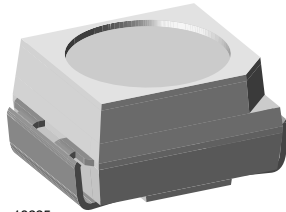


## Low Current SMD LED PLCC-2



19225

### 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:  $\pm 60^\circ$

### 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
- 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
- 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.		
VLMS3000-GS08	Super red	2.8	10	-	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS3000-GS18	Super red	2.8	10	-	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J1K2-GS08	Super red	4.5	8.5	11.2	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J1K2-GS18	Super red	4.5	8.5	11.2	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30K1L2-GS08	Super red	7.1	10.5	18	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30K1L2-GS18	Super red	7.1	10.5	18	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J1L2-GS08	Super red	4.5	10	18	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J1L2-GS18	Super red	4.5	10	18	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J2K2-GS08	Super red	5.6	8.5	11.2	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30J2K2-GS18	Super red	5.6	8.5	11.2	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMS30K2L2-GS08	Super red	9	12	18	2	624	630	636	2	-	1.8	2.2	2	AllnGaP
VLMO3000-GS08	Orange	5.6	16	-	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO3000-GS18	Orange	5.6	16	-	2	600	605	609	2	-	1.8	2.2	2	AllnGaP



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.		
VLMO30K1L2-GS08	Orange	7.1	15	18	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO30K1L2-GS18	Orange	7.1	15	18	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO30L1M2-GS08	Orange	11.2	16.5	28	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO30L1M2-GS18	Orange	11.2	16.5	28	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO30K1M2-GS08	Orange	7.1	16	28	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMO30K1M2-GS18	Orange	7.1	16	28	2	600	605	609	2	-	1.8	2.2	2	AllnGaP
VLMY3000-GS08	Yellow	4.5	11.6	-	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY3000-GS18	Yellow	4.5	11.6	-	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY3001-GS08	Yellow	7.1	11.8	18	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY3001-GS18	Yellow	7.1	11.8	18	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30J2L1-GS08	Yellow	5.6	10.6	14	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30J2L1-GS18	Yellow	5.6	10.6	14	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30K2M1-GS08	Yellow	9	12.3	22.4	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30K2M1-GS18	Yellow	9	12.3	22.4	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30J2M1-GS08	Yellow	5.6	11.6	22.4	2	581	587	594	2	-	1.8	2.2	2	AllnGaP
VLMY30J2M1-GS18	Yellow	5.6	11.6	22.4	2	581	587	594	2	-	1.8	2.2	2	AllnGaP

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
VLM30..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>		V <sub>R</sub>	6	V
DC forward current		I <sub>F</sub>	15	mA
Surge forward current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	0.1	A
Power dissipation		P <sub>V</sub>	40	mW
Junction temperature		T <sub>j</sub>	125	°C
Operating temperature range		T <sub>amb</sub>	-40 to +100	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Thermal resistance junction / ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	R <sub>thJA</sub>	400	K/W

**Note**

<sup>(1)</sup> 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)							
VLMO30.., RED							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 2 mA	VLMS3000	I <sub>v</sub>	2.8	10	-	mcd
	I <sub>F</sub> = 2 mA	VLMS30J1K2	I <sub>v</sub>	4.5	8.5	11.2	mcd
	I <sub>F</sub> = 2 mA	VLMS30K1L2	I <sub>v</sub>	7.1	10.5	18	mcd
	I <sub>F</sub> = 2 mA	VLMS30J1L2	I <sub>v</sub>	4.5	10	18	mcd
	I <sub>F</sub> = 2 mA	VLMS30J2K2	I <sub>v</sub>	5.6	8.5	11.2	mcd
	I <sub>F</sub> = 2 mA	VLMS30K2L2	I <sub>v</sub>	9	12	18	mcd
Dominant wavelength	I <sub>F</sub> = 2 mA		λ <sub>d</sub>	624	630	636	nm
Peak wavelength	I <sub>F</sub> = 2 mA		λ <sub>p</sub>	-	635	-	nm
Angle of half intensity	I <sub>F</sub> = 2 mA		φ	-	± 60	-	deg
Forward voltage	I <sub>F</sub> = 2 mA		V <sub>F</sub>	-	1.8	2.2	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	6	15	-	V

