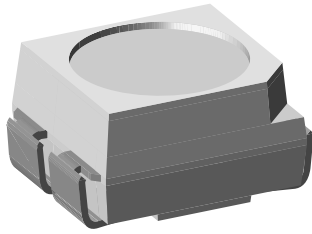




Power SMD LED PLCC-4



19210

DESCRIPTION

The VLMS322.. and VLMK322.. series are an advanced development 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 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 cathode pins, 1 anode pin
- Available in 8 mm tape
- High brightness SMD LED
- 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 according to JESD22-A114-B
- Suitable for all soldering methods according to CECC 00802 and J-STD-020
- Preconditioning according to JEDEC® level 2
- Qualified according to JEDEC moisture sensitivity level 2
- Compatible with IR reflow solder 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

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Interior and exterior lighting
- Indicator and backlighting purposes for audio, video, LCDs, switches, symbols, illuminated advertising etc.
- Illumination purpose, alternative to incandescent lamps
- General use

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (mcd)			at I_F (mA)	WAVELENGTH (nm)			at I_F (mA)	FORWARD VOLTAGE (V)			at I_F (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VLMS322T2V1-GS08	Super red	355	450	900	50	625	630	640	50	1.7	2.1	2.6	50	AllnGaP on GaAs
VLMK322U1V2-GS08	Amber	450	750	1125	50	610	-	621	50	-	1.9	2.6	50	AllnGaP on GaAs

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified) VLMS322.., VLMK322..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage ⁽¹⁾		V_R	5	V
Forward current		I_F	70	mA
Power dissipation	at RT	P_{tot}	225	mW
Junction temperature		T_j	125	$^\circ\text{C}$
Operating temperature range		T_{amb}	-40 to +100	$^\circ\text{C}$
Storage temperature range		T_{stg}	-40 to +100	$^\circ\text{C}$
Thermal resistance junction-to-ambient	Mounted on PC board FR4	R_{thJA}	290	K/W

Note

⁽¹⁾ Driving the LED in reverse direction is suitable for short term application


OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMS322.., SUPER RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 50\text{ mA}$	VLMS322T2V1	I_V	355	450	900	mcd
Dominant wavelength	$I_F = 50\text{ mA}$		λ_d	625	630	640	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$		ϕ	-	± 60	-	$^{\circ}$
Forward voltage ⁽²⁾	$I_F = 50\text{ mA}$		V_F	1.7	2.1	2.6	V
Reverse current	$V_R = 5\text{ V}$		I_R	-	0.01	10	μA

Notes

- (1) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$
 (2) Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.1\text{ V}$

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMK322.., AMBER

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 50\text{ mA}$	VLMK322U1V2	I_V	450	750	1125	mcd
Dominant wavelength	$I_F = 50\text{ mA}$		λ_d	610	-	621	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$		ϕ	-	± 60	-	$^{\circ}$
Forward voltage ⁽²⁾	$I_F = 50\text{ mA}$		V_F	1.7	2.1	2.6	V
Reverse current	$V_R = 5\text{ V}$		I_R	-	0.01	10	μA

Notes

- (3) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$
 (4) Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.1\text{ V}$

