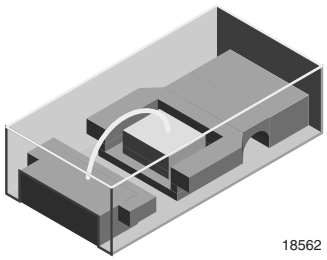
Ultrabright 0603 SMD LED



FEATURES

- High efficient InGaN technology
- Smallest SMD package 0603 with exceptional brightness 1.6 mm x 0.8 mm x 0.6 mm (L x W x H)
- High reliability lead frame based
- Temperature range - 40 °C to + 100 °C
- Chromaticity coordinate categorized according to CIE1931 per packing unit
- Typical color temperature 5500 K
- EIA and ICE standard package
- Compatible with IR reflow, vapor phase and wave solder processes acc. to CECC 00802 and J-STD-020C
- Available in 8 mm tape reel
- Lead (Pb)-free device
- Preconditioning: according to JEDEC level 2
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- ESD-withstand voltage: up to 1 kV according to JESD22-A114-B

DESCRIPTION

The new 0603 LED series have been designed in the smallest SMD package. This innovative 0603 LED technology opens the way to

- smaller products of higher performance
- more design in flexibility
- enhanced applications

The 0603 LED is an obvious solution for small-scale, high power products that are expected to work reliability in an arduous environment.

The reflector inside this package is filled with a mixture of epoxy and yellow converter.

This yellow converter converts the blue emission partially to yellow, which mixes the remaining blue to give white.

APPLICATIONS

- Automotive: backlighting in dashboards, switches and keypads
- Telecommunication: indicator and backlighting in telephone and fax
- Backlighting for audio and video equipment
- Backlighting in office equipment
- Indoor and outdoor message boards
- Flat backlight for LCDs, switches and symbols

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0603
- Product series: standard
- Angle of half intensity: ± 80°

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMW11R2S2-5K8L-08	White, I_V = (140 to 280) mcd	InGaN/yellow converter

ABSOLUTE MAXIMUM RATINGS[1] VLMW11..				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage[2]	I_R max = 10 µA	V_R	5	V
DC forward current	$T_{amb} \leq 60$ °C	I_F	20	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.1	A
Power dissipation		P_V	80	mW
Junction temperature		T_j	100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Thermal resistance junction/ ambient	mounted on PC board (pad size > 16 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 short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] VLMW11.., WHITE							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN**	**TYP.**	**MAX**	**UNIT**
Luminous intensity	I_F = 10 mA	VLMW11R2S2	I_V	140		280	mcd
Chromaticity coordinate x acc. to CIE 1931	I_F = 10 mA	VLMW11	x		0.33		
Chromaticity coordinate y acc. to CIE 1931	I_F = 10 mA	VLMW11	y		0.33		
Angle of half intensity	I_F = 10 mA		φ		± 80		deg
Forward voltage	I_F = 20 mA		V_F	2.9		4.0	V
Temperature coefficient of V_F	I_F = 10 mA		TC_{VF}		- 3		mV/K
Temperature coefficient of I_V	I_F = 10 mA		TC_{IV}		- 0.4		%/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

LUMINOUS INTENSITY CLASSIFICATION			
GROUP	**LIGHT INTENSITY (MCD)**		
STANDARD	**OPTIONAL**	**MIN**	**MAX**
R	-	-	-
	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 ± 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 are 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 are not be orderable.

CROSSING TABLE	
VISHAY	**OSRAM**
VLMW11R2S2	LWL28G-R2S2

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 °C, unless otherwise specified

