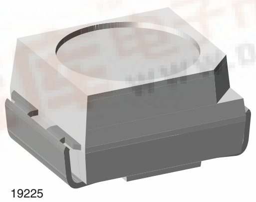
Low current SMD LED PLCC-2



FEATURES

- SMD LED with exceptional brightness
- Luminous intensity 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-020B
- 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 $I_{Vmax}/I_{Vmin} \leq 1.6$
- Lead (Pb)-free device
- Preconditioning: acc. to JEDEC Level 2a
- ESD-withstand voltage: > 2 kV acc. to MIL STD 883 D, Method 3015.7
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Automotive qualified AEC-Q101

DESCRIPTION

This device has been designed to meet the increasing demand for InGaN technology.

The package of the VLMPG/YG30.. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

PRODUCT GROUP AND PACKAGE DATA

- Product group: SMD LED
- Product series: Low current LED
- Package: PLCC-2
- 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
VLMPG30E1F2-GS08	Pure green, I_V = (0.71 to 1.80) mcd	AlInGaP/GaAS
VLMPG30E1F2-GS18	Pure green, I_V = (0.71 to 1.80) mcd	AlInGaP/GaAS
VLMPG30F1G2-GS08	Pure green, I_V = (1.12 to 2.80) mcd	AlInGaP/GaAS
VLMPG30F1G2-GS18	Pure green, I_V = (1.12 to 2.80) mcd	AlInGaP/GaAS
VLMPG30E1G2-GS08	Pure green, I_V = (0.71 to 2.80) mcd	AlInGaP/GaAS
VLMPG30E1G2-GS18	Pure green, I_V = (0.71 to 2.80) mcd	AlInGaP/GaAS
VLMYG30G2J1-GS08	Yellow green, I_V = (2.24 to 5.60) mcd	AlInGaP/GaAS
VLMYG30G2J1-GS18	Yellow green, I_V = (2.24 to 5.60) mcd	AlInGaP/GaAS
VLMYG30H2K1-GS08	Yellow green, I_V = (3.55 to 9.00) mcd	AlInGaP/GaAS
VLMYG30H2K1-GS18	Yellow green, I_V = (3.55 to 9.00) mcd	AlInGaP/GaAS
VLMYG30G2K1-GS08	Yellow green, I_V = (2.24 to 9.00) mcd	AlInGaP/GaAS
VLMYG30G2K1-GS18	Yellow green, I_V = (2.24 to 9.00) mcd	AlInGaP/GaAS

ABSOLUTE MAXIMUM RATINGS[1] VLMPG30.., VLMYG30..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage[2]		V_R	5	V
DC Forward current	$T_{amb} \leq 80$ °C	I_F	20	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.2	A
Power dissipation		P_V	60	mW
Junction temperature		T_j	125	°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 > 16 mm^2)	R_{thJA}	400	K/W

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

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] VLMPG30.., PURE GREEN

PARAMETER	TEST CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Luminous intensity[2]	I_F = 2 mA	I_V	0.71		2.8	mcd
Dominant wavelength	I_F = 2 mA	λ_d	555	560	565	nm
Peak wavelength	I_F = 2 mA	λ_p		565		nm
Angle of half intensity	I_F = 2 mA	φ		± 60		deg
Forward voltage	I_F = 2 mA	V_F			2.2	V
Reverse voltage	I_R = 10 µA	V_R	5			V
Temperature coefficient of V_F	I_F = 20 mA	TC_V		- 4		mV/K
Temperature coefficient of I_V	I_F = 20 mA	TC_I		- 0.4		%/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] VLMYG30.., YELLOW GREEN

PARAMETER	TEST CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Luminous intensity[2]	I_F = 2 mA	I_V	2.24		9.0	mcd
Dominant wavelength	I_F = 2 mA	λ_d	566	574	575	nm
Peak wavelength	I_F = 2 mA	λ_p		576		nm
Angle of half intensity	I_F = 2 mA	φ		± 60		deg
Forward voltage	I_F = 2 mA	V_F			2.2	V
Reverse voltage	I_R = 10 µA	V_R	5			V
Temperature coefficient of V_F	I_F = 20 mA	TC_V		- 4		mV/K
Temperature coefficient of I_V	I_F = 20 mA	TC_I		- 0.2		%/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