**Note**

<sup>(1)</sup> In one packing unit I<sub>vmax</sub>/I<sub>vmin</sub> ≤ 1.6



OPTICAL AND ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)							
VLMY30.., ORANGE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 2 mA	VLMO3000	I <sub>V</sub>	5.6	16	-	mcd
	I <sub>F</sub> = 2 mA	VLMO30K1L2	I <sub>V</sub>	7.1	15	18	mcd
	I <sub>F</sub> = 2 mA	VLMO30L1M2	I <sub>V</sub>	11.2	16.5	28	mcd
	I <sub>F</sub> = 2 mA	VLMO30K1M2	I <sub>V</sub>	7.1	16	28	mcd
Dominant wavelength	I <sub>F</sub> = 2 mA		λ <sub>d</sub>	600	605	609	nm
Peak wavelength	I <sub>F</sub> = 2 mA		λ <sub>p</sub>	-	610	-	nm
Angle of half intensity	I <sub>F</sub> = 2 mA		φ	-	± 60	-	deg
Forward voltage	I <sub>F</sub> = 2 mA		V <sub>F</sub>	-	1.8	2.2	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	6	15	-	V

**Note**

(1) In one packing unit I<sub>Vmax</sub>/I<sub>Vmin</sub>. ≤ 1.6

OPTICAL AND ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)							
VLMY30.., YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 2 mA	VLMY3000	I <sub>V</sub>	4.5	11.6	-	mcd
	I <sub>F</sub> = 2 mA	VLMY3001	I <sub>V</sub>	7.1	11.8	18	mcd
	I <sub>F</sub> = 2 mA	VLMY30J2L1	I <sub>V</sub>	5.6	10.6	14	mcd
	I <sub>F</sub> = 2 mA	VLMY30K2M1	I <sub>V</sub>	9	12.3	22.4	mcd
	I <sub>F</sub> = 2 mA	VLMY30J2M1	I <sub>V</sub>	5.6	11.6	22.4	mcd
Dominant wavelength	I <sub>F</sub> = 2 mA		λ <sub>d</sub>	581	587	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	-	deg
Forward voltage	I <sub>F</sub> = 2 mA		V <sub>F</sub>	-	1.8	2.2	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	6	15	-	V

**Note**

(1) In one packing unit I<sub>Vmax</sub>/I<sub>Vmin</sub>. ≤ 1.6

LUMINOUS INTENSITY CLASSIFICATION			
GROUP STANDARD	LIGHT INTENSITY (mcd)		
	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 groups 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.

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

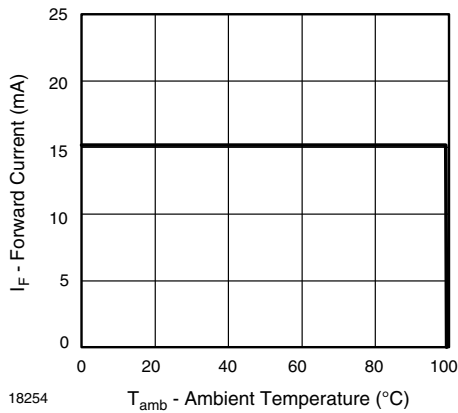
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

