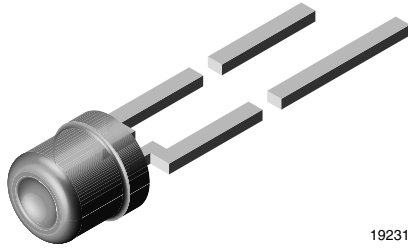




## Backlighting LED in Ø 3 mm Tinted Non-Diffused Package



19231

### DESCRIPTION

The TLV.420. 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.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 3 mm backlighting
- Product series: standard
- Angle of half intensity:  $\pm 85^\circ$

### FEATURES

- High light output
- Wide viewing angle
- Categorized for luminous flux
- Tinted clear package
- Low power dissipation
- Low self heating
- Rugged design
- High reliability
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### 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

### PARTS TABLE

| PART     | COLOR       | LUMINOUS FLUX (mIm) |      |      | at I <sub>F</sub> (mA) | WAVELENGTH (nm) |      |      | at I <sub>F</sub> (mA) | FORWARD VOLTAGE (V) |      |      | at I <sub>F</sub> (mA) | TECHNOLOGY   |
|----------|-------------|---------------------|------|------|------------------------|-----------------|------|------|------------------------|---------------------|------|------|------------------------|--------------|
|          |             | MIN.                | TYP. | MAX. |                        | MIN.            | TYP. | MAX. |                        | MIN.                | TYP. | MAX. |                        |              |
| TLVH4200 | Red         | 10                  | 55   | -    | 15                     | 612             | -    | 625  | 10                     | -                   | 2.4  | 3    | 20                     | GaAsP on GaP |
| TLVS4200 | Soft orange | 10                  | 70   | -    | 15                     | 598             | -    | 611  | 10                     | -                   | 2.4  | 3    | 20                     | GaAsP on GaP |
| TLVY4200 | Yellow      | 10                  | 30   | -    | 15                     | 581             | -    | 594  | 10                     | -                   | 2.4  | 3    | 20                     | GaAsP on GaP |
| TLVG4200 | Green       | 10                  | 30   | -    | 15                     | 562             | -    | 575  | 10                     | -                   | 2.4  | 3    | 20                     | GaP on GaP   |
| TLVP4200 | Pure green  | 4                   | 20   | -    | 15                     | 555             | -    | 565  | 10                     | -                   | 2.4  | 3    | 20                     | GaP on GaP   |
| TLVP4201 | Pure green  | 16                  | 30   | -    | 15                     | 555             | -    | 565  | 10                     | -                   | 2.4  | 3    | 20                     | GaP on GaP   |

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified) TLVH4200, TLVS4200, TLVY4200, TLVG4200, TLVP4200, TLVP4201

| PARAMETER                              | TEST CONDITION           | SYMBOL            | VALUE       | UNIT |
|--|--------------------------|-------------------|-------------|------|
| Reverse voltage <sup>(1)</sup>         |                          | V <sub>R</sub>    | 5           | V    |
| DC forward current                     | T <sub>amb</sub> ≤ 60 °C | I <sub>F</sub>    | 30          | mA   |
| Surge forward current                  | t <sub>p</sub> ≤ 10 μs   | I <sub>FSM</sub>  | 1           | A    |
| Power dissipation                      |                          | P <sub>V</sub>    | 90          | mW   |
| Junction temperature                   |                          | T <sub>j</sub>    | 100         | °C   |
| Operating temperature range            |                          | T <sub>amb</sub>  | -40 to +100 | °C   |
| Storage temperature range              |                          | T <sub>stg</sub>  | -55 to +100 | °C   |
| Soldering temperature                  | t ≤ 5 s, 2 mm from body  | T <sub>sd</sub>   | 260         | °C   |
| Thermal resistance junction-to-ambient |                          | R <sub>thJA</sub> | 400         | K/W  |

