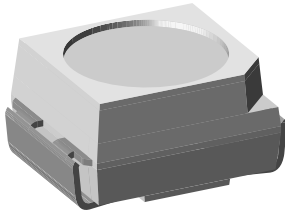




### Standard SMD LED PLCC-2



94 8553

#### FEATURES

- Lead (Pb)-free product-RoHS compliant
- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with infrared, vapor phase and wave solder processes according to CECC 00802 and J-STD-020B
- Available in 8 mm tape
- Low profile package
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Low power consumption
- Luminous intensity ratio in one packaging unit  $I_{Vmax}/I_{Vmin} \leq 1.6$
- Preconditioning: acc. to JEDEC level 2a



#### DESCRIPTION

These devices have been designed to meet the increasing demand for surface mounting technology.

The package of the VLM.310. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up 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
- Indicator and backlight for audio and video equipment
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches and symbols
- General use

PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMH3100-GS08	Red, $I_V > 2.8$ mcd	GaAsP on GaP
VLMH3100-GS18	Red, $I_V > 2.8$ mcd	GaAsP on GaP
VLMH3101-GS08	Red, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMH3101-GS18	Red, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMH3102-GS08	Red, $I_V = (7.1 \text{ to } 18)$ mcd	GaAsP on GaP
VLMH3102-GS18	Red, $I_V = (7.1 \text{ to } 18)$ mcd	GaAsP on GaP
VLMO3100-GS08	Soft orange, $I_V > 2.8$ mcd	GaAsP on GaP
VLMO3100-GS18	Soft orange, $I_V > 2.8$ mcd	GaAsP on GaP
VLMO3101-GS08	Soft orange, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMO3101-GS18	Soft orange, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMY3100-GS08	Yellow, $I_V > 2.8$ mcd	GaAsP on GaP



PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMY3100-GS18	Yellow, $I_V > 2.8$ mcd	GaAsP on GaP
VLMY3101-GS08	Yellow, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMY3101-GS18	Yellow, $I_V = (4.5 \text{ to } 11.2)$ mcd	GaAsP on GaP
VLMY3102-GS08	Yellow, $I_V = (7.1 \text{ to } 18)$ mcd	GaAsP on GaP
VLMY3102-GS18	Yellow, $I_V = (7.1 \text{ to } 18)$ mcd	GaAsP on GaP
VLMG3100-GS08	Green, $I_V > 4.5$ mcd	GaP on GaP
VLMG3100-GS18	Green, $I_V > 4.5$ mcd	GaP on GaP
VLMG3102-GS08	Green, $I_V = (11.2 \text{ to } 18)$ mcd	GaP on GaP
VLMG3102-GS18	Green, $I_V = (11.2 \text{ to } 18)$ mcd	GaP on GaP
VLMG3105-GS08	Green, $I_V = (7.1 \text{ to } 18)$ mcd	GaP on GaP
VLMG3105-GS18	Green, $I_V = (7.1 \text{ to } 18)$ mcd	GaP on GaP
VLMP3100-GS08	Pure green, $I_V > 1.12$ mcd	GaP on GaP
VLMP3100-GS18	Pure green, $I_V > 1.12$ mcd	GaP on GaP
VLMP3101-GS08	Pure green, $I_V = (1.8 \text{ to } 4.5)$ mcd	GaP on GaP
VLMP3101-GS18	Pure green, $I_V = (1.8 \text{ to } 4.5)$ mcd	GaP on GaP
VLMP3107-GS08	Pure green, $I_V = (2.8 \text{ to } 5.6)$ mcd	GaP on GaP
VLMP3107-GS18	Pure green, $I_V = (2.8 \text{ to } 5.6)$ mcd	GaP on GaP
VLMP3102-GS08	Pure green, $I_V = (2.8 \text{ to } 7.1)$ mcd	GaP on GaP
VLMP3102-GS18	Pure green, $I_V = (2.8 \text{ to } 7.1)$ mcd	GaP on GaP

ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMG310. , VLMH310. , VLMO310. , VLMP310. , VLMY310.				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	6	V
DC forward current	$T_{amb} \leq 60$ °C	$I_F$	30	mA
Surge forward current	$t_p \leq 10$ $\mu$ s	$I_{FSM}$	0.5	A
Power dissipation	$T_{amb} \leq 60$ °C	$P_V$	100	mW
Junction temperature		$T_j$	100	°C
Operating temperature range		$T_{amb}$	- 40 to + 100	°C
Storage temperature range		$T_{stg}$	- 40 to + 100	°C
Soldering temperature	$t \leq 5$ s	$T_{sd}$	260	°C
Thermal resistance junction/ambient	mounted on PC board (pad size > 16 mm <sup>2</sup> )	$R_{thJA}$	400	K/W

Note:

<sup>1)</sup>  $T_{amb} = 25$  °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMH310., RED							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 10$ mA	VLMH3100	$I_V$	2.8	10		mcd
		VLMH3101	$I_V$	4.5		11.2	mcd
		VLMH3102	$I_V$	7.1		18	mcd
Dominant wavelength	$I_F = 10$ mA		$\lambda_d$	612		625	nm
Peak wavelength	$I_F = 10$ mA		$\lambda_p$		635		nm
Angle of half intensity	$I_F = 10$ mA		$\varphi$		$\pm 60$		deg
Forward voltage	$I_F = 20$ mA		$V_F$		2	2.8	V
Reverse voltage	$I_R = 10$ $\mu$ A		$V_R$	6	15		V
Junction capacitance	$V_R = 0, f = 1$ MHz		$C_j$		15		pF

Note:

<sup>1)</sup>  $T_{amb} = 25$  °C, unless otherwise specified

<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$



OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMO310., SOFT ORANGE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 10 \text{ mA}$	VLMO3100	$I_V$	2.8	8		mcd
		VLMO3101	$I_V$	4.5		11.2	mcd
Dominant wavelength	$I_F = 10 \text{ mA}$		$\lambda_d$	598		611	nm
Peak wavelength	$I_F = 10 \text{ mA}$		$\lambda_p$		605		nm
Angle of half intensity	$I_F = 10 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 20 \text{ mA}$		$V_F$		2	2.8	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		15		pF

Note:

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

<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMY310., YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 10 \text{ mA}$	VLMY3100	$I_V$	2.8	10		mcd
		VLMY3101	$I_V$	4.5		11.2	mcd
		VLMY3102	$I_V$	7.1		18	mcd
Dominant wavelength	$I_F = 10 \text{ mA}$		$\lambda_d$	581		594	nm
Peak wavelength	$I_F = 10 \text{ mA}$		$\lambda_p$		585		nm
Angle of half intensity	$I_F = 10 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 20 \text{ mA}$		$V_F$		2.1	2.8	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		15		pF

Note:

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

<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMG310., GREEN							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 10 \text{ mA}$	VLMG3100	$I_V$	4.5	16		mcd
		VLMG3102	$I_V$	11.2		18	mcd
		VLMG3105	$I_V$	7.1		18	mcd
Dominant wavelength	$I_F = 10 \text{ mA}$		$\lambda_d$	562		575	nm
Peak wavelength	$I_F = 10 \text{ mA}$		$\lambda_p$		565		nm
Angle of half intensity	$I_F = 10 \text{ mA}$		$\phi$		$\pm 60$		deg
Forward voltage	$I_F = 20 \text{ mA}$		$V_F$		2.2	2.8	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		15		pF

Note:

