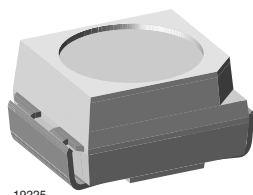


## Standard SMD LED PLCC-2



19225

### DESCRIPTION

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

The package of the VLMW42.. 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 a mixture of epoxy and TAG phosphor.

The TAG phosphor converts the blue emission partially to yellow, which mixes with the remaining blue to give white.

### PRODUCT GROUP AND PACKAGE DATA

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

### FEATURES

- High efficient InGaN technology
- Chromaticity coordinate categorized according to CIE1931 per packing unit
- Typical color temperature 5000 K
- EIA and ICE standard package
- Compatible with reflow, vapor phase and wave solder processes acc. to CECC 00802 and J-STD-020
- Available in 8 mm tape reel
- Preconditioning: according to JEDEC level 2a
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Luminous intensity ratio in one packing unit  $I_{Vmax}/I_{Vmin.} \leq 1.6$
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

AUTOMOTIVE  
GRADE



RoHS  
COMPLIANT

GREEN  
(5-2008)\*

### APPLICATIONS

- Camera flash light
- Signal and symbol luminaire
- Marker lights
- Interior and exterior automotive lighting: brake lights, turn lights, backlighting, side markers
- Indicator lighting

### PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMW42T2U2-6K6L-08	White, $I_V = (355 \text{ to } 710) \text{ mcd}$	InGaN/TAG on sapphire
VLMW42T2V1-6K7L-08	White, $I_V = (355 \text{ to } 900) \text{ mcd}$	InGaN/TAG on sapphire

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLMW42...

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
DC forward current	$T_{amb} \leq 80^\circ\text{C}$	$I_F$	20	mA
Surge forward current	$t_p \leq 10 \mu\text{s}$	$I_{FSM}$	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 <sup>2</sup> )	$R_{thJA}$	360	K/W

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMW42...**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 20\text{ mA}$	VLMW42T2U2-6K6L	$I_V$	355		710	mcd
	$I_F = 20\text{ mA}$	VLMW42T2V1-6K7L	$I_V$	355		900	mcd
Chromaticity coordinate x acc. to CIE 1931	$I_F = 20\text{ mA}$		x		0.32		
Chromaticity coordinate y acc. to CIE 1931	$I_F = 20\text{ mA}$		y		0.32		
Angle of half intensity	$I_F = 20\text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 20\text{ mA}$		$V_F$		3.3	4.2	V
Temperature coefficient of $V_F$	$I_F = 20\text{ mA}$		$TC_{VF}$		- 3		mV/K
Temperature coefficient of $I_V$	$I_F = 20\text{ mA}$		$TC_{IV}$		- 0.4		%/K

Note:

Not designed for reverse operation

**LUMINOUS INTENSITY CLASSIFICATION**

GROUP	LIGHT INTENSITY (mcd)		
	STANDARD	OPTIONAL	MIN. MAX.
T		2	355 450
U		1	450 560
		2	560 710
V		1	710 900

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.

**CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED**

	X	Y
6L	0.310	0.297
	0.307	0.312
	0.330	0.347
	0.330	0.330
6K	0.313	0.284
	0.310	0.297
	0.330	0.330
	0.330	0.310
7L	0.330	0.330
	0.330	0.347
	0.347	0.371
	0.345	0.352
7K	0.330	0.310
	0.330	0.330
	0.338	0.342
	0.352	0.344

Note:

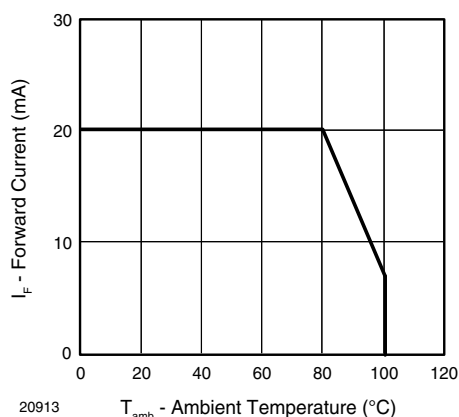
Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$ .**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Figure 1. Forward Current vs. Ambient Temperature

