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 AlInGaP / 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: ± 11°

FEATURES

- Utilizing latest advanced AlInGaP 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

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_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.		
VLDS1235G	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDS1235R	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDR1235G	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDR1235R	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDK1235G	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AlInGaP on Si
VLDK1235R	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AlInGaP on Si
VLDY1235G	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AlInGaP on Si
VLDY1235R	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AlInGaP on Si
VLDS1235G-08	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDS1235R-08	Super red	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDR1235G-08	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDR1235R-08	Red	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50	AlInGaP on Si
VLDK1235G-08	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AlInGaP on Si
VLDK1235R-08	Amber	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50	AlInGaP on Si
VLDY1235G-08	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AlInGaP on Si
VLDY1235R-08	Yellow	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50	AlInGaP on Si

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
VLDS1235..., VLDR1235..., VLDK1235..., VLDY1235...

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	70	mA
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 mm^2)	R_{thJA}	325	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)
VLDS1235G, VLDS1235R, SUPER RED

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 50 mA	I_V	5600	11 000	22 400	mcd
Luminous flux/luminous intensity		ϕ_V/I_V	-	0.5	-	mlm/mcd
Dominant wavelength (1)	I_F = 50 mA	λ_d	626	630	637	nm
Peak wavelength	I_F = 50 mA	λ_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	φ	-	± 11	-	deg
Forward voltage (1)	I_F = 50 mA	V_F	1.9	2.2	2.7	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 λ_d

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLDR1235G, VLDR1235R, RED

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 50 mA	I_V	9000	14 500	35 500	mcd
Luminous flux/luminous intensity		ϕ_V/I_V	-	0.5	-	mlm/mcd
Dominant wavelength (1)	I_F = 50 mA	λ_d	619	624	631	nm
Peak wavelength	I_F = 50 mA	λ_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	φ	-	± 11	-	deg
Forward voltage (1)	I_F = 50 mA	V_F	1.9	2.2	2.7	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 λ_d

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLDK1235G, VLDK1235R, AMBER

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 50 mA	I_V	9000	18 000	35 500	mcd
Luminous flux/luminous intensity		ϕ_V/I_V	-	0.5	-	mlm/mcd
Dominant wavelength (1)	I_F = 50 mA	λ_d	611	616	621	nm
Peak wavelength	I_F = 50 mA	λ_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	φ	-	± 11	-	deg
Forward voltage (1)	I_F = 50 mA	V_F	1.9	2.25	2.7	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 λ_d

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) VLDY1235G, VLDY1235R, YELLOW

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 50 mA	I_V	9000	18 000	35 500	mcd
Luminous flux/luminous intensity		ϕ_V/I_V	-	0.5	-	mlm/mcd
Dominant wavelength (1)	I_F = 50 mA	λ_d	583	589	595	nm
Peak wavelength	I_F = 50 mA	λ_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	φ		± 11		deg
Forward voltage (1)	I_F = 50 mA	V_F	1.9	2.3	2.7	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 λ_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 ± 1 nm

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd)	
STANDARD	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 ± 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)

