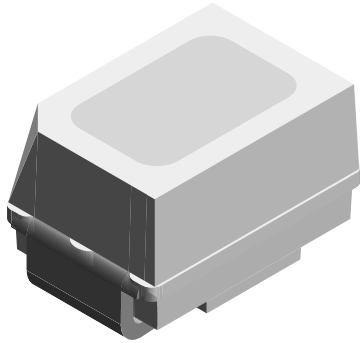




### Standard SMD MiniLED



#### DESCRIPTION

The MiniLED premold package consists of a leadframe which is embedded in a white thermoplast featuring exceptional brightness and small package dimensions 2.2 mm x 1.3 mm x 1.4 mm. The MiniLED is an obvious solution for small-scale, high-power products that are expected to work reliably in an arduous environment.

#### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD MiniLED
- Product series: standard
- Angle of half intensity: ± 60°

#### FEATURES

- Small dimensions (L x W x H in mm): 2.2 x 1.4 x 1.3
- Luminous intensity and color categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- IR reflow soldering according to J-STD-020
- Available in 8 mm tape
- Excellent for coupling to light pipes and backlighting
- Preconditioning according to JEDEC® level 2a
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



#### APPLICATIONS

- Smoke detectors using blue light
- Pulse rate detection using green light
- Medical light treatment
- Signal lights
- Backlight and indicator for office-, entertainment-, and telecommunication equipment
- Flat backlight for LCDs, switches, and symbols
- General use

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.		
VLMB2332T1U2-08	Blue	280	440	710	20	458	465	472	20	2.6	2.9	3.4	20	InGaN / sapphire
VLMTG2332ABCA-08	True green	1400	2300	3550	20	515	525	541	20	2.6	2.9	3.4	20	InGaN / sapphire

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMB2332..., VLMTG2332...**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>		$V_R$	5	V
DC forward current	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	$I_F$	25	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	0.1	A
Power dissipation		$P_V$	88	mW
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
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> )	$R_{thJA}$	450	K/W

**Note**

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

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMB2332..., BLUE**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 20\text{ mA}$	$I_V$	280	440	710	mcd
Luminous flux/luminous intensity		$\phi_v/I_V$	-	3.0	-	mlm/mcd
Radiant intensity	$I_F = 20\text{ mA}$	$I_e$	-	7.3	-	mW/sr
Dominant wavelength <sup>(1)</sup>	$I_F = 20\text{ mA}$	$\lambda_d$	458	465	472	nm
Peak wavelength	$I_F = 20\text{ mA}$	$\lambda_p$	-	460	-	nm
Spectral bandwidth at 50% $I_{rel. max.}$	$I_F = 20\text{ mA}$	$\Delta\lambda_{0.5}$	-	18	-	nm
Angle of half intensity	$I_F = 20\text{ mA}$	$\phi$	-	$\pm 60$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 20\text{ mA}$	$V_F$	2.6	2.9	3.4	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	0.1	10	$\mu\text{A}$

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMTG2332..., TRUE GREEN**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 20\text{ mA}$	$I_V$	1400	2300	3550	mcd
Luminous flux/luminous intensity		$\phi_v/I_V$	-	3.0	-	mlm/mcd
Radiant intensity	$I_F = 20\text{ mA}$	$I_e$	-	4.7	-	mW/sr
Dominant wavelength <sup>(1)</sup>	$I_F = 20\text{ mA}$	$\lambda_d$	515	525	541	nm
Peak wavelength	$I_F = 20\text{ mA}$	$\lambda_p$	-	519	-	nm
Spectral bandwidth at 50% $I_{rel. max.}$	$I_F = 20\text{ mA}$	$\Delta\lambda_{0.5}$	-	27	-	nm
Angle of half intensity	$I_F = 20\text{ mA}$	$\phi$	-	$\pm 60$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 20\text{ mA}$	$V_F$	2.6	2.9	3.4	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	0.1	10	$\mu\text{A}$

**Note**

<sup>(1)</sup> Tolerances:  $\pm 11\%$  for  $I_V$ ,  $\pm 0.1\text{ V}$  for  $V_F$ ,  $\pm 1\text{ nm}$  for  $\lambda_d$



