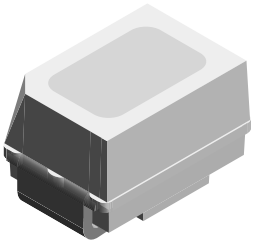
Standard Mini SMD LED



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FEATURES

- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- IR reflow soldering
- 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 $I_{Vmax}/I_{Vmin} \leq 2.0$, optional ≤ 1.6
- Preconditioning acc. to JEDEC Level 2a
- Lead (Pb)-free device
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Automotive qualified AEC-Q101

DESCRIPTION

The MiniLED series has been designed in a small white SMT package. The feature of the device is the very small package 2.3 mm x 1.3 mm x 1.4 mm. The MinLED is an obvious solution for small-scale, high-power products that are expected to work reliably in an arduous environment. This is often the case in automotive and industrial application of course.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: Mini
- Product series: SMD
- Angle of half intensity: ± 60°

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	TECHNOLOGY
VLMG21J2L1-GS08	Green, I_V = (5.6 to 14) mcd	GaP on GaP
VLMG21K2M1-GS08	Green, I_V = (9 to 22.4) mcd	GaP on GaP
VLMG21J2M1-GS08	Green, I_V = (5.6 to 22.4) mcd	GaP on GaP
VLMG21K1L2-GS08	Green, I_V = (7.1 to 18) mcd	GaP on GaP

ABSOLUTE MAXIMUM RATINGS[1] VLMG21..				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage[2]		V_R	6	V
DC Forward current	$T_{amb} \leq 60$ °C	I_F	30	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.5	A
Power dissipation		P_V	95	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Thermal resistance junction/ ambient	mounted on PC board (pad size > 5 mm^2)	R_{thJA}	480	K/W

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] Driving the LED in reverse direction is suitable for a short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] VLMG21.., GREEN							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN**	**TYP.**	**MAX**	**UNIT**
Luminous intensity[2]	I_F = 10 mA	VLMG21J2L1	I_V	5.6		14	mcd
	I_F = 10 mA	VLMG21K2M1	I_V	9		22.4	mcd
	I_F = 10 mA	VLMG21J2M1	I_V	5.6		22.4	mcd
	I_F = 10 mA	VLMG21K1L2	I_V	7.1		18	mcd
Dominant wavelength	I_F = 10 mA		λ_d	562	568	575	nm
Peak wavelength	I_F = 10 mA		λ_p		565		nm
Angle of half intensity	I_F = 10 mA		φ		± 60		deg
Forward voltage	I_F = 10 mA		V_F		2.1	2.8	V
Reverse voltage	I_R = 10 µA		V_R	6	15		V
Junction capacitance	V_R = 0, f = 1 MHz		C_j		15		pF

Note:
[1] T_{amb} = 25 °C unless otherwise specified
[2] In one Packing Unit $I_{Vmax}/I_{Vmin} \leq 2.0$

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	**LIGHT INTENSITY (MCD)**		
STANDARD	**OPTIONAL**	**MIN**	**MAX**
J	2	5.6	7.1
K	1	7.1	9.0
	2	9.0	11.2
L	1	11.2	14.0
	2	14.0	18.0
M	1	18.0	22.4

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 on any one reel.
In order to ensure availability, single wavelength groups will not be orderable.

CROSSING TABLE	
VISHAY	**OSRAM**
VLMG21J2L1	LGM670J2L1
VLMG21K2M1	LGM670K2M1
VLMG21J2M1	LGM670J2M1
VLMG21K1L2	LGM670K1L2

COLOR CLASSIFICATION		
GROUP	**GREEN**	
	DOM. WAVELENGTH (NM)	
	MIN.	**MAX.**
3	562	565
4	564	567
5	566	569
6	568	571
7	570	573
8	572	575

