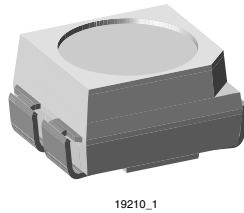


## Power SMD LED PLCC-4



### DESCRIPTION

The VLMW32.. 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: PLCC-4
- Product series: SMD Power
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- High efficient InGaN technology
- Angle of half intensity  $\varphi = \pm 60^\circ$
- Available in 8 mm tape
- Luminous intensity, color and forward voltage categorized per packing unit
- Luminous intensity ratio per packing unit  $I_{Vmax}/I_{Vmin} \leq 1.6$
- ESD-withstand voltage: up to 1 kV according to JESD22-A114-B
- Lead (Pb)-free device
- Preconditioning: according to Jedec Level 2a
- Compatible with IR-Reflow, vapor phase and wave soldering processes according to CECC 00802 and J-STD-020C
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Automotive qualified AEC-Q101



### APPLICATIONS

- Camera flash light
- Signal and symbol luminaire
- Marker lights
- Interior and exterior automotive lighting (brake lights, turn lights, backlighting, side markers)
- Indicator lighting

### PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY WAVELENGTH
VLMW32T2V1-5K8L-08	White, $I_V = (355 \text{ to } 900) \text{ mcd}$	InGaN/TAG on SiC
VLMW32T2V1-5K8L-18	White, $I_V = (355 \text{ to } 900) \text{ mcd}$	InGaN/TAG on SiC
VLMW32U2V2-5K8L-08	White, $I_V = (560 \text{ to } 1120) \text{ mcd}$	InGaN/TAG on SiC
VLMW32U2V2-5K8L-18	White, $I_V = (560 \text{ to } 1120) \text{ mcd}$	InGaN/TAG on SiC
VLMW32T1V2-5K8L-08	White, $I_V = (280 \text{ to } 1120) \text{ mcd}$	InGaN/TAG on SiC
VLMW32T1V2-5K8L-18	White, $I_V = (280 \text{ to } 1120) \text{ mcd}$	InGaN/TAG on SiC
VLMW32U2AA-5K8L-08	White, $I_V = (560 \text{ to } 1400) \text{ mcd}$	InGaN/TAG on SiC
VLMW32U2AA-5K8L-18	White, $I_V = (560 \text{ to } 1400) \text{ mcd}$	InGaN/TAG on SiC
VLMW32V2AB-5K8L-08	White, $I_V = (900 \text{ to } 1800) \text{ mcd}$	InGaN/TAG on SiC
VLMW32V2AB-5K8L-18	White, $I_V = (900 \text{ to } 1800) \text{ mcd}$	InGaN/TAG on SiC

ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMW32..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>2)</sup>		$V_R$	5	V
DC Forward current	$T_{amb} \leq 65\text{ }^\circ\text{C}$	$I_F$	30	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	0.1	A
Power dissipation		PV	127	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
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 design see page 6)	$R_{thJA}$	270	K/W

Note:

1)  $T_{amb} = 25\text{ }^\circ\text{C}$ , unless otherwise specified

2) Driving the LED in reverse direction is suitable for a short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMW32.., WHITE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity	$I_F = 30\text{ mA}$	VLMW32T2V1-5K8L	$I_V$	355		900	mcd
		VLMW32U2V2-5K8L	$I_V$	560		1120	mcd
		VLMW32T1V2-5K8L	$I_V$	280		1120	mcd
		VLMW32U2AA-5K8L	$I_V$	560		1400	mcd
		VLMW32V2AB-5K8L	$I_V$	900		1800	mcd
Luminous Flux	$I_F = 30\text{ mA}$	VLMW32T2V1-5K8L	$\phi_V$	1100		2800	mlm
		VLMW32U2V2-5K8L	$\phi_V$	1700		3500	mlm
		VLMW32T1V2-5K8L	$\phi_V$	860		3500	mlm
		VLMW32U2AA-5K8L	$\phi_V$	1736		4340	mlm
		VLMW32V2AB-5K8L	$\phi_V$	2790		5580	mlm
Chromaticity coordinate x, y acc. to CIE 1931	$I_F = 30\text{ mA}$		x y		0.33 0.33		
Angle of half intensity	$I_F = 30\text{ mA}$		$\varphi$		$\pm 60$		deg
Forward voltage	$I_F = 30\text{ mA}$		$V_F$		3.7	4.2	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		$V_R$	5			V
Temperature coefficient of $V_F$	$I_F = 20\text{ mA}$		$TC_{VF}$		- 4		mV/K
Temperature coefficient of $I_V$	$I_F = 20\text{ mA}$		$TC_{IV}$		- 0.5		%/K

