



## Backlighting LED in ø 3 mm Tinted Non-Diffused Package

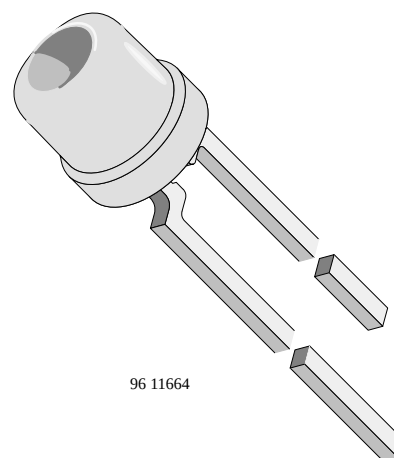
| Color               | Type     | Technology   | Angle of Half Intensity<br>$\pm\varphi$ |
|---------------------|----------|--------------|-----------------------------------------|
| High efficiency red | TLVH4200 | GaAsP on GaP | 85°                                     |
| Soft orange         | TLVS4200 | GaAsP on GaP | 85°                                     |
| Yellow              | TLVY4200 | GaAsP on GaP | 85°                                     |
| Green               | TLVG4200 | GaP on GaP   | 85°                                     |
| Pure green          | TLVP4200 | GaP on GaP   | 85°                                     |

### Description

The TLV.4200 series was developed for backlighting. Due to its special shape the spatial distribution of the radiation is qualified for backlighting.

To optimize the brightness of backlighting a custom-built reflector (with scattering) is required. Uniform illumination can be enhanced by covering the front of the reflector with diffusor material.

This is a flexible solution for backlighting different areas.



### Features

- High light output
- Wide viewing angle
- Categorized for luminous flux
- Tinted clear package
- Low power dissipation
- Low self heating
- Rugged design
- High reliability

### Applications

Backlighting of display panels, LCD displays, symbols on switches, keyboards, graphic boards and measuring scales  
Illumination of large areas e.g. dot matrix displays

### Absolute Maximum Ratings

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

TLVH4200 , TLVS4200 , TLVY4200 , TLVG4200 , TLVP4200

| Parameter                           | Test Conditions                       | Symbol     | Value       | Unit               |
|-------------------------------------|---------------------------------------|------------|-------------|--------------------|
| Reverse voltage                     |                                       | $V_R$      | 6           | V                  |
| DC forward current                  | $T_{amb} \leq 60^{\circ}\text{C}$     | $I_F$      | 30          | mA                 |
| Surge forward current               | $t_p \leq 10 \mu\text{s}$             | $I_{FSM}$  | 1           | A                  |
| Power dissipation                   | $T_{amb} \leq 60^{\circ}\text{C}$     | $P_V$      | 100         | mW                 |
| Junction temperature                |                                       | $T_j$      | 100         | $^{\circ}\text{C}$ |
| Operating temperature range         |                                       | $T_{amb}$  | -20 to +100 | $^{\circ}\text{C}$ |
| Storage temperature range           |                                       | $T_{stg}$  | -55 to +100 | $^{\circ}\text{C}$ |
| Soldering temperature               | $t \leq 5 \text{ s}$ , 2 mm from body | $T_{sd}$   | 260         | $^{\circ}\text{C}$ |
| Thermal resistance junction/ambient |                                       | $R_{thJA}$ | 400         | K/W                |

### Optical and Electrical Characteristics

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

High efficiency red (TLVH4200 )

| Parameter               | Test Conditions                 | Type | Symbol      | Min | Typ      | Max | Unit |
|-------------------------|---------------------------------|------|-------------|-----|----------|-----|------|
| Luminous flux           | $I_F = 15 \text{ mA}$           |      | $\phi_V$    | 10  | 25       |     | mlm  |
| Dominant wavelength     | $I_F = 10 \text{ mA}$           |      | $\lambda_d$ | 612 |          | 625 | nm   |
| Peak wavelength         | $I_F = 10 \text{ mA}$           |      | $\lambda_p$ |     | 635      |     | nm   |
| Angle of half intensity | $I_F = 10 \text{ mA}$           |      | $\phi$      |     | $\pm 85$ |     | deg  |
| Forward voltage         | $I_F = 20 \text{ mA}$           |      | $V_F$       |     | 2.4      | 3   | V    |
| Reverse voltage         | $I_R = 10 \mu\text{A}$          |      | $V_R$       | 6   | 15       |     | V    |
| Junction capacitance    | $V_R = 0$ , $f = 1 \text{ MHz}$ |      | $C_j$       |     | 50       |     | pF   |

