

## Dome Lens SMD LED

VLD.1235R...



VLD.1235G...



### 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.1235... series is using recent ultrabright AllnGaP / Si chip technology with high luminous flux and large chip size allowing a high DC forward current up to 70 mA.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Product series: power
- Package: SMD dome lens
- Angle of half intensity:  $\pm 11^\circ$

### FEATURES

- Utilizing latest advanced AllnGaP 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

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

### PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (mcd)			at I <sub>F</sub> (mA)	WAVELENGTH (nm)			at I <sub>F</sub> (mA)	FORWARD VOLTAGE (V)			at I <sub>F</sub> (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VLDS1235G	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDS1235R	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDR1235G	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDR1235R	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDK1235G	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AllnGaP on Si
VLDK1235R	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AllnGaP on Si
VLDY1235G	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AllnGaP on Si
VLDY1235R	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AllnGaP on Si
VLDS1235G-08	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDS1235R-08	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDR1235G-08	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDR1235R-08	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AllnGaP on Si
VLDK1235G-08	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AllnGaP on Si
VLDK1235R-08	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AllnGaP on Si
VLDY1235G-08	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AllnGaP on Si
VLDY1235R-08	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AllnGaP on Si



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLDS1235..., VLDR1235..., VLDK1235..., VLDY1235...</b>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>	Short term application only	$V_R$	5	V
DC Forward current	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	$I_F$	70	mA
Power dissipation		$P_V$	200	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^{\circ}\text{C}$
Thermal resistance junction-to-ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	$R_{thJA}$	325	K/W

**Note**

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLDS1235G, VLDS1235R, SUPER RED</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 50\text{ mA}$	$I_V$	5600	11 000	22 400	mcd
Luminous flux/luminous intensity		$\phi_V/I_V$	-	0.5	-	mlm/mcd
Dominant wavelength <sup>(1)</sup>	$I_F = 50\text{ mA}$	$\lambda_d$	626	630	637	nm
Peak wavelength	$I_F = 50\text{ mA}$	$\lambda_p$	-	639	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$	$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$	$\phi$	-	$\pm 11$	-	deg
Forward voltage <sup>(1)</sup>	$I_F = 50\text{ mA}$	$V_F$	1.9	2.2	2.7	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	0.01	10	$\mu\text{A}$

**Note**

<sup>(1)</sup> Tolerances:  $\pm 15\%$  for  $I_V$ ,  $\pm 0.1\text{ V}$  for  $V_F$ ,  $\pm 1\text{ nm}$  for  $\lambda_d$

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLDR1235G, VLDR1235R, RED</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 50\text{ mA}$	$I_V$	9000	14 500	35 500	mcd
Luminous flux/luminous intensity		$\phi_V/I_V$	-	0.5	-	mlm/mcd
Dominant wavelength <sup>(1)</sup>	$I_F = 50\text{ mA}$	$\lambda_d$	619	624	631	nm
Peak wavelength	$I_F = 50\text{ mA}$	$\lambda_p$	-	632	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$	$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$	$\phi$	-	$\pm 11$	-	deg
Forward voltage <sup>(1)</sup>	$I_F = 50\text{ mA}$	$V_F$	1.9	2.2	2.7	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	0.01	10	$\mu\text{A}$

**Note**

<sup>(1)</sup> Tolerances:  $\pm 15\%$  for  $I_V$ ,  $\pm 0.1\text{ V}$  for  $V_F$ ,  $\pm 1\text{ nm}$  for  $\lambda_d$

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLDK1235G, VLDK1235R, AMBER</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 50\text{ mA}$	$I_V$	9000	18 000	35 500	mcd
Luminous flux/luminous intensity		$\phi_V/I_V$	-	0.5	-	mlm/mcd
Dominant wavelength <sup>(1)</sup>	$I_F = 50\text{ mA}$	$\lambda_d$	611	616	621	nm
Peak wavelength	$I_F = 50\text{ mA}$	$\lambda_p$	-	622	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$	$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 50\text{ mA}$	$\phi$	-	$\pm 11$	-	deg
Forward voltage <sup>(1)</sup>	$I_F = 50\text{ mA}$	$V_F$	1.9	2.25	2.7	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	0.01	10	$\mu\text{A}$

**Note**

<sup>(1)</sup> Tolerances:  $\pm 15\%$  for  $I_V$ ,  $\pm 0.1\text{ V}$  for  $V_F$ ,  $\pm 1\text{ nm}$  for  $\lambda_d$

