UV SMD LED With Silicone Lens

FEATURES

- Ceramic SMT package with silicone lens
- Dimension (L x W x H) in mm: 3.5 x 3.5 x 2.9
- Forward current: up to 1250 mA
- Radiant power (typ.): 900 mW at 500 mA
- Materials:
  - Die: InGaN
  - Resin: silicone (water clear)
  - Leads / terminations finish: gold plated (Au)
- Grouping parameters:
  - Radiant power
  - Peak wavelength
  - Forward voltage
- Reflow soldering method
- MSL2 according to J-STD-020
- Packaging: 12 mm tape on reel, Ø 180 mm (7"), 500 pcs per reel
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

DESCRIPTION

VLMU3520-...-060 series is a ceramic based high power UV LED with silicone lens for long life time. The package size is 3.5 mm x 3.5 mm and the radiant power up to 2 W at 1200 mA in a wavelength range of 380 nm to 410 nm.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD ceramic high power
- Product series: high power UV LED
- Angle of half intensity: ± 30°
- Lead-finishing: Au

SAFETY ADVICES

UV LEDs emit highly concentrated, non visible UV light which can be harmful to the human eye. Do not expose the eyes or skin directly to the UV light. Wear appropriate protective gear when operating the LED. Keep out of the reach of children.

APPLICATIONS

- Industrial curing
- Photocatalytic purification
- Poster printing curing
- Counterfeit money detector
- Blood detector
- Nail curing
- Teeth curing

PARTS TABLE

PART	COLOR	RADIANT POWER (mW)			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.		
VLMU3520-385-060	Ultraviolet	740	900	-	500	380	385	390	500	3.2	3.6	4.0	500	InGaN
VLMU3520-395-060	Ultraviolet	740	900	-	500	390	395	400	500	3.2	3.6	4.0	500	InGaN
VLMU3520-405-060	Ultraviolet	740	900	-	500	400	405	410	500	3.2	3.6	4.0	500	InGaN

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **VLMU3520-...-060**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
DC forward current		I_F	1250	mA
Pulse forward current	Duty cycle 1/10, pulse width 0.1 ms	I_{FP}	1500	mA
Power dissipation		P_V	5	W
Electrostatic discharge	HBM: MIL-STD-883 C 3B	ESD	8000	V
Junction temperature		T_j	+130	°C
Operating temperature range		T_{amb}	-40 to +105	°C
Storage temperature range		T_{stg}	-40 to +105	°C
Solder temperature		T_{sol}	260	°C
Thermal resistance - junction to solder point		R_{thJS}	10	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMU3520-...-060, ULTRAVIOLET**							
PARAMETER	**TEST CONDITION**	**DEVICE TYPE**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Forward voltage	I_F = 500 mA		V_F	3.2	3.6	4	V
Radiant power	I_F = 500 mA	VLMU3520-...-060	ϕ_e	740	900	-	mW
Radiant power	I_F = 1200 mA	VLMU3520-...-060	ϕ_e	-	2000	-	mW
Ratio of radiant intensity / radiant power	I_F = 500 mA	VLMU3520-...-060	I_e/Φ_e	-	0.63	-	sr^{-1}
Peak wavelength	I_F = 500 mA	VLMU3520-385-060	λ_p	380	385	390	nm
		VLMU3520-395-060		390	395	400	nm
		VLMU3520-405-060		400	405	410	nm
Spectral bandwidth at 50 % $\Phi_{rel.}$ max.	I_F = 500 mA	VLMU3520-385-060	$\Delta\lambda_{0.5}$	-	13	-	nm
		VLMU3520-395-060		-	15	-	nm
		VLMU3520-405-060		-	18	-	nm
Angle of half intensity	I_F = 500 mA		φ	-	± 30	-	°
Reverse current	V_R = 5 V		I_R	-	-	10	µA

Note

- Tolerances: ± 11 % for ϕ_e, ± 0.1 V for V_F, ± 1 nm for λ_p

RADIANT POWER CLASSIFICATION (I_F = 500 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
U074	740	780	
U078	780	820	mW
U082	820	860	
U086	860	900	
U090	900	940	
U094	940	980	
U098	980	1020	

PEAK WAVELENGTH CLASSIFICATION (I_F = 500 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
Q380	380	385	nm
Q385	385	390	
Q390	390	395	
Q395	395	400	
Q400	400	405	
Q405	405	410	

FORWARD VOLTAGE CLASSIFICATION (I_F = 500 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
V3234	3.2	3.4	V
V3436	3.4	3.6	
V3638	3.6	3.8	
V3840	3.8	4.0	