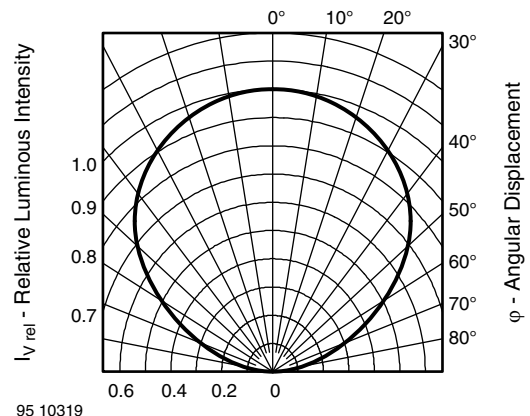


Figure 2. Rel. Luminous Intensity vs. Angular Displacement

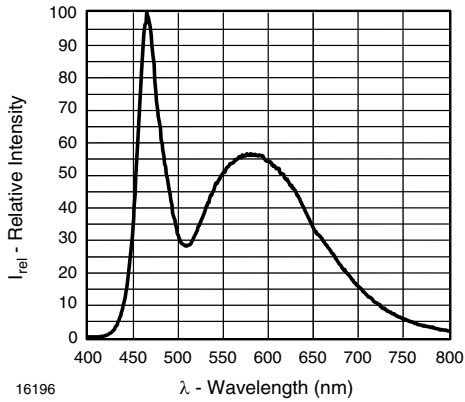


Figure 3. Relative Intensity vs. Wavelength

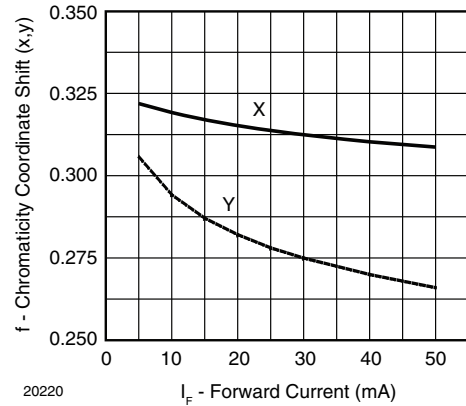


Figure 6. Chromaticity Coordinate Shift vs. Forward Current

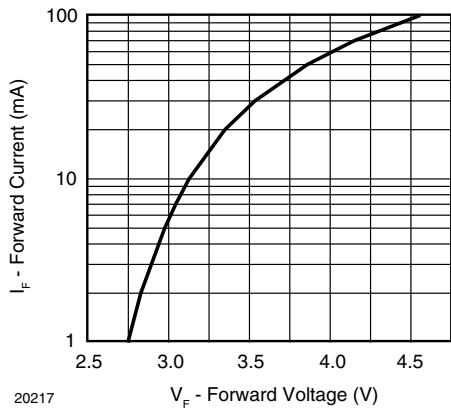


Figure 4. Forward Current vs. Forward Voltage

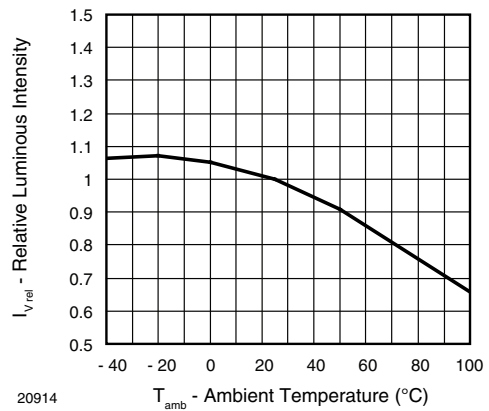


Figure 7. Rel. Luminous Intensity vs. Ambient Temperature

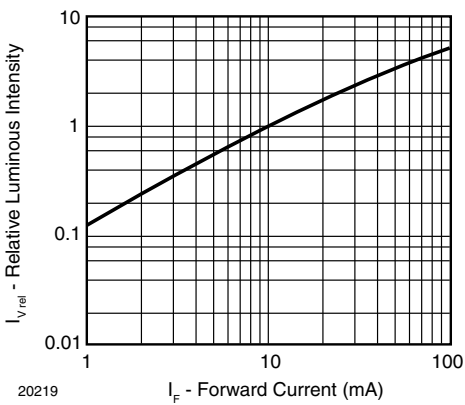


Figure 5. Relative Luminous Intensity vs. Forward Current

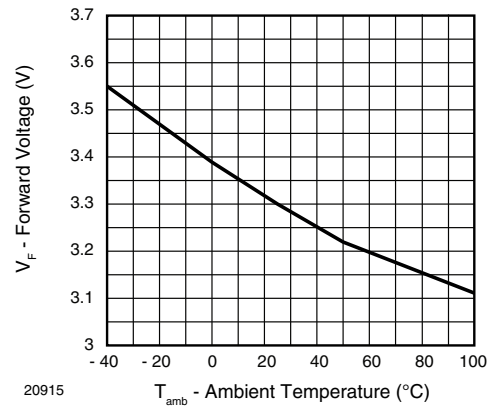


Figure 8. Forward Voltage vs. Ambient Temperature

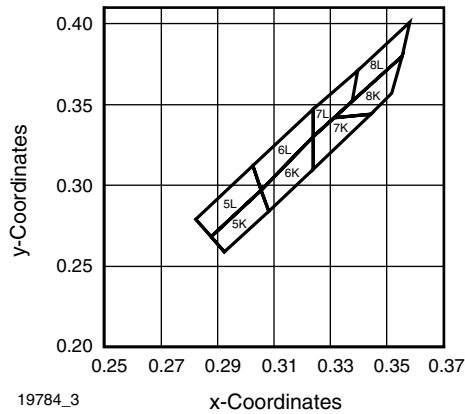
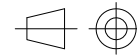
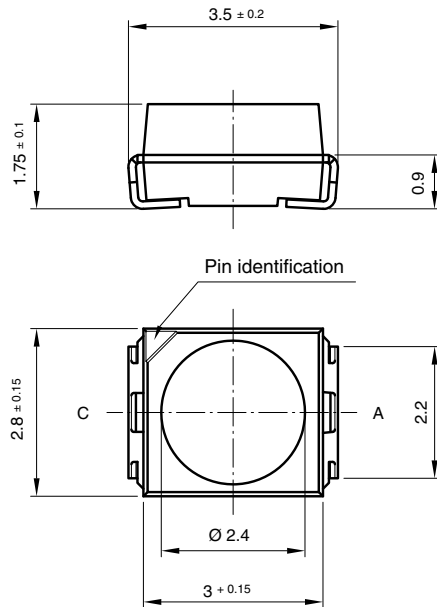


