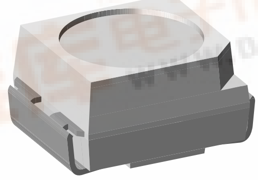
High Speed Infrared Emitting Diode, 890 nm RoHS Compliant, Released for Lead (Pb)-free Solder Process

Description

VSMF3710 is a high speed infrared emitting diode in GaAlAs double hetero (DH) technology in a miniature PLCC-2 SMD package.

DH technology combines high speed with high radiant power at wavelength of 890 nm.



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Features

- High radiant power
- High speed: t_r = 30 ns
- High modulation band width: f_c = 12 MHz
- Peak wavelength: λ_p = 890 nm
- High reliability
- Low forward voltage
- Suitable for high pulse current application
- Wide angle of half intensity
- Compatible with automatic placement equipment
- EIA and ICE standard package
- 8 mm tape and reel standard: GS08 or GS18
- Lead (Pb)-free reflow soldering
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

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

Order Instructions

Part	Ordering code	Remarks
VSMF3710	VSMF3710-GS08	MOQ: 7500 pcs, 1500 pcs per reel
VSMF3710	VSMF3710-GS18	MOQ: 8000 pcs, 8000 pcs per reel

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	170	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	acc. figure 8, J-STD-020B	T_{sd}	260	°C
Thermal resistance junction / ambient		R_{thJA}	400	K/W

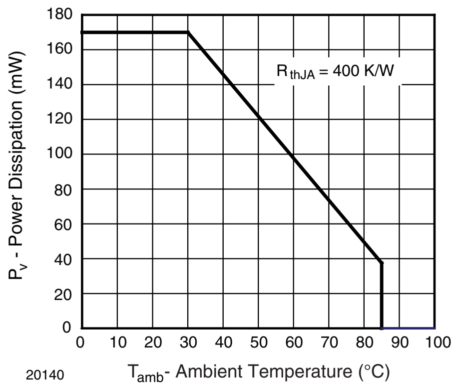


Figure 1. Power Dissipation Limit vs. Ambient Temperature

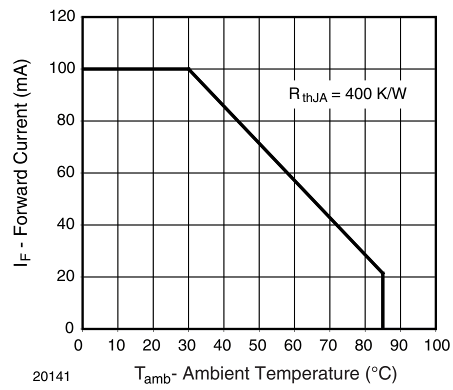


Figure 2. Forward Current Limit vs. Ambient Temperature

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		1.4	1.6	V
	I_F = 1 A, t_p = 100 µs	V_F		2.3		V
Temp. coefficient of V_F	I_F = 100 mA	TK_{VF}		- 2.1		mV/K
Reverse current	V_R = 5 V	I_R			10	µA
Junction capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_j		125		pF
Radiant intensity	I_F = 100 mA, t_p = 20 ms	I_e	6	10	22	mW/sr
	I_F = 1 A, t_p = 100 µs	I_e		100		mW/sr
Radiant power	I_F = 100 mA, t_p = 20 ms	ϕ_e		40		mW
Temp. coefficient of ϕ_e	I_F = 100 mA	$TK\phi_e$		- 0.35		%/K
Angle of half intensity		φ		± 60		deg
Peak wavelength	I_F = 100 mA	λ_p		890		nm
Spectral bandwidth	I_F = 100 mA	$\Delta\lambda$		40		nm
Temp. coefficient of λ_p	I_F = 100 mA	$TK\lambda_p$		0.25		nm/K
Rise time	I_F = 100 mA	t_r		30		ns
Fall time	I_F = 100 mA	t_f		30		ns
Virtual source size		∅		0.44		mm

