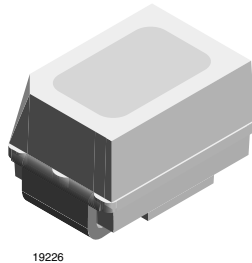


Standard Mini SMD LED



19226

DESCRIPTION

The MiniLED has been designed to meet the increasing demand for white SMD LEDs. The feature of the device is the very small package 2.2 mm x 1.3 mm x 1.4 mm. The MiniLED 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: SMD MiniLED
- Product series: standard
- Angle of half intensity: $\pm 60^\circ$

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
- Excellent for coupling to light pipes and backlighting
- Low power consumption
- Lead (Pb)-free device
- Preconditioning: acc. to JEDEC level 3
- ESD-withstand voltage: up to 1 kV according to JESD22-A114-B
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Automotive qualified AEC-Q101



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 AT $I_F = 10 \text{ mA}$	TECHNOLOGY
VLMW2100-5K8L-08	White, $I_V \geq 56 \text{ mcd}$	InGaN/TAG on SiC
VLMW21N2R2-5K8L-08	White, $I_V = (35.5 \text{ to } 180) \text{ mcd}$	InGaN/TAG on SiC
VLMW21P1Q2-5K8L-08	White, $I_V = (45 \text{ to } 112) \text{ mcd}$	InGaN/TAG on SiC
VLMW21Q1R2-5K8L-08	White, $I_V = (71 \text{ to } 180) \text{ mcd}$	InGaN/TAG on SiC



ABSOLUTE MAXIMUM RATINGS ¹⁾ VLMW21..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage ²⁾		V_R	5	V
DC Forward current	$T_{amb} \leq 60\text{ }^\circ\text{C}$	I_F	20	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	0.1	A
Power dissipation		P_V	80	mW
Junction temperature		T_j	100	$^\circ\text{C}$
Operating temperature range		T_{amb}	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		T_{stg}	- 40 to + 100	$^\circ\text{C}$
Thermal resistance junction/ambient	mounted on PC board (pad size > 16 mm ²)	R_{thJA}	480	K/W

Note:

¹⁾ $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

²⁾ Driving the LED in reverse direction is suitable for short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS ¹⁾ VLMW21.., WHITE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 10\text{ mA}$	VLMW2100-5K8L-08	I_V	56	80		mcd
		VLMW21N2R2-5K8L-08	I_V	35.5		180	mcd
		VLMW21P1Q2-5K8L-08	I_V	45		112	mcd
		VLMW21Q1R2-5K8L-08	I_V	71		180	mcd
Chromaticity coordinate x acc. to CIE 1931	$I_F = 10\text{ mA}$		x		0.33		
Chromaticity coordinate y acc. to CIE 1931	$I_F = 10\text{ mA}$		y		0.33		
Angle of half intensity	$I_F = 10\text{ mA}$		φ		± 60		deg
Forward voltage	$I_F = 10\text{ mA}$		V_F		3.0	3.7	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		V_R	5			V
Temperature coefficient of V_F	$I_F = 20\text{ mA}$		TC_{VF}		- 3.6		mV/K
Temperature coefficient of I_V	$I_F = 20\text{ mA}$		TC_{IV}		- 0.3		%/K

Note:

¹⁾ $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	LIGHT INTENSITY (mcd)		
	STANDARD	OPTIONAL	MIN. MAX.
N	2	35.5	45
P	1	45	56
	2	56	71
Q	1	71	90
	2	90	112
R	1	112	140
	2	140	180
S	1	180	224
	2	224	280

Note:

Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$.

