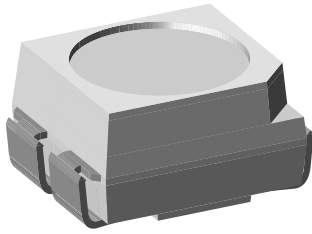


## Bicolor SMD LED PLCC-4



19211

### DESCRIPTION

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

The package of the VLMSY3420 is the PLCC-4.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

This SMD device consists of a red and yellow chip. So it is possible to choose the color in one device.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-4
- Product series: bicolor
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- SMD LED with exceptional brightness
- Multicolored
- Luminous intensity categorized
- EIA and ICE standard package
- Compatible with automatic placement equipment
- Compatible with IR reflow, vapor phase and wave soldering 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
- Low power consumption
- Luminous intensity ratio in one packaging unit  $I_{Vmax}/I_{Vmin} \leq 1.6$
- Preconditioning according to JEDEC level 2a
- ESD-withstand voltage: Up to 2 kV according to JESD22-A114-B
- 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 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.		
VLMSY3420-GS08	Red	224	-	900	50	-	630	-	50	-	2.1	2.6	50	AllnGaP on GaAs
VLMSY3420-GS08	Yellow	280	-	1120	50	581	588	594	50	-	2.1	2.6	50	AllnGaP on GaAs
VLMSY3420-GS18	Red	224	-	900	50	-	630	-	50	-	2.1	2.6	50	AllnGaP on GaAs
VLMSY3420-GS18	Yellow	280	-	1120	50	581	588	594	50	-	2.1	2.6	50	AllnGaP on GaAs

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Reverse voltage per diode <sup>(1)</sup>	I <sub>R</sub> = 10 μA	V <sub>R</sub>	5	V	
DC forward current per diode	T <sub>amb</sub> ≤ 65 °C	I <sub>F</sub>	50	mA	
Surge forward current per diode		I <sub>FSM</sub>	0.1	A	
Power dissipation per diode		P <sub>V</sub>	130	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> )	1 chip on	R <sub>thJA</sub>	480	K/W
		2 chips on	R <sub>thJA</sub>	650	K/W

#### Note

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



<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLMSY3420, SUPER RED</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 50\text{ mA}$	VLMSY3420	$I_V$	224	-	900	mcd
Dominant wavelength	$I_F = 50\text{ mA}$		$\lambda_d$	-	630	-	nm
Peak wavelength	$I_F = 50\text{ mA}$		$\lambda_p$	-	643	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$		$\phi$	-	$\pm 60$	-	deg
Forward voltage	$I_F = 50\text{ mA}$		$V_F$	-	2.1	2.6	V
Reverse current	$V_R = 5\text{ V}$		$I_R$	-	-	10	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_j$	-	15	-	pF

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLMSY3420, YELLOW</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 50\text{ mA}$	VLMSY3420	$I_V$	280	-	1120	mcd
Dominant wavelength	$I_F = 50\text{ mA}$		$\lambda_d$	581	588	594	nm
Peak wavelength	$I_F = 50\text{ mA}$		$\lambda_p$	-	590	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$		$\phi$	-	$\pm 60$	-	deg
Forward voltage	$I_F = 50\text{ mA}$		$V_F$	-	2.1	2.6	V
Reverse current	$V_R = 5\text{ V}$		$I_R$	-	-	10	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_j$	-	15	-	pF

<b>LUMINOUS INTENSITY CLASSIFICATION AND GROUP COMBINATIONS VLMSY3420</b>							
		RED					
		S2	T1	T2	U1	U2	V1
		224 mcd to 280 mcd	280 mcd to 355 mcd	355 mcd to 450 mcd	450 mcd to 560 mcd	560 mcd to 710 mcd	710 mcd to 900 mcd
YELLOW	T1 280 mcd to 355 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420
	T2 355 mcd to 450 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420
	U1 450 mcd to 560 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420
	U2 560 mcd to 710 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420
	V1 710 mcd to 900 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420
	V2 900 mcd to 1120 mcd	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420	VLMSY3420

