Highbright 0603 ChipLED



FEATURES

- Super thin ChipLED with exceptional brightness 1.6 mm x 0.8 mm x 0.55 mm (L x W x H)
- High reliability PCB based
- Wavelength typ. 525 nm (true green)
- InGaN technology
- Viewing angle: extremely wide 146°
- Grouping parameter: luminous intensity, dominant wavelength, and forward voltage
- Available in 8 mm tape on 7" diameter reel
- Compatible to IR reflow soldering
- Preconditioning according to JEDEC® level 2a
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

DESCRIPTION

The new ChipLED series have been designed in the smallest SMD package. This innovative ChipLED technology opens the way to

- smaller products of higher performance
- more design-in flexibility
- enhanced applications

The 0603 LED is an obvious solution for small-scale, high brightness products that are expected to work reliably in an arduous environment.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0603 ChipLED
- Product series: power
- Angle of half intensity: ± 73°

APPLICATIONS

- Wearables
- Backlight keypads
- Navigation systems
- Cellular phone displays
- Displays for industrial control systems
- Miniaturized color effects
- Traffic displays
- Heart rate monitoring

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.		
VLMTG1400-GS08	True green	1200	1400	2800	20	515	525	535	20	2.45	2.80	3.05	20	InGaN
VLMTG1401-GS08	True green	1200	1400	2800	20	515	525	535	20	2.60	2.80	3.05	20	InGaN
VLMTG1402-GS08	True green	1200	1400	2800	20	520	527	535	20	2.45	2.80	3.05	20	InGaN

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
VLMTG1400, VLMTG1401 (InGaN technology)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
DC forward current		I_F	20	mA
Surge forward current	1/10 duty cycle, 0.1 ms pulse width	I_{FSM}	100	mA
Power dissipation	$T_{amb} \leq 25$ °C	P_V	64	mW
Operating temperature range		T_{amb}	-40 to +80	°C
Storage temperature range		T_{stg}	-40 to +100	°C
IRED solder conditions	According Vishay specifications	T_{st}	260	°C
Thermal resistance junction-to-ambient	Mounted on PCB (pad size > 5 mm^2)	R_{thJA}	550	K/W
ESD rating	HBM, CDM, MM	V_{ESD}	300, 500, 50	V

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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLMTG1400, VLMTG1401, TRUE GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 20 mA		I_V	1200	1400	2800	mcd
Radiant intensity	I_F = 20 mA		I_e	-	2.8	-	mW/sr
Conversion factor between flux and intensity			Φ/I	-	4.8	-	sr
Dominant wavelength	I_F = 20 mA	VLMTG1400, VLMTG1401	λ_d	515	525	535	nm
		VLMTG1402	λ_d	520	527	535	nm
Peak wavelength	I_F = 20 mA		λ_p	-	518	-	nm
Angle of half intensity	I_F = 20 mA		φ	-	± 73	-	°
Spectral line half width	I_F = 20 mA		Δλ	-	35	-	nm
Forward voltage	I_F = 20 mA	VLMTG1400, VLMTG1402	V_F	2.45	2.80	3.05	V
	I_F = 20 mA	VLMTG1401	V_F	2.60	2.80	3.05	V
Reverse current	V_R = 5 V		I_R	-	-	10	µA

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd)	
	MIN.	MAX.
W	1200	1800
X	1800	2800

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 in any one reel.
  In order to ensure availability, single wavelength groups will not be orderable. Also single forward voltage groups are not orderable

COLOR CLASSIFICATION

COLOR	GROUP	DOMINANT WAVELENGTH (nm)	
		MIN.	MAX.
True green	AN	515	520
	AP	520	525
	AQ	525	530
	AR	530	535

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm

FORWARD VOLTAGE CLASSIFICATION

COLOR	GROUP	FORWARD VOLTAGE (V)	
		MIN.	MAX.
True green	J6	2.45	2.60
	J7	2.60	2.75
	J8	2.75	2.90
	J9	2.90	3.05

Note

- Forward voltage is measured with a tolerance of ± 0.1 V

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TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

