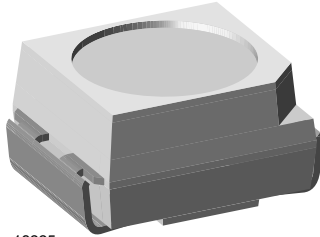


## Low Current SMD LED PLCC-2



19225

### DESCRIPTION

These new devices have been designed to meet the increasing demand for low current SMD LEDs.

The package of the VLMA310x is the PLCC-2 (equivalent to a size B tantalum capacitor).

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: low current
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- SMD LED with exceptional brightness
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with infrared, vapor phase and wave solder processes according to CECC
- Available in 8 mm tape
- Low profile package
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Very low power consumption
- Luminous intensity ratio in one packaging unit  $I_{Vmax}/I_{Vmin} \leq 2.0$
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE GRADE



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### 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 for battery driven equipment
- Small indicator for outdoor applications
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches, and symbols
- General use

PARTS TABLE														
PART	COLOR	LUMINOUS INTENSITY (mcd)			at I <sub>F</sub> (mA)	WAVELENGTH (nm)			at I <sub>F</sub> (mA)	FORWARD VOLTAGE (V)			at I <sub>F</sub> (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VLMA3100-GS08	Yellow	0.28	0.8	-	2	581	588	594	2	-	2.2	2.9	2	GaAsP on GaP
VLMA3100-GS18	Yellow	0.28	0.8	-	2	581	588	594	2	-	2.2	2.9	2	GaAsP on GaP
VLMA3101-GS08	Yellow	0.56	-	1.4	2	581	588	594	2	-	2.2	2.9	2	GaAsP on GaP
VLMA3101-GS18	Yellow	0.56	-	1.4	2	581	588	594	2	-	2.2	2.9	2	GaAsP on GaP



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) VLMA3100, VLMA3101				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>		V <sub>R</sub>	6	V
DC forward current		I <sub>F</sub>	7	mA
Surge forward current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	0.5	A
Power dissipation		P <sub>V</sub>	20	mW
Junction temperature		T <sub>j</sub>	100	°C
Operating temperature range		T <sub>amb</sub>	-40 to +100	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Soldering temperature	t ≤ 5 s	T <sub>sd</sub>	260	°C
Thermal resistance junction-to-ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	R <sub>thJA</sub>	500	K/W

Note

(1) Driving the LED in reverse direction is suitable for short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) VLMA3100, VLMA3101, YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 2 mA	VLMA3100	I <sub>v</sub>	0.28	0.8	-	mcd
		VLMA3101	I <sub>v</sub>	0.56	-	1.4	mcd
Dominant wavelength	I <sub>F</sub> = 2 mA		λ <sub>d</sub>	581	588	594	nm
Peak wavelength	I <sub>F</sub> = 2 mA		λ <sub>p</sub>	-	585	-	nm
Angle of half intensity	I <sub>F</sub> = 2 mA		φ	-	± 60	-	°
Forward voltage	I <sub>F</sub> = 2 mA		V <sub>F</sub>	-	2.2	2.9	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	6	20	-	V
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz		C <sub>j</sub>	-	50	-	pF

Note

(1) In one packing unit I<sub>vmax</sub>/I<sub>vmin</sub> ≤ 2.0

LUMINOUS INTENSITY CLASSIFICATION		
GROUP	LUMINOUS INTENSITY (mcd)	
	MIN.	MAX.
C1	0.28	0.36
C2	0.36	0.45
D1	0.45	0.56
D2	0.56	0.71
E1	0.71	0.90
E2	0.90	1.12
F1	1.12	1.40
F2	1.40	1.80

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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

COLOR CLASSIFICATION		
GROUP	YELLOW	
	DOMINANT WAVELENGTH (nm)	
	MIN.	MAX.
1	581	584
2	583	586
3	585	588
4	587	590
5	589	592
6	591	594

