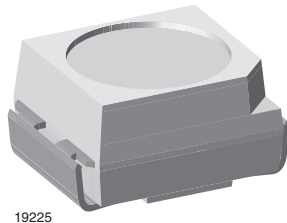


## Power SMD LED in PLCC-2 Package



### FEATURES

- Available in 8 mm tape
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Compatible with IR reflow, vapor phase and wave solder processes according to CECC 00802 and J-STD-020
- Preconditioning: acc. to JEDEC level 2a
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



### DESCRIPTION

The VLMK33.. series is an advanced modification of the Vishay VLMK31.. series. It is designed to incorporate larger chips, therefore, capable of withstanding a 50 mA drive current.

The package of the VLMK33.. 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.

### APPLICATIONS

- Interior and exterior lighting
- Indicator and backlighting purposes for audio, video, LCDs, switches, symbols, illuminated advertising etc.
- Illumination purpose, alternative to incandescent lamps
- General use

### PRODUCT GROUP AND PACKAGE DATA

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

PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMK33Q2T1-GS08	Red, $I_V > (90 \text{ to } 355) \text{ mcd}$	AllnGaP on GaAs
VLMK33Q2T1-GS18	Red, $I_V > (90 \text{ to } 355) \text{ mcd}$	AllnGaP on GaAs
VLMK33R1S2-GS08	Red, $I_V = (112 \text{ to } 280) \text{ mcd}$	AllnGaP on GaAs
VLMK33R1S2-GS18	Red, $I_V = (112 \text{ to } 280) \text{ mcd}$	AllnGaP on GaAs
VLMK33R2T2-2-GS08	Red, $I_V = (140 \text{ to } 450) \text{ mcd}$	AllnGaP on GaAs
VLMK33S1T1-GS08	Red, $I_V = (180 \text{ to } 355) \text{ mcd}$	AllnGaP on GaAs
VLMK33S1T1-GS18	Red, $I_V = (180 \text{ to } 355) \text{ mcd}$	AllnGaP on GaAs

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

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) <b>VLMK33..</b>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>1)</sup>		$V_R$	5	V
DC forward current		$I_F$	50	mA
Power dissipation		$P_V$	130	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^{\circ}\text{C}$
Soldering temperature	$t \leq 5\text{ s}$	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal resistance junction/ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	$R_{thJA}$	400	K/W

Note:

<sup>1)</sup> Driving LED in reverse direction is suitable for a short term application

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) <b>VLMK33.., RED</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 20\text{ mA}$	VLMK33Q2T1	$I_V$	90		355	mcd
		VLMK33R1S2	$I_V$	112		280	mcd
		VLMK33R2T2-2	$I_V$	140		450	mcd
		VLMK33S1T1	$I_V$	180		355	mcd
Luminous flux/luminous intensity			$\phi_V/I_V$		3.14		mlm/mcd
Dominant wavelength	$I_F = 20\text{ mA}$	VLMK33Q2T1	$\lambda_d$	611	617	622	nm
		VLMK33R1S2	$\lambda_d$	611	617	622	nm
		VLMK33S1T1	$\lambda_d$	611	617	622	nm
		VLMK33R2T2-2	$\lambda_d$	614		622	nm
Peak wavelength	$I_F = 20\text{ mA}$		$\lambda_p$		624		nm
Spectral bandwidth at 50 % $I_{rel\ max}$ .	$I_F = 20\text{ mA}$		$\Delta\lambda$		18		nm
Angle of half intensity	$I_F = 20\text{ mA}$		$\varphi$		$\pm 60$		deg
Forward voltage	$I_F = 20\text{ mA}$		$V_F$		1.9	2.5	V
Reverse current	$V_R = 5\text{ V}$		$V_R$		0.01	10	$\mu\text{A}$

<b>LUMINOUS INTENSITY CLASSIFICATION</b>		
GROUP	LUMINOUS INTENSITY (mcd)	
	MIN.	MAX.
Q1	71	90
Q2	90	112
R1	112	140
R2	140	180
S1	180	224
S2	224	280
T1	280	355
T2	355	450

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 be not 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 be not orderable.

<b>COLOR CLASSIFICATION</b>		
GROUP	DOMINANT WAVELENGTH (nm)	
	RED	
	MIN.	MAX.
1	611	618
2	614	622

Note:

Wavelength are tested at a current pulse duration of 25 ms.