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLDY1235G, VLDY1235R, YELLOW**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 50\text{ mA}$	$I_V$	9000	18 000	35 500	mcd
Luminous flux/luminous intensity		$\phi_V/I_V$	-	0.5	-	mlm/mcd
Dominant wavelength <sup>(1)</sup>	$I_F = 50\text{ mA}$	$\lambda_d$	583	589	595	nm
Peak wavelength	$I_F = 50\text{ mA}$	$\lambda_p$	-	591	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	$I_F = 50\text{ mA}$	$\Delta\lambda$		17		nm
Angle of half intensity	$I_F = 50\text{ mA}$	$\phi$		$\pm 11$		deg
Forward voltage <sup>(1)</sup>	$I_F = 50\text{ mA}$	$V_F$	1.9	2.3	2.7	V
Reverse current	$V_R = 5\text{ V}$	$I_R$		0.01	10	$\mu\text{A}$

**Note**

- <sup>(1)</sup> Tolerances:  $\pm 15\%$  for  $I_V$ ,  $\pm 0.1\text{ V}$  for  $V_F$ ,  $\pm 1\text{ nm}$  for  $\lambda_d$

**COLOR CLASSIFICATION**

GROUP	DOMINANT WAVELENGTH (nm)			
	AMBER		YELLOW	
	MIN.	MAX.	MIN.	MAX.
2	611	616		
3	616	621	583	586
4			586	589
5			589	592
6			592	595

**Note**

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of  $\pm 1\text{ nm}$

**LUMINOUS INTENSITY CLASSIFICATION**

GROUP STANDARD	LUMINOUS INTENSITY (mcd)	
	MIN.	MAX.
DB	5600	7100
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
HA	28 000	35 500

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 15\%$ .  
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

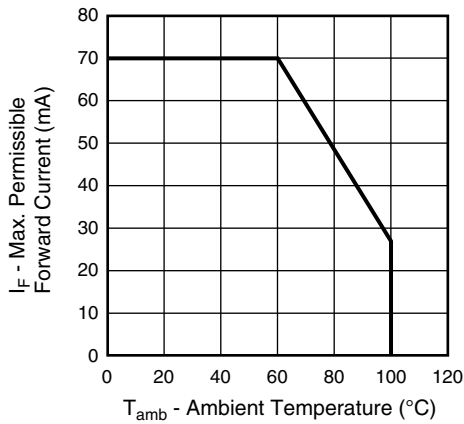
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


