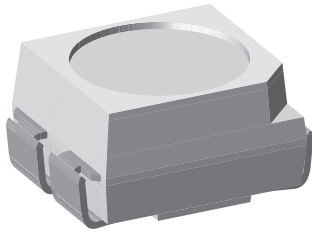


## Power SMD LED PLCC-4



19210\_1

### DESCRIPTION

The VLMW321.. white LED is an advanced product in terms of heat dissipation.

The leadframe profile of this PLCC-4 SMD package is optimized to reduce the thermal resistance.

This allows higher drive current and doubles the light output compared to Vishay's high intensity SMD LED in PLCC-2 standard package.

### PRODUCT GROUP AND PACKAGE DATA

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

### FEATURES

- 3 anode pins, 1 cathode pin
- High efficient InGaN technology
- Long life time, due to silicone casting
- Angle of half intensity  $\varphi = \pm 60^\circ$
- Available in 8 mm tape
- Luminous intensity and color categorized per packing unit
- Luminous intensity ratio per packing unit  $I_{Vmax}/I_{Vmin.} \leq 1.6$
- ESD-withstand voltage: Up to 2 kV (HBM) according to JESD22-A114-B
- Preconditioning: according to JEDEC level 2a
- Compatible with IR-reflow, vapor phase and wave soldering processes according to CECC 00802 and J-STD-020
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- Camera flash light
- Signals, signs, and symbol luminaire
- Marker lights
- Interior and exterior automotive lighting (brake lights, turn lights, backlighting, side markers)
- Indicator lighting
- General and architectural lighting
- Backlighting (advertising, displays, LCDs, switches, ...)

PARTS TABLE														
PART	COLOR	LUMINOUS INTENSITY (mcd)			at I <sub>F</sub> (mA)	COORDINATE (x, y)			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.		
VLMW321ABBB5K8L-08	White	1400	2200	2850	30	-	0.33, 0.33	-	30	2.9	3.4	4	30	InGaN on SiC
VLMW321BACA5K8L-08	White	1800	2800	3550	30	-	0.33, 0.33	-	30	2.9	3.4	4	30	InGaN on SiC

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMW321..**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>		$V_R$	5	V
DC forward current	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	$I_F$	50	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	0.3	A
Power dissipation		PV	200	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 110	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 110	$^{\circ}\text{C}$
Thermal resistance junction/ambient	Mounted on PC board (pad design see page 6)	$R_{thJA}$	300	K/W

**Note**

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

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMW321.., WHITE**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 30\text{ mA}$	VLMW321ABBB5K8L	$I_V$	1400	2200	2850	mcd
		VLMW321BACA5K8L	$I_V$	1800	2800	3550	mcd
Luminous flux	$I_F = 30\text{ mA}$	VLMW321ABBB5K8L	$\phi_V$	-	7000	-	mlm
		VLMW321BACA5K8L	$\phi_V$	-	8900	-	mlm
Chromaticity coordinate x, y acc. to CIE 1931	$I_F = 30\text{ mA}$		x	-	0.33	-	
			y	-	0.33	-	
Angle of half intensity	$I_F = 30\text{ mA}$		$\varphi$	-	$\pm 60$	-	deg
Forward voltage	$I_F = 30\text{ mA}$		$V_F$	2.9	3.4	4	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		$V_R$	5	-	-	V
Temperature coefficient of $V_F$	$I_F = 30\text{ mA}$		$TC_{VF}$	-	- 3.6	-	mV/K
Temperature coefficient of $I_V$	$I_F = 30\text{ mA}$		$TC_{IV}$	-	- 0.5	-	%/K
Temperature coefficient of x	$I_F = 30\text{ mA}$		$TC_x$	-	- 0.0002	-	Dx/K
Temperature coefficient of y	$I_F = 30\text{ mA}$		$TC_y$	-	- 0.0003	-	Dy/K

