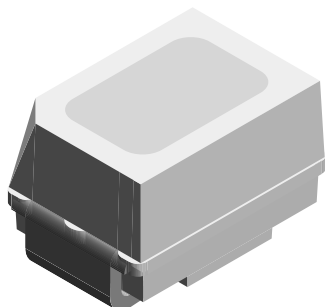


Power Mini SMD LED



19226

DESCRIPTION

The new MiniLED series have 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.

PRODUCT GROUP AND PACKAGE DATA

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

FEATURES

- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- 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
- Luminous intensity ratio in one packing unit $I_{Vmax}/I_{Vmin} \leq 2.0$, optional ≤ 1.6
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- Preconditioning according to JEDEC® level 2a
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Automotive: backlighting in dashboards and switches
- 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

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.		
VLMP232M2N2-GS08	Pure green	22.4	-	45	30	555	558	565	30	-	2.2	2.6	30	AllnGaP on GaAs
VLMP232N1P1-GS08	Pure green	28	-	56	30	555	558	565	30	-	2.2	2.6	30	AllnGaP on GaAs
VLMP232M2P1-GS08	Pure green	22.4	-	56	30	555	558	565	30	-	2.2	2.6	30	AllnGaP on GaAs

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

VLMP232..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage ⁽¹⁾		V	5	V
DC forward current	$T_{amb} \leq 80^\circ\text{C}$	I_F	40	mA
Surge forward current	$t_p \leq 10 \mu\text{s}$	I_{FSM}	0.1	A
Power dissipation		P_V	110	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 / ambient	Mounted on PC board (pad size > 5 mm ²)	R_{thJA}	400	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)
VLMP232.., PURE GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 30\text{ mA}$	VLMP232M2N2	I_V	22.4	-	45	mcd
		VLMP232N1P1	I_V	28	-	56	mcd
		VLMP232M2P1	I_V	22.4	-	56	mcd
Dominant wavelength	$I_F = 30\text{ mA}$		λ_d	555	558	565	nm
Peak wavelength	$I_F = 30\text{ mA}$		λ_p	-	555	-	nm
Angle of half intensity	$I_F = 30\text{ mA}$		ϕ	-	± 60	-	deg
Forward voltage	$I_F = 30\text{ mA}$		V_F	-	2.2	2.6	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		V_R	5	-	-	V
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$		C_j	-	15	-	pF

Note

⁽¹⁾ In one packing unit $I_{Vmax}/I_{Vmin} \leq 2.0$

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LIGHT INTENSITY (mcd)		
	OPTIONAL	MIN.	MAX.
M	1	18	22.4
	2	22.4	28
N	1	28	35.5
	2	35.5	45
P	1	45	56
	2	56	71

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	DOMINANT WAVELENGTH (nm)	
	PURE GREEN	
	MIN.	MAX.
0	555	559
1	558	561
2	560	563
3	562	565

Note

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

CROSSING TABLE

VISHAY	OSRAM
VLMP232M2P1	LPM675-M2P1

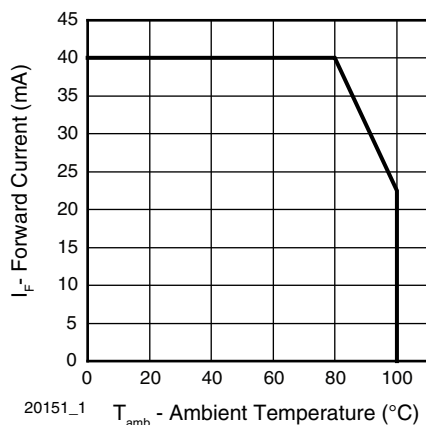
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

