# Dome Lens SMD LED

VLD.1232R...

VLD.1232G...

## FEATURES

- Utilizing latest advanced InGaN technology
- Package type: surface-mount
- Package form: gullwing, reverse gullwing
- Dimensions (L x W x H in mm): 2.3 x 2.3 x 2.8
- High luminous flux and luminous intensity
- 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
- Preconditioning according to JEDEC® level 2a
- Suitable for reflow soldering according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## DESCRIPTION

The dome lens SMD LED series has been designed in a small untinted and clear molded package with lens for surface mounting as gullwing or reverse gullwing version. The VLD.1232... series is using recent ultrabright InGaN / sapphire chip technology with high luminous flux.

## PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Product series: power
- Package: SMD dome lens
- Angle of half intensity: ± 9°

## APPLICATIONS

- Traffic signals and signs
- Interior and exterior lighting
- Smoke detectors
- Bio sensing
- Indicator and backlighting purposes for audio, video, LCDs switches, symbols, illuminated advertising etc.

## SAFETY ADVICES

Depending on the mode of operation, these devices emit highly concentrated blue light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 62471 “Photobiological Safety of Lamps and Lamp Systems”.

**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. | | |
| VLDB1232G-08 | Blue | 1800 | 3500 | - | 20 | 458 | 465 | 472 | 20 | 2.6 | 3.0 | 3.4 | 20 | InGaN on sapphire |
| VLDB1232R-08 | Blue | 1800 | 3500 | - | 20 | 458 | 465 | 472 | 20 | 2.6 | 3.0 | 3.4 | 20 | InGaN on sapphire |
| VLDTG1232G-08 | True green | 7100 | 16 000 | - | 20 | 515 | 525 | 541 | 20 | 2.6 | 2.9 | 3.4 | 20 | InGaN on sapphire |
| VLDTG1232R-08 | True green | 7100 | 16 000 | - | 20 | 515 | 525 | 541 | 20 | 2.6 | 2.9 | 3.4 | 20 | InGaN on sapphire |

| **ABSOLUTE MAXIMUM RATINGS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLDB1232..., VLDTG1232...** | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| Reverse voltage (1) | Short term application only | $V_R$ | 5 | V |
| DC Forward current | $T_{amb} \leq 60$ °C | $I_F$ | 30 | mA |
| Power dissipation | | $P_V$ | 100 | mW |
| Junction temperature | | $T_j$ | 100 | °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 mm$^2$) | $R_{thJA}$ | 400 | K/W |

**Note**

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

| **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLDB1232G.., VLDB1232R.., BLUE** | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Luminous intensity (1) | $I_F$ = 20 mA | $I_V$ | 1800 | 3500 | - | mcd |
| Luminous flux/luminous intensity | | $\phi_V/I_V$ | - | 0.35 | - | mlm/mcd |
| Dominant wavelength (1) | $I_F$ = 20 mA | $\lambda_d$ | 458 | 465 | 472 | nm |
| Radiant intensity | $I_F$ = 20 mA | $I_e$ | - | 62 | - | mW/sr |
| Peak wavelength | $I_F$ = 20 mA | $\lambda_p$ | - | 460 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 20 mA | $\Delta\lambda$ | - | 18 | - | nm |
| Angle of half intensity | $I_F$ = 20 mA | $\varphi$ | - | ± 9 | - | ° |
| Forward voltage (1) | $I_F$ = 20 mA | $V_F$ | 2.6 | 3.0 | 3.4 | V |
| Reverse current | $V_R$ = 5 V | $I_R$ | - | 0.01 | 10 | µA |