LUMINOUS INTENSITY CLASSIFICATION VLMB2332..., BLUE		
GROUP	LUMINOUS INTENSITY (mcd)	
STANDARD	MAX.	MAX.
T1	280	355
T2	355	450
U1	450	560
U2	560	710

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
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 in any one reel. In order to ensure availability, single wavelength groups will not be orderable

LUMINOUS INTENSITY CLASSIFICATION VLMTG2332..., TRUE GREEN		
GROUP	LUMINOUS INTENSITY (mcd)	
STANDARD	MAX.	MAX.
AB	1400	1800
BA	1800	2240
BB	2240	2800
CA	2800	3550

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
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 in any one reel. In order to ensure availability, single wavelength groups will not be orderable

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  $\pm 1\text{ nm}$

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

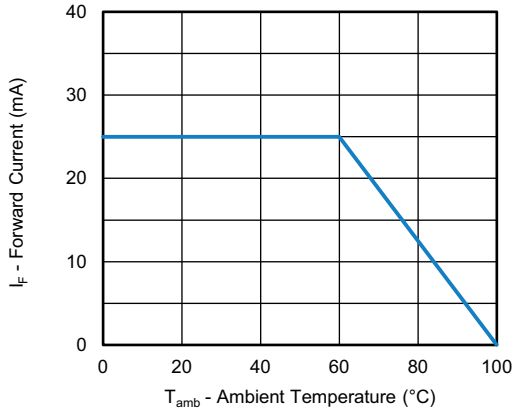


Fig. 1 - Maximum Permissible Forward Current vs. Ambient Temperature

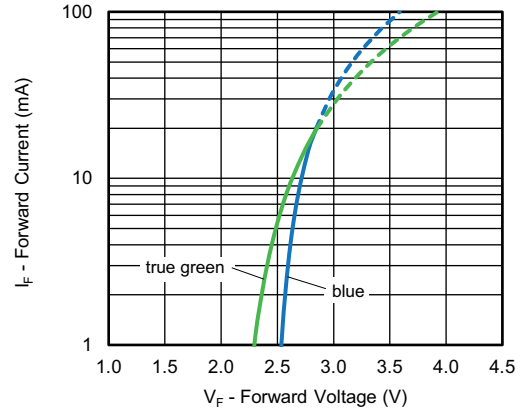


Fig. 4 - Forward Current vs. Forward Voltage

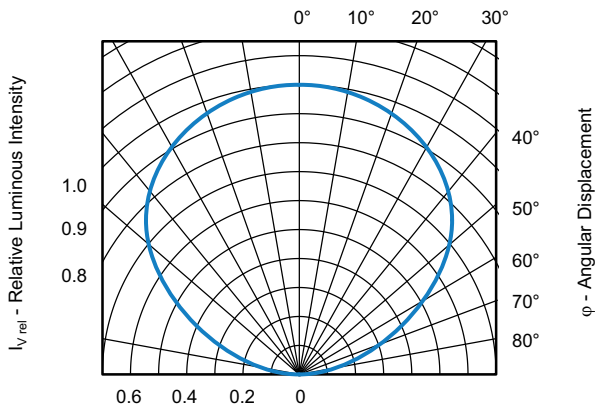


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

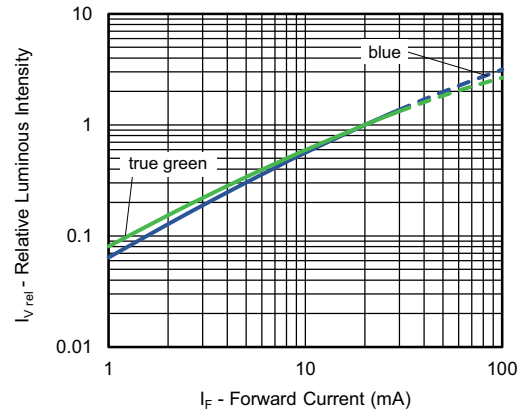


Fig. 5 - Relative Luminous Intensity vs. Forward Current

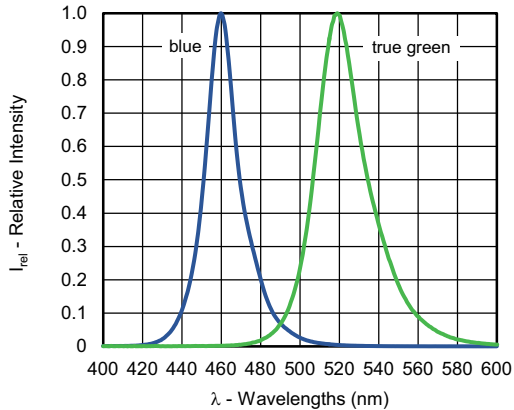


Fig. 3 - Relative Intensity vs. Wavelength

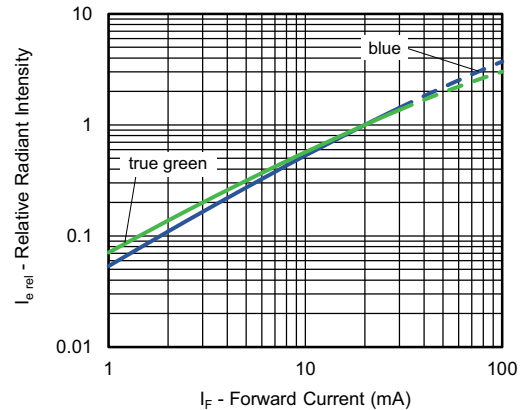


Fig. 6 - Relative Radiant Intensity vs. Forward Current