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$

<b>COLOR CLASSIFICATION</b>			
GROUP	DOMINANT WAVELENGTH (nm)		
	YELLOW		
	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)

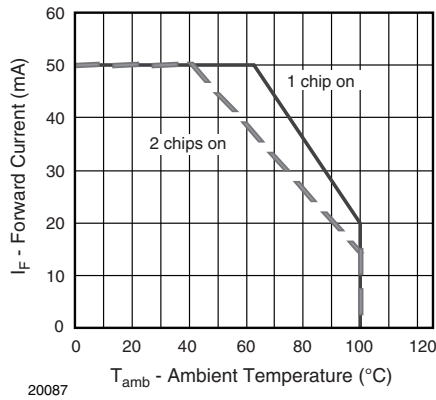


Fig. 1 - Forward Current vs. Ambient Temperature

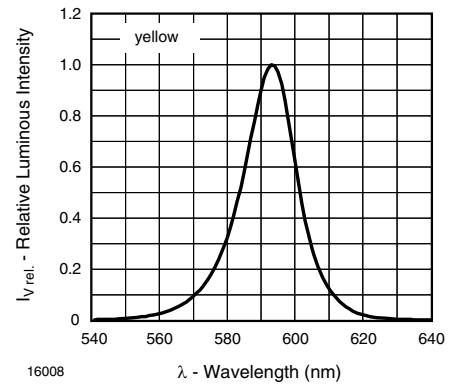


Fig. 4 - Relative Intensity vs. Wavelength

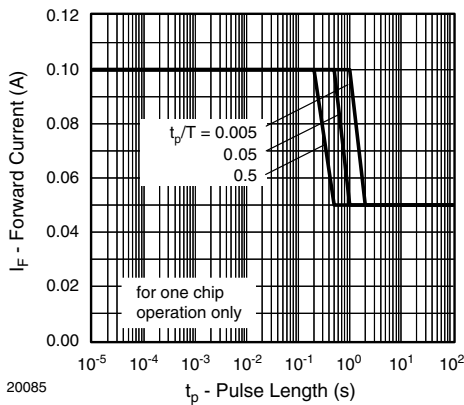


Fig. 2 - Forward Current vs. Pulse Duration

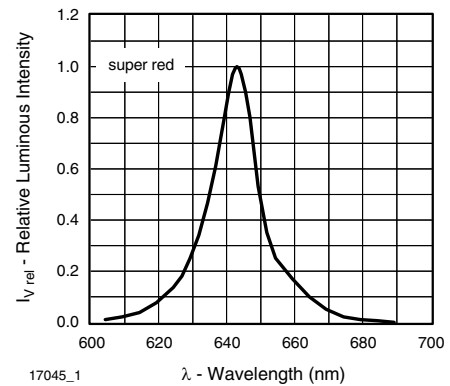


Fig. 5 - Relative Intensity vs. Wavelength