LUMINOUS INTENSITY CLASSIFICATION

GROUP		LIGHT INTENSITY (MCD)	
STANDARD	OPTIONAL	MIN	MAX
E	1	0.71	0.90
	2	0.90	1.12
F	1	1.12	1.40
	2	1.40	1.80
G	1	1.80	2.24
	2	2.24	2.80
H	1	2.80	3.55
	2	3.55	4.50
J	1	4.50	5.60
	2	5.60	7.10
K	1	7.10	9.00

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.

COLOR CLASSIFICATION

GROUP	PURE GREEN	
	DOM. WAVELENGTH (NM)	
	MIN.	MAX.
0	555	559
1	558	561
2	560	563
3	562	565

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

COLOR CLASSIFICATION

GROUP	YELLOW-GREEN	
	DOM. WAVELENGTH (NM)	
	MIN.	MAX.
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

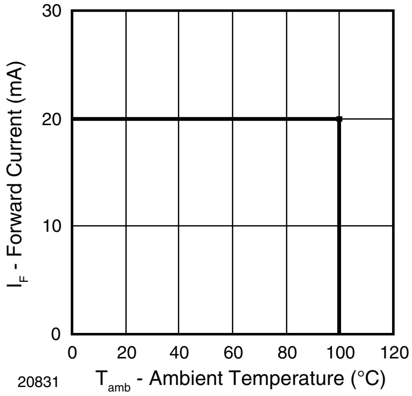


Figure 1. Forward Current vs. Ambient Temperature