**LUMINOUS INTENSITY CLASSIFICATION**

GROUP STANDARD	LIGHT INTENSITY (mcd)	
	MIN.	MAX.
AB	1400	1800
BA	1800	2240
BB	2240	2850
CA	2850	3550

**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 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.

CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED						
	X	Y		X	Y	
5L	0.291	0.268		7L	0.330	0.330
	0.285	0.279			0.330	0.347
	0.307	0.312			0.347	0.371
	0.310	0.297			0.345	0.352
5K	0.296	0.259		7K	0.330	0.310
	0.291	0.268			0.330	0.330
	0.310	0.297			0.338	0.342
	0.313	0.284			0.352	0.344
6L	0.310	0.297		8L	0.345	0.352
	0.307	0.312			0.347	0.371
	0.330	0.347			0.367	0.401
	0.330	0.330			0.364	0.380
6K	0.313	0.284		8K	0.352	0.344
	0.310	0.297			0.338	0.342
	0.330	0.330			0.364	0.380
	0.330	0.310			0.360	0.357

**Note**

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$ .

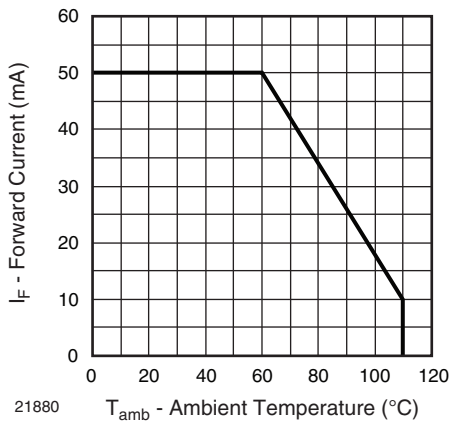
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