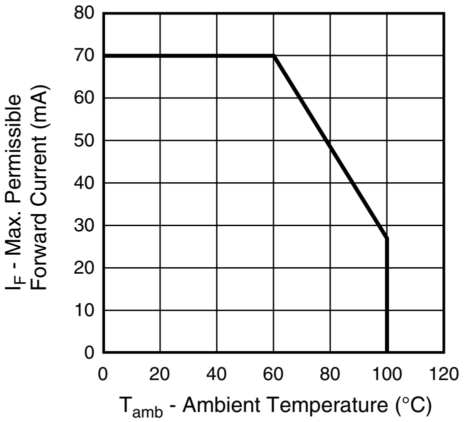


Fig. 1 - Maximum Permissible Forward Current vs. Ambient Temperature

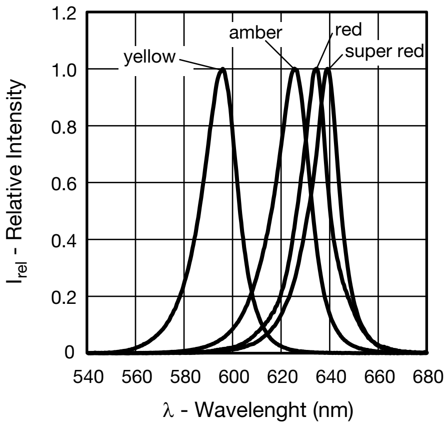


Fig. 4 - Relative Intensity vs. Wavelength

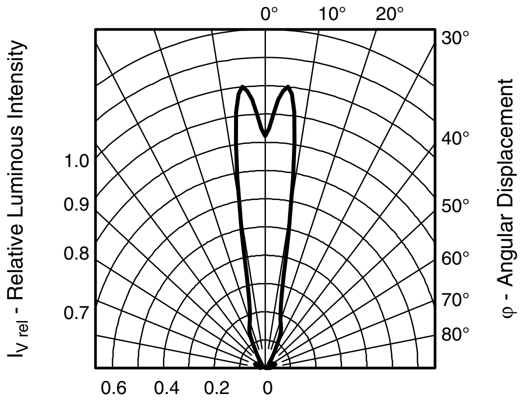


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

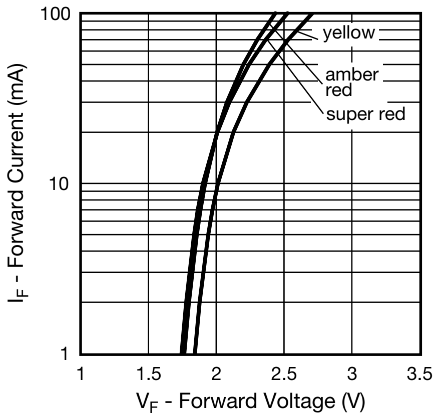


Fig. 5 - Forward Current vs. Forward Voltage

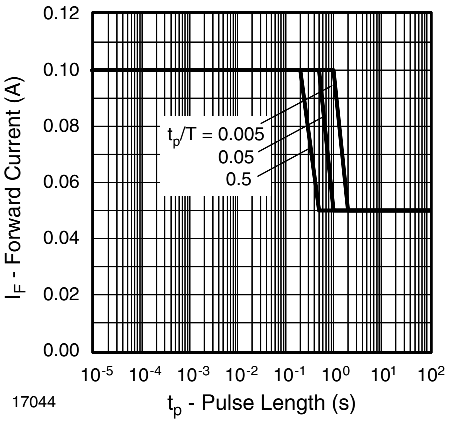


Fig. 3 - Forward Current vs. Pulse Length

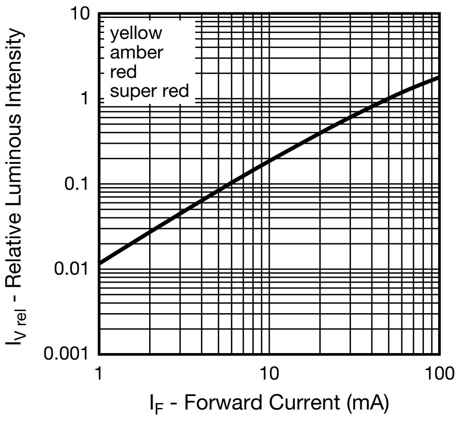


