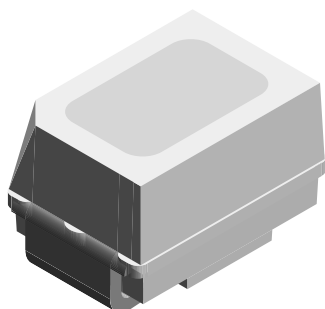


Standard Mini SMD LED



19226

DESCRIPTION

The new MiniLED series has been designed in a small white SMT package. The feature of the device is the very small package 2.3 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. This is often the case in automotive and industrial application of course.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD MiniLED
- Product series: standard
- Angle of half intensity: $\pm 60^\circ$

FEATURES

- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- IR reflow soldering
- Available in 8 mm tape
- Low profile package
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Low power consumption
- ESD-withstand voltage: up to 2 kV (HBM) according to JESD22-A114-B
- Luminous intensity ratio in one packaging unit $I_{Vmax}/I_{Vmin.} \leq 1.6$
- Preconditioning according to JEDEC® level 2a
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Telecommunication: indicator and backlighting in telephone and fax
- Indicator and backlight for audio and video equipment
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches, and symbols
- General use

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.		
VLMO2100-GS08	Soft orange	3.55	7.0	-	10	598	605	611	10	-	2.1	3	20	GaAsP on GaP
VLMY2100-GS08	Yellow	3.55	8.5	-	10	581	588	594	10	-	2.2	3	20	GaAsP on GaP

**ABSOLUTE MAXIMUM RATINGS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMO21.., VLMY21..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage ⁽¹⁾		V_R	6	V
DC forward current	$T_{amb} \leq 74\text{ }^{\circ}\text{C}$	I_F	20	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	0.34	A
Power dissipation		P_V	56	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	$^{\circ}\text{C}$
Soldering temperature	$t \leq 5\text{ s}$	T_{sd}	260	$^{\circ}\text{C}$
Thermal resistance junction to ambient	Mounted on PC board (pad size > 5 mm ²)	R_{thJA}	480	K/W

Note

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

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMO21.., SOFT ORANGE

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 10\text{ mA}$	VLMO2100	I_V	3.55	7.0	-	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		λ_d	598	605	611	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	605	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		θ	-	± 60	-	$^{\circ}$
Forward voltage	$I_F = 20\text{ mA}$		V_F	-	2.1	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15	-	V
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$		C_j	-	15	-	pF

Note

⁽¹⁾ In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLMY21.., YELLOW

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 10\text{ mA}$	VLMY2100	I_V	3.55	8.5	-	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		λ_d	581	588	594	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	585	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		ϕ	-	± 60	-	$^{\circ}$
Forward voltage	$I_F = 20\text{ mA}$		V_F	-	2.2	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15	-	V
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$		C_j	-	15	-	pF

Note

⁽¹⁾ In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	LIGHT INTENSITY (mcd)		
STANDARD	OPTIONAL	MIN	MAX
H	1	2.8	3.55
	2	3.55	4.5
J	1	4.5	5.6
	2	5.6	7.1
K	1	7.1	9.0
	2	9.0	11.2
L	1	11.2	14.0
	2	14.0	18.0
M	1	18.0	22.4
	2	22.4	28.0
N	1	28.0	35.5
	2	35.5	45.0

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

COLOR CLASSIFICATION				
GROUP	YELLOW		SOFT ORANGE	
	DOM. WAVELENGTH (nm)			
	MIN.	MAX.	MIN.	MAX.
1	581	584	598	601
2	583	586	600	603
3	585	588	602	605
4	587	590	604	607
5	589	592	606	609
6	591	594	608	611