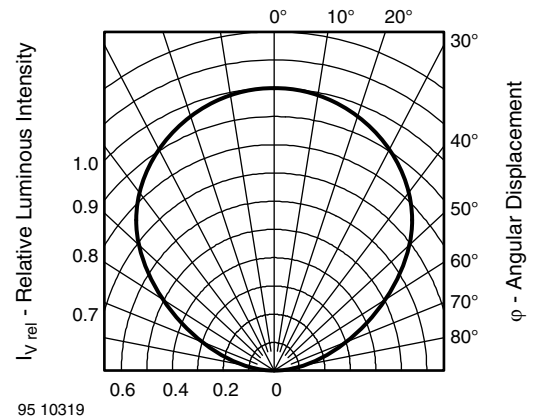


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

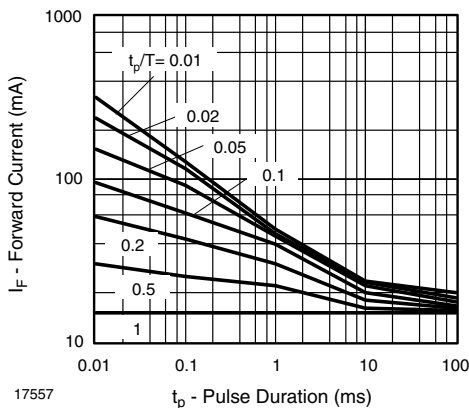


Fig. 2 - Forward Current vs. Pulse Length

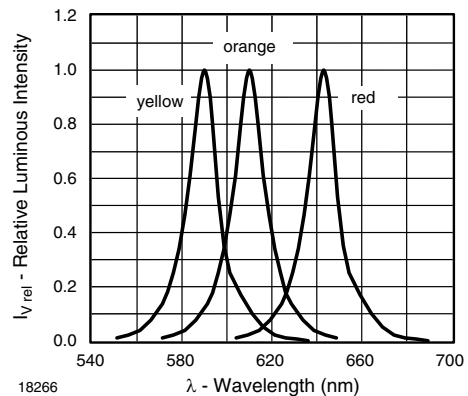


Fig. 4 - Relative Intensity vs. Wavelength

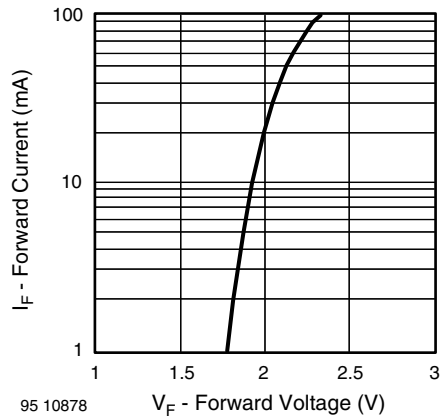


Fig. 5 - Forward Current vs. Forward Voltage

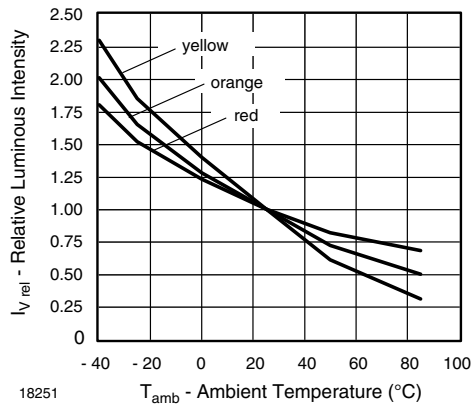


Fig. 6 - Relative Luminous Intensity vs. Ambient Temperature

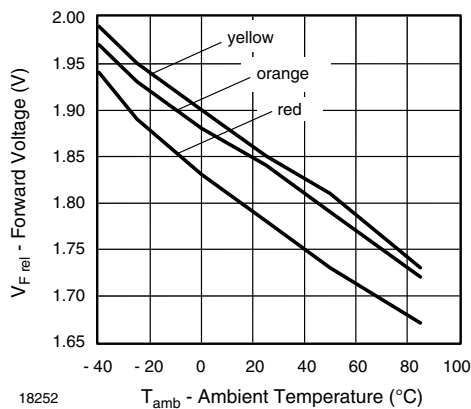
