

Reverse Gullwing SMD LED



DESCRIPTION

The **PLCC-2 reverse gullwing LED** is a compact surface-mount device for indication, illumination and light coupling applications requiring compact size and high reliability. It features a metal lead frame embedded in a white thermoplastic forming a reflector which is filled with clear epoxy, providing a wide, Lambertian-like emission. The LED is mounted top-down and emits through the PCB. The package is compatible with standard SMT and lead (Pb)-free reflow soldering.

PRODUCT GROUP AND PACKAGE DATA

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

FEATURES

- Dimensions (L x W x H) in mm: 5.2 x 2.7 x 1.8
- High brightness AlInGaP chip technology
- Luminous intensity, dominant wavelength, and forward voltage 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-020C
- Available in 12 mm tape
- Low profile package
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Low power consumption
- Preconditioning according to JEDEC® level 3
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Status indication in consumer and industrial devices like control panels, buttons, indicators
- Industrial equipment backlighting e.g. for machine interfaces, switches, instrumentation
- Reverse-mount SMD applications where the LED must shine through a cutout or light pipe
- Backlighting for LCDs, switches, symbols, or icons
- General use

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.		
VLRK311S1T2-GS08	Red	180	-	450	20	620	-	635	20	1.75	2.0	2.35	20	AlInGaP on GaAs
VLRE311R1S2-GS08	Yellow	112	-	285	20	582	-	594	20	1.75	2.0	2.35	20	AlInGaP on GaAs
VLRYG311N2Q1-GS08	Yellow green	36	-	90	20	570	-	574.5	20	1.75	2.0	2.35	20	AlInGaP on GaAs

**ABSOLUTE MAXIMUM RATINGS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLRK311S1T2, VLRE311R1S2, VLRYG311N2Q1

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage ⁽¹⁾		V_R	5	V
DC forward current	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	I_F	30	mA
Peak forward current	$t_p \leq 100\text{ }\mu\text{s}$, $t_p/T = 0.1$	I_{FP}	60	mA
Power dissipation		P_V	70.5	mW
Junction temperature		T_j	+115	$^{\circ}\text{C}$
Operating temperature range		T_{amb}	-40 to +85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-40 to +90	$^{\circ}\text{C}$
Thermal resistance junction to ambient	Mounted on PC board (pad size > 16 mm ²)	R_{thJA}	400	K/W
ESD voltage	HBM	V_{ESD}	2000	V
Soldering temperature	Reflow	T_{sol}	260	$^{\circ}\text{C}$

Note

(1) Driving LED in reverse direction is suitable for short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLRK311S1T2, RED

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 20\text{ mA}$	I_V	180	-	450	mcd
Dominant wavelength ⁽¹⁾	$I_F = 20\text{ mA}$	λ_d	620	-	635	nm
Spectral bandwidth at 50 % $I_{rel. max.}$	$I_F = 20\text{ mA}$	$\Delta\lambda_{0.5}$	-	20	-	nm
Peak wavelength	$I_F = 20\text{ mA}$	λ_p	-	636	-	nm
Angle of half intensity	$I_F = 20\text{ mA}$	ϕ	-	± 60	-	$^{\circ}$
Forward voltage ⁽¹⁾	$I_F = 20\text{ mA}$	V_F	1.75	2.0	2.35	V
Reverse current	$V_R = 10\text{ V}$	I_R	-	-	2	μA

Note(2) Tolerances: $\pm 11\%$ for I_V , $\pm 0.1\text{ V}$ for V_F , $\pm 1\text{ nm}$ for LD_{dom} **OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLRE311R1S2, YELLOW

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 20\text{ mA}$	I_V	112	-	285	mcd
Dominant wavelength ⁽¹⁾	$I_F = 20\text{ mA}$	λ_d	582	-	594	nm
Spectral bandwidth at 50 % $I_{rel. max.}$	$I_F = 20\text{ mA}$	$\Delta\lambda_{0.5}$	-	15	-	nm
Peak wavelength	$I_F = 20\text{ mA}$	λ_p	-	591	-	nm
Angle of half intensity	$I_F = 20\text{ mA}$	ϕ	-	± 60	-	$^{\circ}$
Forward voltage ⁽¹⁾	$I_F = 20\text{ mA}$	V_F	1.75	2.0	2.35	V
Reverse current	$V_R = 10\text{ V}$	I_R	-	-	2	μA

Note(1) Tolerances: $\pm 11\%$ for I_V , $\pm 0.1\text{ V}$ for V_F , $\pm 1\text{ nm}$ for LD_{dom}

