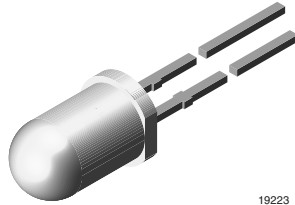


## High Intensity LED, $\varnothing$ 5 mm Untinted Non-Diffused



19223

### FEATURES

- Untinted non diffused lens
- Choice of four colors
- TLH.5101 and TLH.5102 with reduced light matching factor
- TLH.5100 for cost effective design
- Medium viewing angle
- Lead (Pb)-free device



### DESCRIPTION

The TLH.51.. series is a clear, non diffused 5 mm LED for outdoor application.

These clear lamps utilize the highly developed technologies like AlInGaP and GaP.

The lens and the viewing angle is optimized to achieve best performance of light output and visibility.

The subtypes TLH.5101 and TLH.5102 with their very stable light output are especially recommended for applications where a homogeneous appearance is required.

### APPLICATIONS

- Outdoor LED panels
- Central high mounted stop lights (CHMSL) for motor vehicles
- Instrumentation and front panel indicators
- Light guide design
- Traffic signals

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 5 mm
- Product series: standard
- Angle of half intensity:  $\pm 9^\circ$

PARTS TABLE		
PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
TLHK5100	Red, $I_V > 320$ mcd	AlInGaP on GaAs
TLHE5100	Yellow, $I_V > 750$ mcd	AlInGaP on GaAs
TLHG5100	Green, $I_V > 240$ mcd	GaP on GaP
TLHG5101	Green, $I_V > 240$ mcd	GaP on GaP
TLHG5102	Green, $I_V > 240$ mcd	GaP on GaP
TLHP5100	Pure green, $I_V > 66$ mcd	GaP on GaP
TLHP5101	Pure green, $I_V > 66$ mcd	GaP on GaP
TLHP5102	Pure green, $I_V > 66$ mcd	GaP on GaP



<b>ABSOLUTE MAXIMUM RATINGS<sup>1)</sup> TLHK51.. , TLHE51.. , TLHG51.. , TLHP51..</b>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	6	V
DC Forward current	$T_{amb} \leq 65\text{ }^\circ\text{C}$	$I_F$	30	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	1	A
Power dissipation	$T_{amb} \leq 65\text{ }^\circ\text{C}$	$P_V$	100	mW
Junction temperature		$T_j$	100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 55 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5\text{ s, } 2\text{ mm from body}$	$T_{sd}$	260	$^\circ\text{C}$
Thermal resistance junction/ambient		$R_{thJA}$	350	K/W

Note:

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS<sup>1)</sup> TLHK51..., RED</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 20\text{ mA}$	TLHK5100	$I_V$	320			mcd
Dominant wavelength	$I_F = 10\text{ mA}$		$\lambda_d$	626	630	639	nm
Peak wavelength	$I_F = 10\text{ mA}$		$\lambda_p$		643		nm
Angle of half intensity	$I_F = 10\text{ mA}$		$\varphi$		$\pm 9$		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	$V_R = 0, f = 1\text{ MHz}$		$C_j$		15		pF

Note:

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

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS<sup>1)</sup> TLHE51..., YELLOW</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 20\text{ mA}$	TLHE5100	$I_V$	750			mcd
Dominant wavelength	$I_F = 10\text{ mA}$		$\lambda_d$	581	588	594	nm
Peak wavelength	$I_F = 10\text{ mA}$		$\lambda_p$		590		nm
Angle of half intensity	$I_F = 10\text{ mA}$		$\varphi$		$\pm 9$		deg
Forward voltage	$I_F = 20\text{ mA}$		$V_F$		2	2.6	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		$V_R$	5			V
Junction capacitance	$V_R = 0, f = 1\text{ MHz}$		$C_j$		15		pF

Note:

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

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS<sup>1)</sup> TLHG51.., GREEN</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 20 \text{ mA}$	TLHG5100	$I_V$	240			mcd
		TLHG5101	$I_V$	240		480	mcd
		TLHG5102	$I_V$	240		640	mcd
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	$I_F = 10 \text{ mA}$		$\phi$		$\pm 9$		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:

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

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS<sup>1)</sup> TLHP51.., PURE GREEN</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity <sup>2)</sup>	$I_F = 20 \text{ mA}$	TLHP5100	$I_V$	66			mcd
		TLHP5101	$I_V$	66		132	mcd
		TLHP5102	$I_V$	66		200	mcd
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	$I_F = 10 \text{ mA}$		$\phi$		$\pm 9$		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:

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

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

### TYPICAL CHARACTERISTICS

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

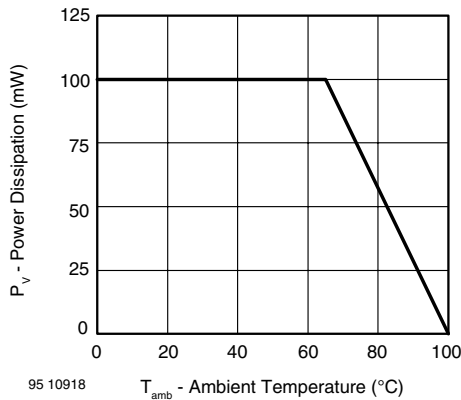


Figure 1. Power Dissipation vs. Ambient Temperature

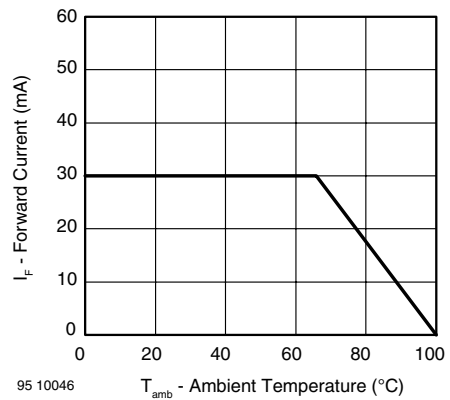