Note

- Wavelengths are tested at a current pulse duration of 25 ms

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

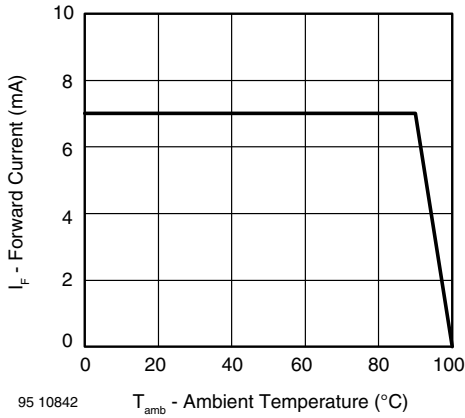


Fig. 1 - Forward Current vs. Ambient Temperature

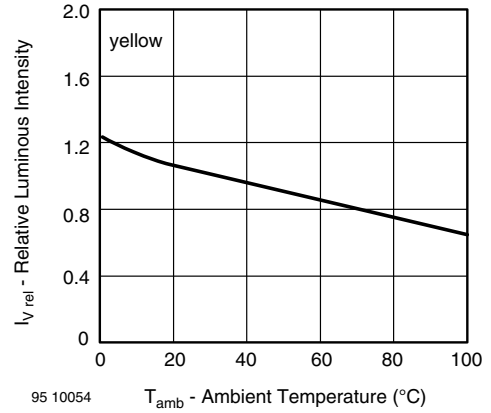


Fig. 4 - Relative Luminous Intensity vs. Ambient Temperature

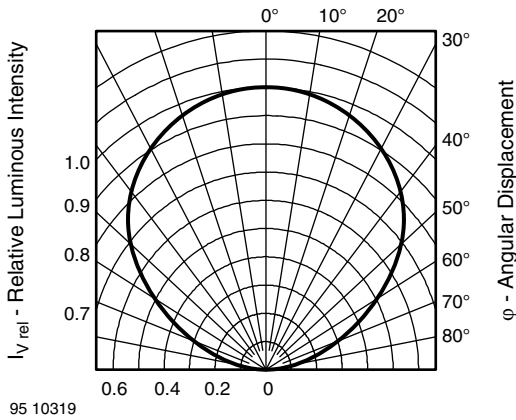


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

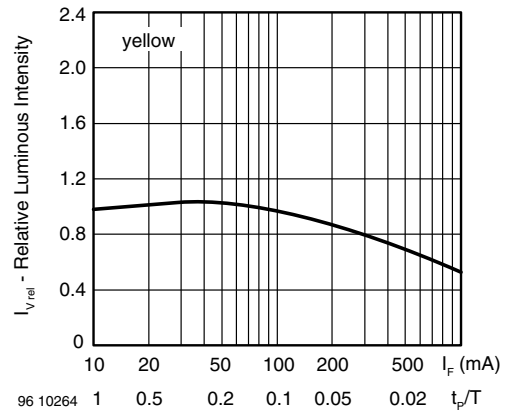


Fig. 5 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

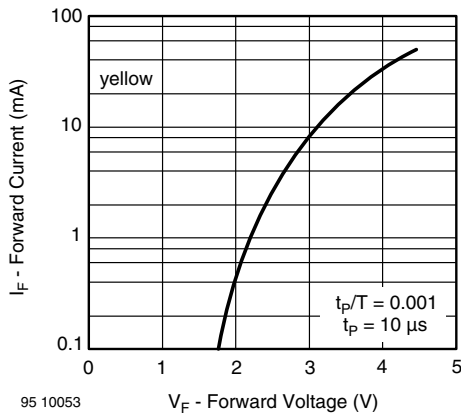