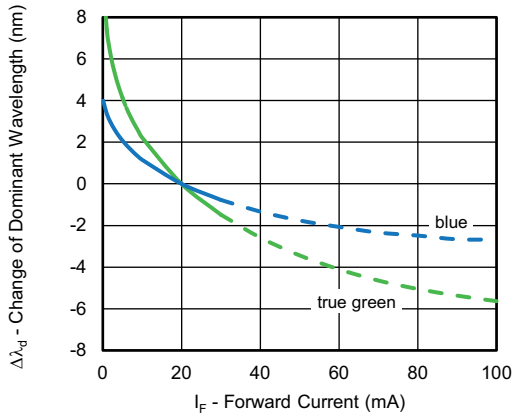


Fig. 7 - Change of Dominant Wavelength vs. Forward Current

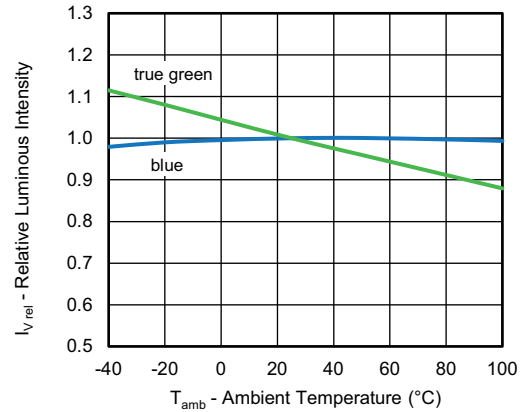


Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

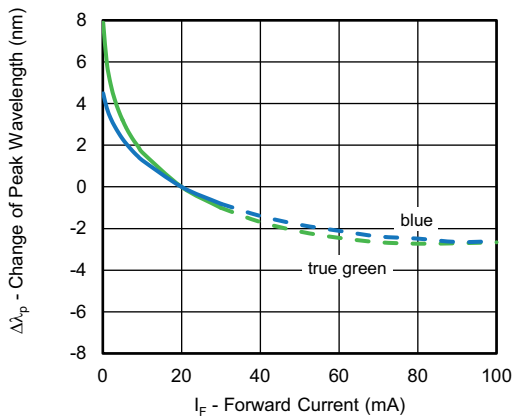


Fig. 8 - Change of Peak Wavelength vs. Forward Current

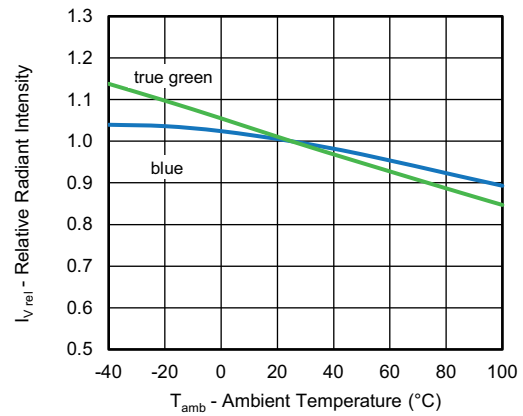


Fig. 11 - Relative Radiant Intensity vs. Ambient Temperature

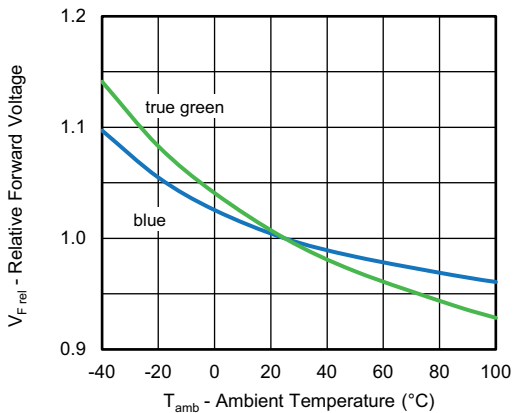


Fig. 9 - Change of Forward Voltage vs. Ambient Temperature

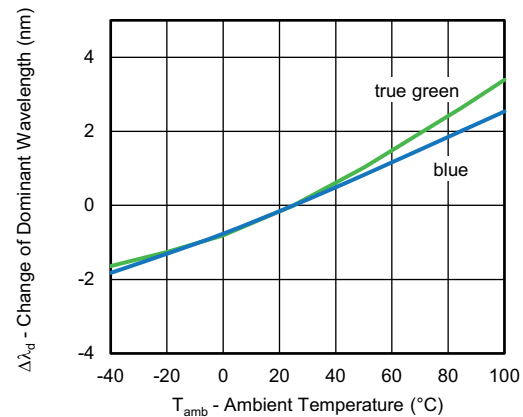


Fig. 12 - Change of Dominant Wavelength vs. Ambient Temperature

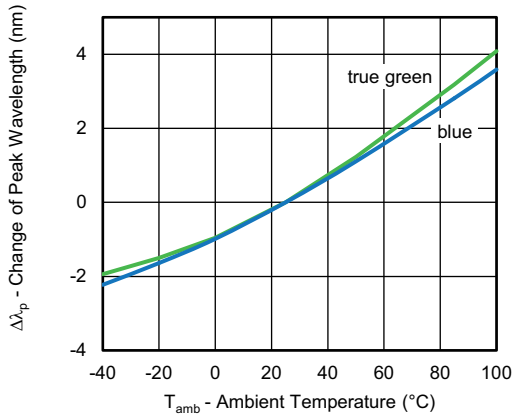
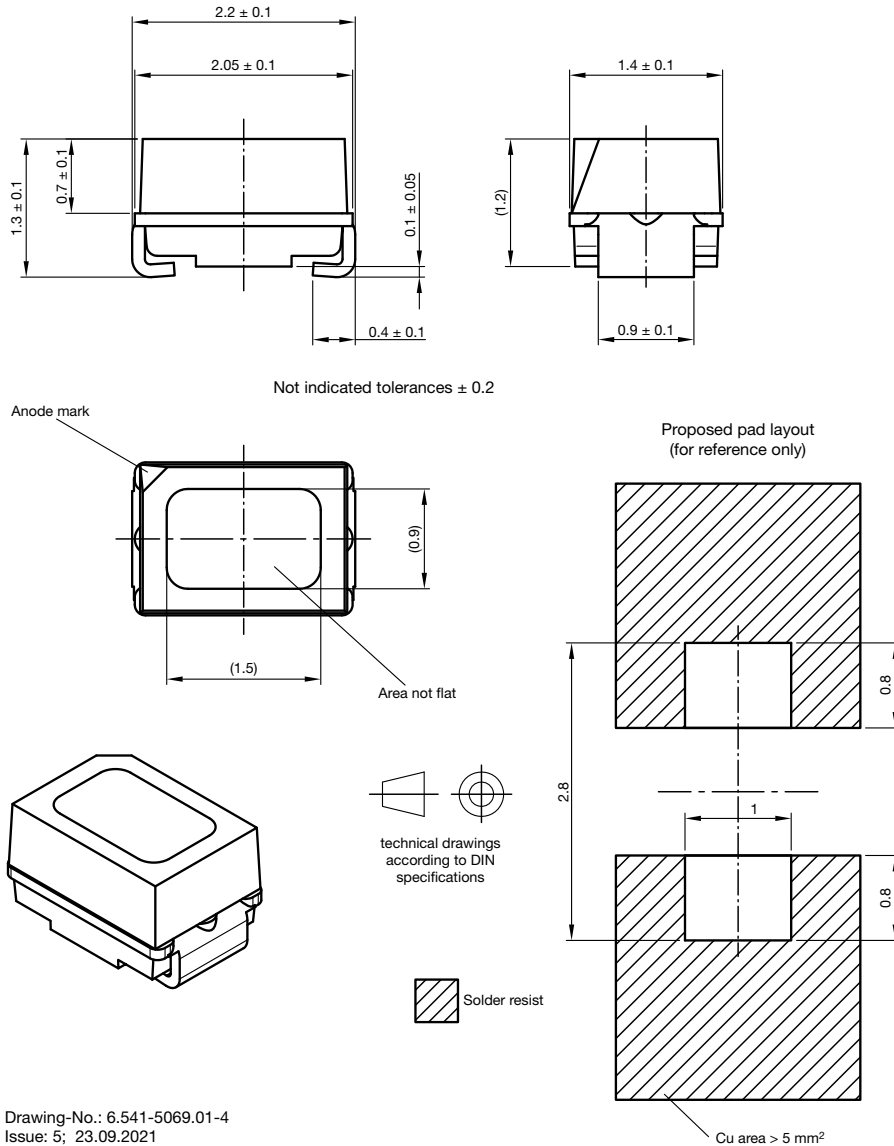


