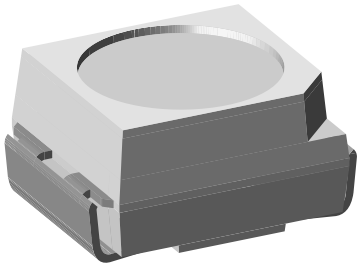
# Power SMD LED PLCC-2



## DESCRIPTION

The VLM.334.. series is an advanced modification of the Vishay VLM.31.. series. It is designed to incorporate larger chips, therefore, capable of withstanding a 70 mA drive current.

The package of the VLM.334.. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

## PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: power
- Angle of half intensity: ± 60°

## FEATURES

- Utilizing latest advanced AlInGaP technology
- Available in 8 mm tape
- Luminous intensity and color categorized per packing unit
- Luminous intensity ratio per packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- Thermal resistance R = 300 K/W
- ESD-withstand voltage: Up to 2 kV according to JESD22-A114-B
- Preconditioning according to JEDEC® level 2a
- Compatible with reflow, vapor phase and wave 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

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

## APPLICATIONS

- Traffic signals and signs
- Interior and exterior lighting
- Dashboard illumination
- Indicator and backlighting purposes for audio, video, LCDs switches, symbols, illuminated advertising etc.

**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. | | |
| VLMS334AABB-GS08 | Super red | 1120 | 1600 | 2800 | 50 | 626 | 630 | 639 | 50 | 1.9 | 2.2 | 2.8 | 50 | AlInGaP on Si |
| VLMR334BACB-GS08 | Red | 1800 | 2200 | 4500 | 50 | 619 | 625 | 631 | 50 | 1.9 | 2.2 | 2.8 | 50 | AlInGaP on Si |
| VLMK334BACB-GS08 | Orange red | 1800 | 2800 | 4500 | 50 | 611 | 616 | 622 | 50 | 1.9 | 2.25 | 2.8 | 50 | AlInGaP on Si |
| VLMY334BACB-GS08 | Yellow | 1800 | 2300 | 4500 | 50 | 583 | 589 | 594 | 50 | 1.9 | 2.3 | 2.8 | 50 | AlInGaP on Si |


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| **ABSOLUTE MAXIMUM RATINGS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLMS334..., VLMR334..., VLMK334..., VLMY334...** | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| Reverse voltage [1] | Short term application only | $V_R$ | 5 | V |
| DC forward current | $T_{amb} \leq 65$ °C (300 K/W) | $I_F$ | 70 | mA |
| Surge forward current | $t_p \leq 10$ µs | $I_{FSM}$ | 0.1 | A |
| Power dissipation | | $P_V$ | 200 | mW |
| Junction temperature | | $T_j$ | 125 | °C |
| Operating temperature range | | $T_{amb}$ | -40 to +100 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +100 | °C |
| Thermal resistance junction to ambient | Mounted on PC board (pad size > 16 mm²) | $R_{thJA}$ | 300 | K/W |

**Note**

[1] Driving the LED in reverse direction is suitable for a short term application

| **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLMS334.., SUPER RED** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Luminous intensity | $I_F$ = 50 mA | VLMS334AABB | $I_V$ | 1120 | 1600 | 2800 | mcd |
| Luminous flux/luminous intensity | | | $\phi_V/I_V$ | - | 3 | - | mlm/mcd |
| Dominant wavelength | $I_F$ = 50 mA | | $\lambda_d$ | 626 | 630 | 639 | nm |
| Peak wavelength | $I_F$ = 50 mA | | $\lambda_p$ | - | 639 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 50 mA | | $\Delta\lambda$ | - | 18 | - | nm |
| Angle of half intensity | $I_F$ = 50 mA | | $\varphi$ | - | ± 60 | - | ° |
| Forward voltage | $I_F$ = 50 mA | | $V_F$ | 1.9 | 2.2 | 2.8 | V |
| Reverse current | $V_R$ = 5 V | | $I_R$ | - | 0.01 | 10 | µA |