Note:

1)  $T_{amb} = 25\text{ }^\circ\text{C}$ , unless otherwise specified



LUMINOUS INTENSITY CLASSIFICATION		
GROUP	LIGHT INTENSITY (MCD)	
	MIN	MAX
T1	280	355
T2	355	450
U1	450	560
U2	560	710
V1	710	900
V2	900	1120
AA	1120	1400
AB	1400	1800

CROSSING TABLE		
VISHAY	OSRAM	NICHIA
VLMW32T2V1	LWE67C-T2V1	NSCW021T
VLMW32U2V2	LWE67C-U2V2	NSCW021T
VLMW32T1V2	LWE67C-T1V2	NSCW021T
VLMW32U2AA	LWE6SC-U2AA	NSCW021T
VLMW32V2AB	LWE6SC-V2AB	NSCW021T

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

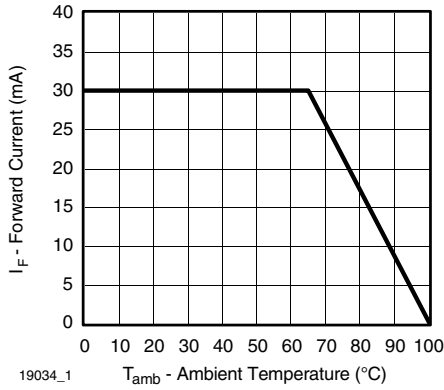


Figure 1. Forward Current vs. Ambient Temperature

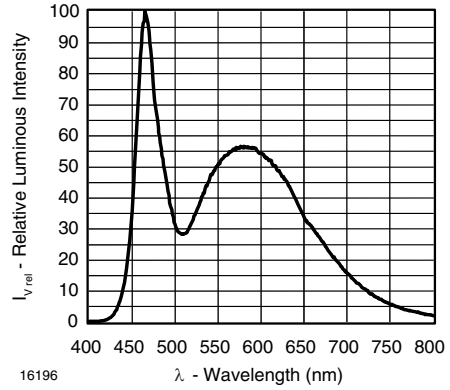


Figure 4. Relative Intensity vs. Wavelength

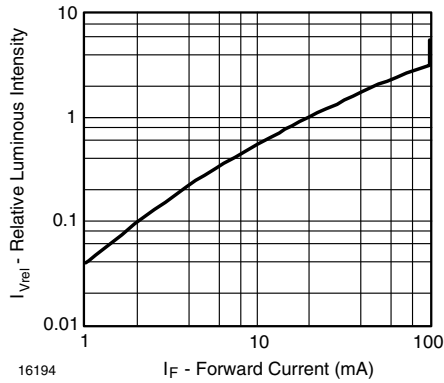