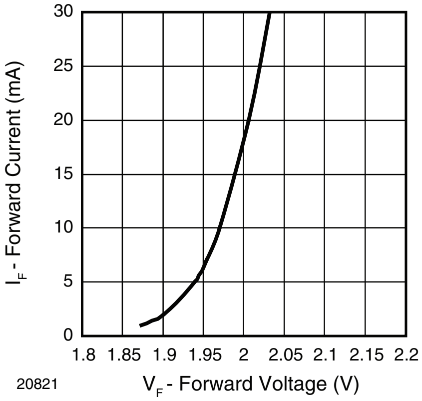


Figure 2. Forward Current vs. Forward Voltage

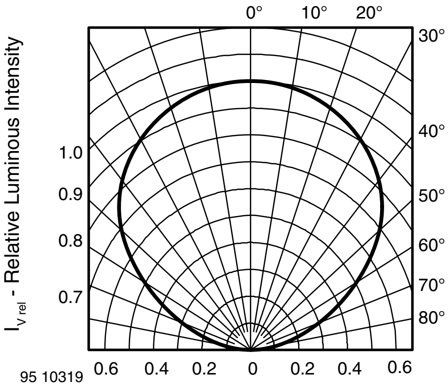


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

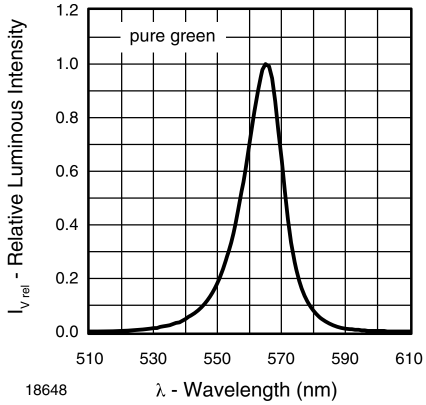


Figure 4. Relative Luminous Intensity vs. Wavelength

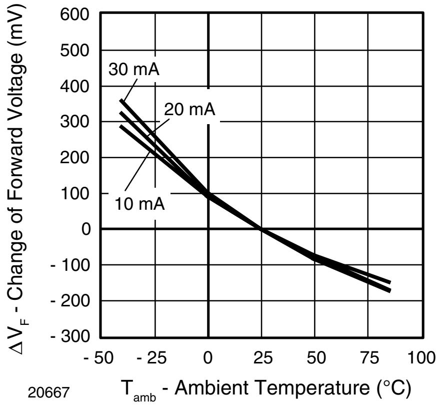


Figure 5. Change of Forward Voltage vs. Ambient Temperature

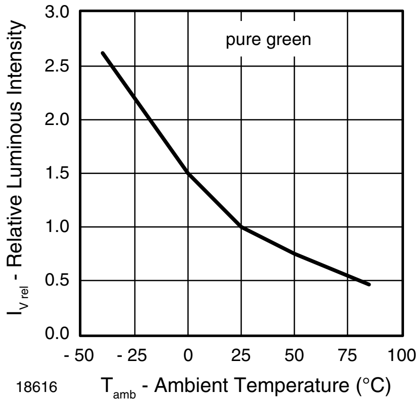


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

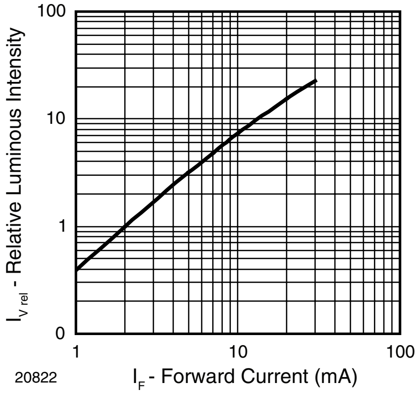


Figure 7. Rel. Luminous Intensity vs. Forward Current

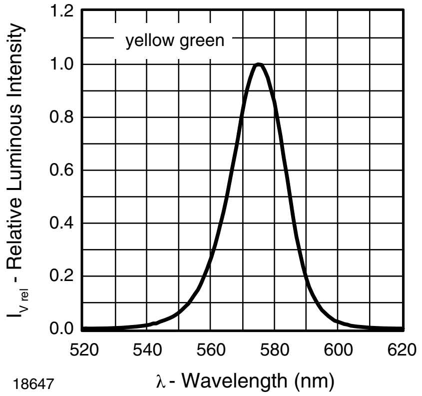


Figure 10. Rel. Luminous Intensity vs. Wavelength