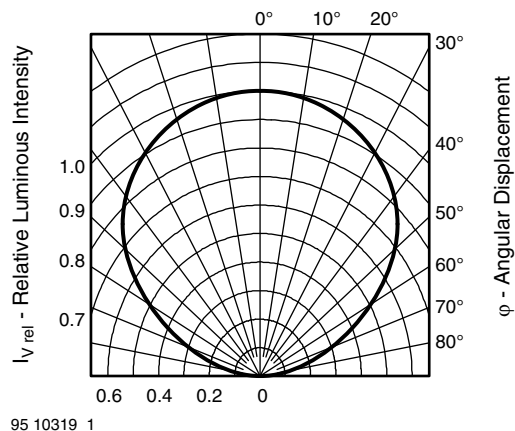


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

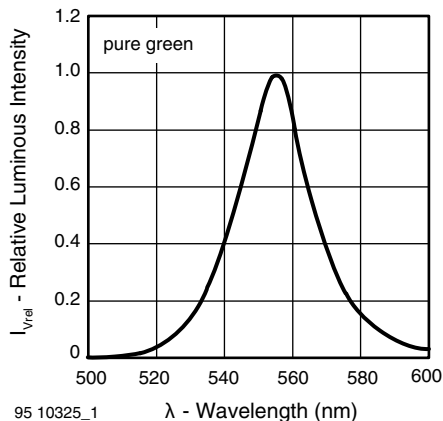


Fig. 3 - Relative Intensity vs. Wavelength

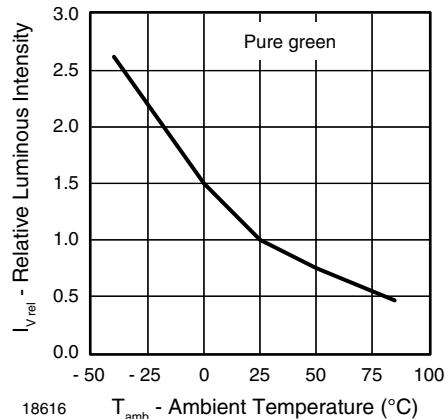


Fig. 6 - Relative Luminous Intensity vs. Ambient Temperature

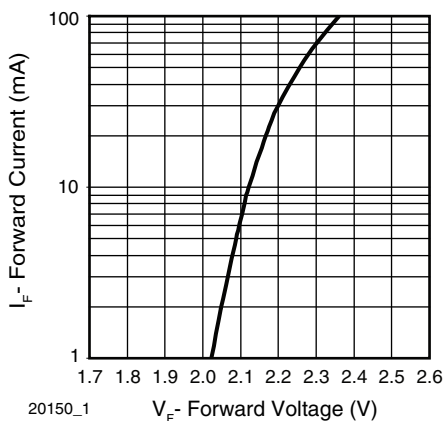


Fig. 4 - Forward Current vs. Forward Voltage

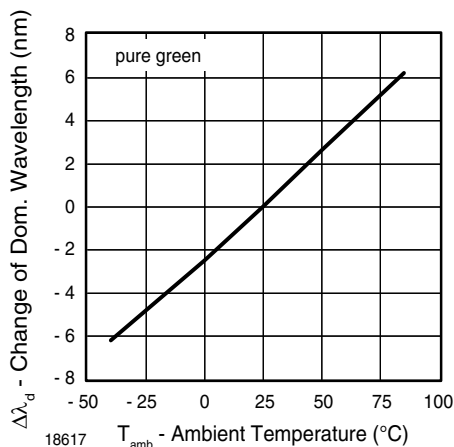


Fig. 7 - Change of Dominant Wavelength vs. Ambient Temperature

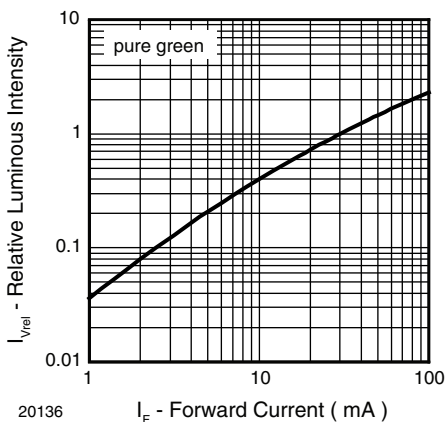


