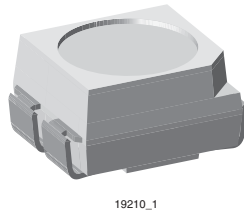


## Power SMD LED PLCC-4



19210\_1

### 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)\*\*

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

### 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                          | TECHNOLOGY WAVELENGTH |
|--------------------|----------------------------------------------------|-----------------------|
| VLMW321ABBB5K8L-08 | White, $I_V = (1400 \text{ to } 2850) \text{ mcd}$ | InGaN on SiC          |
| VLMW321BACA5K8L-08 | White, $I_V = (1800 \text{ to } 3550) \text{ mcd}$ | InGaN on SiC          |

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

**ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMW321..**

| PARAMETER                               | TEST CONDITION                                 | SYMBOL     | VALUE         | UNIT             |
|-----------------------------------------|------------------------------------------------|------------|---------------|------------------|
| Reverse voltage <sup>2)</sup>           |                                                | $V_R$      | 5             | V                |
| DC forward current                      | $T_{amb} \leq 60^\circ\text{C}$                | $I_F$      | 50            | mA               |
| Surge forward current                   | $t_p \leq 10 \mu\text{s}$                      | $I_{FSM}$  | 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/<br>ambient | Mounted on PC board<br>(pad design see page 6) | $R_{thJA}$ | 300           | K/W              |

Notes:

<sup>1)</sup>  $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified<sup>2)</sup> Driving the LED in reverse direction is suitable for a short term application**OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> 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<br>acc. to CIE 1931 | $I_F = 30 \text{ mA}$  |                 | x<br>y    |      | 0.33<br>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                                  | $I_R = 10 \mu\text{A}$ |                 | $V_R$     | 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     |      | $\Delta x/K$ |
| Temperature coefficient of y                     | $I_F = 30 \text{ mA}$  |                 | $TC_y$    |      | - 0.0003     |      | $\Delta y/K$ |

Note:

<sup>1)</sup>  $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified**LUMINOUS INTENSITY CLASSIFICATION**