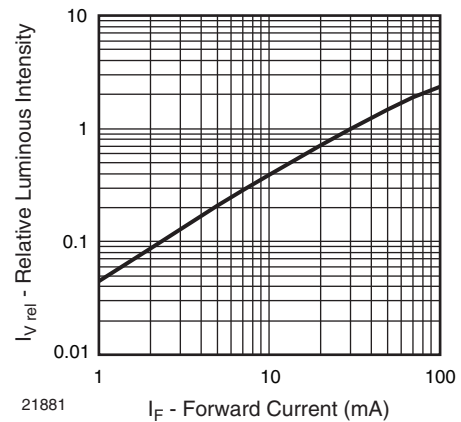


Fig. 2 - Relative Luminous Intensity vs. Forward Current

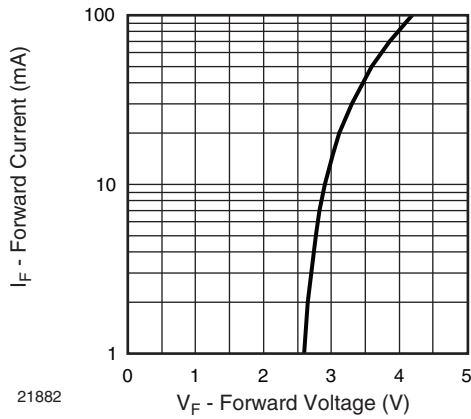


Fig. 3 - Forward Current vs. Forward Voltage

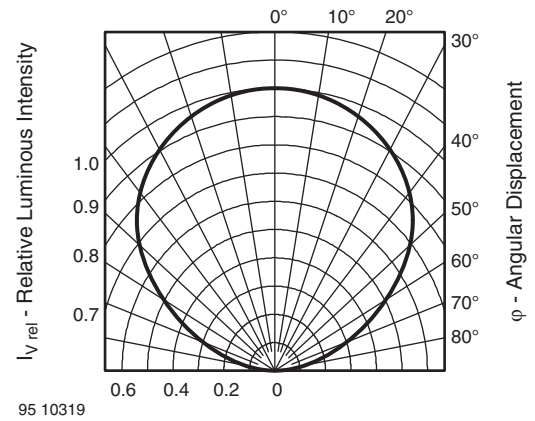


Fig. 5 - Relative Luminous Intensity vs. Angular Displacement

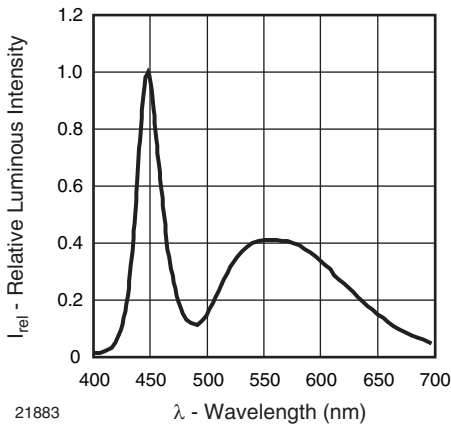


Fig. 4 - Relative Intensity vs. Wavelength

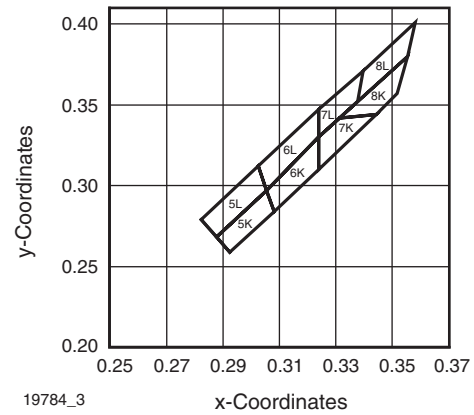
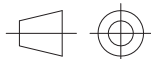
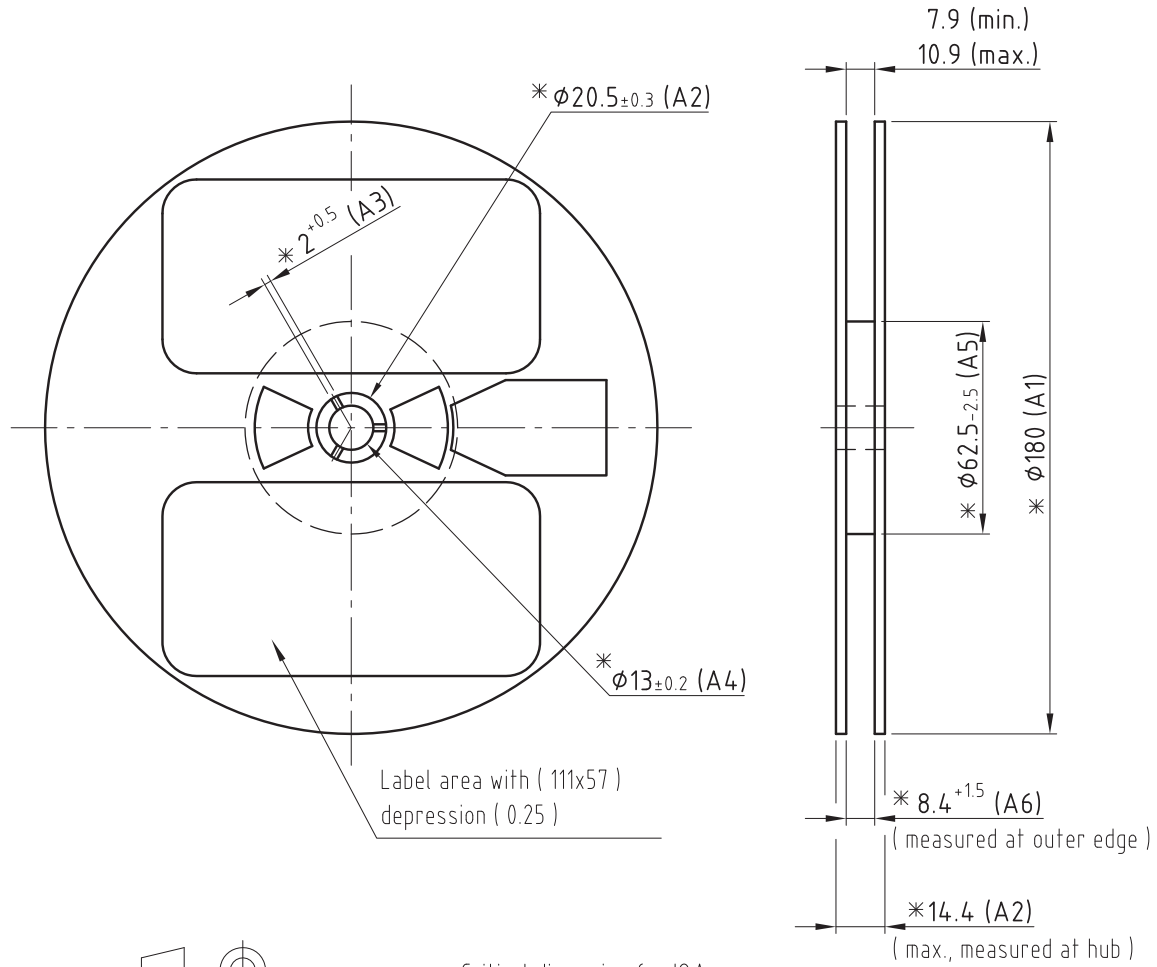