LUMINOUS INTENSITY CLASSIFICATION

GROUP STANDARD	LIGHT INTENSITY (mcd)	
	MIN.	MAX.
T2	355	450
U1	450	560
U2	560	715
V1	715	900
V2	900	1125

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

COLOR CLASSIFICATION

GROUP	AMBER	
	DOM. WAVELENGTH (nm)	
	MAX.	MAX.
W	610	615
X	615	621

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of $\pm 1\text{ nm}$



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

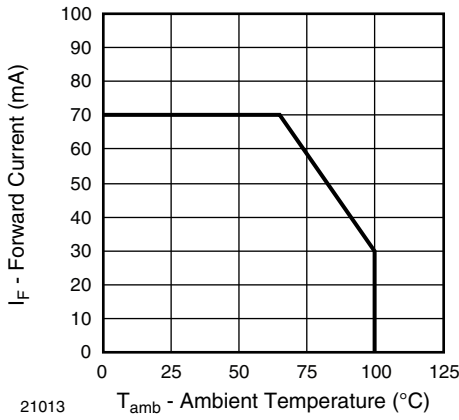


Fig. 1 - Forward Current vs. Ambient Temperature

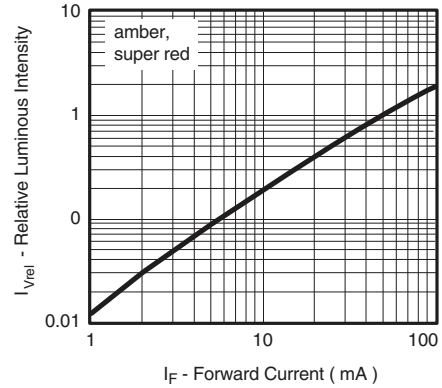


Fig. 4 - Relative Luminous Intensity vs. Forward Current