Figure 2. Relative Luminous Intensity vs. Forward Current

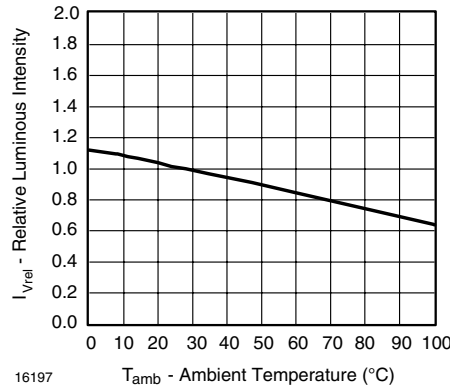


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

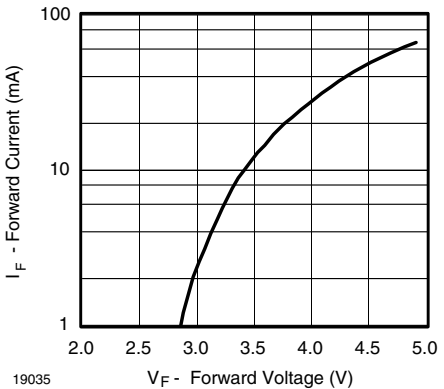


Figure 3. Forward Current vs. Forward Voltage

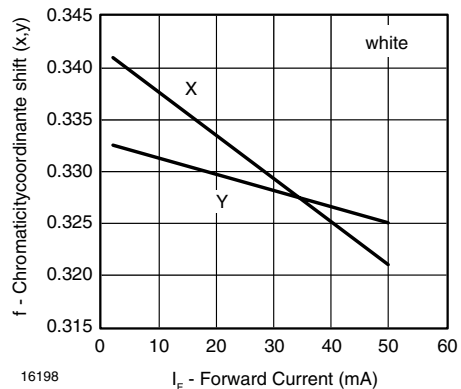


Figure 6. Chromaticity Coordinate Shift vs. Forward Current

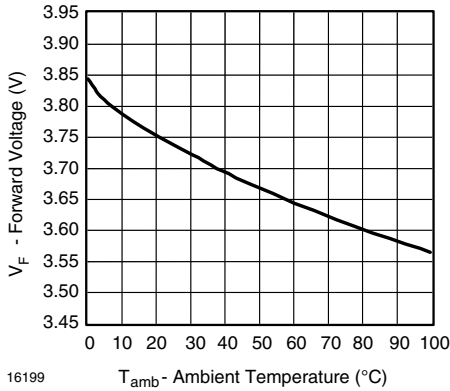


Figure 7. Forward Voltage vs. Ambient Temperature

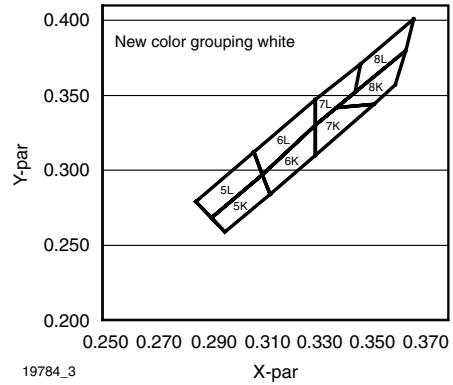


Figure 9. White Grouping SMD

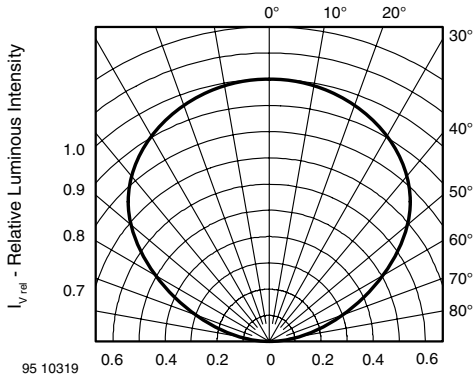


Figure 8. Rel. Luminous Intensity vs. Angular Displacement

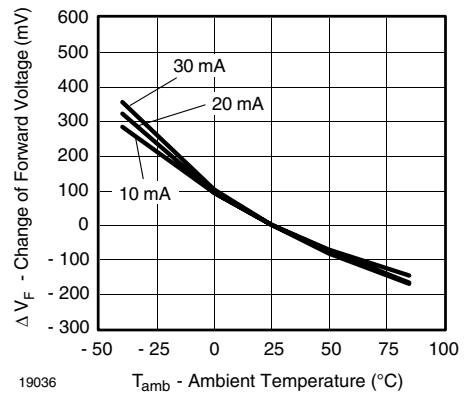
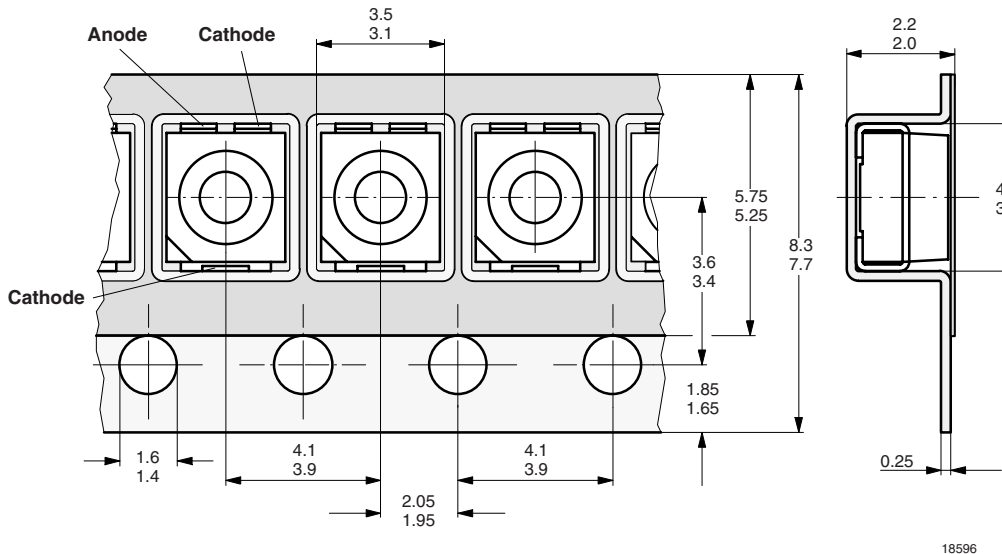
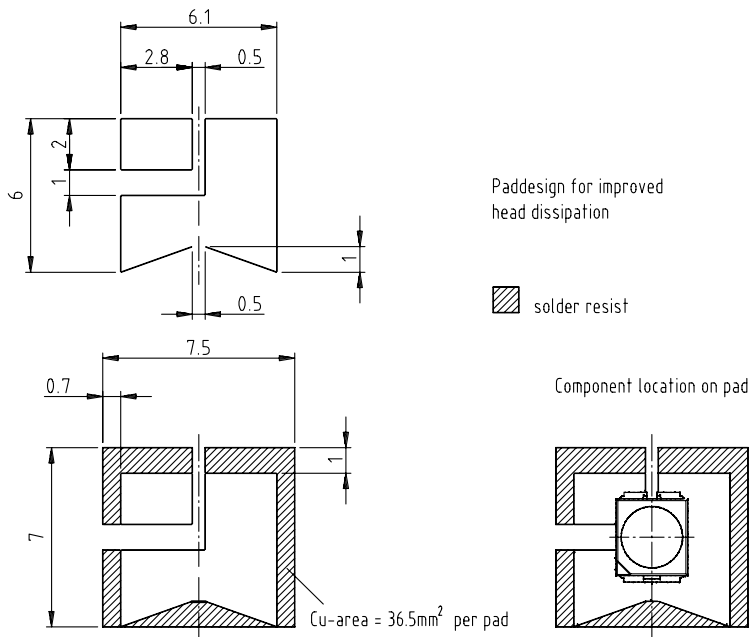