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLRYG311N2Q1, YELLOW GREEN

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity ⁽¹⁾	$I_F = 20\text{ mA}$	I_V	36	-	90	mcd
Dominant wavelength ⁽¹⁾	$I_F = 20\text{ mA}$	λ_d	570	-	574.5	nm
Spectral bandwidth at 50 % $I_{rel. max.}$	$I_F = 20\text{ mA}$	$\Delta\lambda_{0.5}$	-	20	-	nm
Peak wavelength	$I_F = 20\text{ mA}$	λ_p	-	575	-	nm
Angle of half intensity	$I_F = 20\text{ mA}$	ϕ	-	± 60	-	$^{\circ}$
Forward voltage ⁽¹⁾	$I_F = 20\text{ mA}$	V_F	1.75	2.0	2.35	V
Reverse current	$V_R = 10\text{ V}$	I_R	-	-	2	μA

Note

⁽¹⁾ Tolerances: $\pm 11\%$ for I_V , $\pm 0.1\text{ V}$ for V_F , $\pm 1\text{ nm}$ for λ_{dom}

BINNING TABLES**Notes**

- To ensure consistent availability, individual bins for luminous intensity, dominant wavelength, and forward voltage cannot be ordered separately
- Each reel contains LEDs from only one luminous intensity, dominant wavelength, and forward voltage bin

LUMINOUS INTENSITY CLASSIFICATION (at 20 mA)

GROUP	LUMINOUS INTENSITY I _V (mcd)		ASSIGNMENT		
	MIN.	MAX.			
N2	36	45	-	-	VLRYG311 N2Q1...
P1	45	56	-	-	
P2	56	72	-	-	
Q1	72	90	-	-	
Q2	90	112	-	-	-
R1	112	140	-	VLRE311 R1S2...	-
R2	140	180	-		-
S1	180	224	VLRK311 S1T2...		-
S2	224	285			-
T1	285	360		-	
T2	360	450		-	

Note

- Tolerance of luminous intensity is $\pm 11\%$

COLOR CLASSIFICATION (at 20 mA)

COLOR	GROUP	DOMINANT WAVELENGTH (nm)	
		MIN.	MAX.
Super red	K1	620	625
	K2	625	630
	K3	630	635
Yellow	E1	582	585
	E2	585	588
	E3	588	591
	E4	591	594
Yellow green	G3	570.0	571.5
	G4	571.5	573.0
	G5	573.0	574.5

Note

- Tolerance of dominant wavelength is $\pm 1\text{ nm}$



FORWARD VOLTAGE CLASSIFICATION (at 20 mA)

