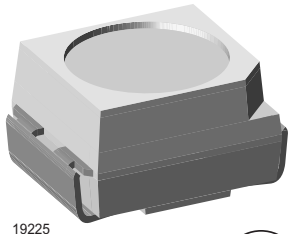
# SMD LED in PLCC-2 Package

## Description

These devices have been designed to meet the increasing demand for surface mounting technology.

The package of the TLMS310. is the PLCC-2 (equivalent to a size B tantalum capacitor).

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




e3 Pb Pb-free

## Features

- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- EIA and ICE standard package
- Compatible with infrared, vapor phase and wave solder processes according to CECC
- 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 $\leq 1.6$
- Lead-free device

## 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 | Angle of Half Intensity (±φ) | Technology |
|---|---|---|---|
| TLMS3100 | Red, $I_V$ > 2.5 mcd | 60 ° | GaAsP on GaP |
| TLMS3101 | Red, $I_V$ = (4 to 12.5) mcd | 60 ° | GaAsP on GaP |

## Absolute Maximum Ratings

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

**TLMS310.**

| Parameter | Test condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Reverse voltage | | $V_R$ | 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 | $T_{amb} \leq 60$ °C | $P_V$ | 100 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | - 40 to + 100 | °C |

| Parameter | Test condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Storage temperature range | | $T_{stg}$ | - 40 to + 100 | °C |
| Soldering temperature | t ≤ 5 s | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ ambient | mounted on PC board (pad size > 16 mm$^2$) | $R_{thJA}$ | 400 | K/W |

## Optical and Electrical Characteristics

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

## Red

**TLMS310.**

| Parameter | Test condition | Part | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Luminous intensity [1] | $I_F$ = 10 mA | TLMS3100 | $I_V$ | 2.5 | 7.5 | | |
| | | TLMS3101 | $I_V$ | 4 | | 12.5 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 624 | | 636 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | | 640 | | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | | ± 60 | | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | | 2.0 | 2.6 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | | | V |
| Junction capacitance | $V_R$ = 0, f = 1 MHz | | $C_j$ | | 7.0 | | pF |
| Temperature coefficient of $V_F$ | $I_F$ = 20 mA | | $TC_{VF}$ | | - 1.8 | | mV/K |
| Temperature coefficient of $\lambda_d$ | $I_F$ = 10 mA | | $TC_{\lambda d}$ | | 0.05 | | nm/K |