Figure 10. Change of Forward Voltage vs. Ambient Temperature

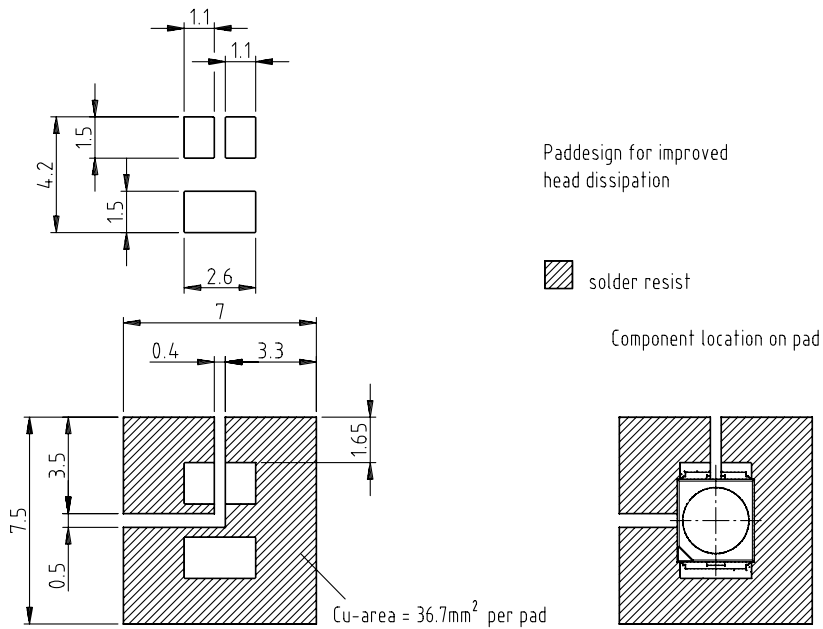
**TAPING** Dimensions in millimeters



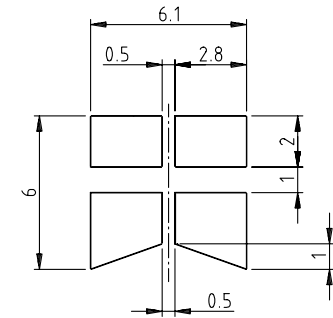
**RECOMMENDED PAD DESIGN** Dimensions in millimeters  
 (Wave-Soldering),  $R_{thJA} = 270 \text{ K/W}$