**Note**

(1) Tolerances: ± 15 % for $I_V$, ± 0.1 V for $V_F$, ± 1 nm for $\lambda_d$

| **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)<br>**VLDTG1232G.., VLDTG1232R.., TRUE GREEN** | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Luminous intensity (1) | $I_F$ = 20 mA | $I_V$ | 7100 | 16 000 | - | mcd |
| Luminous flux/luminous intensity | | $\phi_V/I_V$ | - | 0.35 | - | mlm/mcd |
| Dominant wavelength (1) | $I_F$ = 20 mA | $\lambda_d$ | 515 | 525 | 541 | nm |
| Radiant intensity | $I_F$ = 20 mA | $I_e$ | - | 37 | - | mW/sr |
| Peak wavelength | $I_F$ = 20 mA | $\lambda_p$ | - | 519 | - | nm |
| Spectral bandwidth at 50 % $I_{rel\ max.}$ | $I_F$ = 20 mA | $\Delta\lambda$ | - | 28 | - | nm |
| Angle of half intensity | $I_F$ = 20 mA | $\varphi$ | - | ± 9 | - | ° |
| Forward voltage (1) | $I_F$ = 20 mA | $V_F$ | 2.6 | 2.9 | 3.4 | V |
| Reverse current | $V_R$ = 5 V | $I_R$ | - | 0.01 | 10 | µA |

**Note**

(1) Tolerances: ± 15 % for $I_V$, ± 0.1 V for $V_F$, ± 1 nm for $\lambda_d$

## COLOR CLASSIFICATION

| GROUP | DOMINANT WAVELENGTH (nm) | | | |
|---|---|---|---|---|
| | BLUE | | TRUE GREEN | |
| | MIN. | MAX. | MIN. | MAX. |
| 2 | 458 | 464 | - | - |
| 3 | 462 | 468 | 515 | 523 |
| 4 | 466 | 472 | 521 | 529 |
| 5 | - | - | 527 | 535 |
| 6 | - | - | 533 | 541 |

**Note**

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

## LUMINOUS INTENSITY CLASSIFICATION - BLUE

| GROUP | LUMINOUS INTENSITY (mcd) | |
|---|---|---|
| STANDARD | MIN. | MAX. |
| BA | 1800 | 2240 |
| BB | 2240 | 2800 |
| CA | 2800 | 3550 |
| CB | 3550 | 4500 |
| DA | 4500 | 5600 |
| DB | 5600 | 7100 |

## LUMINOUS INTENSITY CLASSIFICATION - TRUE GREEN

| GROUP | LUMINOUS INTENSITY (mcd) | |
|---|---|---|
| STANDARD | MIN. | MAX. |
| EA | 7100 | 9000 |
| EB | 9000 | 11 200 |
| FA | 11 200 | 14 000 |
| FB | 14 000 | 18 000 |
| GA | 18 000 | 22 400 |
| GB | 22 400 | 28 000 |

**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 on any one reel.
  In order to ensure availability, single wavelength groups will not be orderable