Soft orange (TLVS4200 )

| Parameter               | Test Conditions                 | Type | Symbol      | Min | Typ      | Max | Unit |
|-------------------------|---------------------------------|------|-------------|-----|----------|-----|------|
| Luminous flux           | $I_F = 15 \text{ mA}$           |      | $\phi_V$    | 10  | 25       |     | mlm  |
| Dominant wavelength     | $I_F = 10 \text{ mA}$           |      | $\lambda_d$ | 598 |          | 611 | nm   |
| Peak wavelength         | $I_F = 10 \text{ mA}$           |      | $\lambda_p$ |     | 605      |     | nm   |
| Angle of half intensity | $I_F = 10 \text{ mA}$           |      | $\phi$      |     | $\pm 85$ |     | deg  |
| Forward voltage         | $I_F = 20 \text{ mA}$           |      | $V_F$       |     | 2.4      | 3   | V    |
| Reverse voltage         | $I_R = 10 \mu\text{A}$          |      | $V_R$       | 6   | 15       |     | V    |
| Junction capacitance    | $V_R = 0$ , $f = 1 \text{ MHz}$ |      | $C_j$       |     | 50       |     | pF   |

**Yellow (TLVY4200 )**

| Parameter               | Test Conditions              | Type | Symbol      | Min | Typ      | Max | Unit |
|-------------------------|------------------------------|------|-------------|-----|----------|-----|------|
| Luminous flux           | $I_F = 15 \text{ mA}$        |      | $\phi_V$    | 10  | 20       |     | mlm  |
| Dominant wavelength     | $I_F = 10 \text{ mA}$        |      | $\lambda_d$ | 581 |          | 594 | nm   |
| Peak wavelength         | $I_F = 10 \text{ mA}$        |      | $\lambda_p$ |     | 585      |     | nm   |
| Angle of half intensity | $I_F = 10 \text{ mA}$        |      | $\phi$      |     | $\pm 85$ |     | deg  |
| Forward voltage         | $I_F = 20 \text{ mA}$        |      | $V_F$       |     | 2.4      | 3   | V    |
| Reverse voltage         | $I_R = 10 \mu\text{A}$       |      | $V_R$       | 6   | 15       |     | V    |
| Junction capacitance    | $V_R = 0, f = 1 \text{ MHz}$ |      | $C_j$       |     | 50       |     | pF   |

**Green (TLVG4200 )**

| Parameter               | Test Conditions              | Type | Symbol      | Min | Typ      | Max | Unit |
|-------------------------|------------------------------|------|-------------|-----|----------|-----|------|
| Luminous flux           | $I_F = 15 \text{ mA}$        |      | $\phi_V$    | 10  | 30       |     | mlm  |
| Dominant wavelength     | $I_F = 10 \text{ mA}$        |      | $\lambda_d$ | 562 |          | 575 | nm   |
| Peak wavelength         | $I_F = 10 \text{ mA}$        |      | $\lambda_p$ |     | 565      |     | nm   |
| Angle of half intensity | $I_F = 10 \text{ mA}$        |      | $\phi$      |     | $\pm 85$ |     | deg  |
| Forward voltage         | $I_F = 20 \text{ mA}$        |      | $V_F$       |     | 2.4      | 3   | V    |
| Reverse voltage         | $I_R = 10 \mu\text{A}$       |      | $V_R$       | 6   | 15       |     | V    |
| Junction capacitance    | $V_R = 0, f = 1 \text{ MHz}$ |      | $C_j$       |     | 50       |     | pF   |

**Pure green (TLVP4200 )**

| Parameter               | Test Conditions              | Type | Symbol      | Min | Typ      | Max | Unit |
|-------------------------|------------------------------|------|-------------|-----|----------|-----|------|
| Luminous flux           | $I_F = 15 \text{ mA}$        |      | $\phi_V$    | 4   | 10       |     | mlm  |
| Dominant wavelength     | $I_F = 10 \text{ mA}$        |      | $\lambda_d$ | 555 |          | 565 | nm   |
| Peak wavelength         | $I_F = 10 \text{ mA}$        |      | $\lambda_p$ |     | 555      |     | nm   |
| Angle of half intensity | $I_F = 10 \text{ mA}$        |      | $\phi$      |     | $\pm 85$ |     | deg  |
| Forward voltage         | $I_F = 20 \text{ mA}$        |      | $V_F$       |     | 2.4      | 3   | V    |
| Reverse voltage         | $I_R = 10 \mu\text{A}$       |      | $V_R$       | 6   | 15       |     | V    |
| Junction capacitance    | $V_R = 0, f = 1 \text{ MHz}$ |      | $C_j$       |     | 50       |     | pF   |

