UVC Emitting Diode in SMD Package

FEATURES

- Ceramic SMT package with silicone lens
- Dimension (L x W x H) in mm: 3.45 x 3.45 x 1.38
- DC forward current: up to 30 mA
- Radiant power (typ.): 3 mW at 20 mA and 4.3 mW at 30 mA
- Leads / terminations finish: gold plated (Au)
- Reflow soldering method
- MSL 3 according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

VLMU35CL2.-275-120 is a ceramic based low power UVC LED with silicone lens for long life time. The package size is 3.45 mm x 3.45 mm x 1.38 mm and the radiant power typically 3 mW at 20 mA in a wavelength range of 265 nm to 285 nm.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD ceramic
- Product series: standard power UV LED
- Angle of half intensity: ± 60°
- Lead-finishing: Au

APPLICATIONS

- Sterilization
- Medical application
- Sensing of gases, germs, DNA, ...

SAFETY ADVICES

These LEDs emit very strong UV radiation during operation. Do not look directly into the LED light when in operation as UV radiation can harm your eyes. To prevent inadequate exposure, wear protective eyewear. If LEDs are embedded in devices, please indicate warning labels. Avoid exposure to skin or other tissue during operation. Keep out of the reach of children. Take appropriate precautions around pets and other living organisms to avoid UV exposure.

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.		
VLMU35CL20-275-120	Ultraviolet	2.0	3.0	-	20	265	277	285	20	5.0	6.0	7.0	20	AlGaN

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
VLMU35CL2.-275-120

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
DC forward current		I_F	30	mA
Power dissipation		P_V	0.21	W
Reverse voltage		Not designed for reverse operation		
Electrostatic discharge	HBM: MIL-STD-883 C 3B	ESD	2000	V
Junction temperature		T_j	+90	°C
Operating temperature range		T_{amb}	-40 to +80	°C
Storage temperature range		T_{stg}	-40 to +100	°C
Solder temperature		T_{sol}	260	°C

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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMU35CL2.-275-120, ULTRAVIOLET**						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Forward voltage	I_F = 20 mA	V_F	5.0	6.0	7.0	V
Radiant power	I_F = 20 mA	ϕ_e	2.0	3.0	-	mW
	I_F = 30 mA		-	4.3	-	
Ratio of radiant intensity/radiant power	I_F = 20 mA	I_e/ϕ_e	-	0.34	-	sr^{-1}
Peak wavelength	I_F = 20 mA	λ_p	265	277	285	nm
Angle of half intensity	I_F = 20 mA	φ	-	± 60	-	°
Thermal resistance junction to solder-point	Soldered on 20 x 20 x 1.7 (in mm) Al MCPCB	R_{thJS}	-	38	-	K/W

Note

- Tolerances: ± 11 % for ϕ_e, ± 0.1 V for V_F, ± 3 nm for λ_p

RADIANT POWER CLASSIFICATION (I_F = 20 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
X1	2.0	-	mW

PEAK WAVELENGTH CLASSIFICATION (I_F = 20 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
W1	265	285	nm

FORWARD VOLTAGE CLASSIFICATION (I_F = 20 mA)			
GROUP	**MIN.**	**MAX.**	**UNIT**
V1	5.0	5.5	V
V2	5.5	6.0	
V3	6.0	6.5	
V4	6.5	7.0	

