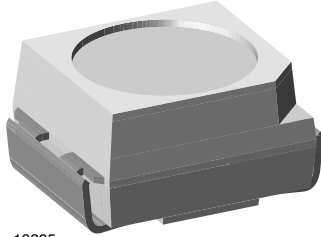


## Standard SMD LED PLCC-2



19225

### DESCRIPTION

This device has been designed to meet the increasing demand for AlInGaP technology.

The package of the VLME31-series is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: standard
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- SMD LED with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with IR reflow, vapor phase and wave solder processes according to CECC 00802 and J-STD-020
- 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 packaging unit  $I_{Vmax}/I_{Vmin} \leq 1.6$
- Preconditioning according to JEDEC® level 2a
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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
- 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.		
VLME31Q2T1-GS08	Yellow	90	190	355	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs
VLME31Q2T1-GS18 <sup>(1)</sup>	Yellow	90	190	355	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs
VLME31R1S2-GS08	Yellow	112	195	280	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs
VLME31R1S2-GS18 <sup>(1)</sup>	Yellow	112	195	280	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs
VLME31S1T1-GS08	Yellow	180	210	355	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs
VLME31S1T1-GS18 <sup>(1)</sup>	Yellow	180	210	355	20	581	588	594	20	-	2.0	2.6	20	AllInGaP on GaAs

#### Note

<sup>(1)</sup> Not for new designs



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
VLME31..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>(1)</sup>		V <sub>R</sub>	5	V
DC forward current	T <sub>amb</sub> ≤ 85 °C	I <sub>F</sub>	30	mA
Surge forward current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	0.1	A
Power dissipation		P <sub>V</sub>	80	mW
Junction temperature		T <sub>j</sub>	+125	°C
Operating temperature range		T <sub>amb</sub>	-40 to +100	°C
Storage temperature range		T <sub>stg</sub>	-40 to +100	°C
Thermal resistance junction to ambient	Mounted on PC board (pad size > 16 mm <sup>2</sup> )	R <sub>thJA</sub>	400	K/W

**Note**

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

OPTICAL AND ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)							
VLME31.., YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 20 mA	VLME31Q2T1	I <sub>v</sub>	90	190	355	mcd
		VLME31R1S2	I <sub>v</sub>	112	195	280	mcd
		VLME31S1T1	I <sub>v</sub>	180	210	355	mcd
Dominant wavelength	I <sub>F</sub> = 20 mA	VLME31Q2T1, VLME31R1S2, VLME31S1T1	λ <sub>d</sub>	581	588	594	nm
Peak wavelength	I <sub>F</sub> = 20 mA		λ <sub>p</sub>	-	590	-	nm
Angle of half intensity	I <sub>F</sub> = 20 mA		φ	-	± 60	-	°
Forward voltage	I <sub>F</sub> = 20 mA		V <sub>F</sub>	-	2.0	2.6	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	5	-	-	V
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz		C <sub>j</sub>	-	15	-	pF

**Note**

<sup>(1)</sup> In one packing unit I<sub>vmax</sub>/I<sub>vmin</sub> ≤ 1.6

LUMINOUS INTENSITY CLASSIFICATION				
GROUP	LUMINOUS INTENSITY I <sub>v</sub> (mcd)			
	STANDARD	OPTIONAL	MIN.	MAX.
Q	1	71	90	
	2	90	112	
R	1	112	140	
	2	140	180	
S	1	180	224	
	2	224	280	
T	1	280	355	
	2	355	450	

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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.