| GROUP | 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

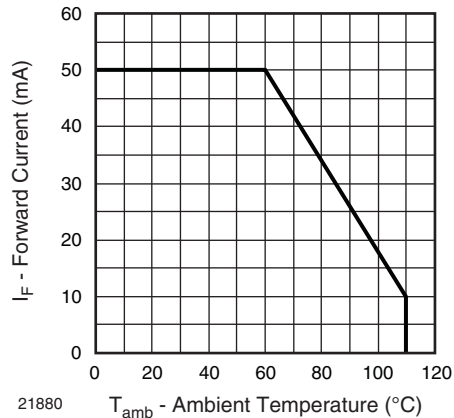


Figure 1. Forward Current vs. Ambient Temperature

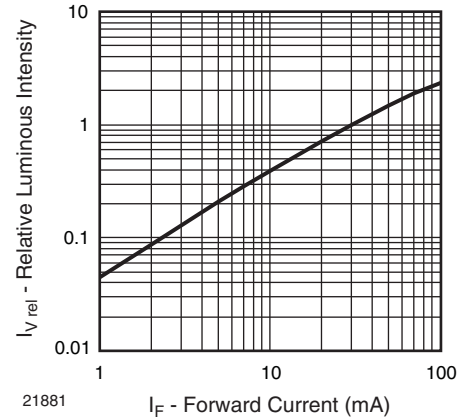


Figure 2. Relative Luminous Intensity vs. Forward Current

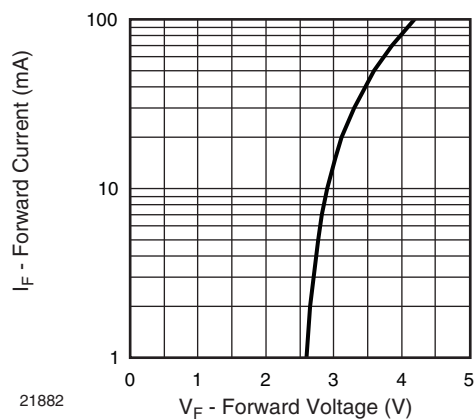


Figure 3. Forward Current vs. Forward Voltage

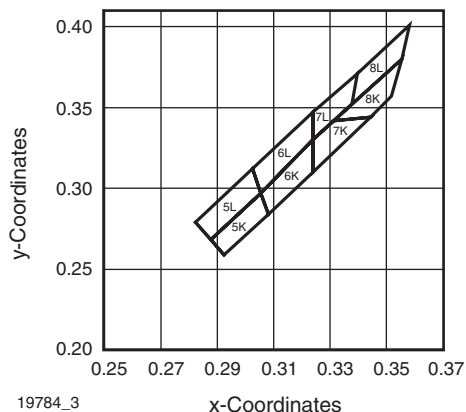


Figure 6. White Grouping SMD

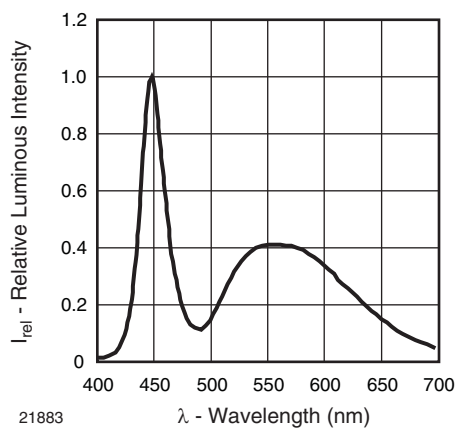


Figure 4. Relative Intensity vs. Wavelength

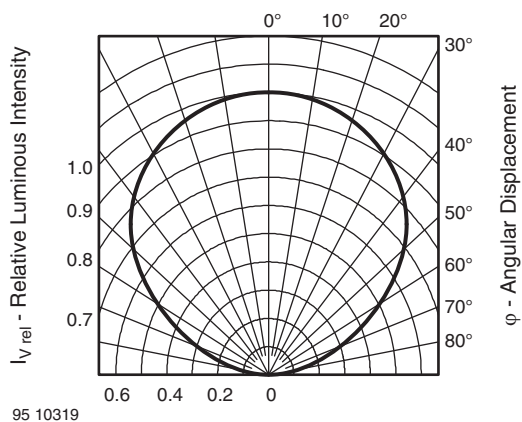
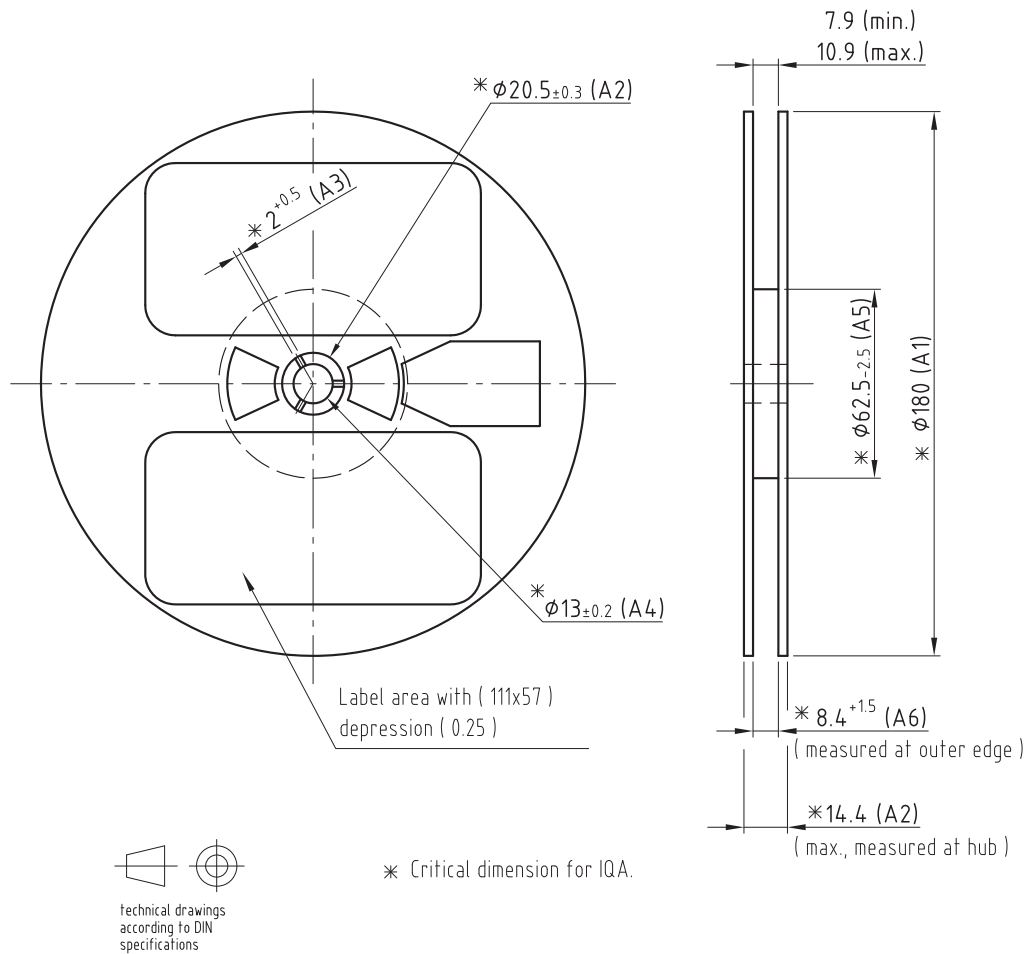