**Typical Characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)

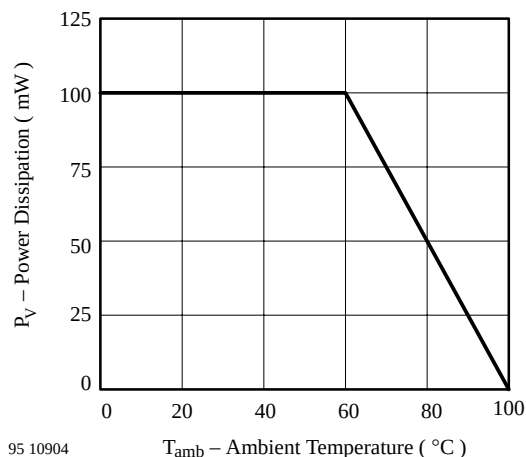


Figure 1 Power Dissipation vs. Ambient Temperature

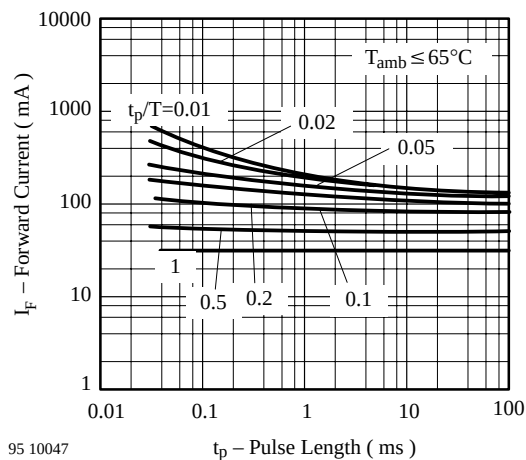


Figure 3 Forward Current vs. Pulse Length

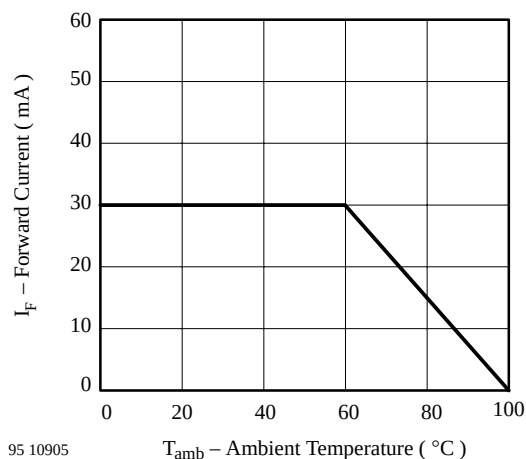


Figure 2 Forward Current vs. Ambient Temperature

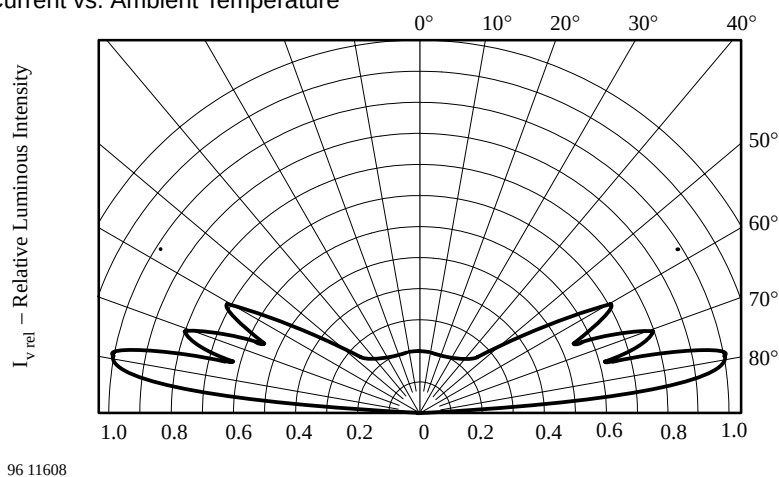


Figure 4 Rel. Luminous Intensity vs. Angular Displacement

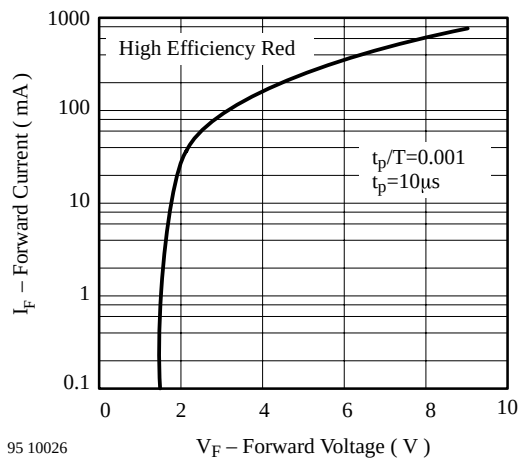