Fig. 6 - Relative Luminous Intensity vs. Forward Current

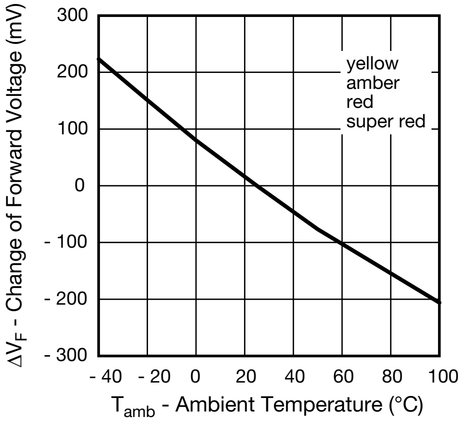


Fig. 7 - Change of Forward Voltage vs. Ambient Temperature

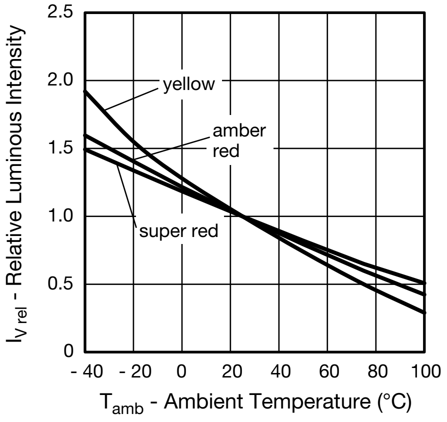


Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

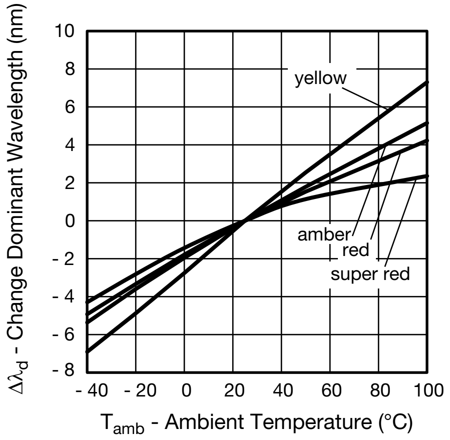
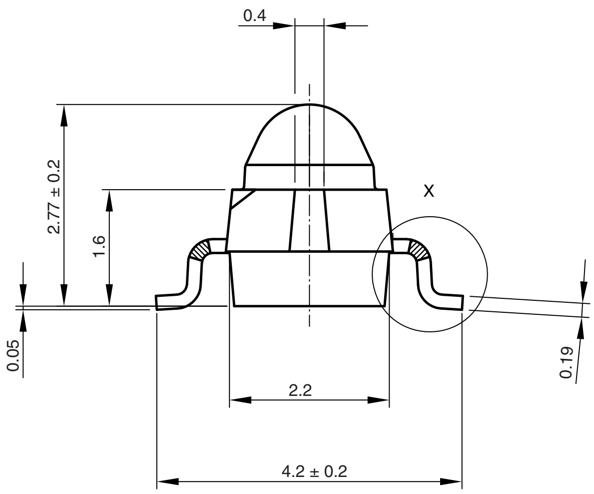
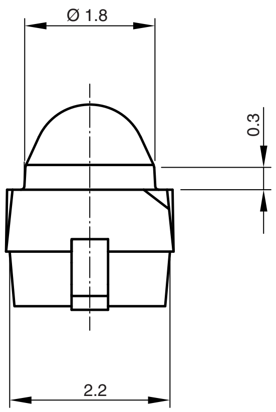
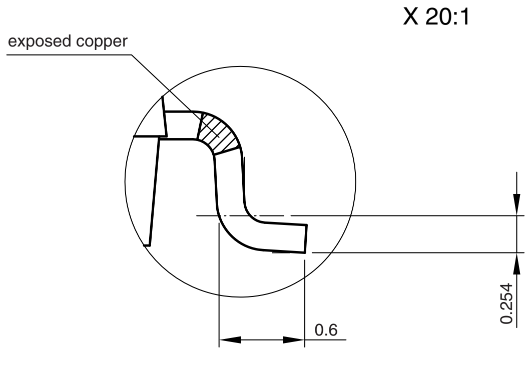


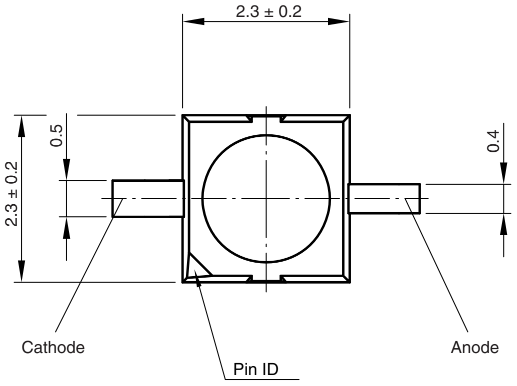
Fig. 9 - Change of Dominant Wavelength vs. Ambient Temperature