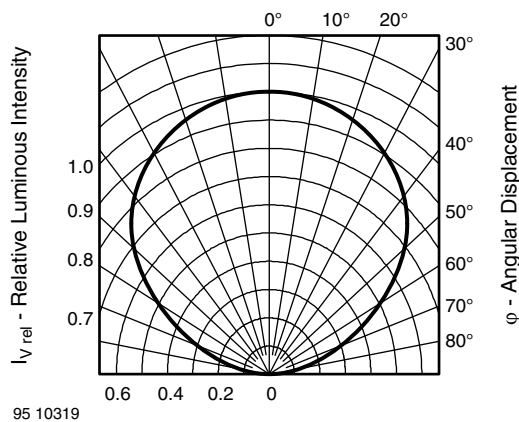


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

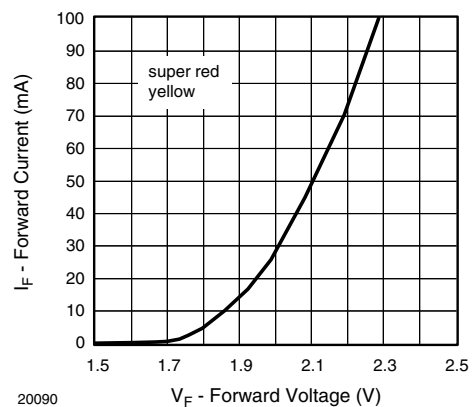


Fig. 6 - Relative Forward Voltage vs. Ambient Temperature

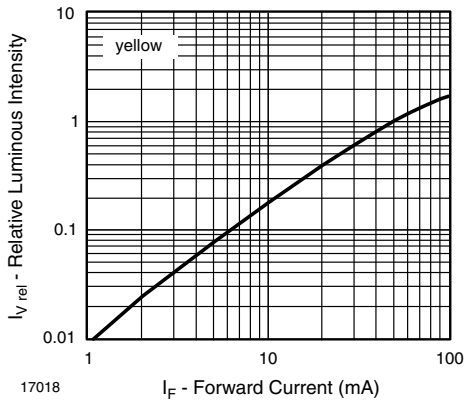


Fig. 7 - Relative Luminous Intensity vs. Forward Current

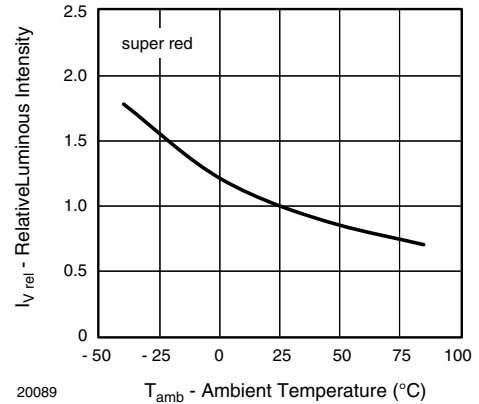


Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

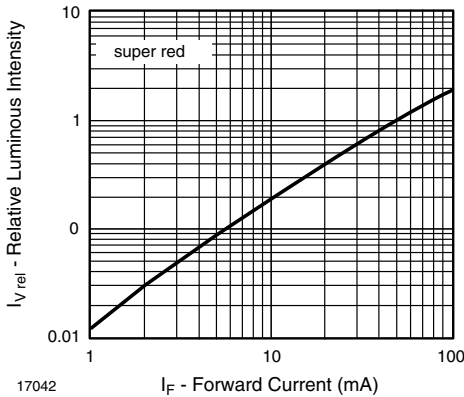


Fig. 8 - Relative Luminous Intensity vs. Forward Current

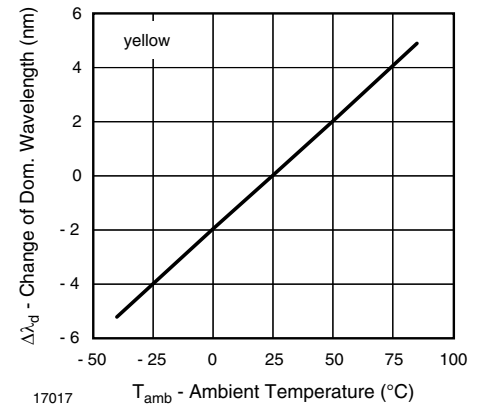