Figure 5. Rel. Luminous Intensity vs. Angular Displacement

**REEL DIMENSIONS** in millimeters


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

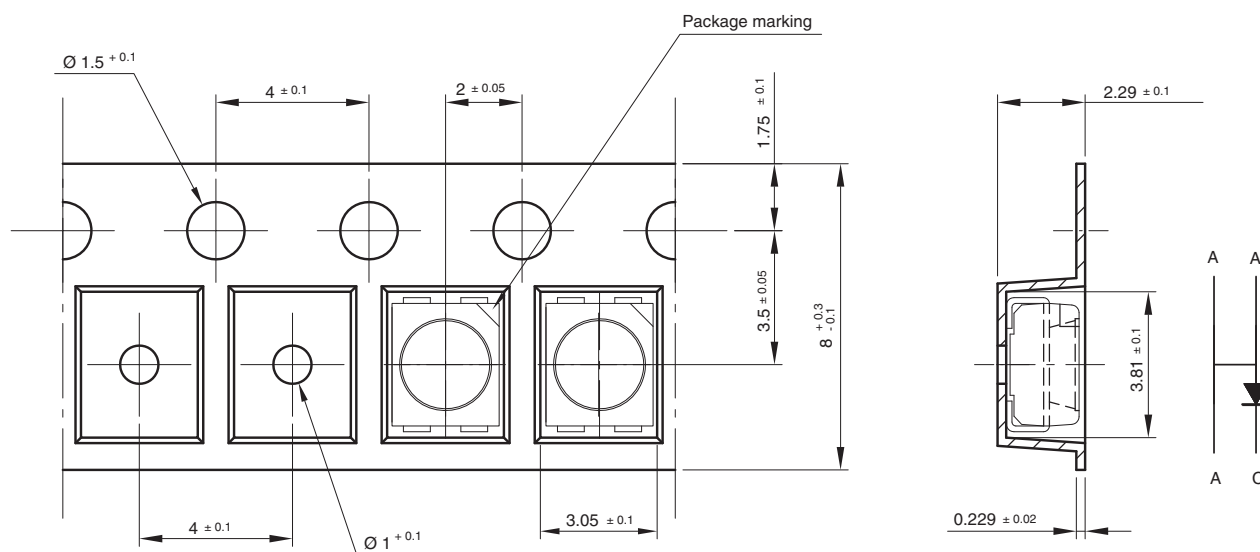
20983

### TAPING DIMENSIONS in millimeters

#### Taping and orientation

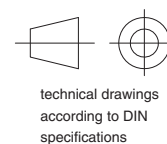
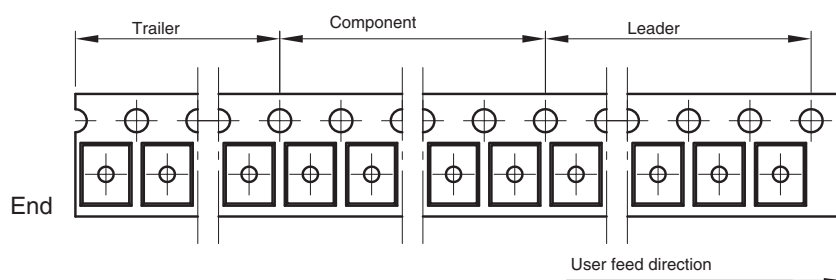
180 reel come in quantity of 2000 units