Note

- Wavelengths are tested at a current pulse duration of 25 ms

CROSSING TABLE	
VISHAY	OSRAM
VLMO2100	LOM670
VLMY2100	LYM670

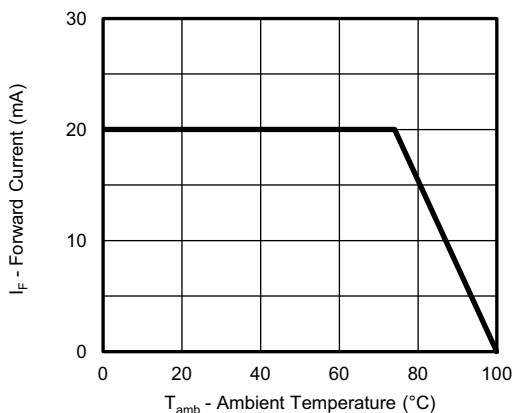
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

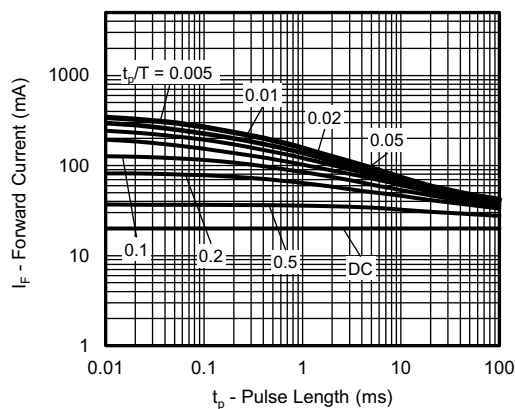


Fig. 2 - Pulse Forward Current vs. Pulse Duration

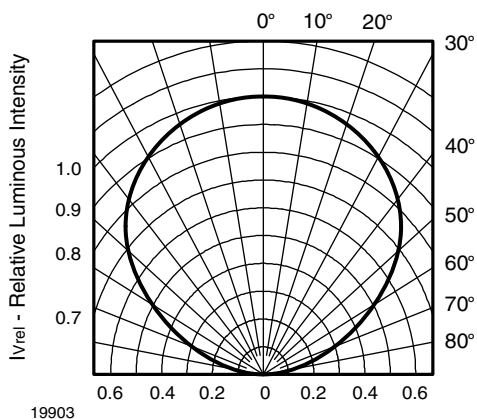


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

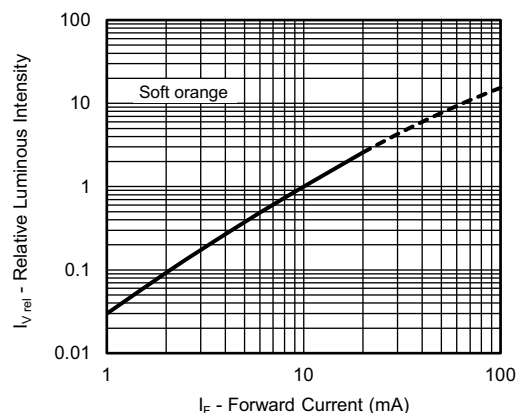


Fig. 6 - Relative Luminous Intensity vs. Forward Current

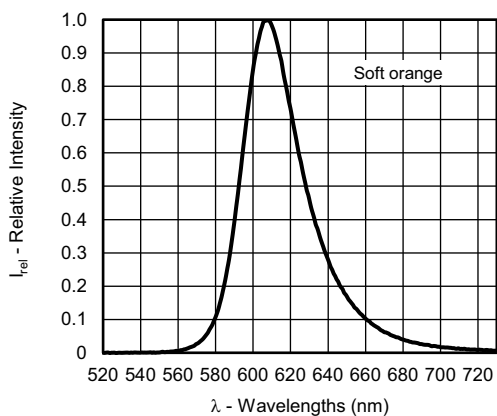