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
VLMW2100-5K8L-08	LWM673-5K8L
VLMW21N2R2-5K8L-08	LWM673-N2R2-5K8L
VLMW21P1Q2-5K8L-08	LWM673-P1Q2-5K8L
VLMW21Q1R2-5K8L-08	LWM673-Q1R2-5K8L

CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED					
	X	Y		X	Y
5L	0.291	0.268	7L	0.330	0.330
	0.285	0.279		0.330	0.347
	0.307	0.312		0.347	0.371
	0.310	0.297		0.345	0.352
5K	0.296	0.259	7K	0.330	0.310
	0.291	0.268		0.330	0.330
	0.310	0.297		0.338	0.342
	0.313	0.284		0.352	0.344
6L	0.310	0.297	8L	0.345	0.352
	0.307	0.312		0.347	0.371
	0.330	0.347		0.367	0.401
	0.330	0.330		0.364	0.380
6K	0.313	0.284	8K	0.352	0.344
	0.310	0.297		0.338	0.342
	0.330	0.330		0.364	0.380
	0.330	0.310		0.360	0.357

Note:

Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01

TYPICAL CHARACTERISTICS

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

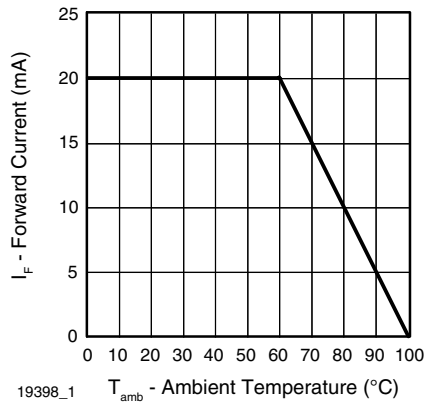


Figure 1. Forward Current vs. Ambient Temperature

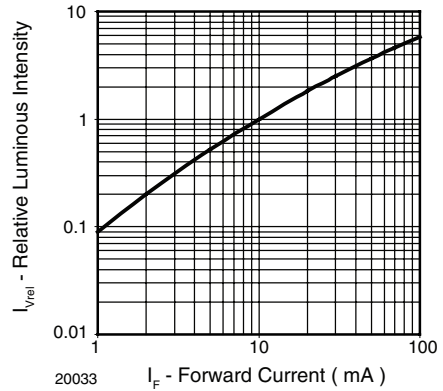


Figure 2. Relative Luminous Intensity vs. Forward Current

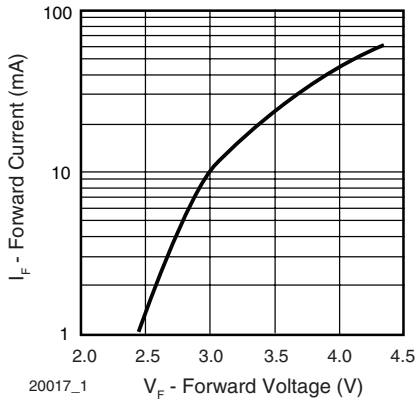


Figure 3. Forward Current vs. Forward Voltage

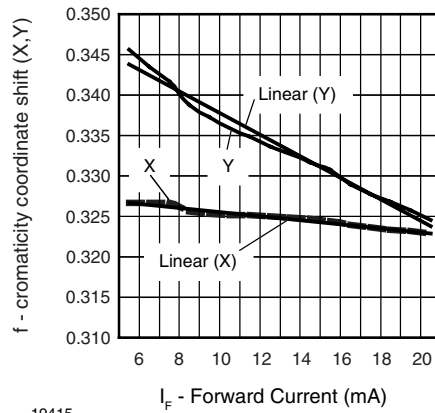


Figure 6. Chromaticity Coordinate Shift vs. Forward Current

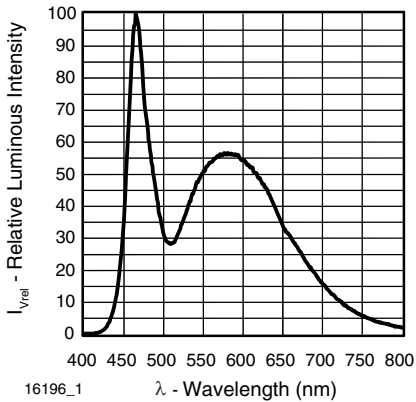


Figure 4. Relative Intensity vs. Wavelength

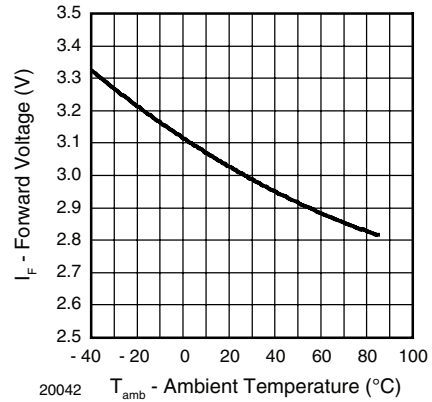


Figure 7. Forward Voltage vs. Ambient Temperature

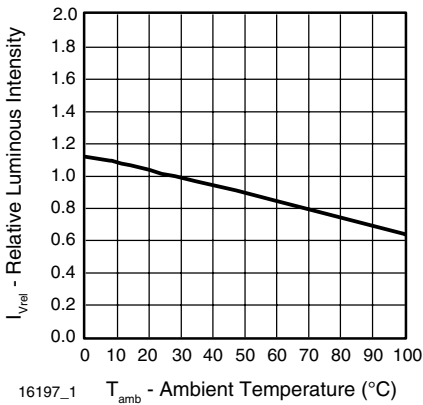


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

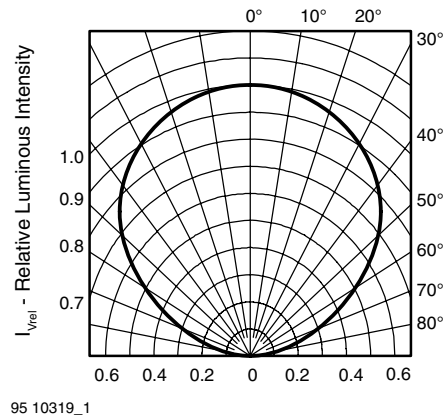


Figure 8. Rel. Luminous Intensity vs. Angular Displacement

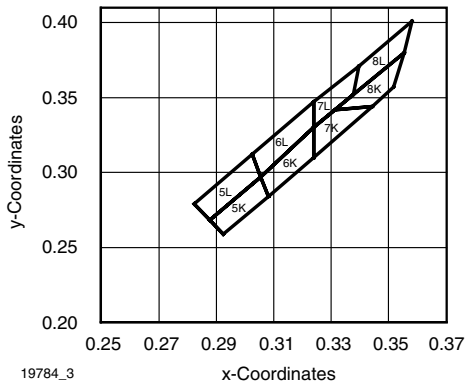
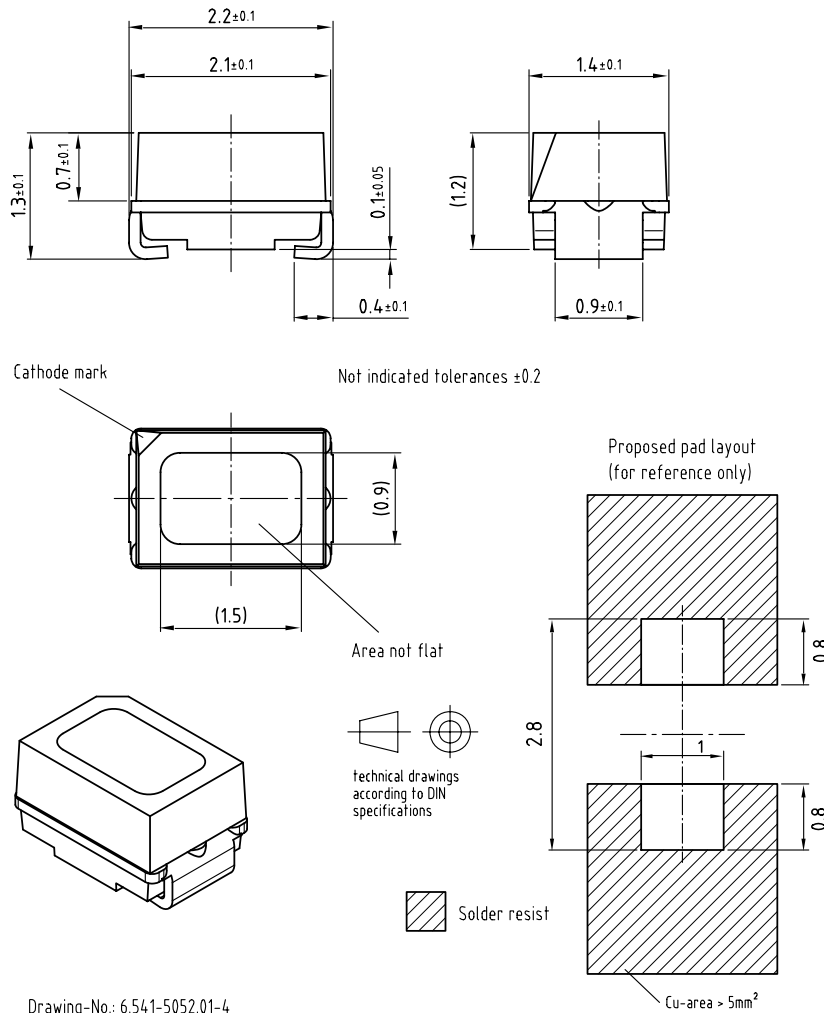


