



Highbright 0603 ChipLED



DESCRIPTION

The new ChipLED series have been designed in the smallest SMD package. This innovative ChipLED technology opens the way to

- smaller products of higher performance
- more design-in flexibility
- enhanced applications

The 0603 LED is an obvious solution for small-scale, high brightness products that are expected to work reliably in an arduous environment.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0603 ChipLED
- Product series: power
- Angle of half intensity: $\pm 73^\circ$

FEATURES

- Super thin ChipLED with exceptional brightness 1.6 mm x 0.8 mm x 0.55 mm (L x W x H)
- High reliability PCB based
- Wavelength typ. 525 nm (true green)
- InGaN technology
- Viewing angle: extremely wide 146°
- Grouping parameter: luminous intensity, dominant wavelength, and forward voltage
- Available in 8 mm tape on 7" diameter reel
- Compatible to IR reflow soldering
- Preconditioning according to JEDEC® level 2a
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Wearables
- Backlight keypads
- Navigation systems
- Cellular phone displays
- Displays for industrial control systems
- Miniaturized color effects
- Traffic displays
- Heart rate monitoring

| 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. | | |
| VLMTG1400-GS08 | True green | 1200 | 1400 | 2800 | 20 | 515 | 525 | 535 | 20 | 2.45 | 2.80 | 3.05 | 20 | InGaN |
| VLMTG1401-GS08 | True green | 1200 | 1400 | 2800 | 20 | 515 | 525 | 535 | 20 | 2.60 | 2.80 | 3.05 | 20 | InGaN |
| VLMTG1402-GS08 | True green | 1200 | 1400 | 2800 | 20 | 520 | 527 | 535 | 20 | 2.45 | 2.80 | 3.05 | 20 | InGaN |

| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|--|-------------------|--------------|------|
| VLMTG1400, VLMTG1401 (InGaN technology) | | | | |
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| DC forward current | | I _F | 20 | mA |
| Surge forward current | 1/10 duty cycle, 0.1 ms pulse width | I _{FSM} | 100 | mA |
| Power dissipation | T _{amb} ≤ 25 °C | P _V | 64 | mW |
| Operating temperature range | | T _{amb} | -40 to +80 | °C |
| Storage temperature range | | T _{stg} | -40 to +100 | °C |
| IREL solder conditions | According Vishay specifications | T _{st} | 260 | °C |
| Thermal resistance junction-to-ambient | Mounted on PCB (pad size > 5 mm ²) | R _{thJA} | 550 | K/W |
| ESD rating | HBM, CDM, MM | V _{ESD} | 300, 500, 50 | V |



OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) VLMTG1400, VLMTG1401, TRUE GREEN

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|--|------------------------|-------------------------|----------------|------|------|------|-------|
| Luminous intensity | I _F = 20 mA | | I _v | 1200 | 1400 | 2800 | mcd |
| Radiant intensity | I _F = 20 mA | | I _e | - | 2.8 | - | mW/sr |
| Conversion factor between flux and intensity | | | Φ/I | - | 4.8 | - | sr |
| Dominant wavelength | I _F = 20 mA | VLMTG1400, VLMTG1401 | λ _d | 515 | 525 | 535 | nm |
| | | VLMTG1402 | λ _d | 520 | 527 | 535 | nm |
| Peak wavelength | I _F = 20 mA | | λ _p | - | 518 | - | nm |
| Angle of half intensity | I _F = 20 mA | | φ | - | ± 73 | - | ° |
| Spectral line half width | I _F = 20 mA | | Δλ | - | 35 | - | nm |
| Forward voltage | I _F = 20 mA | VLMTG1400, VLMTG1402 | V _F | 2.45 | 2.80 | 3.05 | V |
| | I _F = 20 mA | VLMTG1401 | V _F | 2.60 | 2.80 | 3.05 | V |
| Reverse current | V _R = 5 V | | I _R | - | - | 10 | μA |

| LUMINOUS INTENSITY CLASSIFICATION | | |
|-----------------------------------|--------------------------|------|
| GROUP | LUMINOUS INTENSITY (mcd) | |
| | MIN. | MAX. |
| W | 1200 | 1800 |
| X | 1800 | 2800 |