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

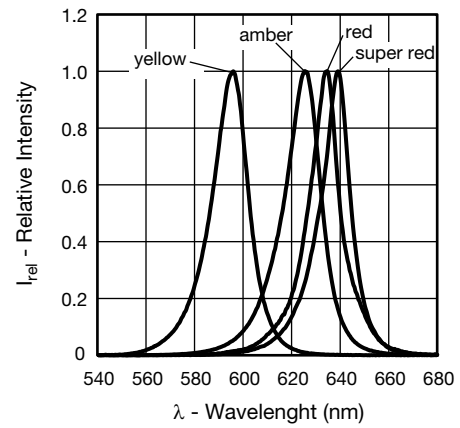


Fig. 4 - Relative Intensity vs. Wavelength

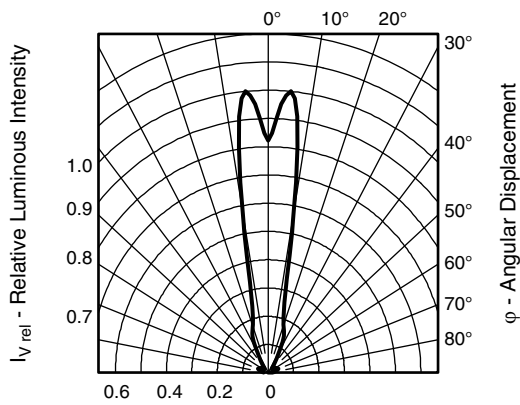


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

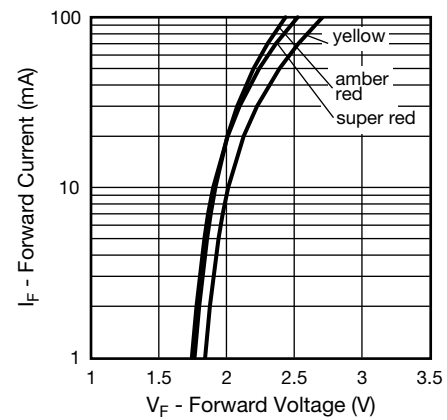


Fig. 5 - Forward Current vs. Forward Voltage

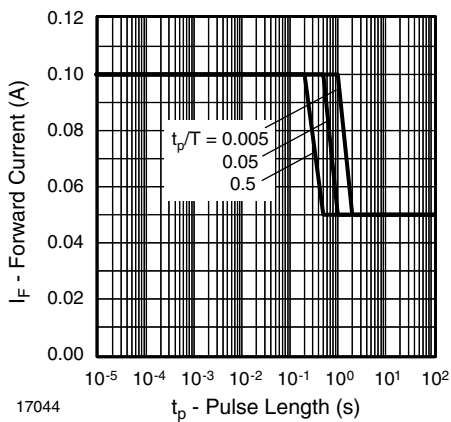


Fig. 3 - Forward Current vs. Pulse Length

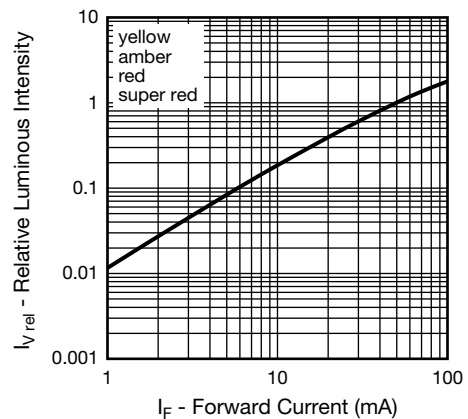


Fig. 6 - Relative Luminous Intensity vs. Forward Current

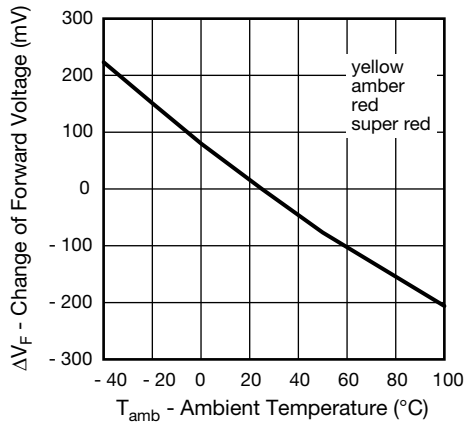


Fig. 7 - Change of Forward Voltage vs. Ambient Temperature

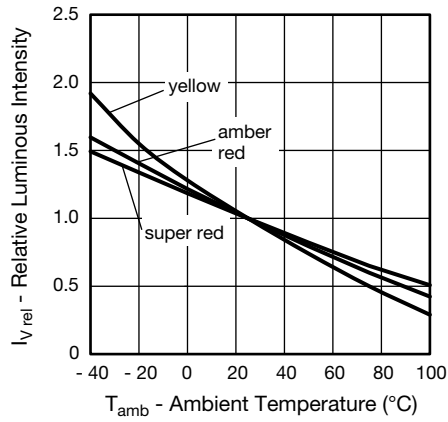


Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

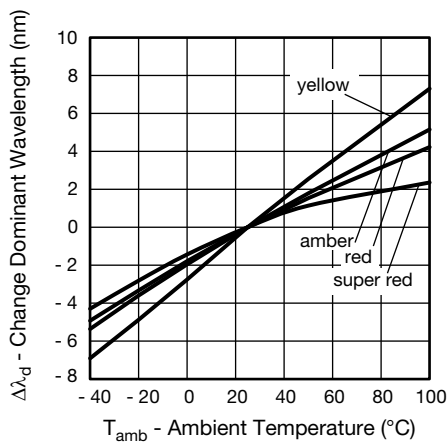
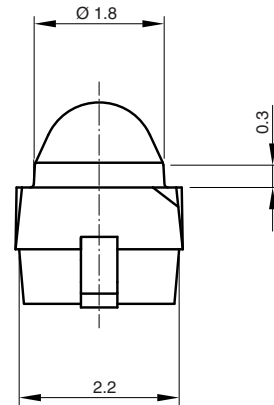
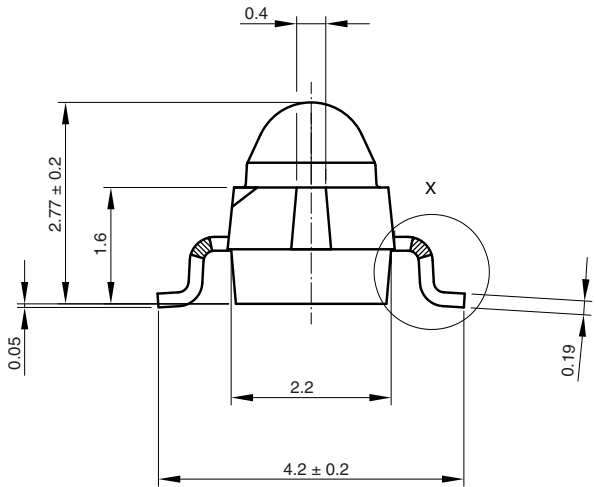