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

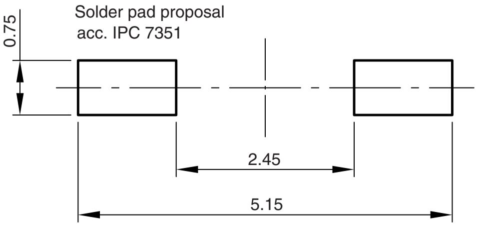




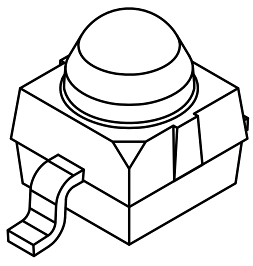




technical drawings according to DIN specifications

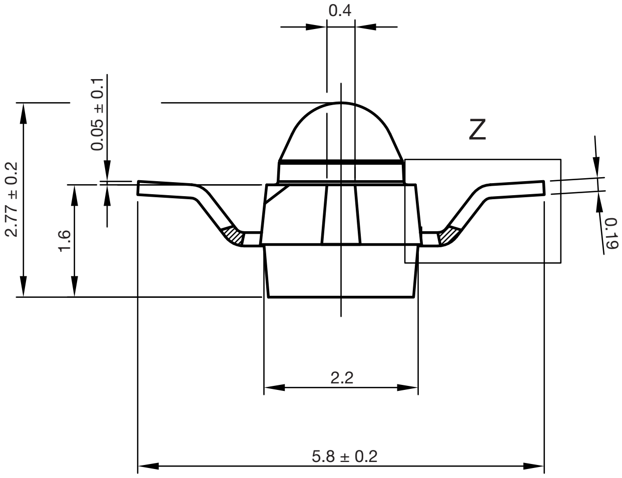


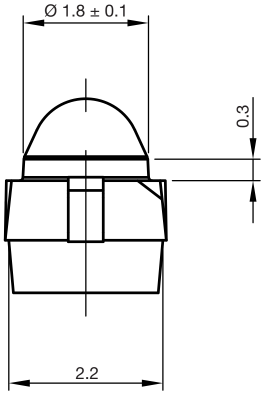
Not indicated tolerances ± 0.1

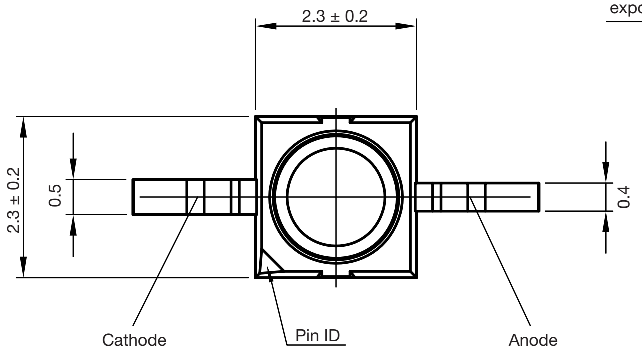


Drawing-No.: 6.544-5383.02-4
Issue: 4; 18.03.10
21488

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







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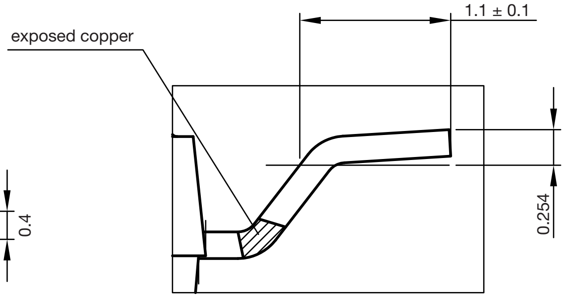
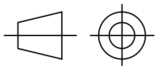
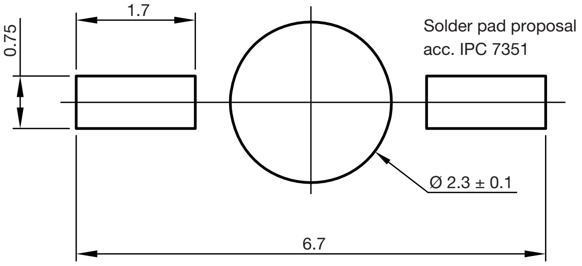