**RECOMMENDED PAD DESIGN** Dimensions in millimeters  
 (Reflow-Soldering),  $R_{thJA} = 270 \text{ K/W}$

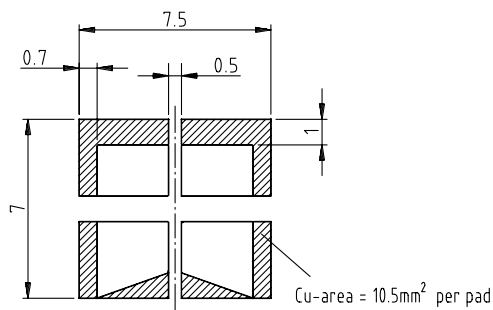


**OPTIONAL PAD DESIGN** Dimensions in millimeters  
(Wave-Soldering),  $R_{thJA} = 290 \text{ K/W}$

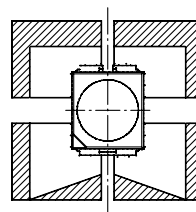


Optional pad design

solder resist

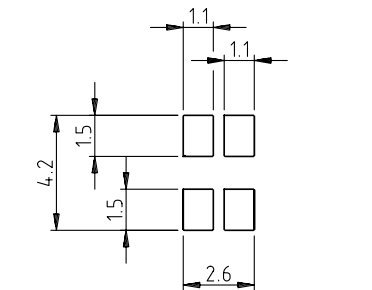


Component location on pad



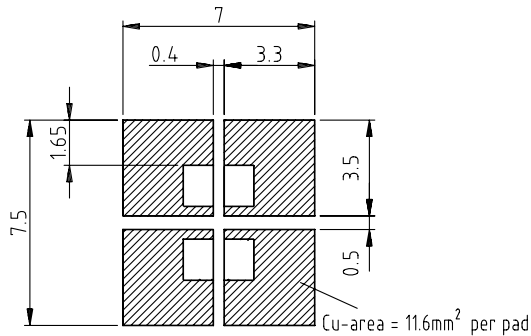
16262

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

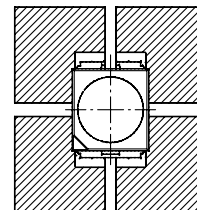


Optional pad design

solder resist

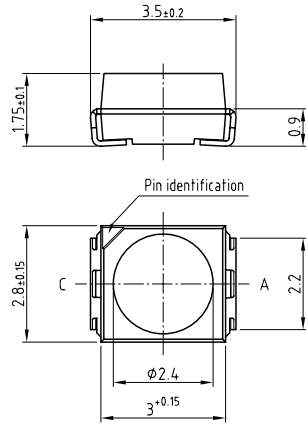


Component location on pad

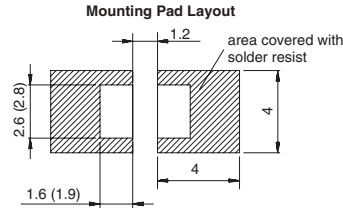


16263

**PACKAGE DIMENSIONS** in millimeters



Technical drawings according to DIN specifications

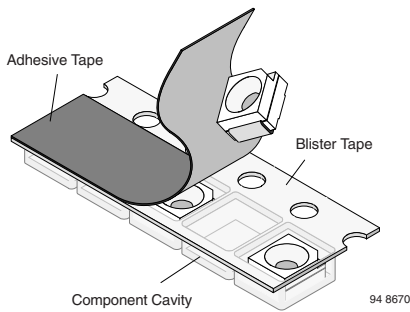


Drawing-No: 6.541-5067.01-4  
Issue: 3; 30.05.07  
20541

**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.



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

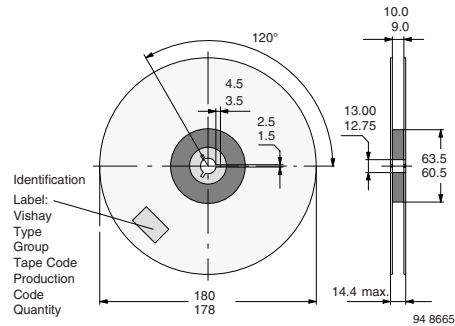


Figure 12. Reel dimensions - GS08

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

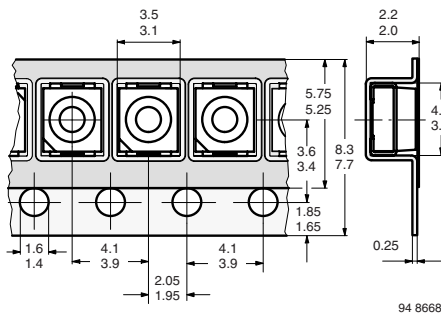


Figure 11. Tape dimensions in mm for PLCC-x

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

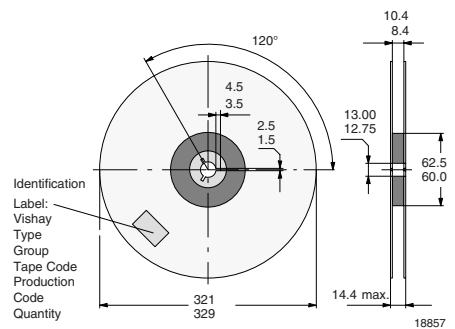


Figure 13. Reel dimensions - GS18



**SOLDERING PROFILE**

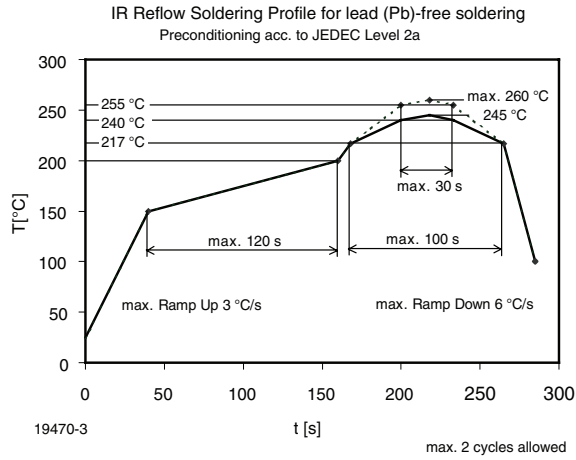


Figure 14. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

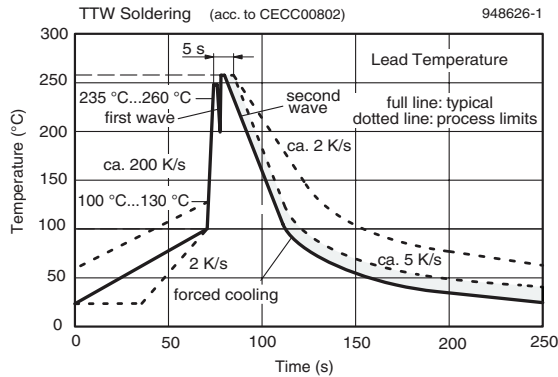
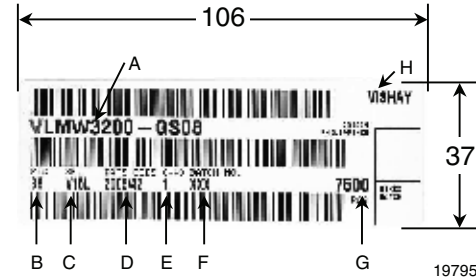