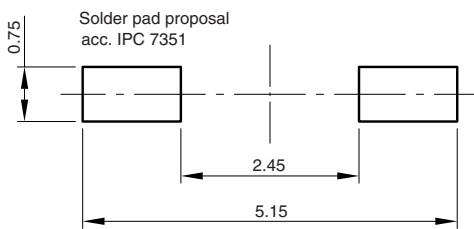
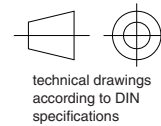
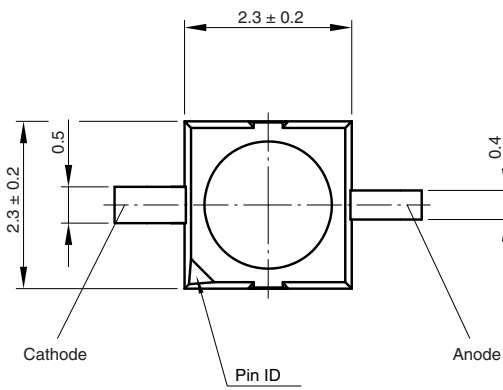
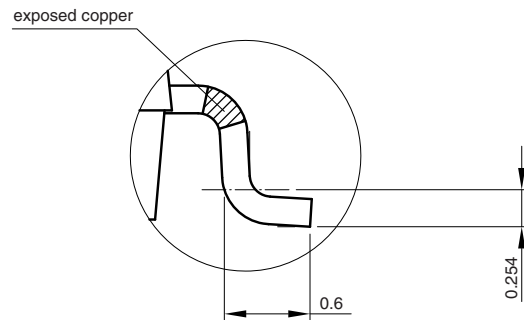
Fig. 9 - Change of Dominant Wavelength vs. Ambient Temperature



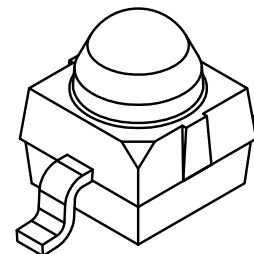
**PACKAGE DIMENSIONS** in millimeters: **VLD.1235G..** (gullwing)



X 20:1



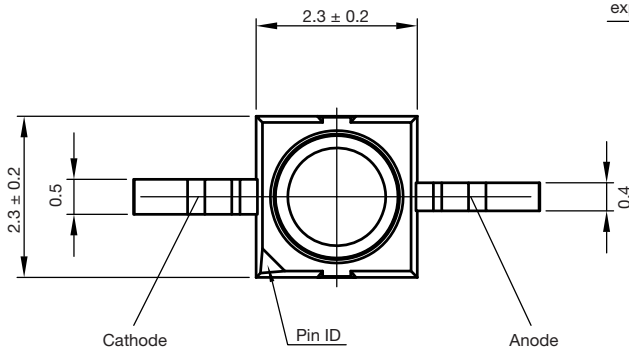
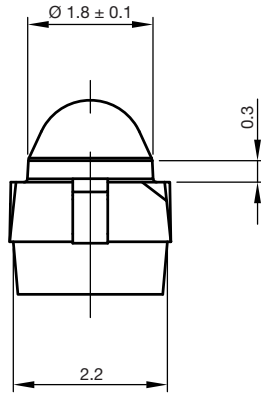
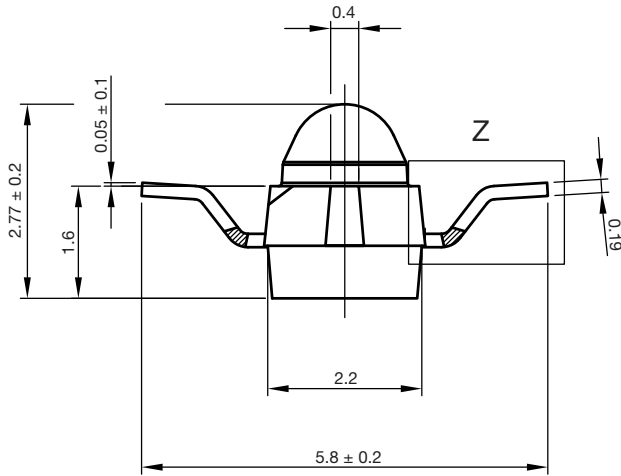
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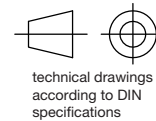
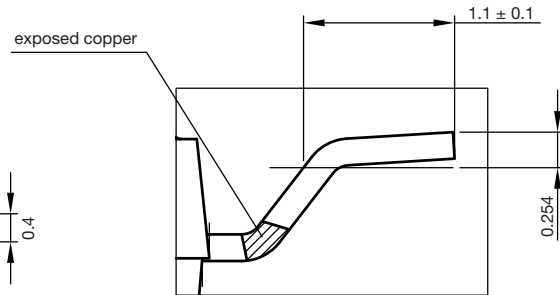
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 Issue: 4; 18.03.10  
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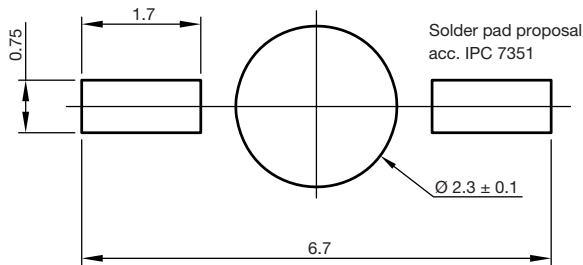
## PACKAGE DIMENSIONS in millimeters: **VLD.1235R..** (reverse gullwing)



