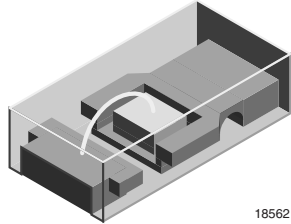


## Standard 0603 SMD LED



18562

### 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 reliable in an arduous environment.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0603
- Product series: standard
- Angle of half intensity:  $\pm 80^\circ$

### FEATURES

- 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
- Footprint compatible to 0603 chipled
- Wavelength 606 nm (orange)
- Viewing angle: extremely wide 160°
- Grouping parameter: luminous intensity, wavelength
- Available in 8 mm tape
- IR reflow and TTW soldering
- Lead (Pb)-free device
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Qualified according to JEDEC moisture sensitivity level 2
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Automotive qualified AEC-Q101



### APPLICATIONS

- Backlight keypads
- Navigation systems
- Cellular phone displays
- Displays for industrial control systems
- Automotive features
- Miniaturized color effects
- Traffic displays

### PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
VLMO11Q1R2-GS08	Orange, $I_V = (71 \text{ to } 180) \text{ mcd}$	AllnGaP



ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMO11Q1R2				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage <sup>2)</sup>		$V_R$	12	V
DC Forward current	$T_{amb} \leq 75\text{ }^\circ\text{C}$	$I_F$	30	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	0.5	A
Power dissipation		$P_V$	90	mW
Junction temperature		$T_j$	120	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	acc. Vishay spec	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ ambient	mounted on PC board (pad size > 5 mm <sup>2</sup> )	$R_{thJA}$	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 VLMO11Q1R2, ORANGE						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 20\text{ mA}$	$I_V$	71		180	mcd
Dominant wavelength	$I_F = 20\text{ mA}$	$\lambda_d$	600	606	609	nm
Peak wavelength	$I_F = 20\text{ mA}$	$\lambda_p$		610		nm
Angle of half intensity	$I_F = 20\text{ mA}$	$\phi$		$\pm 80$		deg
Forward voltage	$I_F = 20\text{ mA}$	$V_F$		2.1	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$	$V_R$	6			V
Junction capacitance	$V_R = 0, f = 1\text{ MHz}$	$C_j$		15		pF

Note:

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

COLOR CLASSIFICATION			
GROUP	DOMINANT WAVELENGTH (NM)		
	ORANGE		
	MIN.		MAX.
- 2	600		603
- 3	603		606
- 4	606		609
- 5	609		612

Note:

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of  $\pm 1\text{ nm}$

LUMINOUS INTENSITY CLASSIFICATION		
GROUP	LUMINOUS INTENSITY (MCD)	
	MIN.	MAX.
Q1	71	90
Q2	90	112
R1	112	140
R2	140	180

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 in any one reel.

In order to ensure availability, single wavelength groups will not be orderable.