Fig. 11 - Change of Dominant Wavelength vs. Ambient Temperature

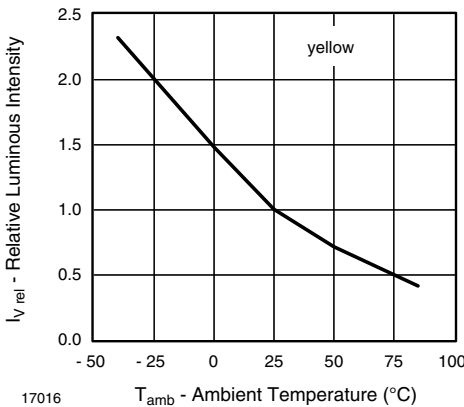


Fig. 9 - Relative Luminous Intensity vs. Ambient Temperature

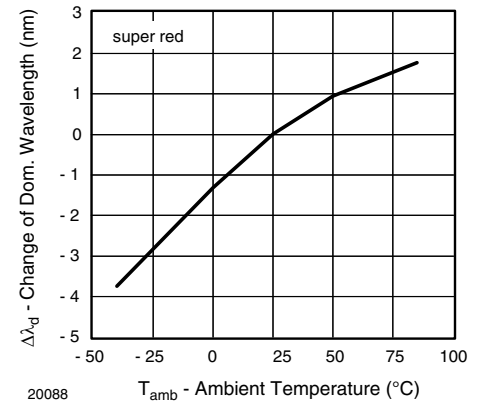


Fig. 12 - Change of Dominant Wavelength vs. Ambient Temperature

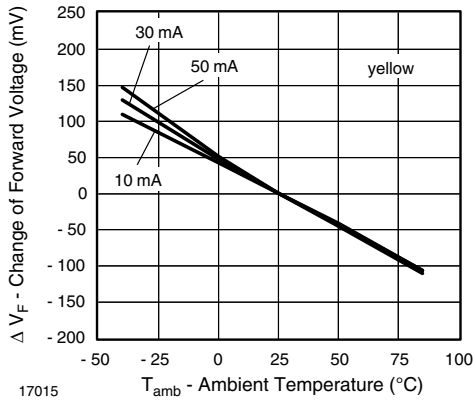


Fig. 13 - Change of Forward Voltage vs. Ambient Temperature

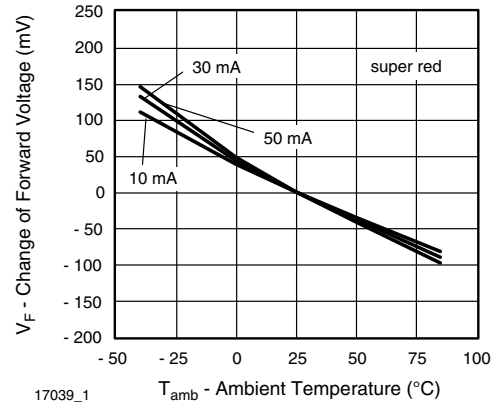
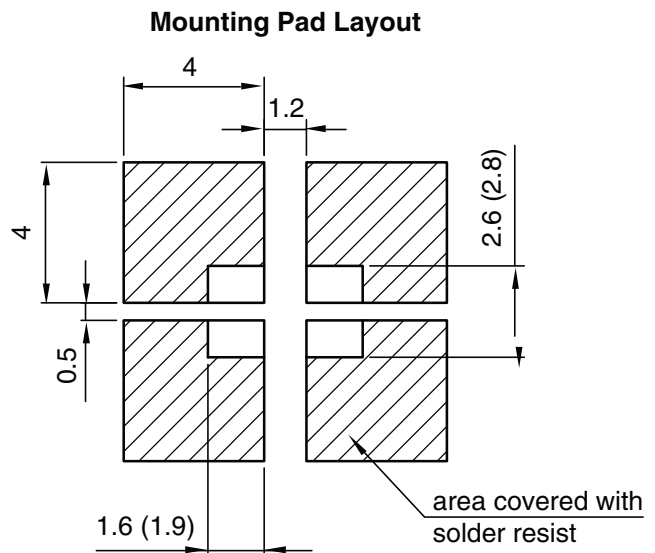
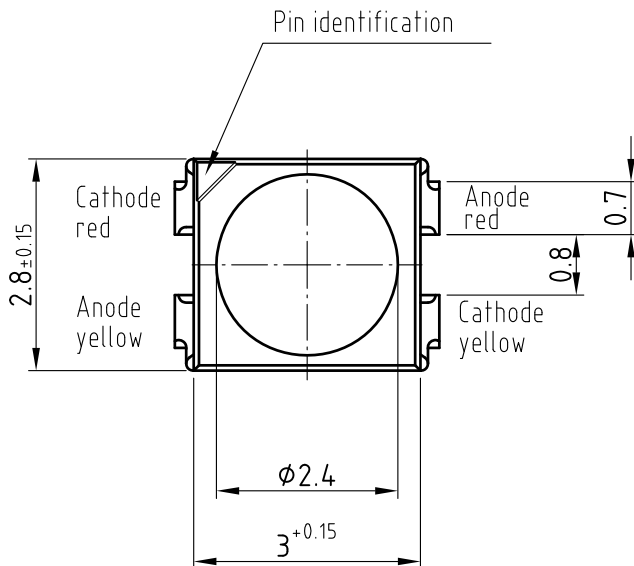
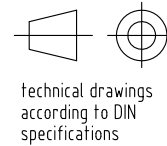
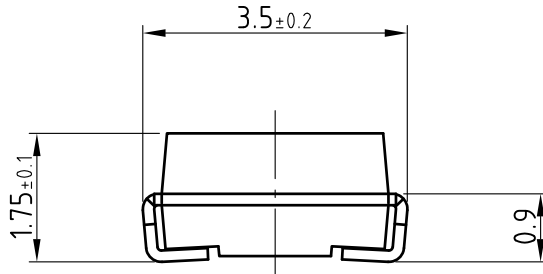


