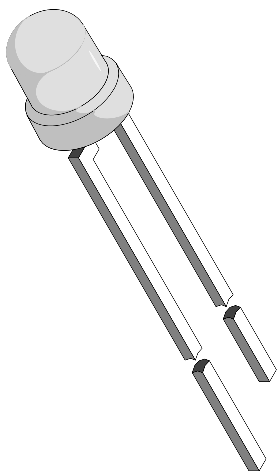
# Low Current LED in ø 3 mm Tinted Diffused Package

| Color | Type | Technology | Angle of Half Intensity ±φ |
|---|---|---|---|
| High efficiency red | TLLR440. | GaAsP on GaP | 25° |
| Yellow | TLLY440. | GaAsP on GaP | 25° |
| Green | TLLG440. | GaP on GaP | 25° |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## Features

- Low power consumption
- High brightness
- CMOS/MOS compatible
- Specified at $I_F$ = 2 mA
- Luminous intensity categorized
- Yellow and green color categorized

## Applications

Low power DC circuits

## Absolute Maximum Ratings

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

**TLLR440. ,TLLY440. ,TLLG440. ,**

| Parameter | Test Conditions | Symbol | Value | Unit |
|---|---|---|---|---|
| Reverse voltage | | $V_R$ | 6 | V |
| DC forward current | | $I_F$ | 7 | mA |
| Surge forward current | $t_p \leq 10\ \mu s$ | $I_{FSM}$ | 0.15 | A |
| Power dissipation | $T_{amb} \leq 84°C$ | $P_V$ | 20 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | –40 to +100 | °C |
| Storage temperature range | | $T_{stg}$ | –55 to +100 | °C |
| Soldering temperature | t ≤ 5 s, 2 mm from body | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | | $R_{thJA}$ | 800 | K/W |

## Optical and Electrical Characteristics

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

**High efficiency red** (**TLLR440.** )

| Parameter | Test Conditions | Type | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Luminous intensity [1] | $I_F$ = 2 mA | TLLR4400 | $I_V$ | 0.63 | 1.2 | | mcd |
| | | TLLR4401 | $I_V$ | 1 | 2 | | mcd |
| Dominant wavelength | $I_F$ = 2 mA | | $\lambda_d$ | 612 | | 625 | nm |
| Peak wavelength | $I_F$ = 2 mA | | $\lambda_p$ | | 635 | | nm |
| Angle of half intensity | $I_F$ = 2 mA | | $\varphi$ | | ±25 | | deg |
| Forward voltage | $I_F$ = 2 mA | | $V_F$ | | 1.9 | 2.4 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 20 | | V |
| Junction capacitance | $V_R$ = 0, f = 1 MHz | | $C_j$ | | 50 | | pF |
| [1] in one Packing Unit $I_V$Min./ $I_V$ Max. ≤ 0.5 | | | | | | | |

**Yellow** (**TLLY440.** )

| Parameter | Test Conditions | Type | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Luminous intensity [1] | $I_F$ = 2 mA | TLLY4400 | $I_V$ | 0.63 | 1.2 | | mcd |
| | | TLLY4401 | $I_V$ | 1 | 2 | | mcd |
| Dominant wavelength | $I_F$ = 2 mA | | $\lambda_d$ | 581 | | 594 | nm |
| Peak wavelength | $I_F$ = 2 mA | | $\lambda_p$ | | 585 | | nm |
| Angle of half intensity | $I_F$ = 2 mA | | $\varphi$ | | ±25 | | deg |
| Forward voltage | $I_F$ = 2 mA | | $V_F$ | | 2.4 | 2.9 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 20 | | V |
| Junction capacitance | $V_R$ = 0, f = 1 MHz | | $C_j$ | | 50 | | pF |
| [1] in one Packing Unit $I_V$Min./ $I_V$ Max. ≤ 0.5 | | | | | | | |