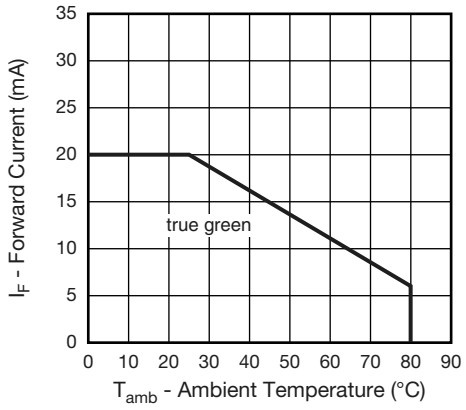


Fig. 1 - Forward Current vs. Ambient Temperature

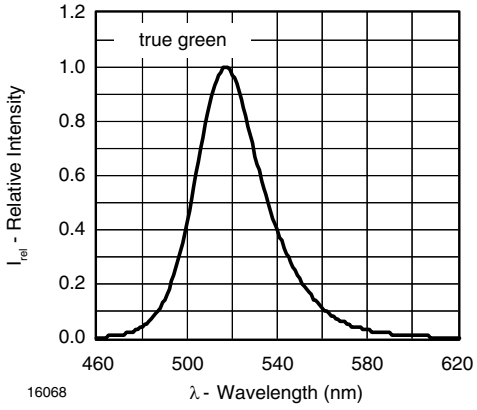


Fig. 4 - Relative Intensity vs. Wavelength

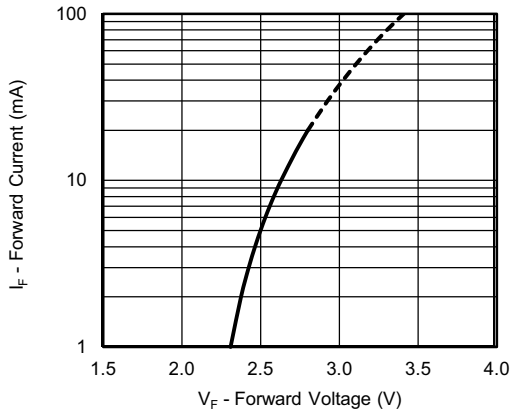


Fig. 2 - Forward Current vs. Forward Voltage

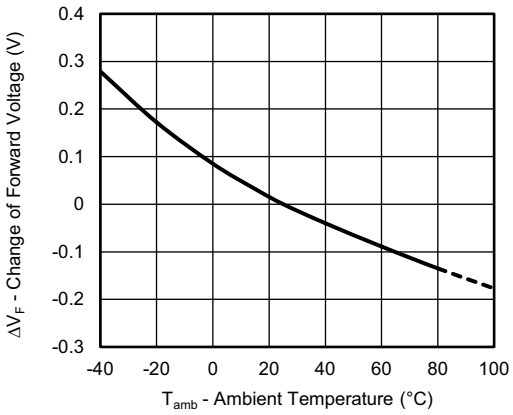


Fig. 5 - Change of Forward Voltage vs. Ambient Temperature

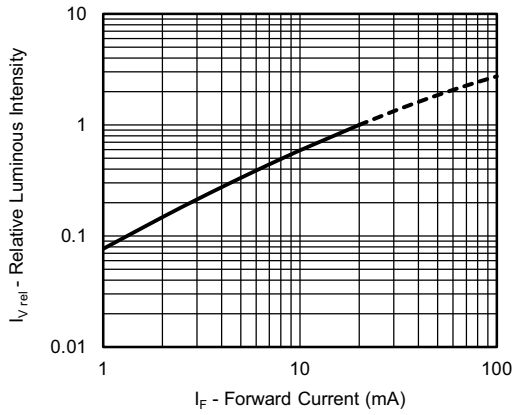


Fig. 3 - Relative Luminous Intensity vs. Forward Current