Figure 5 Forward Current vs. Forward Voltage

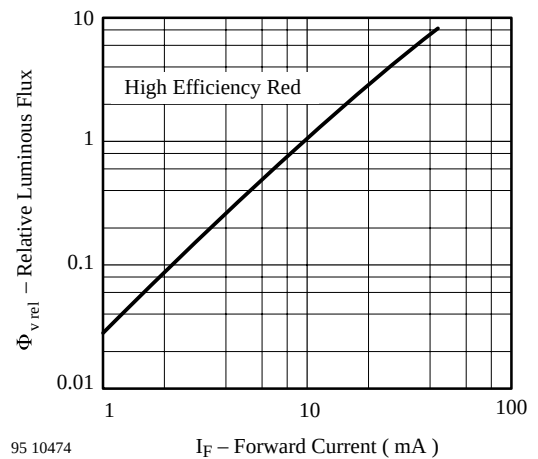


Figure 8 Relative Luminous Flux vs. Forward Current

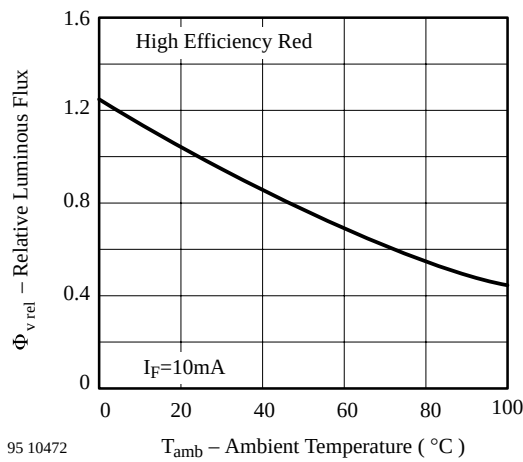


Figure 6 Rel. Luminous Flux vs. Ambient Temperature

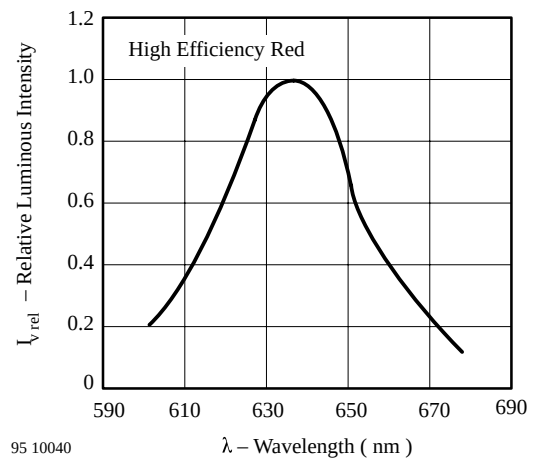


Figure 9 Relative Luminous Intensity vs. Wavelength

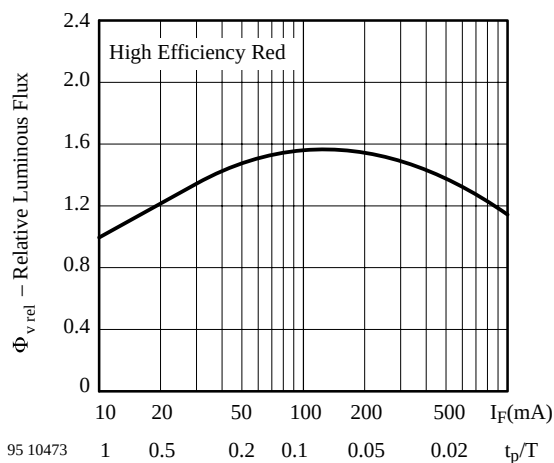


Figure 7 Rel. Luminous Flux vs.  
Forw. Current/Duty Cycle

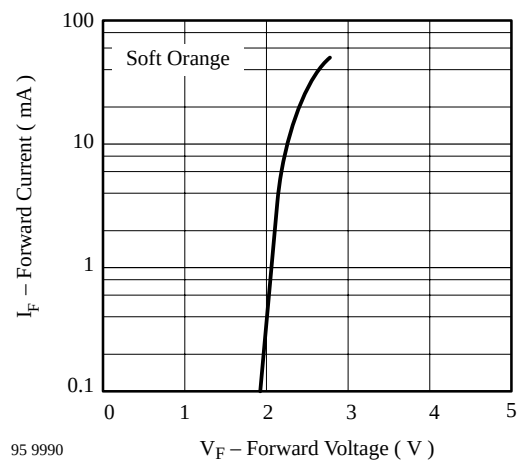


Figure 10 Forward Current vs. Forward Voltage