**Green** (**TLLG440.**)

| Parameter | Test Conditions | Type | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Luminous intensity [1] | $I_F$ = 2 mA | TLLG4400 | $I_V$ | 0.63 | 1.2 | | mcd |
| | | TLLG4401 | $I_V$ | 1 | 2 | | mcd |
| Dominant wavelength | $I_F$ = 2 mA | | $\lambda_d$ | 562 | | 575 | nm |
| Peak wavelength | $I_F$ = 2 mA | | $\lambda_p$ | | 565 | | nm |
| Angle of half intensity | $I_F$ = 2 mA | | $\varphi$ | | ±25 | | deg |
| Forward voltage | $I_F$ = 2 mA | | $V_F$ | | 1.9 | 2.4 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 20 | | V |
| Junction capacitance | $V_R$ = 0, f = 1 MHz | | $C_j$ | | 50 | | pF |
| [1] in one Packing Unit $I_V$Min./ $I_V$ Max. ≤ 0.5 | | | | | | | |

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

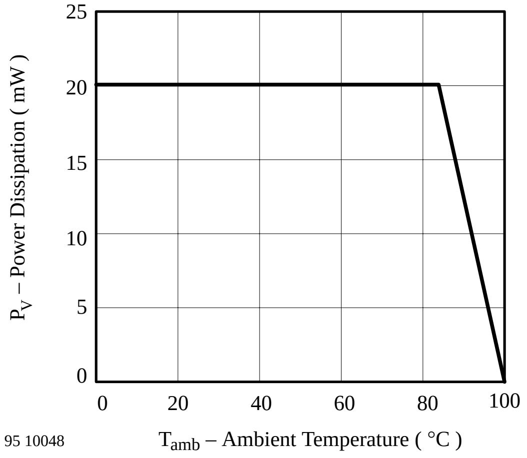



Figure 1. Power Dissipation vs. Ambient Temperature

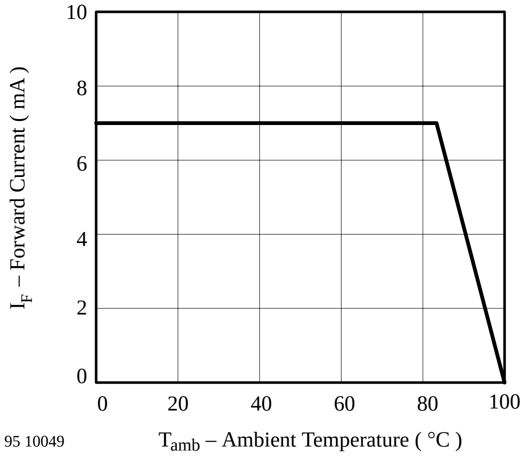



Figure 2. Forward Current vs. Ambient Temperature

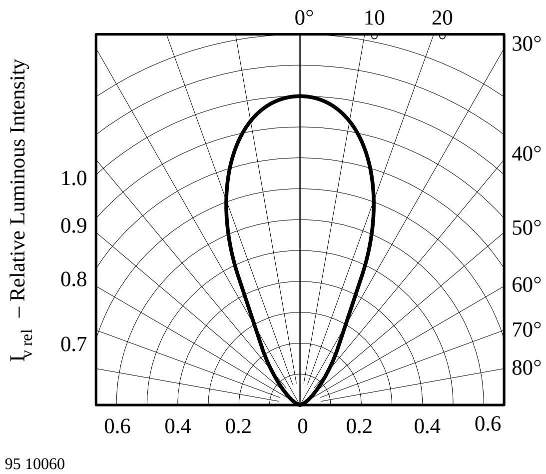



Figure 3. Rel. Luminous Intensity vs. Angular Displacement

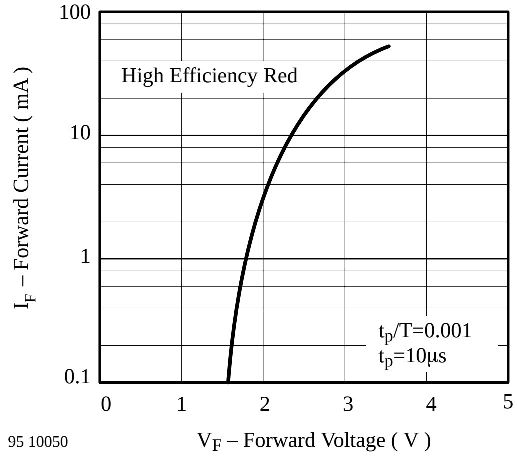



Figure 4. Forward Current vs. Forward Voltage