#### Note

<sup>(1)</sup> Driving the LED in reverse direction is suitable for a short term application



| <b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |          |             |      |          |      |      |
|--|---|----------|-------------|------|----------|------|------|
| <b>TLVH4200, RED</b>   |   |          |             |      |          |      |      |
| PARAMETER  | TEST CONDITION                          | PART     | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
| Luminous flux  | $I_F = 15\text{ mA}$                    | TLVH4200 | $\phi_V$    | 10   | 55       | -    | 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  | $I_F = 10\text{ mA}$                    |          | $\varphi$   | -    | $\pm 85$ | -    | deg  |
| Forward voltage  | $I_F = 20\text{ mA}$                    |          | $V_F$       | -    | 2.4      | 3    | V    |
| Reverse voltage  | $I_R = 10\text{ }\mu\text{A}$           |          | $V_R$       | 6    | 15       | -    | V    |
| Junction capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ |          | $C_j$       | -    | 50       | -    | pF   |

| <b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |          |             |      |          |      |      |
|--|---|----------|-------------|------|----------|------|------|
| <b>TLVS4200, SOFT ORANGE</b>   |   |          |             |      |          |      |      |
| PARAMETER  | TEST CONDITION                          | PART     | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
| Luminous flux  | $I_F = 15\text{ mA}$                    | TLVS4200 | $\phi_V$    | 10   | 70       | -    | 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  | $I_F = 10\text{ mA}$                    |          | $\varphi$   | -    | $\pm 85$ | -    | deg  |
| Forward voltage  | $I_F = 20\text{ mA}$                    |          | $V_F$       | -    | 2.4      | 3    | V    |
| Reverse voltage  | $I_R = 10\text{ }\mu\text{A}$           |          | $V_R$       | 6    | 15       | -    | V    |
| Junction capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ |          | $C_j$       | -    | 50       | -    | pF   |

| <b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |          |             |      |          |      |      |
|--|---|----------|-------------|------|----------|------|------|
| <b>TLVY4200, YELLOW</b>  |   |          |             |      |          |      |      |
| PARAMETER  | TEST CONDITION                          | PART     | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
| Luminous flux  | $I_F = 15\text{ mA}$                    | TLVY4200 | $\phi_V$    | 10   | 30       | -    | 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  | $I_F = 10\text{ mA}$                    |          | $\varphi$   | -    | $\pm 85$ | -    | deg  |
| Forward voltage  | $I_F = 20\text{ mA}$                    |          | $V_F$       | -    | 2.4      | 3    | V    |
| Reverse voltage  | $I_R = 10\text{ }\mu\text{A}$           |          | $V_R$       | 6    | 15       | -    | V    |
| Junction capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ |          | $C_j$       | -    | 50       | -    | pF   |

| <b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |          |             |      |          |      |      |
|--|---|----------|-------------|------|----------|------|------|
| <b>TLVG4200, GREEN</b>   |   |          |             |      |          |      |      |
| PARAMETER  | TEST CONDITION                          | PART     | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
| Luminous flux  | $I_F = 15\text{ mA}$                    | TLVG4200 | $\phi_V$    | 10   | 30       | -    | mlm  |
| Dominant wavelength  | $I_F = 10\text{ mA}$                    |          | $\lambda_d$ | 562  | -        | 575  | nm   |
| Peak wavelength  | $I_F = 10\text{ mA}$                    |          | $\lambda_p$ | -    | 555      | -    | nm   |
| Angle of half intensity  | $I_F = 10\text{ mA}$                    |          | $\varphi$   | -    | $\pm 85$ | -    | deg  |
| Forward voltage  | $I_F = 20\text{ mA}$                    |          | $V_F$       | -    | 2.4      | 3    | V    |
| Reverse voltage  | $I_R = 10\text{ }\mu\text{A}$           |          | $V_R$       | 6    | 15       | -    | V    |
| Junction capacitance   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ |          | $C_j$       | -    | 50       | -    | pF   |