Fig. 6 - White Grouping SMD



REEL DIMENSIONS in millimeters



technical drawings according to DIN specifications

\* Critical dimension for IQA.

GS08 = 2000 pcs

Not indicated tolerances  $\pm 0.05$   
Material: black static dissipative

Drawing refers to following types:  $\phi 180$  mm Plastic reel  
Drawing-No.: 9.800-5086.01-4  
Issue: 2; 05.05.08  
20983

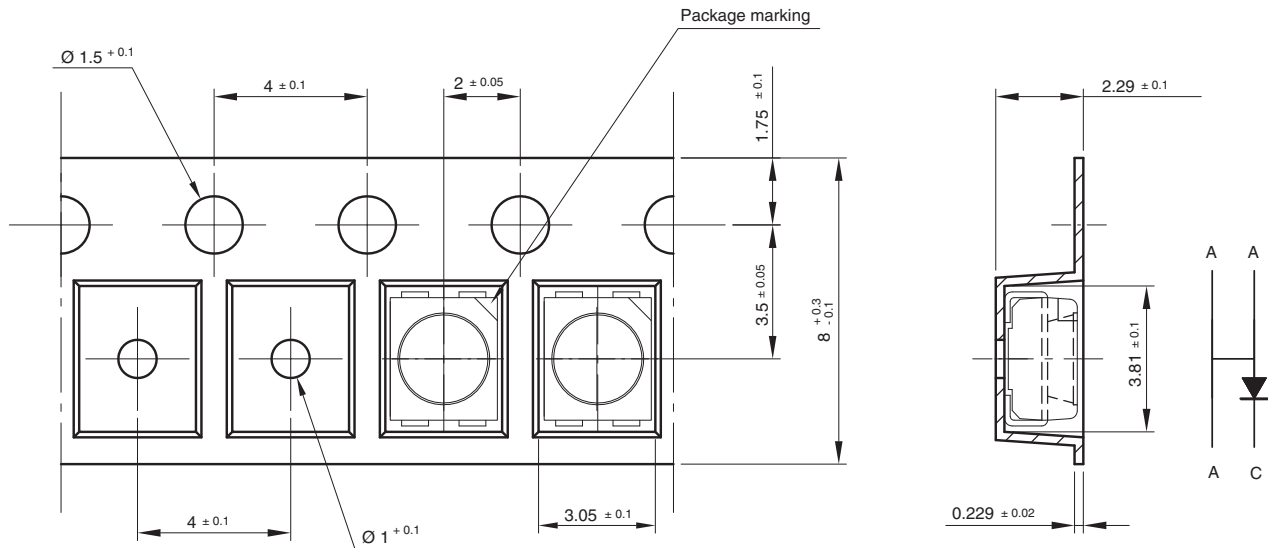


**TAPING DIMENSIONS** in millimeters

Taping and orientation

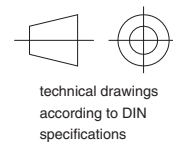
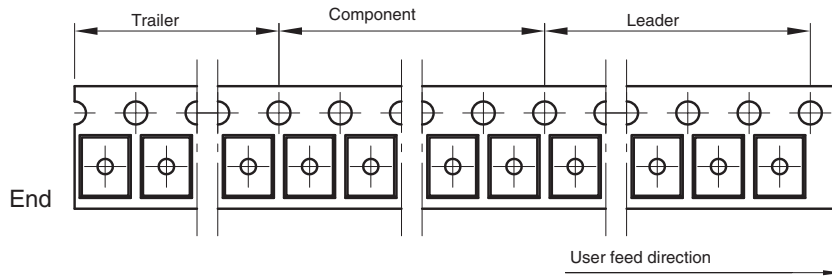
180 reel come in quantity of 2000 units