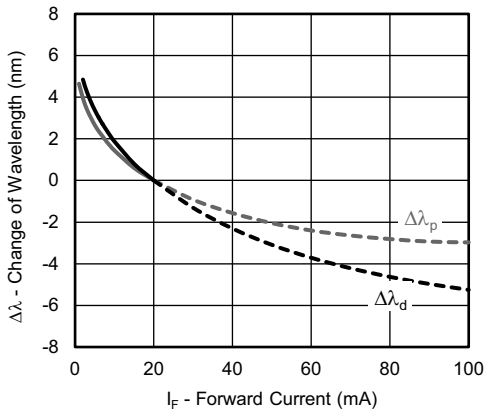


Fig. 6 - Change of Wavelength vs. Forward Current

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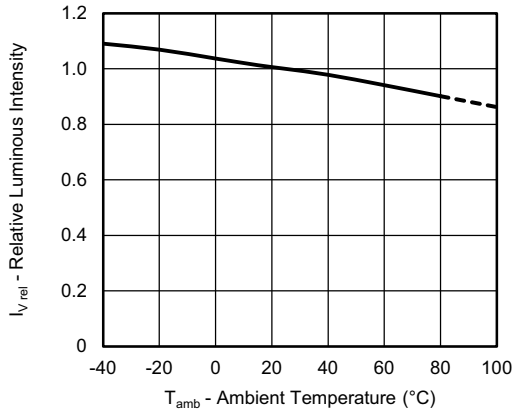


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

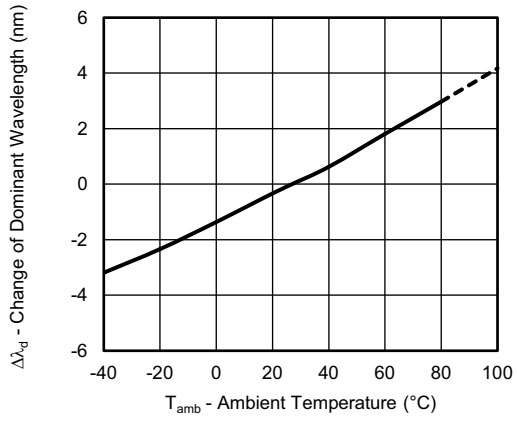


Fig. 8 - Change of Dominant Wavelength vs. Ambient Temperature

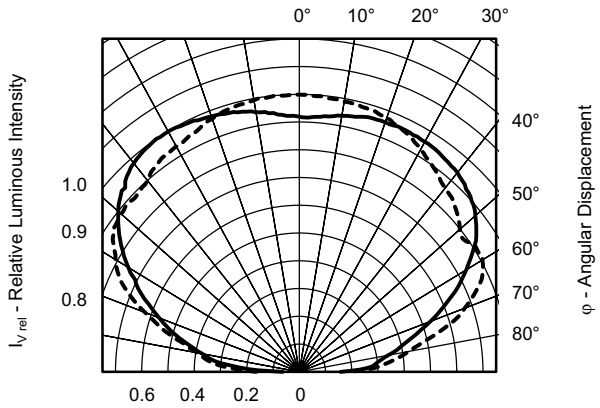
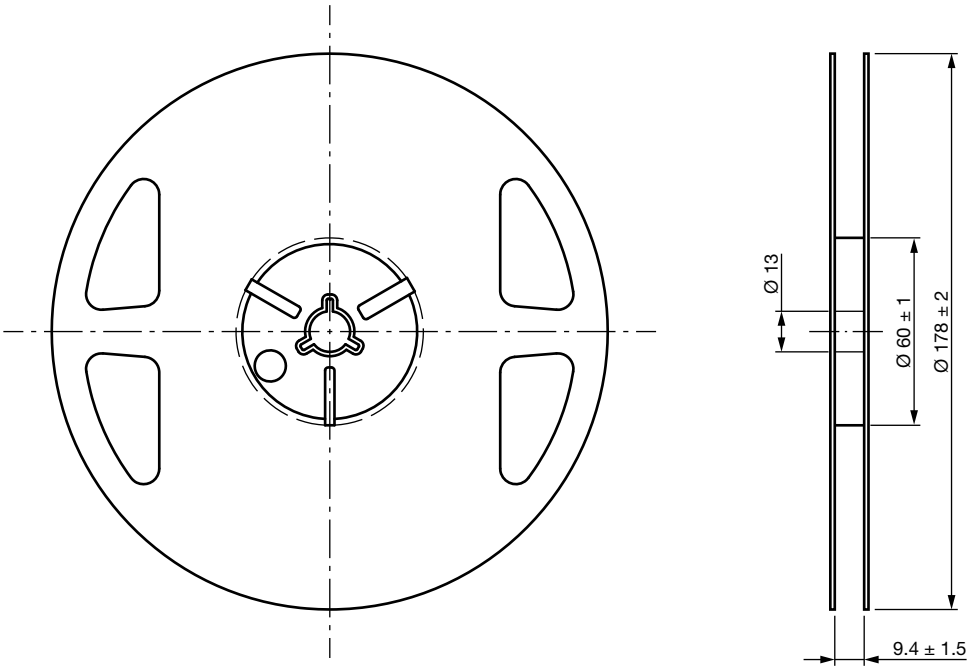