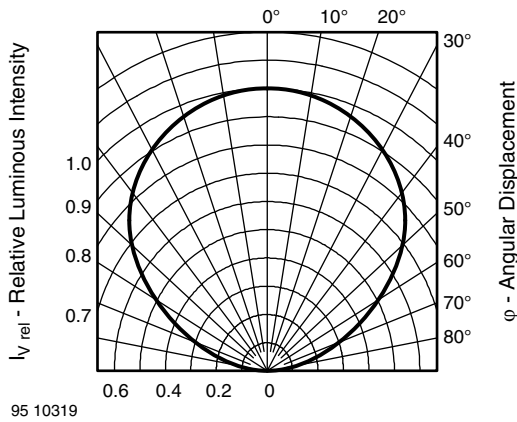


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

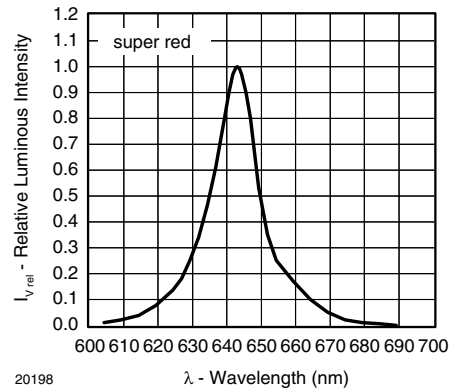


Fig. 5 - Relative Intensity vs. Wavelength

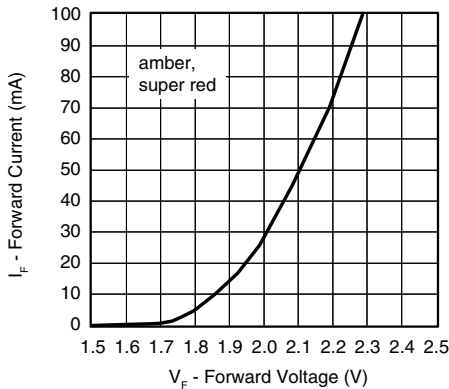


Fig. 3 - Relative Luminous Intensity vs. Forward Current

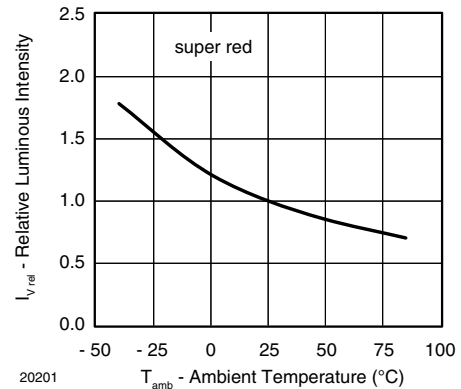


Fig. 6 - Relative Luminous Intensity vs. Ambient Temperature

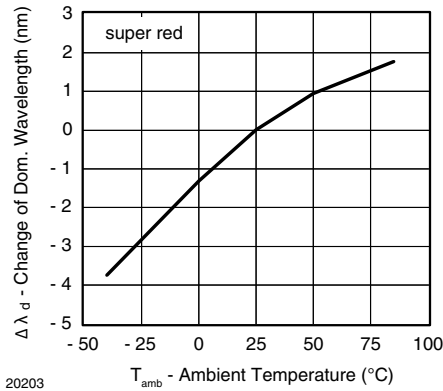


Fig. 7 - Change of Dominant Wavelength vs. Ambient Temperature

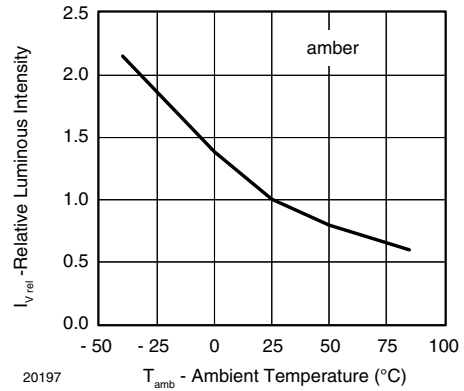


Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