| <b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)<br><b>TLVP4200, TLVP4201, PURE GREEN</b> |   |          |             |      |          |      |      |
|---|---|----------|-------------|------|----------|------|------|
| PARAMETER   | TEST CONDITION                          | PART     | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
| Luminous flux   | $I_F = 15\text{ mA}$                    | TLVP4200 | $\phi_V$    | 4    | 20       | -    | mIm  |
|   |   | TLVP4201 | $\phi_V$    | 16   | 30       | -    | mIm  |
| 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   | $I_R = 10\text{ }\mu\text{A}$           |          | $V_R$       | 6    | 15       | -    | V    |
| Junction capacitance  | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ |          | $C_j$       | -    | 50       | -    | pF   |

| <b>LUMINOUS FLUX CLASSIFICATION</b> |                     |      |
|-------------------------------------|---------------------|------|
| GROUP                               | LUMINOUS FLUX (mIm) |      |
| STANDARD                            | MIN.                | MAX. |
| P                                   | 4                   | 8    |
| Q                                   | 6.3                 | 12.5 |
| R                                   | 10                  | 20   |
| S                                   | 16                  | 32   |
| T                                   | 25                  | 50   |
| U                                   | 40                  | 80   |
| V                                   | 63                  | 125  |
| W                                   | 100                 | 200  |
| X                                   | 130                 | 260  |
| Y                                   | 180                 | 360  |
| Z                                   | 240                 | 480  |

**Note**

- Luminous flux is tested at a current pulse duration of 25 ms.  
The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each bag (there will be no mixing of two groups in each bag).  
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 on any one bag.  
In order to ensure availability, single wavelength groups will not be orderable

| <b>COLOR CLASSIFICATION</b> |                      |      |       |      |            |      |
|-----------------------------|----------------------|------|-------|------|------------|------|
| GROUP                       | DOM. WAVELENGTH (nm) |      |       |      |            |      |
|                             | YELLOW               |      | GREEN |      | PURE GREEN |      |
|                             | MIN.                 | MAX. | MIN.  | MAX. | MIN.       | MAX. |
| 0                           |                      |      |       |      | 555        | 559  |
| 1                           | 581                  | 584  |       |      | 558        | 561  |
| 2                           | 583                  | 586  |       |      | 560        | 563  |
| 3                           | 585                  | 588  | 562   | 565  | 562        | 565  |
| 4                           | 587                  | 590  | 564   | 567  |            |      |
| 5                           | 589                  | 592  | 566   | 569  |            |      |
| 6                           | 591                  | 594  | 568   | 571  |            |      |
| 7                           |                      |      | 570   | 573  |            |      |
| 8                           |                      |      | 572   | 575  |            |      |