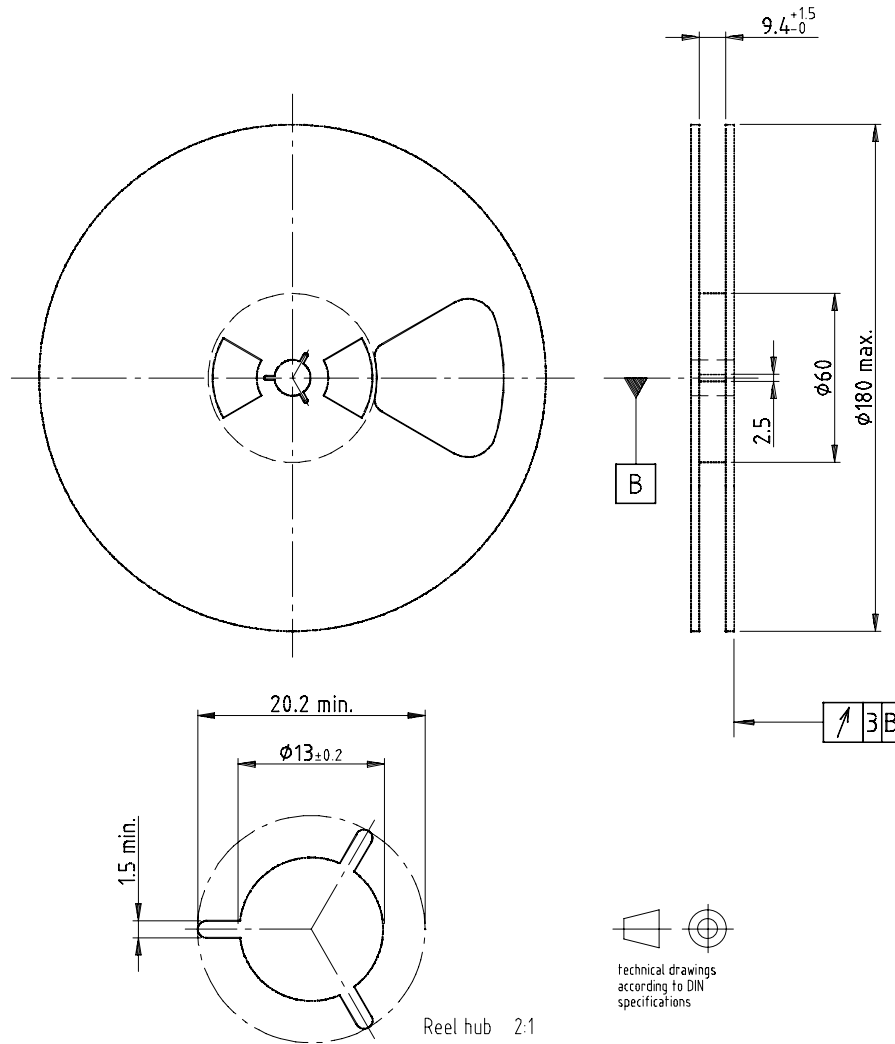
Figure 9. White Grouping SMD

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5052.01-4
Issue: 3; 22.04.03
16892