**TYPICAL CHARACTERISTICS**

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

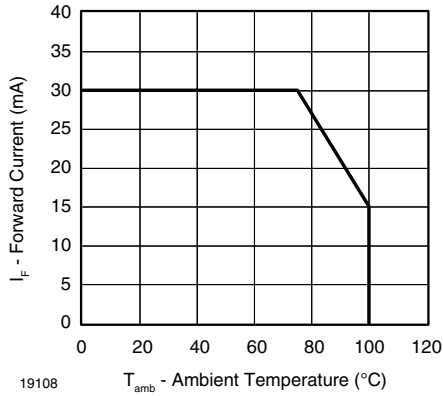


Figure 1. Forward Current vs. Ambient Temperature

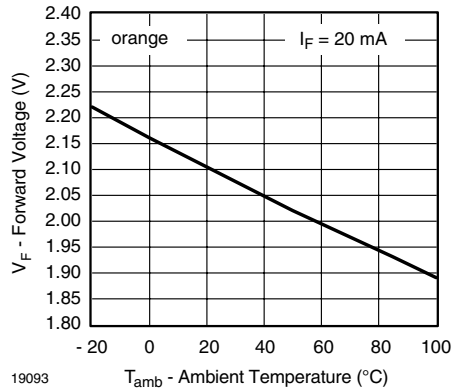


Figure 4. Forward Voltage vs. Ambient Temperature

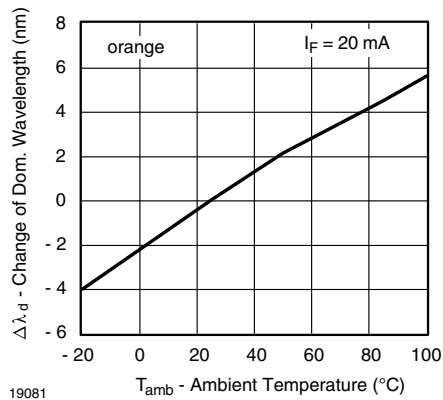


Figure 2. Change of Dominant Wavelength vs. Ambient Temperature

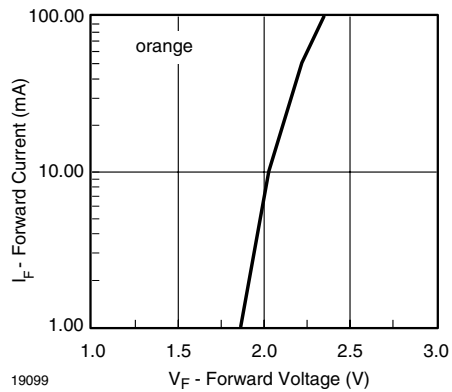


Figure 5. Forward Current vs. Forward Voltage

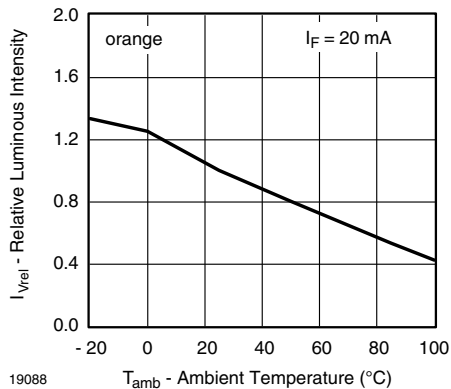
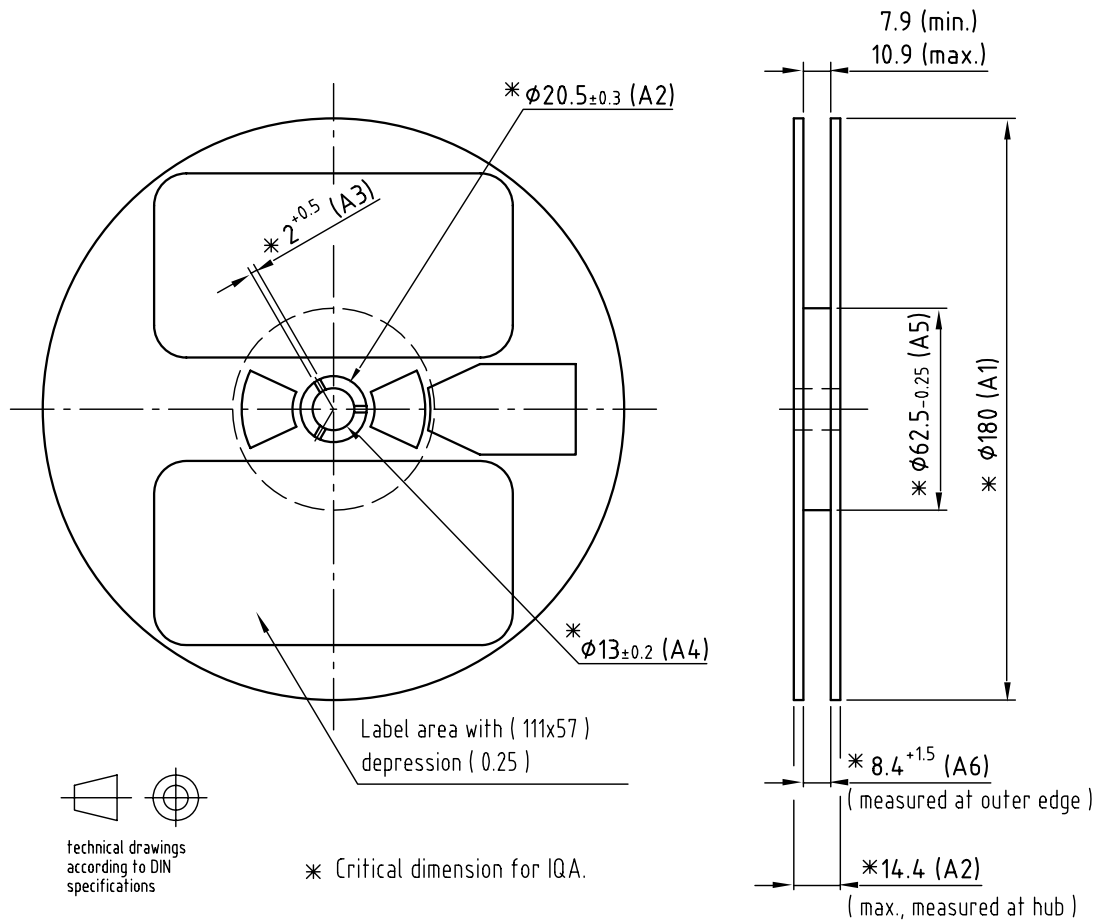