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

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

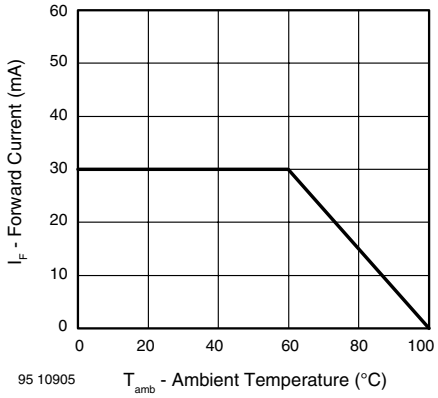


Figure 1. Forward Current vs. Ambient Temperature

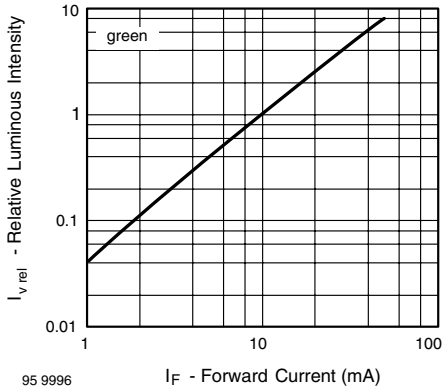


Figure 4. Relative Luminous Intensity vs. Forward Current

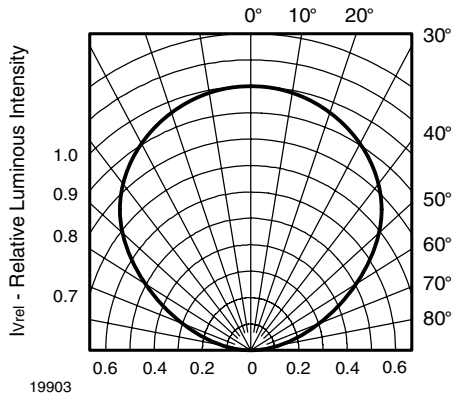


Figure 2. Rel. Luminous Intensity vs. Angular Displacement