Fig. 3 - Forward Current vs. Forward Voltage

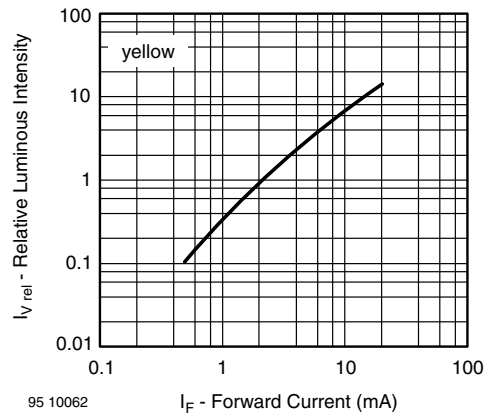


Fig. 6 - Relative Luminous Intensity vs. Forward Current

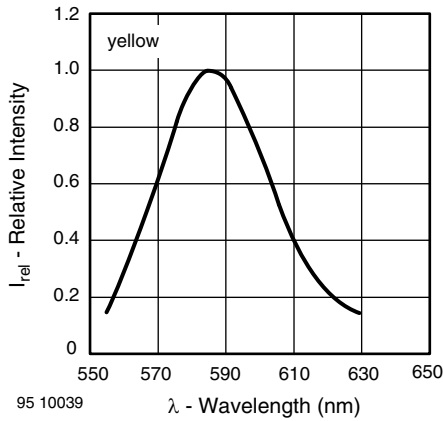
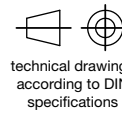
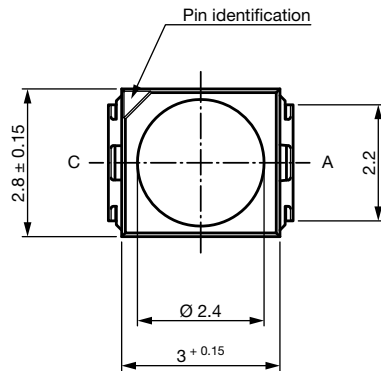
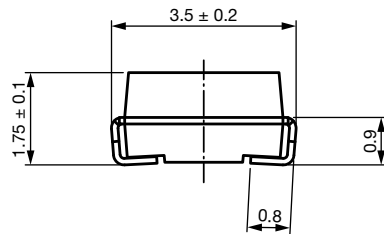
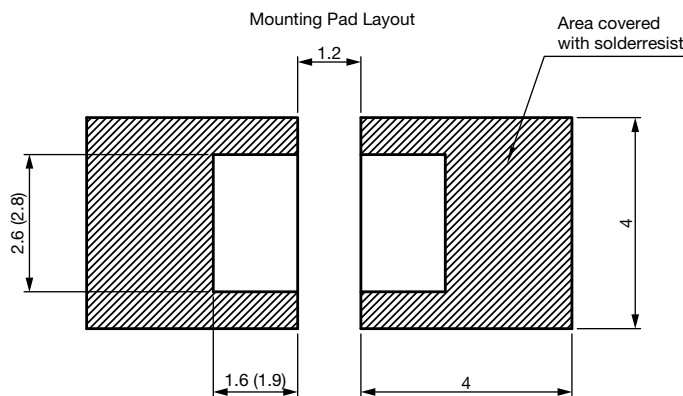


Fig. 7 - Relative Intensity vs. Wavelength

**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.541-5067.01-4  
Issue: 7; 12.03.14

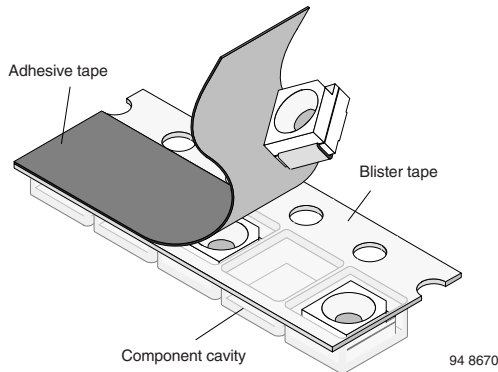


Dimensions: reflow and vapor phase (wave soldering)