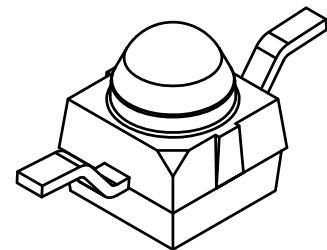
Z 20:1



Not indicated tolerances ± 0.1

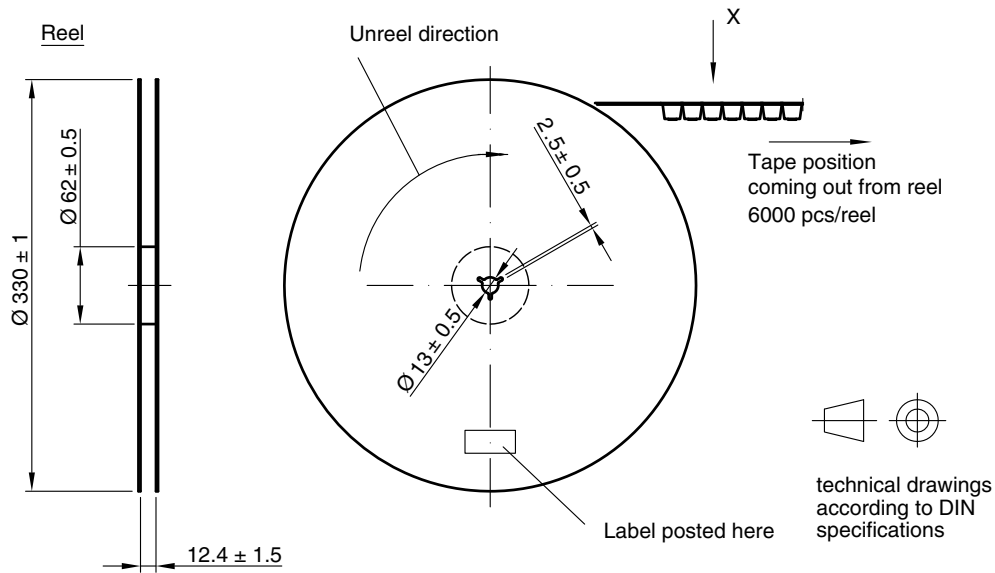


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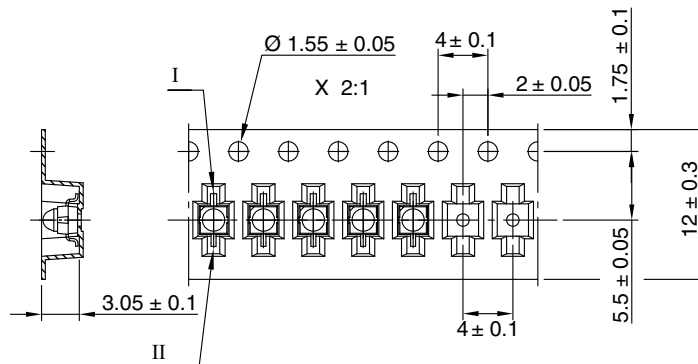
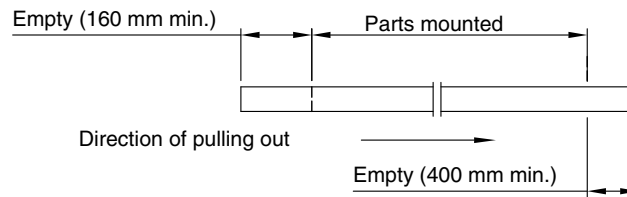