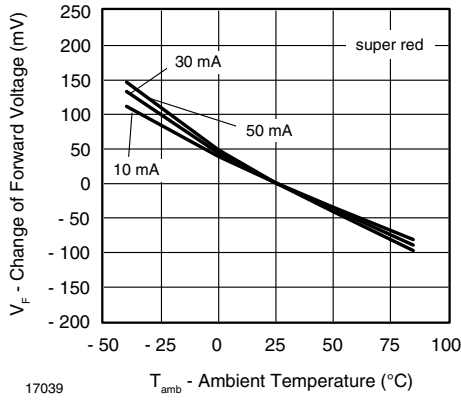


Fig. 8 - Change of Forward Voltage vs. Ambient Temperature

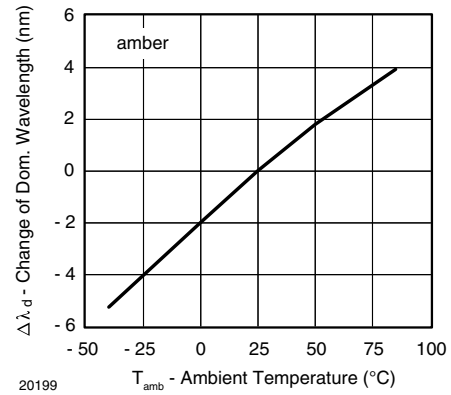


Fig. 11 - Change of Dominant Wavelength vs. Ambient Temperature

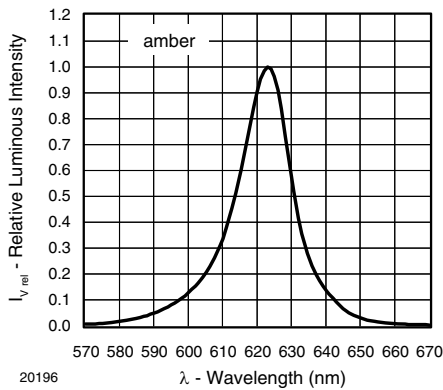


Fig. 9 - Relative Intensity vs. Wavelength

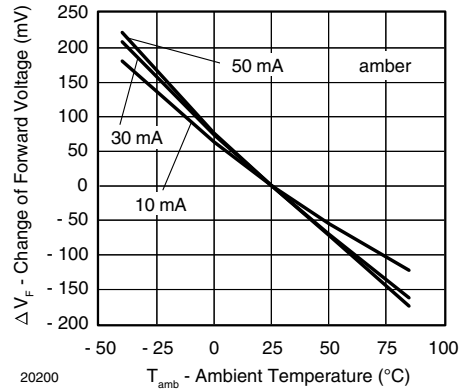
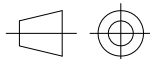
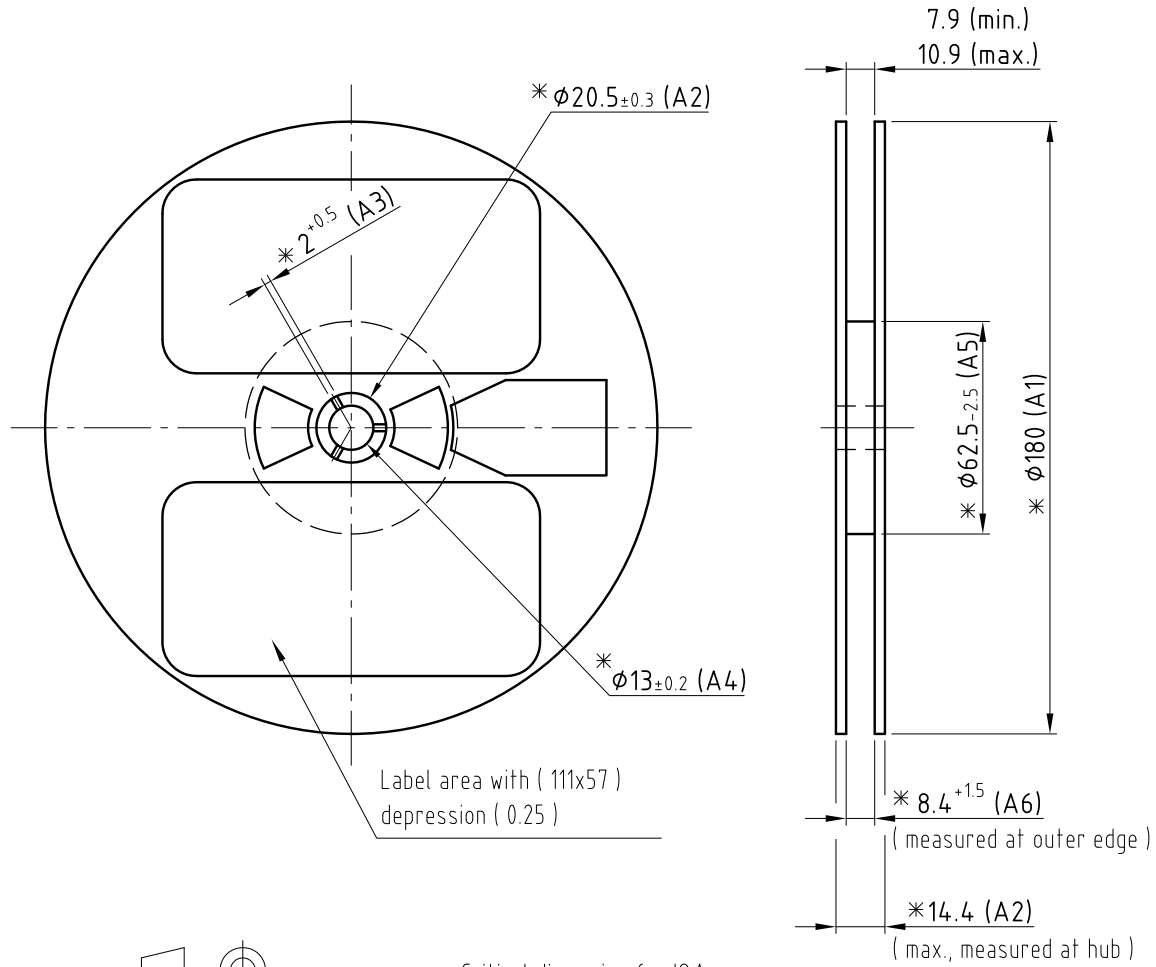


Fig. 12 - Change of Forward Voltage vs. Ambient Temperature



REEL DIMENSIONS in millimeters



technical drawings according to DIN specifications

* Critical dimension for IQA.

