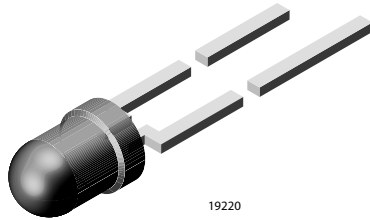


High Efficiency LED, \varnothing 3 mm Tinted Total Diffused Package



DESCRIPTION

The TLH.46.. series was developed for applications which need a very wide radiation angle like backlighting, general indicating and lighting purposes. It is housed in a 3 mm tinted total diffused plastic package. The wide viewing angle of these devices provides a high on-off contrast.

Several selection types with different luminous intensities are offered. All LEDs are categorized in luminous intensity groups. The green and yellow LEDs are categorized additionally in wavelength groups.

That allows users to assemble LEDs with uniform appearance.

FEATURES

- Choice of three bright colors
- Standard T-1 package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Very wide viewing angle
- Luminous intensity categorized
- Yellow and green color categorized
- Lead (Pb)-free device



APPLICATIONS

- Status lights
- OFF/ON indicator
- Background illumination
- Readout lights
- Maintenance lights
- Legend light

PRODUCT GROUP AND PACKAGE DATA

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

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
TLHR4600	Red, $I_V > 1$ mcd	GaAsP on GaP
TLHR4601	Red, $I_V > 1.6$ mcd	GaAsP on GaP
TLHR4605	Red, $I_V > 2.5$ mcd	GaAsP on GaP
TLHY4600	Yellow, $I_V > 0.63$ mcd	GaAsP on GaP
TLHY4601	Yellow, $I_V > 1$ mcd	GaAsP on GaP
TLHY4605	Yellow, $I_V > 2.5$ mcd	GaAsP on GaP
TLHG4600	Green, $I_V > 1$ mcd	GaP on GaP
TLHG4601	Green, $I_V > 1.6$ mcd	GaP on GaP
TLHG4605	Green, $I_V > 4$ mcd	GaP on GaP



ABSOLUTE MAXIMUM RATINGS¹⁾ TLHR46.. , TLHY46.. , TLHG46..				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	6	V
DC Forward current	$T_{amb} \leq 60\text{ }^\circ\text{C}$	I_F	30	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	I_{FSM}	1	A
Power dissipation	$T_{amb} \leq 60\text{ }^\circ\text{C}$	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

Note:

¹⁾ $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS¹⁾ TLHR46.., RED							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity ²⁾	$I_F = 10\text{ mA}$	TLHR4600	I_V	1	2		mcd
		TLHR4601	I_V	1.6	3.5		mcd
		TLHR4605	I_V	2.5	6		mcd
Dominant wavelength	$I_F = 10\text{ mA}$		λ_d	612		625	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p		635		nm
Angle of half intensity	$I_F = 10\text{ mA}$		ϕ		± 60		deg
Forward voltage	$I_F = 20\text{ mA}$		V_F		2	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		V_R	6	15		V
Junction capacitance	$V_R = 0, f = 1\text{ MHz}$		C_j		50		pF

Note:

¹⁾ $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

²⁾ In one packing unit $I_{Vmin}/I_{Vmax} \leq 0.5$

OPTICAL AND ELECTRICAL CHARACTERISTICS¹⁾ TLHY46.., YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity ²⁾	$I_F = 10\text{ mA}$	TLHY4600	I_V	0.63	2		mcd
		TLHY4601	I_V	1	3.5		mcd
		TLHY4605	I_V	2.5	5		mcd
Dominant wavelength	$I_F = 10\text{ mA}$		λ_d	581		594	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p		585		nm
Angle of half intensity	$I_F = 10\text{ mA}$		ϕ		± 60		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	$V_R = 0, f = 1\text{ MHz}$		C_j		50		pF

Note:

¹⁾ $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

²⁾ In one packing unit $I_{Vmin}/I_{Vmax} \leq 0.5$

OPTICAL AND ELECTRICAL CHARACTERISTICS¹⁾ TLHG46.., GREEN							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity ²⁾	$I_F = 10 \text{ mA}$	TLHG4600	I_V	1	2		mcd
		TLHG4601	I_V	1.6	3.5		mcd
		TLHG4605	I_V	4	6		mcd
Dominant wavelength	$I_F = 10 \text{ mA}$		λ_d	562		575	nm
Peak wavelength	$I_F = 10 \text{ mA}$		λ_p		565		nm
Angle of half intensity	$I_F = 10 \text{ mA}$		ϕ		± 60		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

Note:

¹⁾ $T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

²⁾ In one packing unit $I_{Vmin}/I_{Vmax} \leq 0.5$

TYPICAL CHARACTERISTICS

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

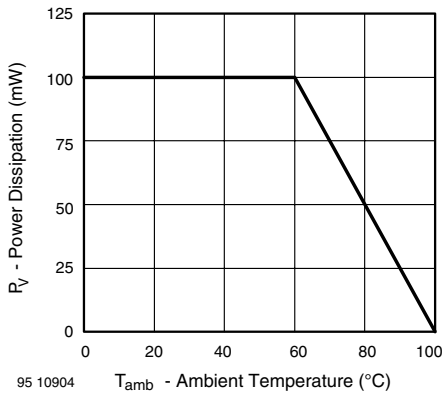


Figure 1. Power Dissipation vs. Ambient Temperature

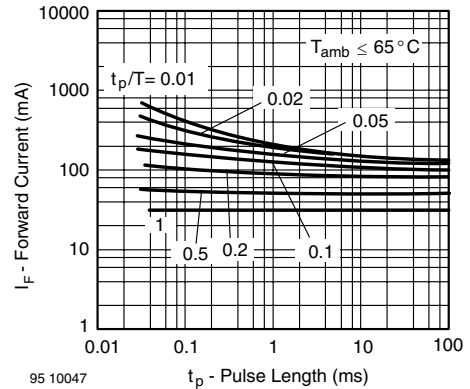


Figure 3. Forward Current vs. Pulse Length

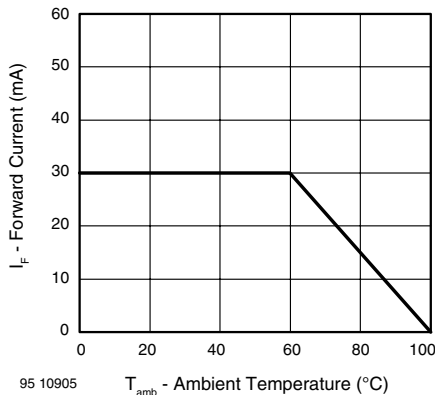


Figure 2. Forward Current vs. Ambient Temperature for InGaN

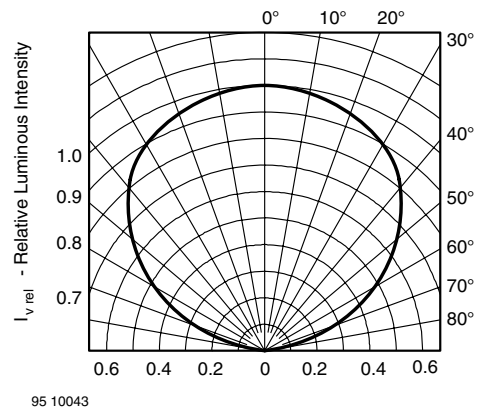


Figure 4. Rel. Luminous Intensity vs. Angular Displacement

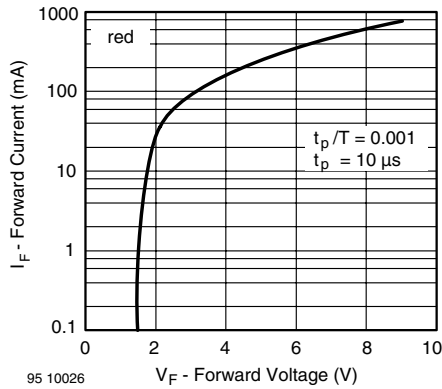


Figure 5. Forward Current vs. Forward Voltage

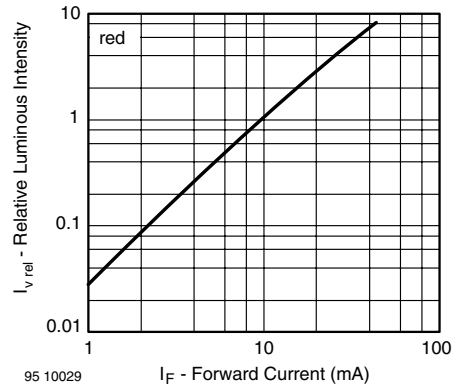


Figure 8. Relative Luminous Intensity vs. Forward Current

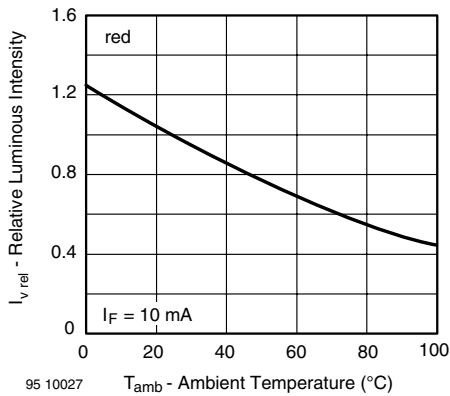


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