## TAPING AND REEL DIMENSIONS in millimeters: **VLD.1235G** (gullwing)



### Leader and trailer tape:

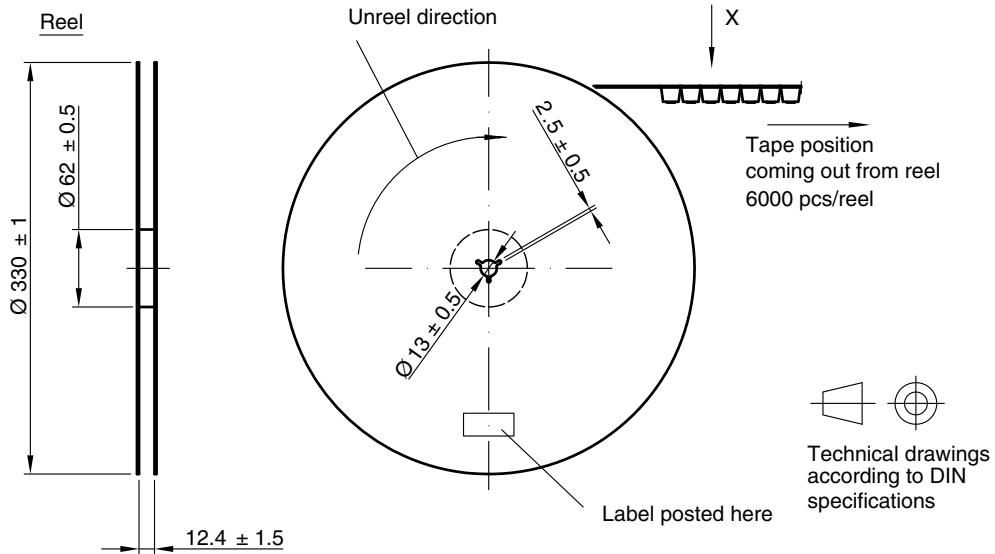


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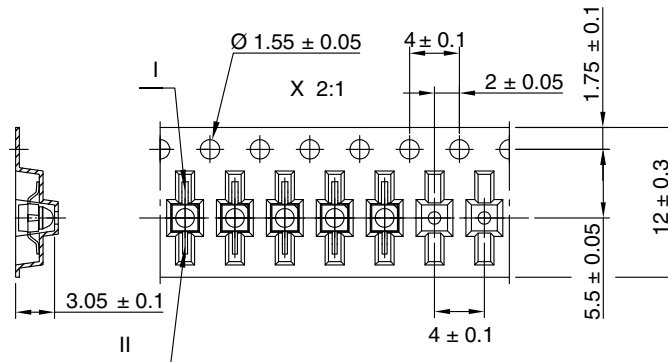
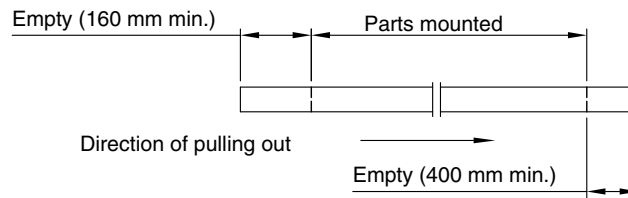