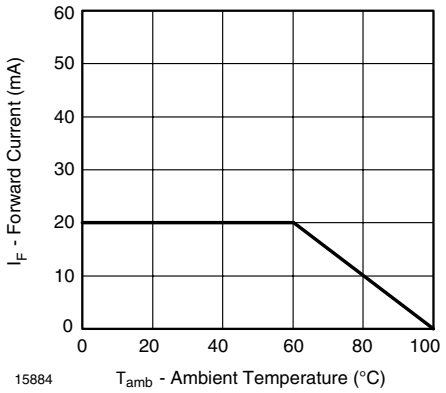


Figure 1. Forward Current vs. Ambient Temperature

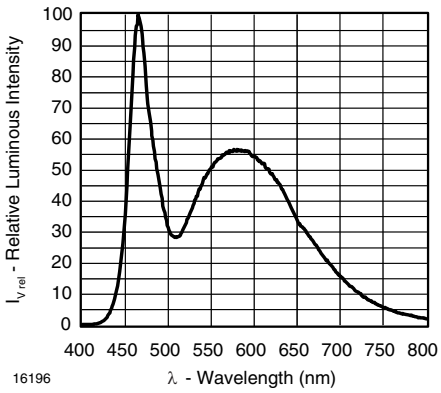


Figure 2. Relative Intensity vs. Wavelength

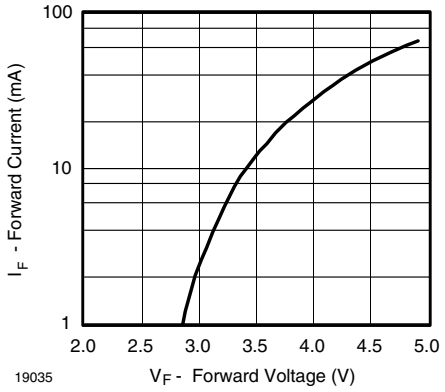


Figure 3. Forward Current vs. Forward Voltage

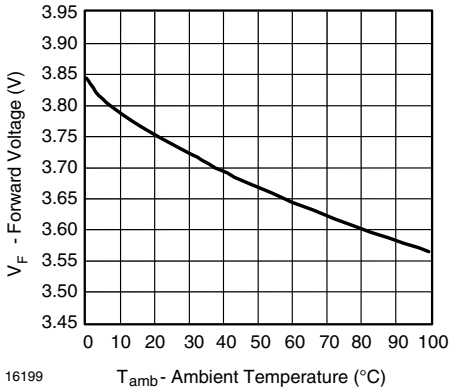