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

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

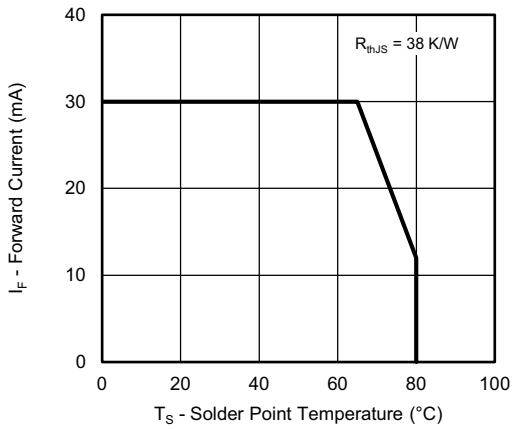

Fig. 1 - Maximum Forward Current vs. Solder Point Temperature

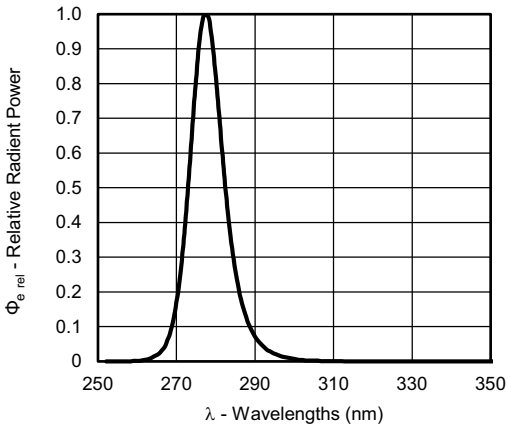

Fig. 4 - Relative Radiant Power vs. Wavelength

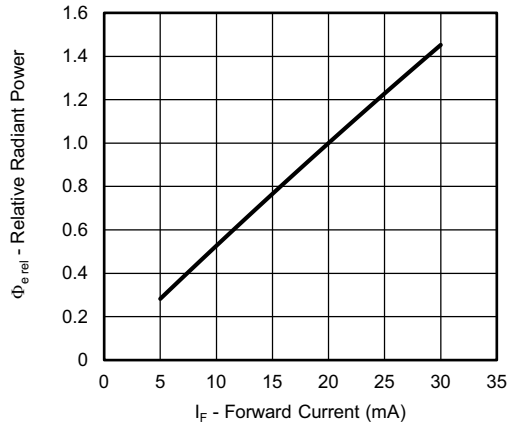

Fig. 2 - Relative Radiant Power vs. Forward Current