## TAPING AND REEL DIMENSIONS in millimeters: **VLD.1235R** (reverse gullwing)



### Leader and trailer tape:

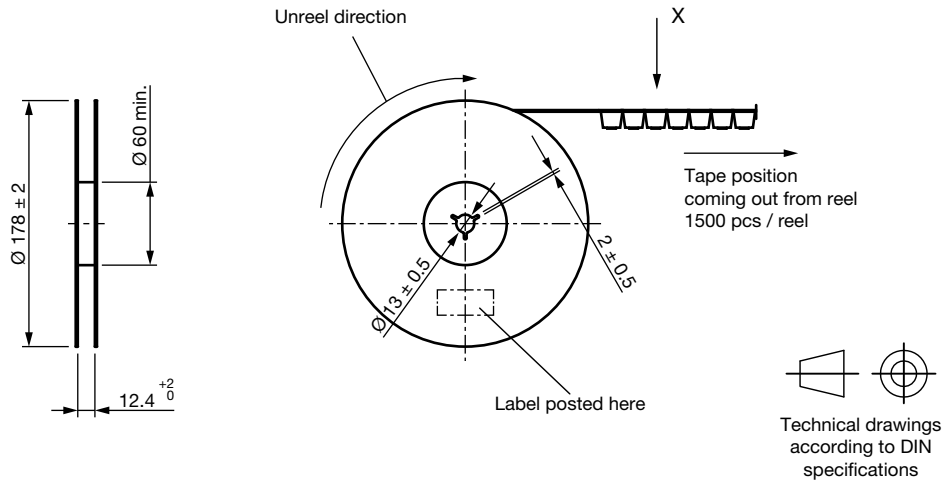


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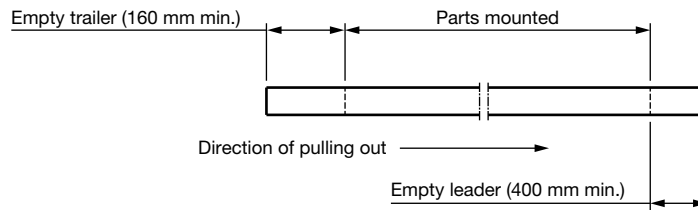


**TAPING AND REEL DIMENSIONS** in millimeters: **VLD.1235G-08** (gullwing)

Reel

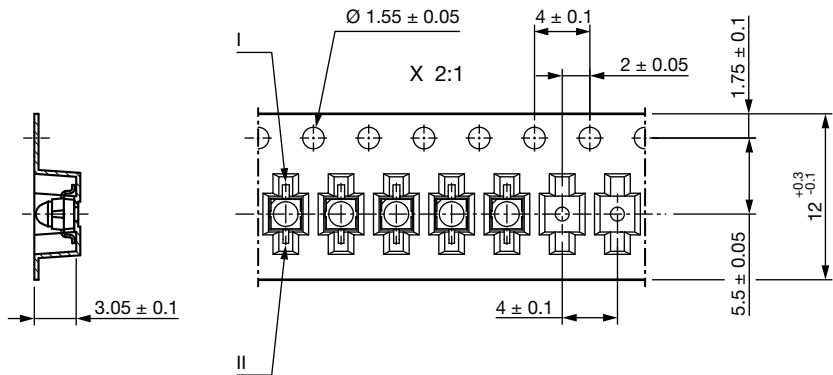


Leader and trailer tape



Terminal position in tape

Device	Lead I	Lead II
VLDY153.G...-08	Cathode	Anode
VLDK153.G...-08		
VLDR153.G...-08		
VLDS153.G...-08		

