AUTOMOTIVE GRADE

COMPLIANT

HALOGEN

FREE GREEN

(5-2008)



## Vishay Semiconductors

## High Power Infrared Emitting Diode, 940 nm, GaAlAs, MQW



#### **DESCRIPTION**

VSML3710 is an infrared, 940 nm emitting diode in GaAlAs, MQW (multi quantum well) technology with high radiant power, molded in a PLCC-2 package for surface mounting (SMD).

#### **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:  $\lambda_p = 940 \text{ nm}$ 

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

· Good spectral matching with Si photodetectors

Package matched with IR emitter series VEMT3700

• 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 <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **APPLICATIONS**

- IR emitter in photointerrupters, sensors, and reflective sensors
- IR emitter in low space applications
- Household appliance
- Tactile keyboards

PRODUCT SUMMARY					
COMPONENT	I <sub>e</sub> (mW/sr)	φ (deg) λ <sub>p</sub> (nr		t <sub>r</sub> (ns)	
VSML3710	9.5	± 60	940	15	

#### Note

• Test conditions see table "Basic Characteristics"

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM		
VSML3710-GS08	Tape and reel	MOQ: 7500 pcs, 1500 pcs/reel	PLCC-2		
VSML3710-GS18	Tape and reel	MOQ: 8000 pcs, 8000 pcs/reel	PLCC-2		

#### Note

· MOQ: minimum order quantity



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<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage		V <sub>R</sub>	5	V	
Forward current		I <sub>F</sub>	100	mA	
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	I <sub>FM</sub>	200	mA	
Surge forward current	t <sub>p</sub> = 100 μs	I <sub>FSM</sub>	1	Α	
Power dissipation		P <sub>V</sub>	160	mW	
Junction temperature		T <sub>j</sub>	100	°C	
Operating temperature range		T <sub>amb</sub>	-40 to +85	°C	
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C	
Soldering temperature	Acc. figure 11, J-STD-020	T <sub>sd</sub>	260	°C	
Thermal resistance junction/ambient	J-STD-051, soldered on PCB	R <sub>thJA</sub>	250	K/W	

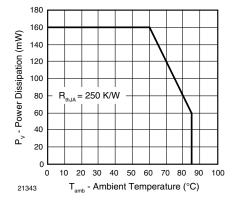


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T <sub>amb</sub> = 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 <sub>F</sub>		1.35	1.6	V
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	V <sub>F</sub>		2.6	3	V
Temperature coefficient of V <sub>F</sub>	I <sub>F</sub> = 1 mA	TK <sub>VF</sub>		-1.8		mV/K
Reverse current	V <sub>R</sub> = 5 V	I <sub>R</sub>			100	μΑ
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz, E = 0	C <sub>j</sub>		60		pF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	I <sub>e</sub>	4	9.5	20	mW/sr
	$I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$	I <sub>e</sub>		70		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	фe		40		mW
Temperature coefficient of φ <sub>e</sub>	I <sub>F</sub> = 100 mA	TΚφ <sub>e</sub>		-0.6		%/K
Angle of half intensity		φ		± 60		deg
Peak wavelength	I <sub>F</sub> = 100 mA	λρ		940		nm
Spectral bandwidth	I <sub>F</sub> = 100 mA	Δλ		30		nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 100 mA	TKλ <sub>p</sub>		0.2		nm/K
Rise time	I <sub>F</sub> = 100 mA	t <sub>r</sub>		15		ns
Fall time	I <sub>F</sub> = 100 mA	t <sub>f</sub>		15		ns