| **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLMR334.., RED** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Luminous intensity | $I_F$ = 50 mA | VLMR334BACB | $I_V$ | 1800 | 2200 | 4500 | mcd |
| Luminous flux/luminous intensity | | | $\phi_V/I_V$ | - | 3 | - | mlm/mcd |
| Dominant wavelength | $I_F$ = 50 mA | | $\lambda_d$ | 619 | 625 | 631 | nm |
| Peak wavelength | $I_F$ = 50 mA | | $\lambda_p$ | - | 632 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 50 mA | | $\Delta\lambda$ | - | 18 | - | nm |
| Angle of half intensity | $I_F$ = 50 mA | | $\varphi$ | - | ± 60 | - | ° |
| Forward voltage | $I_F$ = 50 mA | | $V_F$ | 1.9 | 2.2 | 2.8 | V |
| Reverse current | $V_R$ = 5 V | | $I_R$ | - | 0.01 | 10 | µA |

| **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLMK334.., ORANGE RED** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Luminous intensity | $I_F$ = 50 mA | VLMK334BACB | $I_V$ | 1800 | 2800 | 4500 | mcd |
| Luminous flux/luminous intensity | | | $\phi_V/I_V$ | - | 3 | - | mlm/mcd |
| Dominant wavelength | $I_F$ = 50 mA | | $\lambda_d$ | 611 | 616 | 622 | nm |
| Peak wavelength | $I_F$ = 50 mA | | $\lambda_p$ | - | 622 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 50 mA | | $\Delta\lambda$ | - | 18 | - | nm |
| Angle of half intensity | $I_F$ = 50 mA | | $\varphi$ | - | ± 60 | - | ° |
| Forward voltage | $I_F$ = 50 mA | | $V_F$ | 1.9 | 2.25 | 2.8 | V |
| Reverse current | $V_R$ = 5 V | | $I_R$ | - | 0.01 | 10 | µA |


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## OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)
## VLMY334.., YELLOW

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity | $I_F$ = 50 mA | VLMY334BACB | $I_V$ | 1800 | 2300 | 4500 | mcd |
| Luminous flux/luminous intensity | | | $\phi_V/I_V$ | - | 3 | - | mlm/mcd |
| Dominant wavelength | $I_F$ = 50 mA | | $\lambda_d$ | 583 | 589 | 594 | nm |
| Peak wavelength | $I_F$ = 50 mA | | $\lambda_p$ | - | 591 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 50 mA | | $\Delta\lambda$ | - | 17 | - | nm |
| Angle of half intensity | $I_F$ = 50 mA | | $\varphi$ | - | ± 60 | - | ° |
| Forward voltage | $I_F$ = 50 mA | | $V_F$ | 1.9 | 2.3 | 2.8 | V |
| Reverse current | $V_R$ = 5 V | | $I_R$ | - | 0.01 | 10 | µA |

## COLOR CLASSIFICATION

| GROUP | DOM. WAVELENGTH (nm) | | | |
|---|---|---|---|---|
| | ORANGE RED | | YELLOW | |
| | MIN. | MAX. | MIN. | MAX. |
| 1 | 611 | 618 | - | - |
| 2 | 614 | 622 | 583 | 586 |
| 3 | - | - | 585 | 588 |
| 4 | - | - | 587 | 590 |
| 5 | - | - | 589 | 592 |
| 6 | - | - | 591 | 594 |

**Note**

- Wavelengths are tested at a current pulse duration of 25 ms

## LUMINOUS INTENSITY CLASSIFICATION

| GROUP | LIGHT INTENSITY (mcd) | |
|---|---|---|
| STANDARD | MIN. | MAX. |
| AA | 1120 | 1400 |
| AB | 1400 | 1800 |
| BA | 1800 | 2240 |
| BB | 2240 | 2800 |
| CA | 2800 | 3550 |
| CB | 3550 | 4500 |

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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