technical drawings
according to DIN
specifications



Not indicated tolerances ± 0.1

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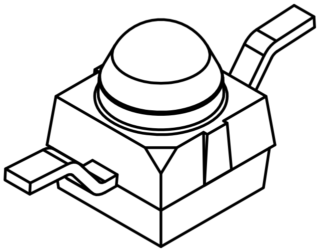
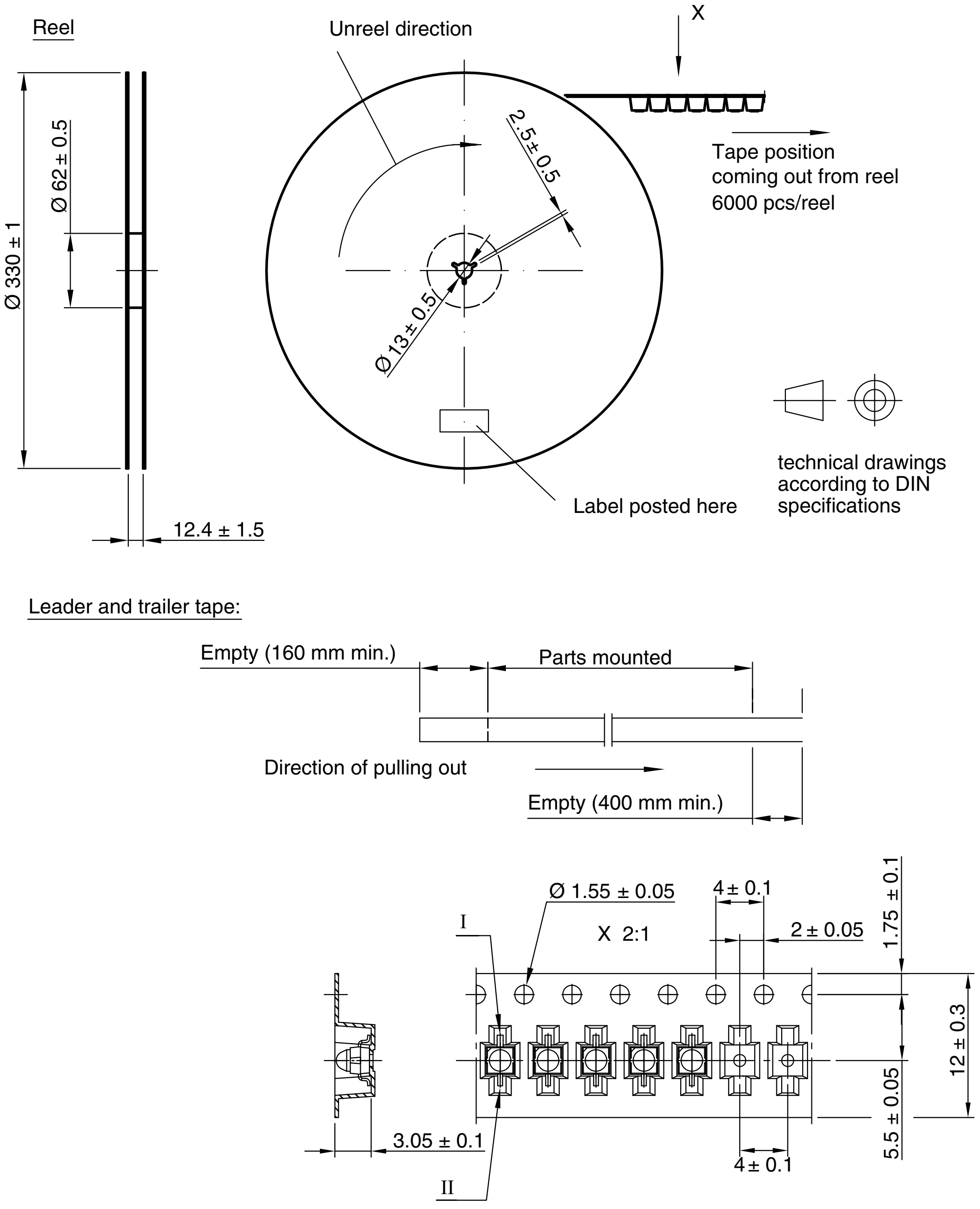
Issue: 2; 18.03.10
21517

