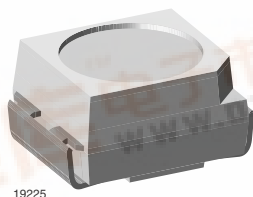


**VLMB41..**

Vishay Semiconductors

Standard SMD LED PLCC-2**FEATURES**

- High efficient InGaN technology
- EIA and ICE standard package
- Compatible with IR reflow, vapor phase and wave solder processes acc. to CECC 00802 and J-STD-020C
- Available in 8 mm tape reel
- Lead (Pb)-free device
- Preconditioning: according to JEDEC level 2a
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Automotive qualified AEC-Q101

**DESCRIPTION**

This device has been designed to meet the increasing demand for blue SMD LED.

The package of the VLMB41.. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled with clear epoxy.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: standard
- Angle of half intensity: $\pm 60^\circ$

APPLICATIONS

- Automotive: backlighting in dashboards and switches
- Telecommunication: indicator and backlighting in telephone and fax
- Backlighting for audio and video equipment
- Backlighting in office equipment
- Indoor and outdoor message boards
- Flat backlight for LCDs, switches and symbols
- Illumination purposes, alternative to incandescent lamps
- General use

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMB41P1Q2-GS08	Blue, $I_V = (45 \text{ to } 112) \text{ mcd}$	InGaN on Sapphire
VLMB41P1Q2-GS18	Blue, $I_V = (45 \text{ to } 112) \text{ mcd}$	InGaN on Sapphire
VLMB41P1Q1-GS08	Blue, $I_V = (45 \text{ to } 90) \text{ mcd}$	InGaN on Sapphire
VLMB41P1Q1-GS18	Blue, $I_V = (45 \text{ to } 90) \text{ mcd}$	InGaN on Sapphire
VLMB41P2Q2-GS08	Blue, $I_V = (56 \text{ to } 112) \text{ mcd}$	InGaN on Sapphire
VLMB41P2Q2-GS18	Blue, $I_V = (56 \text{ to } 112) \text{ mcd}$	InGaN on Sapphire

VLMB41..

Vishay Semiconductors



ABSOLUTE MAXIMUM RATINGS ¹⁾ VLMB41..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
DC forward current	$T_{amb} \leq 80\text{ }^{\circ}\text{C}$	I_F	20	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	0.1	A
Power dissipation		P_V	84	mW
Junction temperature		T_j	110	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 100	$^{\circ}\text{C}$
Operating temperature range		T_{amb}	- 40 to + 100	$^{\circ}\text{C}$
Thermal resistance junction/ambient	mounted on PC board (pad size > 16 mm ²)	R_{thJA}	360	K/W

Note:

¹⁾ $T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS ¹⁾ VLMB41.., BLUE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity	$I_F = 10\text{ mA}$	VLMB41P1Q2	I_V	45		112	mcd
		VLMB41P1Q1	I_V	45		90	mcd
		VLMB41P2Q2	I_V	56		112	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		λ_d	462		476	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p		464		nm
Angle of half intensity	$I_F = 10\text{ mA}$		ϕ		± 60		deg
Forward voltage	$I_F = 20\text{ mA}$		V_F		3.2	4.2	V
Temperature coefficient of V_F	$I_F = 10\text{ mA}$		TC_{VF}		- 3		mV/K
Temperature coefficient of I_V	$I_F = 10\text{ mA}$		TC_{IV}		- 0.4		%/K

Note:

Not designed for reverse operation

¹⁾ $T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	LIGHT INTENSITY (MCD)		
STANDARD	OPTIONAL	MIN	MAX
P	1	45	56
	2	56	71
Q	1	71	90
	2	90	112

Note:

Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$.

The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each reel (there will be no mixing of two groups on each reel). In order to ensure availability, single brightness groups are not be orderable.

In a similar manner for colors where wavelength groups are measured and binned, single wavelength groups will be shipped on any one reel.