Fig. 13 - Change of Peak Wavelength vs. Ambient Temperature

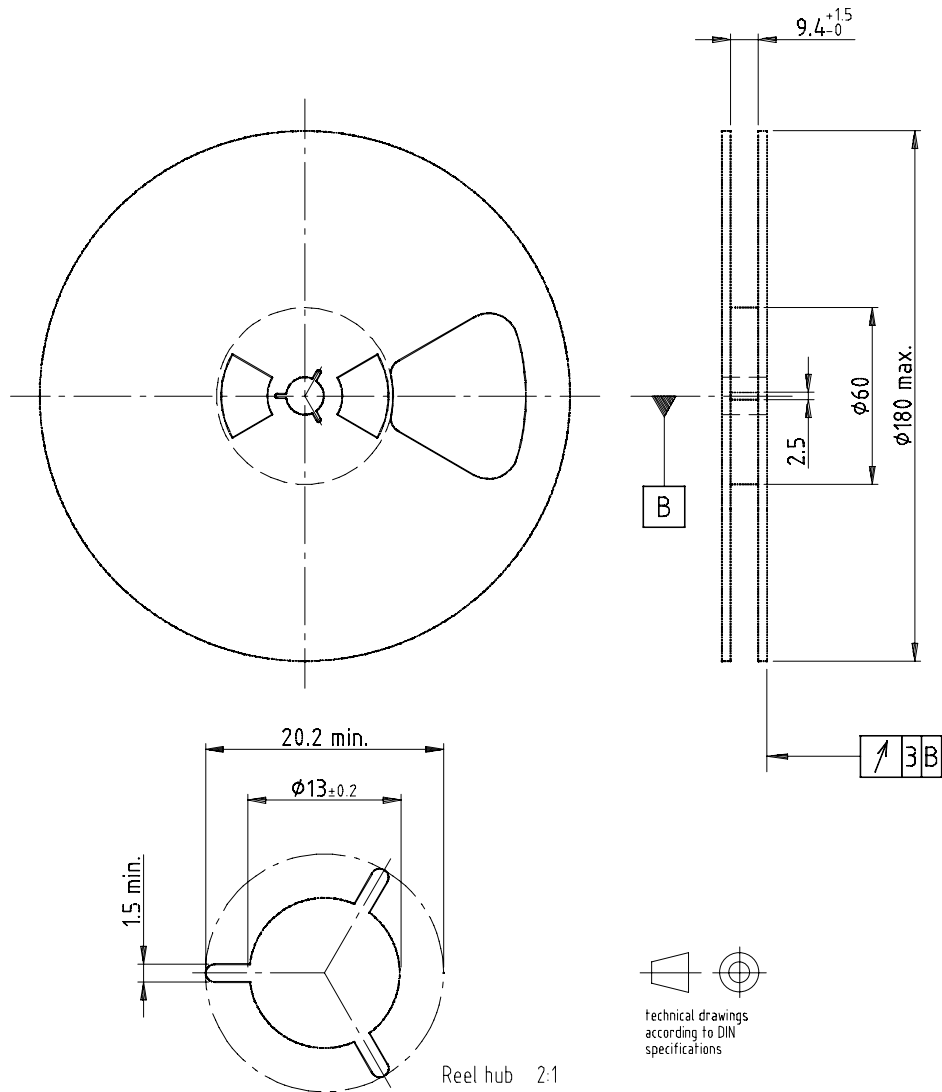
**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.541-5069.01-4  
Issue: 5; 23.09.2021