**Note**

- Wavelengths are tested at a current pulse duration of 25 ms



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

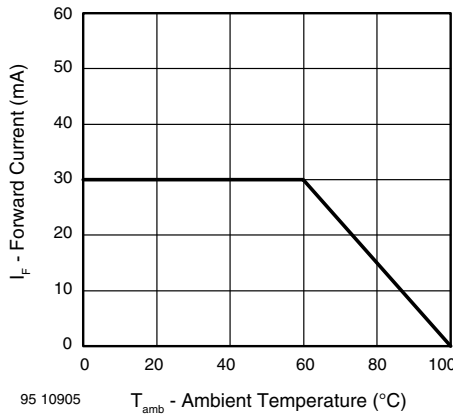


Fig. 1 - Forward Current vs. Ambient Temperature

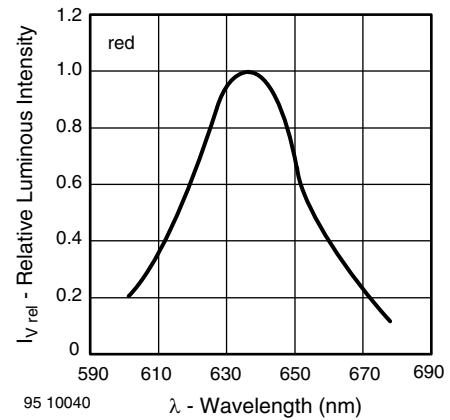


Fig. 4 - Relative Intensity vs. Wavelength

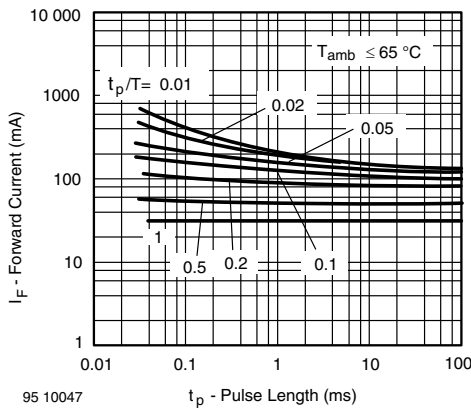


Fig. 2 - Forward Current vs. Pulse Length

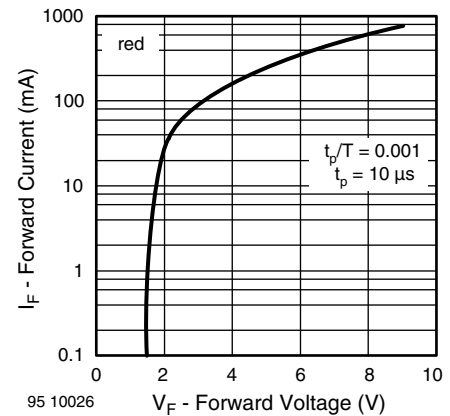


Fig. 5 - Forward Current vs. Forward Voltage

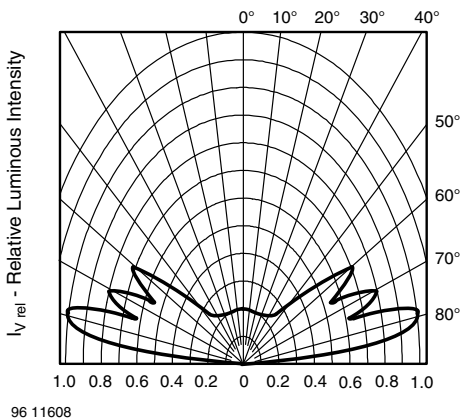


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement for 90° Emission Angle