In order to ensure availability, single wavelength groups are not be orderable.

COLOR CLASSIFICATION		
GROUP	BLUE	
	DOM. WAVELENGTH (NM)	
	MIN.	MAX.
3	462	468
4	466	472
5	470	476

Note:

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of $\pm 1\text{ nm}$.

CROSSING TABLE	
VISHAY	OSRAM
VLMB41..	LBT67C

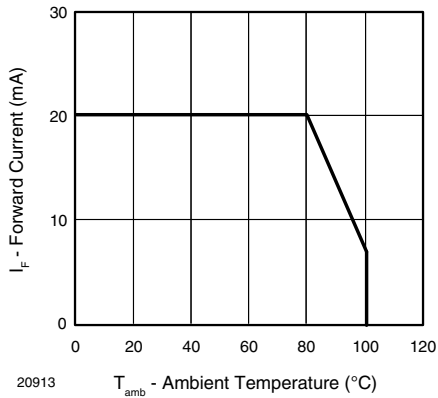
**TYPICAL CHARACTERISTICS** $T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Figure 1. Forward Current vs. Ambient Temperature

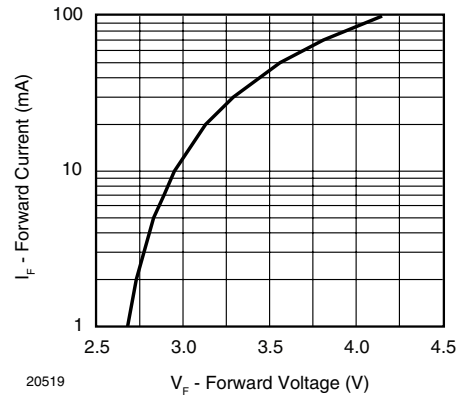


Figure 4. Forward Current vs. Forward Voltage

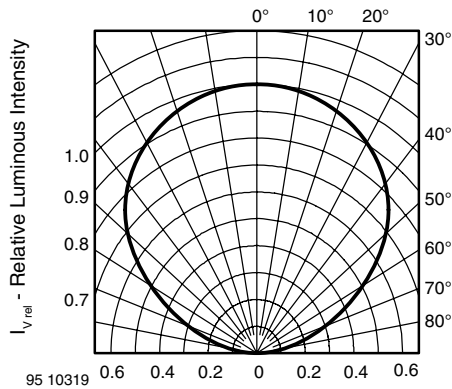


Figure 2. Rel. Luminous Intensity vs. Angular Displacement

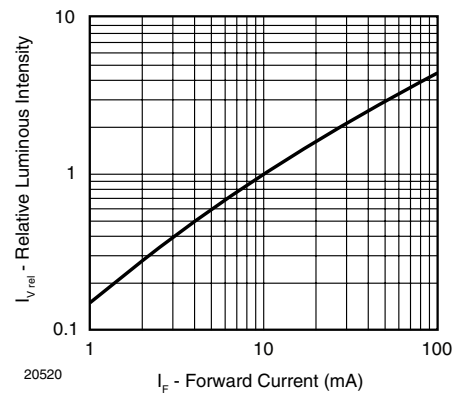


Figure 5. Relative Luminous Intensity vs. Forward Current

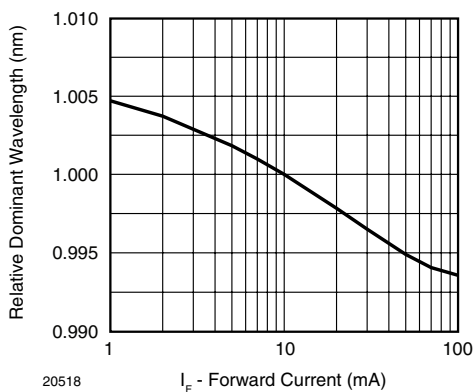


Figure 3. Relative Dominant Wavelength vs. Forward Current