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

<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$



OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMP310., PURE GREEN							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 10 \text{ mA}$	VLMP3100	$I_V$	1.12	4		mcd
		VLMP3101	$I_V$	1.8		4.5	mcd
		VLMP3102	$I_V$	2.8		7.1	mcd
		VLMP3107	$I_V$	2.8		5.6	mcd
Dominant wavelength	$I_F = 10 \text{ mA}$		$\lambda_d$	555		565	nm
Peak wavelength	$I_F = 10 \text{ mA}$		$\lambda_p$		555		nm
Angle of half intensity	$I_F = 10 \text{ mA}$		$\varphi$		$\pm 60$		deg
Forward voltage	$I_F = 20 \text{ mA}$		$V_F$		2.1	2.8	V
Reverse voltage	$I_R = 10 \mu\text{A}$		$V_R$	6	15		V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		15		pF

Note:

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

<sup>2)</sup> In one packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$

COLOR CLASSIFICATION								
GROUP	YELLOW		GREEN		SOFTORANGE		PURE GREEN	
	DOM. WAVELENGTH (nm)				DOM. WAVELENGTH (nm)			
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0							555	559
1	581	584			598	601	558	561
2	583	586			600	603	560	563
3	585	588			602	605	562	565
4	587	590	564	567	604	607		
5	589	592	566	569	606	609		
6	591	594	568	571	608	611		
7			570	573	606	609		
8			572	575	608	611		

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	LIGHT INTENSITY (mcd)		
	STANDARD	OPTIONAL	MAX.
F	-	-	-
	2	1.40	1.80
G	1	1.80	2.24
	2	2.24	2.80
H	1	2.80	3.55
	2	3.55	4.50
J	1	4.50	5.60
	2	5.60	7.10
K	1	7.10	9.00
	2	9.00	11.20
L	1	11.20	14.00
	2	14.00	18.00
M	1	18.00	22.40
	2	22.40	28.00

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 will 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 will not be orderable.



CROSSING TABLE		
VISHAY	OSRAM	STANLEY
VLMH3100	-	-
VLMH3101	-	-
VLMH3102	-	-
VLMO3100	LOT670J1L2	-
VLMO3101	LOT670J1K2	-
VLMY3100	LYT670J1L2	-
VLMY3101	LYT670J1K2	-
VLMY3102	LYT670K1L2	-
VLMG3100	LGT670K1M2	VYBG1104B
VLMG3102	LGT670L1L2	-
VLMG3105	LGT671K1L2	-
VLMP3100	LPT670F2J2	-
VLMP3101	LPT670G1H2	VYBG1101W
VLMP3102	LPT670H1J2	-
VLMP3107	LPT670H1J1	-