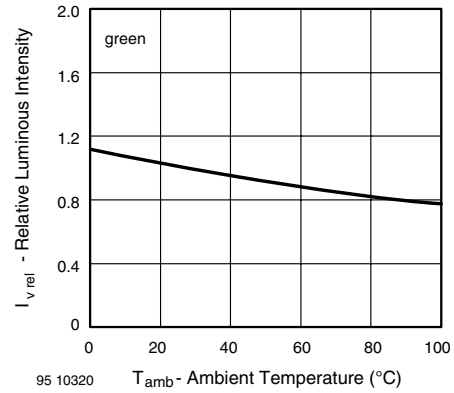


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

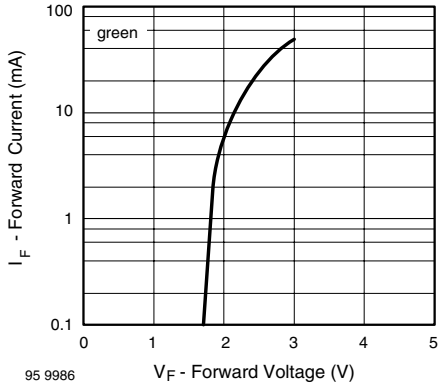


Figure 3. Forward Current vs. Forward Voltage

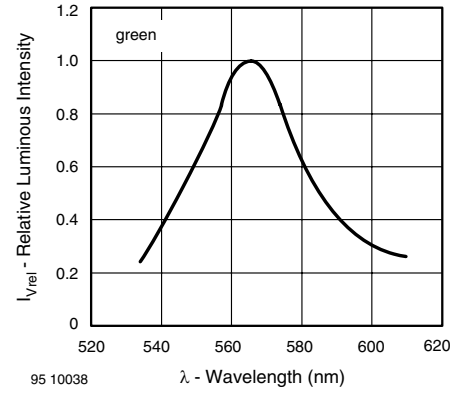


Figure 6. Relative Intensity vs. Wavelength

SOLDERING PROFILE

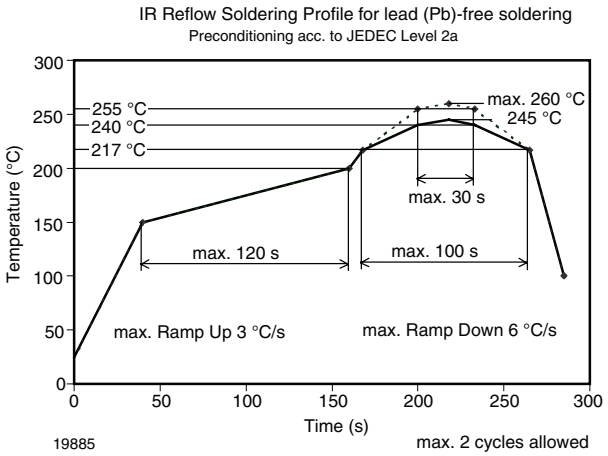
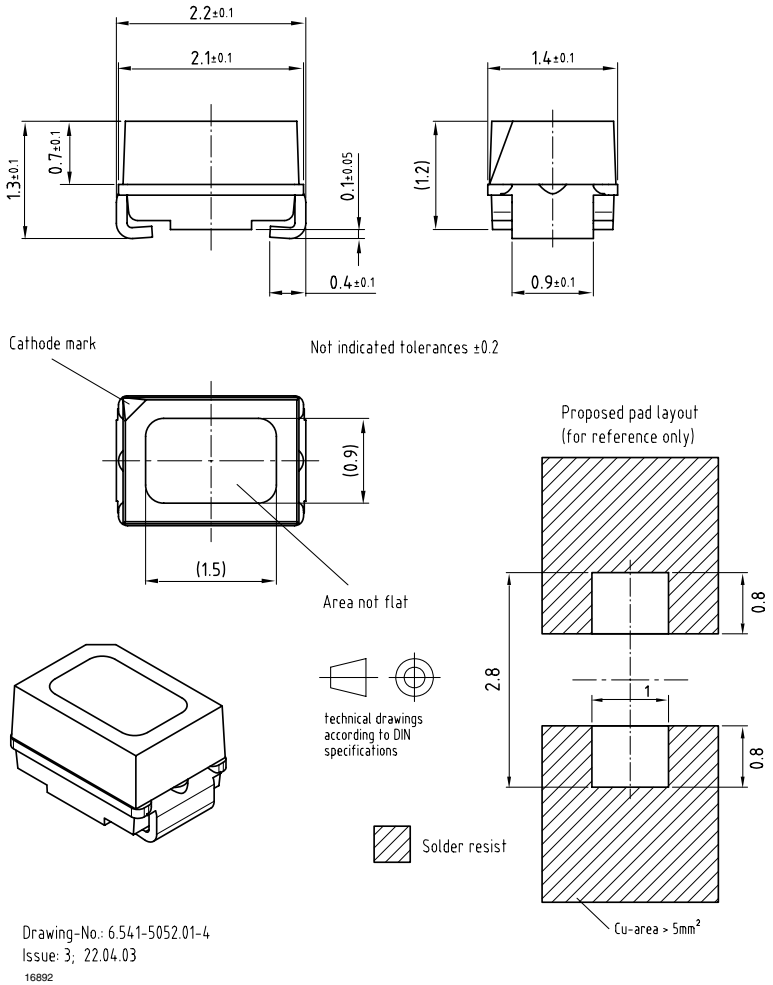
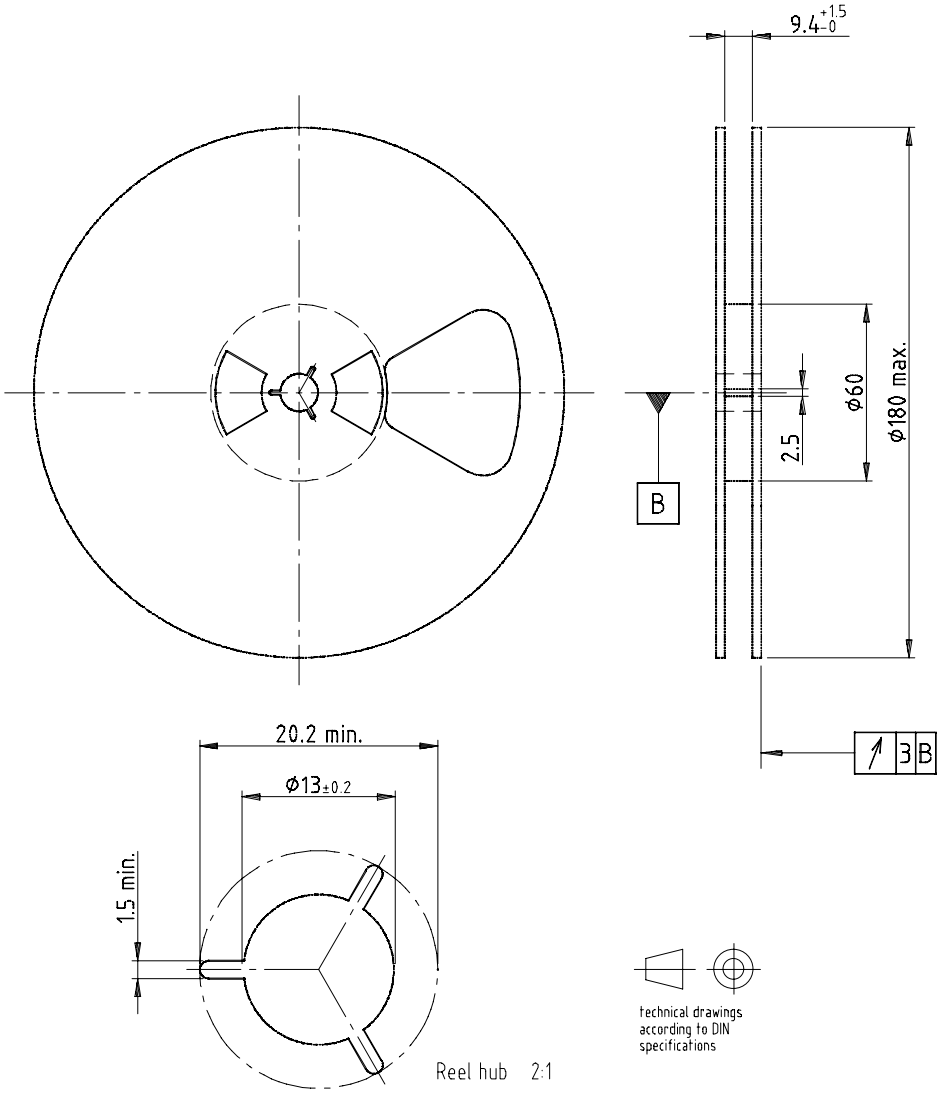