## CROSSING TABLE

| VISHAY | OSRAM |
|---|---|
| VLMS334AABB | LS T67F-T2V2-1-1 |
| VLMR334BACB | LR T67F-U1AA-1-1 |
| VLMK334BACB | LA T67F-U2AB-24-1 |
| VLMY334BACB | LY T67F-U1AA-36-1 |


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**TYPICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

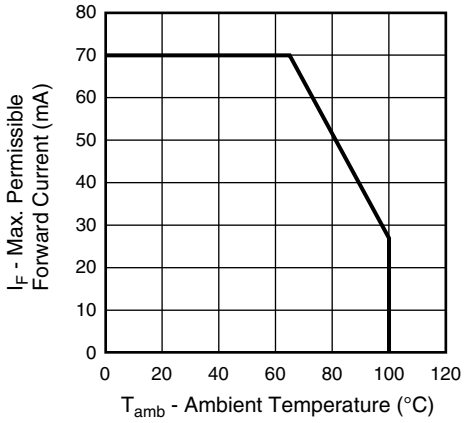



Fig. 1 - Maximum Permissible Forward Current vs. Ambient Temperature

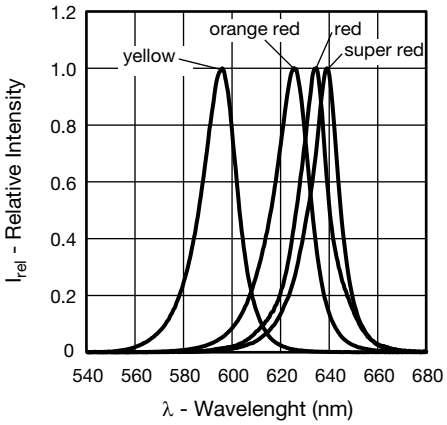



Fig. 4 - Relative Intensity vs. Wavelength

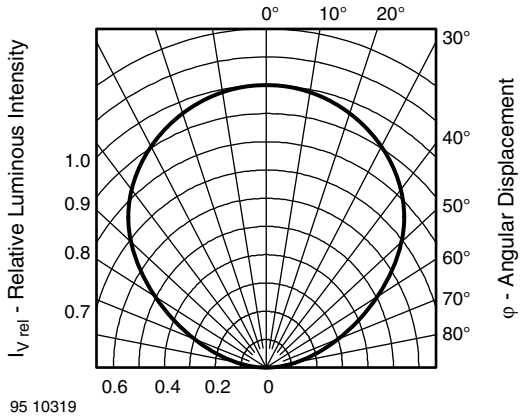



Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

