

Standard SMD LED PLCC-2



FEATURES

- High efficient InGaN technology
- Very narrow chromaticity coordinate group categorization according to CIE1931 per packing unit
- Typical color temperature 5500 K
- EIA and ICE standard package
- Compatible with reflow, vapor phase and wave solder processes acc. to CECC 00802 and J-STD-020
- Available in 8 mm tape reel
- Preconditioning: according to JEDEC level 2a
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- AEC-Q101 qualified



DESCRIPTION

This device has been designed to meet the increasing demand for white SMD LED.

The package of the VLMW41.. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled with a mixture of epoxy and TAG phosphor.

The TAG phosphor converts the blue emission partially to yellow, which mixes with the remaining blue to give white.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: standard
- Angle of half intensity: $\pm 60^\circ$

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 | CHROMATICITY COORDINATES | TECHNOLOGY |
|--------------------|--|--------------------------|------------------------|
| VLMW41S1T2-JKPL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.33/0.33 | InGaN/Sapphire and TAG |
| VLMW41S1T2-JKPL-18 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.33/0.33 | InGaN/Sapphire and TAG |
| VLMW41S1T2-JKLL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.30/0.28 | InGaN/Sapphire and TAG |
| VLMW41S1T2-KKLL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.31/0.30 | InGaN/Sapphire and TAG |
| VLMW41S1T2-LKML-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.32/0.31 | InGaN/Sapphire and TAG |
| VLMW41S1T2-LKML-18 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.32/0.31 | InGaN/Sapphire and TAG |
| VLMW41S1T2-MKNL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.33/0.33 | InGaN/Sapphire and TAG |
| VLMW41S1T2-NKOL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.34/0.34 | InGaN/Sapphire and TAG |
| VLMW41S1T2-OKPL-08 | White, $I_V = (180 \text{ to } 450) \text{ mcd}$ | x/y typ.: 0.35/0.36 | InGaN/Sapphire and TAG |

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMW41..

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---|---|------------|---------------|--------------------|
| DC forward current | $T_{amb} \leq 80\text{ }^{\circ}\text{C}$ | I_F | 20 | mA |
| Surge forward current | $t_p \leq 10\text{ }\mu\text{s}$ | I_{FSM} | 0.1 | A |
| Power dissipation | | P_V | 84 | mW |
| Junction temperature | | T_j | 110 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | - 40 to + 100 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | - 40 to + 100 | $^{\circ}\text{C}$ |
| Thermal resistance junction/ ambient | Mounted on PC board (pad size > 16 mm ²) | R_{thJA} | 360 | K/W |

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMW41.., WHITE

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|--|----------------------|-----------------|-----------|------|-----------|------|------|
| Luminous intensity | $I_F = 10\text{ mA}$ | VLMW41S1T2 | I_V | 180 | | 450 | mcd |
| Chromaticity coordinates acc. to CIE 1931 | $I_F = 10\text{ mA}$ | VLMW41S1T2-JKPL | x/y | | 0.33/0.33 | | |
| | | VLMW41S1T2-JKKL | | | 0.30/0.28 | | |
| | | VLMW41S1T2-KKLL | | | 0.31/0.30 | | |
| | | VLMW41S1T2-LKML | | | 0.32/0.31 | | |
| | | VLMW41S1T2-MKNL | | | 0.33/0.33 | | |
| | | VLMW41S1T2-NKOL | | | 0.34/0.34 | | |
| | | VLMW41S1T2-OKPL | | | 0.35/0.36 | | |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | φ | | ± 60 | | deg |
| Forward voltage | $I_F = 20\text{ mA}$ | | V_F | 2.7 | 3.3 | 4.2 | V |
| Temperature coefficient of V_F | $I_F = 10\text{ mA}$ | | TC_{VF} | | - 3 | | mV/K |
| Temperature coefficient of I_V | $I_F = 10\text{ mA}$ | | TC_{IV} | | - 0.4 | | %/K |

Note:

Not designed for reverse operation

LUMINOUS INTENSITY CLASSIFICATION

| GROUP | LIGHT INTENSITY (mcd) | | | |
|-------|-----------------------|----------|------|------|
| | STANDARD | OPTIONAL | MIN. | MAX. |
| S | 1 | 180 | 224 | |
| | 2 | 224 | 280 | |
| T | 1 | 280 | 355 | |
| | 2 | 355 | 450 | |

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 are 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 are not be orderable.