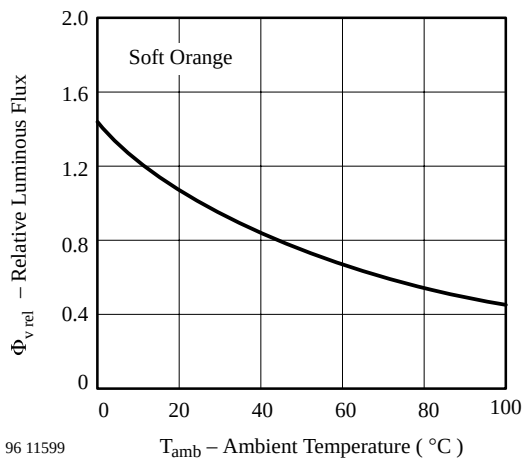


Figure 11 Rel. Luminous Flux vs. Ambient Temperature

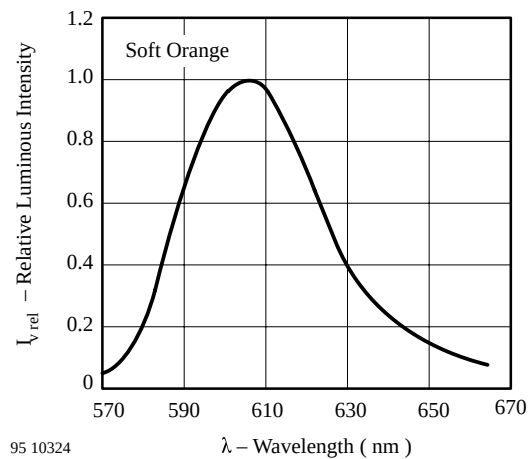


Figure 14 Relative Luminous Intensity vs. Wavelength

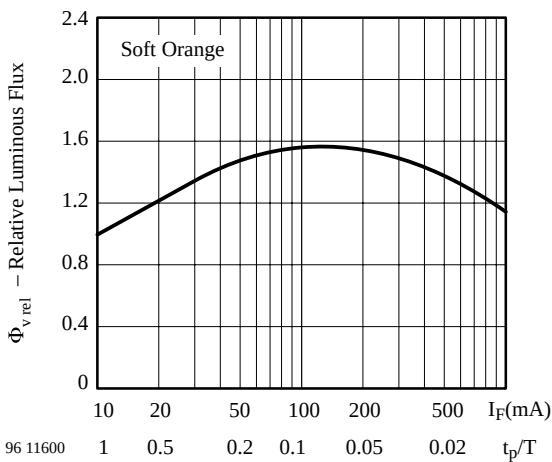


Figure 12 Rel. Luminous Flux vs. Forw. Current/Duty Cycle

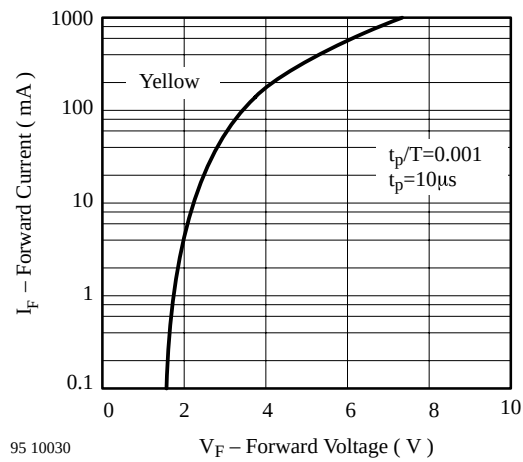


Figure 15 Rel. Luminous Flux vs. Ambient Temperature

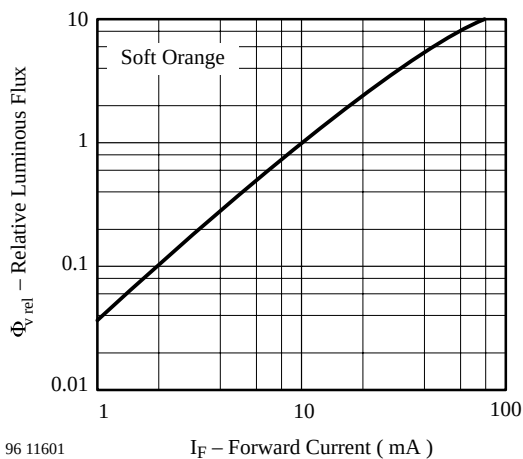


Figure 13 Relative Luminous Flux vs. Forward Current