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

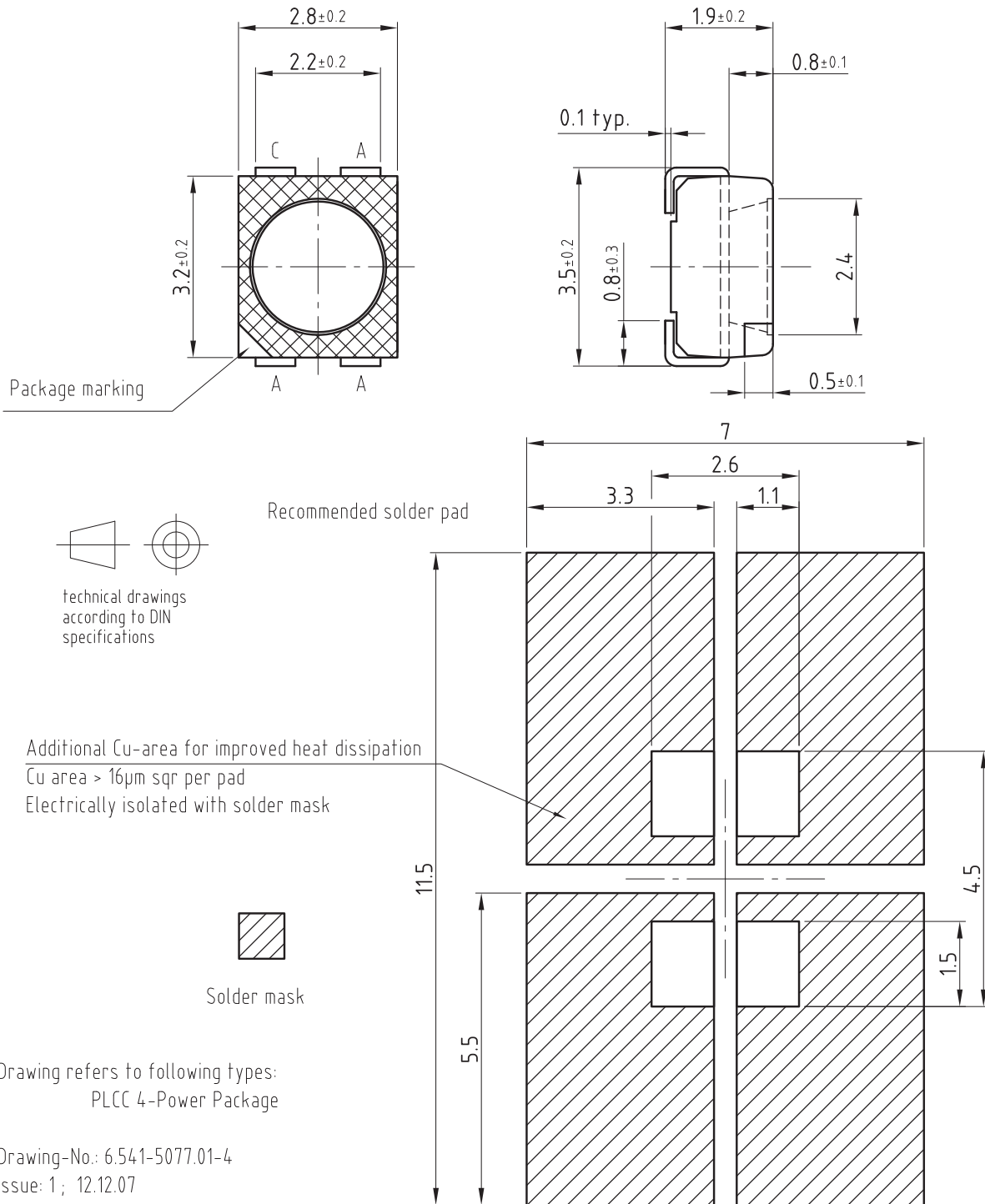


Drawing-No.: 9.700-5334.01-4

Issue: 3; 27.11.08

21066

**OPTIONAL PAD DESIGN DIMENSIONS** in millimeters

(Reflow-Soldering),  $R_{thJA} = 290 \text{ K/W}$ 


### SOLDERING PROFILE

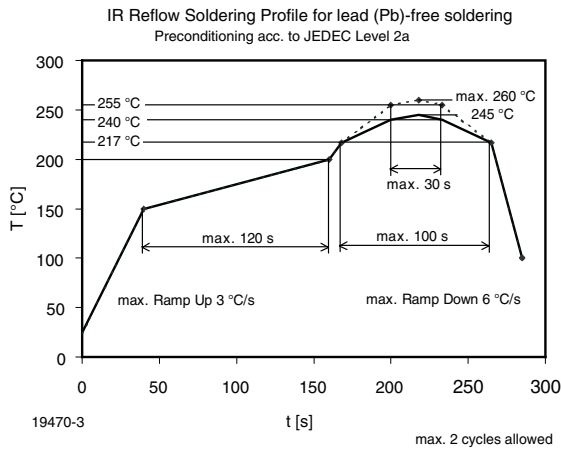


Figure 7. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

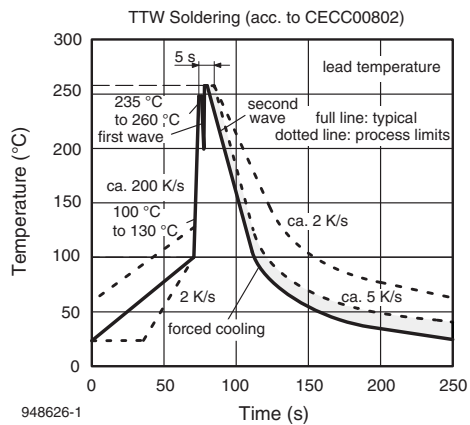
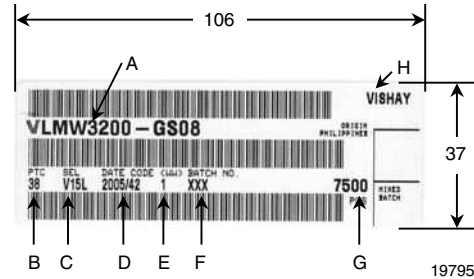