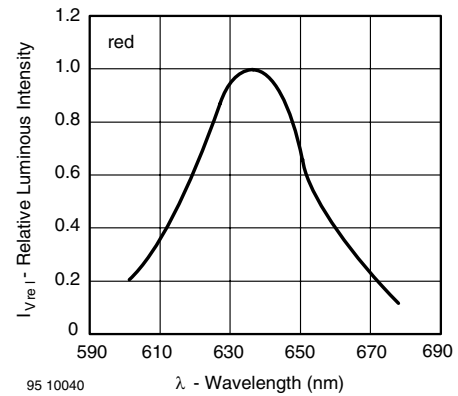


Figure 9. Relative Intensity vs. Wavelength

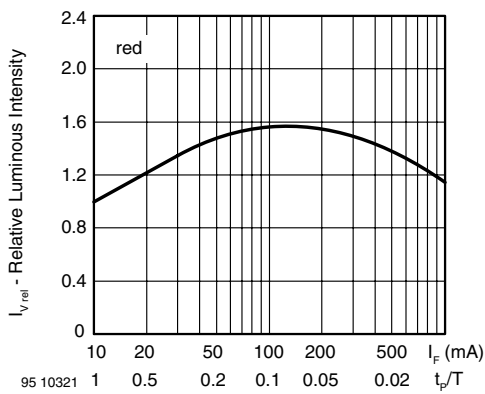


Figure 7. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

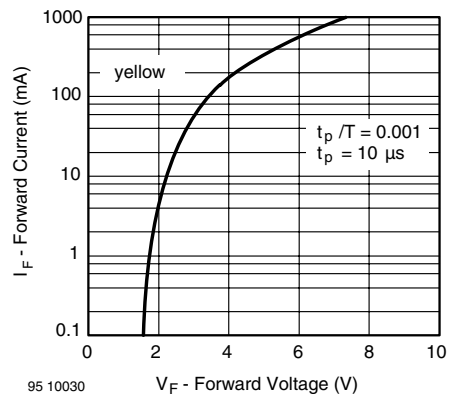


Figure 10. Forward Current vs. Forward Voltage

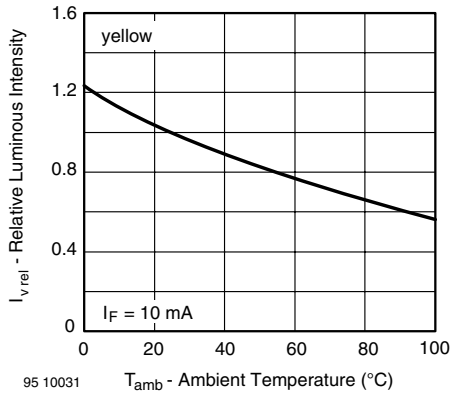


Figure 11. Rel. Luminous Intensity vs. Ambient Temperature

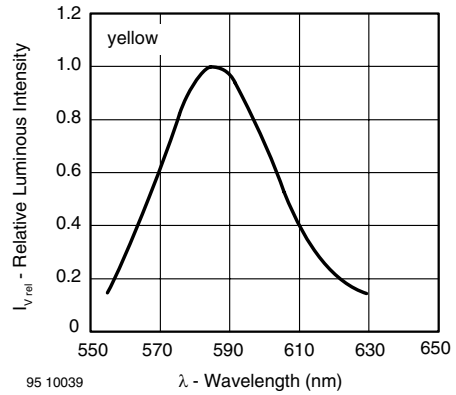


Figure 14. Relative Intensity vs. Wavelength

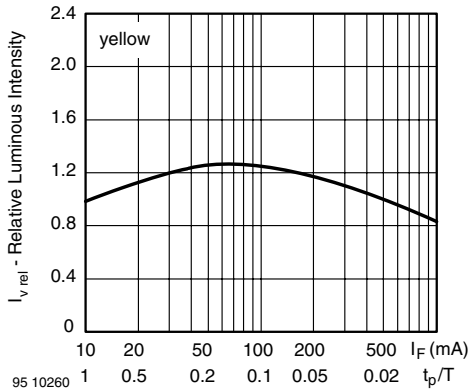


Figure 12. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

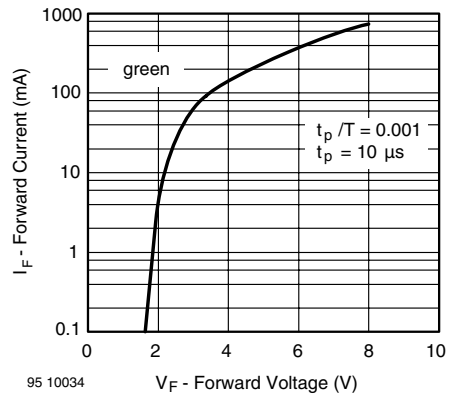


Figure 15. Forward Current vs. Forward Voltage

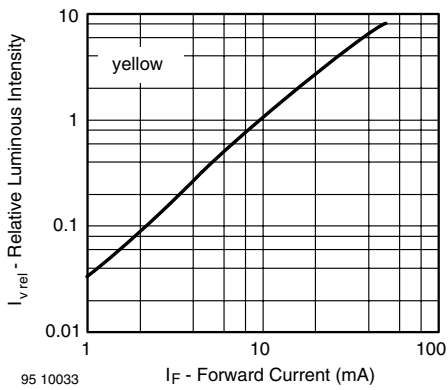