## METHOD OF TAPING / POLARITY AND TAPE AND REEL

### SMD LED (VLM.3 - 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.



### EEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDs, TAPE OPTION GS18 (= 8000 PCS.) PREFERRED

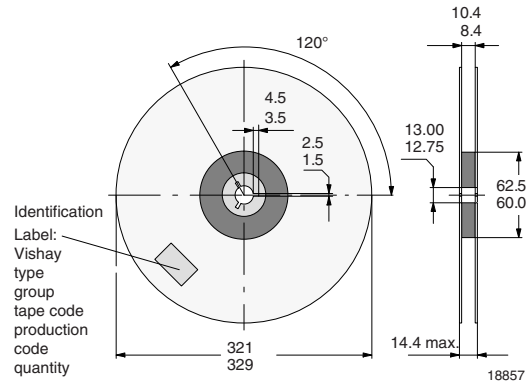


Fig. 10 - Reel dimensions - GS18

### TAPING OF VLM.3...

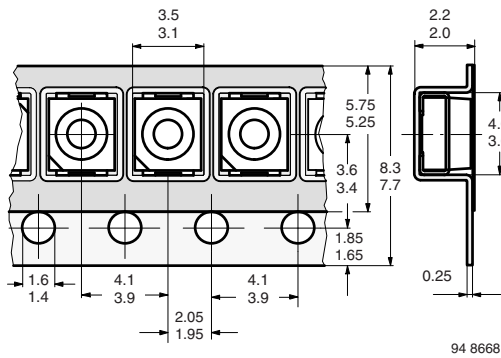


Fig. 8 - Tape dimensions in mm for PLCC-2

### SOLDERING PROFILE

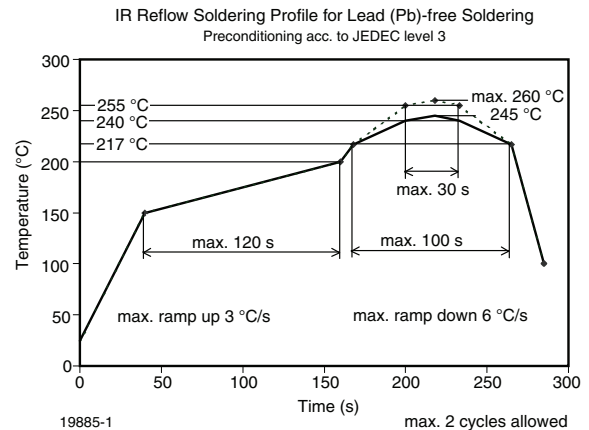


Fig. 11 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

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

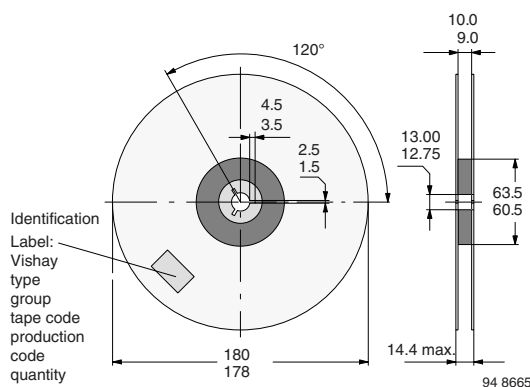


Fig. 9 - Reel dimensions - GS08

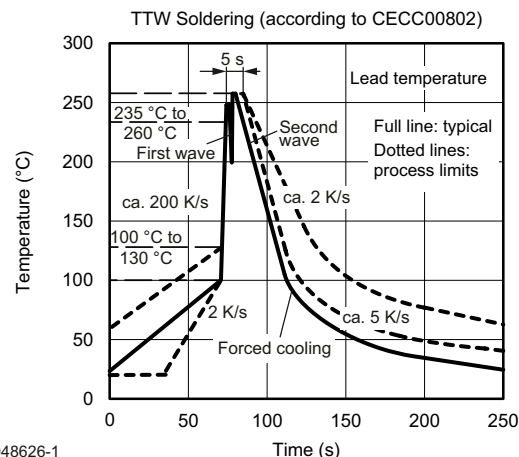
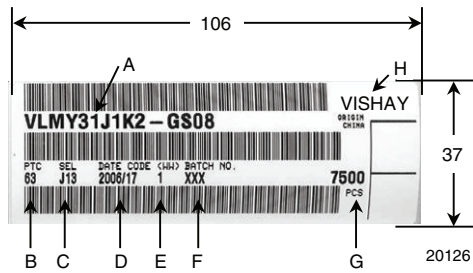


Fig. 12 - Double Wave Soldering of Opto Devices (all packages)

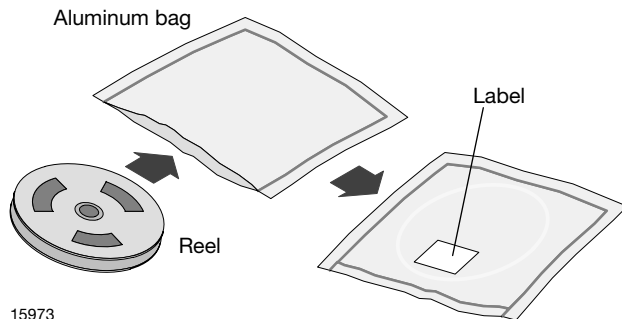
## BAR CODE PRODUCT LABEL (example)



- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: J1 = code for luminous intensity group  
3 = code for color group
- D. Date code year / week
- E. Day code (e.g. 1: Monday)
- 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 ≤ 60 % RH max.

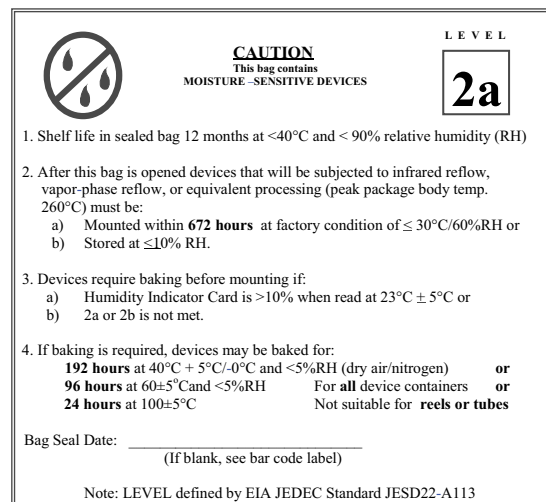
After more than 672 h under these conditions moisture content will be too high for reflow soldering.

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.



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. Electrostatic 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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