GROUP	FORWARD VOLTAGE (V)	
	MIN.	MAX.
0	1.75	1.95
1	1.95	2.15
2	2.15	2.35

Note

- Tolerance of forward voltage is ± 0.1 V

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

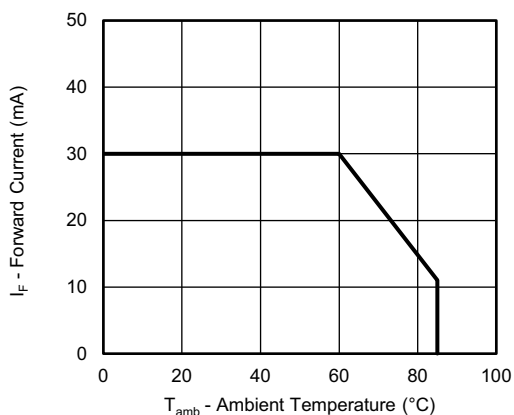


Fig. 1 - Maximum Permissible Forward Current vs. Ambient Temperature

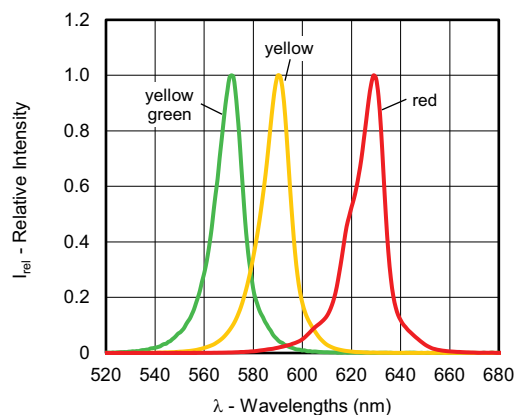


Fig. 3 - Relative Intensity vs. Wavelength

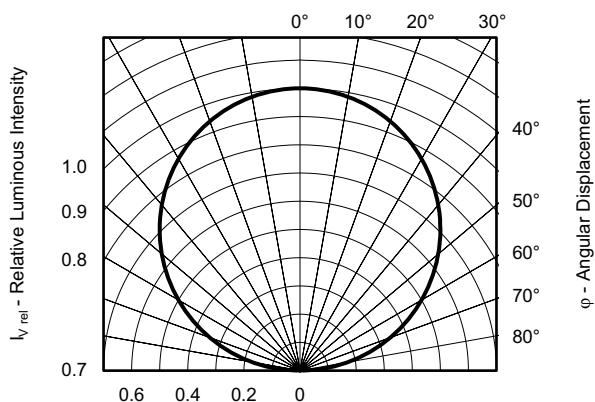


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

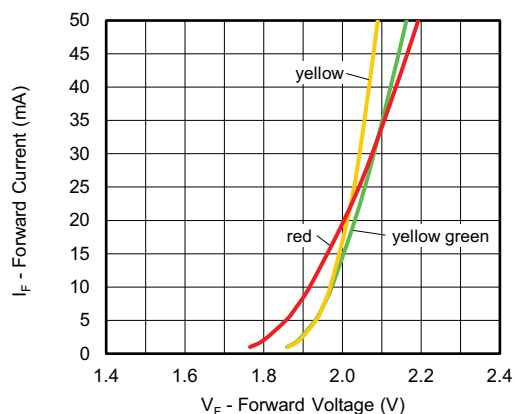


Fig. 4 - Forward Current vs. Forward Voltage

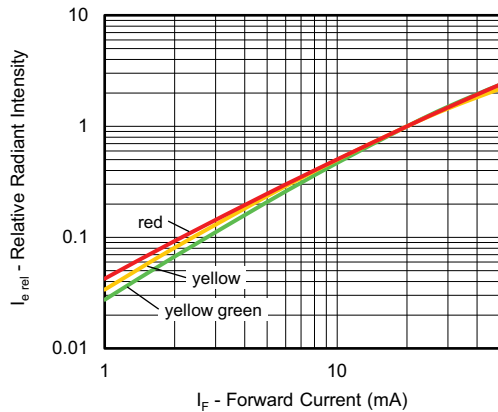


Fig. 5 - Relative Radiant Intensity vs. Forward Current

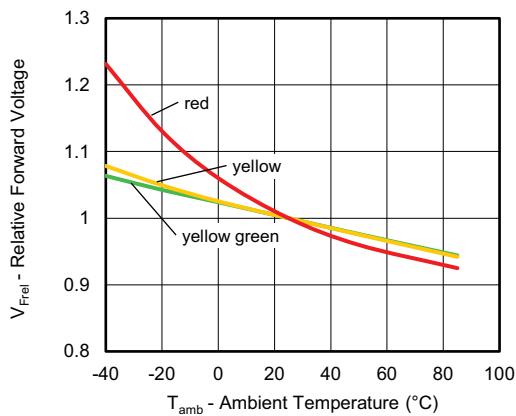


Fig. 6 - Relative Forward Voltage vs. Ambient Temperature

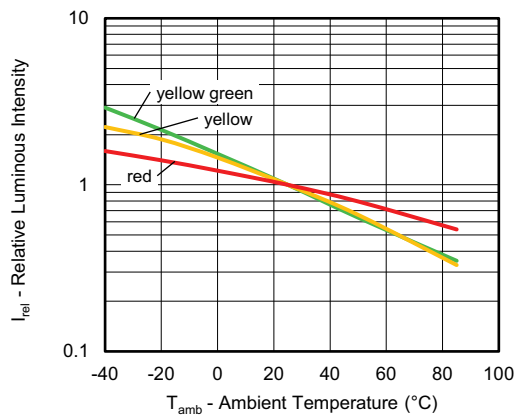


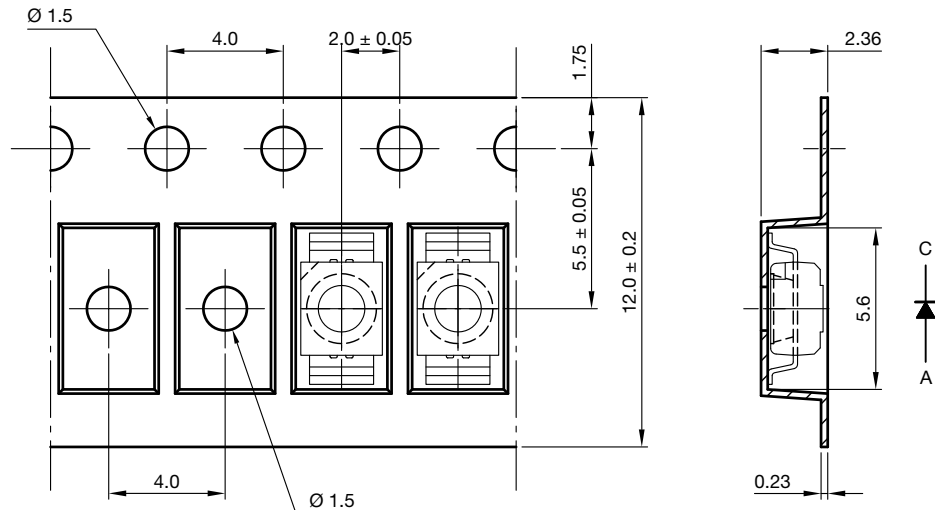
Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature