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

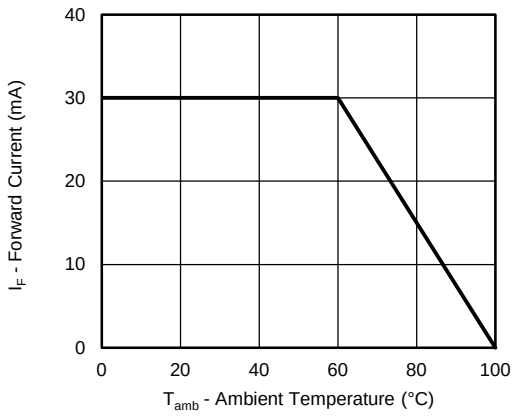



Fig. 1 - Maximum Permissible Forward Current vs. Ambient Temperature

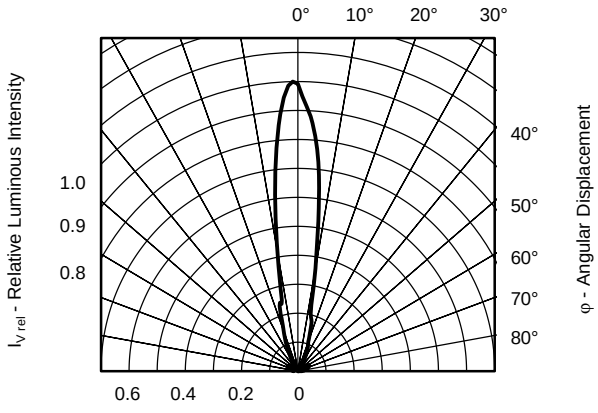



Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

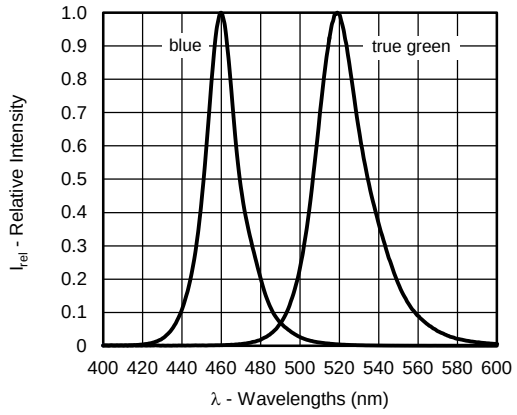



Fig. 3 - Relative Intensity vs. Wavelength

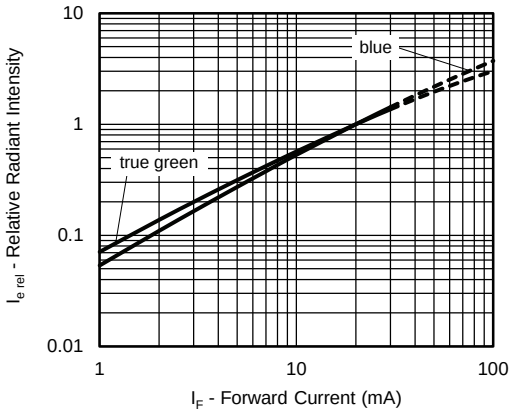



Fig. 6 - Relative Radiant Intensity vs. Forward Current