<b>CROSSING TABLE</b>	
VISHAY	OSRAM
VLMK33Q2T1	LAT676-Q2T1
VLMK33R1S2	LAT676-R1S2
VLMK33S1T1	LAT676-S1T1

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

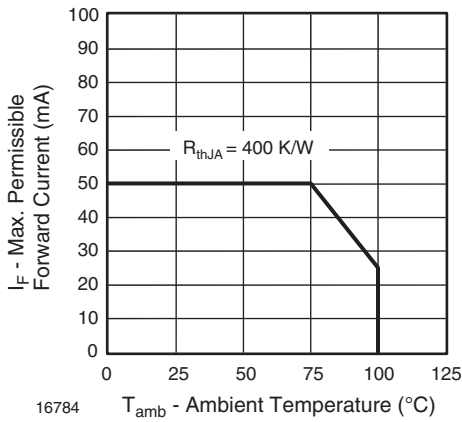


Figure 1. Forward Current vs. Ambient Temperature

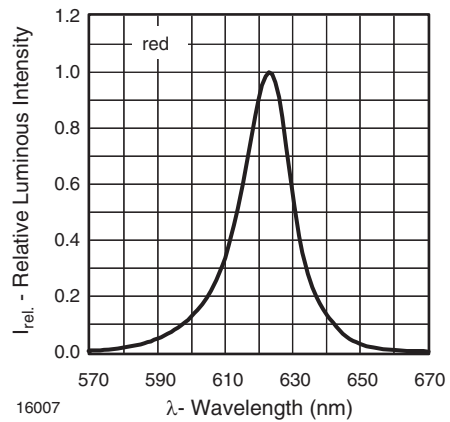


Figure 4. Rel. Luminous Intensity vs. Angular Displacement

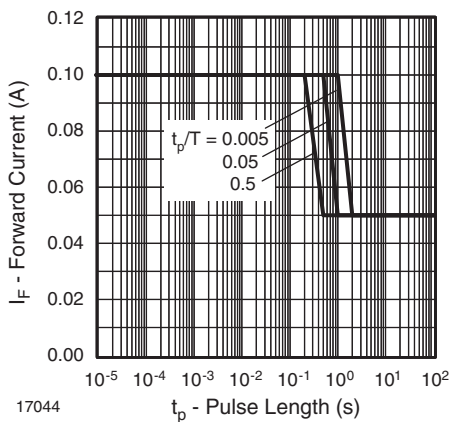


Figure 2. Forward Current vs. Pulse Length

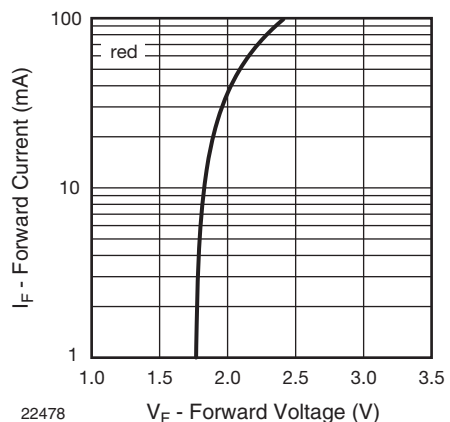


Figure 5. Forward Current vs. Forward Voltage

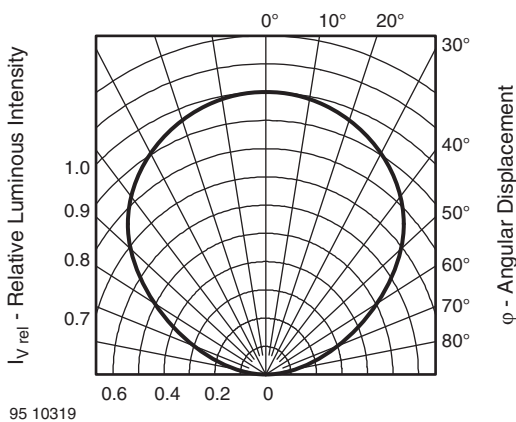