[1] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

## Typical Characteristics ($T_{amb}$ = 25 °C unless otherwise specified)

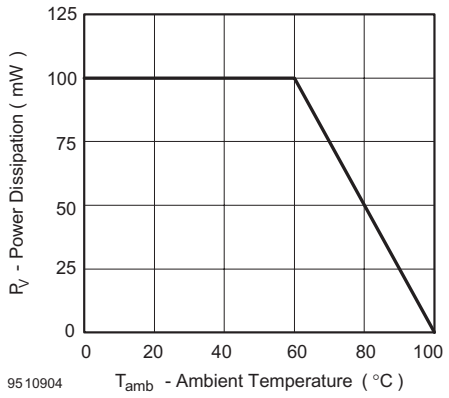



Figure 1. Power Dissipation vs. Ambient Temperature

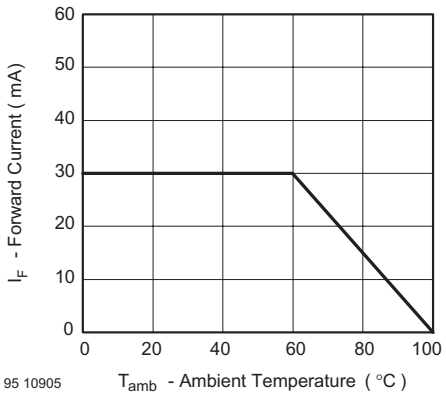



Figure 2. Forward Current vs. Ambient Temperature for InGaN

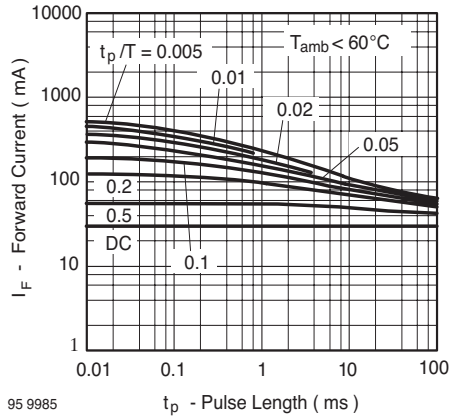



Figure 3. Pulse Forward Current vs. Pulse Duration

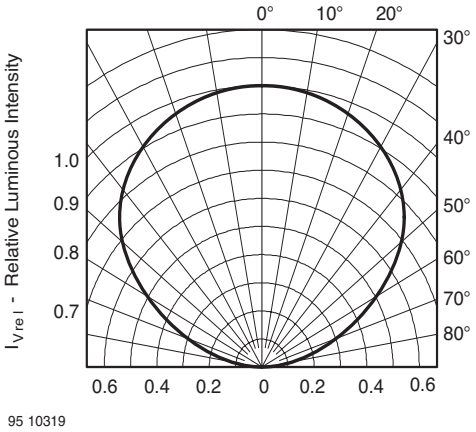



Figure 4. Rel. Luminous Intensity vs. Angular Displacement

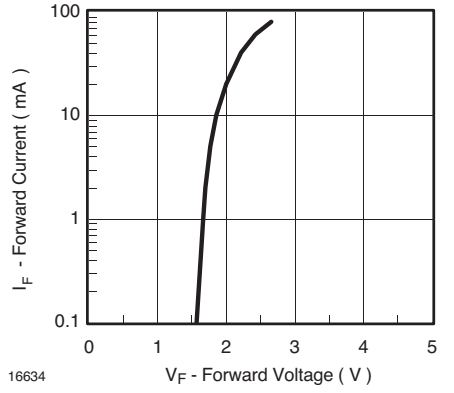



Figure 5. Forward Current vs. Forward Voltage

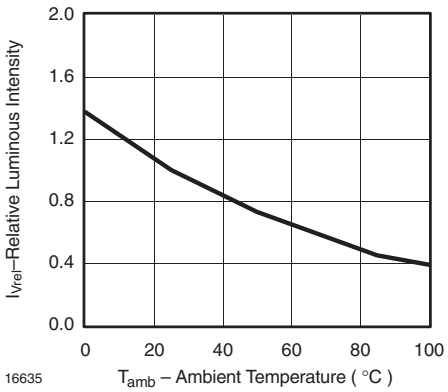



Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

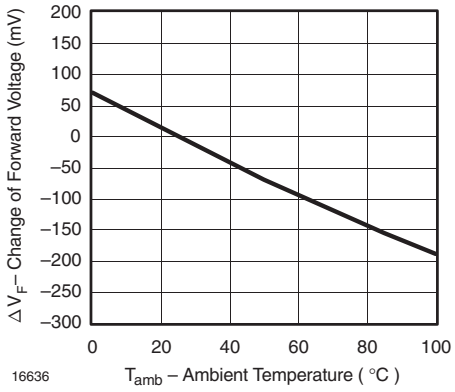



Figure 7. Change of Forward Voltage vs. Ambient Temperature

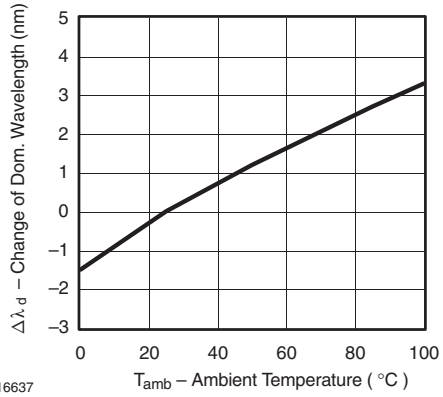



Figure 8. Change of Dominant Wavelength vs. Ambient Temperature

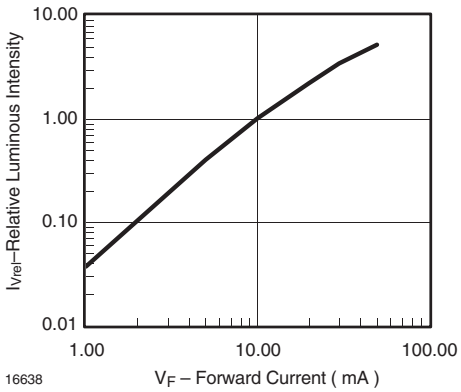



Figure 9. Relative Luminous Intensity vs. Forward Current

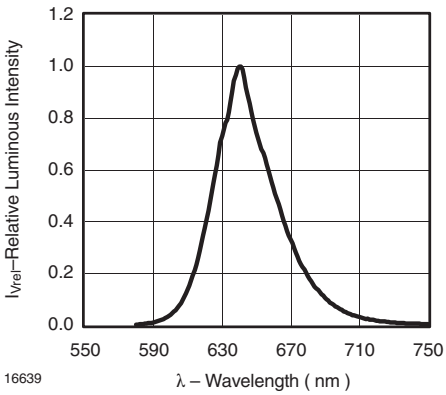
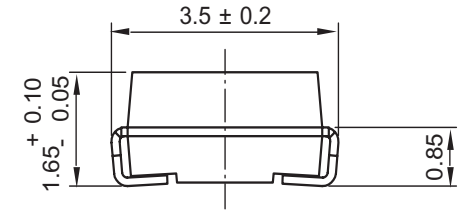
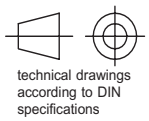
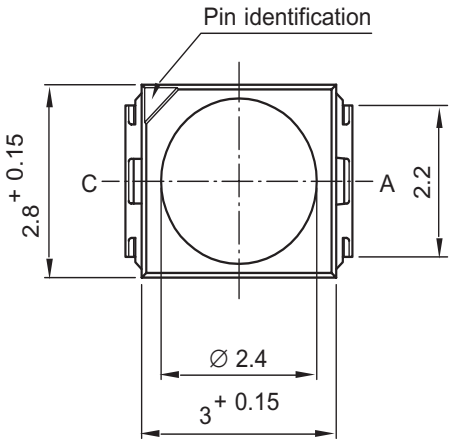



Figure 10. Relative Intensity vs. Wavelength

## Package Dimensions in mm




Drawing-No. : 6.541-5025.01-4
Issue: 7; 05.04.04

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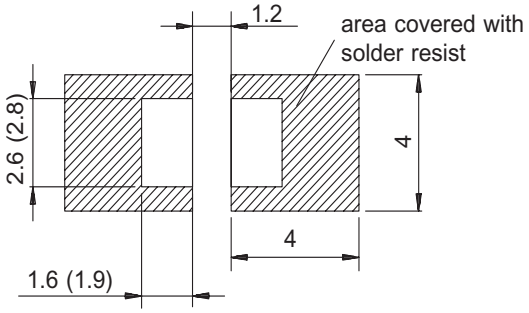
**Mounting Pad Layout**




Dimensions: IR and Vaporphase
(Wave Soldering)

## 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 operatingsystems 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.



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