GS08 = 2000 pcs

Not indicated tolerances ± 0.05
Material: black static dissipative

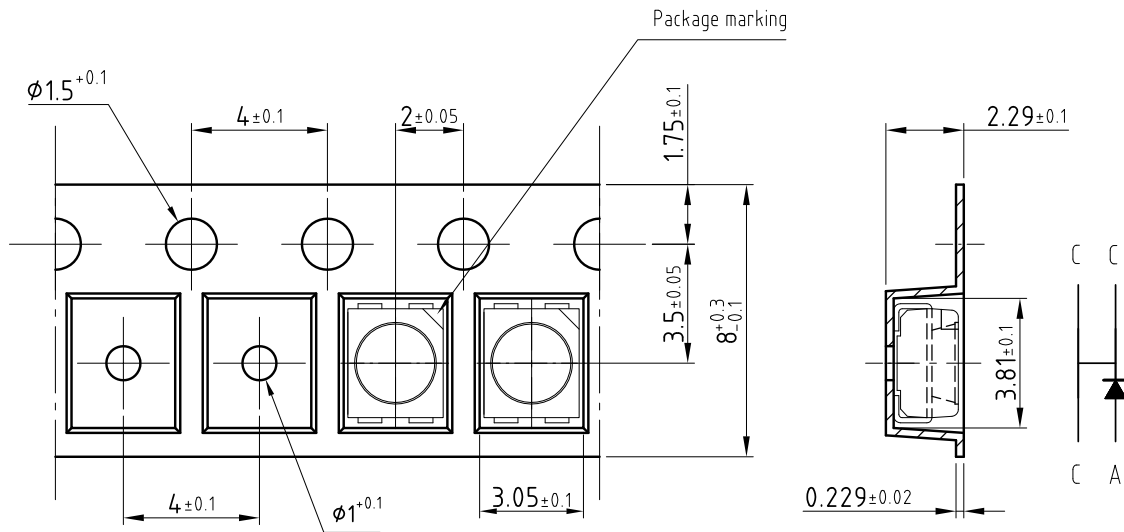
Drawing refers to following types: $\phi 180$ mm Plastic reel
Drawing-No.: 9.800-5086.01-4
Issue: 2; 05.05.08
20983



TAPING DIMENSIONS in millimeters

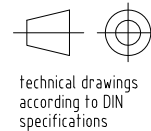
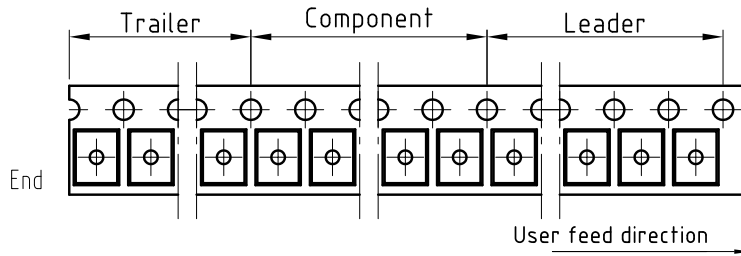
Taping and orientation

Reels come in quantity of 2000 units.



