30	mW/sr
Radiant intensity	I _F = 1 A, t _p = 100 μs	I _e	-	150	-	mW/sr
Radiant power	I _F = 100 mA, t _p = 20 ms	фe	-	50	-	mW
Temperature coefficient of ϕ_e	I _F = 100 mA	TKφ _e	-	-0.35	-	%/K
Angle of half intensity		φ	-	± 60	-	0
Peak wavelength	I _F = 100 mA	λ_{p}	-	870	-	nm
Spectral bandwidth	I _F = 100 mA	Δλ	-	40	-	nm
Temperature coefficient of λ _p	I _F = 100 mA	TKλ _p	-	0.25	-	nm/K
Rise time	I _F = 100 mA	t _r	-	15	-	ns
Fall time	I _F = 100 mA	t _f	-	15	-	ns
Cut-off frequency	I _{DC} = 70 mA, I _{AC} = 30 mA pp	f _c	-	24	-	MHz
Virtual source diameter		d	=	0.67	-	mm

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

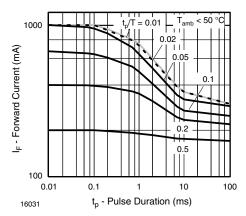


Fig. 3 - Pulse Forward Current vs. Pulse Duration

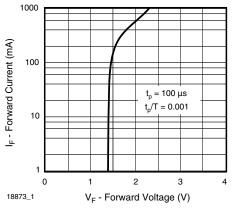


Fig. 4 - Forward Current vs. Forward Voltage

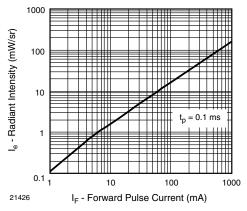


Fig. 5 - Radiant Intensity vs. Forward Current

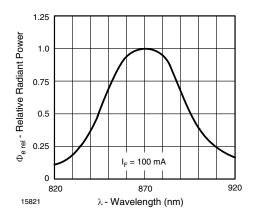


Fig. 6 - Relative Radiant Power vs. Wavelength

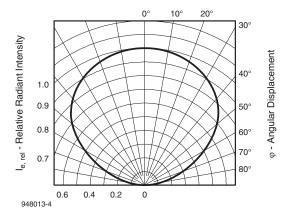


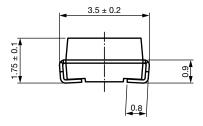
Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

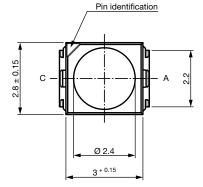


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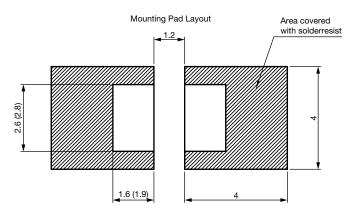
PACKAGE DIMENSIONS in millimeters







Drawing-No.: 6.541-5067.01-4 Issue: 7; 12.03.14



Dimensions: reflow and vapor phase (wave soldering)

SOLDER PROFILE

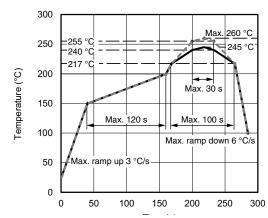


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020 for Preconditioning acc. to ${\sf JEDEC}^{\scriptsize{(0)}}$, Level 3

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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 168 h

Conditions: T_{amb} < 30 °C, RH < 60 %

Moisture sensitivity level 3, acc. to J-STD-020.

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



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TAPE AND REEL

PLCC-2 components are packed in antistatic blister tape (DIN IEC (CO) 564) for automatic component insertion. Cavities of blister tape are covered with adhesive tape.

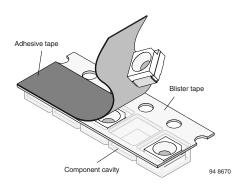


Fig. 9 - Blister Tape

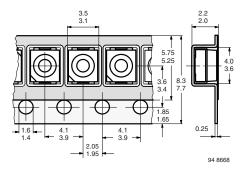


Fig. 10 - Tape Dimensions in mm for PLCC-2

MISSING DEVICES

A maximum of 0.5 % of the total number of components per reel may be missing, exclusively missing components at the beginning and at the end of the reel. A maximum of three consecutive components may be missing, provided this gap is followed by six consecutive components.

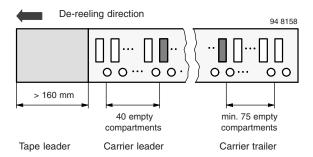


Fig. 11 - Beginning and End of Reel

The tape leader is at least 160 mm and is followed by a carrier tape leader with at least 40 empty compartements. The tape leader may include the carrier tape as long as the cover tape is not connected to the carrier tape. The least component is followed by a carrier tape trailer with a least 75 empty compartements and sealed with cover tape.

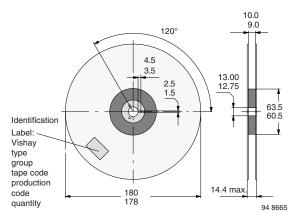


Fig. 12 - Dimensions of Reel-GS08

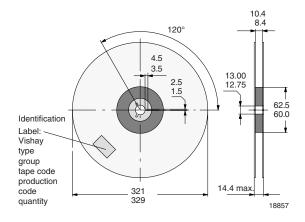


Fig. 13 - Dimensions of Reel-GS18

COVER TAPE REMOVAL FORCE

The removal force lies between 0.1 N and 1.0 N at a removal speed of 5 mm/s. In order to prevent components from popping out of the blisters, the cover tape must be pulled off at an angle of 180° with regard to the feed direction.



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