#### **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

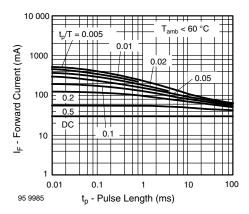


Fig. 3 - Pulse Forward Current vs. Pulse Duration

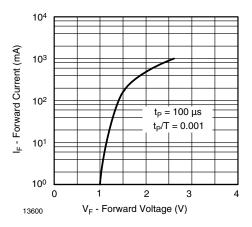


Fig. 4 - Forward Current vs. Forward Voltage

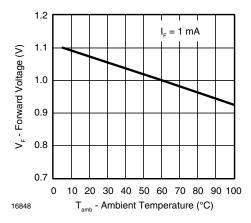


Fig. 5 - Forward Voltage vs. Ambient Temperature

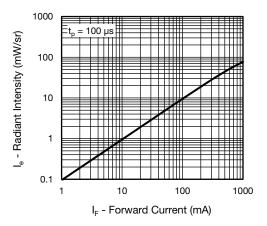


Fig. 6 - Radiant Intensity vs. Forward Current

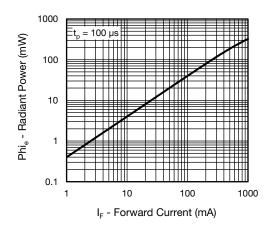


Fig. 7 - Radiant Power vs. Forward Current

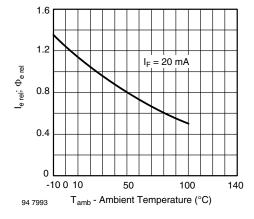
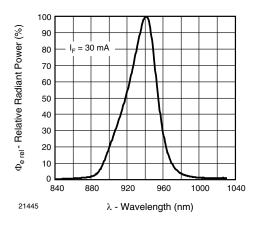


Fig. 8 - Relative Radiant Intensity/Power vs. Ambient Temperature

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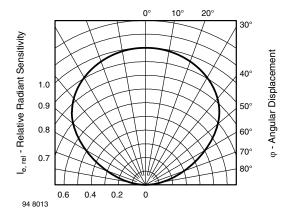
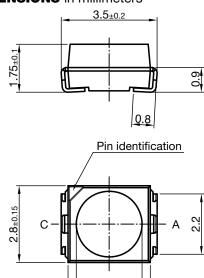


Fig. 10 - Relative Radiant Intensity vs. Angular Displacement

#### **PACKAGE DIMENSIONS** in millimeters



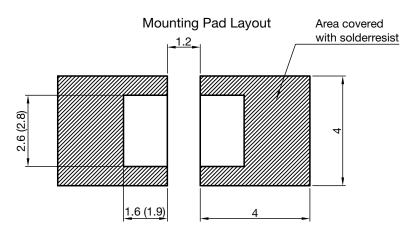
Ø2.4

<u>3</u>+0.15



Dimensions in mm

Drawing-No.: 6.541-5067.01-4 Issue: 6; 23.09.13



Dimensions: Reflow and vapor phase (wave soldering)

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#### **SOLDER PROFILE**

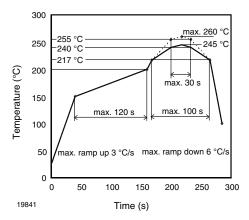


Fig. 11 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

#### **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**

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

Floor life: 168 h

Conditions: T<sub>amb</sub> < 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.

#### **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.

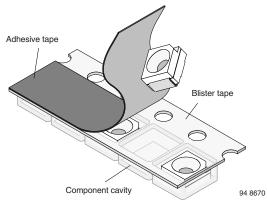


Fig. 12 - Blister Tape

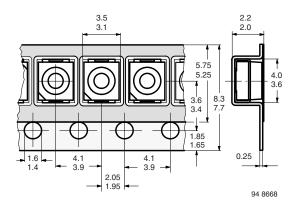


Fig. 13 - Tape Dimensions in mm for PLCC-2

#### **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.

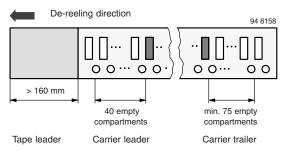


Fig. 14 - Beginning and End of Reel

The tape leader is at least 160 mm and is followed by a carrier tape leader with at least 40 empty compartments. 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 compartments and sealed with cover tape.

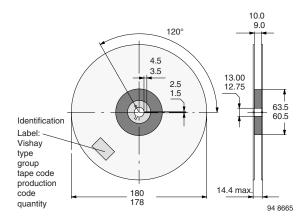


Fig. 15 - Dimensions of Reel-GS08

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# COVER TAPE REMOVAL FORCE The removal force lies between 0.1 N and

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.

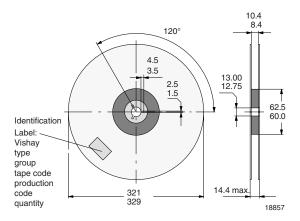


Fig. 16 - Dimensions of Reel-GS18

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