CROSSING TABLE	
VISHAY	OSRAM
VLME31Q2T1	LYT676-Q2T1
VLME31R1S2	LYT676-R1S2
VLME31S1T1	LYT676-S1T1

COLOR CLASSIFICATION		
GROUP	YELLOW	
	DOM. WAVELENGTH (NM)	
	MIN.	MAX.
1	581	584
2	583	586
3	585	588
4	587	590
5	589	592
6	591	594

**Note**

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

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

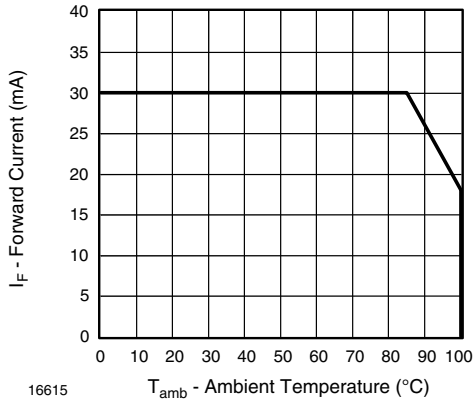


Fig. 1 - Forward Current vs. Ambient Temperature

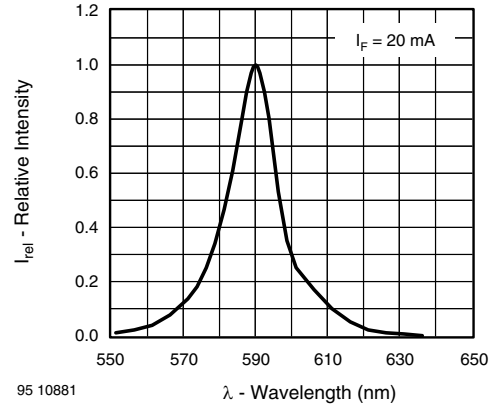


Fig. 4 - Relative Intensity vs. Wavelength

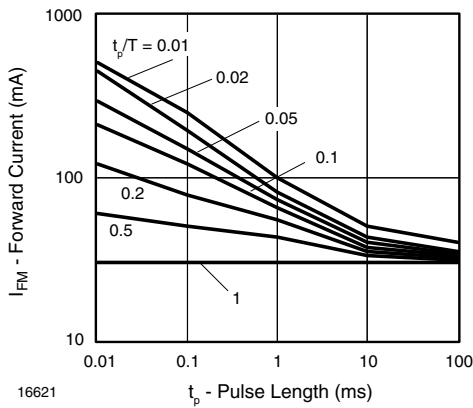


Fig. 2 - Forward Current vs. Pulse Length

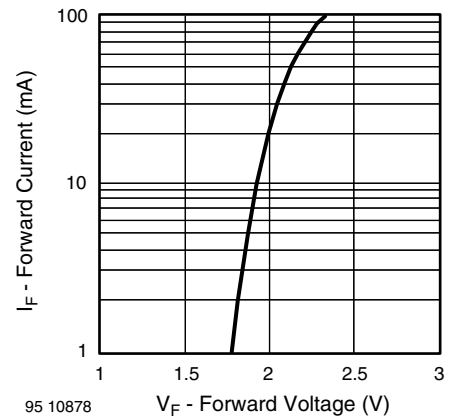