Figure 7. Vishay Lead (Pb)-free Reflow Soldering Profile
(acc. to J-STD-020B)

PACKAGE DIMENSIONS in millimeters



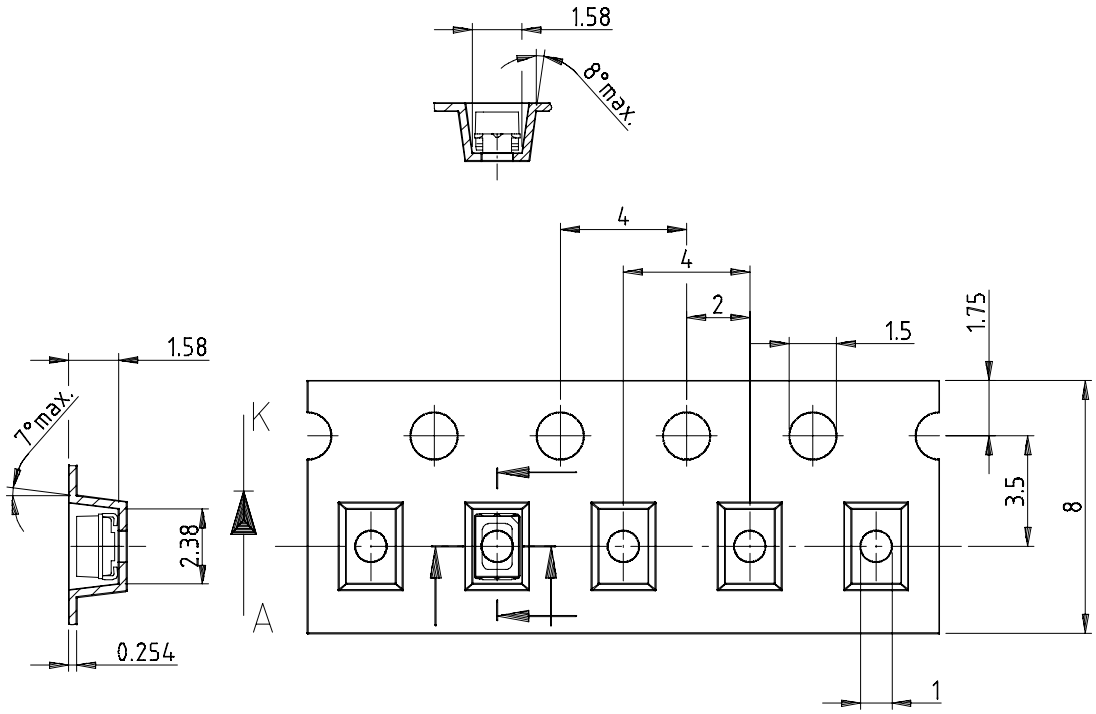
REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5051.V5-4
Issue: 1; 25.07.02