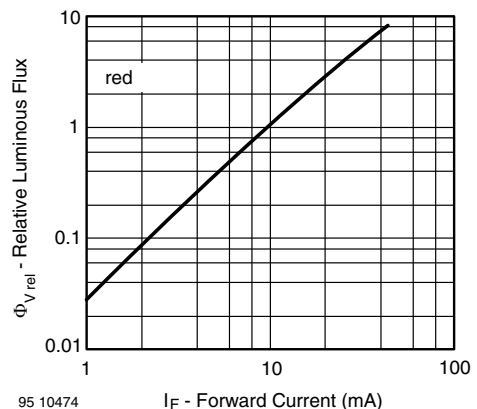


Fig. 6 - Relative Luminous Flux vs. Forward Current

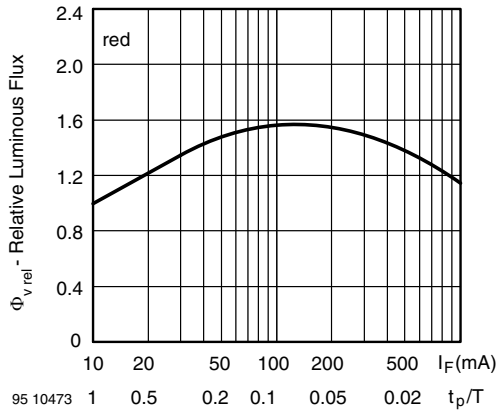


Fig. 7 - Relative Luminous Flux vs. Forward Current/Duty Cycle

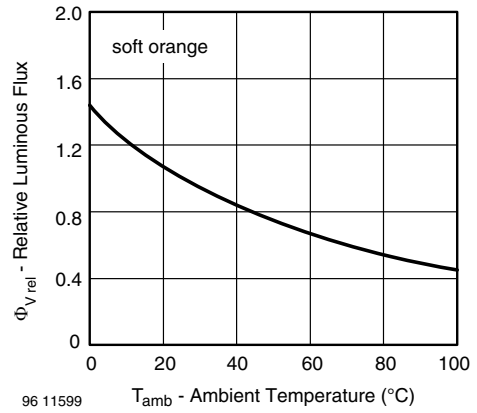


Fig. 10 - Relative Luminous Flux vs. Ambient Temperature

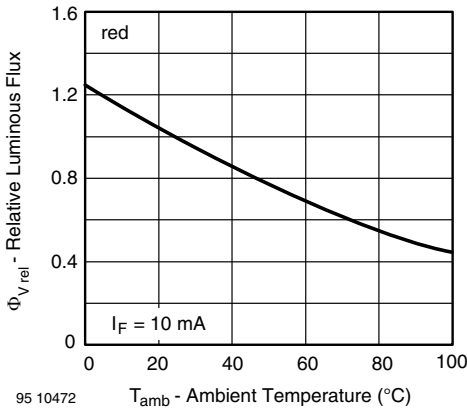


Fig. 8 - Relative Luminous Flux vs. Ambient Temperature

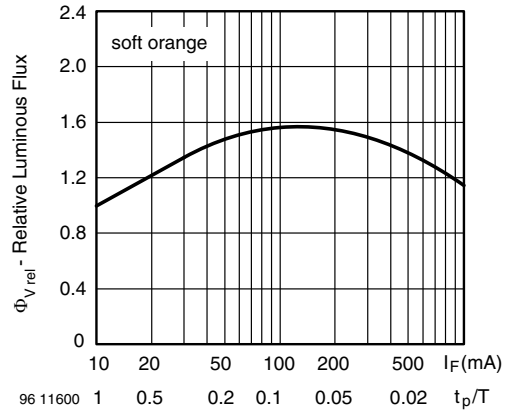


Fig. 11 - Relative Luminous Flux vs. Forward Current/Duty Cycle

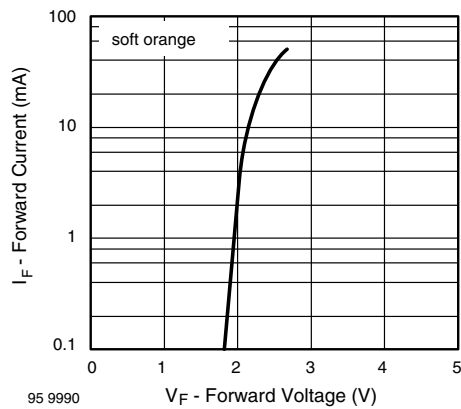