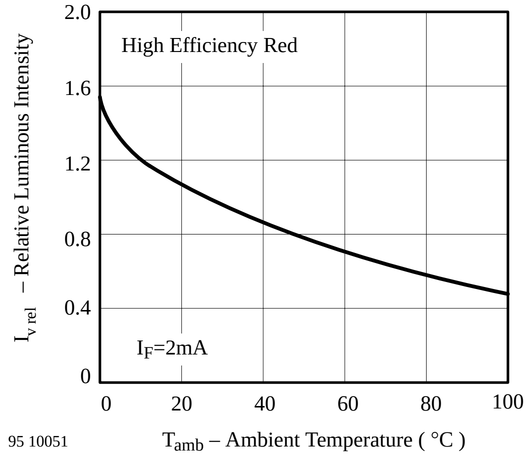



Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

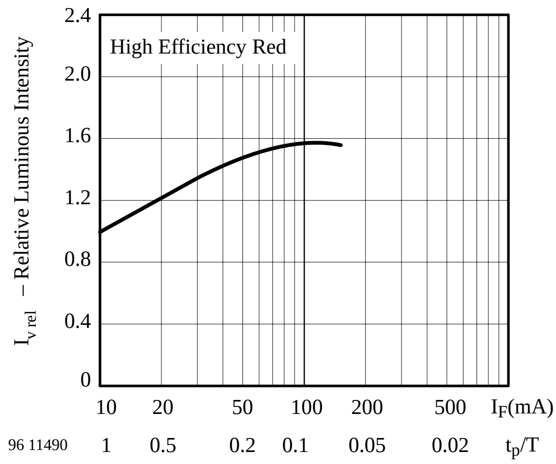



Figure 6. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

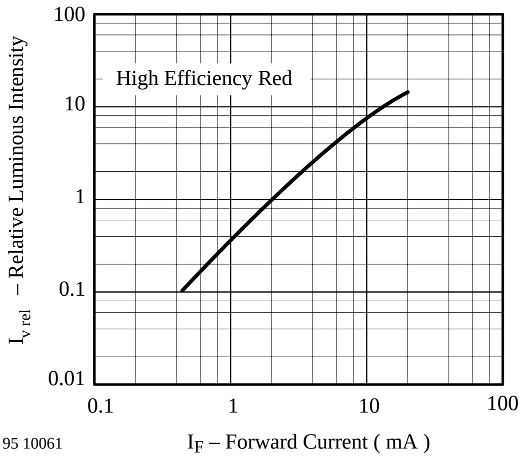



Figure 7. Relative Luminous Intensity vs. Forward Current

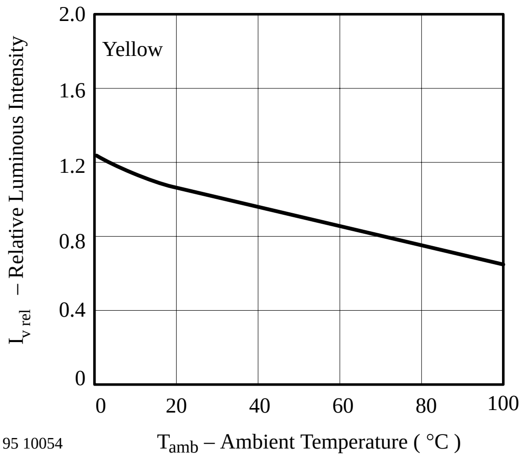



Figure 10. Rel. Luminous Intensity vs. Ambient Temperature

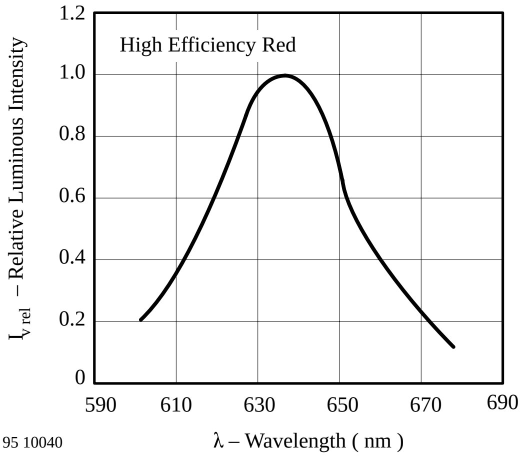



Figure 8. Relative Luminous Intensity vs. Wavelength

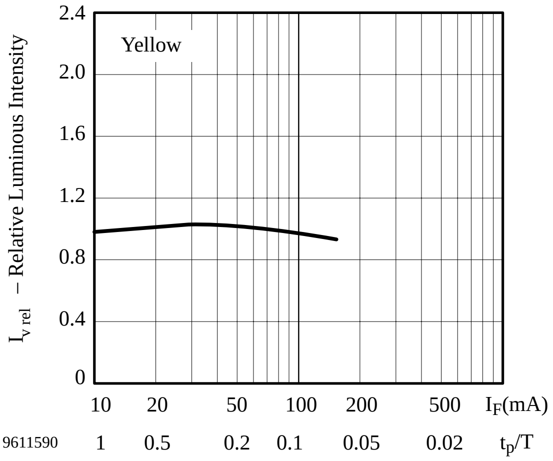