Fig. 14 - Change of Forward Voltage vs. Ambient Temperature

**PACKAGE DIMENSIONS** in millimeters



Dimensions: IR and Vaporphase  
(Wave Soldering)

Drawing-No.: 6.541-5057.01-4

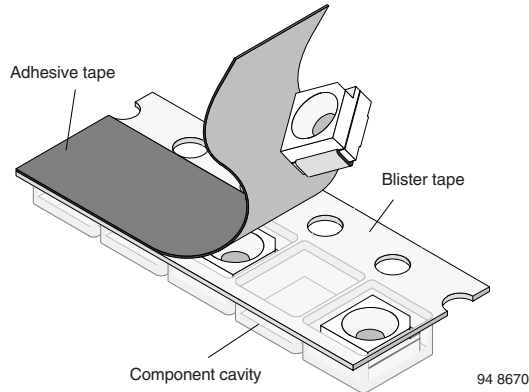
Issue: 5; 30.05.07

19899

**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 GS08 (= 1500 PCS.)**

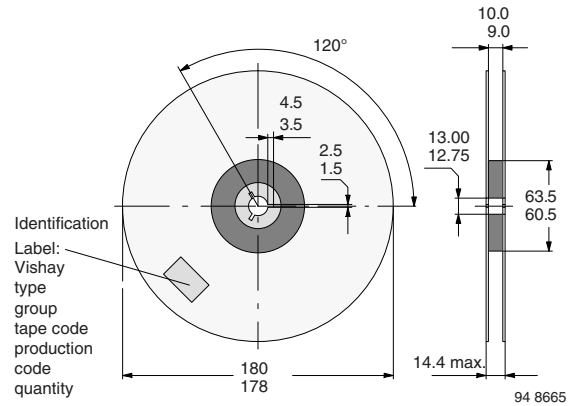


Fig. 16 - Reel Dimensions - GS08

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

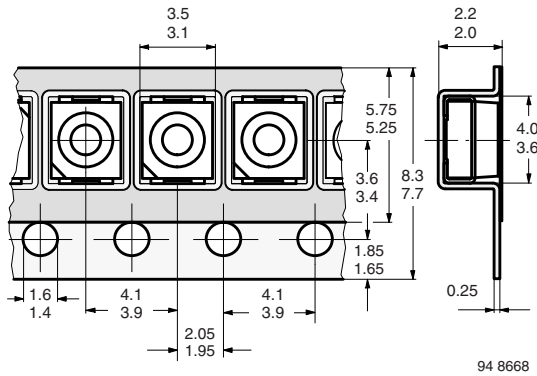


Fig. 15 - Tape Dimensions in mm for PLCC-2

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

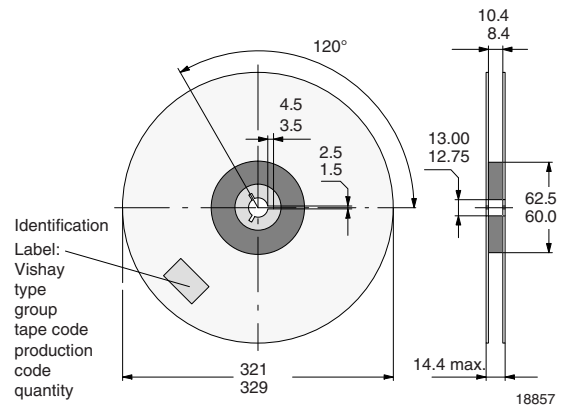


Fig. 17 - Reel Dimensions - GS18