REEL DIMENSIONS in millimeters



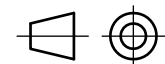
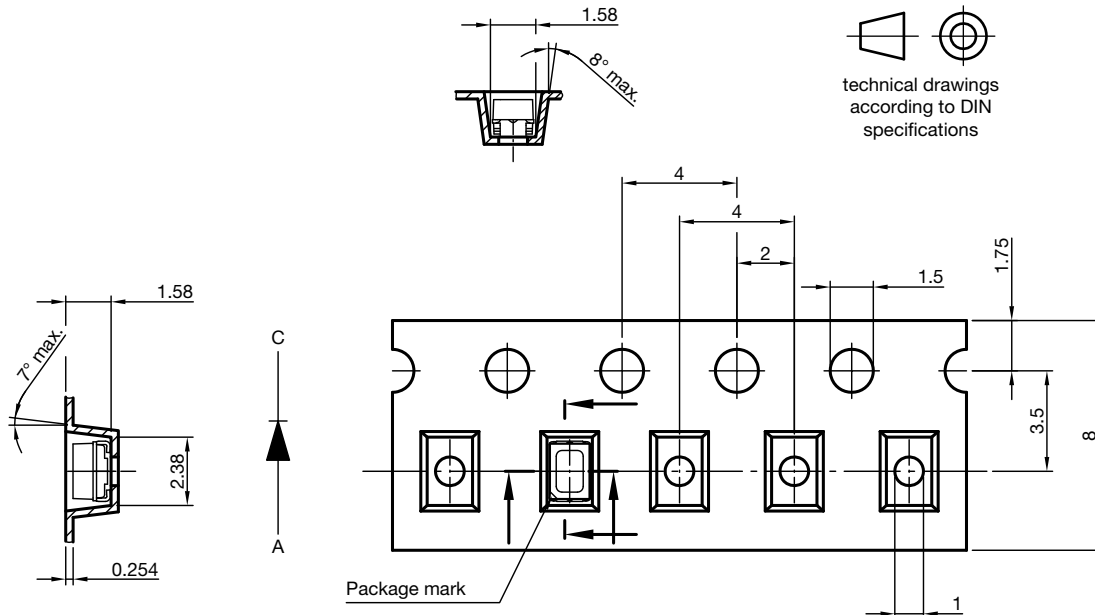
Drawing-No.: 9.800-5051.V5-4

Issue: 1; 25.07.02

16938

Reel hub 2:1

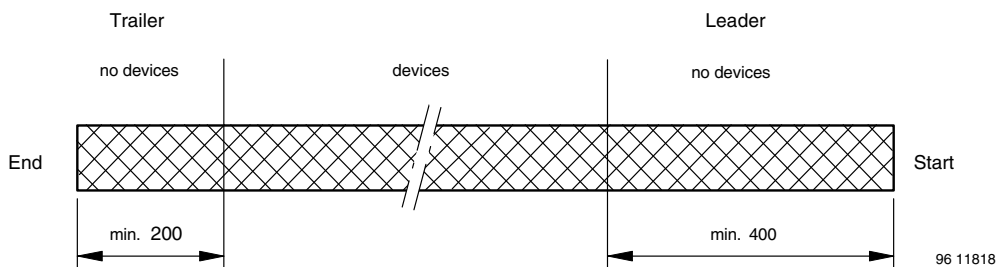
**TAPE DIMENSIONS** in millimeters



technical drawings according to DIN specifications

Drawing-No.: 9.700-5381.01-4  
Issue: 3; 23.09.2021

**LEADER AND TRAILER DIMENSIONS** in millimeters



GS08 = 3000 pcs

**COVER TAPE PEEL STRENGTH**

According to DIN EN 60286-3

0.1 N to 1.3 N

300 mm/min ± 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**

IR Reflow Soldering Profile for lead (Pb)-free soldering  
Preconditioning acc. to JEDEC Level 2a