CROSSING TABLE

| VISHAY | OSRAM |
|----------|----------|
| VLMW41.. | LWT67C.. |

| CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED | | | | | |
|---|--------|--------|----|--------|--------|
| | X | Y | | X | Y |
| JK | 0.2960 | 0.2590 | ML | 0.3189 | 0.3302 |
| | 0.2910 | 0.2680 | | 0.3288 | 0.3452 |
| | 0.3005 | 0.2825 | | 0.3288 | 0.3282 |
| | 0.3045 | 0.2715 | | 0.3197 | 0.3131 |
| JL | 0.2910 | 0.2680 | NK | 0.3288 | 0.3081 |
| | 0.2850 | 0.2790 | | 0.3288 | 0.3282 |
| | 0.2960 | 0.2955 | | 0.3386 | 0.3426 |
| | 0.3005 | 0.2825 | | 0.3386 | 0.3235 |
| KK | 0.3045 | 0.2715 | NL | 0.3288 | 0.3282 |
| | 0.3005 | 0.2825 | | 0.3288 | 0.3453 |
| | 0.3100 | 0.2970 | | 0.3386 | 0.3591 |
| | 0.3130 | 0.2840 | | 0.3386 | 0.3426 |
| KL | 0.3005 | 0.2825 | OK | 0.3386 | 0.3235 |
| | 0.2960 | 0.2955 | | 0.3386 | 0.3426 |
| | 0.3070 | 0.3120 | | 0.3484 | 0.3571 |
| | 0.3100 | 0.2970 | | 0.3484 | 0.3388 |
| LK | 0.3100 | 0.2970 | OL | 0.3386 | 0.3426 |
| | 0.3197 | 0.3131 | | 0.3386 | 0.3591 |
| | 0.3205 | 0.2956 | | 0.3484 | 0.3730 |
| | 0.3130 | 0.2840 | | 0.3484 | 0.3571 |
| LL | 0.3070 | 0.3120 | PK | 0.3484 | 0.3388 |
| | 0.3189 | 0.3302 | | 0.3484 | 0.3571 |
| | 0.3197 | 0.3131 | | 0.3582 | 0.3715 |
| | 0.3100 | 0.2970 | | 0.3582 | 0.3542 |
| MK | 0.3197 | 0.3131 | PL | 0.3484 | 0.3571 |
| | 0.3288 | 0.3282 | | 0.3484 | 0.3730 |
| | 0.3288 | 0.3081 | | 0.3582 | 0.3792 |
| | 0.3205 | 0.2956 | | 0.3582 | 0.3715 |

Note:

Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01 .