16938

TAPE DIMENSIONS in millimeters



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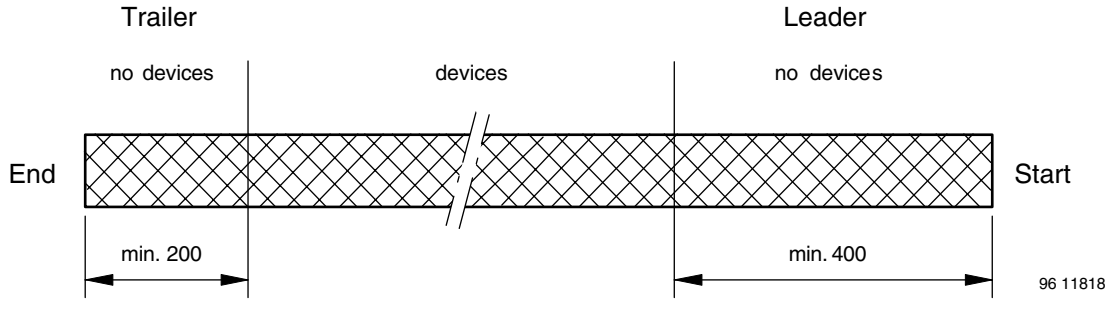
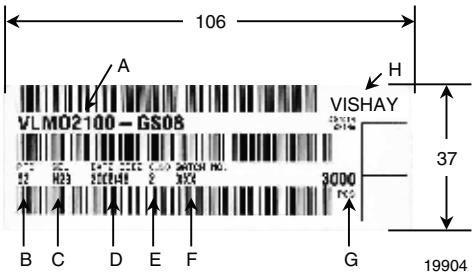
Issue: 1; 05.06.02
16939

LEADER AND TRAILER Dimensions in millimeters



GS08 = 3000 pcs

BARCODE-PRODUCT-LABEL



A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
e.g.: H2 = code for luminous intensity group
3 = code for color group
D) Date code year/week
E) Day code (e.g. 2: Tuesday)
F) Batch no.
G) Total quantity
H) Company code

COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3
0.1 to 1.3 N
300 ± 10 mm/min
165° - 180° peel angle

LABEL

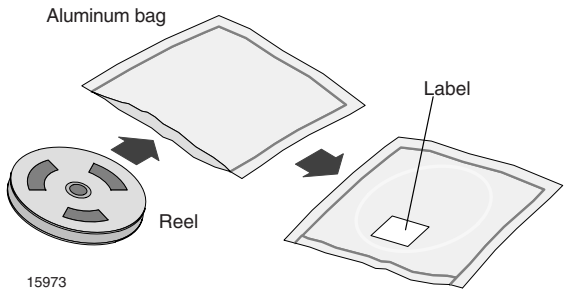
Standard bar code labels for finished goods

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.

VISHAY SEMICONDUCTOR GMBH STANDARD BAR CODE PRODUCT LABEL (FINISHED GOODS)		
PLAIN WRITTING	**ABBREVIATION**	**LENGTH**
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by:	ACC	-
Packed by:	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxx+	Company logo
LONG BAR CODE TOP	**TYPE**	**LENGTH**
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
SHORT BAR CODE BOTTOM	**TYPE**	**LENGTH**
Selection-code	X	3
Data-code	N	3
Batch-number	X	10
Filter	-	1
Total length	-	17

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 hours under these conditions moisture content will be too high for reflow soldering.

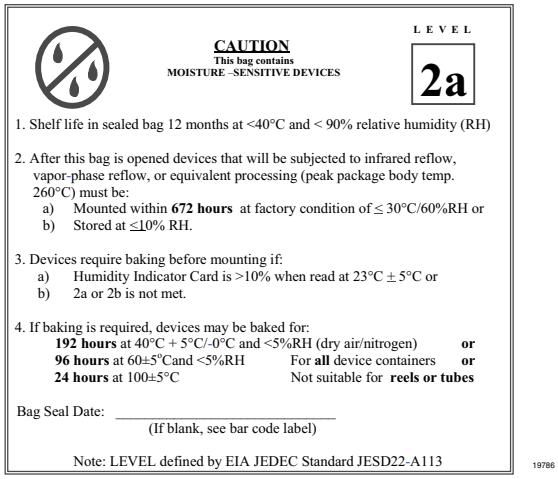
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 hours at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or

96 hours at 60 °C + 5 °C and < 5 % RH for all device containers or

24 hours 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. Electro-static 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.

Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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