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 15 %.
- 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 in any one reel.
- In order to ensure availability, single wavelength groups will not be orderable. Also single forward voltage groups are not orderable.

| COLOR CLASSIFICATION | | | |
|----------------------|-------|--------------------------|------|
| COLOR | GROUP | DOMINANT WAVELENGTH (nm) | |
| | | MIN. | MAX. |
| True green | AN | 515 | 520 |
| | AP | 520 | 525 |
| | AQ | 525 | 530 |
| | AR | 530 | 535 |

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm

| FORWARD VOLTAGE CLASSIFICATION | | | |
|--------------------------------|-------|---------------------|------|
| COLOR | GROUP | FORWARD VOLTAGE (V) | |
| | | MIN. | MAX. |
| True green | J6 | 2.45 | 2.60 |
| | J7 | 2.60 | 2.75 |
| | J8 | 2.75 | 2.90 |
| | J9 | 2.90 | 3.05 |

Note

- Forward voltage is measured with a tolerance of ± 0.1 V



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

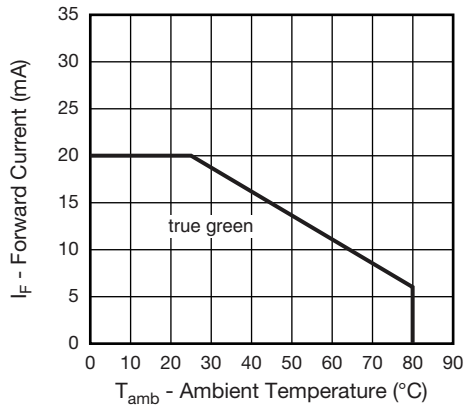


Fig. 1 - Forward Current vs. Ambient Temperature

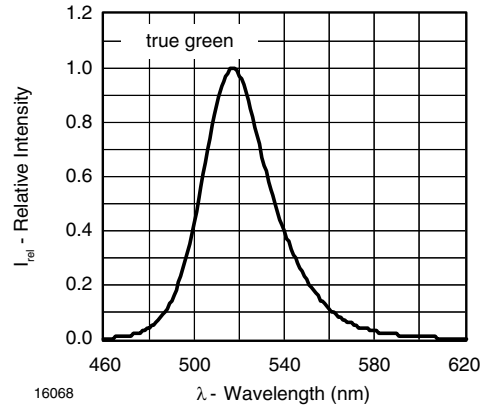


Fig. 4 - Relative Intensity vs. Wavelength

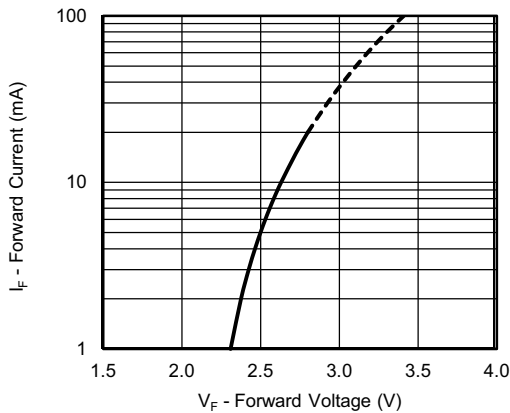


Fig. 2 - Forward Current vs. Forward Voltage

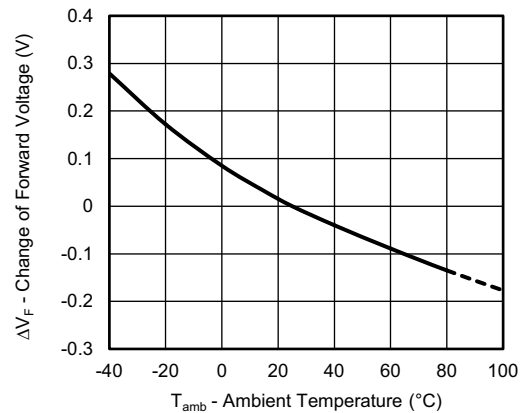


Fig. 5 - Change of Forward Voltage vs. Ambient Temperature

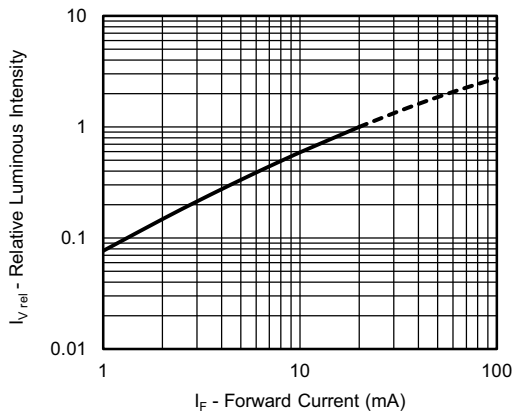