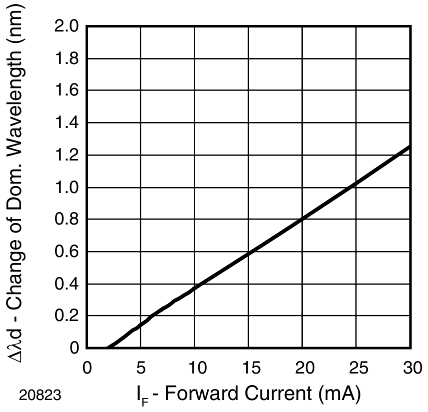


Figure 8. Change of Dominant Wavelength vs. Forward Current

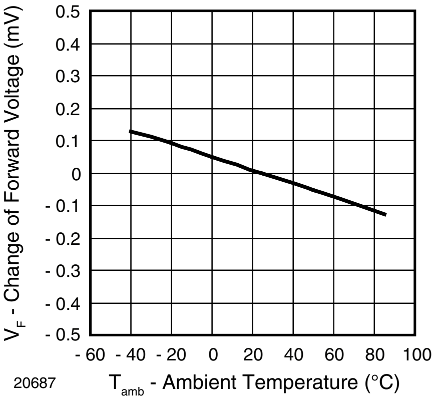


Figure 11. Change of Forward Voltage vs. Ambient Temperature

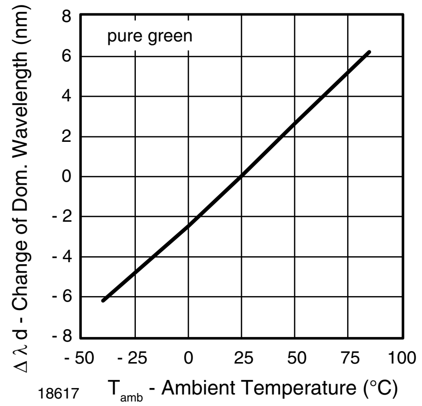


Figure 9. Change of Dominant Wavelength vs.
Ambient Temperature

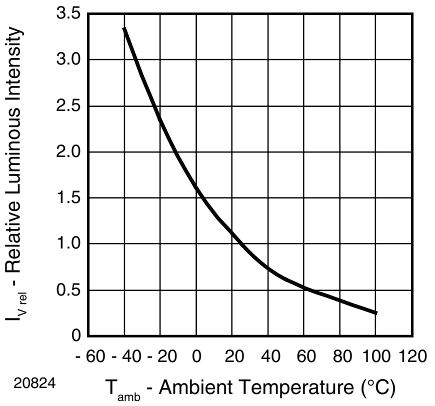


Figure 12. Rel. Luminous Intensity vs. Ambient Temperature

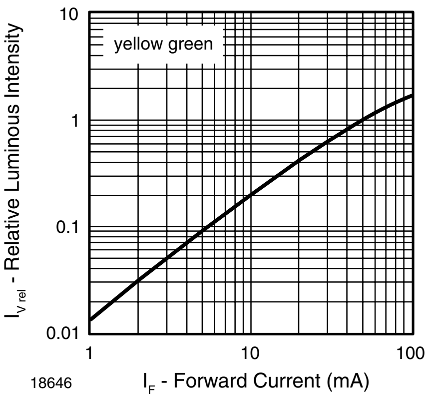


Figure 13. Relative Luminous Intensity vs. Forward Current

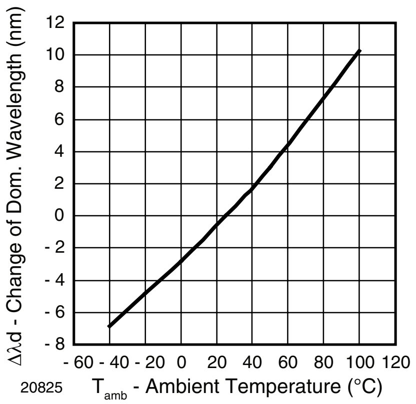


Figure 15. Change of Dominant Wavelength vs. Ambient Temperature

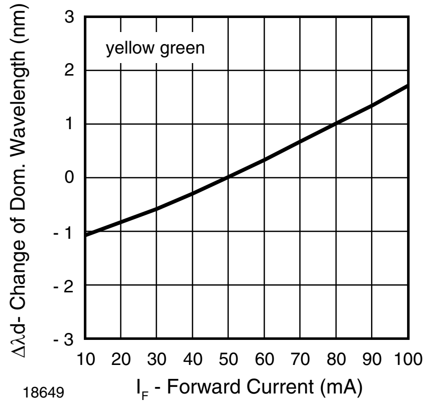
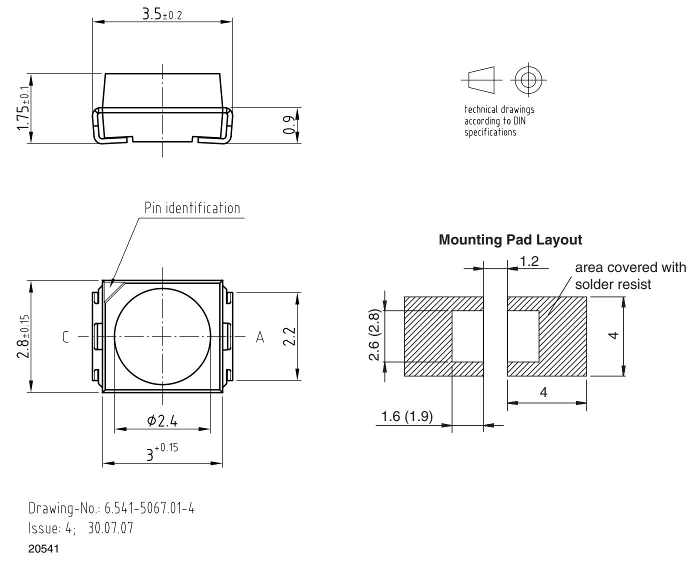