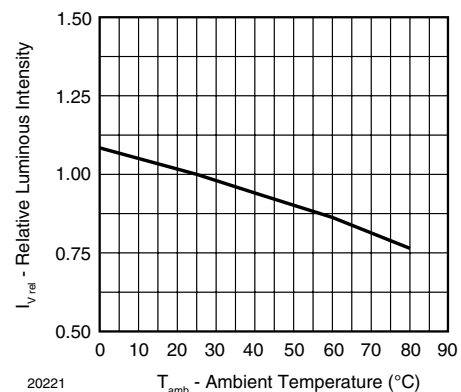


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

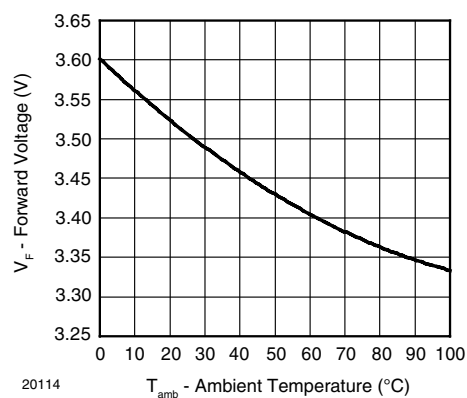
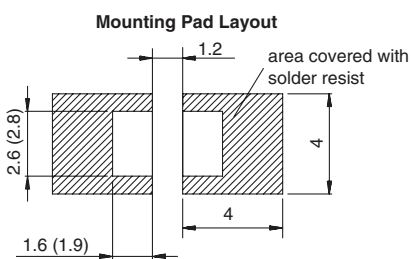
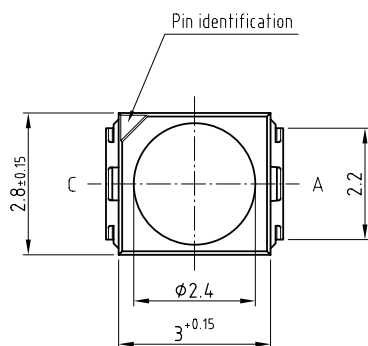
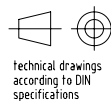
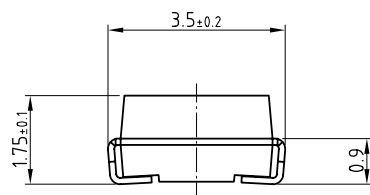
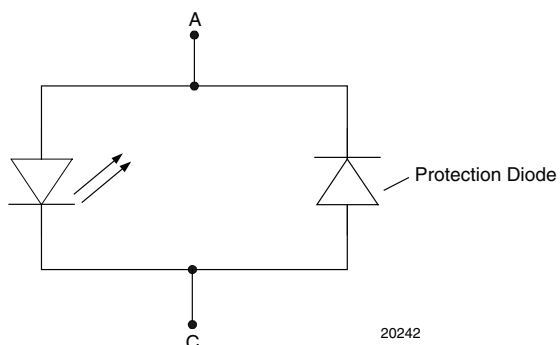


Figure 7. Forward Voltage vs. Ambient Temperature

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5067.01-4
Issue: 4; 30.07.07
20541



**VLMB41..**

Vishay Semiconductors

METHOD OF TAPING/POLARITY AND TAPE AND REEL**SMD LED (VLM.3.../.4... - SERIES)**

Vishay's LEDs in SMD packages are available in an antistatic 8 mm blister tape (in accordance with DIN IEC 40 (CO) 564) for automatic component insertion. The blister tape is a plastic strip with impressed component cavities, covered by a top tape.