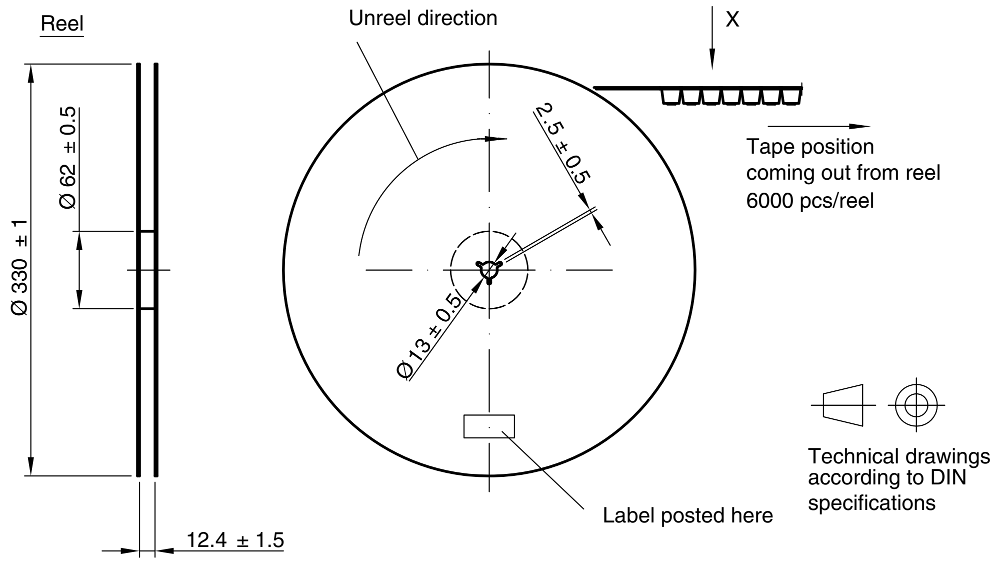


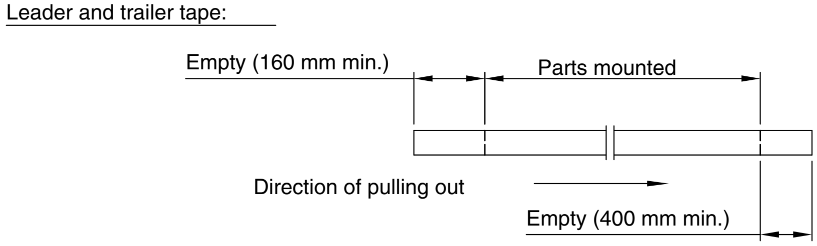
TAPING AND REEL DIMENSIONS in millimeters: **VLD.1235G** (gullwing)