Figure 14. Change of Dominant Wavelength vs. Forward Current

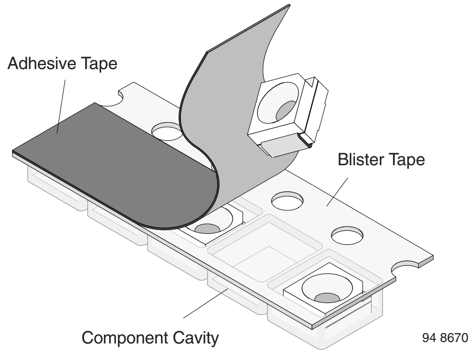
PACKAGE DIMENSIONS in millimeters



METHOD OF TAPING/POLARITY AND TAPE AND REEL

SMD LED (VLM3 - SERIES)

Vishay's LEDs in SMD packages are available in an antistatic 8 mm blister tape (in accordance with DIN IEC 40 (CO) 564) for automatic component insertion. The blister tape is a plastic strip with impressed component cavities, covered by a top tape.



TAPING OF VLM.3..

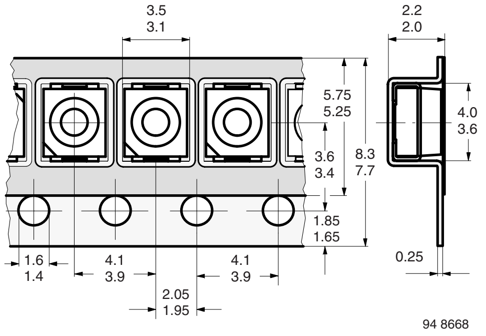


Figure 16. Tape dimensions in mm for PLCC-2

REEL PACKAGE DIMENSION IN MM FOR SMD LEDS, TAPE OPTION GS08 (= 1500 PCS.)

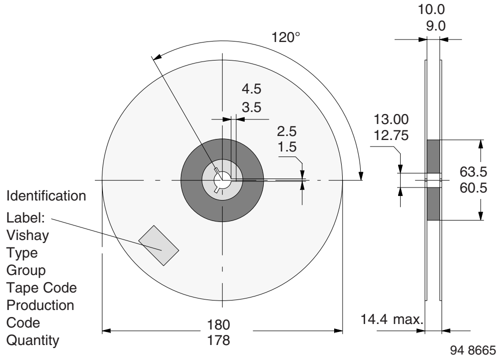


Figure 17. Reel dimensions - GS08

REEL PACKAGE DIMENSION IN MM FOR SMD LEDS, TAPE OPTION GS18 (= 8000 PCS.) PREFERED

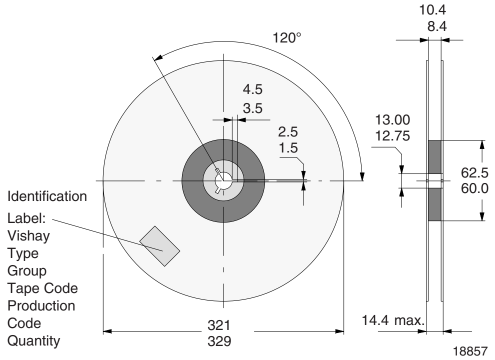


Figure 18. Reel dimensions - GS18

SOLDERING PROFILE

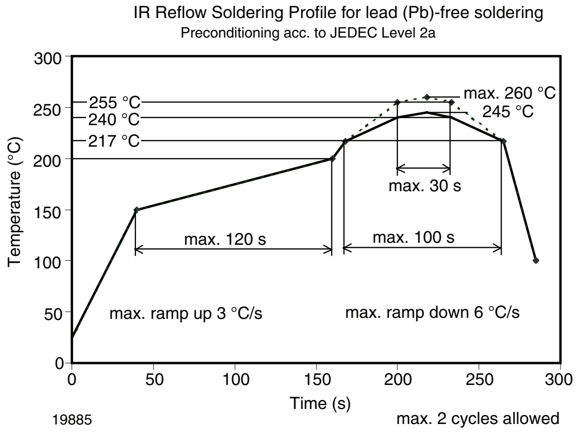


Figure 19. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020B)

