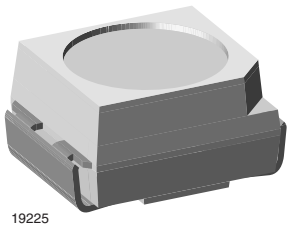
Low Current SMD LED


19225

FEATURES

- SMD LED with exceptional brightness
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with IR reflow, vapor phase and wave solder processes according to CECC 00802 and J-STD-020
- 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 $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- Preconditioning: according to JEDEC level 2a
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

DESCRIPTION

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

The package of the VLM.30.. is the PLCC-2 package.

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: ± 60°

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
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches and symbols
- General use

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMS3000-GS08	Super red, I_V > 2.8 mcd	AlInGaP
VLMS3000-GS18	Super red, I_V > 2.8 mcd	AlInGaP
VLMS30J1K2-GS08	Super red, I_V = (4.5 to 11.2) mcd	AlInGaP
VLMS30J1K2-GS18	Super red, I_V = (4.5 to 11.2) mcd	AlInGaP
VLMS30K1L2-GS08	Super red, I_V = (7.1 to 18) mcd	AlInGaP
VLMS30K1L2-GS18	Super red, I_V = (7.1 to 18) mcd	AlInGaP

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMS30J1L2-GS08	Super red, I_V = (4.5 to 18) mcd	AlInGaP
VLMS30J1L2-GS18	Super red, I_V = (4.5 to 18) mcd	AlInGaP
VLMS30J2K2-GS08	Super red, I_V = (5.6 to 11.2) mcd	AlInGaP
VLMS30J2K2-GS18	Super red, I_V = (5.6 to 11.2) mcd	AlInGaP
VLMS30K2L2-GS08	Super red, I_V = (9 to 18) mcd	AlInGaP
VLMO3000-GS08	Orange, I_V > 5.6 mcd	AlInGaP
VLMO3000-GS18	Orange, I_V > 5.6 mcd	AlInGaP
VLMO30K1L2-GS08	Orange, I_V = (7.1 to 18) mcd	AlInGaP
VLMO30K1L2-GS18	Orange, I_V = (7.1 to 18) mcd	AlInGaP
VLMO30L1M2-GS08	Orange, I_V = (11.2 to 28) mcd	AlInGaP
VLMO30L1M2-GS18	Orange, I_V = (11.2 to 28) mcd	AlInGaP
VLMO30K1M2-GS08	Orange, I_V = (7.1 to 28) mcd	AlInGaP
VLMO30K1M2-GS18	Orange, I_V = (7.1 to 28) mcd	AlInGaP
VLMY3000-GS08	Yellow, I_V > 4.5 mcd	AlInGaP
VLMY3000-GS18	Yellow, I_V > 4.5 mcd	AlInGaP
VLMY3001GS08	Yellow, I_V = (7.1 to 18) mcd	AlInGaP
VLMY3001-GS18	Yellow, I_V = (7.1 to 18) mcd	AlInGaP
VLMY30J2L1-GS08	Yellow, I_V = (5.6 to 14) mcd	AlInGaP
VLMY30J2L1-GS18	Yellow, I_V = (5.6 to 14) mcd	AlInGaP
VLMY30K2M1-GS08	Yellow, I_V = (9 to 22.4) mcd	AlInGaP
VLMY30K2M1-GS18	Yellow, I_V = (9 to 22.4) mcd	AlInGaP
VLMY30J2M1-GS08	Yellow, I_V = (5.6 to 22.4) mcd	AlInGaP
VLMY30J2M1-GS18	Yellow, I_V = (5.6 to 22.4) mcd	AlInGaP

ABSOLUTE MAXIMUM RATINGS [1] VLM30..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage [2]		V_R	6	V
DC forward current		I_F	15	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.1	A
Power dissipation		P_V	40	mW
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Thermal resistance junction/ ambient	Mounted on PC board (pad size > 16 mm^2)	R_{thJA}	400	K/W