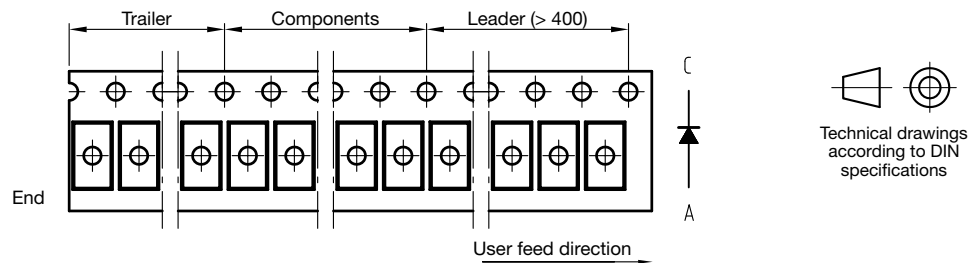
TAPING DIMENSIONS in millimeters

Taping and orientation

GS08: reels come in quantity of 2000 units, reel diameters are 180 mm

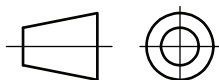
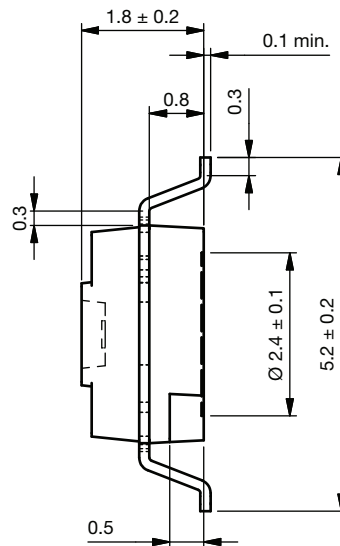
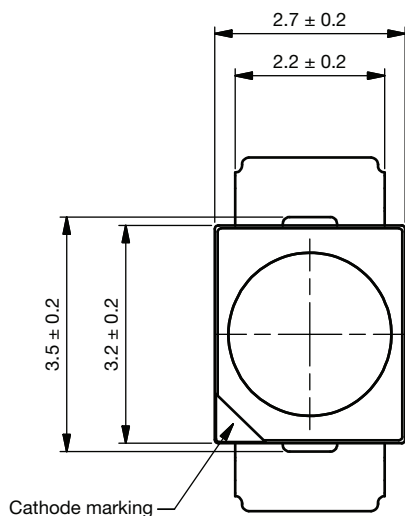