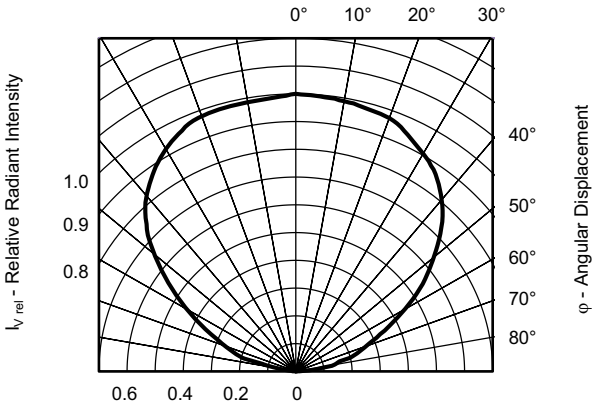

Fig. 5 - Relative Radiant Intensity vs. Angular Displacement

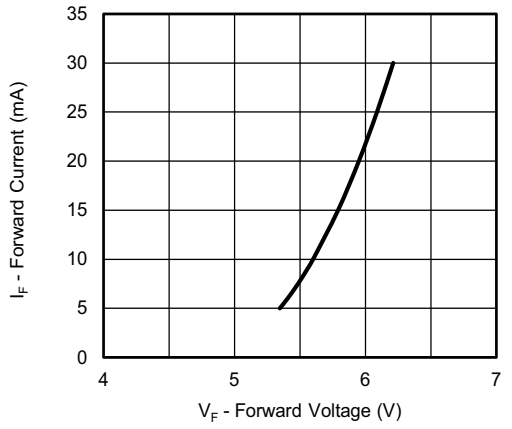

Fig. 3 - Forward Current vs. Forward Voltage

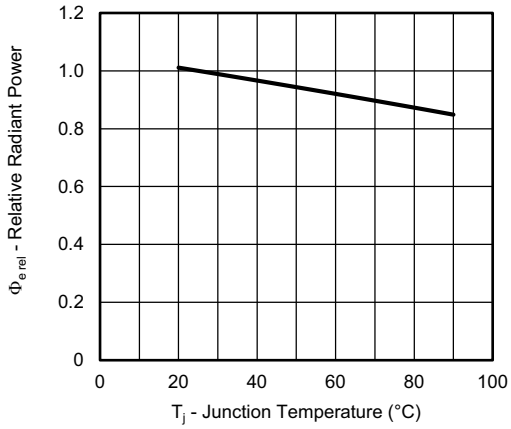

Fig. 6 - Relative Radiant Power vs. Junction Temperature

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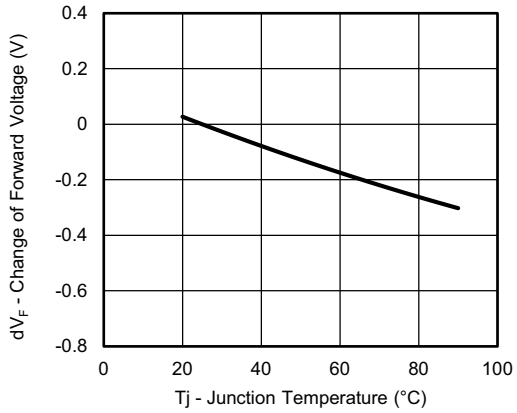
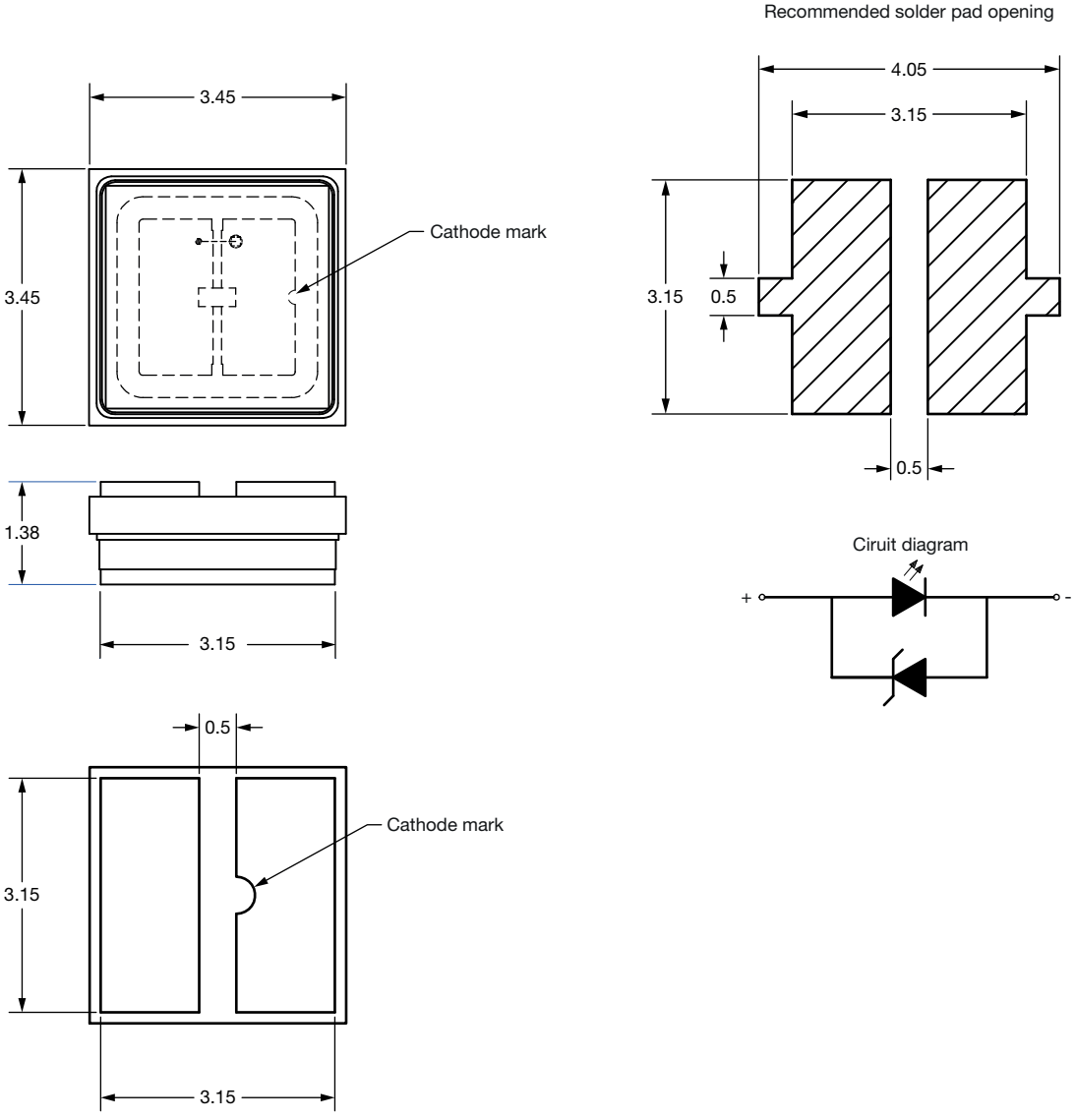