Fig. 9 - Relative Luminous Intensity vs. Angular Displacement

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REEL DIMENSIONS in millimeters



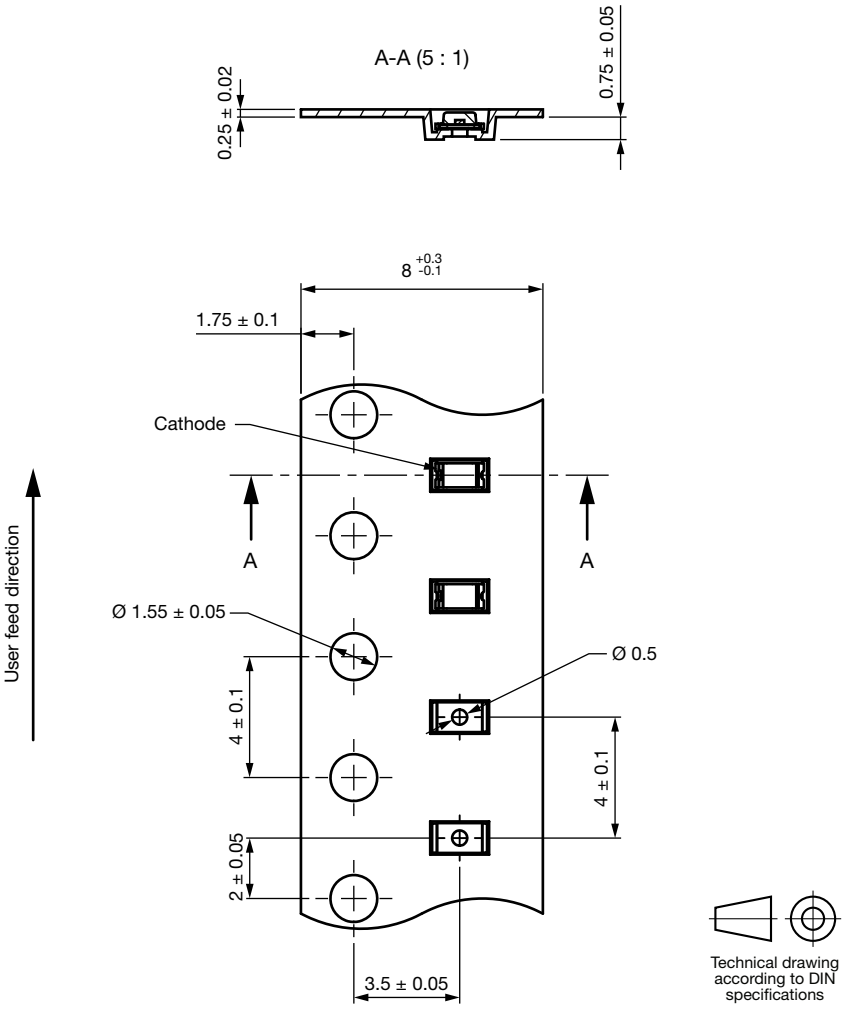
Drawing-No.: 9.800-5122.01-4
Issue: 2; 03.11.11

Technical drawing according to DIN specifications

3000 pieces on one reel
Minimum order quantity: 9000 pieces

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TAPE DIMENSIONS in millimeters

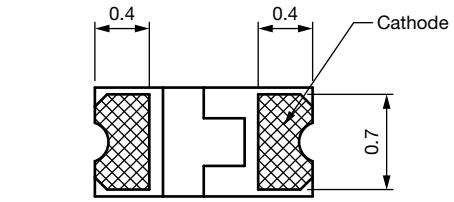


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Issue: prel; 24.03.17

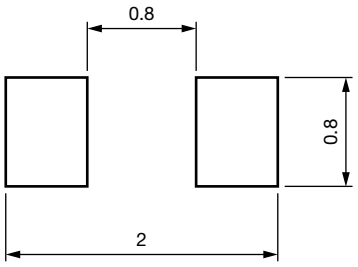
Not indicated tolerances ± 0.1 mm.