Fig. 9 - Forward Current vs. Forward Voltage

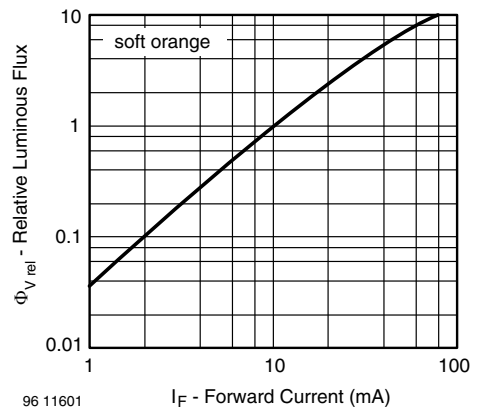


Fig. 12 - Relative Luminous Flux vs. Forward Current

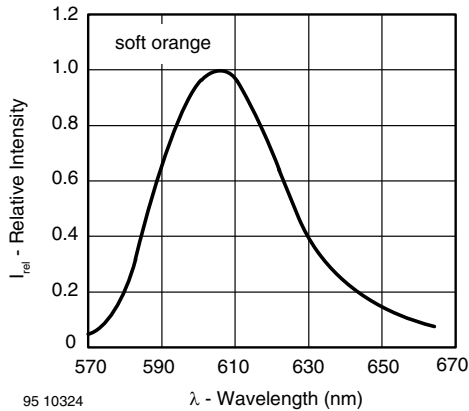


Fig. 13 - Relative Intensity vs. Wavelength



Fig. 16 - Relative Luminous Flux vs. Forward Current



Fig. 14 - Relative Intensity vs. Wavelength

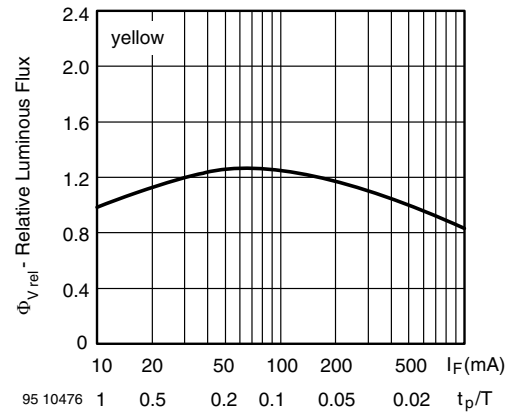


Fig. 17 - Relative Luminous Flux vs. Forward Current/Duty Cycle



Fig. 15 - Forward Current vs. Forward Voltage

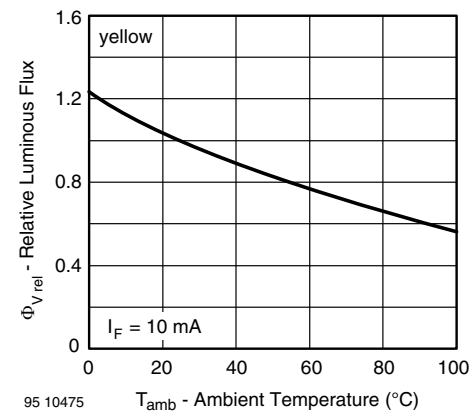


Fig. 18 - Relative Luminous Flux vs. Ambient Temperature