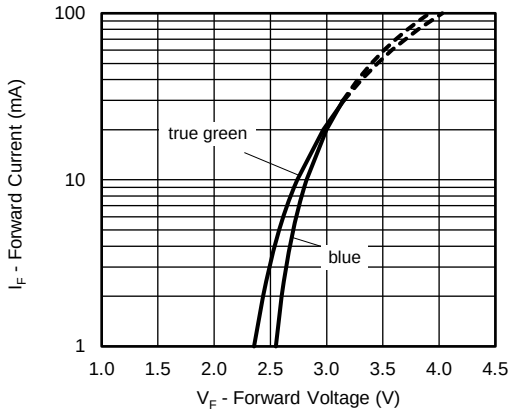



Fig. 4 - Forward Current vs. Forward Voltage

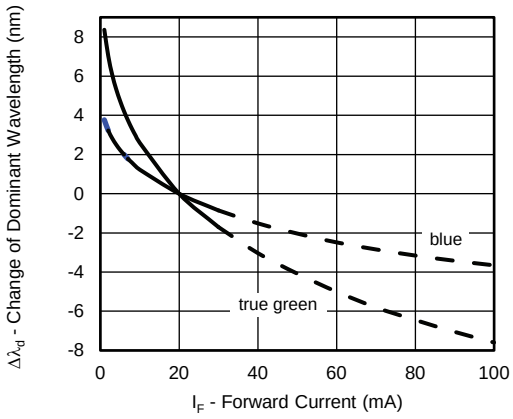



Fig. 7 - Change of Dominant Wavelength vs. Forward Current

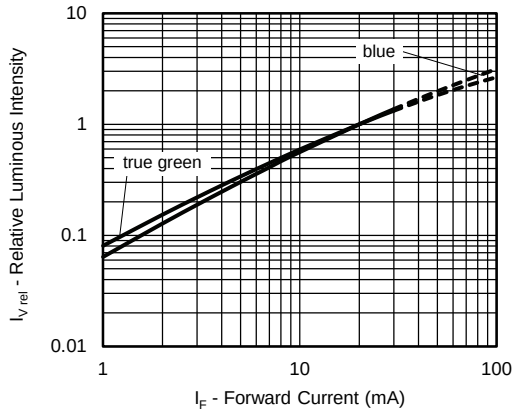



Fig. 5 - Relative Luminous Intensity vs. Forward Current

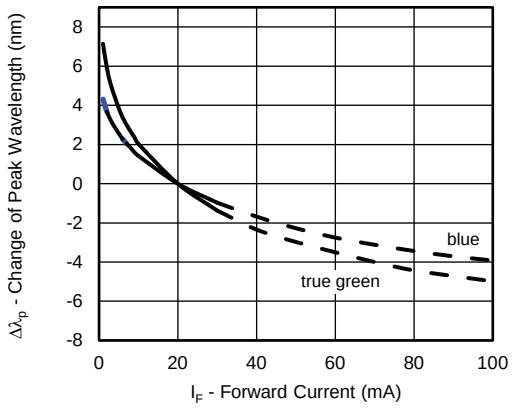



Fig. 8 - Change of Peak Wavelength vs. Forward Current

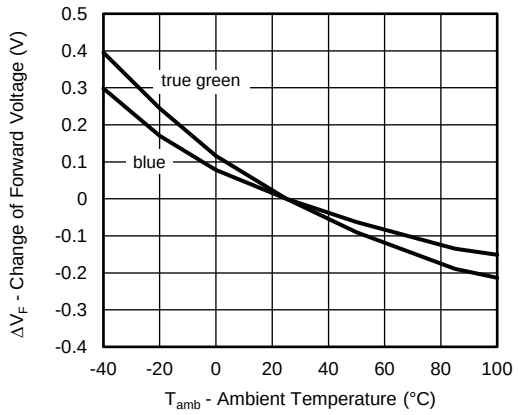