Figure 11. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

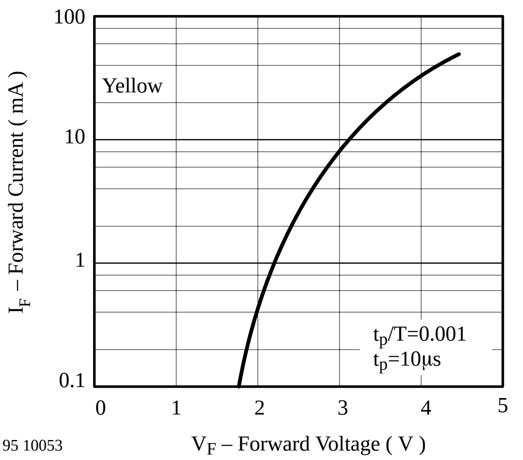



Figure 9. Forward Current vs. Forward Voltage

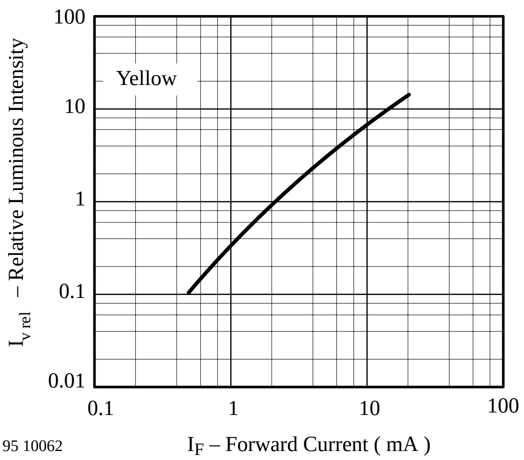



Figure 12. Relative Luminous Intensity vs. Forward Current

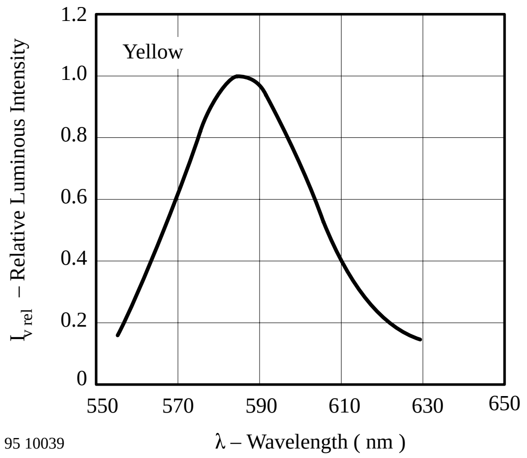



Figure 13. Relative Luminous Intensity vs. Wavelength

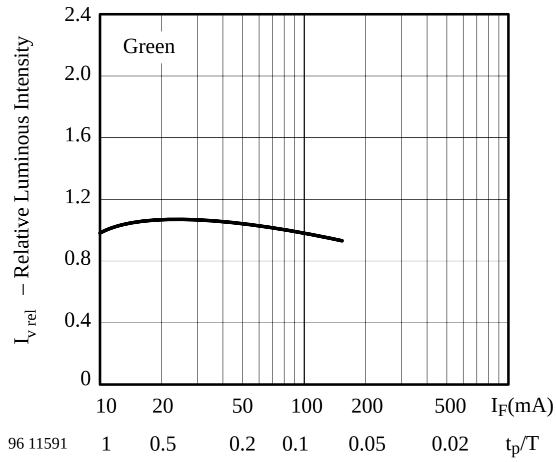



Figure 16. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

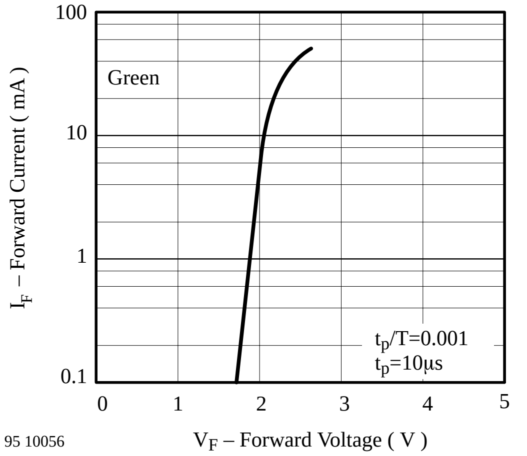



Figure 14. Forward Current vs. Forward Voltage

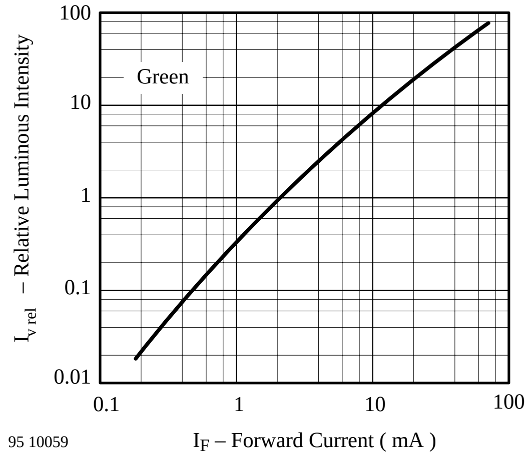