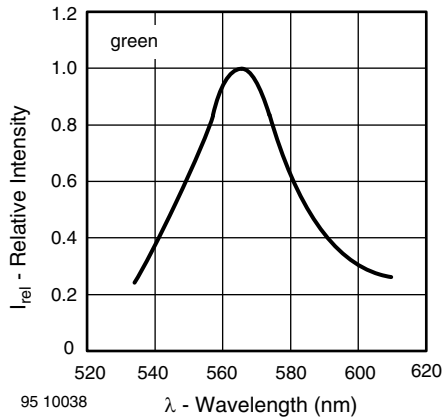


Fig. 19 - Relative Intensity vs. Wavelength

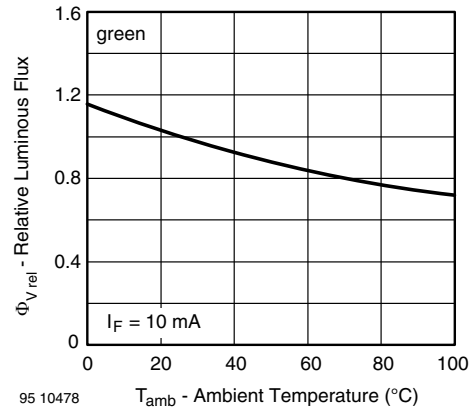


Fig. 22 - Relative Luminous Flux vs. Ambient Temperature

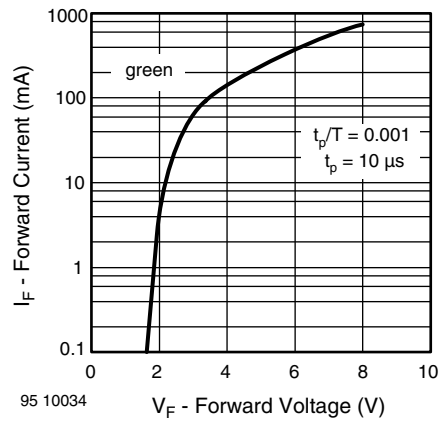


Fig. 20 - Forward Current vs. Forward Voltage

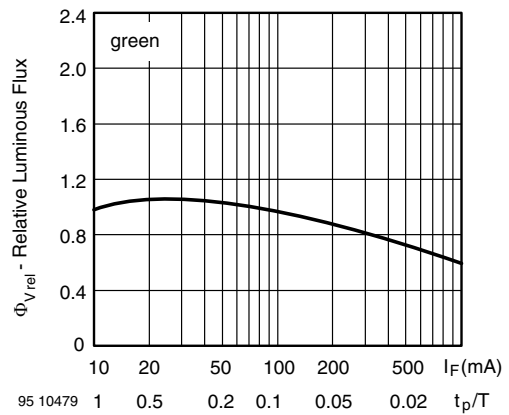


Fig. 23 - Relative Luminous Flux vs. Forward Current/Duty Cycle

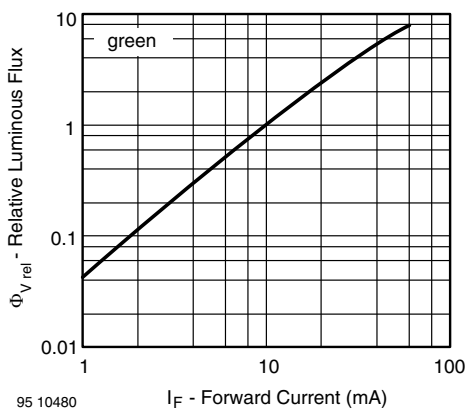


Fig. 21 - Relative Luminous Flux vs. Forward Current

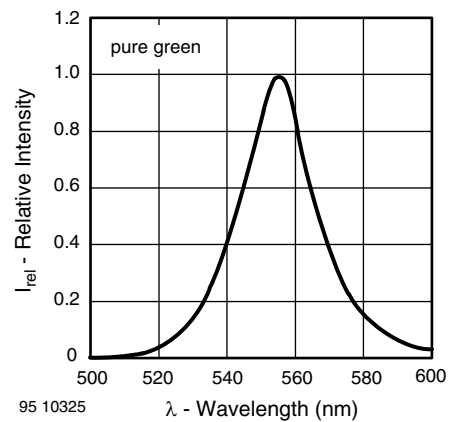


Fig. 24 - Relative Intensity vs. Wavelength

