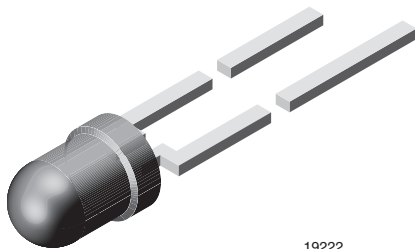


## High Intensity LED in Ø 3 mm Tinted Diffused Package



### DESCRIPTION

This device has been designed to meet the increasing demand for AlInGaP technology.

It is housed in a 3 mm diffused plastic package. The wide viewing angle of these devices provides a high on-off contrast.

All packing units are categorized in luminous intensity groups. That allows users to assemble LEDs with uniform appearance.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 3 mm
- Product series: standard
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- AlInGaP technology
- Standard Ø 3 mm (T-1) package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Very wide viewing angle
- Luminous intensity categorized
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
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(5-2008)

### APPLICATIONS

- Status lights
- Off/on indicator
- Background illumination
- Readout lights
- Maintenance lights
- Legend light

### PARTS TABLE

| PART     | COLOR | LUMINOUS INTENSITY (mcd) |      |      | 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. |                        |                 |
| TLHK4600 | Red   | 6.3                      | 15   | -    | 10                     | -               | 630  | -    | 10                     | -                   | 1.9  | 2.6  | 20                     | AlInGaP on GaAs |

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                           | TEST CONDITION           | SYMBOL            | VALUE         | UNIT |
|-------------------------------------|--------------------------|-------------------|---------------|------|
| Reverse voltage                     |                          | 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>  | 0.1           | A    |
| Power dissipation                   | T <sub>amb</sub> ≤ 60 °C | P <sub>V</sub>    | 80            | 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/ambient |                          | R <sub>thJA</sub> | 400           | K/W  |

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TLHK4600, RED**

| PARAMETER                         | TEST CONDITION                          | SYMBOL      | MIN. | TYP.     | MAX. | UNIT |
|-----------------------------------|-----------------------------------------|-------------|------|----------|------|------|
| Luminous intensity <sup>(1)</sup> | $I_F = 10\text{ mA}$                    | $I_V$       | 6.3  | 15       | -    | mcd  |
| Dominant wavelength               | $I_F = 10\text{ mA}$                    | $\lambda_d$ | -    | 630      | -    | nm   |
| Peak wavelength                   | $I_F = 10\text{ mA}$                    | $\lambda_p$ | -    | 643      | -    | nm   |
| Angle of half intensity           | $I_F = 10\text{ mA}$                    | $\varphi$   | -    | $\pm 60$ | -    | deg  |
| Forward voltage                   | $I_F = 20\text{ mA}$                    | $V_F$       | -    | 1.9      | 2.6  | V    |
| Reverse voltage                   | $I_R = 10\text{ }\mu\text{A}$           | $V_R$       | 5    | -        | -    | V    |
| Junction capacitance              | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ | $C_j$       | -    | 15       | -    | pF   |

**Note**

<sup>(1)</sup> In one packing unit  $I_{Vmin.}/I_{Vmax.} \leq 0.5$

**LUMINOUS INTENSITY CLASSIFICATION**

| GROUP | LIGHT INTENSITY (mcd) |      |
|-------|-----------------------|------|
|       | MIN.                  | MAX. |
| 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 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 bag (there will be no mixing of two groups on 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.

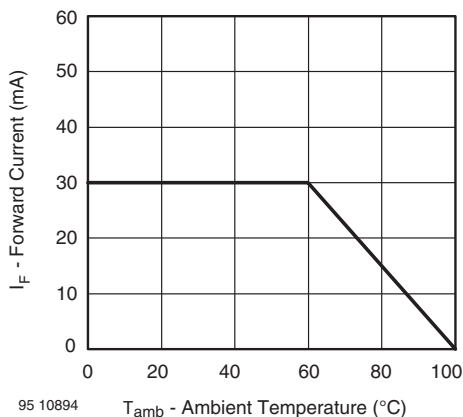
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature for InGaN