330 reel come in quantity of 8000 units



200 mm min. for 180 reel  
200 mm min. for 330 reel

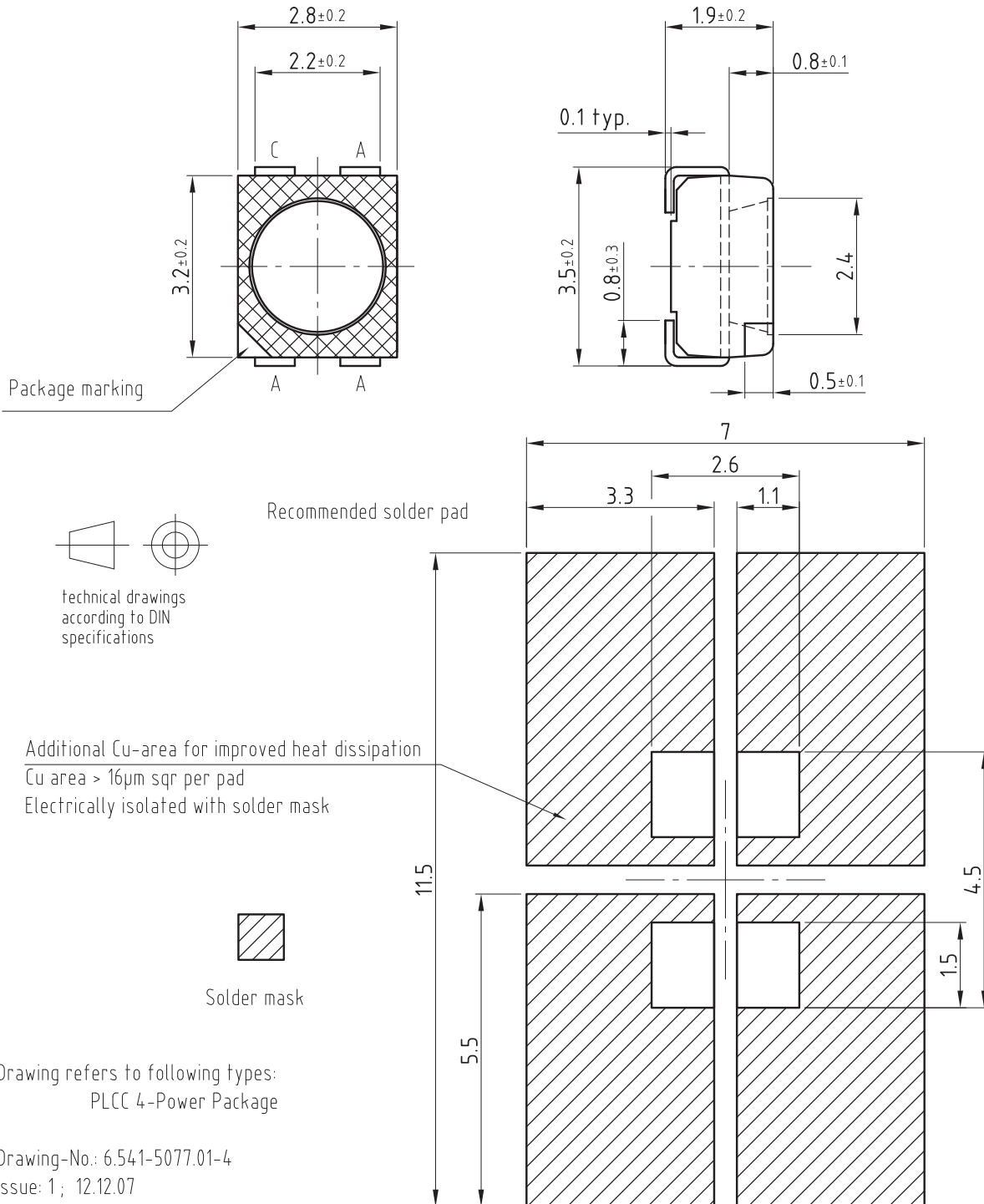
480 mm min. for 180 reel  
960 mm min. for 330 reel