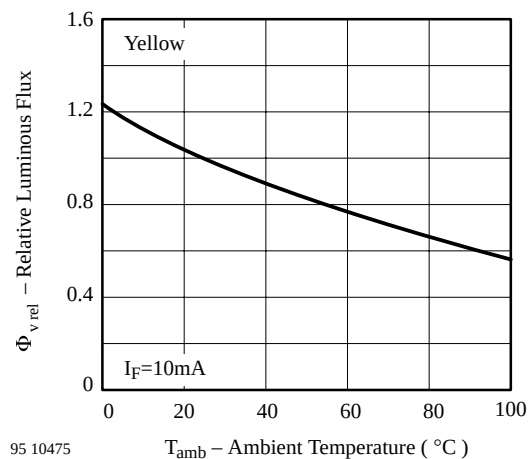


Figure 16 Rel. Luminous Flux vs. Ambient Temperature

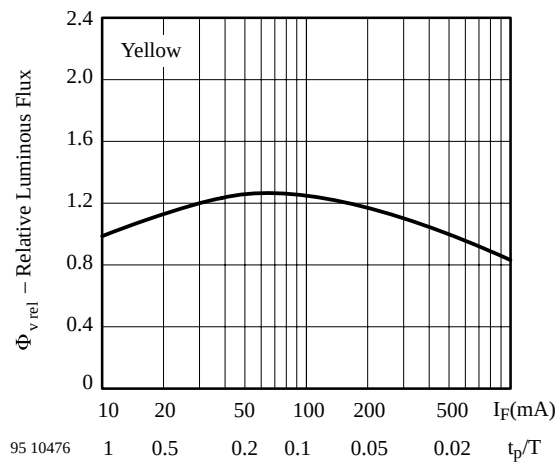


Figure 17 Rel. Luminous Flux vs. Forw. Current/Duty Cycle

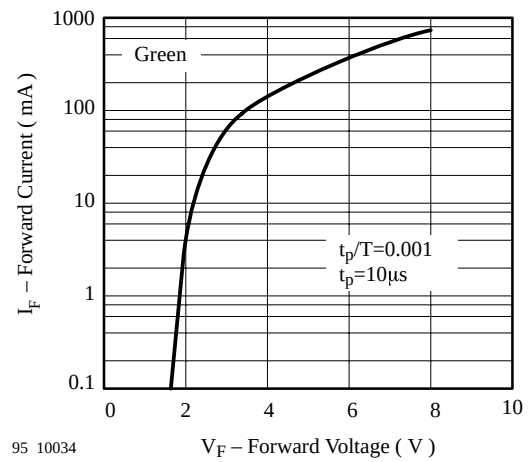


Figure 20 Forward Current vs. Forward Voltage

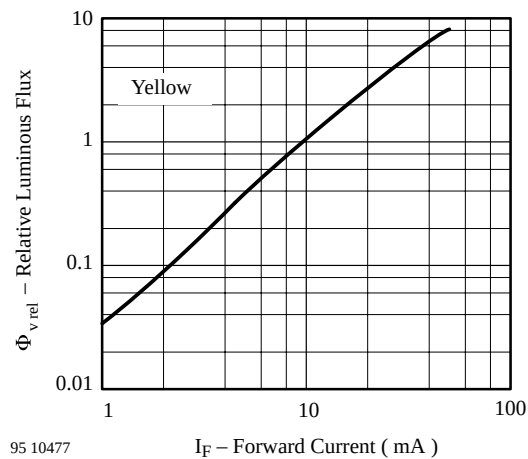


Figure 18 Relative Luminous Flux vs. Forward Current

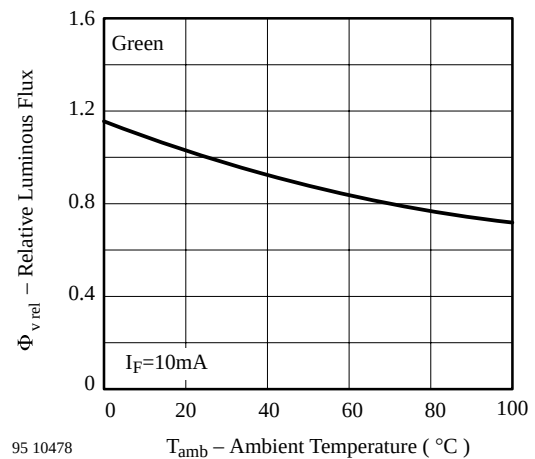


Figure 21 Rel. Luminous Flux vs. Ambient Temperature

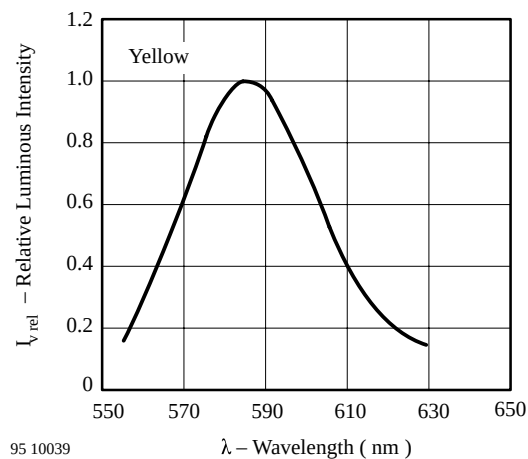