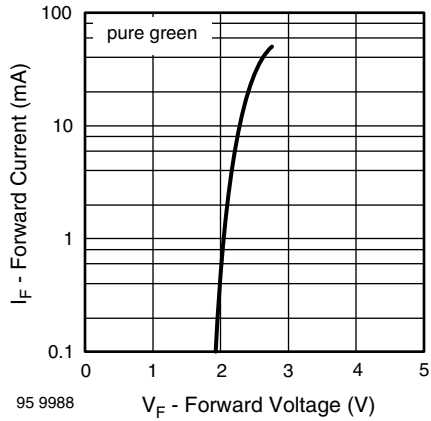


Fig. 25 - Forward Current vs. Forward Voltage

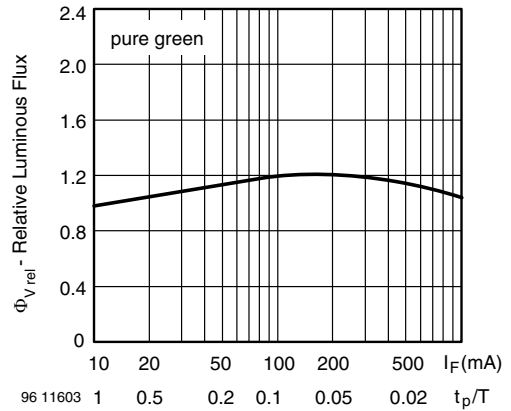


Fig. 27 - Relative Luminous Flux vs. Forward Current/Duty Cycle

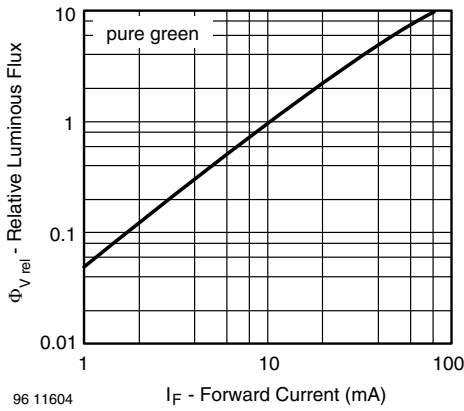


Fig. 26 - Relative Luminous Flux vs. Forward Current

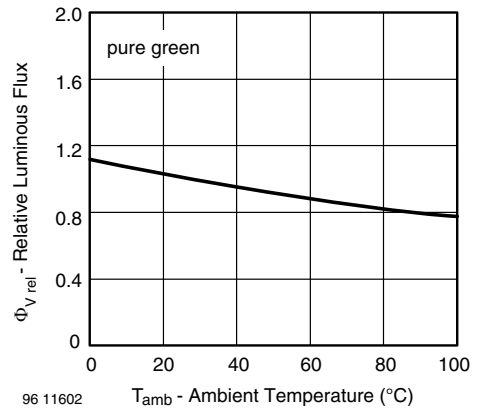
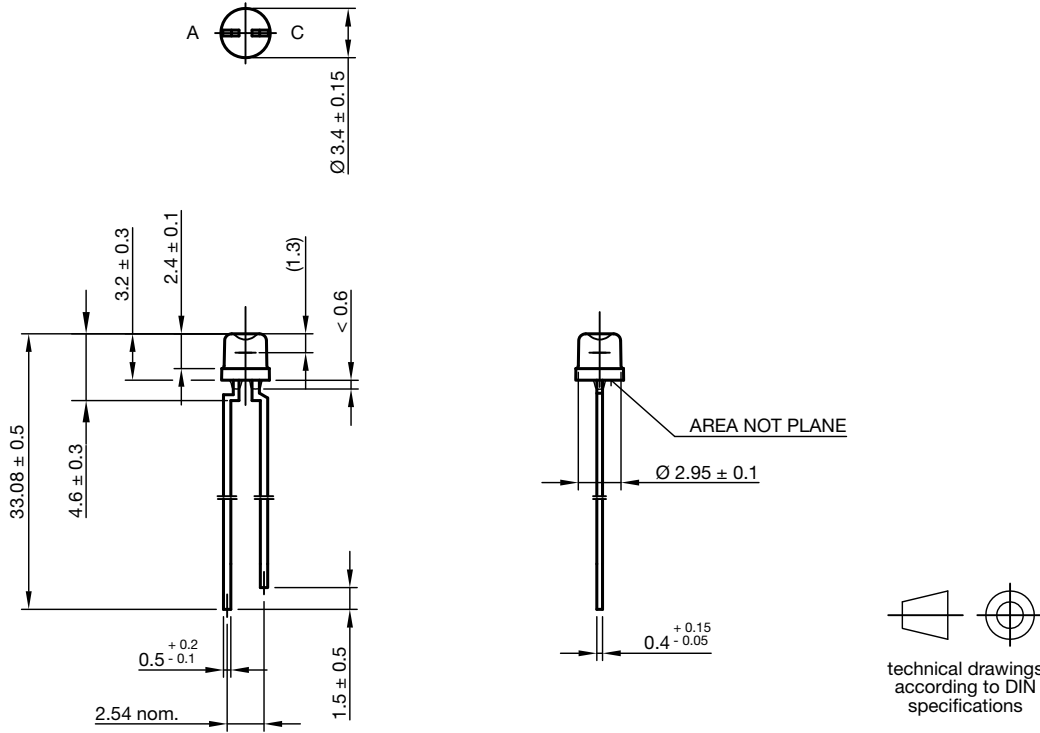


Fig. 28 - Relative Luminous Flux vs. Ambient Temperature





**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.544-5268.01-4  
Issue: 3; 28.07.14



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