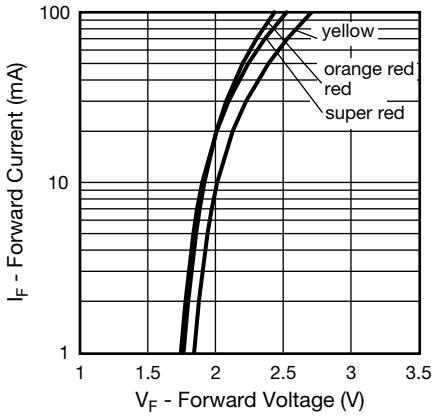



Fig. 5 - Forward Current vs. Forward Voltage

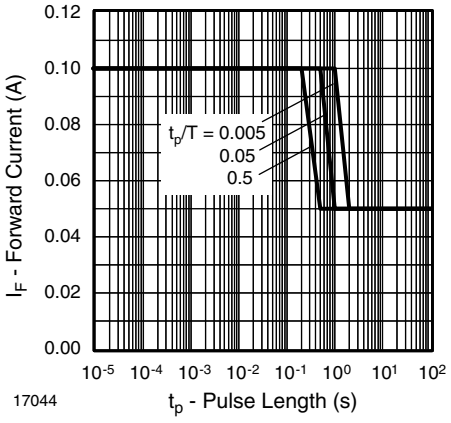



Fig. 3 - Forward Current vs. Pulse Length

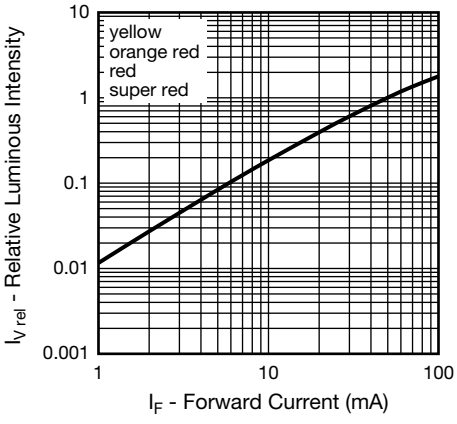



Fig. 6 - Relative Luminous Intensity vs. Forward Current


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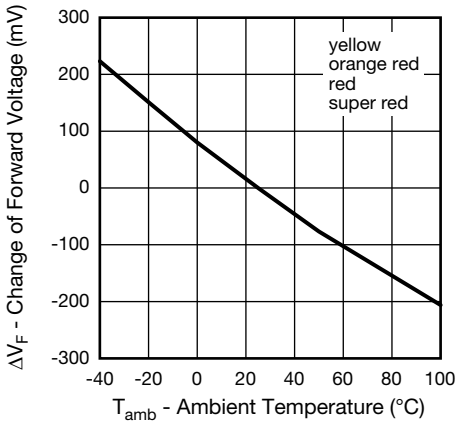



Fig. 7 - Change of Forward Voltage vs. Ambient Temperature

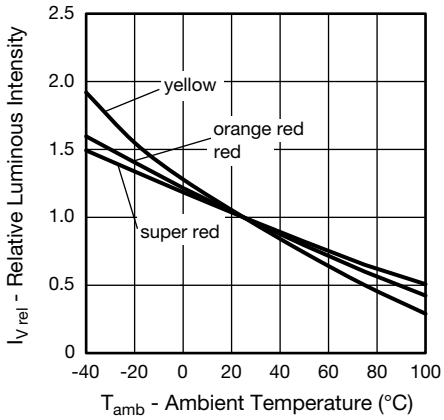



Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

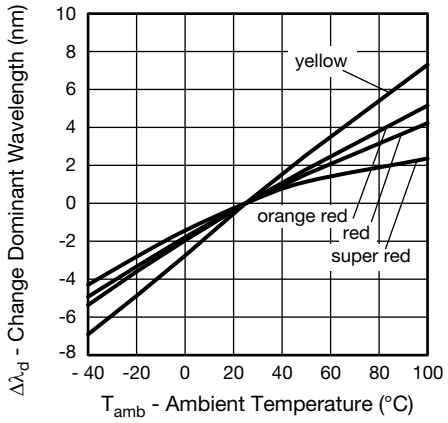
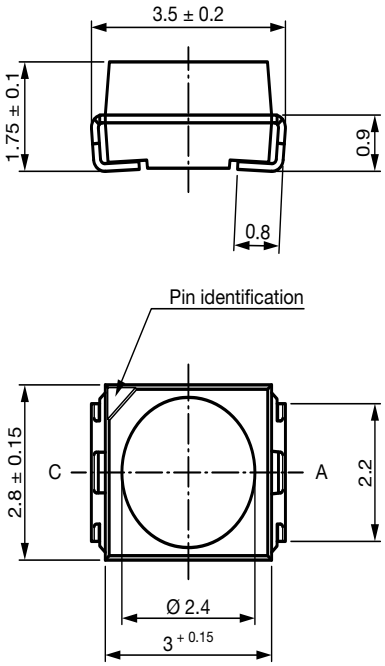