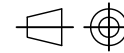
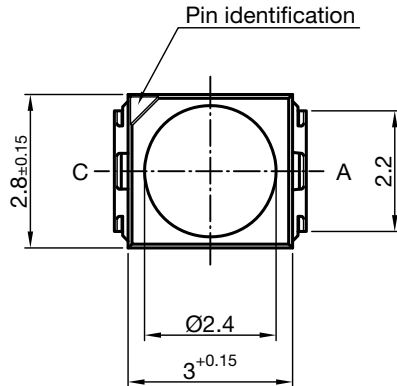
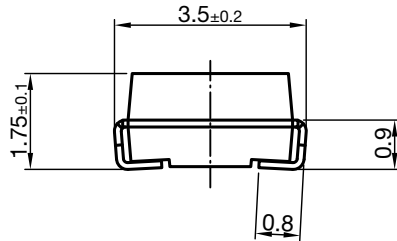


Fig. 7 - Forward Voltage vs. Ambient Temperature



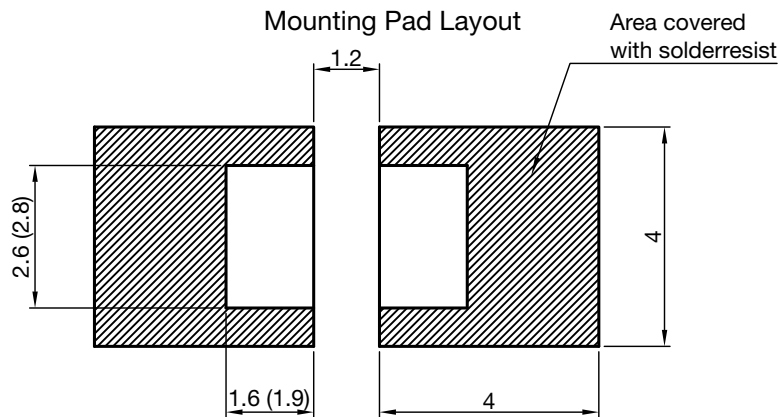
**PACKAGE DIMENSIONS** in millimeters



Technical drawings according to DIN specifications

Dimensions in mm

Drawing-No.: 6.541-5067.01-4  
Issue: 6; 23.09.13

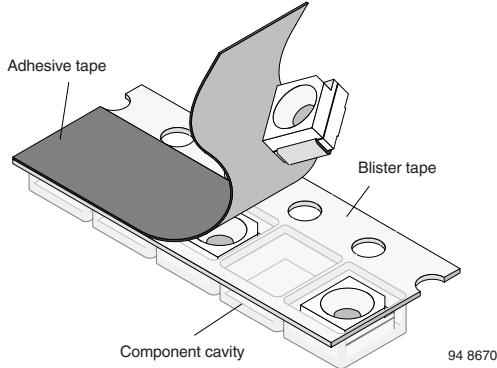


Dimensions: Reflow and vapor phase (wave soldering)