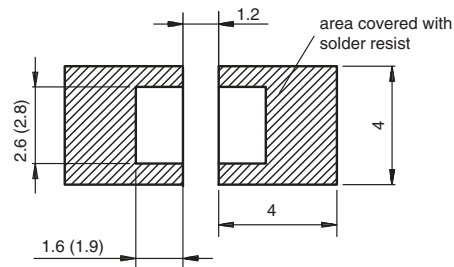
Figure 9. Coordinates of Colorgroups

## PACKAGE DIMENSIONS in millimeters

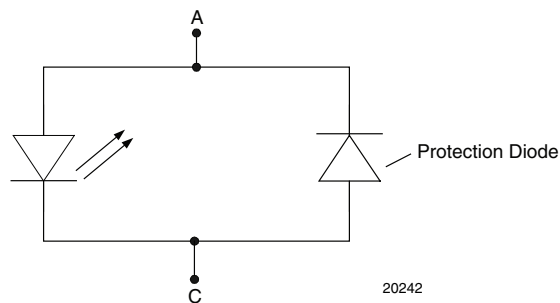


technical drawings  
according to DIN  
specifications

### Mounting Pad Layout



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

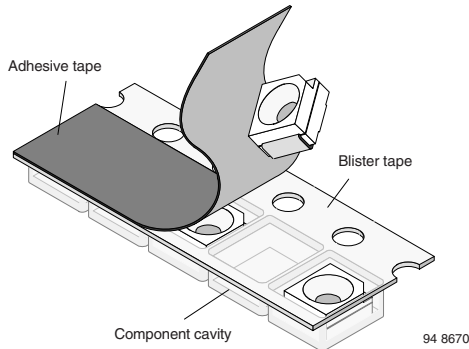


20242

## 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...

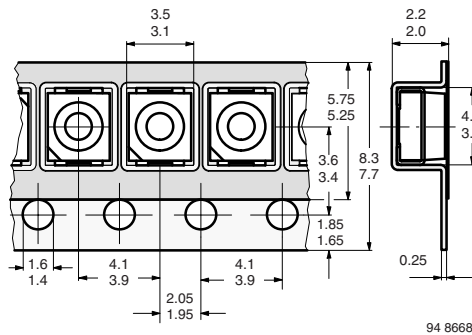


Figure 10. Tape Dimensions in mm for PLCC-2

### REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDs, TAPE OPTION GS08 (= 1500 PCS.)

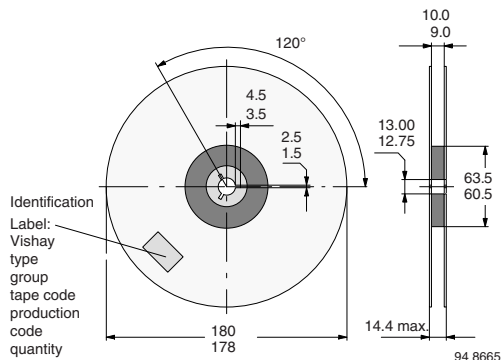


Figure 11. Reel Dimensions - GS08

## SOLDERING PROFILE

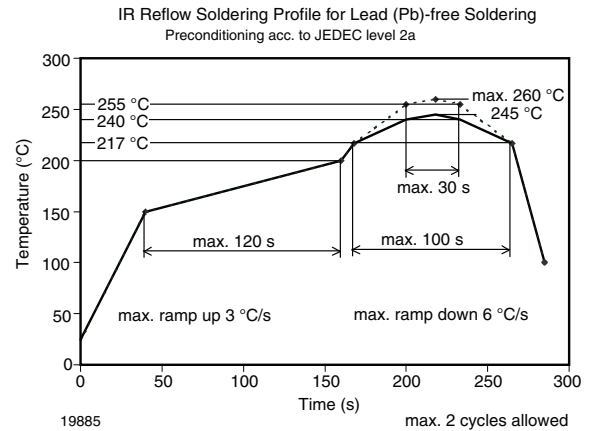


Figure 12. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

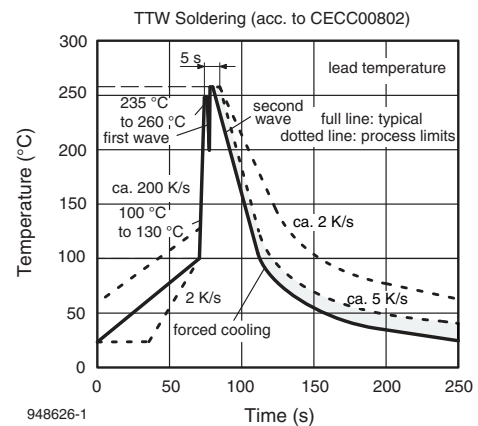
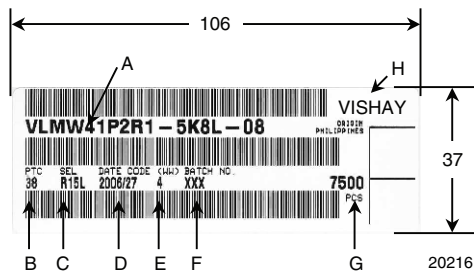


Figure 13. Double Wave Soldering of Opto Devices (all Packages)

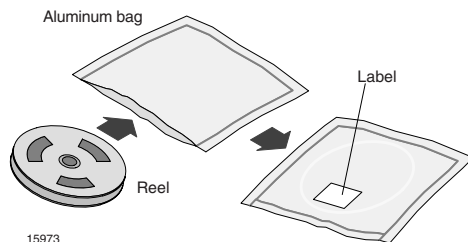
### BAR CODE PRODUCT LABEL EXAMPLE:



- 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.

	<b>CAUTION</b> This bag contains MOISTURE-SENSITIVE DEVICES	LEVEL <b>2a</b>						
1. Shelf life in sealed bag 12 months at <40°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: <ul style="list-style-type: none"> <li>a) Mounted within <b>672 hours</b> at factory condition of <math>\leq 30^\circ\text{C}/60\%\text{RH}</math> or</li> <li>b) Stored at <math>\leq 10\%</math> RH.</li> </ul>								