Fig. 4 - Relative Intensity vs. Wavelength

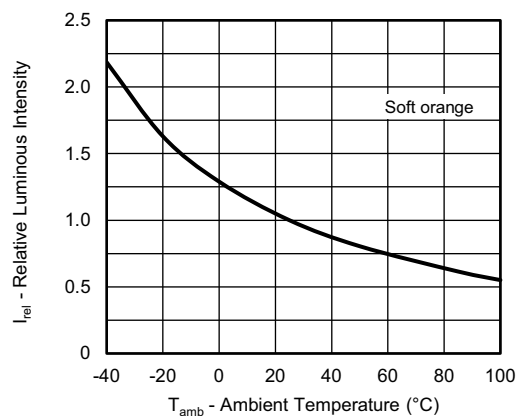


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

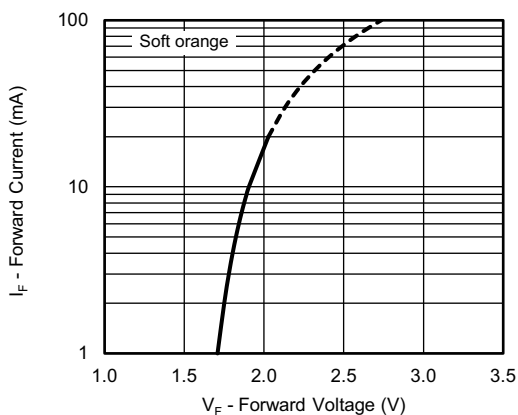


Fig. 5 - Forward Current vs. Forward Voltage

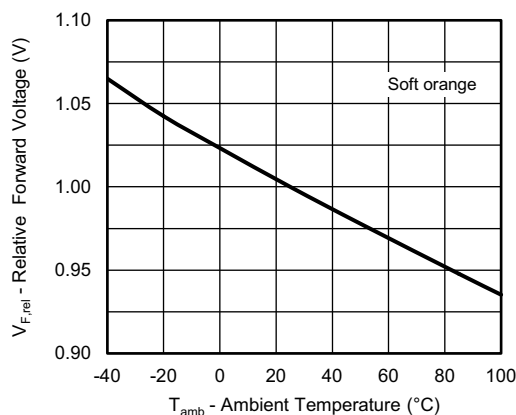


Fig. 8 - Relative Forward Voltage vs. Ambient Temperature

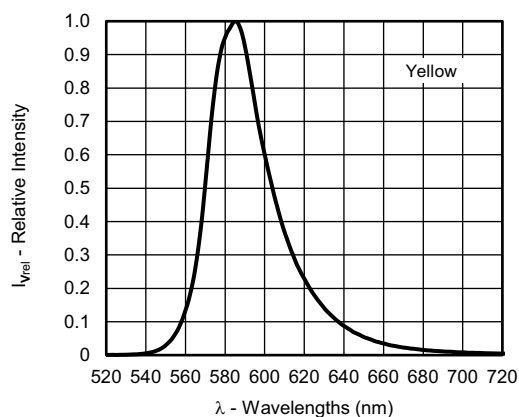


Fig. 9 - Relative Intensity vs. Wavelength

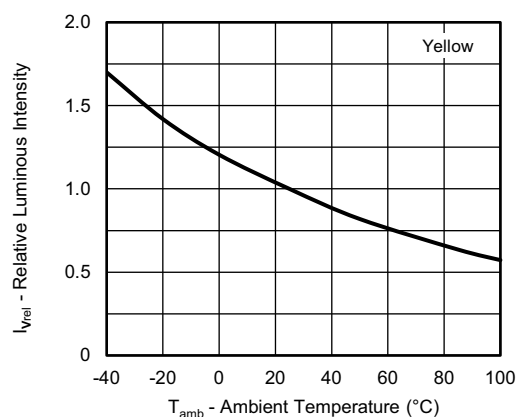


Fig. 12 - Relative Luminous Intensity vs. Ambient Temperature

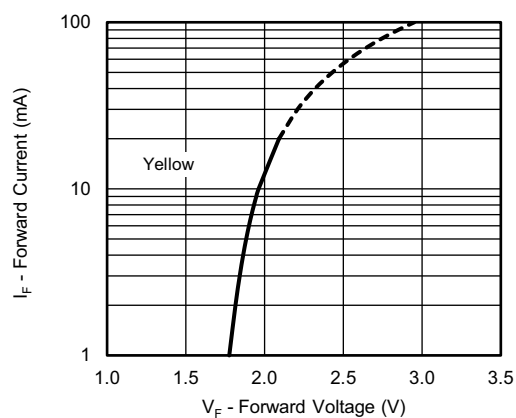