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

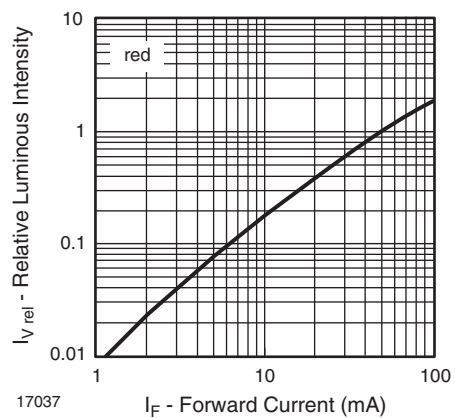


Figure 6. Change of Dominant Wavelength vs. Forward Current

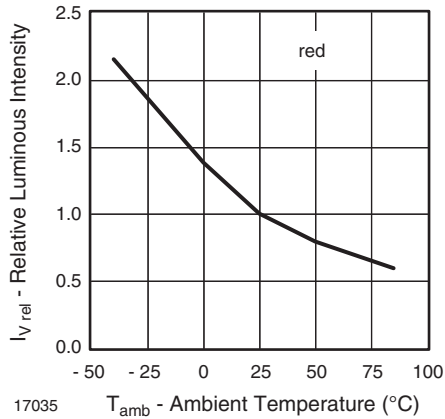


Figure 7. Relative Luminous Intensity vs. Amb. Temperature

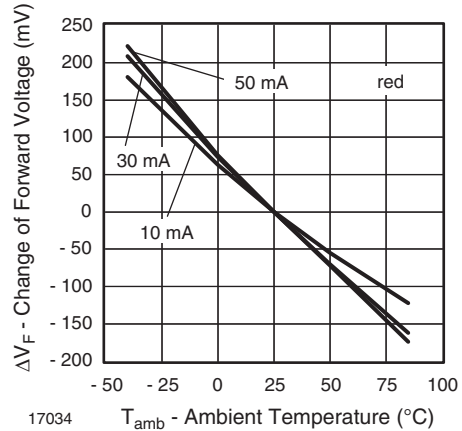


Figure 9. Change of Forward Voltage vs. Ambient Temperature

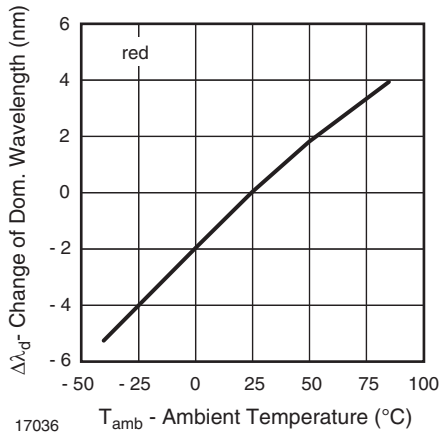
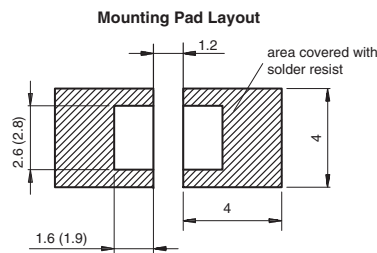
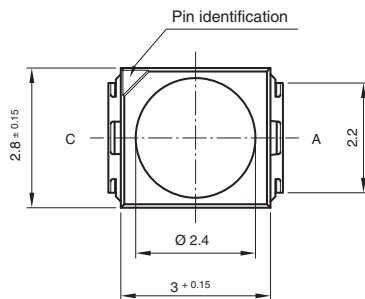
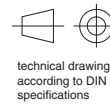
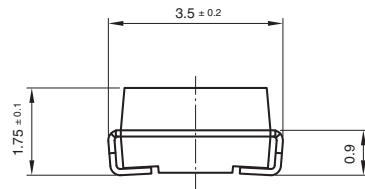