Figure 3. Relative Luminous Intensity vs. Amb. Temperature

**REEL DIMENSIONS** in millimeters



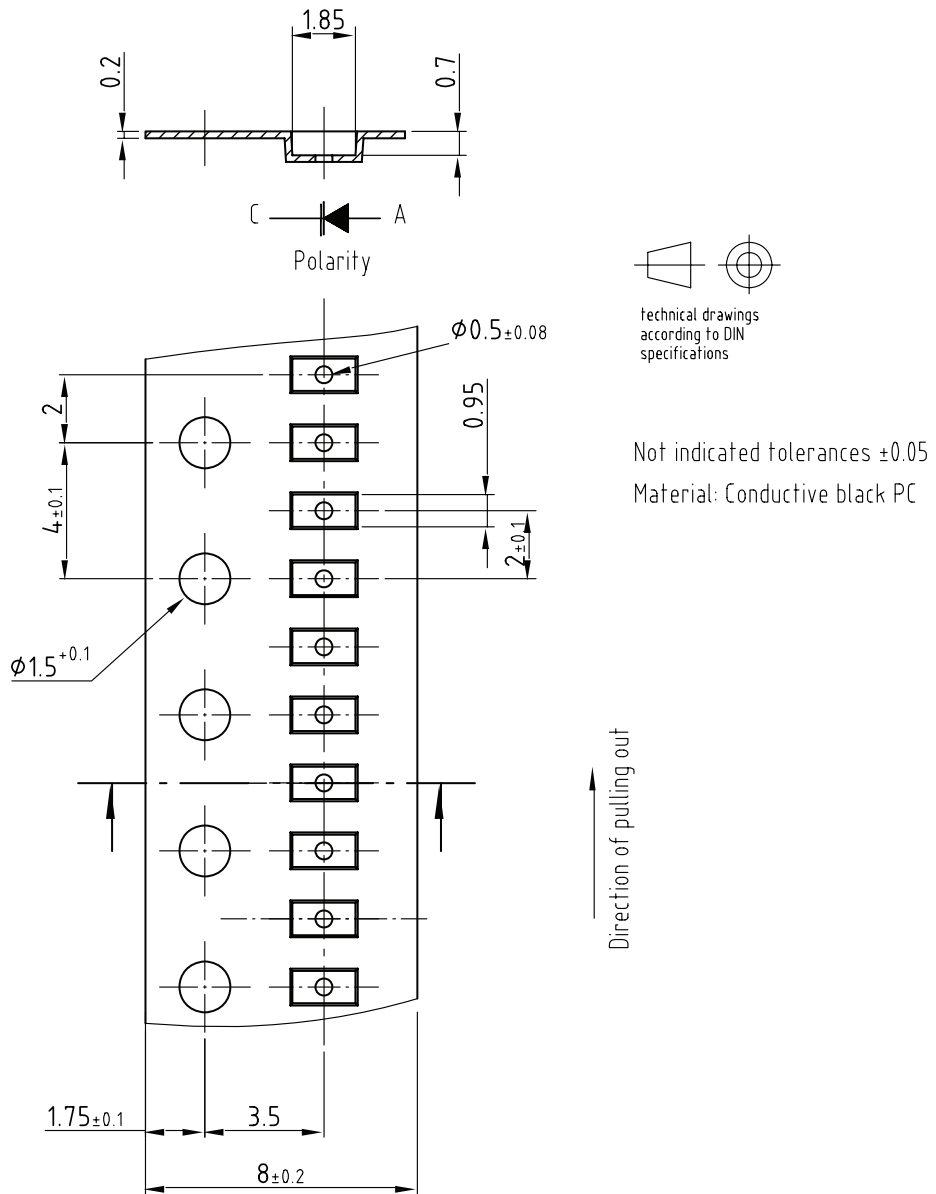
technical drawings according to DIN specifications

\* Critical dimension for IQA.