Note

- In order to ensure availability, single groups for radiant intensity, wavelength, and forward voltage will not be orderable. Only one group for radiant intensity, wavelength, and forward voltage will be shipped in any one reel

MARKING EXAMPLE FOR SELECTION CODE ON LABEL

Selection code: U090Q385V3436

- U090: ϕ_e, range 900 mW to 940 mW
- Q385: λ_p, range 385 nm to 390 nm
- V3436: V_F, range 3.4 V to 3.6 V

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

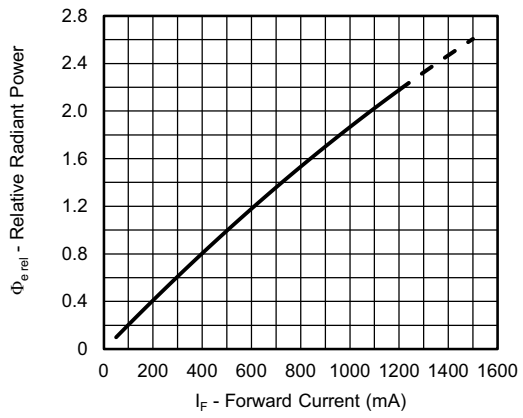


Fig. 1 - Relative Radiant Power vs. Forward Current

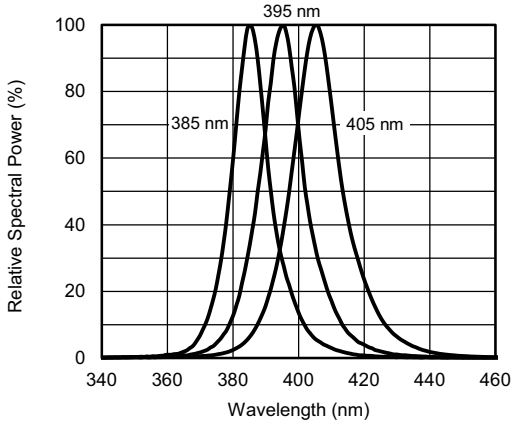