Figure 6. Forward Voltage vs. Ambient Temperature

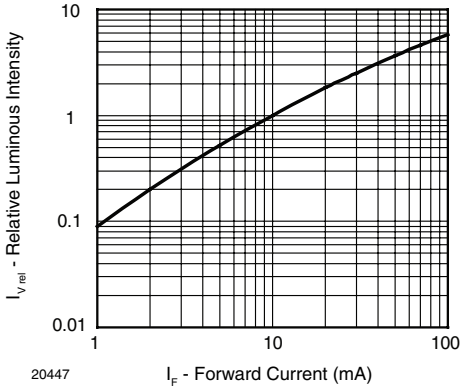


Figure 4. Relative Luminous Intensity vs. Forward Current

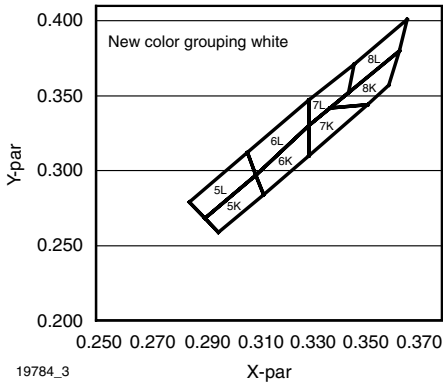


Figure 7. Coordinates of Colorgroups

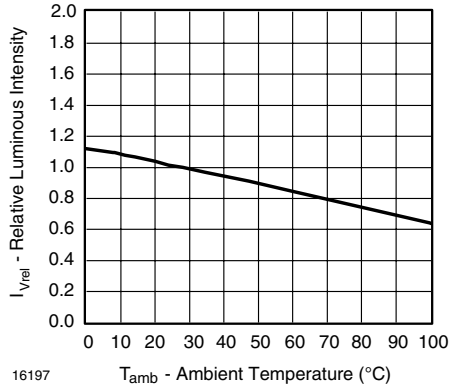
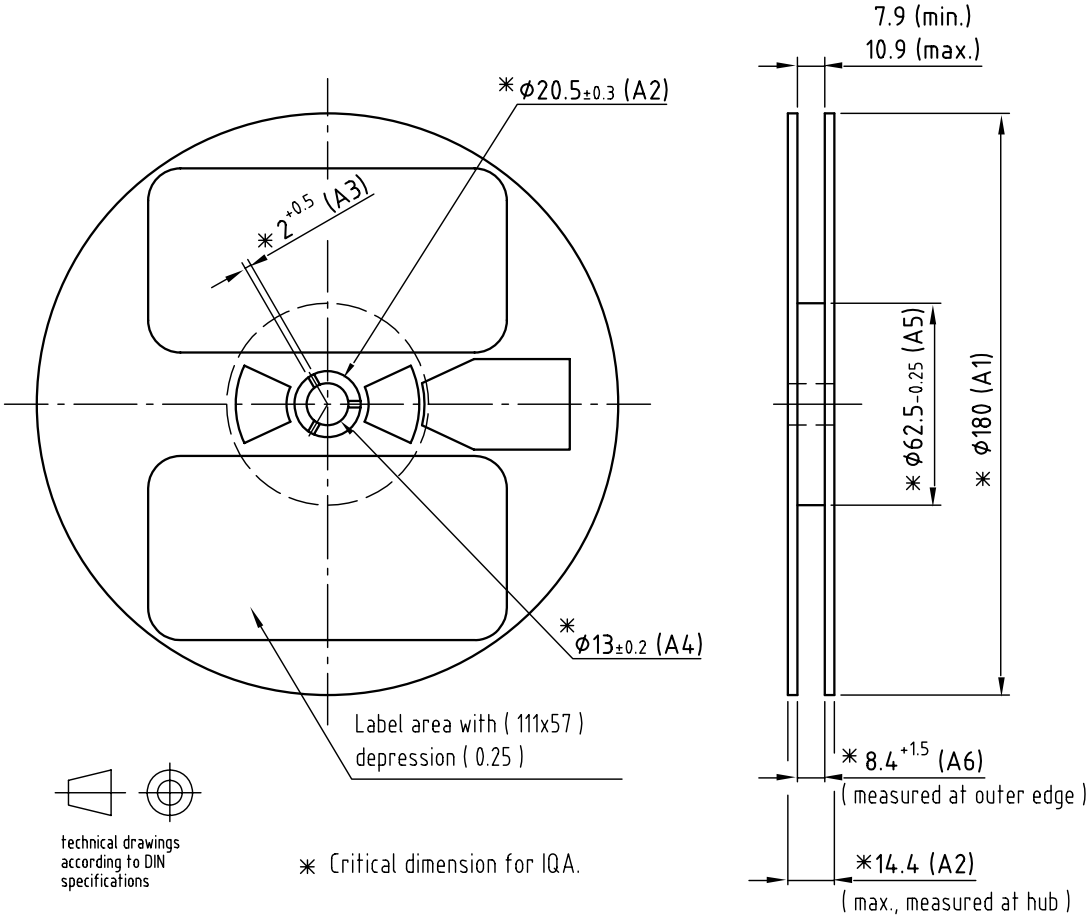