Fig. 5 - Relative Luminous Intensity vs. Forward Current

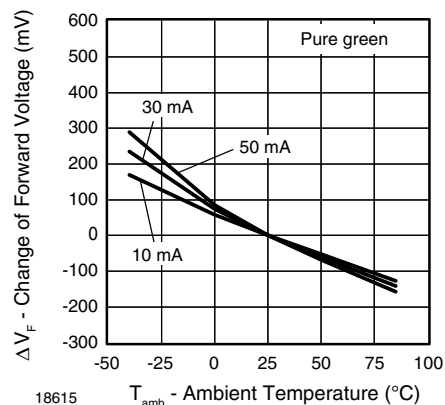
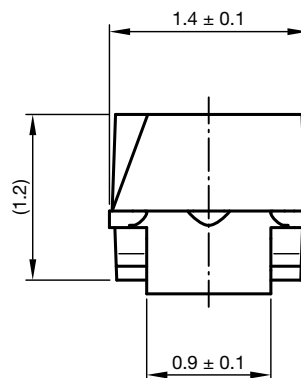
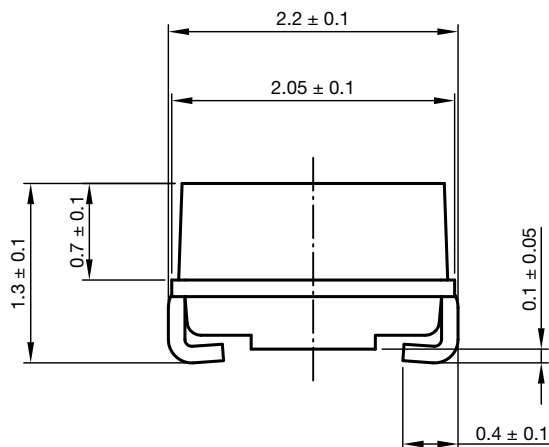
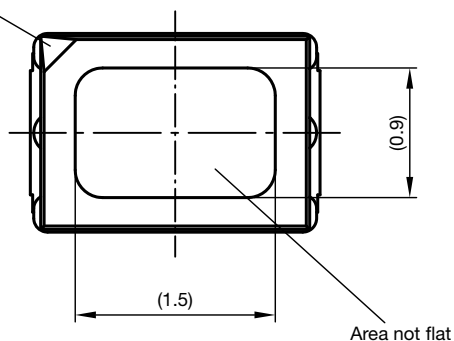


Fig. 8 - Change of Forward Voltage vs. Ambient Temperature

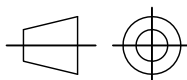
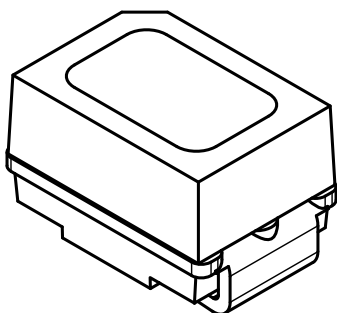
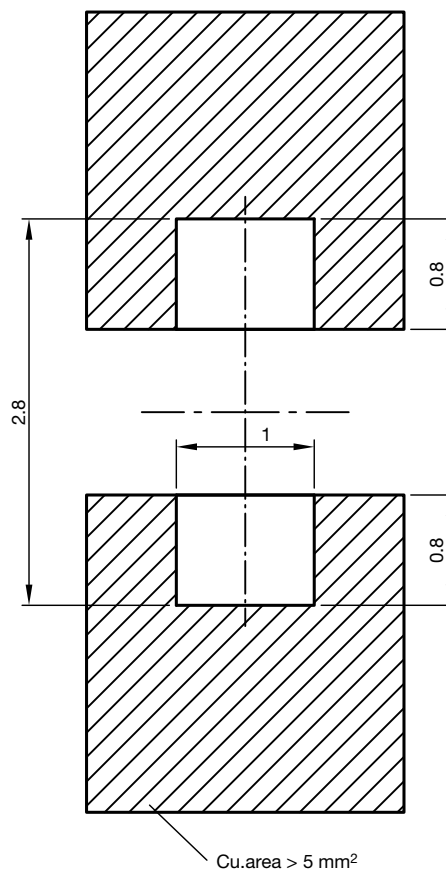
PACKAGE DIMENSIONS in millimeters


Not indicated tolerances ± 0.2

Cathode mark



Proposed pad layout
(for reference only)