3. Devices require baking before mounting if: <ul style="list-style-type: none"> <li>a) Humidity Indicator Card is &gt;10% when read at <math>23^\circ\text{C} \pm 5^\circ\text{C}</math> or</li> <li>b) 2a or 2b is not met.</li> </ul>								
4. If baking is required, devices may be baked for: <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><b>192 hours</b> at <math>40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}</math> and &lt;5%RH (dry air/nitrogen)</td> <td style="text-align: center;">or</td> </tr> <tr> <td style="text-align: center;"><b>96 hours</b> at <math>60 \pm 5^\circ\text{C}</math> and &lt;5%RH</td> <td style="text-align: center;">For all device containers or</td> </tr> <tr> <td style="text-align: center;"><b>24 hours</b> at <math>100 \pm 5^\circ\text{C}</math></td> <td style="text-align: center;">Not suitable for reels or tubes</td> </tr> </table>			<b>192 hours</b> at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or	<b>96 hours</b> at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers or	<b>24 hours</b> at $100 \pm 5^\circ\text{C}$	Not suitable for reels or tubes
<b>192 hours</b> at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or							
<b>96 hours</b> at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers or							
<b>24 hours</b> at $100 \pm 5^\circ\text{C}$	Not suitable for reels or tubes							
Bag Seal Date: _____ (If blank, see bar code label)								
Note: LEVEL defined by EIA JEDEC Standard JESD22-A113								

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.



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