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

Not indicated tolerances  $\pm 0.05$   
 Material: black static dissipative

**TAPE DIMENSIONS** in millimeters

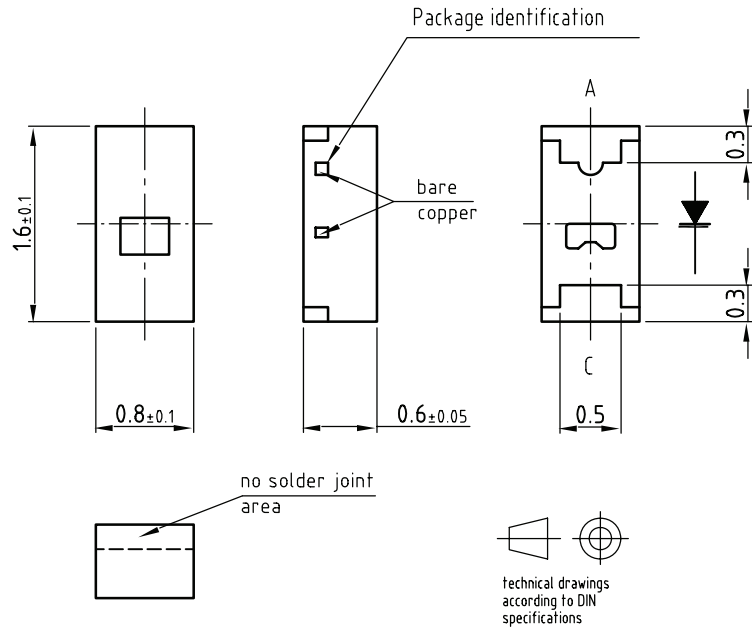


Drawing-No.: 9.700-5290.01-4

Issue: 2; 10.07.06

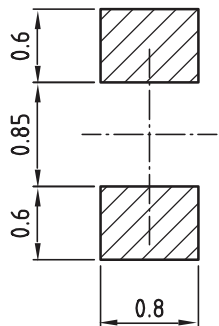
19044

## PACKAGE DIMENSIONS in millimeters



Not indicated tolerances  $\pm 0.1$

Recommended solder pad



Drawing-No.: 6.541-5056.01-4

Issue: 2; 04.05.05

19426

**SOLDERING PROFILE**

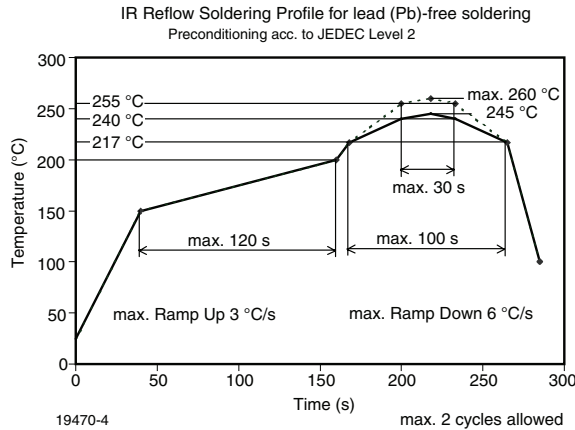
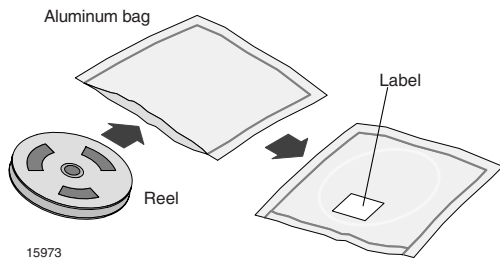


Figure 6. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

**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 1 year under these conditions moisture content will be too high for reflow soldering.

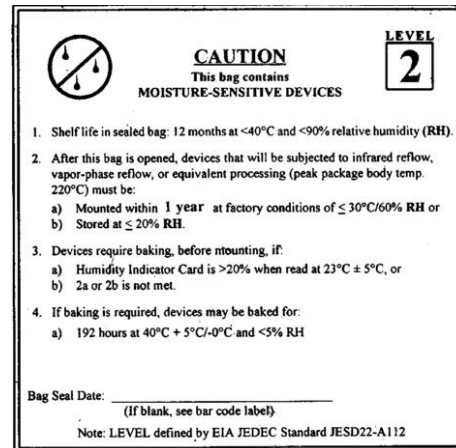
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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.



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





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