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] Driving the LED in reverse direction is suitable for short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] VLMS30.., RED							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 2 mA	VLMS3000	I_V	2.8			mcd
	I_F = 10 mA	VLMS3000	I_V		20		mcd
	I_F = 2 mA	VLMS30J1K2	I_V	4.5		11.2	mcd
	I_F = 2 mA	VLMS30K1L2	I_V	7.1		18	mcd
	I_F = 2 mA	VLMS30J1L2	I_V	4.5		18	mcd
	I_F = 2 mA	VLMS30J2K2	I_V	5.6		11.2	mcd
	I_F = 2 mA	VLMS30K2L2	I_V	9		18	mcd
Dominant wavelength	I_F = 2 mA		λ_d	624		636	nm
Peak wavelength	I_F = 2 mA		λ_p		635		nm
Angle of half intensity	I_F = 2 mA		φ		± 60		deg
Forward voltage	I_F = 2 mA		V_F		1.8	2.2	V
Reverse voltage	I_R = 10 µA		V_R	6	15		V

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] VLMO30.., ORANGE							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 2 mA	VLMO3000	I_V	5.6			mcd
	I_F = 10 mA	VLMO3000	I_V		50		mcd
	I_F = 2 mA	VLMO30K1L2	I_V	7.1		18	mcd
	I_F = 2 mA	VLMO30L1M2	I_V	11.2		28	mcd
	I_F = 2 mA	VLMO30K1M2	I_V	7.1		28	mcd
Dominant wavelength	I_F = 2 mA		λ_d	600		609	nm
Peak wavelength	I_F = 2 mA		λ_p		610		nm
Angle of half intensity	I_F = 2 mA		φ		± 60		deg
Forward voltage	I_F = 2 mA		V_F		1.8	2.2	V
Reverse voltage	I_R = 10 µA		V_R	6	15		V

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] VLMY30.., YELLOW							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 2 mA	VLMY3000	I_V	4.5			mcd
	I_F = 10 mA	VLMY3000	I_V		50		mcd
	I_F = 10 mA	VLMY3001	I_V	7.1		18	mcd
	I_F = 2 mA	VLMY30J2L1	I_V	5.6		14	mcd
	I_F = 2 mA	VLMY30K2M1	I_V	9		22.4	mcd
	I_F = 2 mA	VLMY30J2M1	I_V	5.6		22.4	mcd
Dominant wavelength	I_F = 2 mA		λ_d	581		594	nm
Peak wavelength	I_F = 2 mA		λ_p		585		nm
Angle of half intensity	I_F = 2 mA		φ		± 60		deg
Forward voltage	I_F = 2 mA		V_F		1.8	2.2	V
Reverse voltage	I_R = 10 µA		V_R	6	15		V

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LIGHT INTENSITY (mcd)		
STANDARD	OPTIONAL	MIN.	MAX.
H	1	2.8	3.55
	2	3.55	4.5
J	1	4.5	5.6
	2	5.6	7.1
K	1	7.1	9.0
	2	9.0	11.2
L	1	11.2	14.0
	2	14.0	18.0
M	1	18.0	22.4
	2	22.4	28.0

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 grous which include only a few brightness groups. Only one group will be shipped in one 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 in any one reel. In order to ensure availability, single wavelength groups will not be orderable.

COLOR CLASSIFICATION

GROUP	YELLOW		ORANGE	
	DOM. WAVELENGTH (nm)			
	MIN.	MAX.	MIN.	MAX.
1	581	584		
2	583	586	600	603
3	585	588	602	605
4	587	590	604	607
5	589	592	606	609
6	591	594		

Note:

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm.

CROSSING TABLE

VISHAY	OSRAM
VLMO30K1L2	LOT67K-K1L2
VLMO30K1M2	LOT67K-K1M2
VLMO30L1M2	LOT67K-L1M2
VLMS30J1K2	LST67K-J1K2
VLMS30J1L2	LST67K-J1L2
VLMS30K1L2	LST67K-K1L2
VLMY30J2L1	LYT67K-J2L1
VLMY30J2M1	LYT67K-J2M1
VLMY30K2M1	LYT67K-K2M1