Figure 8. Double Wave Soldering of Opto Devices (all Packages)

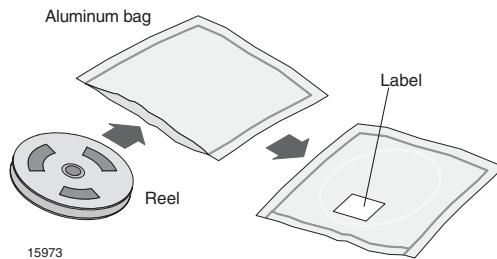
### BARCODE-PRODUCT-LABEL EXAMPLE:



- 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 h under these conditions moisture content will be too high for reflow soldering.

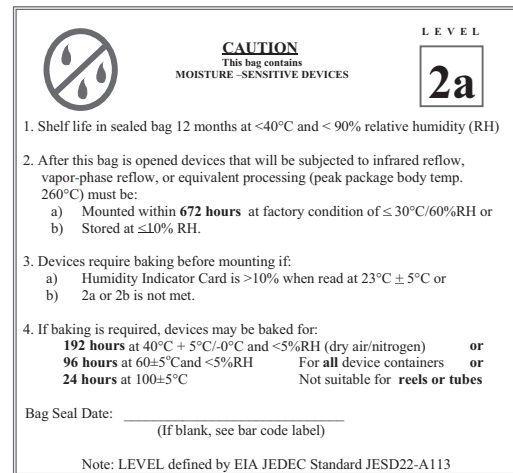
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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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