Fig. 5 - Forward Current vs. Forward Voltage

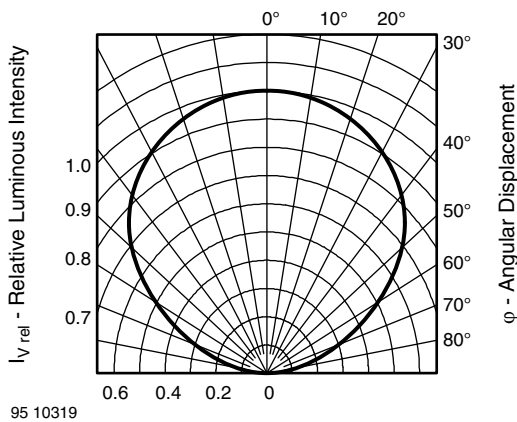


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

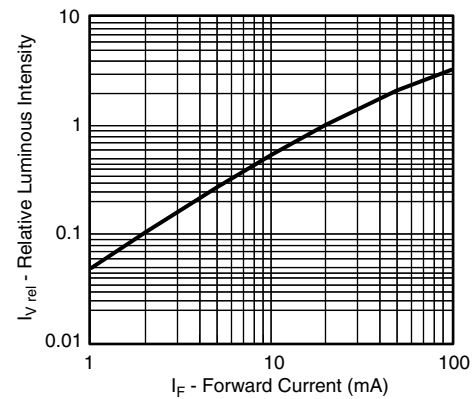


Fig. 6 - Relative Luminous Intensity vs. Forward Current

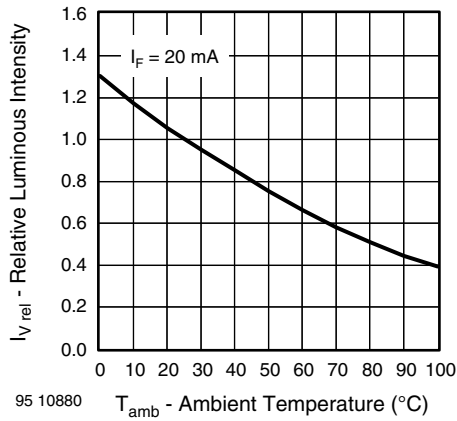


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

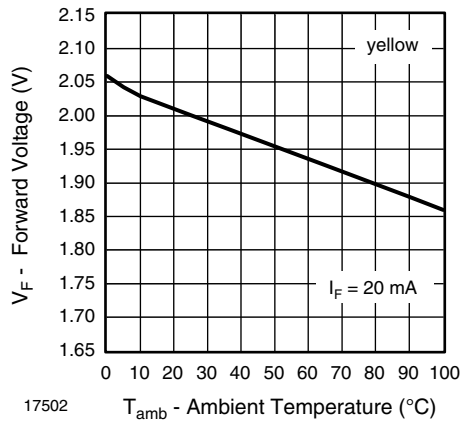


Fig. 8 - Forward Voltage vs. Ambient Temperature

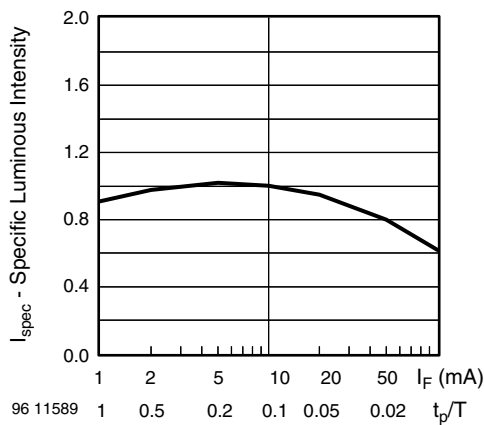
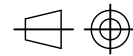
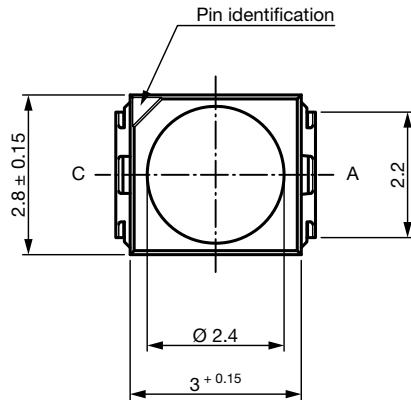
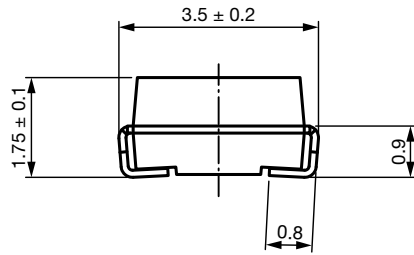


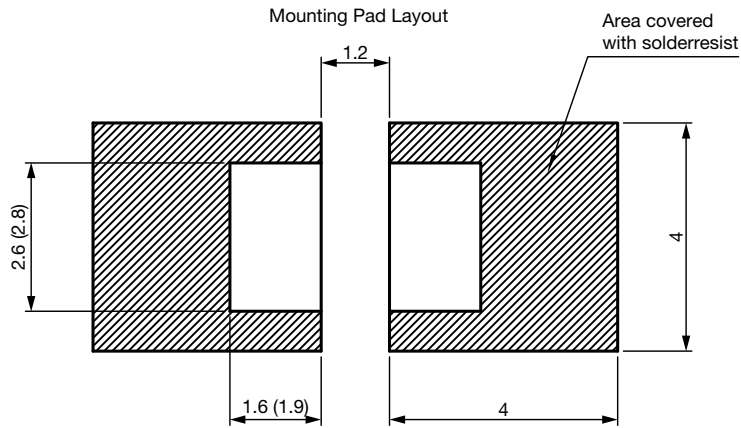
Fig. 9 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