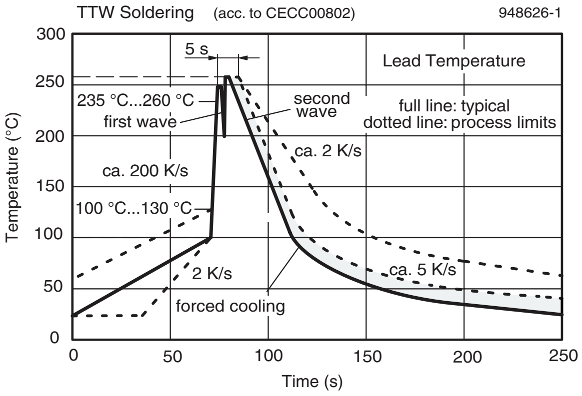
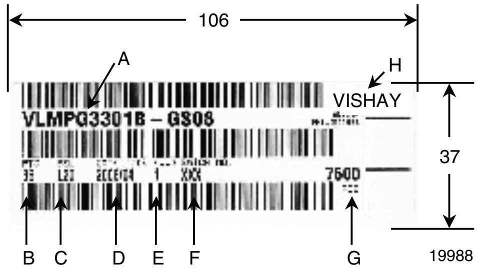


Figure 20. Double Wave Soldering of Opto Devices (all packages)

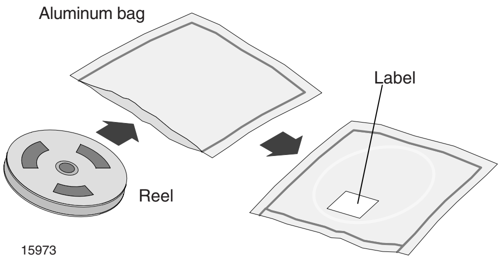
BARCODE-PRODUCT-LABEL EXAMPLE:



A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
e.g.: L2 = code for luminous intensity group
0 = 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 ≤ 60 % RH max.

After more than 672 h under these conditions moisture content will be too high for reflow soldering.

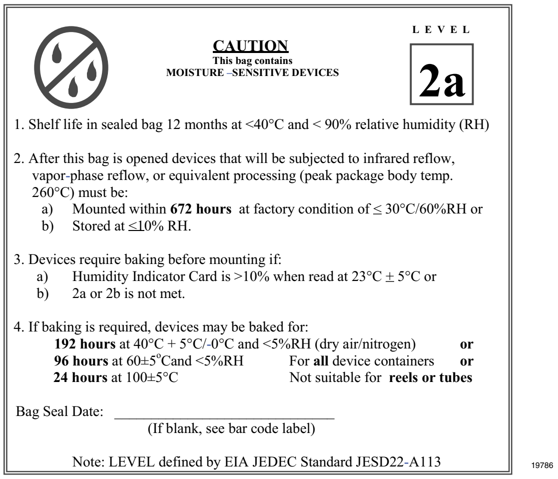
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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 2a label is included on all dry bags.



CAUTION
This bag contains
MOISTURE –SENSITIVE DEVICES

LEVEL
2a

1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)

2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be:
   a) Mounted within **672 hours** at factory condition of ≤ 30°C/60%RH or
   b) Stored at ≤10% RH.

3. Devices require baking before mounting if:
   a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or
   b) 2a or 2b is not met.

4. If baking is required, devices may be baked for:
   192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen) **or**
   96 hours at 60±5°Cand <5%RH For **all** device containers **or**
   24 hours at 100±5°C Not suitable for **reels or tubes**

Bag Seal Date: ______________________________
(If blank, see bar code label)

Note: LEVEL defined by EIA JEDEC Standard JESD22-A113

19786

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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