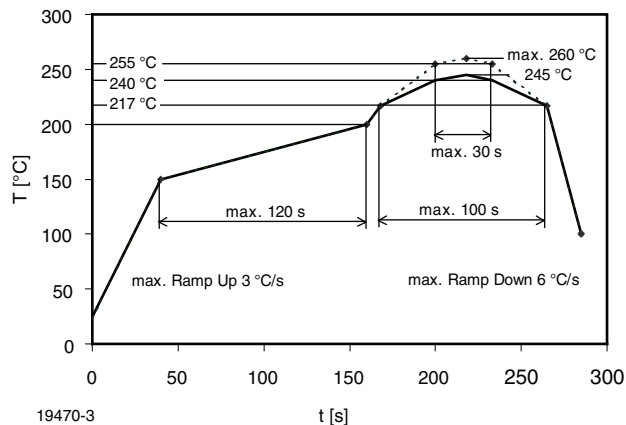
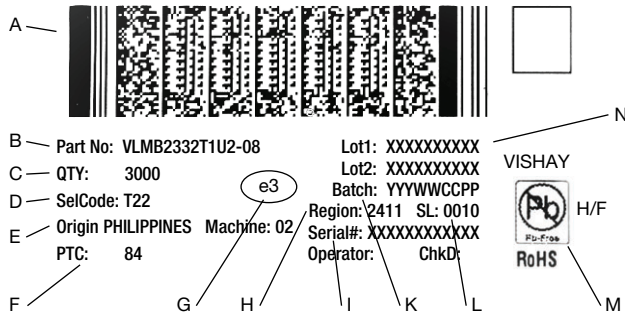


Fig. 14 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)



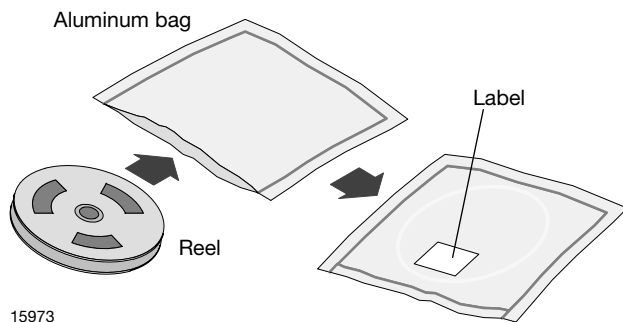
## BAR CODE PRODUCT LABEL (example)



- A. 2D barcode
- B. Part No: Vishay part number
- C. QTY: quantity
- D. SelCode: selection bin code
- E. Country of origin
- F. PTC: production plant code
- G. Termination finish
- H. Region code
- I. Serial#: serial number
- K. Batch Number: year, week, country code, plant code
- L. SL: sales location
- M. Environmental Symbols: RoHS, lead (Pb)-free, halogen-free
- N. Lot numbers

## 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:

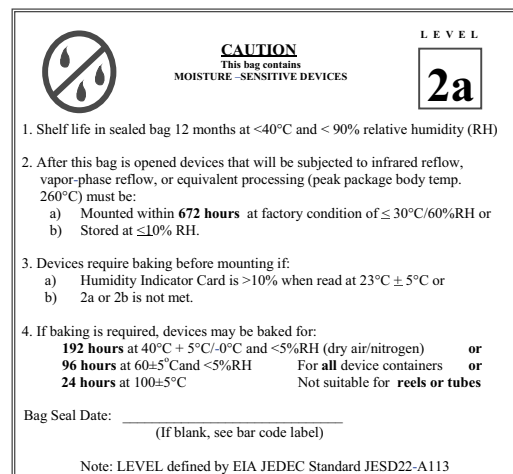
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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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