Fig. 10 - Forward Current vs. Forward Voltage

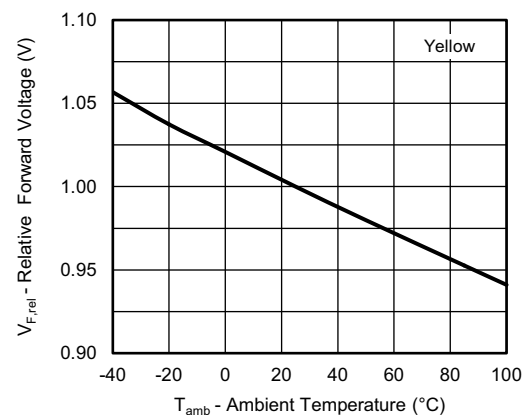


Fig. 13 - Forward Voltage vs. Ambient Temperature

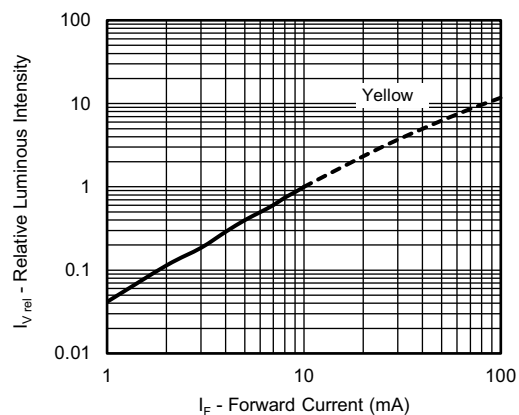


Fig. 11 - Relative Luminous Intensity vs. Forward Current

SOLDERING PROFILE

IR Reflow Soldering Profile for Lead (Pb)-free Soldering
Preconditioning acc. to JEDEC level 2a

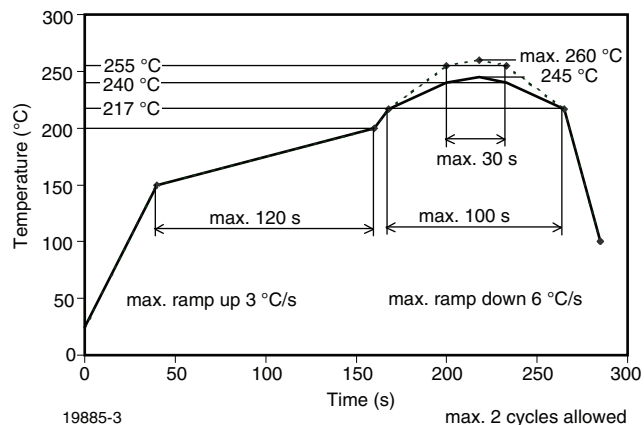
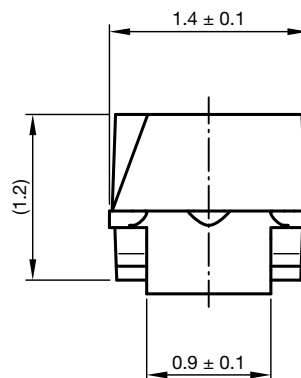
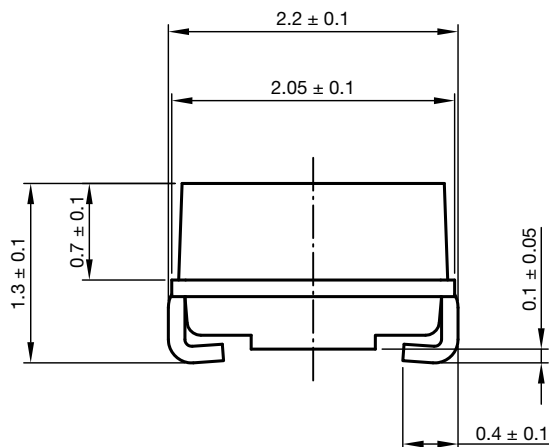


Fig. 14 - Vishay Lead (Pb)-Free Reflow Soldering Profile (according to J-STD-020)