**SOLDERING PROFILE**

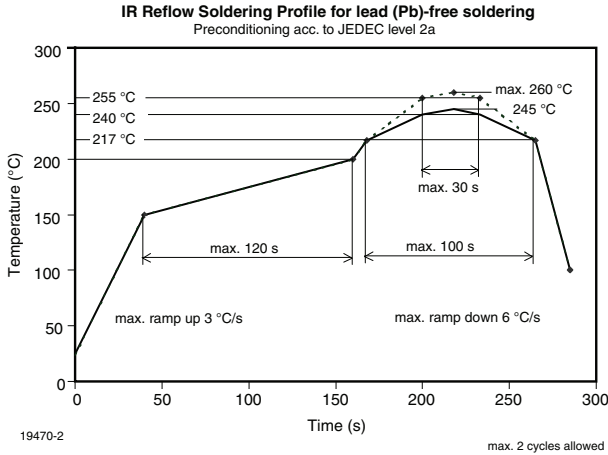


Fig. 18 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

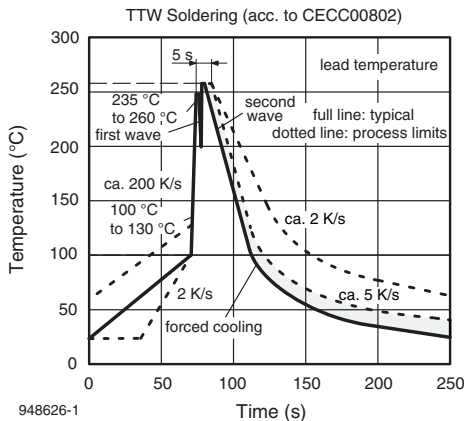
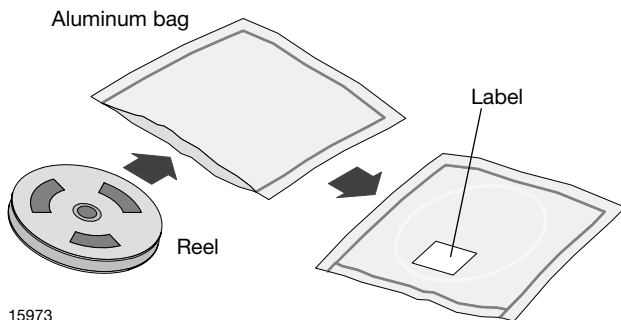


Fig. 19 - Double Wave Soldering of Opto Devices (all Packages)

**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 aluminium bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

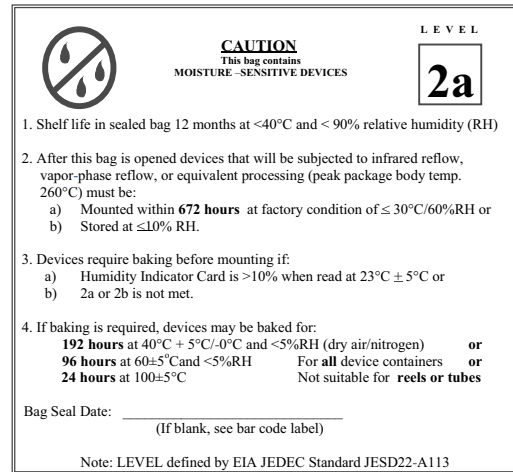
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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. Electro-static 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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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**