Fig. 9 - Change of Forward Voltage vs. Ambient Temperature

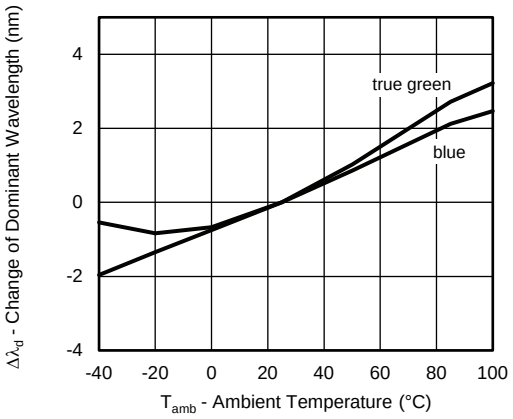



Fig. 12 - Change of Dominant Wavelength vs. Ambient Temperature

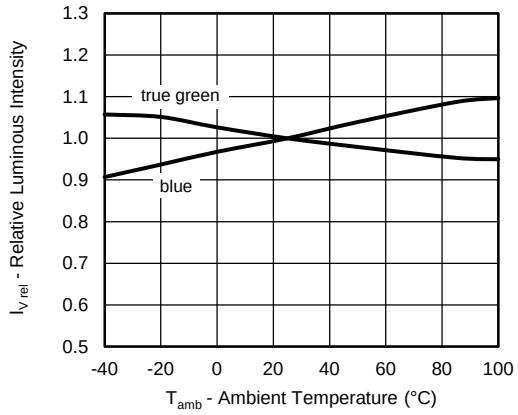



Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

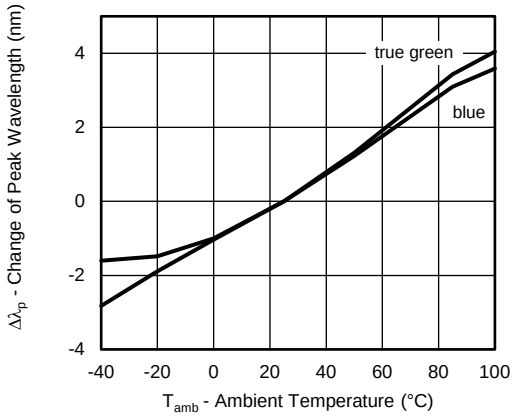



Fig. 13 - Change of Peak Wavelength vs. Ambient Temperature

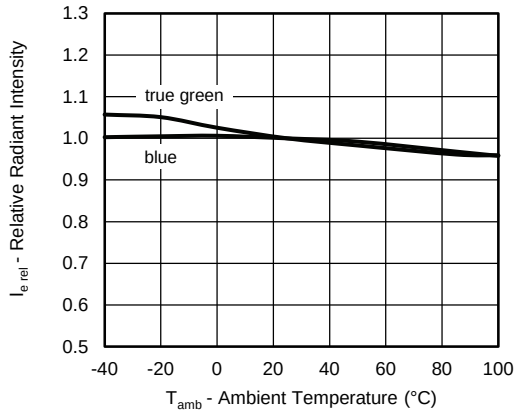
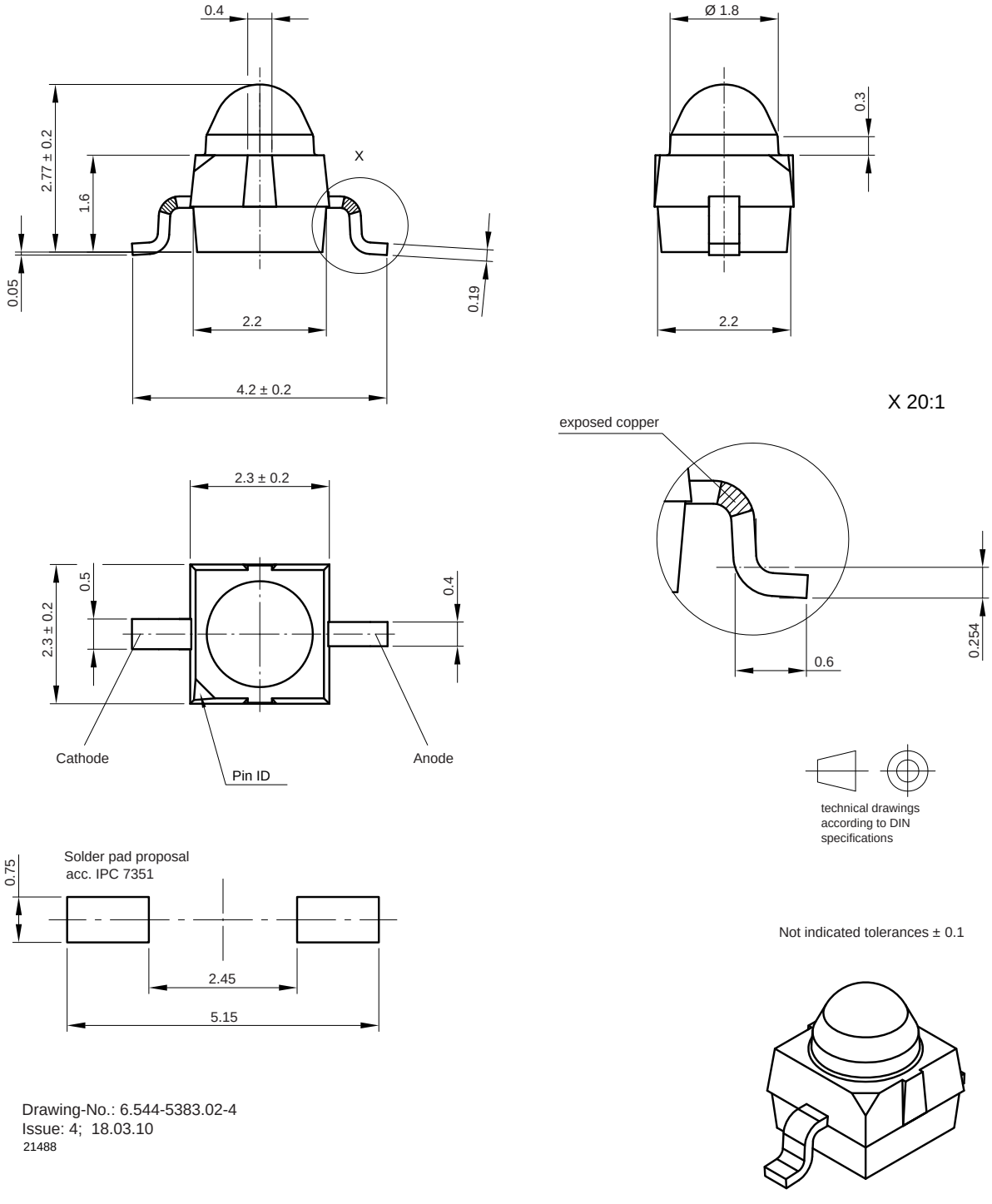