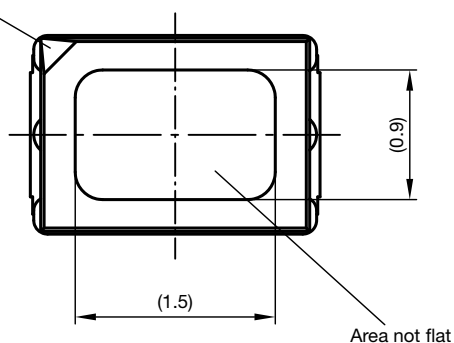


PACKAGE DIMENSIONS in millimeters

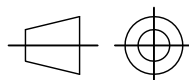
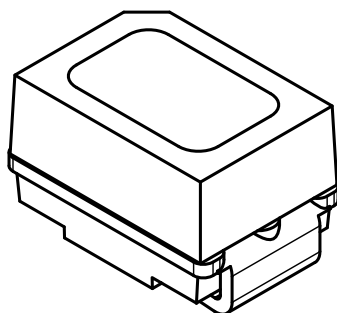
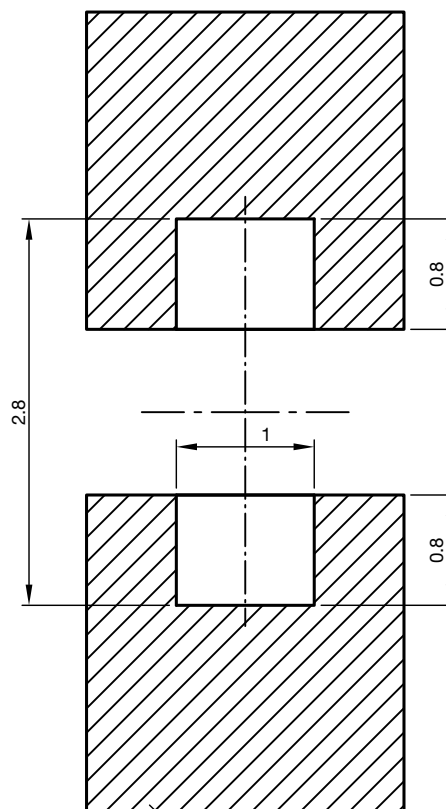


Not indicated tolerances ± 0.2

Cathode mark



Proposed pad layout
(for reference only)