Figure 17. Relative Luminous Intensity vs. Forward Current

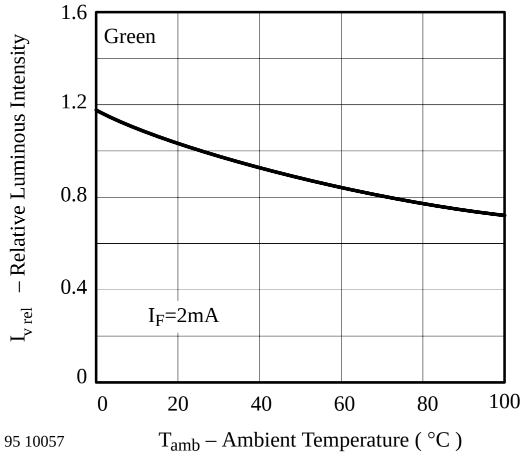



Figure 15. Rel. Luminous. Intensity vs. Ambient Temperature

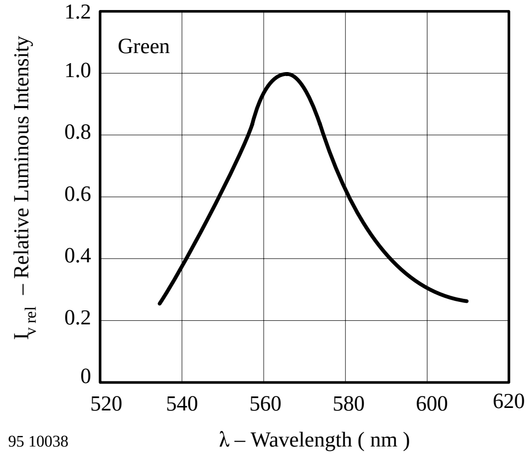
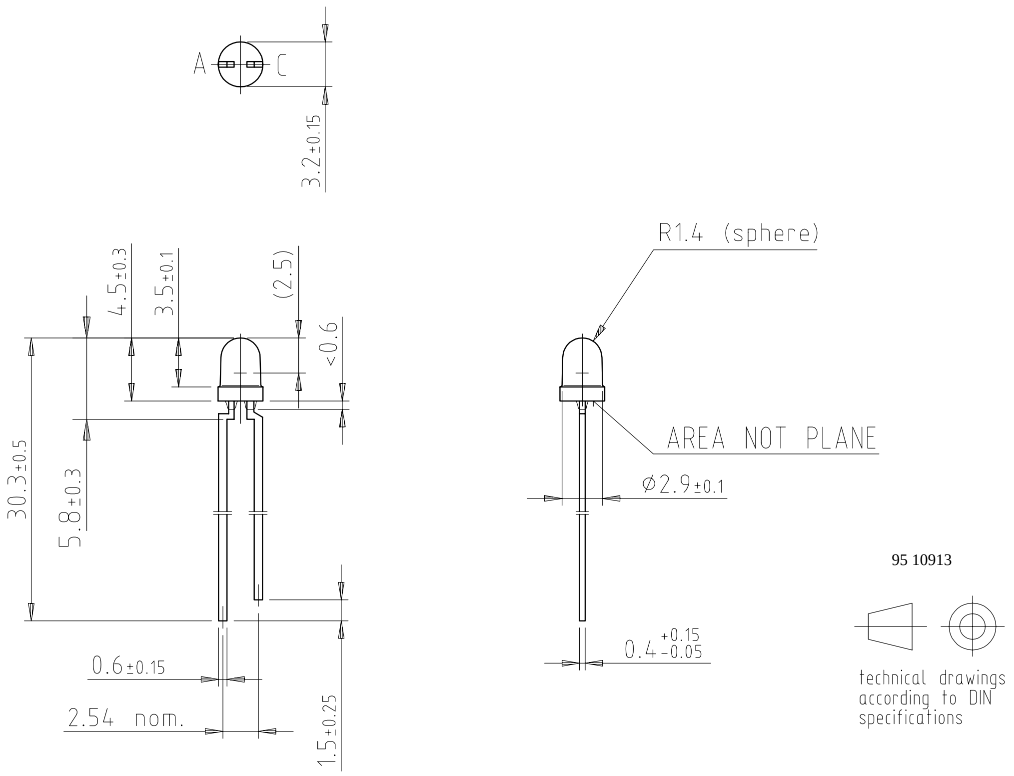



Figure 18. Relative Luminous Intensity vs. Wavelength

## Dimensions in mm



# 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-Telefunken products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Telefunken 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.

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