Figure 2. Forward Current vs. Ambient Temperature

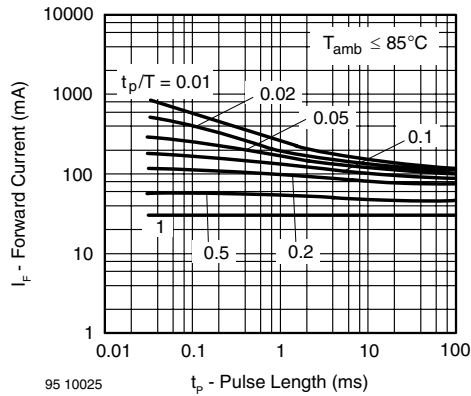


Figure 3. Forward Current vs. Pulse Length

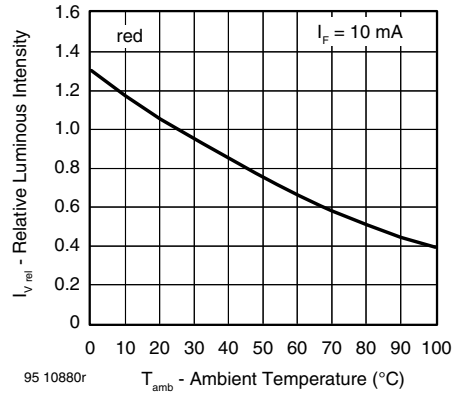


Figure 6. Rel. Luminous Intensity vs. Ambient Temperature

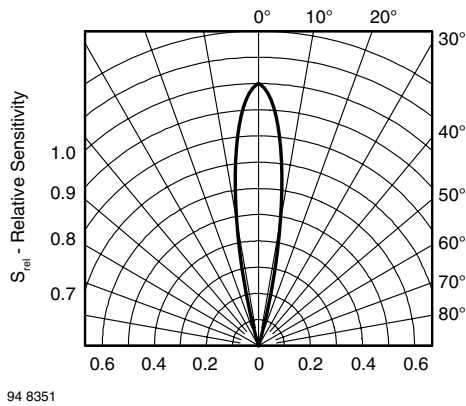


Figure 4. Relative Radiant Sensitivity vs. Angular Displacement

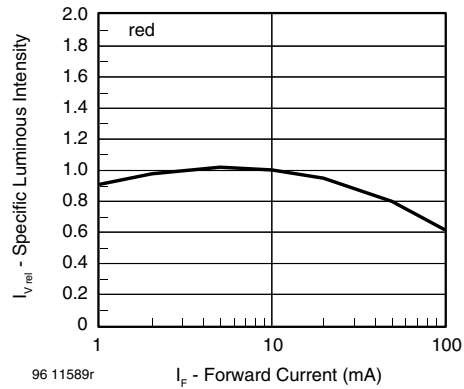


Figure 7. Specific Luminous Intensity vs. Forward Current

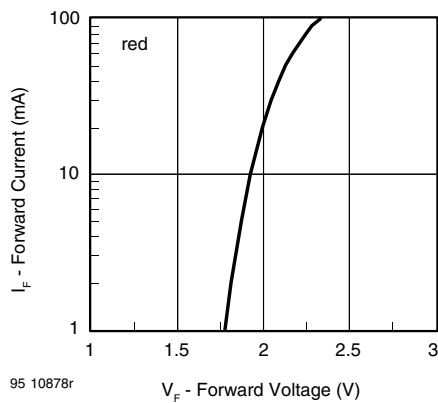


Figure 5. Forward Current vs. Forward Voltage

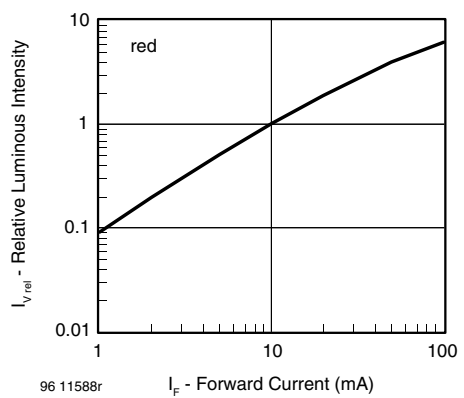


Figure 8. Relative Luminous Intensity vs. Forward Current

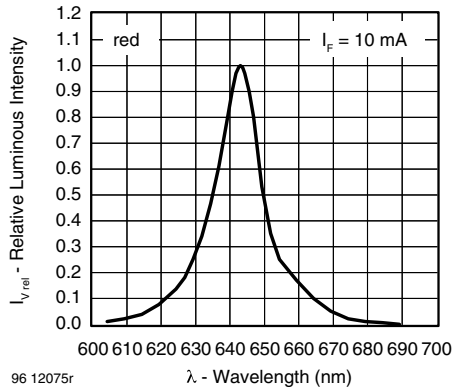


Figure 9. Relative Intensity vs. Wavelength

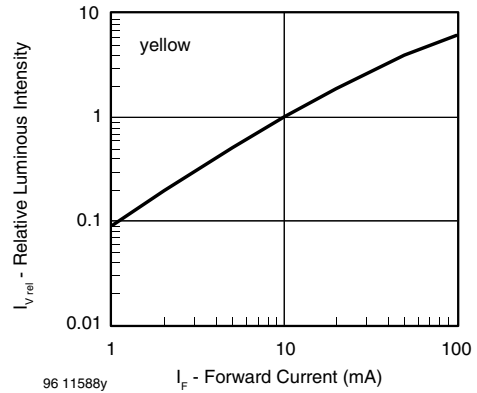