Fig. 3 - Relative Luminous Intensity vs. Forward Current

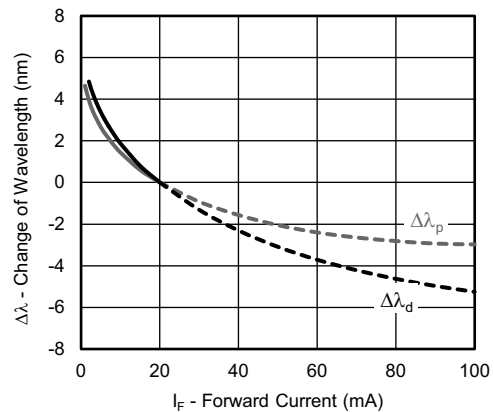


Fig. 6 - Change of Wavelength vs. Forward Current

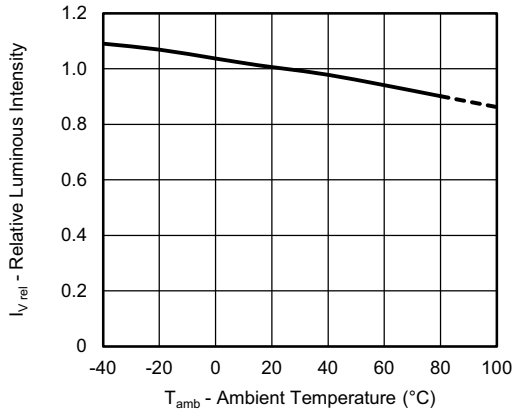


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

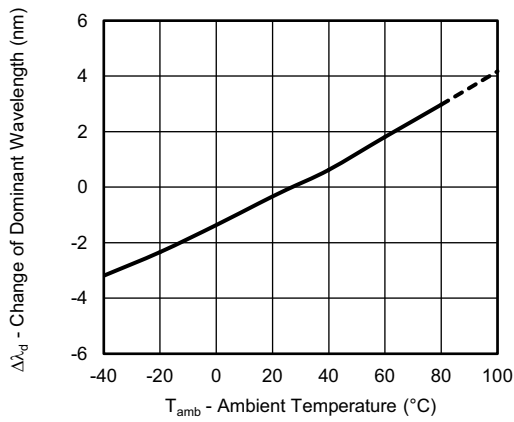


Fig. 8 - Change of Dominant Wavelength vs. Ambient Temperature

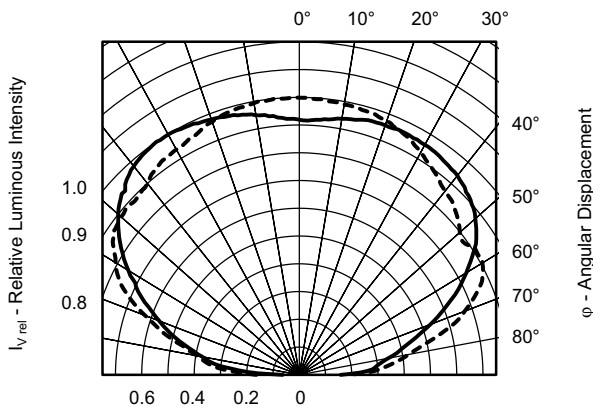
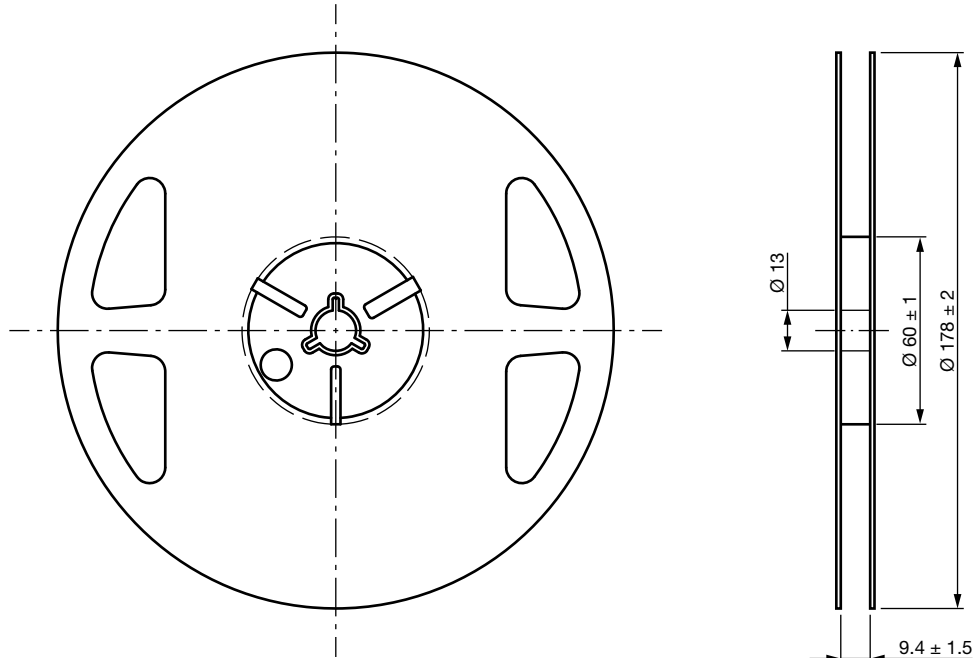


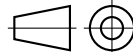
Fig. 9 - Relative Luminous Intensity vs. Angular Displacement



REEL DIMENSIONS in millimeters



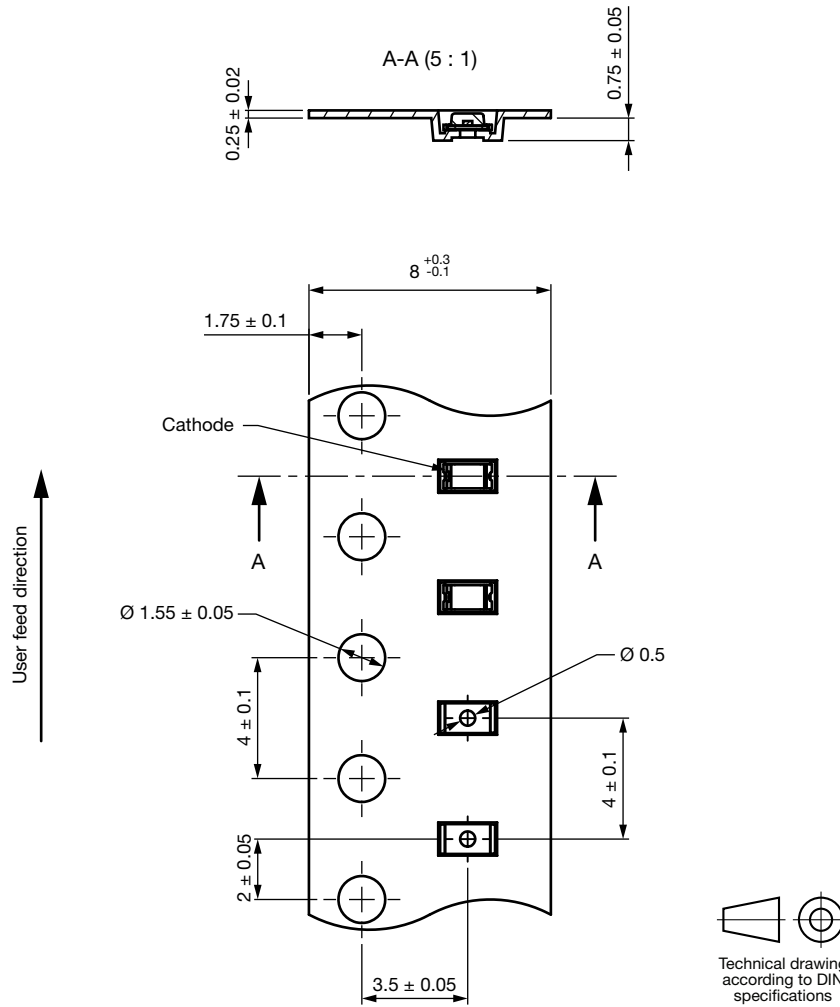
Drawing-No.: 9.800-5122.01-4
Issue: 2; 03.11.11