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

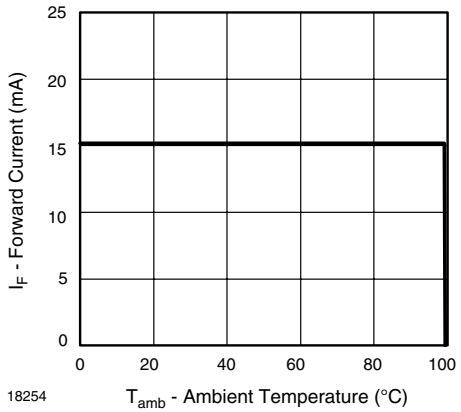


Figure 1. Forward Current vs. Ambient Temperature

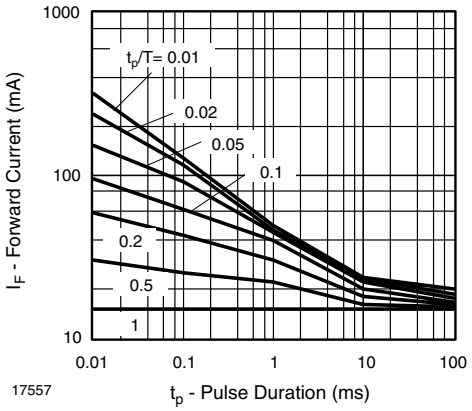


Figure 2. Forward Current vs. Pulse Length

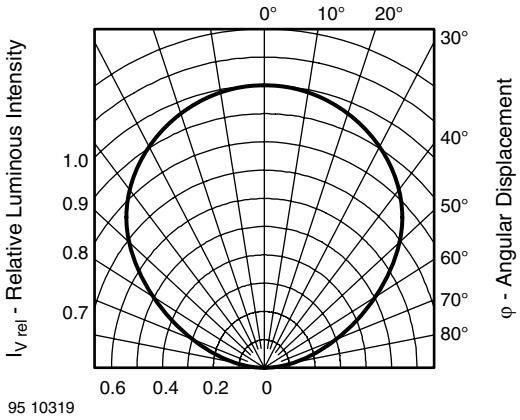


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

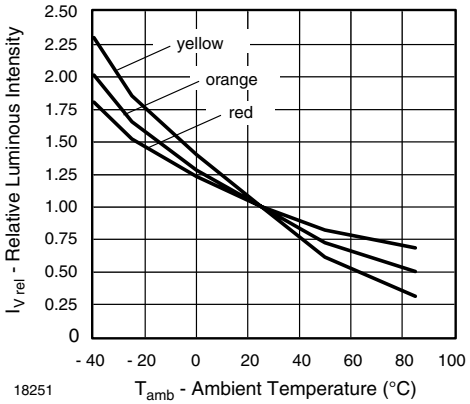


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

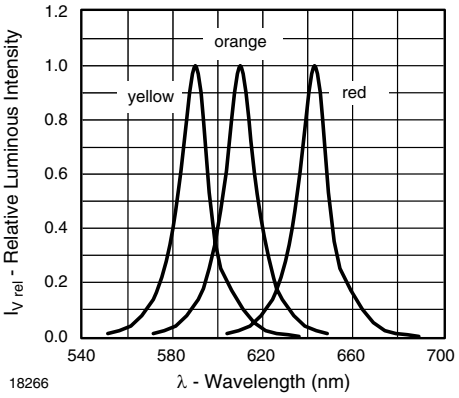


Figure 4. Relative Intensity vs. Wavelength

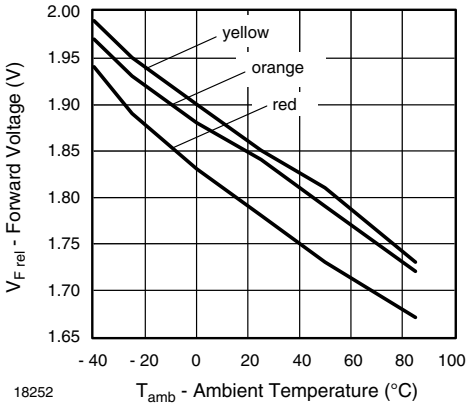


