

Vishay Semiconductors

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



DESCRIPTION

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 current.

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: $\lambda_p = 870 \text{ nm}$
- 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
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Find out more about Vishay's Automotive Grade Product requirements at: <u>www.vishay.com/applications</u>

APPLICATIONS

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

PRODUCT SUMMARY				
COMPONENT	l _e (mW/sr)	φ (deg)	λ _p (nm)	t _r (ns)
VSMF4720	16	± 60	870	15

Note

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



COMPLIANT

GREEN

(5-2008)

^{**} Please see document "Vishay Material Category Policy": <u>www.vishay.com/doc?99902</u>

VSMF4720

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ABSOLUTE MAXIMUM RATINGS					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage		V _R	5	V	
Forward current		I _F	100	mA	
Peak forward current	$t_p/T = 0.5, t_p = 100 \ \mu s$	I _{FM}	200	mA	
Surge forward current	t _p = 100 μs	I _{FSM}	1	A	
Power dissipation		Pv	160	mW	
Junction temperature		Tj	100	°C	
Operating temperature range		T _{amb}	- 40 to + 85	°C	
Storage temperature range		T _{stg}	- 40 to + 100	°C	
Soldering temperature	Acc. figure 8, J-STD-020	T _{sd}	260	°C	
Thermal resistance junction/ambient	J-STD-051, soldered on PCB	R _{thJA}	250	K/W	

Note

T_{amb} = 25 °C, unless otherwise specified

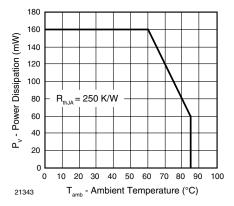
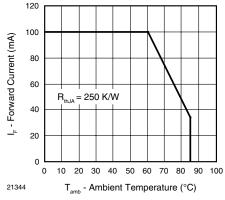


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature





BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	I _F = 100 mA, t _p = 20 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	μA
Junction capacitance	V _R = 0 V, f = 1 MHz, E = 0	Cj		125		pF
Radiant intensity	I _F = 100 mA, t _p = 20 ms	l _e	10	16	30	mW/sr
	I _F = 1 A, t _p = 100 μs	l _e		150		mW/sr
Radiant power	I _F = 100 mA, t _p = 20 ms	φ _e		50		mW
Temperature coefficient of ϕ_{e}	I _F = 100 mA	TKφ _e		- 0.35		%/K
Angle of half intensity		φ		± 60		deg
Peak wavelength	I _F = 100 mA	λρ		870		nm
Spectral bandwidth	I _F = 100 mA	Δλ		40		nm
Temperature coefficient of λ_p	I _F = 100 mA	ΤΚλρ		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

Note

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BASIC CHARACTERISTICS

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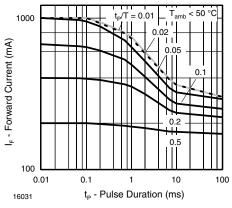


Fig. 3 - Pulse Forward Current vs. Pulse Duration

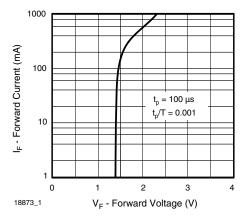


Fig. 4 - Forward Current vs. Forward Voltage

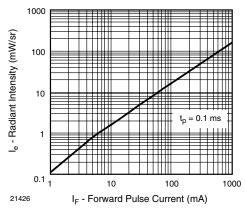


Fig. 5 - Radiant Intensity vs. Forward Current

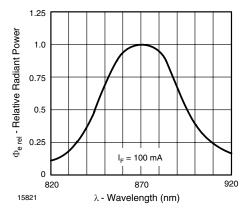


Fig. 6 - Relative Radiant Power vs. Wavelength

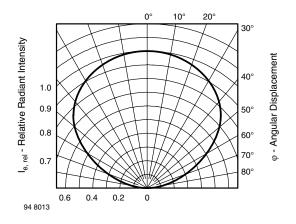
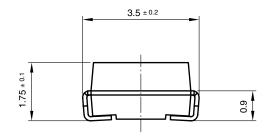
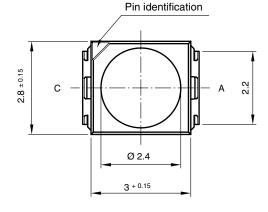


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

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PACKAGE DIMENSIONS in millimeters





Drawing-No.: 6.541-5067.01-4 Issue: 5; 04.11.08 20541

SOLDER PROFILE

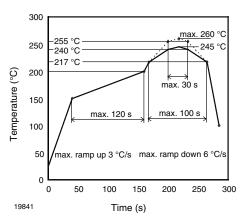
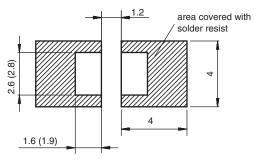


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020 for Preconditioning acc. to JEDEC, Level 3



technical drawings according to DIN specifications

Mounting Pad Layout



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 °C (+ 5 °C), RH < 5 %.

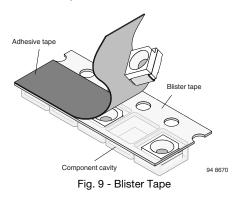




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TAPE AND REEL

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.



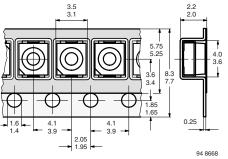
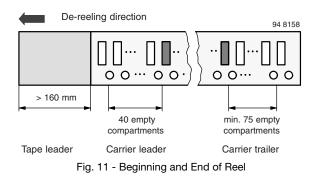


Fig. 10 - Tape Dimensions in mm for PLCC-2

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.



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.

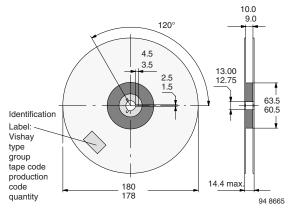


Fig. 12 - Dimensions of Reel-GS08

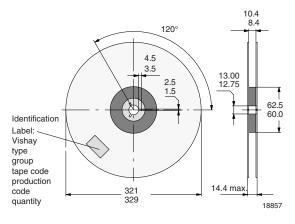


Fig. 13 - Dimensions of Reel-GS18

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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