Fig. 3 - Relative Spectral Power vs. Wavelength

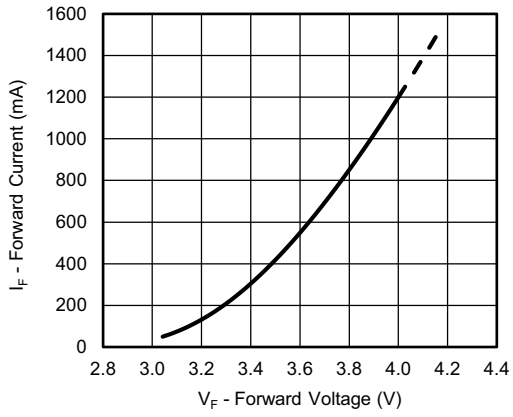


Fig. 2 - Forward Current vs. Forward Voltage

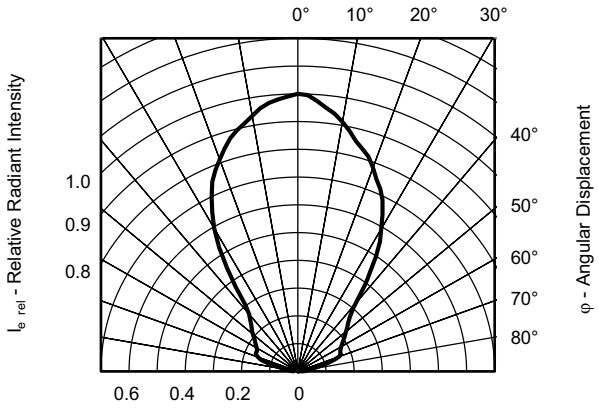


Fig. 4 - Relative Radiant Intensity vs. Angular Displacement

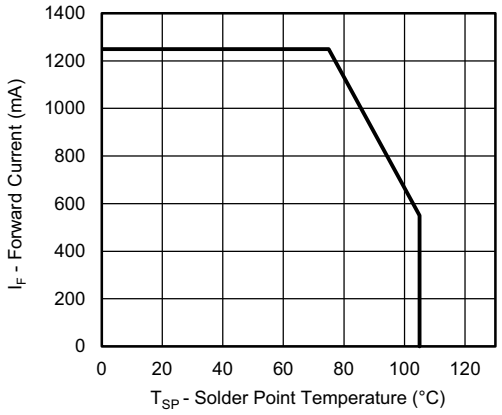


Fig. 5 - Maximum Forward Current vs. Solder Point Temperature

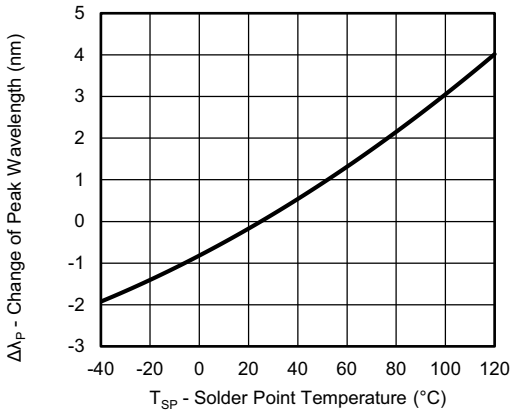


Fig. 7 - Change of Peak Wavelength vs. Solder Point Temperature

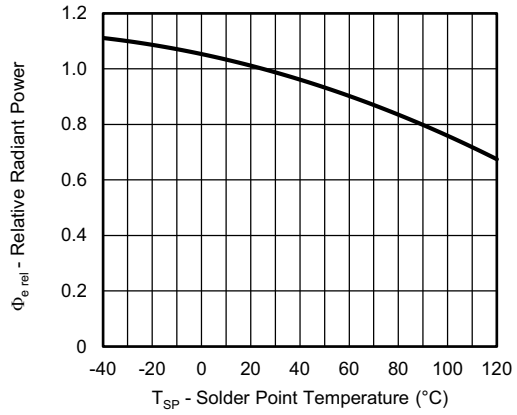


Fig. 6 - Relative Radiant Power vs. Solder Point Temperature

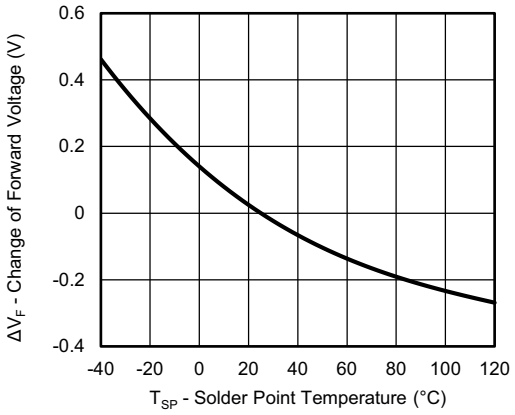
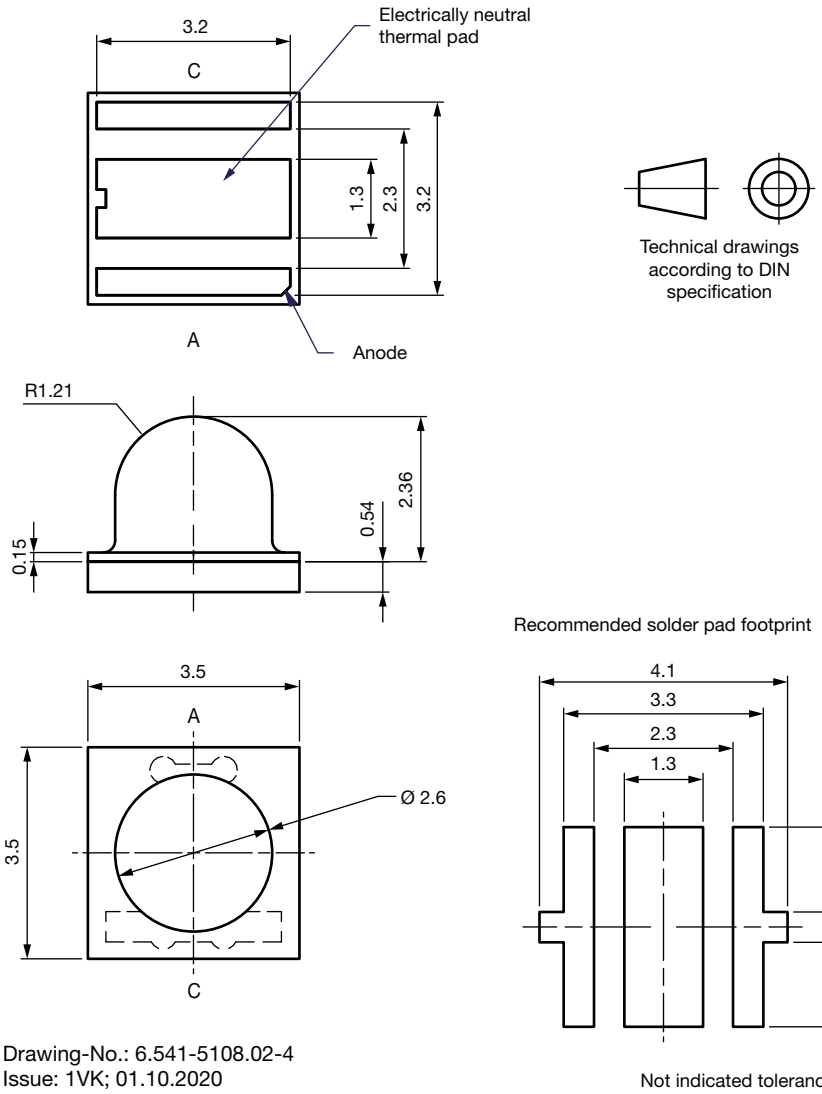