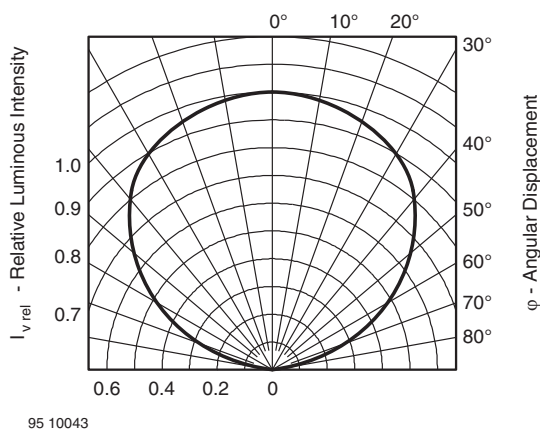


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

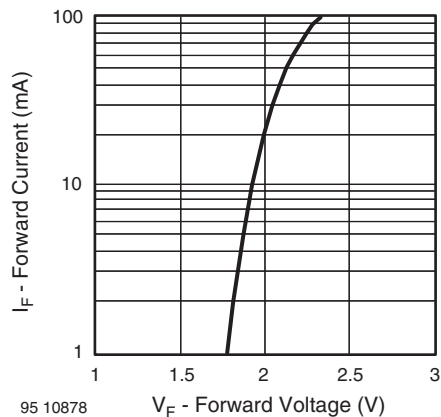


Fig. 3 - Forward Current vs. Forward Voltage

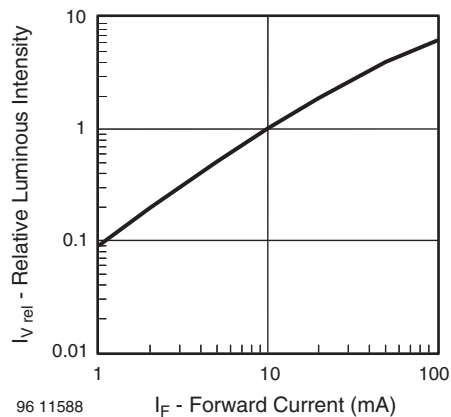


Fig. 6 - Relative Luminous Intensity vs. Forward Current

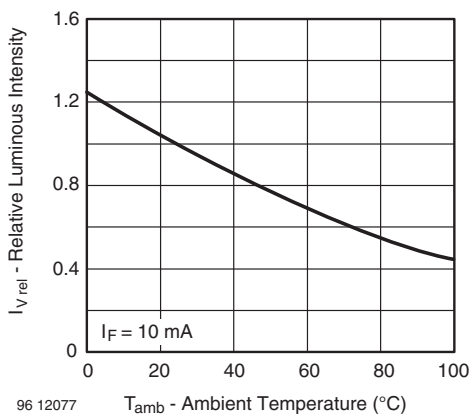


Fig. 4 - Relative Luminous Intensity vs. Ambient Temperature

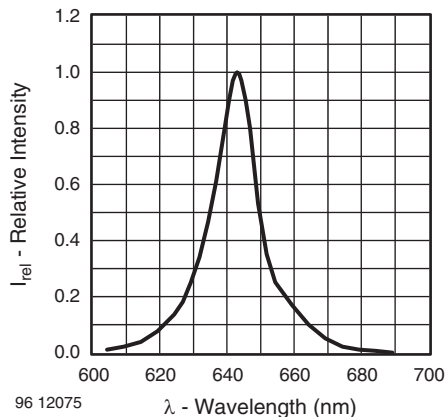


Fig. 7 - Relative Intensity vs. Wavelength

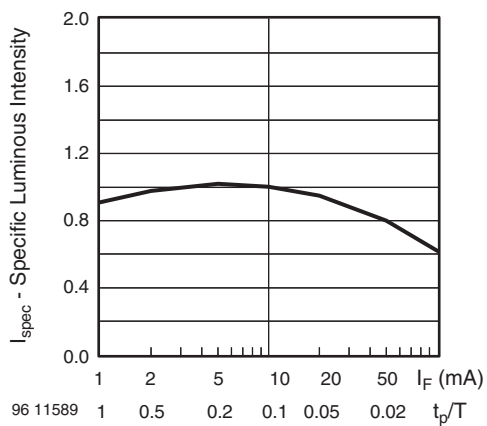
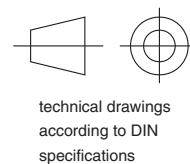
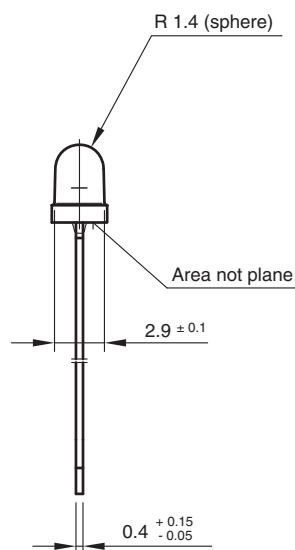
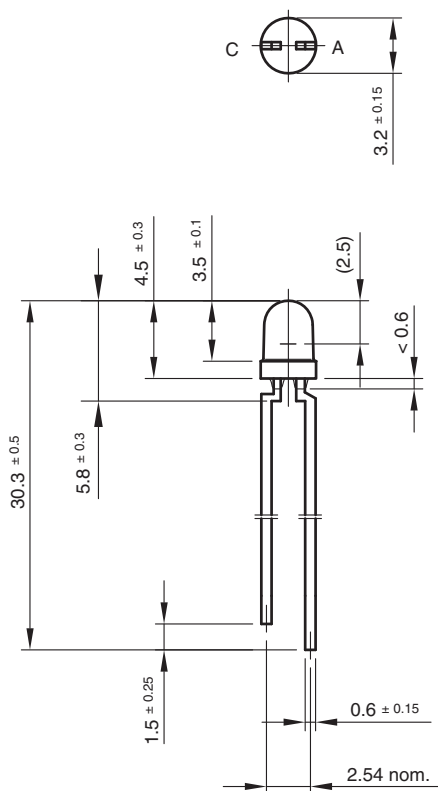


Fig. 5 - Relative Luminous Intensity vs. Forward Current/Duty Cycle



**PACKAGE DIMENSIONS** in millimeters



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