Fig. 9 - Change of Dominant Wavelength vs. Ambient Temperature


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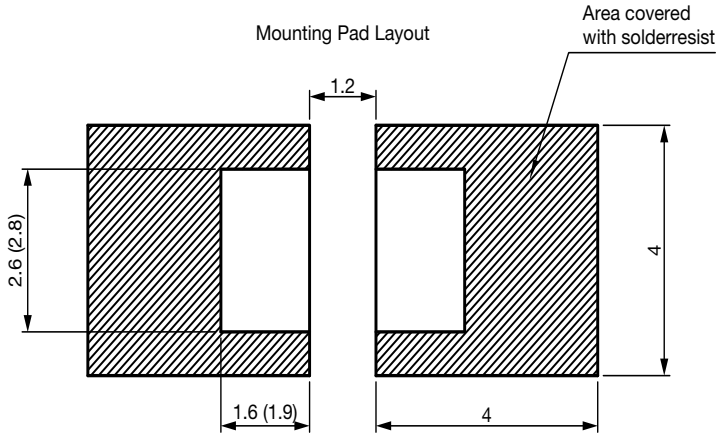
**PACKAGE DIMENSIONS** in millimeters




Technical drawings according to DIN specifications

Not indicated tolerances ± 0.1 mm

Drawing-No.: 6.541-5067.01-4
Issue: 10; 02.05.2023



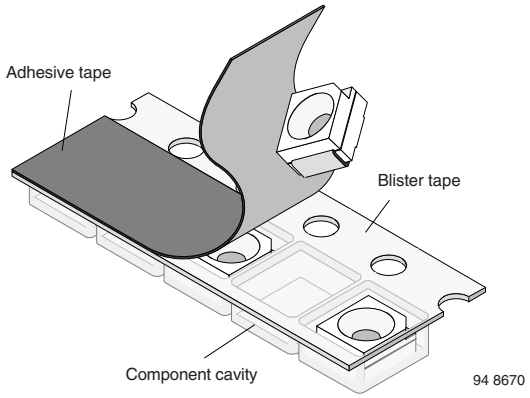

Dimensions: reflow and vapor phase (wave soldering)