technical drawings
according to DIN
specifications

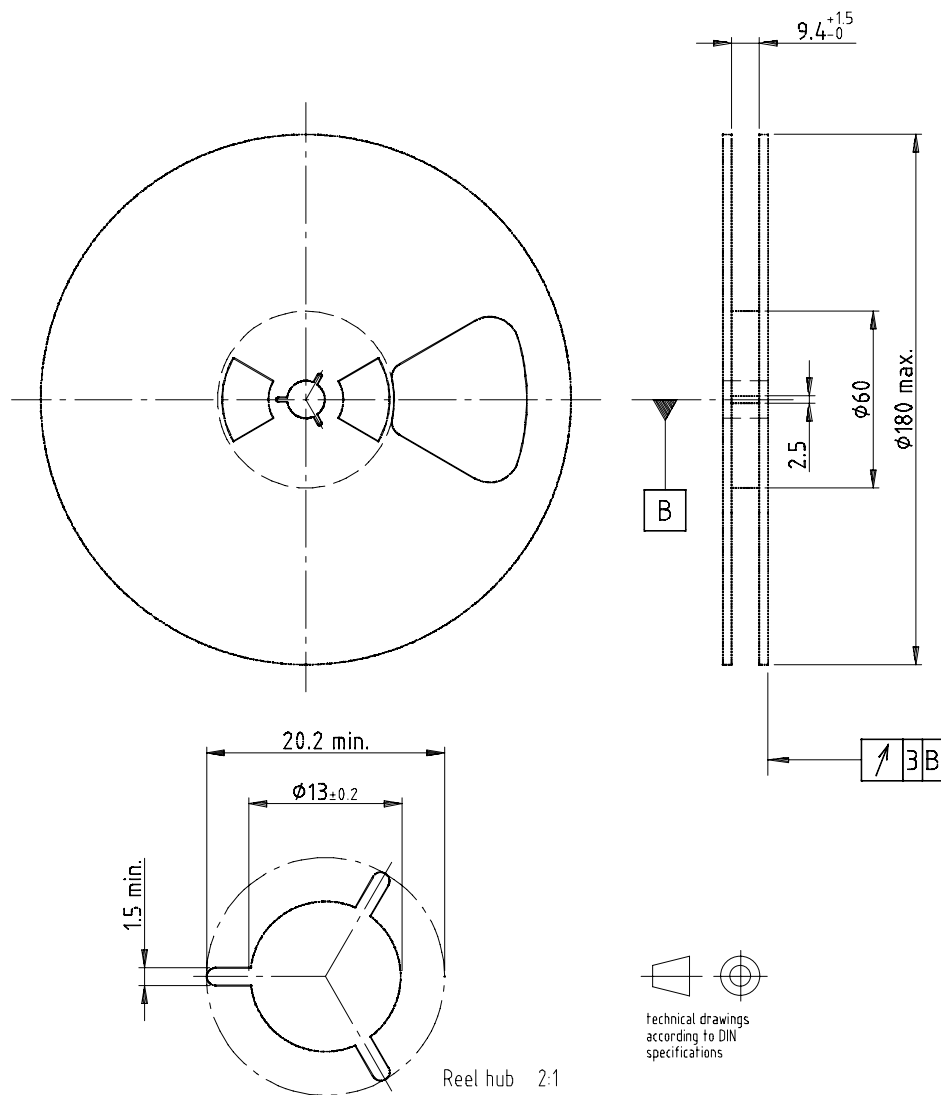


Solder resist

Drawing-No.: 6.541-5069.01-4
Issue: 2; 24.11.14



REEL DIMENSIONS in millimeters

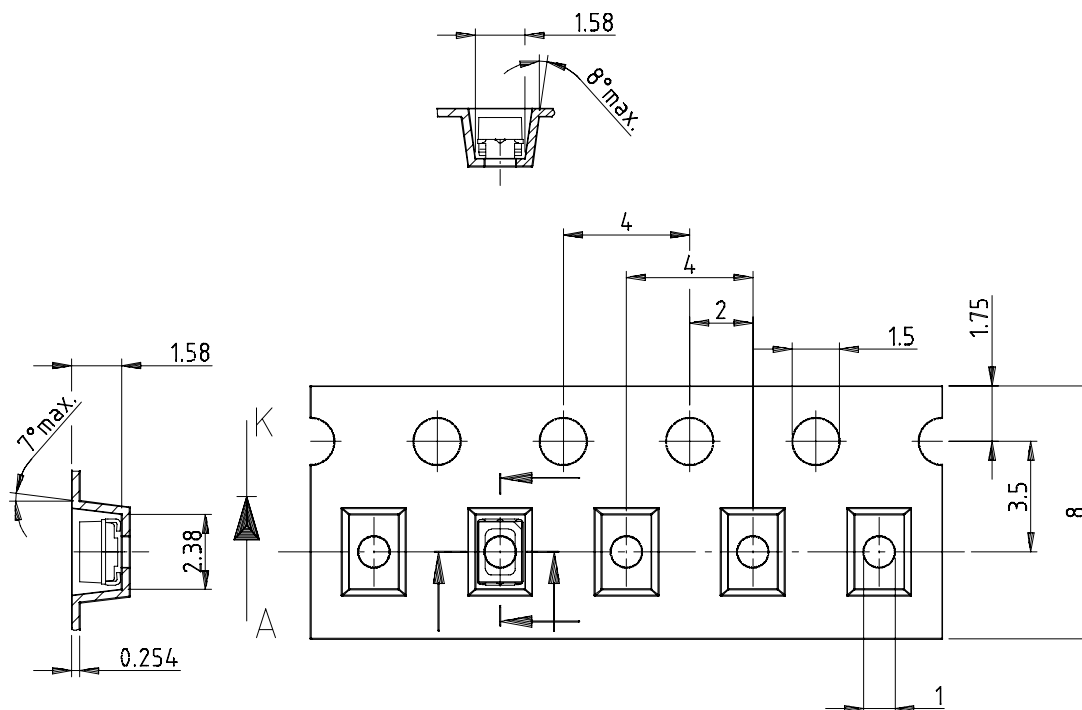


Drawing-No.: 9.800-5051.V5-4

Issue: 1; 25.07.02

16938

TAPE DIMENSIONS in millimeters

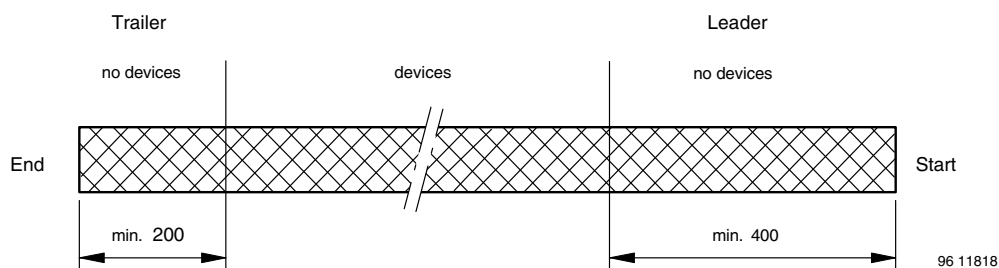


Drawing-No.: 9.700-5266.01-4

Issue: 1; 05.06.02

16939

LEADER AND TRAILER DIMENSIONS in millimeters



Note

- GS08 = 3000 pcs

BAR CODE PRODUCT LABEL


- 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: storage location
- M. Environmental Symbols: RoHS, lead (Pb)-free, halogen free
- N. Lot numbers

COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 mm/min $\pm$ 10 mm/min

165° to 180° peel angle

LABEL
Standard bar code labels for finished goods

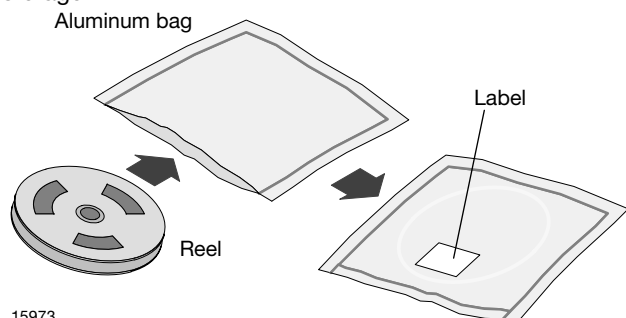
The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain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

VISHAY SEMICONDUCTOR GmbH STANDARD BAR CODE PRODUCT LABEL (finished goods)		
PLAIN WRITTING	ABBREVIATION	LENGTH
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by:	ACC	-
Packed by:	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxx+	Company logo
LONG BAR CODE TOP	TYPE	LENGTH
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
SHORT BAR CODE BOTTOM	TYPE	LENGTH
Selection-code	X	3
Data-code	N	3
Batch-number	X	10
Filter	-	1
Total length	-	17



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 $\leq 60\%$ 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.

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.

	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 $\leq 30^\circ\text{C}/60\%\text{RH}$ or b) Stored at $\leq 10\%$ RH. 3. Devices require baking before mounting if: a) Humidity Indicator Card is >10% when read at $23^\circ\text{C} \pm 5^\circ\text{C}$ or b) 2a or 2b is not met. 4. If baking is required, devices may be baked for: <table border="0"><tr><td>192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)</td><td>or</td></tr><tr><td>96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH</td><td>For all device containers</td><td>or</td></tr><tr><td>24 hours at $100 \pm 5^\circ\text{C}$</td><td>Not suitable for reels or tubes</td><td></td></tr></table>			192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or	96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers	or	24 hours at $100 \pm 5^\circ\text{C}$	Not suitable for reels or tubes	
192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or									
96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers	or								
24 hours at $100 \pm 5^\circ\text{C}$	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



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