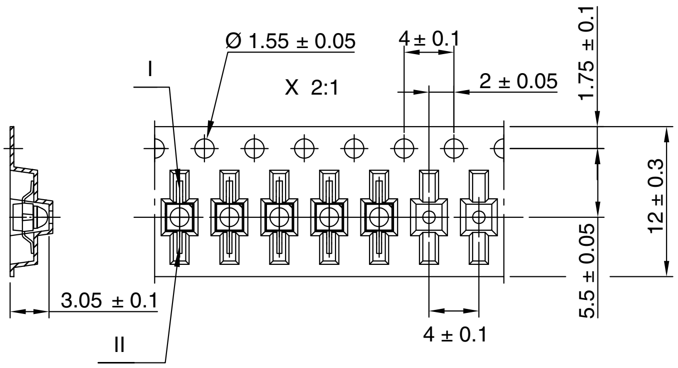


Drawing-No.: 9.800-5091.01-4
Issue: 3; 18.03.10

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

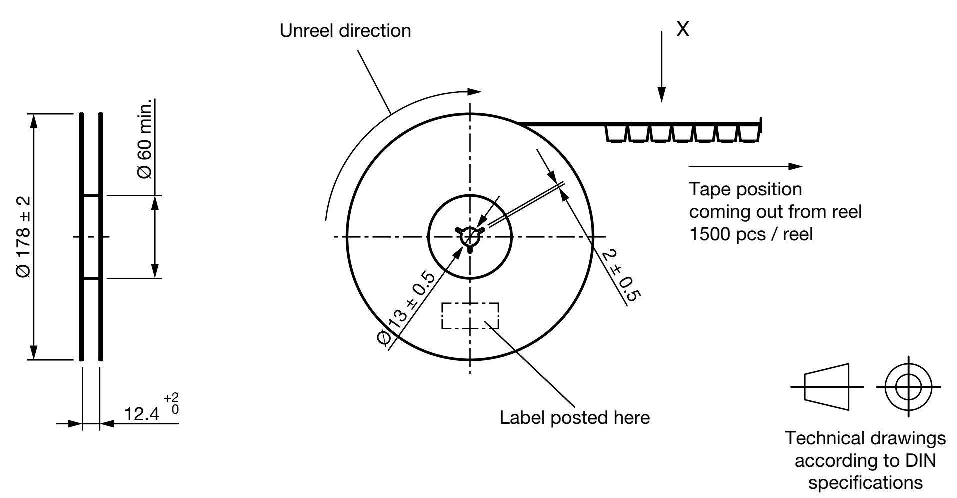


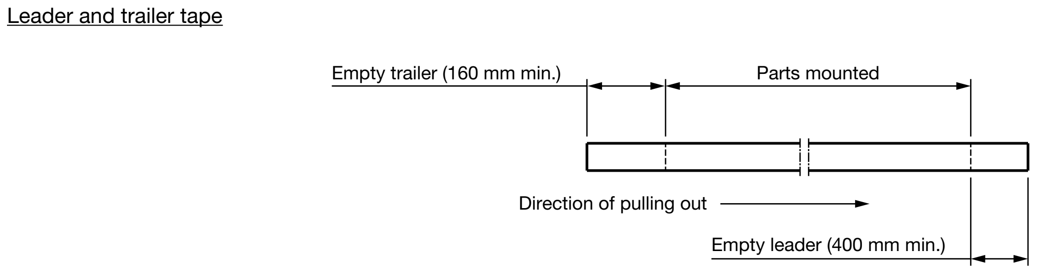




Drawing-No.: 9.800-5100.01-4
Issue: 2; 18.03.10

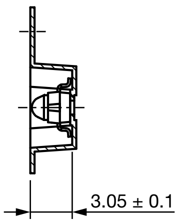
TAPING AND REEL DIMENSIONS in millimeters: **VLD.1235G-08** (gullwing)

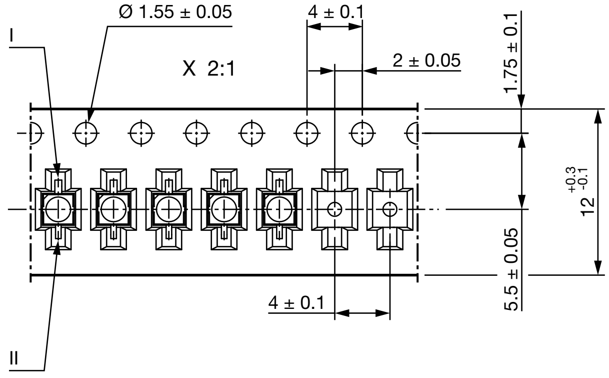




Terminal position in tape

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

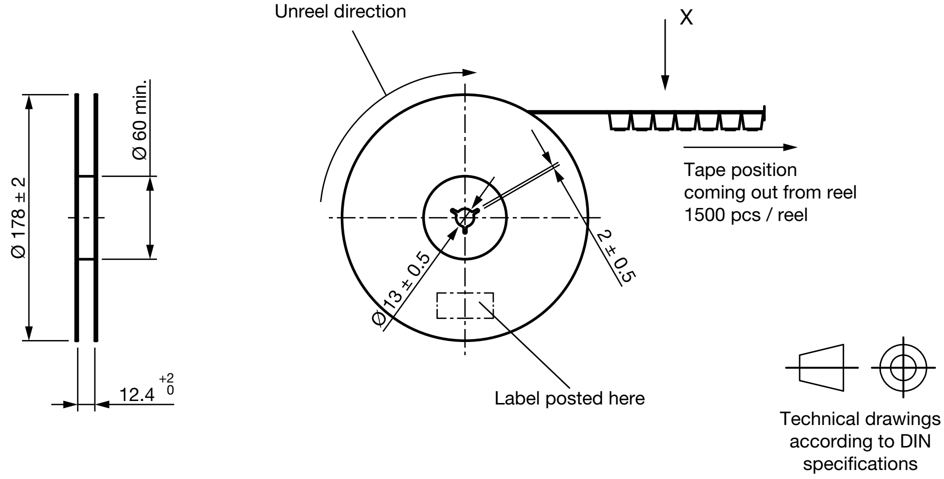




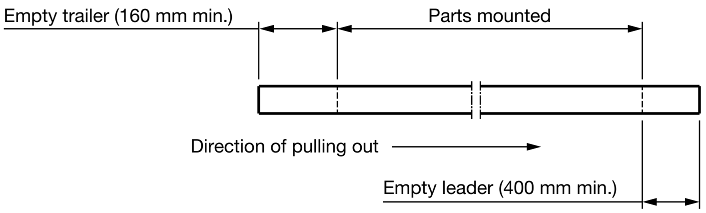
Drawing-No.: 9.800-5137.01-4
Issue: 1; 17.03.16