200mm min. for $\phi 180$ reel

480mm min. for $\phi 180$ reel



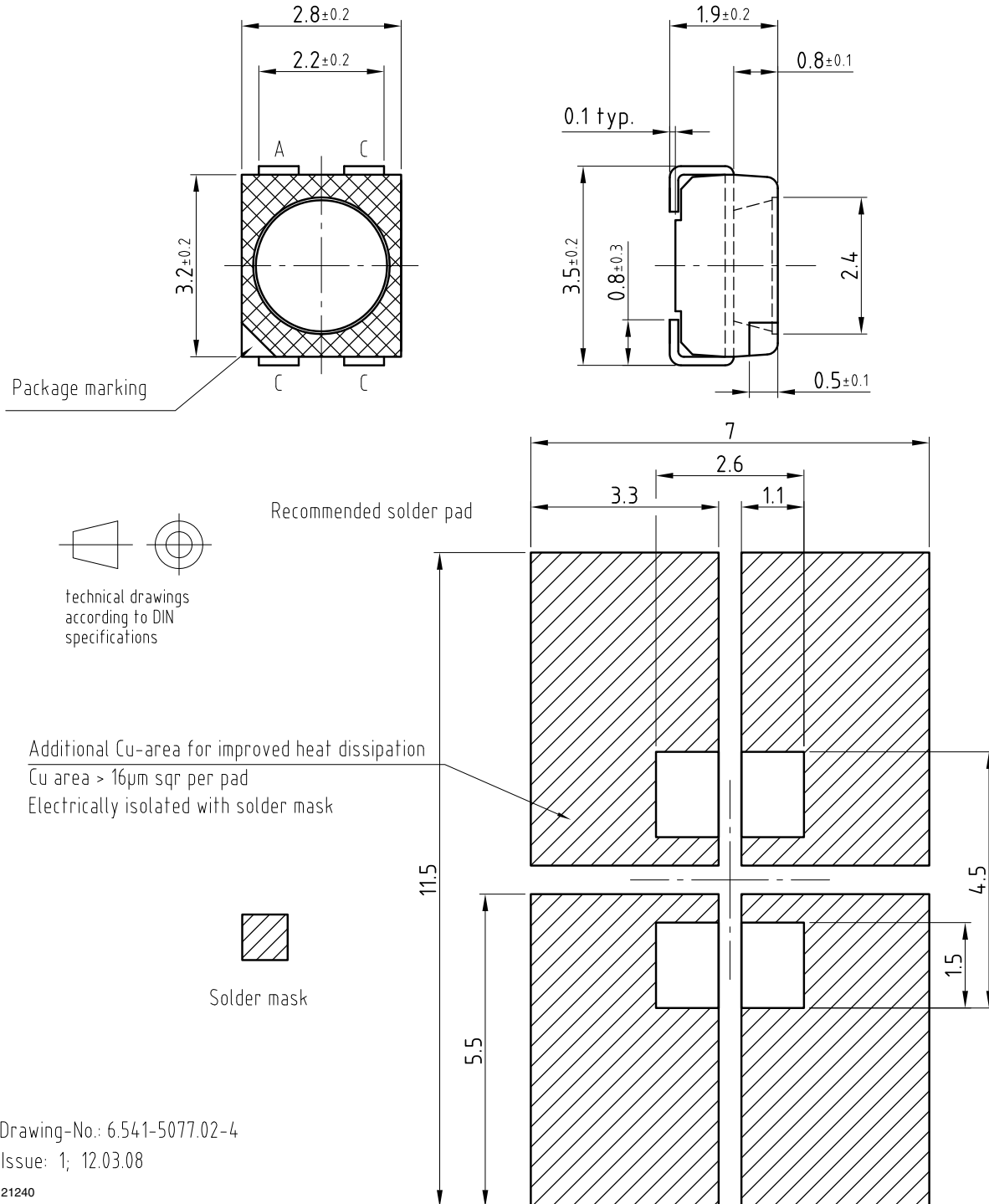
Drawing-No: 9.700-5334.02-4

Issue: 2; 07.04.08

21241



PACKAGE/SOLDERING PADS DIMENSIONS in millimeters



Drawing-No.: 6.541-5077.02-4

Issue: 1; 12.03.08

21240



SOLDERING PROFILE

IR Reflow Soldering Profile for Lead (Pb)-Free Soldering
Preconditioning according to JEDEC level 2