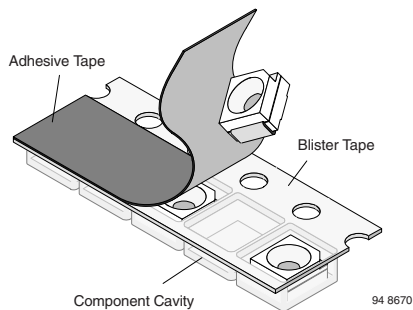
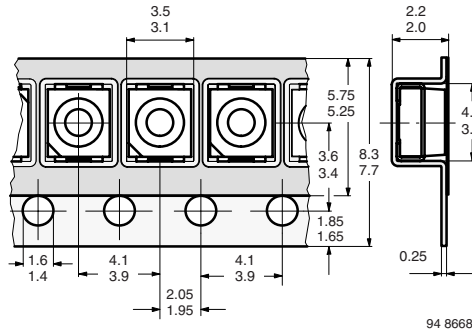
**TAPING OF VLM.3.../.4...**

Figure 8. Tape Dimensions in mm for PLCC-2

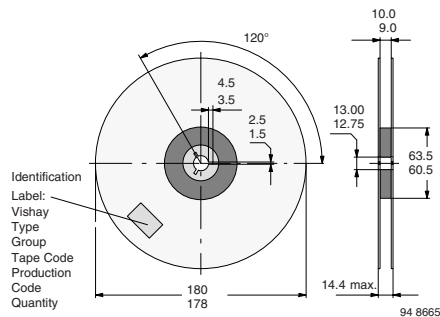
REEL PACKAGE DIMENSION IN MM FOR SMD LED, TAPE OPTION GS08 (= 1500 PCS.)

Figure 9. Reel Dimensions - GS08

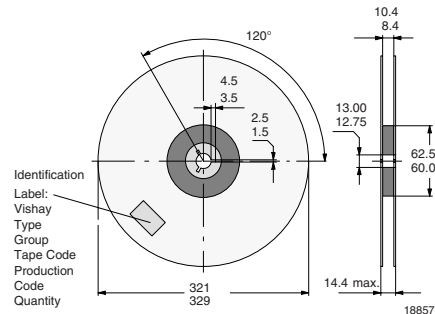
REEL PACKAGE DIMENSION IN MM FOR SMD LED, TAPE OPTION GS18 (= 8000 PCS.) PREFERRED

Figure 10. Reel Dimensions - GS18

SOLDERING PROFILE

IR Reflow Soldering Profile for Lead (Pb)-free Soldering
Preconditioning acc. to JEDEC Level 2a

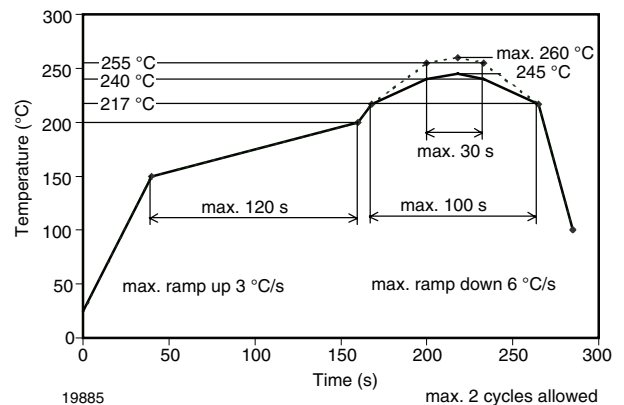


Figure 11. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

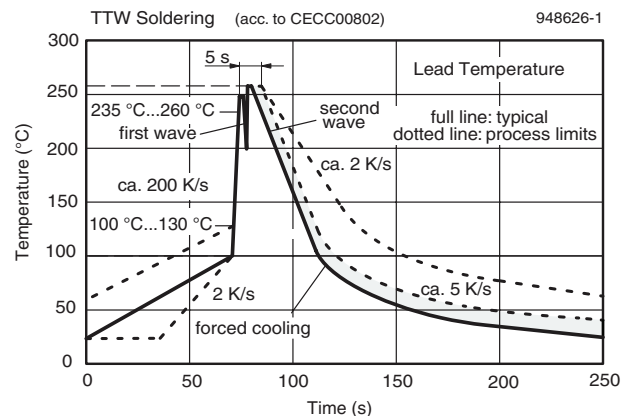


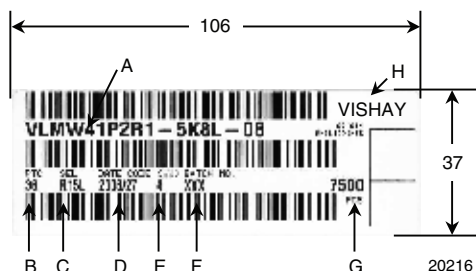
Figure 12. Double Wave Soldering of Opto Devices (all Packages)

VLMB41..