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

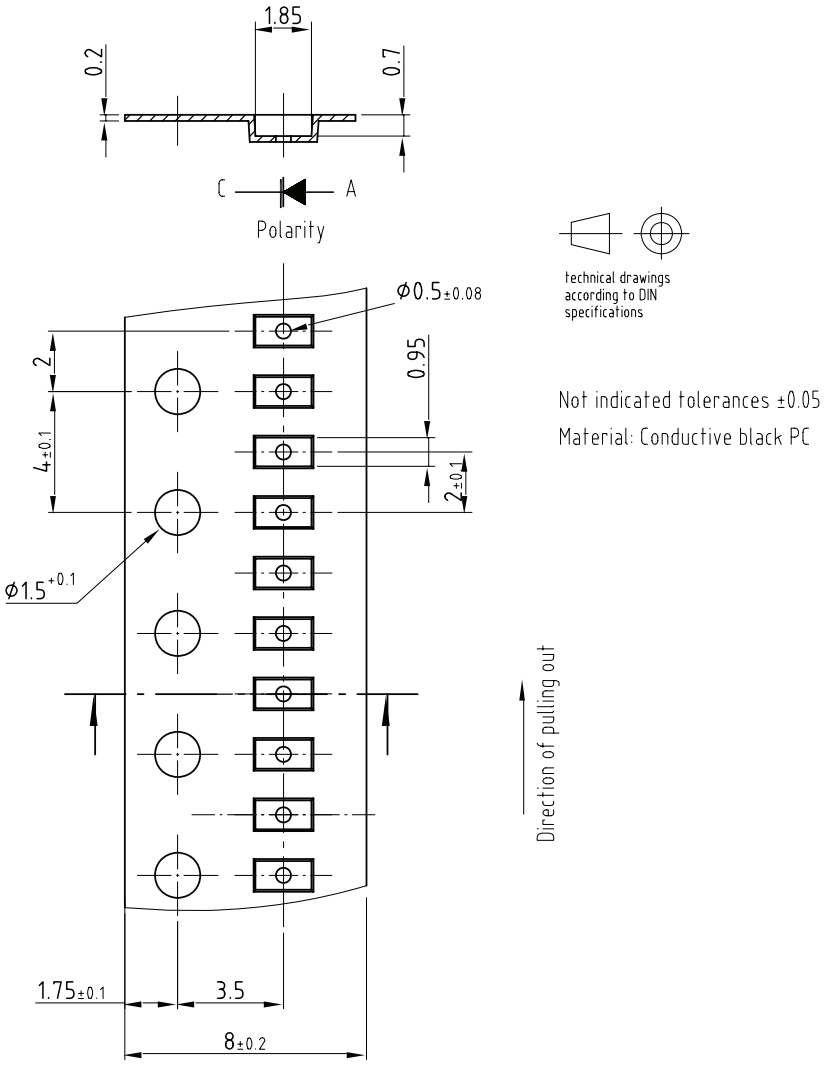
REEL DIMENSIONS IN MM



Drawing-No.: 9.800-5086.01-4
Issue: 1; 29.04.04
19043

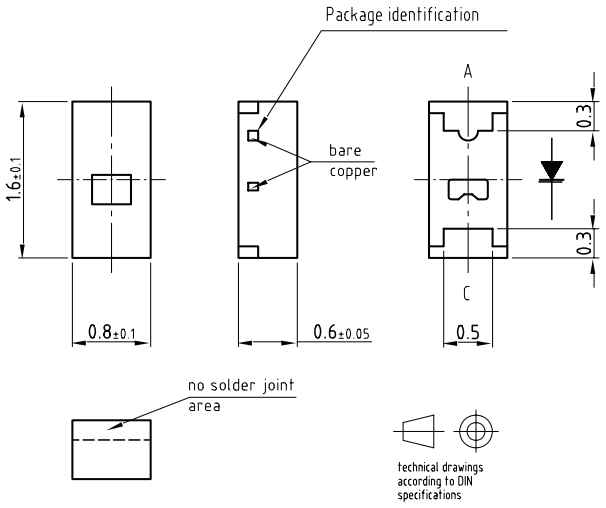
Not indicated tolerances ±0.05
Material: black static dissipative

TAPE DIMENSIONS



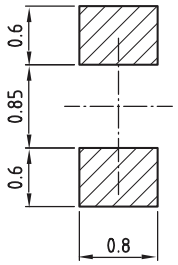
Drawing-No.: 9.700-5290.01-4
Issue: 2; 10.07.06
19044

PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ±0.1

Recommended solder pad



Drawing-No.: 6.541-5056.01-4
Issue: 2; 04.05.05
19426

SOLDERING PROFILE

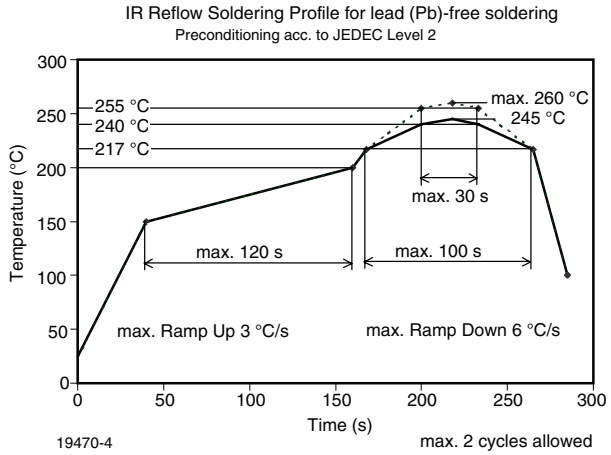


Figure 8. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

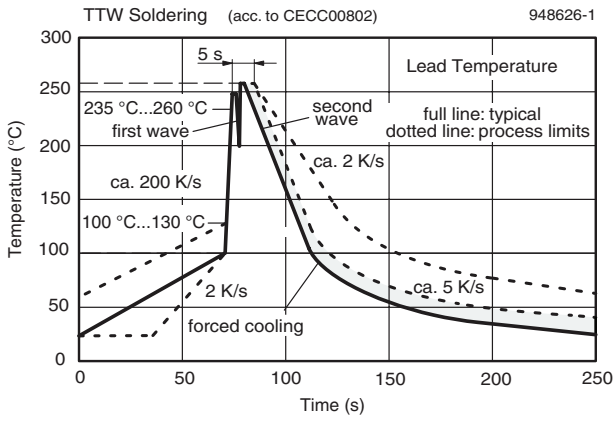
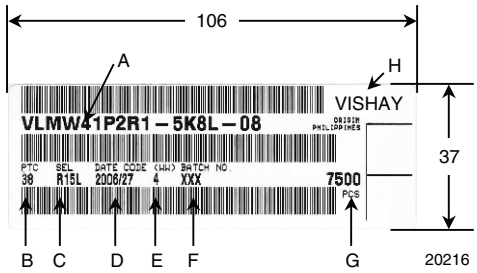


Figure 9. Double Wave Soldering of Opto Devices (all Packages)

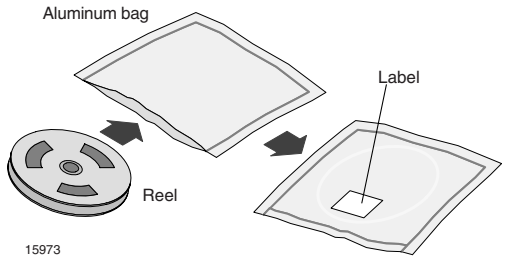
BAR CODE PRODUCT LABEL EXAMPLE:



A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
e.g.: R1 = code for luminous intensity group
5L = code for chrom. coordinate group
D) Date code year/week
E) Day code (e.g. 4: Thursday)
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 aluminium 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 1 year under these conditions moisture content will be too high for reflow soldering.

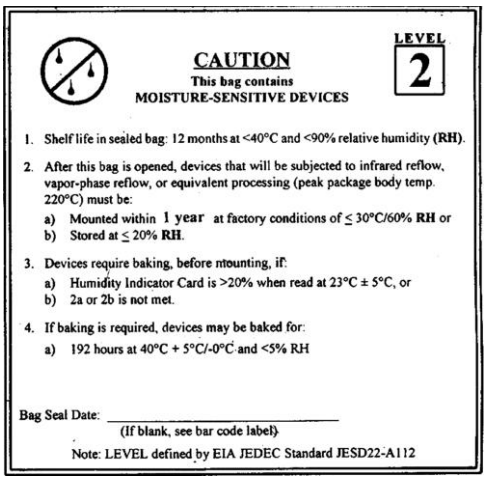
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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 2 label is included on all dry bags.


CAUTION
This bag contains
MOISTURE-SENSITIVE DEVICES
LEVEL 2

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. 220°C) must be:
   a) Mounted within 1 year at factory conditions of ≤ 30°C/60% RH or
   b) Stored at ≤ 20% RH.
3. Devices require baking, before mounting, if:
   a) Humidity Indicator Card is >20% 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:
   a) 192 hours at 40°C + 5°C/-0°C and <5% RH

Bag Seal Date: _____
(If blank, see bar code label)
Note: LEVEL defined by EIA JEDEC Standard JESD22-A112

17028

Example of JESD22-A112 level 2 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

Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.