Figure 7. Forward Voltage vs. Ambient Temperature

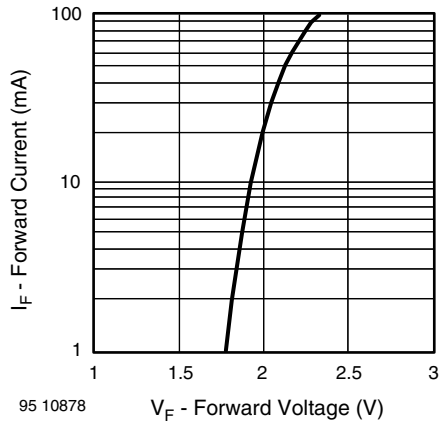
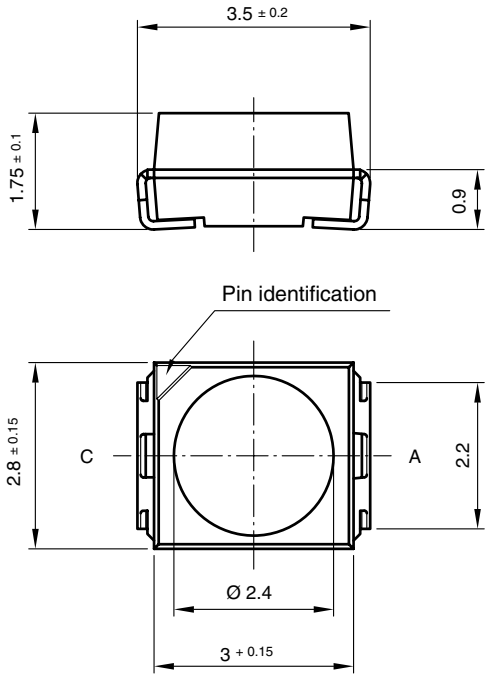
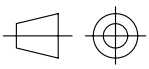


Figure 5. Forward Current vs. Forward Voltage

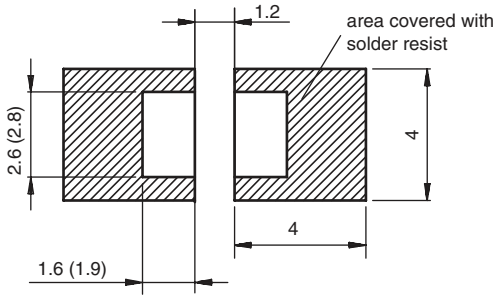
PACKAGE DIMENSIONS in millimeters





technical drawings
according to DIN
specifications

Mounting Pad Layout

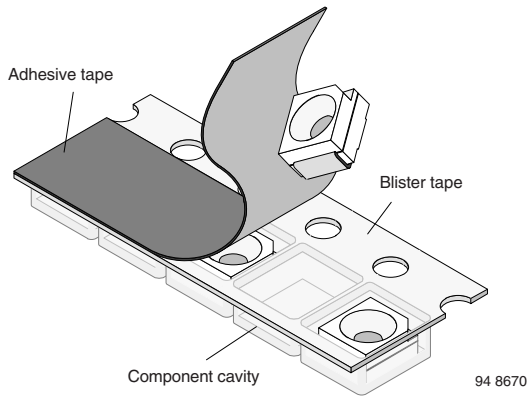


Drawing-No.: 6.541-5067.01-4
Issue: 5; 04.11.08
20541

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.



TAPING OF VLM.3...