Figure 15. Double wave soldering of opto devices (all packages)

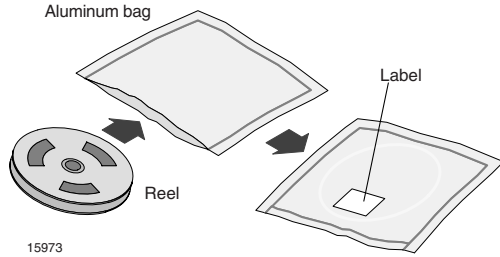
**BARCODE-PRODUCT-LABEL EXAMPLE:**



- 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 hours 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 hours at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or

96 hours at 60 °C + 5 °C and < 5 % RH for all device containers or

24 hours 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.

**CAUTION**  
This bag contains  
MOISTURE -SENSITIVE DEVICES

LEVEL

**2a**

1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)
2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be:
  - a) Mounted within **672 hours** at factory condition of ≤30°C/60%RH or
  - b) Stored at ≤10% RH.
3. Devices require baking before mounting if:
  - a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or
  - b) 2a or 2b is not met.
4. If baking is required, devices may be baked for:
 

<b>192 hours</b> at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen)	<b>or</b>
<b>96 hours</b> at 60±5°C and <5%RH	<b>For all device containers or</b>
<b>24 hours</b> at 100±5°C	<b>Not suitable for reels or tubes</b>

Bag Seal Date: \_\_\_\_\_  
(If blank, see bar code label)

Note: LEVEL defined by EIA JEDEC Standard JESD22-A113

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.

**OZONE DEPLETING SUBSTANCES POLICY STATEMENT**

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design  
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



## Disclaimer

All product specifications and data are subject to change without notice.

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