**PACKAGE DIMENSIONS** in millimeters



technical drawings  
according to DIN  
specifications

Drawing-No.: 6.541-5067.01-4  
Issue: 7; 12.03.14

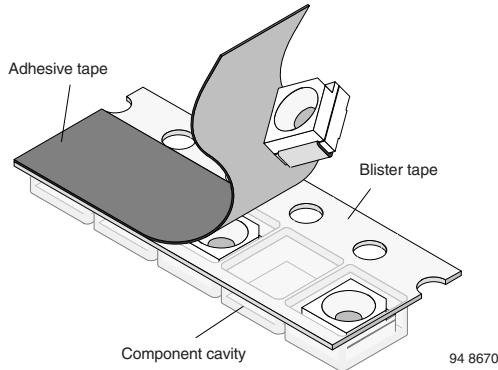


Dimensions: reflow and vapor phase (wave soldering)

**METHOD OF TAPING / POLARITY AND TAPE AND REEL**

**SMD LED (VLM3 - SERIES)**

Vishay's LEDs in SMD packages are available in an antistatic 8 mm blister tape (in accordance with DIN IEC 40 (CO 564) for automatic component insertation. The blister tape is a plastic strip with impressed component cavities, covered by a top tape.



**REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDs, TAPE OPTION GS18 (= 8000 PCS) PREFERRED**

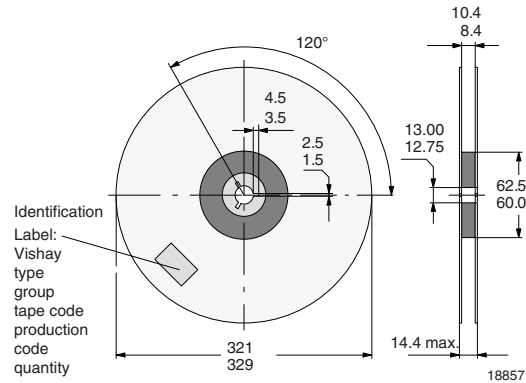


Fig. 12 - Reel Dimensions - GS18

**TAPING OF VLM.3..**

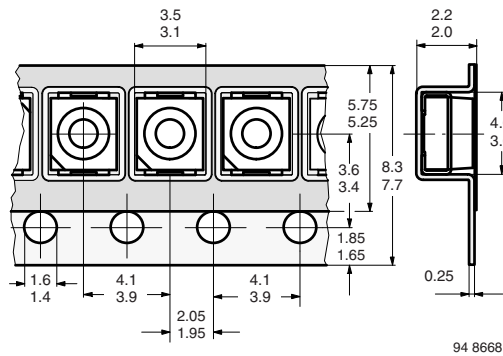


Fig. 10 - Tape Dimensions in mm for PLCC-2

**SOLDERING PROFILE**

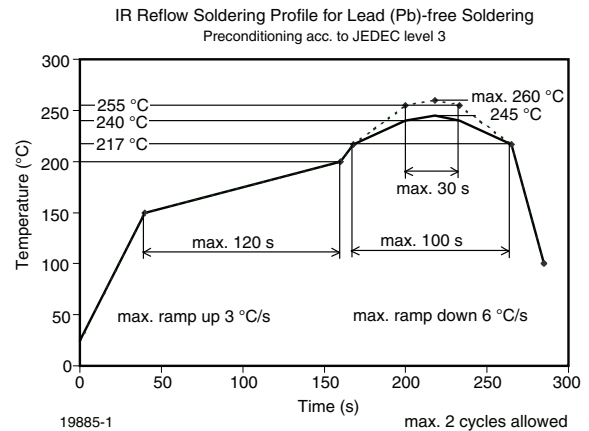


Fig. 13 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

**REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDs, TAPE OPTION GS08 (= 1500 PCS)**

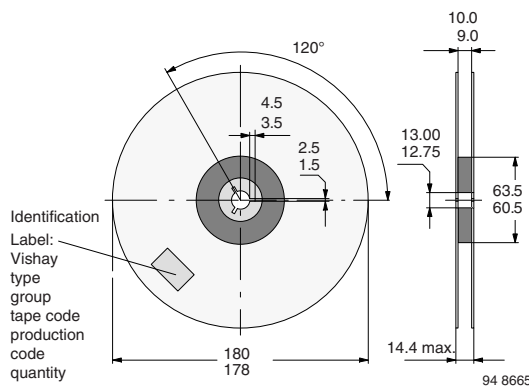


Fig. 11 - Reel Dimensions - GS08

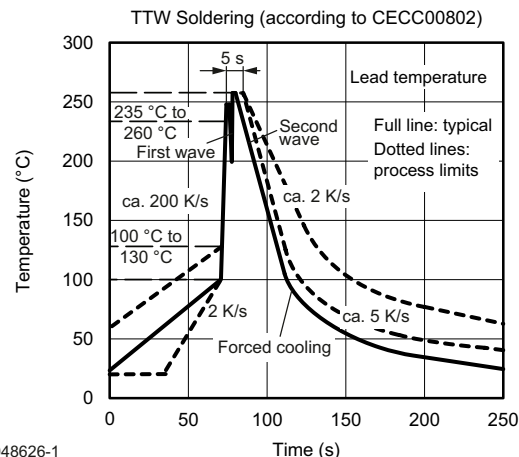
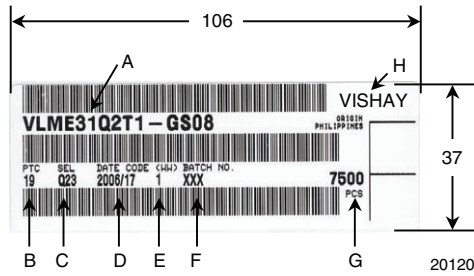


Fig. 14 - Double Wave Soldering of Opto Devices (all Packages)

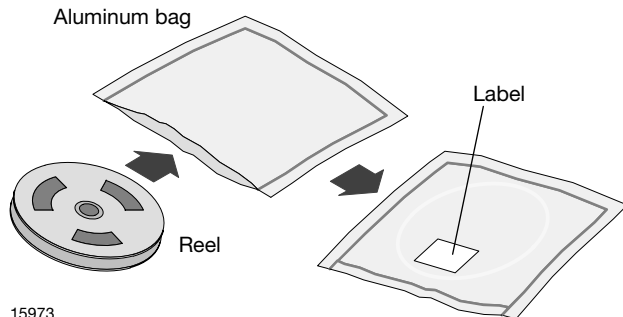
**BAR CODE PRODUCT LABEL (example)**



- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: Q2 = code for luminous intensity group  
3 = code for color group
- D. Date code year / week
- E. Day code (e.g. 1: Monday)
- F. Batch no.
- G. Total quantity
- H. Company code

**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.

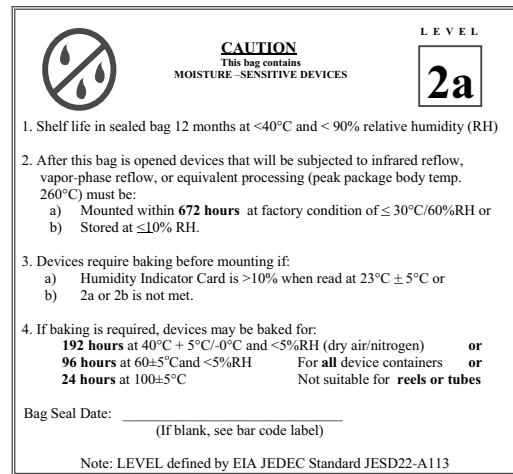
After more than 672 h under these conditions moisture content will be too high for reflow soldering.

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.



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.