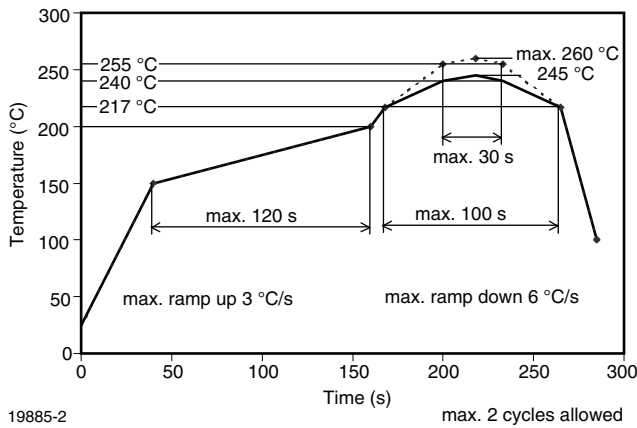
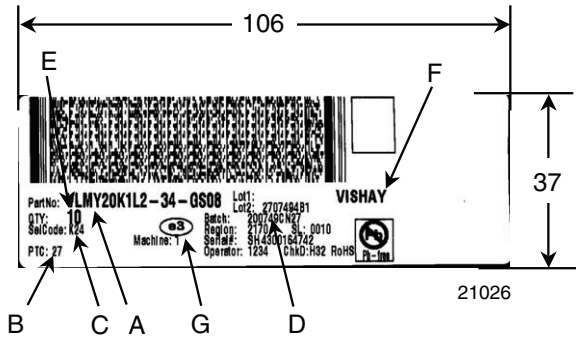


Fig. 13 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

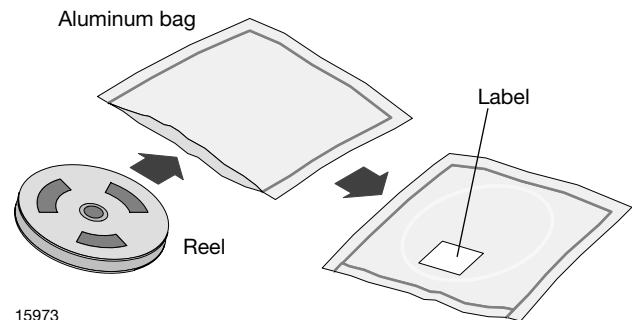
BAR CODE PRODUCT LABEL (example)



- A) Type of component
- B) PTC = manufacturing plant
- C) SEL - selection code (bin):
e.g.: K2 = code for luminous intensity group
4 = code for color group
- D) Batch/date code
- E) Total quantity
- F) Company code
- G) Code for lead (Pb)-free classification (e3)

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.

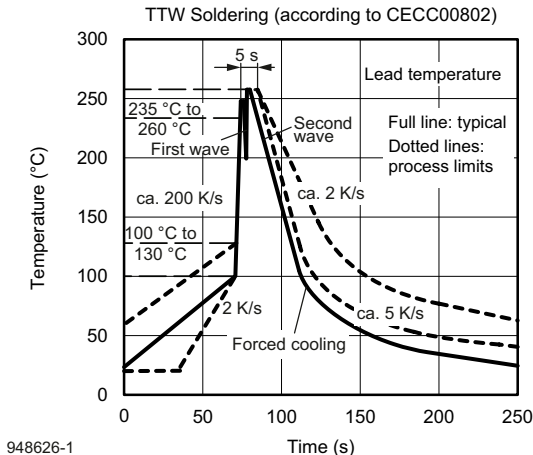


Fig. 14 - Double Wave Soldering of Opto Devices (all Packages)



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 1 year 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 2 label is included on all dry bags.

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.

	CAUTION This bag contains MOISTURE-SENSITIVE DEVICES	L E V E L 2
<p>1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)</p> <p>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:</p> <p>a) Mounted within 672 hours at factory condition of ≤ 30°C/60%RH or</p> <p>b) Stored at ≤10% RH.</p> <p>3. Devices require baking before mounting if:</p> <p>a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or</p> <p>b) 2a or 2b is not met.</p> <p>4. If baking is required, devices may be baked for:</p> <p>192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen) or</p> <p>96 hours at 60±5°C and <5%RH For all device containers or</p> <p>24 hours at 100±5°C Not suitable for reels or tubes</p> <p>Bag Seal Date: _____ (If blank, see bar code label)</p> <p>Note: LEVEL defined by EIA JEDEC Standard JESD22-A113</p>		

19786..1

Example of JESD22-A112 level 2 label



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