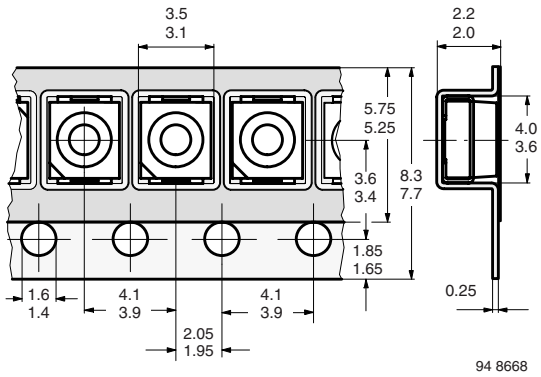


Figure 8. Tape Dimensions in mm for PLCC-2

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

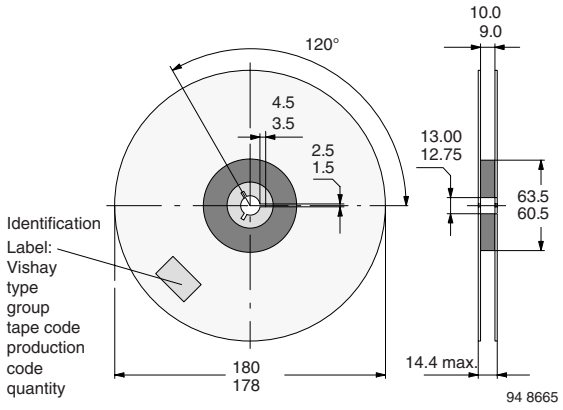


Figure 9. Reel Dimensions - GS08

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

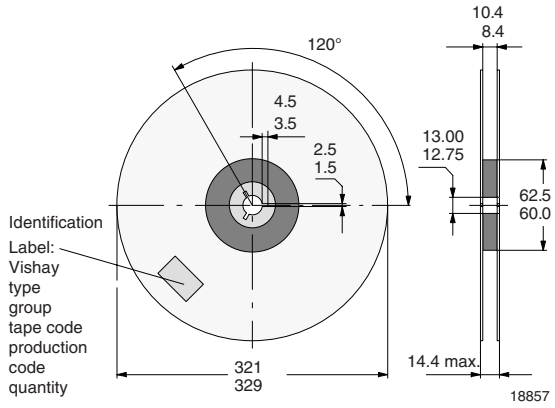


Figure 10. Reel Dimensions - GS18

SOLDERING PROFILE

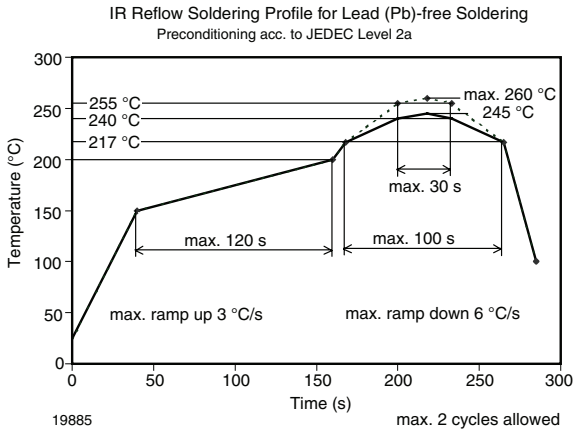


Figure 11. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

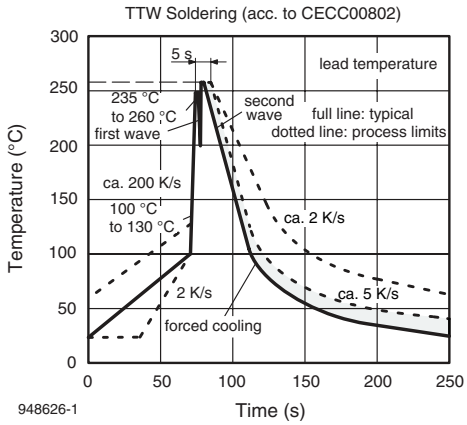
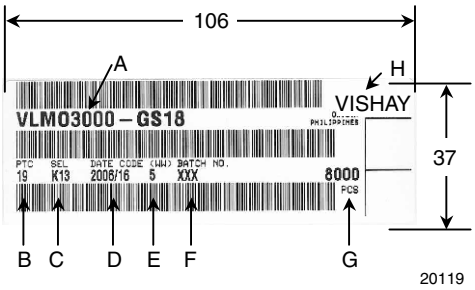


Figure 12. Double Wave Soldering of Opto Devices (all Packages)

BAR CODE PRODUCT LABEL EXAMPLE:



A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
e.g.: K1 = code for luminous intensity group
3 = code for color group
D) Date code year/week
E) Day code (e.g. 5: Friday)
F) Batch no.
G) Total quantity
H) Company code

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