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

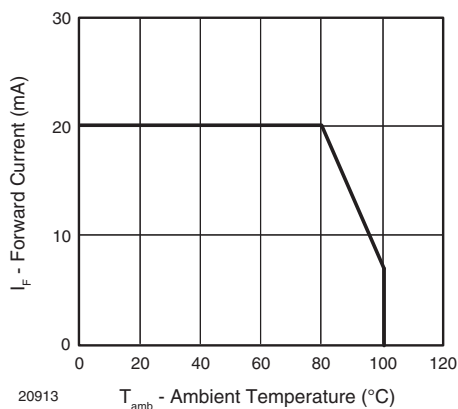


Figure 1. Forward Current vs. Ambient Temperature

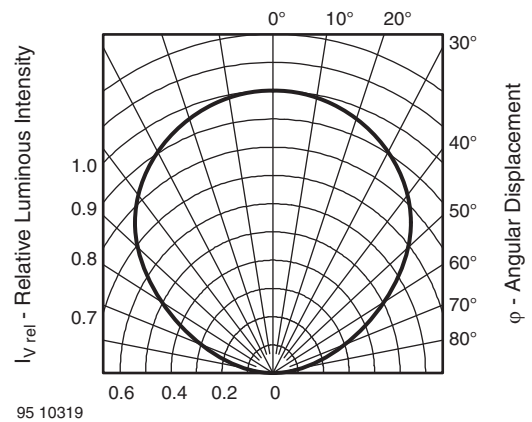


Figure 2. Rel. Luminous Intensity vs. Angular Displacement



Figure 3. Relative Intensity vs. Wavelength



Figure 6. Chromaticity Coordinate Shift vs. Forward Current



Figure 4. Forward Current vs. Forward Voltage



Figure 7. Rel. Luminous Intensity vs. Ambient Temperature



Figure 5. Relative Luminous Intensity vs. Forward Current



Figure 8. Forward Voltage vs. Ambient Temperature



Figure 9. Coordinates of Colorgroups

PACKAGE DIMENSIONS in millimeters



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METHOD OF TAPING/POLARITY AND TAPE AND REEL

SMD LED (VLM.3.../.4... - 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.



TAPING OF VLM.3.../.4...



Figure 10. Tape Dimensions in mm for PLCC-2

REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS08 (= 1500 PCS.)



Figure 11. Reel Dimensions - GS08

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



Figure 12. Reel Dimensions - GS18

SOLDERING PROFILE



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

REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS08 (= 1500 PCS.)

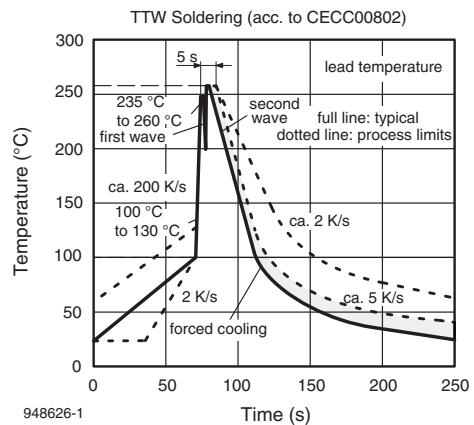
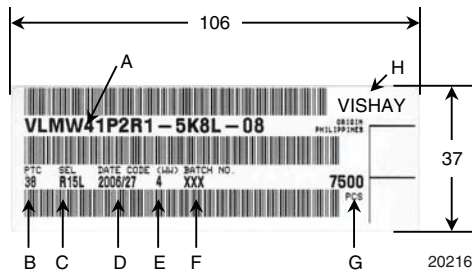


Figure 14. Double Wave Soldering of Opto Devices (all Packages)

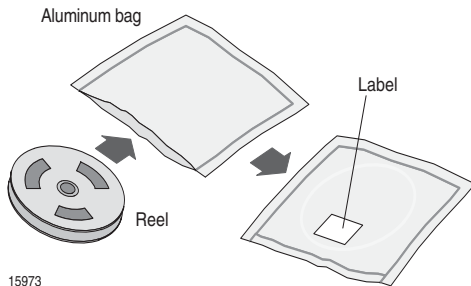
**BAR CODE PRODUCT LABEL
EXAMPLE:**



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):
e.g.: R1 = code for luminous intensity group
5L = code for chrom. coordinate group
- D) Date code year/week
- E) Day code (e.g. 4: Thursday)
- 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:

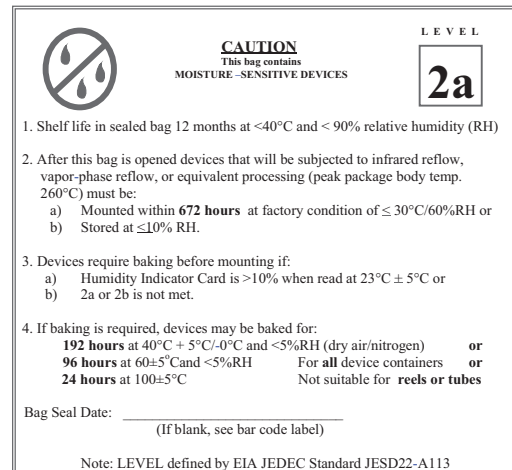
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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.

**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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