Figure 13. Relative Luminous Intensity vs. Forward Current

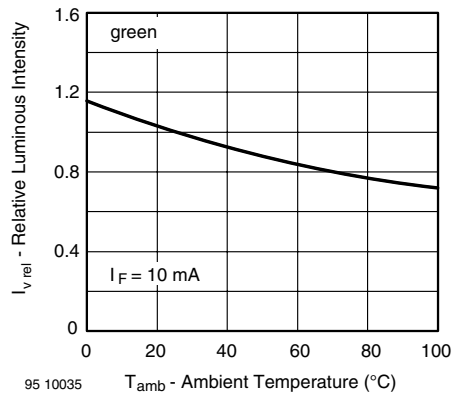


Figure 16. Rel. Luminous Intensity vs. Ambient Temperature

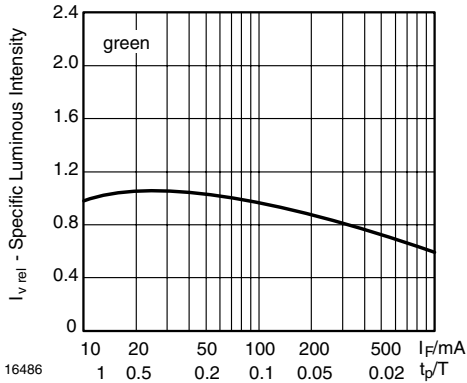


Figure 17. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

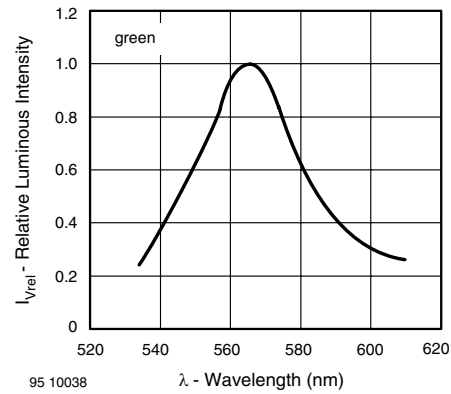


Figure 19. Relative Intensity vs. Wavelength

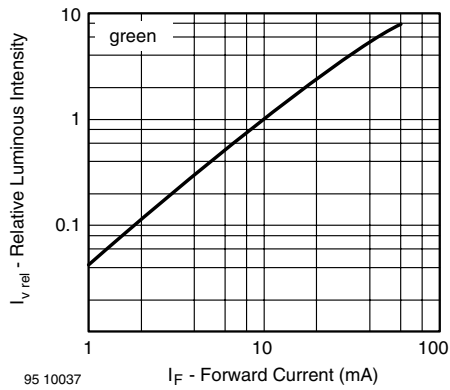
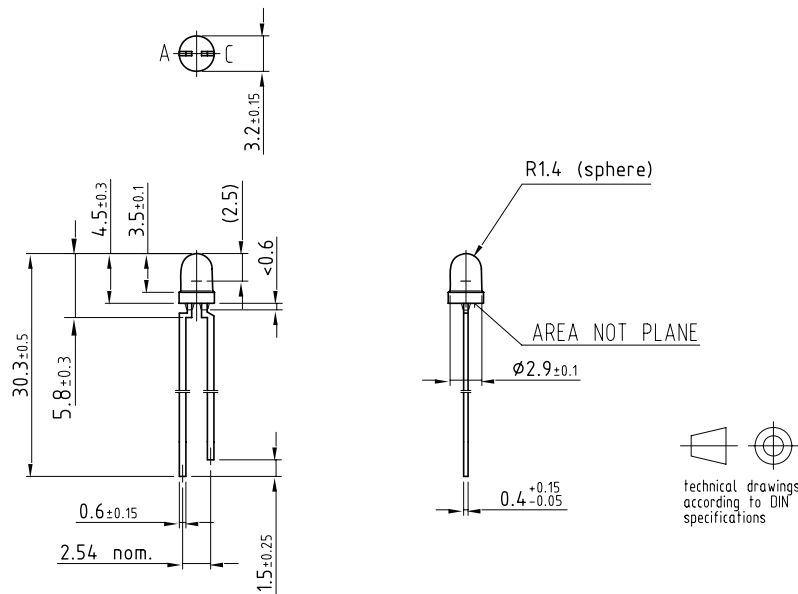


Figure 18. Relative Luminous Intensity vs. Forward Current

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5255.01-4
Issue: 5; 08.11.99

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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.

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