Typical Characteristics

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

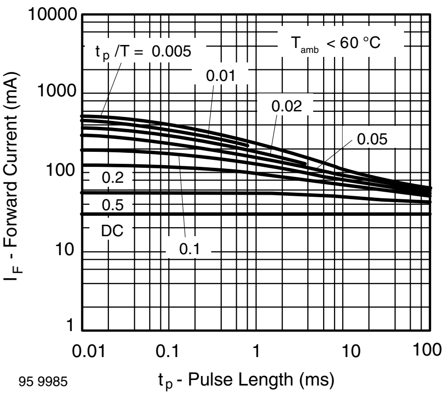


Figure 3. Pulse Forward Current vs. Pulse Duration

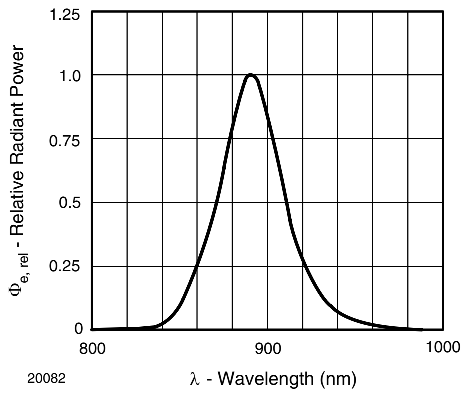


Figure 6. Relative Radiant Power vs. Wavelength

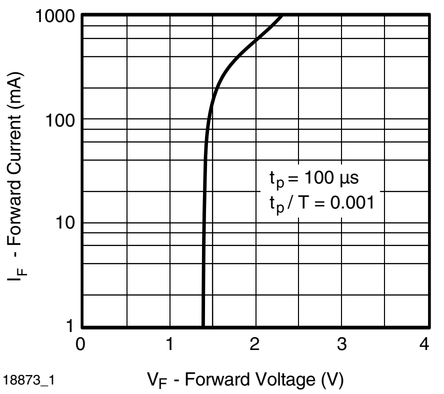


Figure 4. Forward Current vs. Forward Voltage

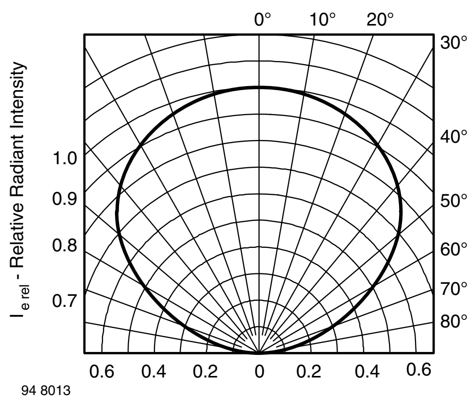


Figure 7. Relative Radiant Intensity vs. Angular Displacement

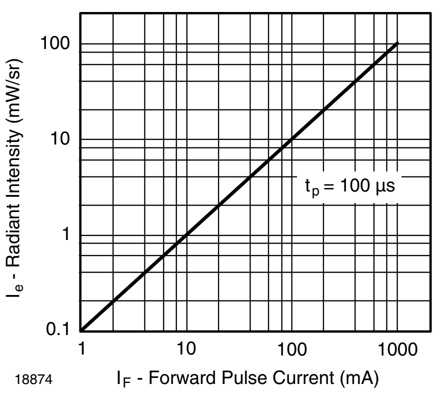
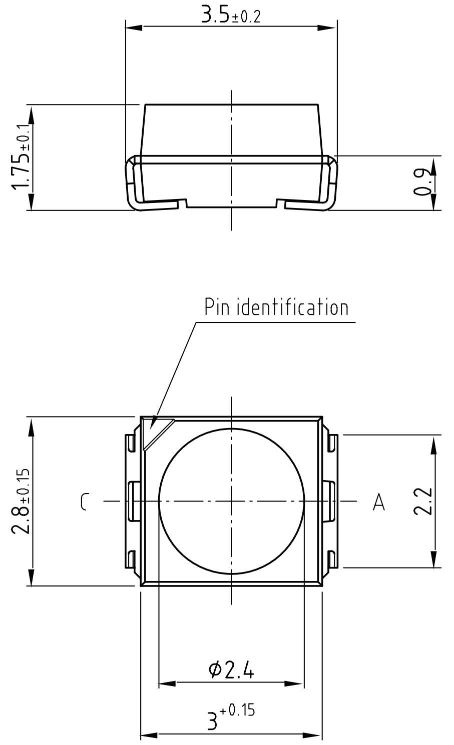
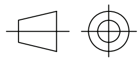


Figure 5. Radiant Intensity vs. Forward Pulse Current

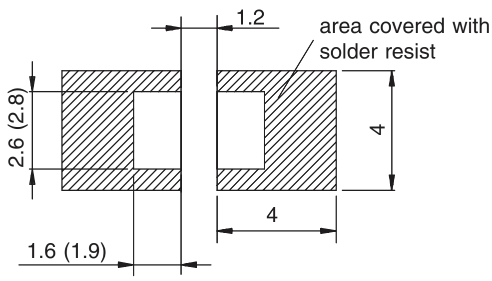
Package Dimensions





Dimensions in mm

Mounting Pad Layout



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Drawing-No.: 6.541-5067.01-4
Issue: 2; 27.06.06

Solder Profile

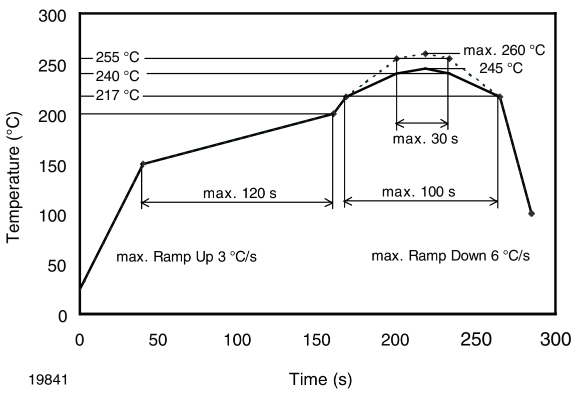

Figure 8. Lead (Pb)-free Reflow Solder Profile acc. J-STD-020B for Preconditioning acc. to JEDEC, Level 2a