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

Reel

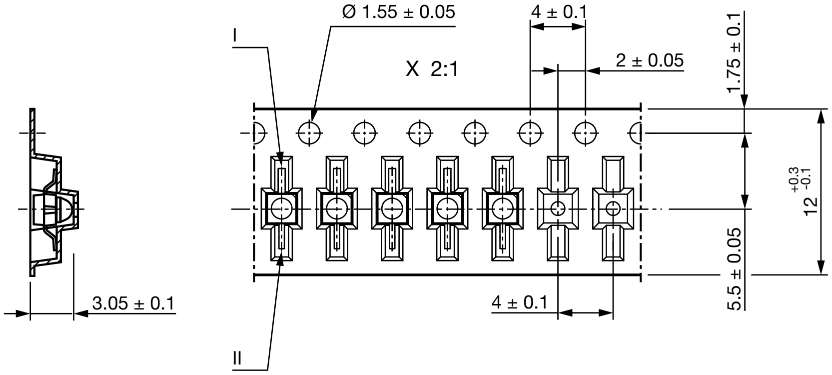


Leader and trailer tape



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

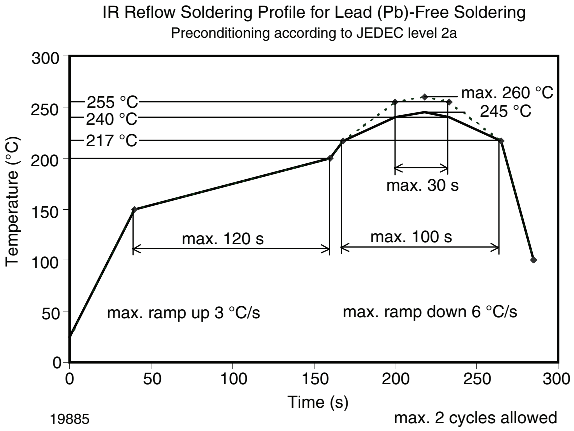
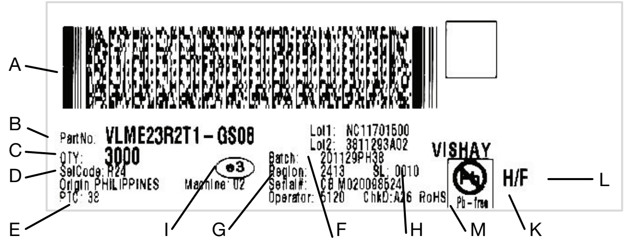


Fig. 10 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

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

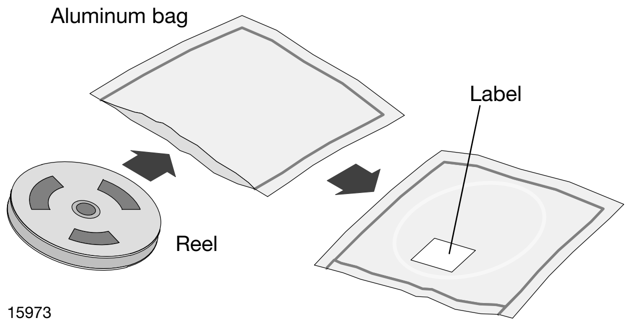
K. Lead (Pb)-free symbol

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.



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:

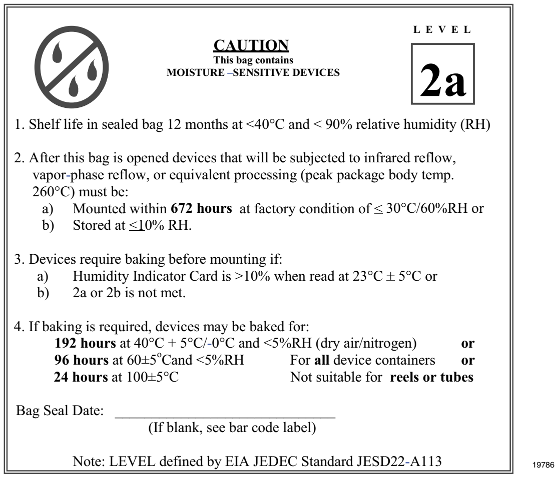
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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.



CAUTION
This bag contains
MOISTURE –SENSITIVE DEVICES

LEVEL
2a

1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)

2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be:
   a) Mounted within **672 hours** at factory condition of ≤ 30°C/60%RH or
   b) Stored at ≤10% RH.

3. Devices require baking before mounting if:
   a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or
   b) 2a or 2b is not met.

4. If baking is required, devices may be baked for:

192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen)		**or**
96 hours at 60±5°Cand <5%RH	For **all** device containers	**or**
24 hours at 100±5°C	Not suitable for **reels or tubes**	

Bag Seal Date: ______________________________
(If blank, see bar code label)

Note: LEVEL defined by EIA JEDEC Standard JESD22-A113

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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