REEL DIMENSIONS in millimeters

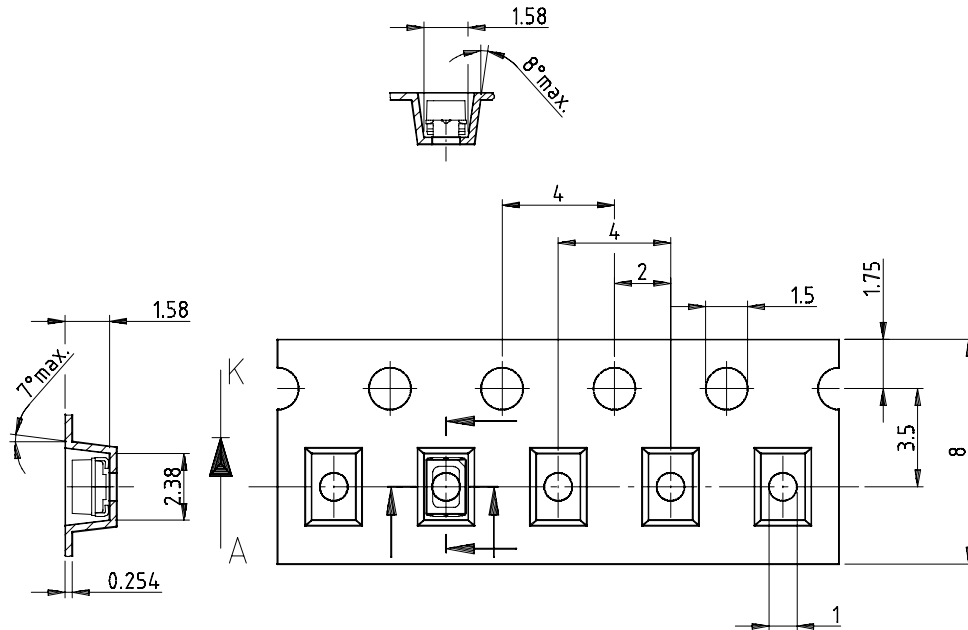


Drawing-No.: 9.800-5051.V5-4

Issue: 1; 25.07.02

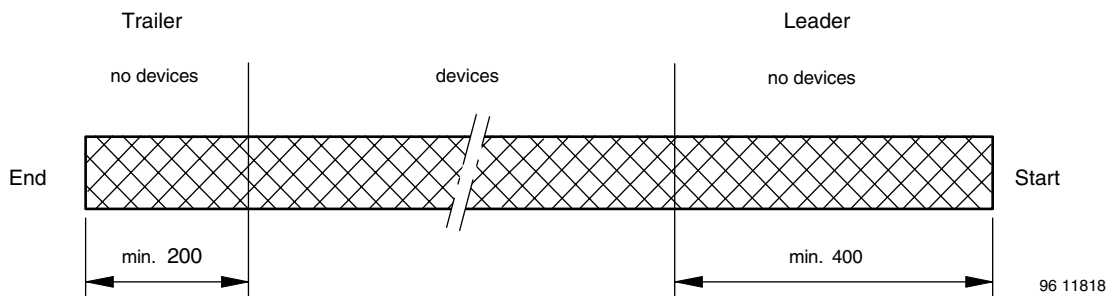
16938

TAPE DIMENSIONS in millimeters



Drawing-No.: 9.700-5266.01-4
Issue: 1; 05.06.02
16939

LEADER AND TRAILER in millimeters



GS08 = 3000 pcs

COVER TAPE PEEL STRENGTH

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

SOLDERING PROFILE

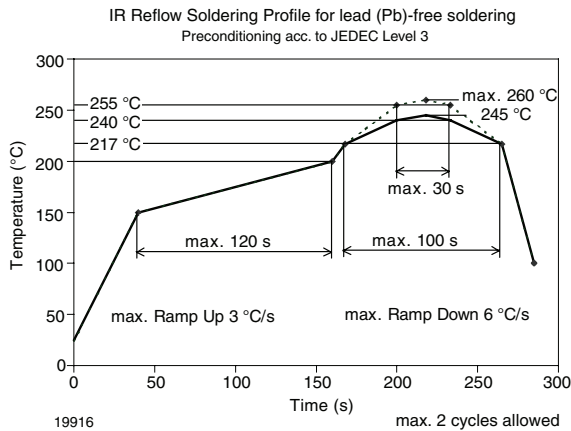
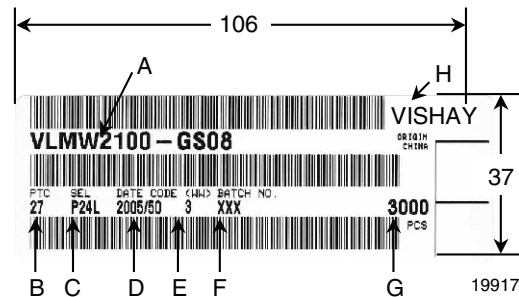


Figure 10. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

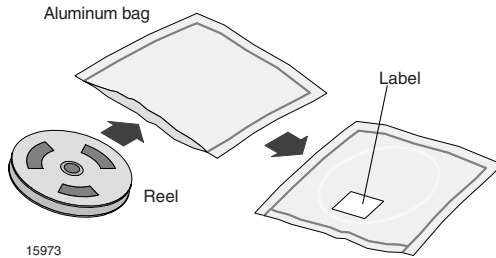
BARCODE PRODUCT LABEL EXAMPLE:



- A) Type of component
- B) Manufacturing plant
- C) SEL - selection code (bin):
e.g.: P2 = code for luminous intensity group
4L = code for color group
- D) Date code year/week
- E) Day code (e.g. 1: Monday)
- F) Batch no.
- G) Total quantity
- H) Company code

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 $\leq 60\%$ RH max.

After more than 168 h under these conditions moisture content will be too high for reflow soldering.

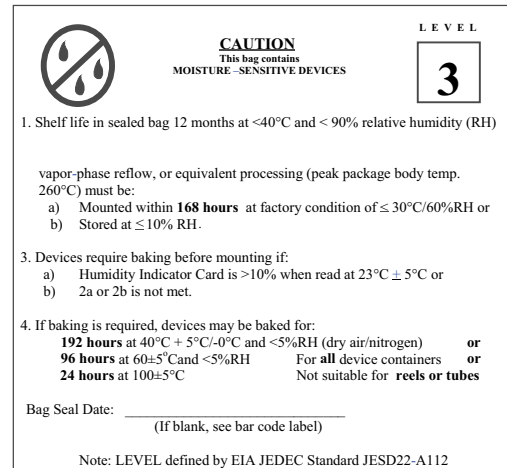
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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

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 3 label is included on all dry bags.



Example of JESD22-A112 level 3 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.

We reserve the right to make changes to improve technical design
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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



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