Technical drawing
according to DIN
specifications

3000 pieces on one reel
Minimum order quantity: 9000 pieces



TAPE DIMENSIONS in millimeters

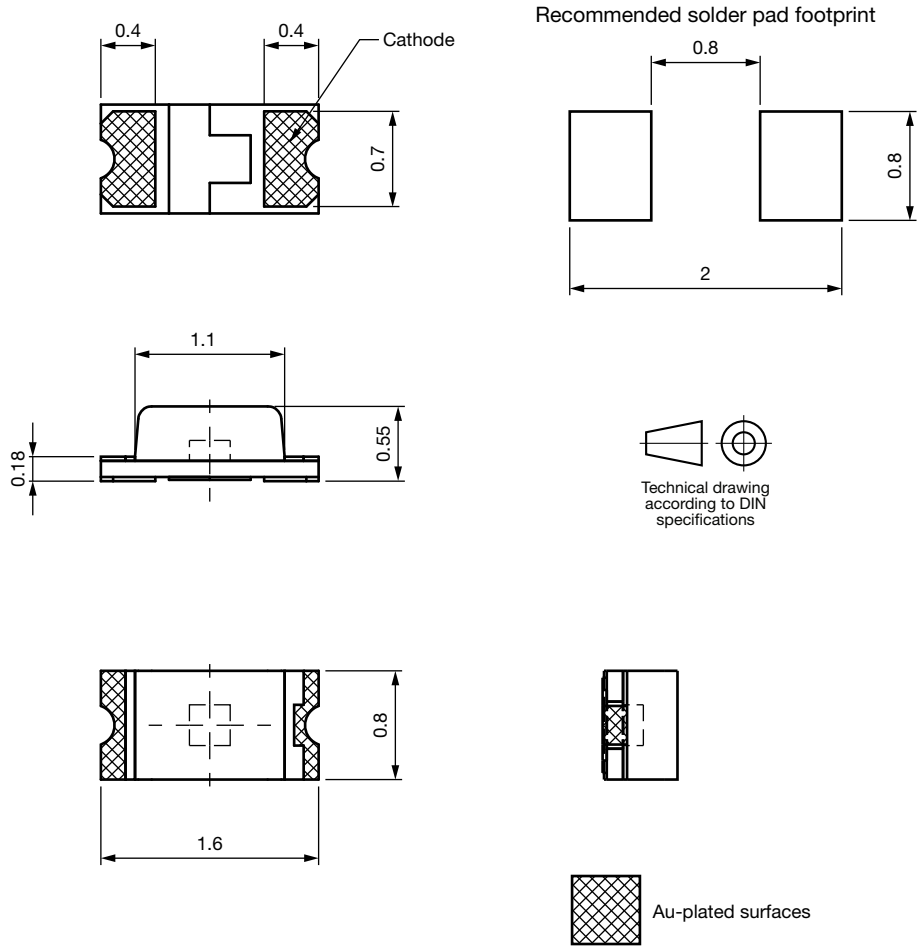


Drawing-No.: 9.700-5407.01-4
Issue: prel; 24.03.17

Not indicated tolerances ± 0.1 mm.