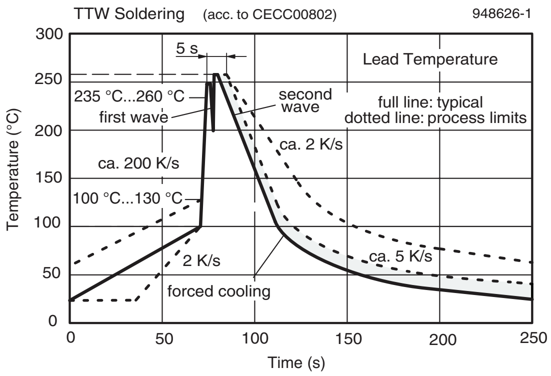

Figure 9. Double Wave Solder Profile for Opto Components

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: 4 weeks
Conditions: T_{amb} < 30 °C, RH < 60 %
Moisture Sensitivity Level 2a, acc. to J-STD-020B.

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 %.

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.

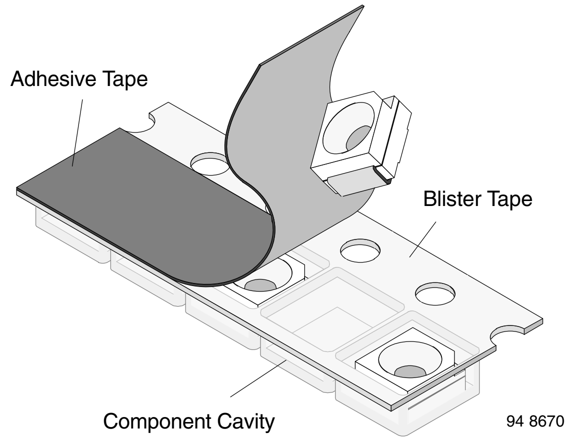

Figure 10. Blister Tape

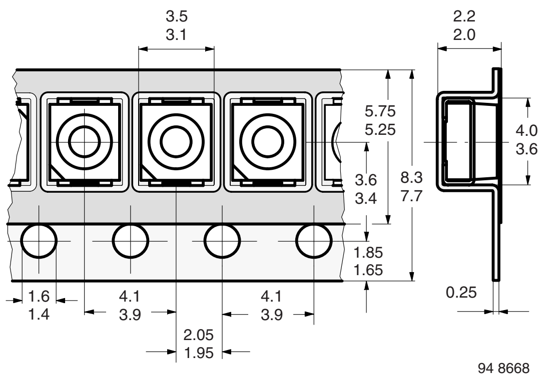

Figure 11. Tape Dimensions in mm for PLCC-2

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.

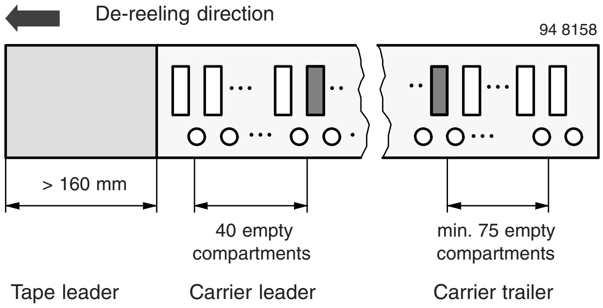

Figure 12. Beginning and End of Reel

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.

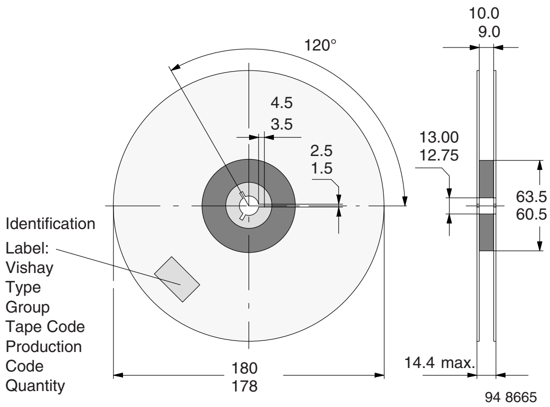

Figure 13. Dimensions of Reel-GS08

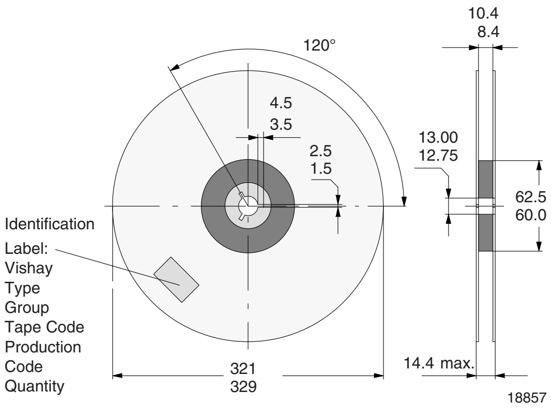

Figure 14. Dimensions of Reel-GS18

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 bliesters, the cover tape must be pulled off at an angle of 180° with regard to the feed direction.

Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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