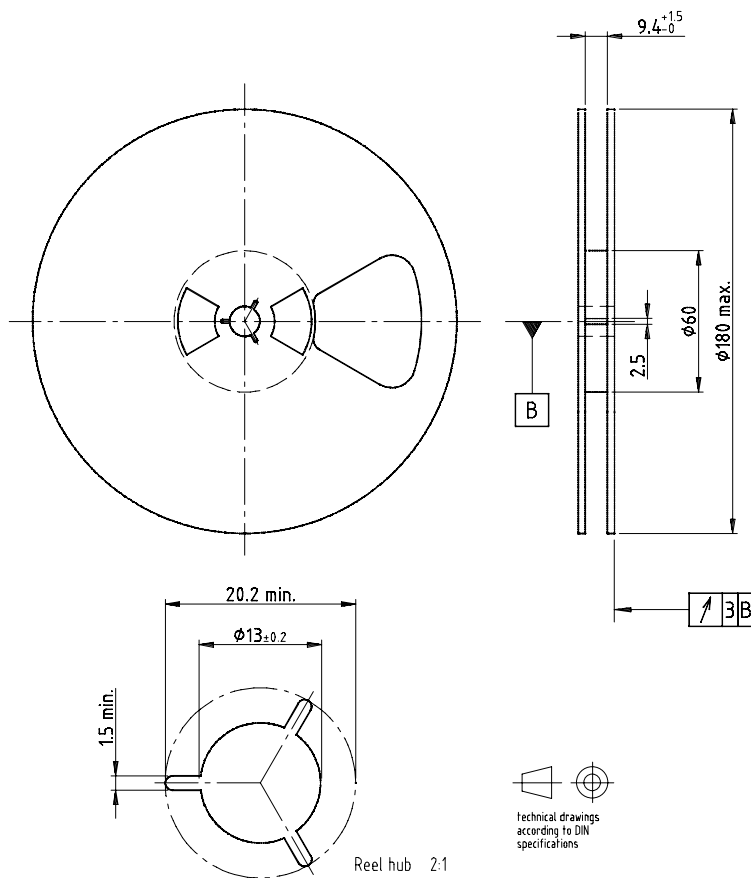


technical drawings
according to DIN
specifications



Solder resist

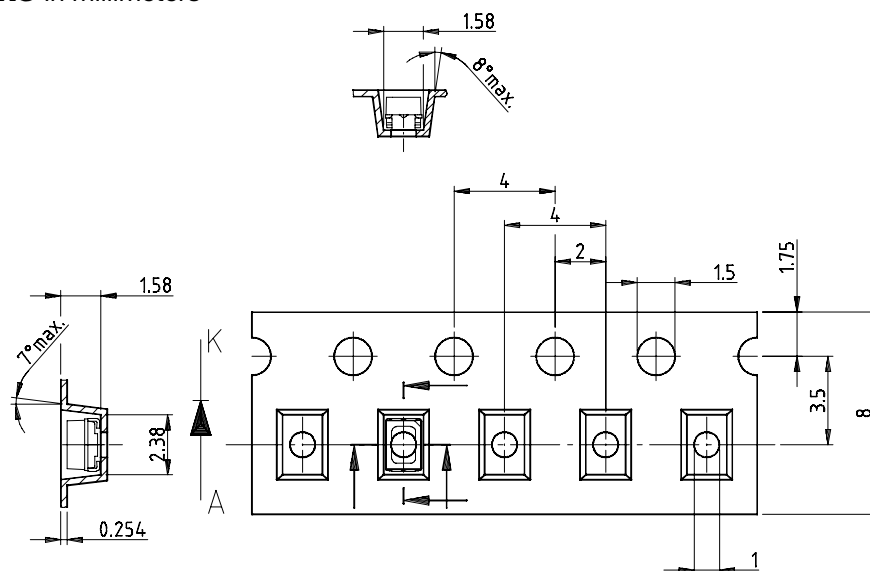
Drawing-No.: 6.541-5069.01-4
Issue: 2; 24.11.14