Vishay Semiconductors



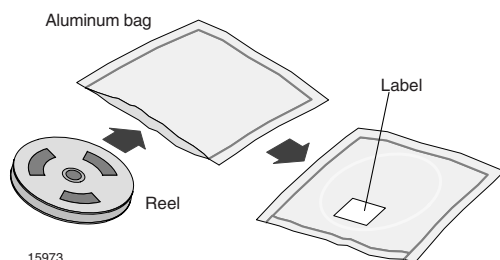
BAR CODE PRODUCT LABEL EXAMPLE:



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):
e.g.: R1 = code for luminous intensity group
5L = code for chrom. coordinate group
- D) Date code year/week
- E) Day code (e.g. 4: Thursday)
- F) Batch no.
- G) Total quantity
- H) Company code

DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity $\leq 60\%$ RH max.

After more than 672 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C/- 0 °C and $< 5\%$ RH (dry air/nitrogen) or

96 h at 60 °C + 5 °C and $< 5\%$ RH for all device containers or

24 h at 100 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC standard JESD22-A112 level 2a label is included on all dry bags.

	CAUTION This bag contains MOISTURE-SENSITIVE DEVICES	LEVEL 2a								
1. Shelf life in sealed bag 12 months at $<40^{\circ}\text{C}$ and $<90\%$ relative humidity (RH) 2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be: a) Mounted within 672 hours at factory condition of $\leq 30^{\circ}\text{C}/60\%\text{RH}$ or b) Stored at $\leq 10\%\text{RH}$. 3. Devices require baking before mounting if: a) Humidity Indicator Card is $>10\%$ when read at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ or b) 2a or 2b is not met. 4. If baking is required, devices may be baked for: <table border="0"><tr><td>192 hours at $40^{\circ}\text{C} + 5^{\circ}\text{C}/-0^{\circ}\text{C}$ and $<5\%\text{RH}$ (dry air/nitrogen)</td><td>or</td></tr><tr><td>96 hours at $60 \pm 5^{\circ}\text{C}$ and $<5\%\text{RH}$</td><td>For all device containers</td><td>or</td></tr><tr><td>24 hours at $100 \pm 5^{\circ}\text{C}$</td><td>Not suitable for reels or tubes</td><td></td></tr></table> Bag Seal Date: _____ (If blank, see bar code label) Note: LEVEL defined by EIA JEDEC Standard JESD22-A113			192 hours at $40^{\circ}\text{C} + 5^{\circ}\text{C}/-0^{\circ}\text{C}$ and $<5\%\text{RH}$ (dry air/nitrogen)	or	96 hours at $60 \pm 5^{\circ}\text{C}$ and $<5\%\text{RH}$	For all device containers	or	24 hours at $100 \pm 5^{\circ}\text{C}$	Not suitable for reels or tubes	
192 hours at $40^{\circ}\text{C} + 5^{\circ}\text{C}/-0^{\circ}\text{C}$ and $<5\%\text{RH}$ (dry air/nitrogen)	or									
96 hours at $60 \pm 5^{\circ}\text{C}$ and $<5\%\text{RH}$	For all device containers	or								
24 hours at $100 \pm 5^{\circ}\text{C}$	Not suitable for reels or tubes									

Example of JESD22-A112 level 2a label

ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electro-static sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.

**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.

We reserve the right to make changes to improve technical design
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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



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