**TYPICAL CHARACTERISTICS**

T<sub>amb</sub> = 25 °C, unless otherwise specified

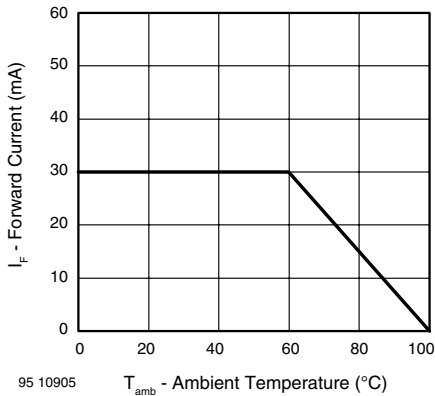


Figure 1. Maximum Permissible Forward Current vs. Ambient Temperature

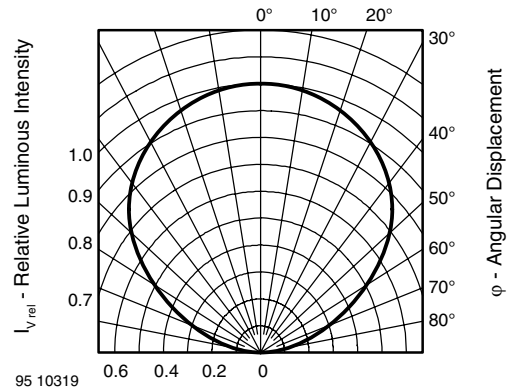


Figure 3. Relative Luminous Intensity vs. Angular Displacement

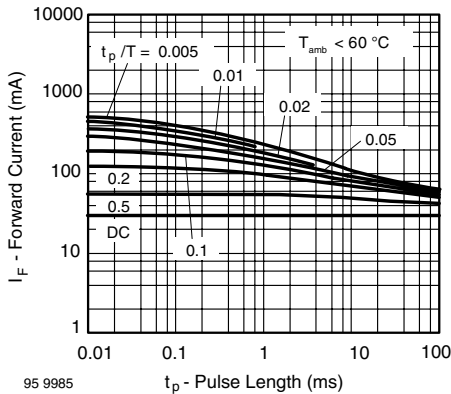


Figure 2. Permissible Pulse Forward Current vs. Pulse Duration

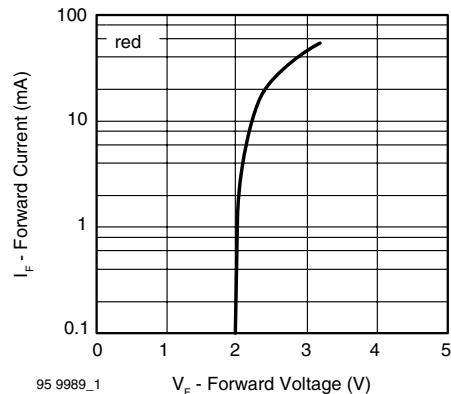
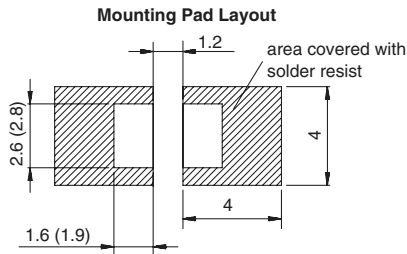
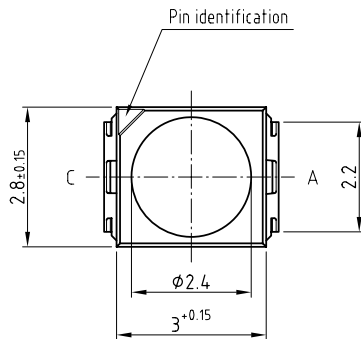
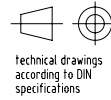
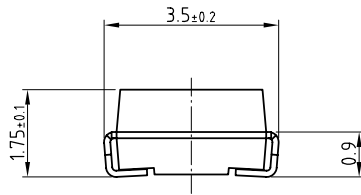


Figure 4. Forward Current vs. Forward Voltage

**PACKAGE DIMENSIONS** in millimeters

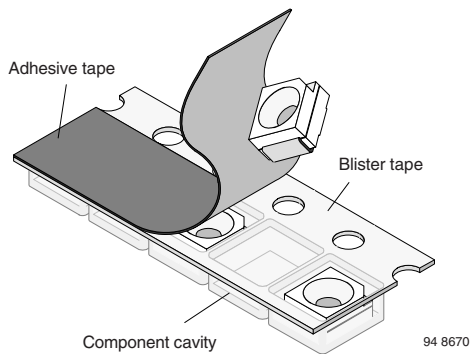


Drawing-No.: 6.541-5067.01-4  
 Issue: 4; 30.07.07  
 20541

**METHOD OF TAPING/POLARITY AND TAPE AND REEL**

**SMD LED (VLM3-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..**

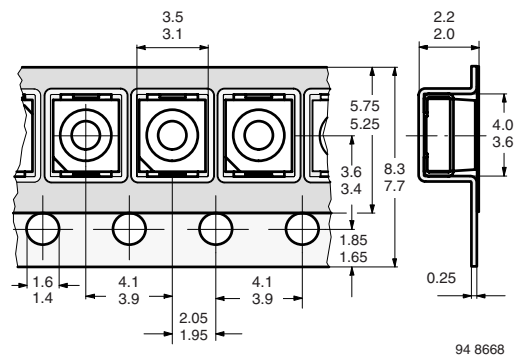


Figure 29. Tape Dimensions in mm for PLCC-2