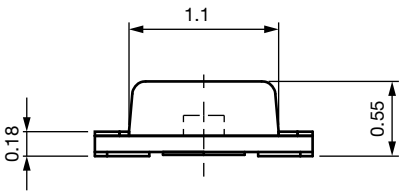
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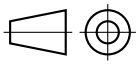
PACKAGE DIMENSIONS in millimeters



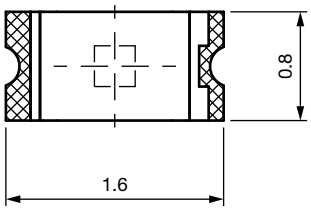
Recommended solder pad footprint

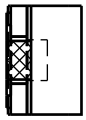






Technical drawing according to DIN specifications

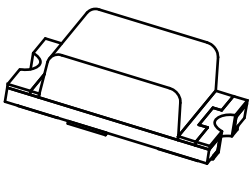






Au-plated surfaces

Not indicated tolerances ± 0.1 mm.



Drawing-No.: 6.541-5116.01-4
Issue: prel; 29.03.17

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SOLDERING PROFILE

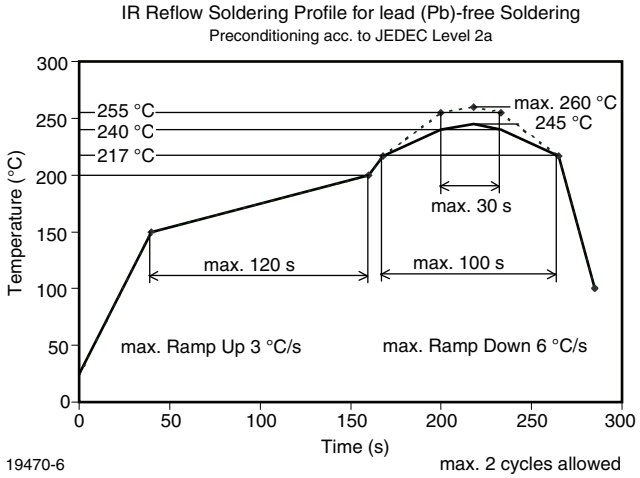
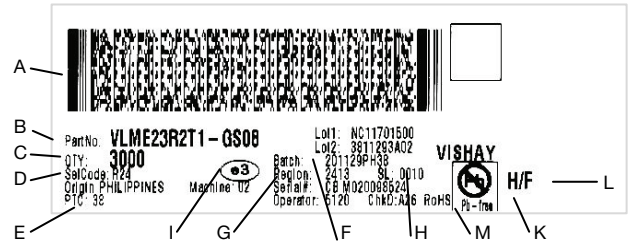


Fig. 10 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

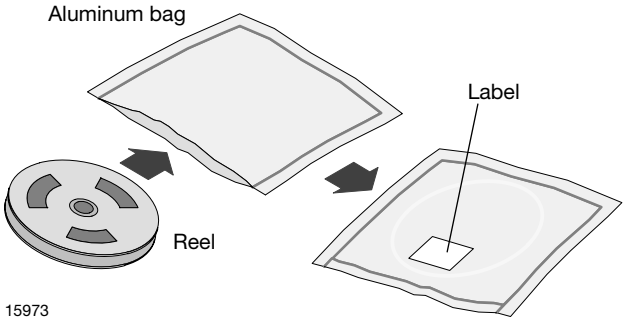
BAR CODE PRODUCT LABEL (example only)



A. 2D barcode
B. Vishay part number
C. 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:

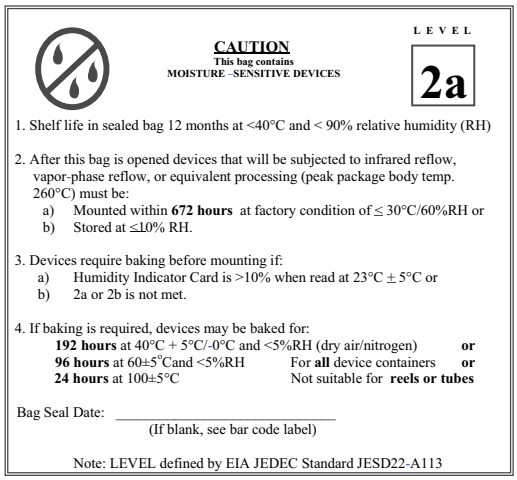
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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.



Example of JESD22-A112 level 2a label

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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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