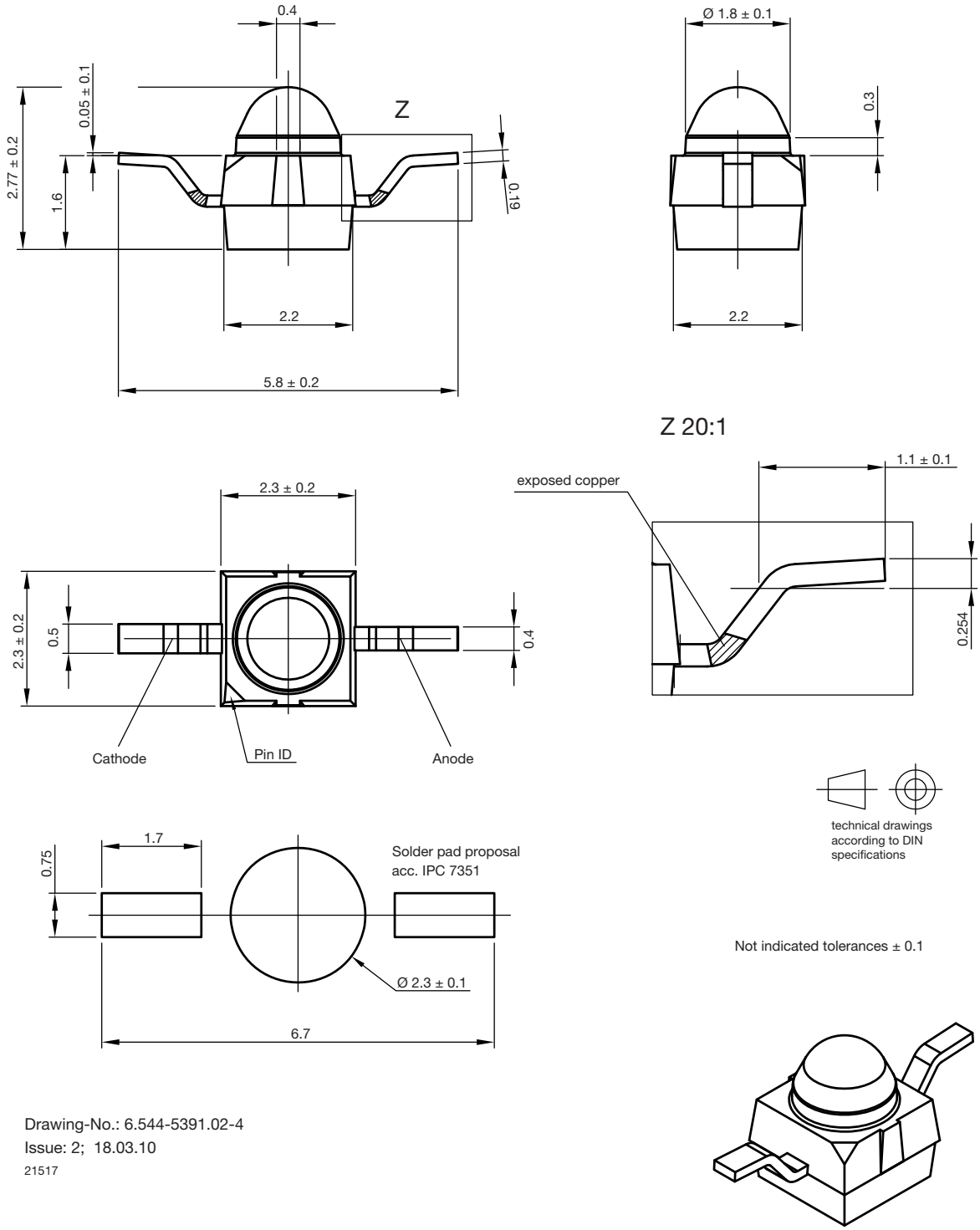

Fig. 11 - Relative Radiant Intensity vs. Ambient Temperature

**PACKAGE DIMENSIONS** in millimeters: **VLD.1232G..** (gullwing)



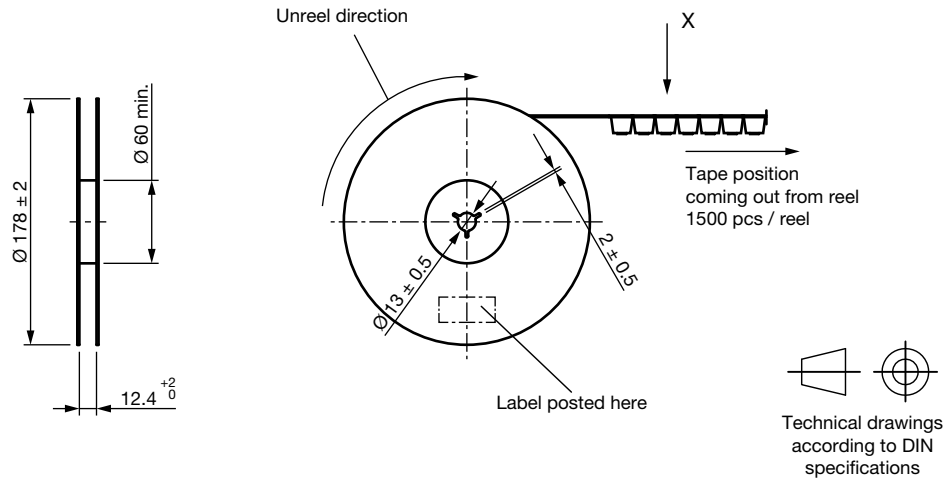

Drawing-No.: 6.544-5383.02-4
Issue: 4; 18.03.10
21488

**PACKAGE DIMENSIONS** in millimeters: **VLD.1232R..** (reverse gullwing)

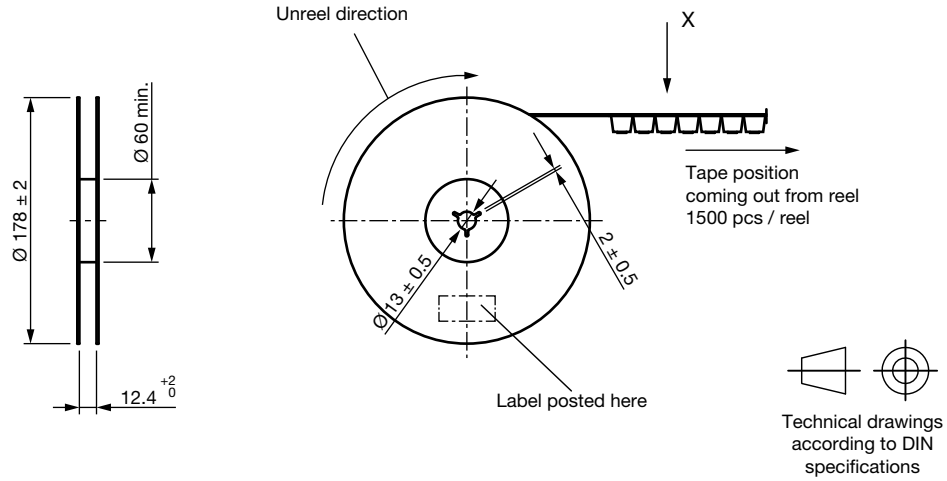



Drawing-No.: 6.544-5391.02-4
Issue: 2; 18.03.10
21517