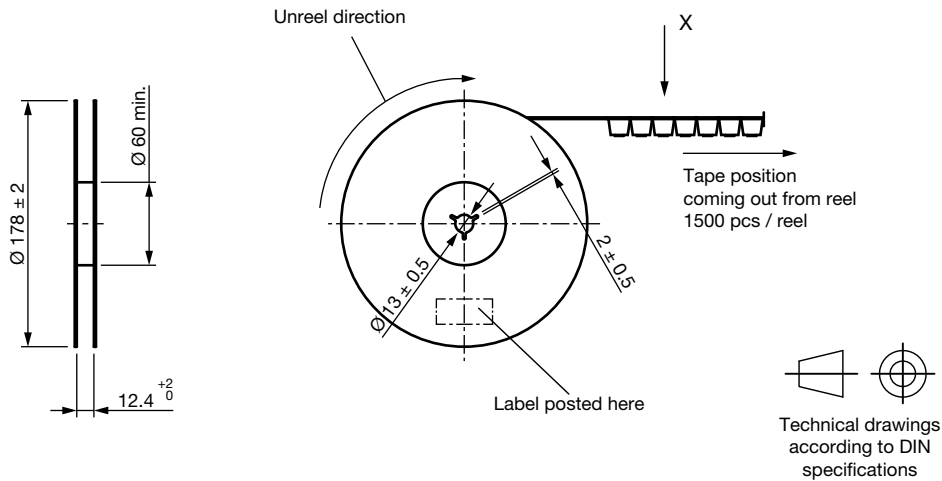


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Issue: 1; 17.03.16

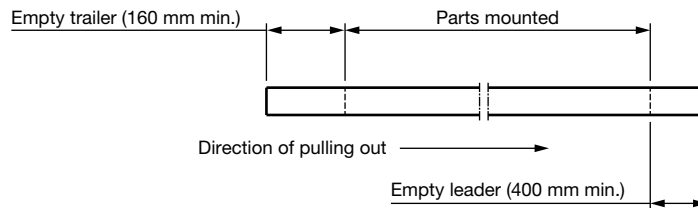


**TAPING AND REEL DIMENSIONS** in millimeters: **VLD.1235R-08** (reverse gullwing)

Reel

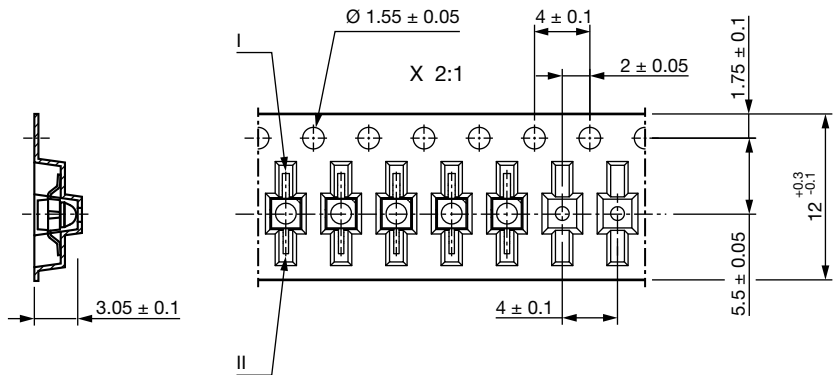


Leader and trailer tape



Terminal position in tape

Device	Lead I	Lead II
VLDY153.R...-08	Cathode	Anode
VLDK153.R...-08		
VLDR153.R...-08		
VLDS153.R...-08		



Drawing-No.: 9.800-5138.01-4  
Issue: 1; 17.03.16

**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**

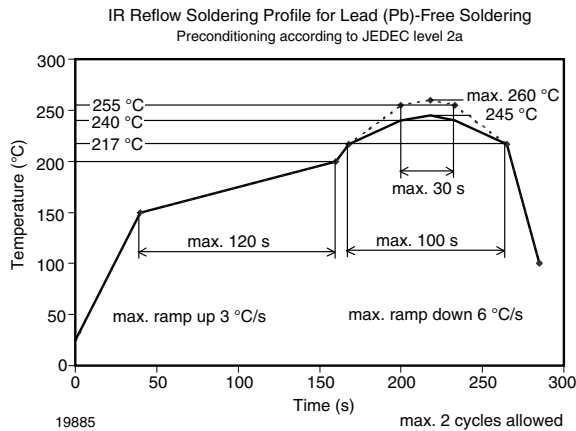
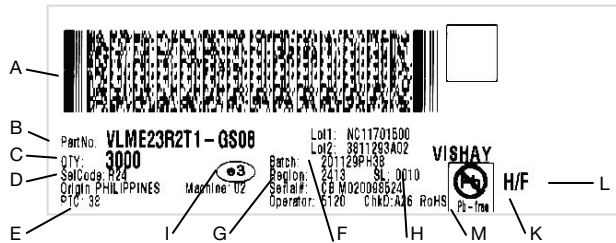


Fig. 10 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

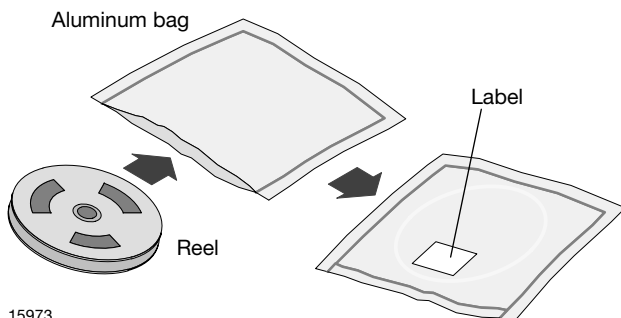
**BAR CODE PRODUCT LABEL (example)**



- 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.



15973

**FINAL PACKING**

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

**RECOMMENDED METHOD OF STORAGE**

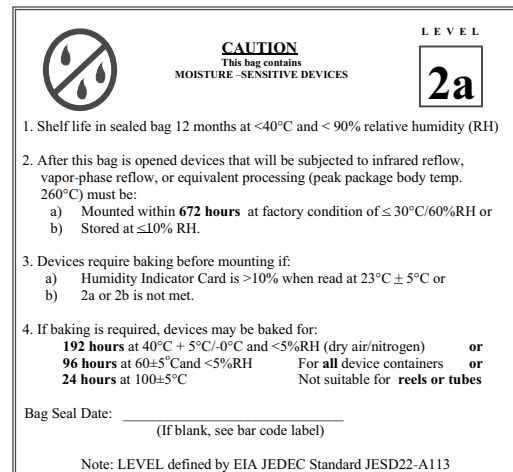
Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- 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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