Fig. 7 - Change of Forward Voltage vs. Junction Temperature

PACKAGE DIMENSIONS in millimeters



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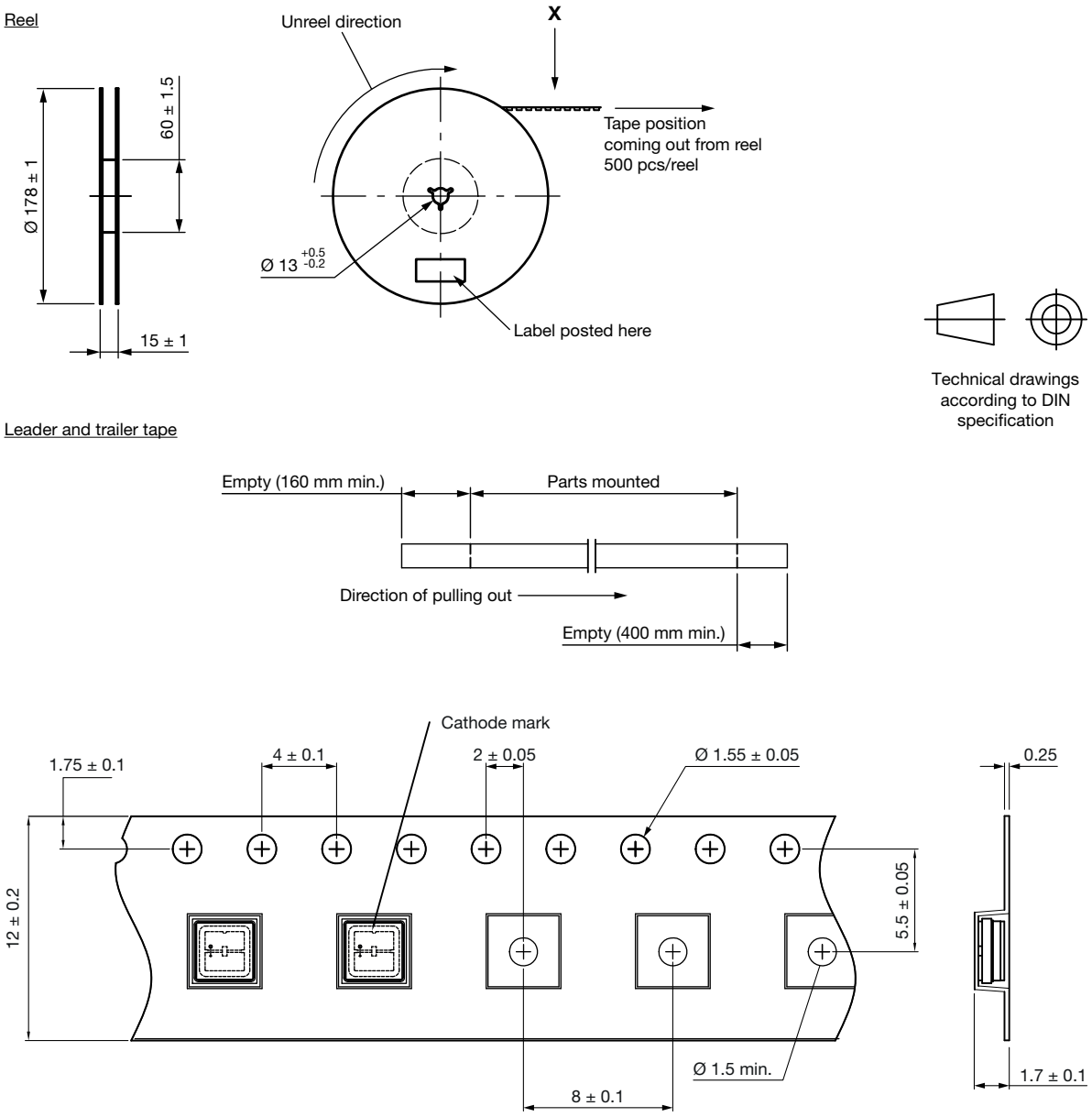
TAPE AND REEL DIMENSIONS in millimeters