**TAPING AND REEL DIMENSIONS** in millimeters: **VLD.1232G** (gullwing)




**TAPING AND REEL DIMENSIONS** in millimeters: **VLD.1232R** (reverse gullwing)




## COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 ± 10 mm/min

165° to 180° peel angle

## LABEL

**Standard bar code labels for finished goods**

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.

## SOLDERING PROFILE

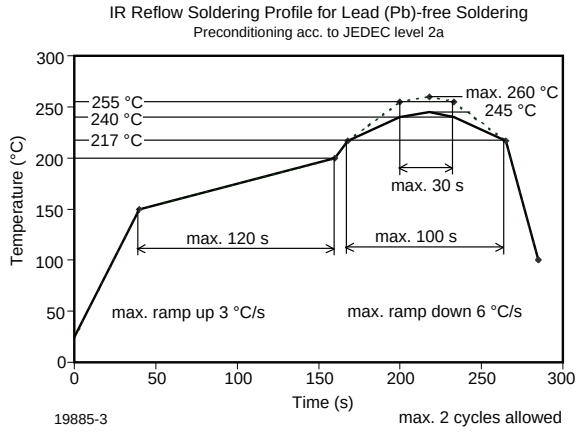
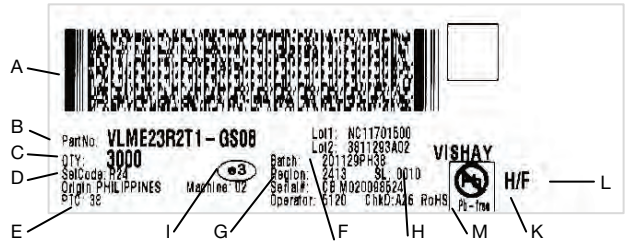