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## METHOD OF TAPING / POLARITY AND TAPE AND REEL

### SMD LED (VLMx334..-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 VLMx334..

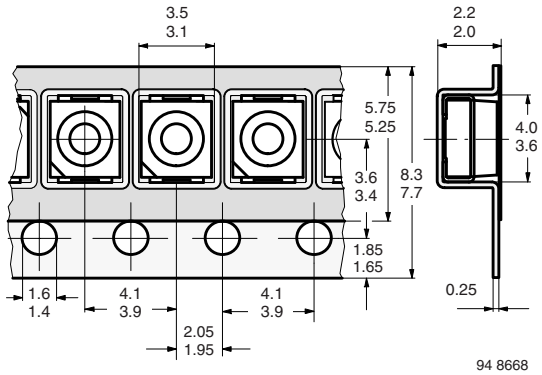



Fig. 10 - Tape Dimensions in mm for PLCC-2

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

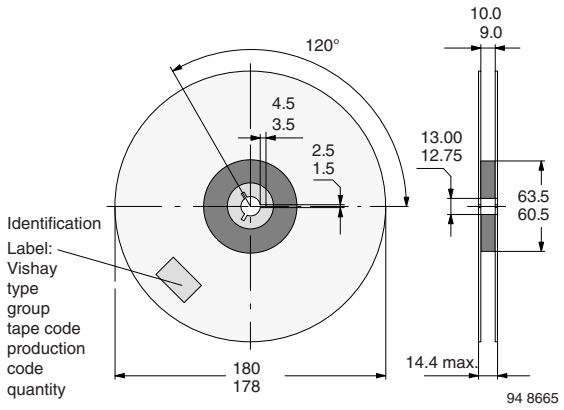



Fig. 11 - Reel Dimensions - GS08

### SOLDERING PROFILE

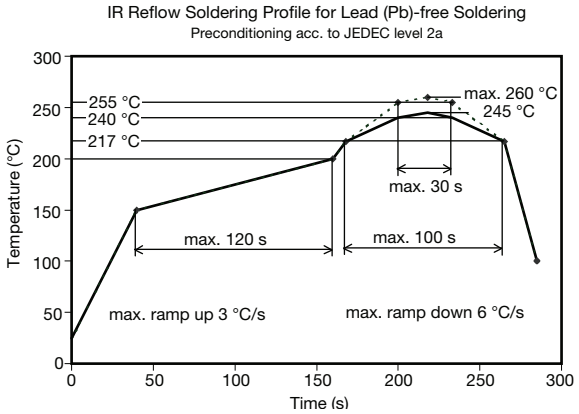



Fig. 12 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

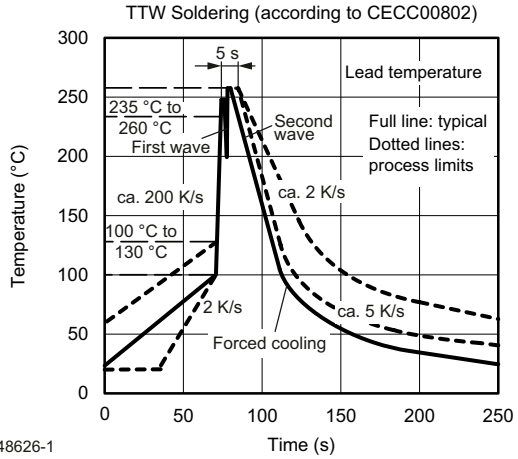



Fig. 13 - Double Wave Soldering of Opto Devices (all Packages)

| PACKING INFORMATION | | | |
|---|---|---|---|
| PART | PIECES PER REEL | REELS PER BOX | MOQ (1) |
| VLMx334xxxx-GS08 | 1500 | 5 | 7500 |

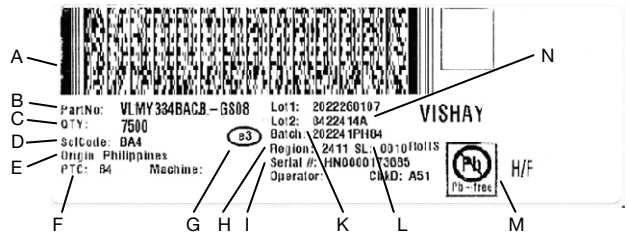
**Note**

(1) MOQ = minumum order quantity



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## BAR CODE PRODUCT LABEL (example only)




A. 2D barcode

B. Vishay part number

C. Quantity

D. PTC = selection code (binning)

E. Code of manufacturing plant

F. Batch = date code: year/week/plant code

G. Region code

H. SL = sales location

I. Terminations finishing

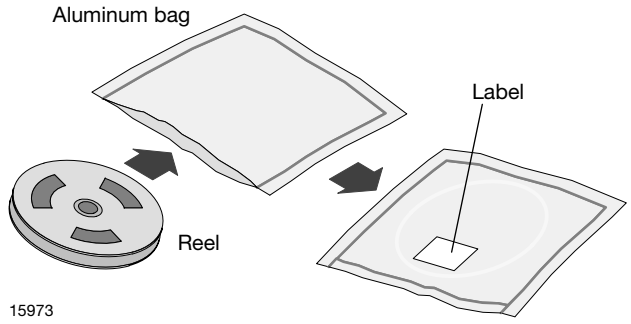
K. Lead (Pb)-free symbol

L. Halogen-free symbol

M. RoHS symbol

## 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.

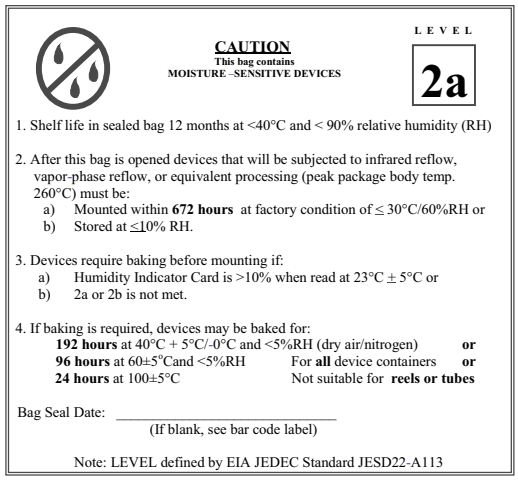
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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. Electrostatic sensitive devices warning labels are on the packaging.

## VISHAY SEMICONDUCTORS STANDARD BAR CODE LABEL

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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