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 isopropy 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

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SOLDERING PROFILE

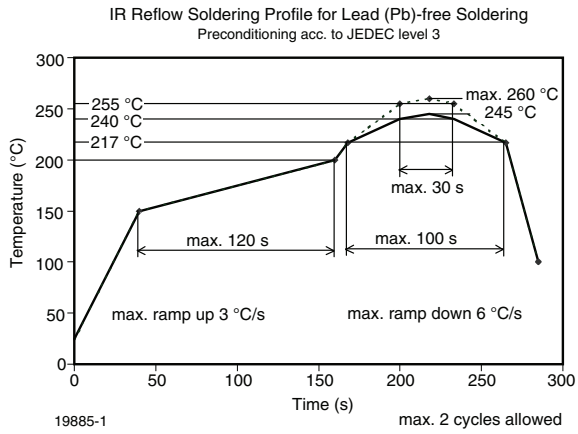
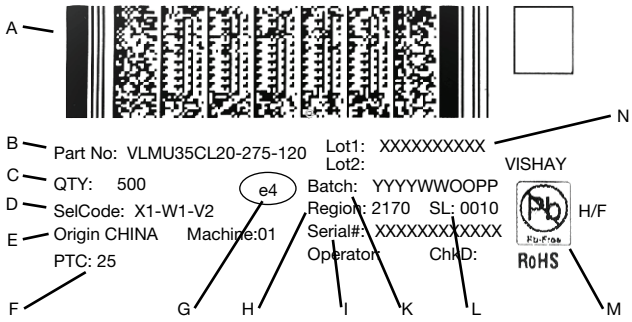


Fig. 8 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

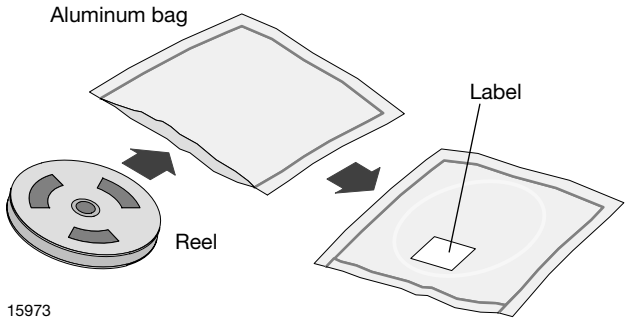
BAR CODE PRODUCT LABEL (example only)



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:

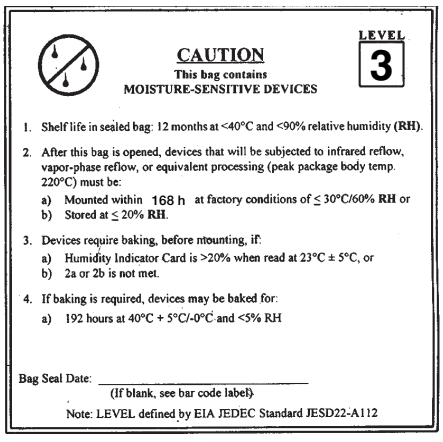
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 168 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
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 3 label is included on all dry bags.



Example of JESD22-A112 level 3 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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