Figure 19 Relative Luminous Intensity vs. Wavelength

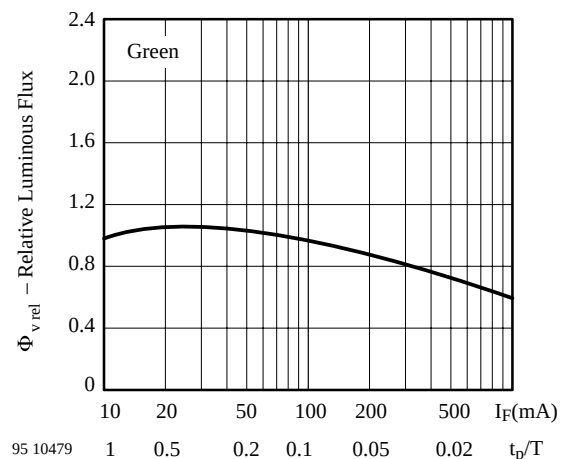


Figure 22 Rel. Luminous Flux vs. Forw. Current/Duty Cycle

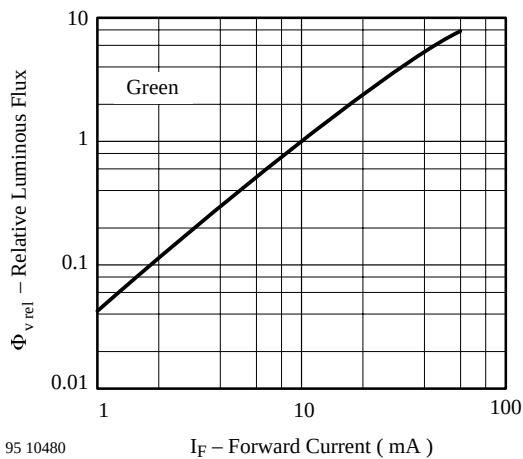


Figure 23 Relative Luminous Flux vs. Forward Current

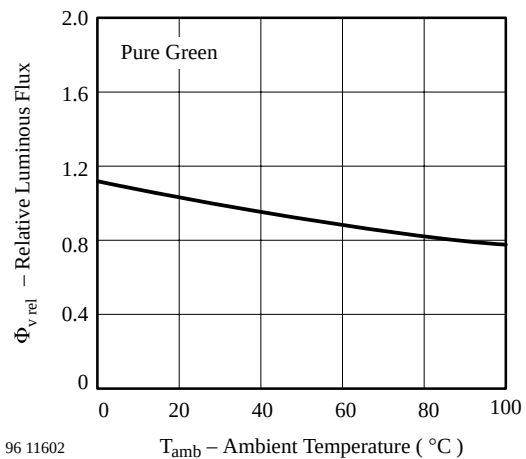


Figure 26 Rel. Luminous Flux vs. Ambient Temperature

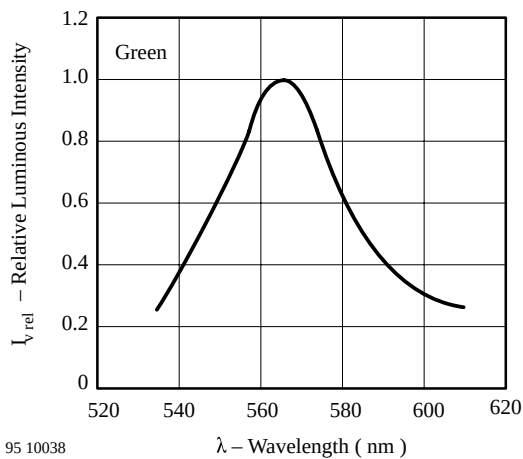


Figure 24 Relative Luminous Intensity vs. Wavelength

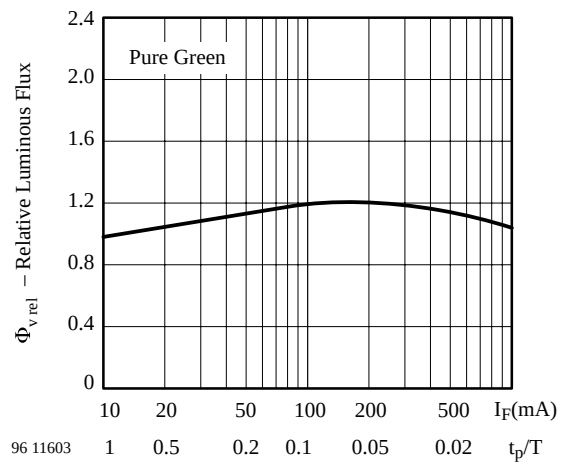