Fig. 8 - Change of Forward Voltage vs. Solder Point Temperature

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5108.02-4
Issue: 1VK; 01.10.2020

Not indicated tolerances ± 0.13

WIRING

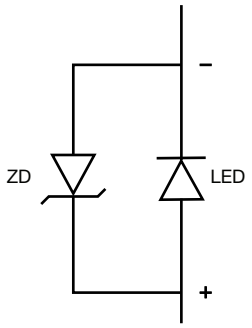
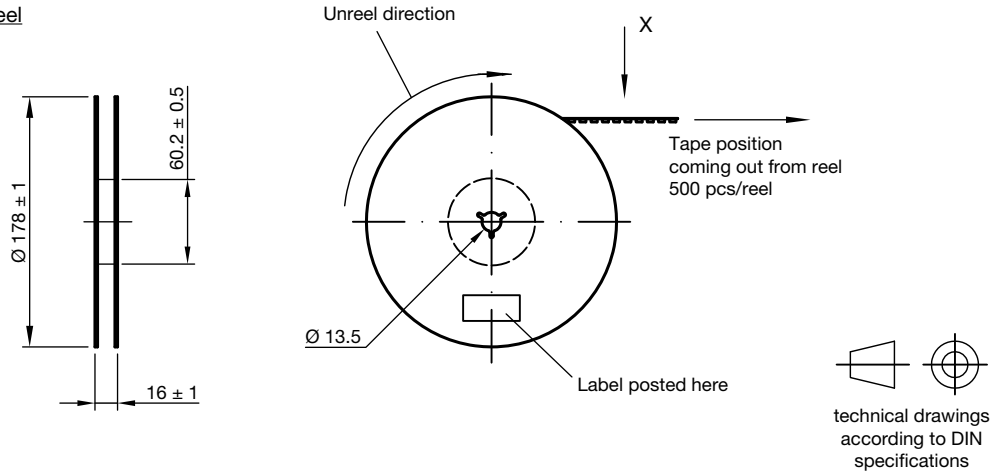


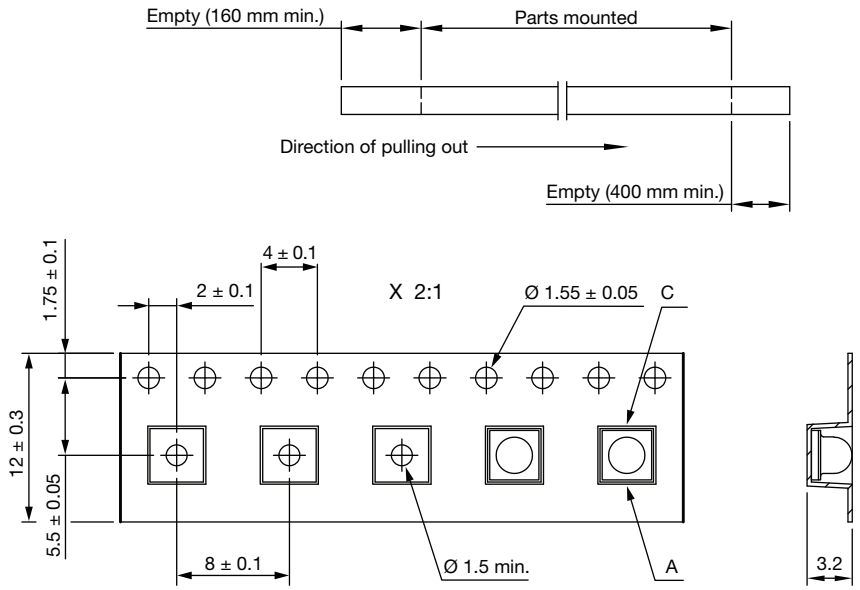
Fig. 9 - Wiring Diagram

TAPE AND REEL DIMENSIONS in millimeters

Reel



Leader and trailer tape



Drawing-No.: 9.800-5131.01-4
Issue: 2; 04.03.20

HANDLING RECOMMENDATIONS

In order to achieve excellent lifetime, the package of these UV-LEDs consists of a ceramic substrate in combination with a UV stable silicone as lens material. Compared to standard materials silicone is generally softer and it tends more to attract dust:

- Minimize the level of dirt and dust particles in contact with the LED
- Small amounts of particles on the LEDs, although noticeable from a cosmetic point of view, do not affect the performance in terms of brightness, reliability and quality
- If cleaning is required, a short rinsing with isopropyl alcohol, not longer than 15 seconds, is recommended. Do not use ultrasonic cleaning, it may damage the LED
- Do not apply mechanical stress on the silicone lens
- Avoid any piercing of the silicone lens by sharp objects
- It is recommended to use a suitable pick and place tool for the removal of the LED from blister tape without applying stress to the lens. The recess of the pick-up needle has to be larger than the silicone lens
- For manual handling using tweezers make sure that the LED will be touched carefully at the sidewall of the ceramic substrate, but not at the silicone lens

SOLDERING PROFILE

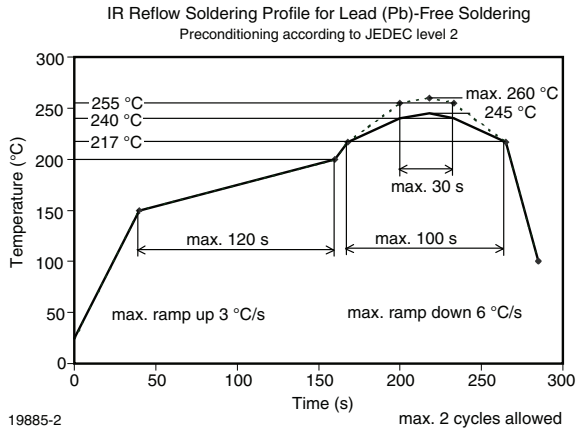
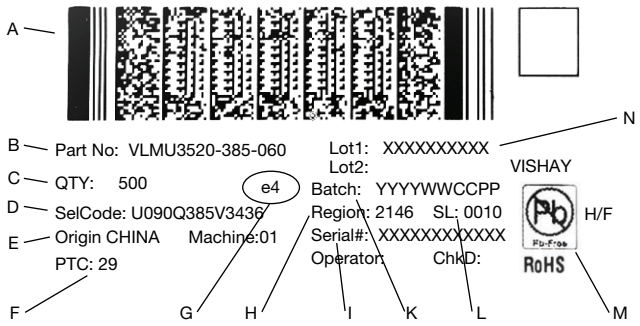


Fig. 10 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

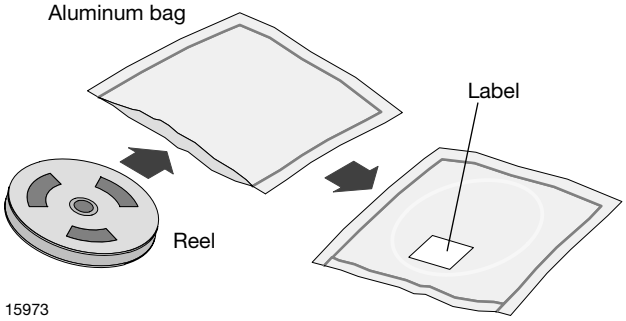
BAR CODE PRODUCT LABEL (example only)



A. 2D barcode
B. 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:

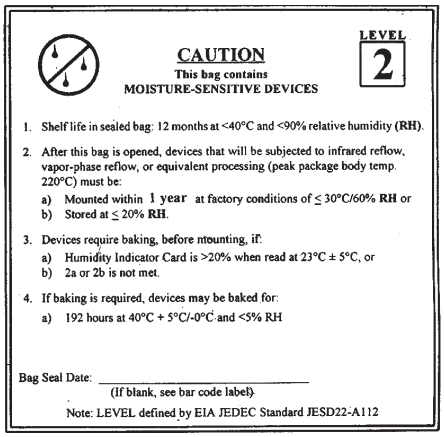
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 1 year 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
24 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 2 label is included on all dry bags.



17028

Example of JESD22-A112 level 2 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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