Fig. 14 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

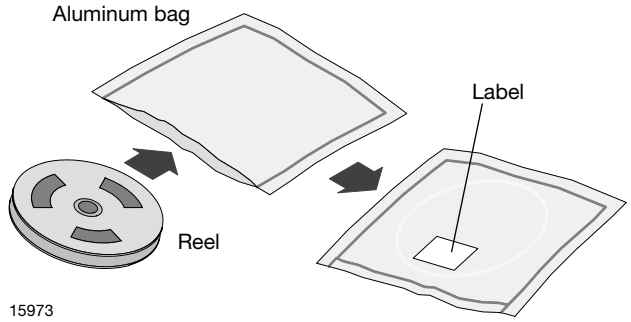
## BAR CODE PRODUCT LABEL (example)




A. 2D barcode
B. PartNo = Vishay part number
C. QTY = 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:

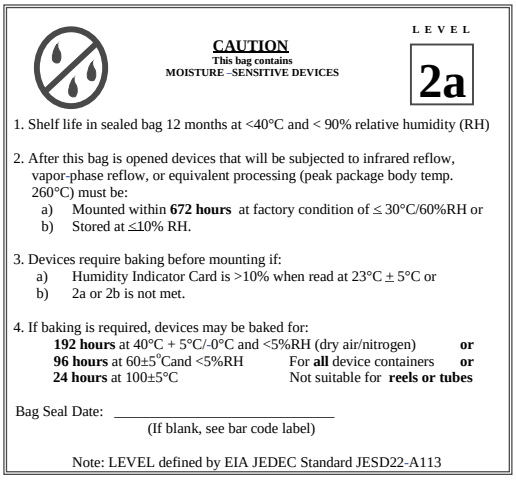
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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 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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