Not indicated tolerances ± 0.1





PACKAGE DIMENSIONS in millimeters

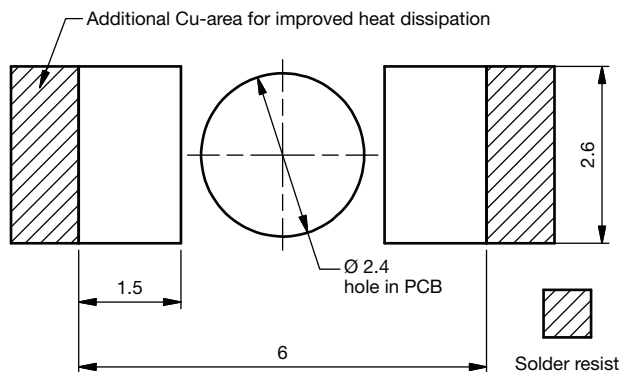


Technical drawing
according to DIN
specification

Not indicated tolerances ± 0.1

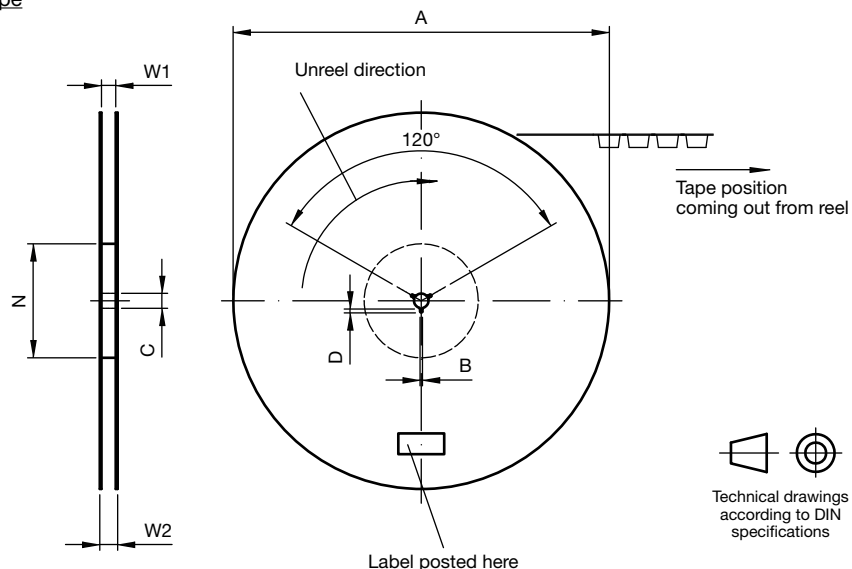
Drawing-No.: 6.541-5127.01-4
Issue: 1VK; 14.04.2026

Recommended solder pad

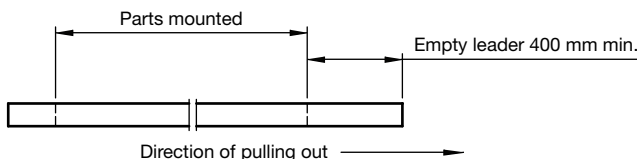


REEL DIMENSIONS in millimeters

Reel dimensions and shape



Leader and trailer tape



Drawing-No.: 9.800-5172.01-4

Issue: VK; 18.04.2024

DIMENSIONS OF REEL in millimeters (according drawing reference)							
TAPING VERSION	A	B	C	D	N	W1	W2
GS08	Ø 178 ±1	2.5 ±0.5	Ø 13 ±0.5	-	Ø 60.2 ±0.5	13.2 ±1	16.2 ±1

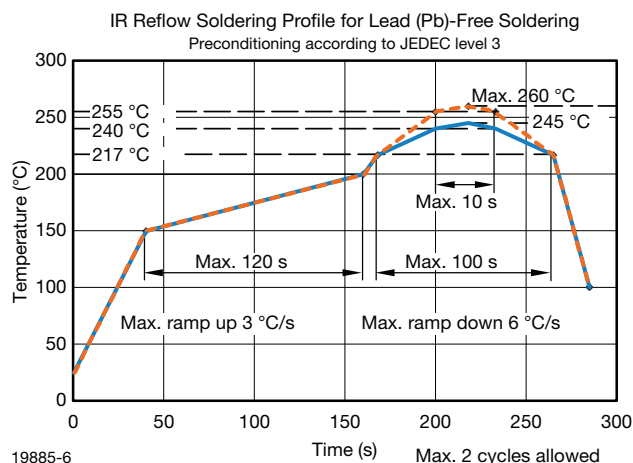
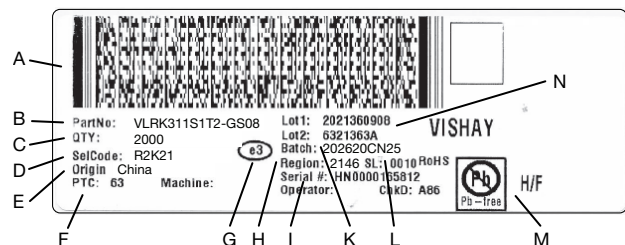
SOLDERING PROFILE


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



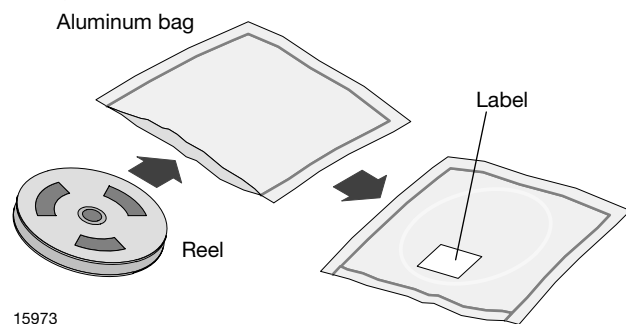
LABEL OF FAN FOLD BOX (example)



- 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: storage 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

A cardboard outer 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 condition given in J-STD-033.

A JEDEC J-STD-033 level 3 label is included on all aluminum dry bags.

BAR CODE



Example of MSL 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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