Drawing-No.: 9.700-5334.01-4  
Issue: 3; 27.11.08  
21066



**OPTIONAL PAD DESIGN DIMENSIONS** in millimeters  
(Reflow-Soldering),  $R_{thJA} = 290$  K/W



Drawing refers to following types:  
PLCC 4-Power Package

Drawing-No.: 6.541-5077.01-4  
Issue: 1 ; 12.12.07

20982

**SOLDERING PROFILE**

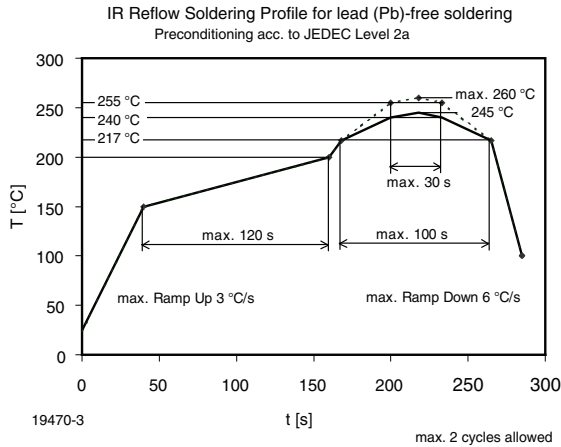


Fig. 7 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

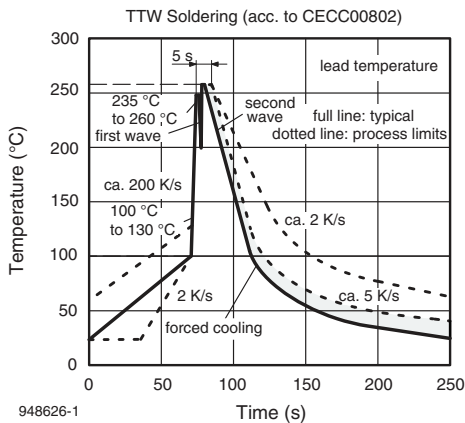
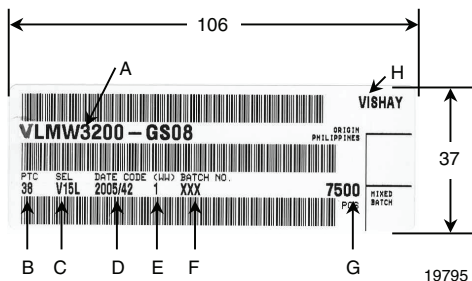


Fig. 8 - Double Wave Soldering of Opto Devices (all Packages)

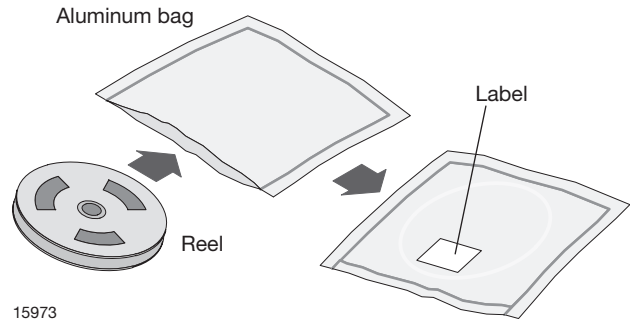
**BAR CODE PRODUCT LABEL (example)**



- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: V1 = code for luminous intensity group  
5L = code for chrom. coordinate 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:

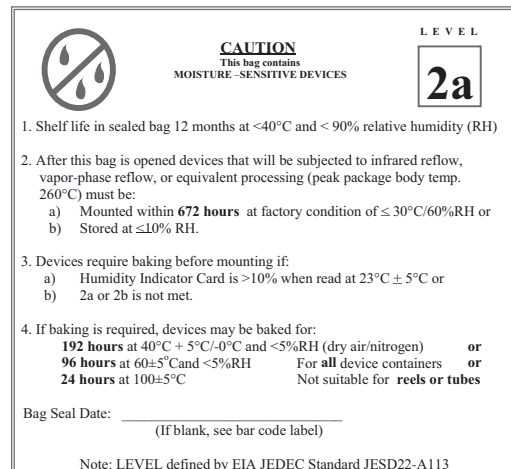
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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. Electro-static sensitive devices warning labels are on the packaging.



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