Figure 8. Change of Dominant Wavelength vs. Ambient Temperature

**PACKAGE DIMENSIONS** in millimeters

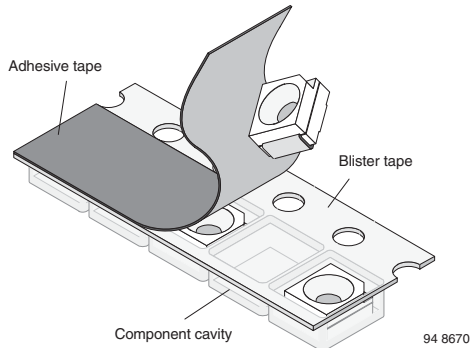


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Issue: 5; 04.11.08  
20541

## 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..

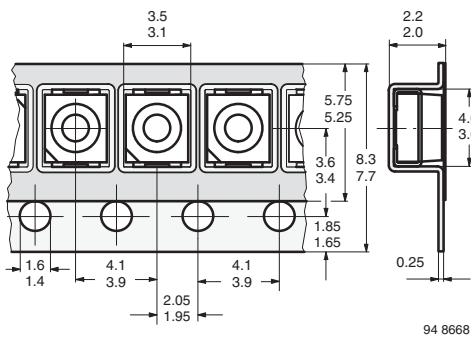


Figure 10. Tape Dimensions in mm for PLCC-2

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

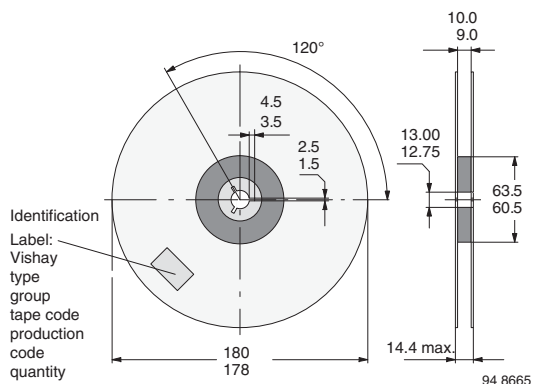


Figure 11. Reel Dimensions - GS08

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

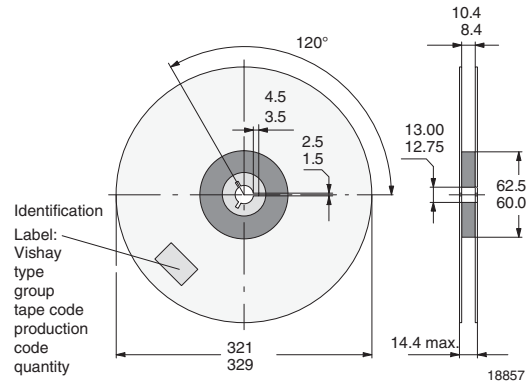


Figure 12. Reel Dimensions - GS18

## SOLDERING PROFILE

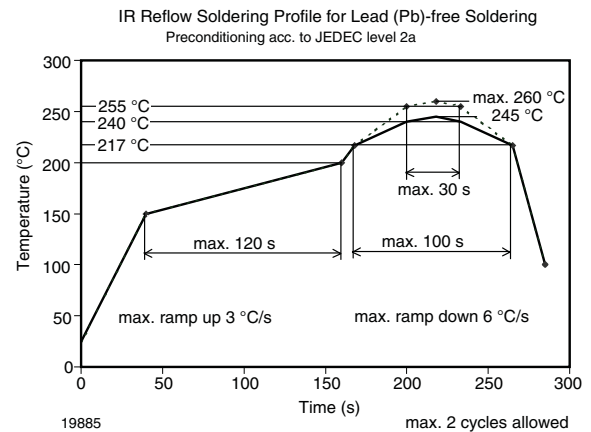


Figure 13. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

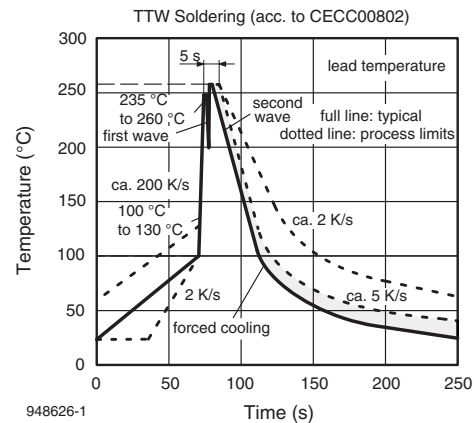
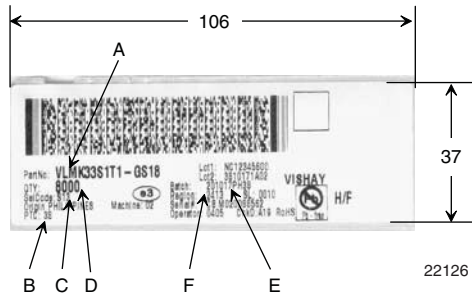


Figure 14. Double Wave Soldering of Opto Devices (all Packages)

## BAR CODE PRODUCT LABEL EXAMPLE:



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):  
e.g.: S1 = code for luminous intensity group  
3 = code for colour group
- D) Total quantity
- E) Batch = date code: year/week/manufacturing plant
- F) Region code



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