Figure 27 Rel. Luminous Flux vs. Forw. Current/Duty Cycle

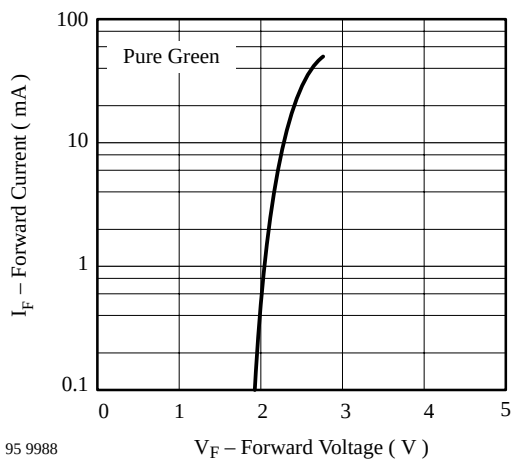


Figure 25 Forward Current vs. Forward Voltage

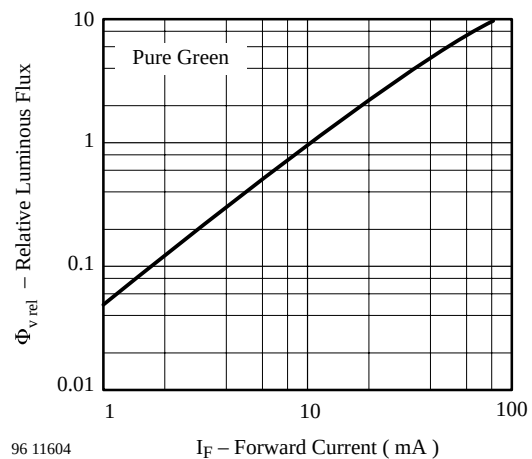


Figure 28 Relative Luminous Flux vs. Forward Current



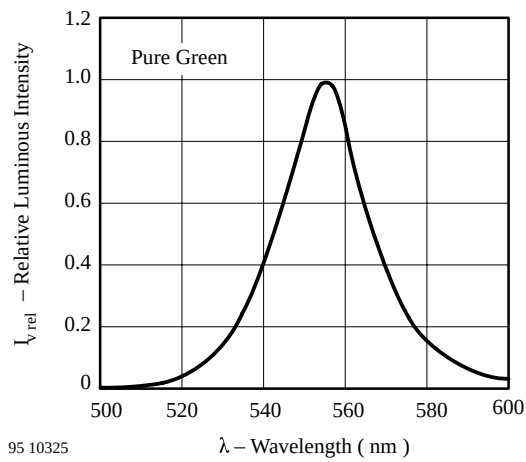
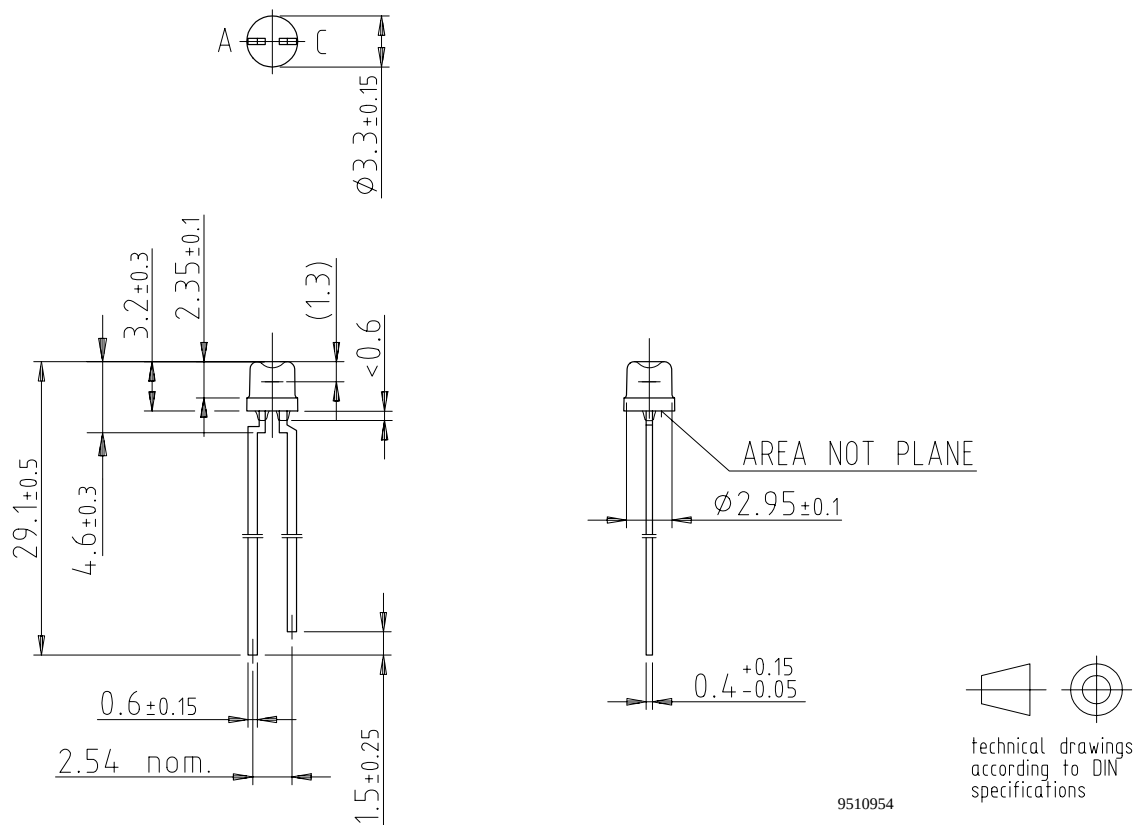


Figure 29 Relative Luminous Intensity vs. Wavelength

## 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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