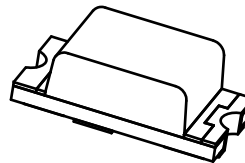


PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.1 mm.

Drawing-No.: 6.541-5116.01-4
Issue: prel; 29.03.17



SOLDERING PROFILE

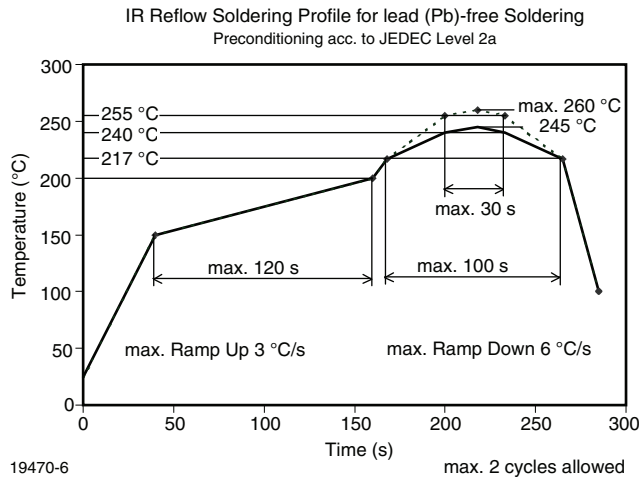
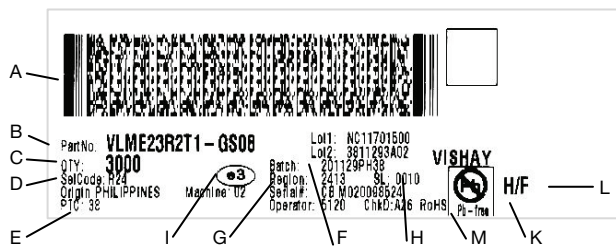


Fig. 10 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

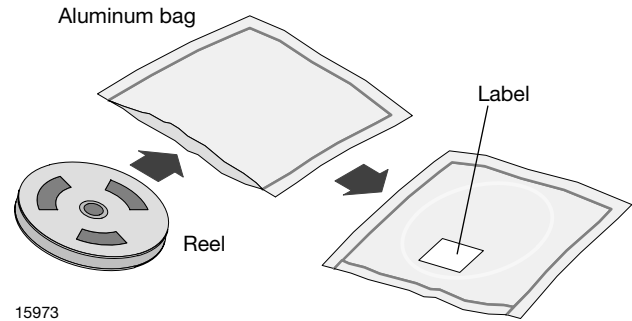
BAR CODE PRODUCT LABEL (example only)



- A. 2D barcode
- B. Vishay part number
- C. Quantity
- D. SelCode = selection code (binning)
- E. PTC = 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

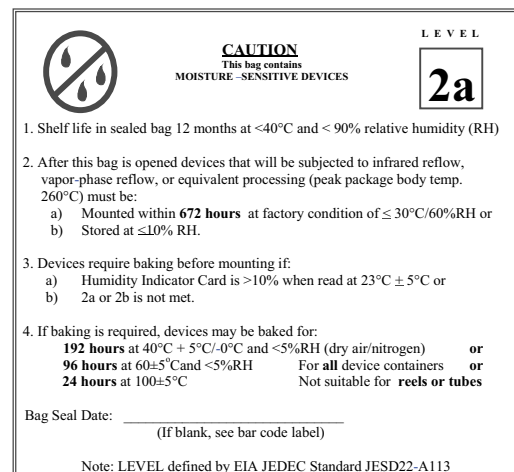
Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- 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 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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