**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.



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

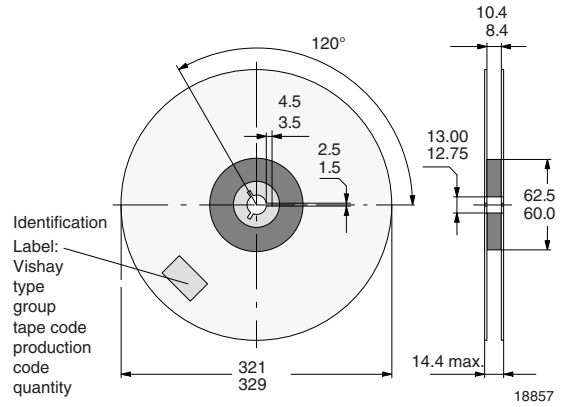


Fig. 10 - Reel Dimensions - GS18

**TAPING OF VLM.3...**

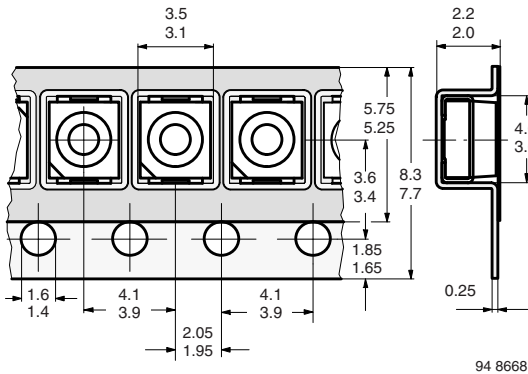


Fig. 8 - Tape Dimensions in mm for PLCC-2

**SOLDERING PROFILE**

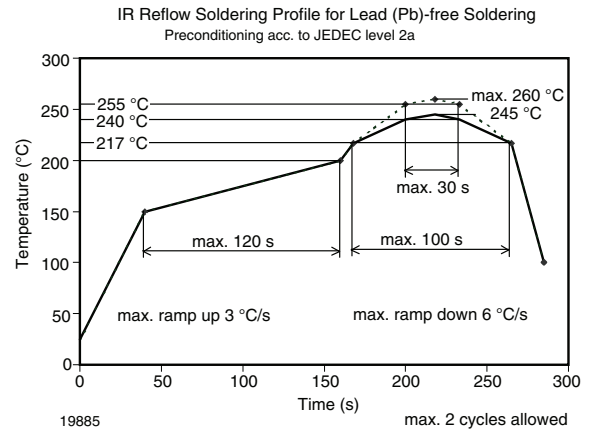


Fig. 11 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

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

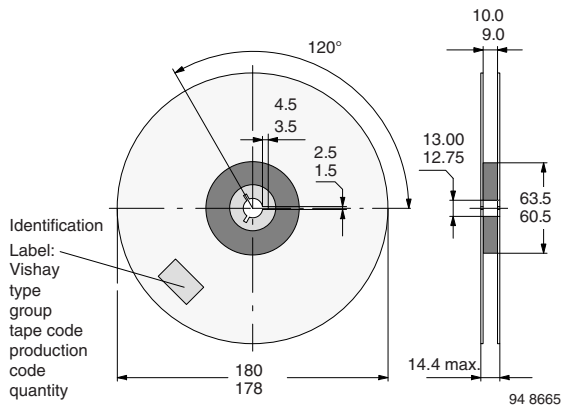


Fig. 9 - Reel Dimensions - GS08

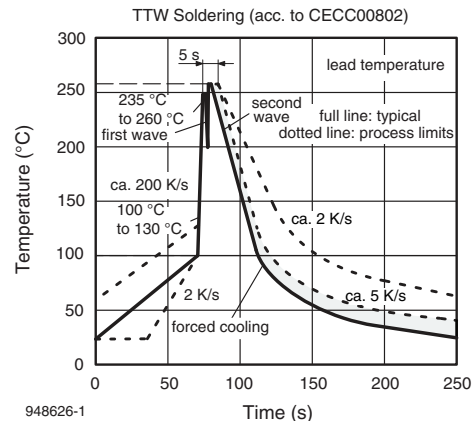
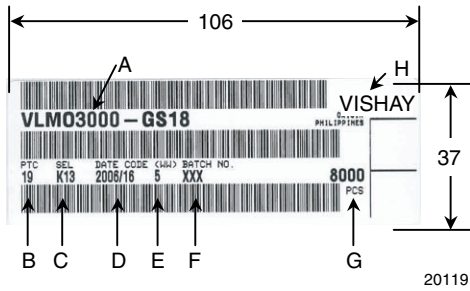


Fig. 12 - Double Wave Soldering of Opto Devices (all Packages)



**BAR CODE PRODUCT LABEL** (example)



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):  
e.g.: 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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