REEL DIMENSIONS in millimeters


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

Issue: 1; 25.07.02

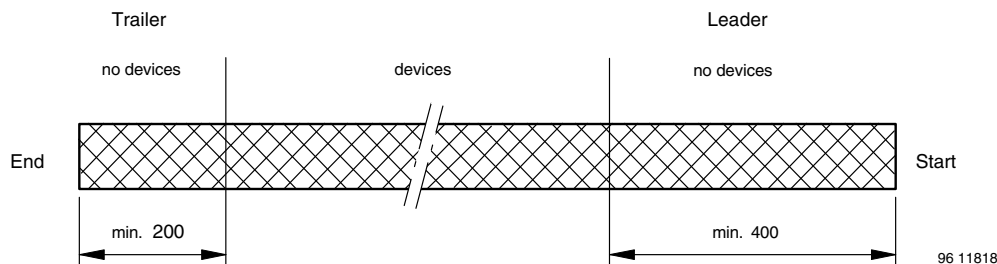
16938

TAPE DIMENSIONS in millimeters


Drawing-No.: 9.700-5266.01-4

Issue: 1; 05.06.02

16939

LEADER AND TRAILER DIMENSIONS in millimeters


GS08 = 3000 pcs

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.

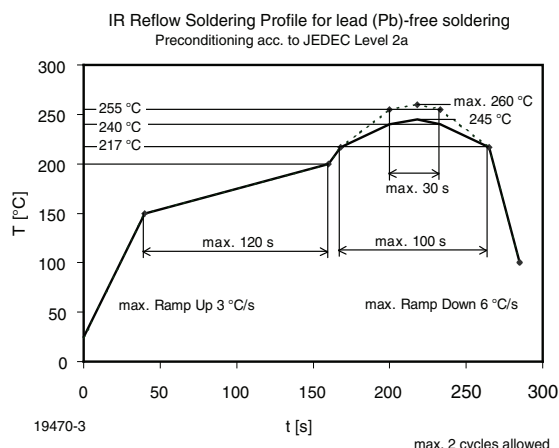
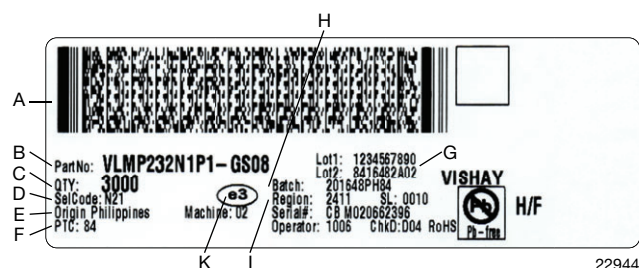
SOLDERING PROFILE


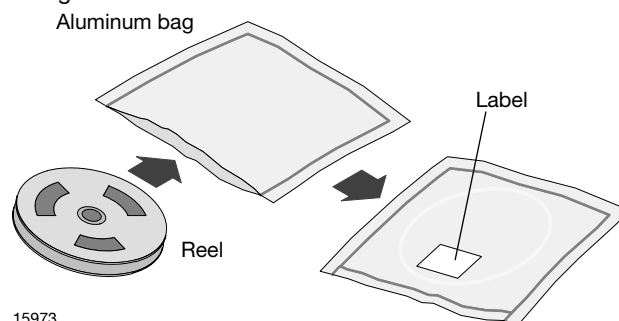
Fig. 9 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

BAR CODE PRODUCT LABEL (example)


- A. 2D bar code label
- B. Vishay part number
- C. QTY: quantity
- D. SelCode: N21: N2 (LOP group)
1 (LD group)
- E. Origin Philippines: country of origin
- F. PTC: 84 = product tracking code
- G. Lot1: internal lot number
Lot2: internal lot number
- H. Batch: 201648PH84:
201648 (date code YYYYWW)
PH (country of origin)
84 (PTC)
- I. Region: 2411: plant code
- K. e3: terminations finishing

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.

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 <div style="border: 1px solid black; padding: 5px; display: inline-block;"> 2a </div>						
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:								
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen)</td> <td style="width: 50%; text-align: right;">or</td> </tr> <tr> <td>96 hours at 60±5°C and <5%RH</td> <td style="text-align: right;">For all device containers or</td> </tr> <tr> <td>24 hours at 100±5°C</td> <td style="text-align: right;">Not suitable for reels or tubes</td> </tr> </table>			192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen)	or	96 hours at 60±5°C and <5%RH	For all device containers or	24 hours at 100±5°C	Not suitable for reels or tubes
192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen)	or							
96 hours at 60±5°C and <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								

19796

Example of JESD22-A112 level 2a label



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