Figure 12. Relative Luminous Intensity vs. Forward Current

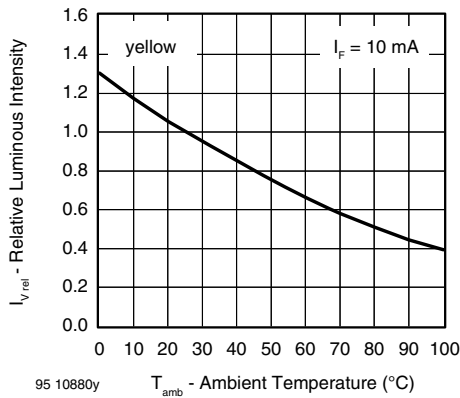


Figure 10. Rel. Luminous Intensity vs. Ambient Temperature

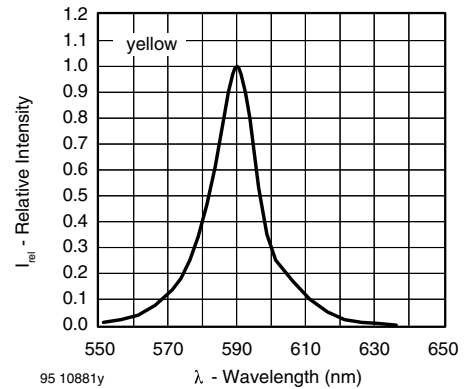


Figure 13. Relative Intensity vs. Wavelength

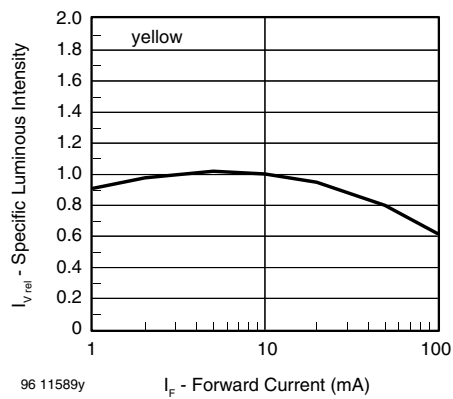


Figure 11. Specific Luminous Intensity vs. Forward Current

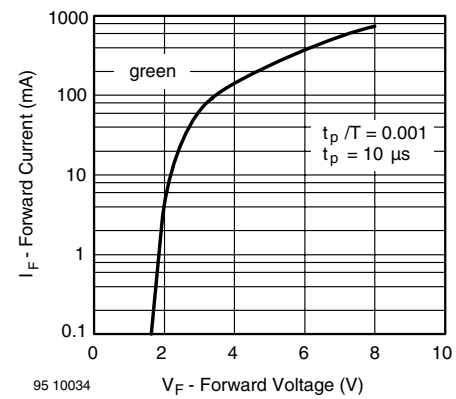


Figure 14. Forward Current vs. Forward Voltage

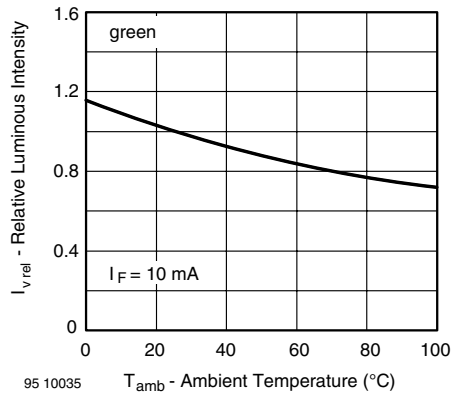


Figure 15. Rel. Luminous Intensity vs. Ambient Temperature

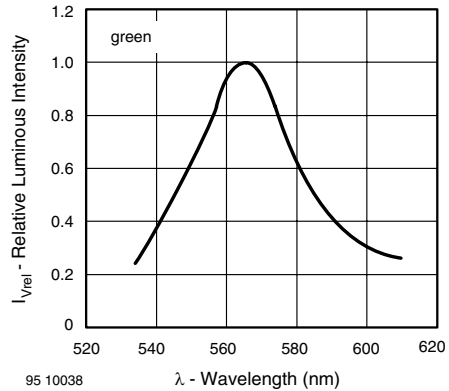


Figure 18. Relative Intensity vs. Wavelength

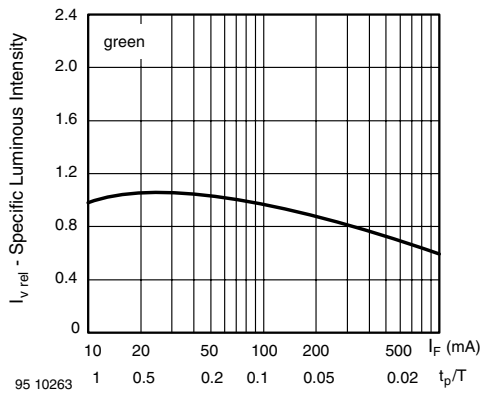


Figure 16. Specific Luminous Intensity vs. Forward Current

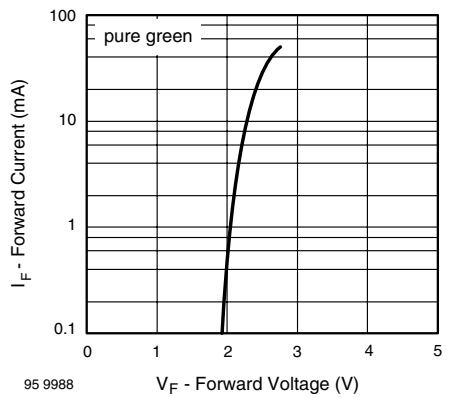


Figure 19. Forward Current vs. Forward Voltage

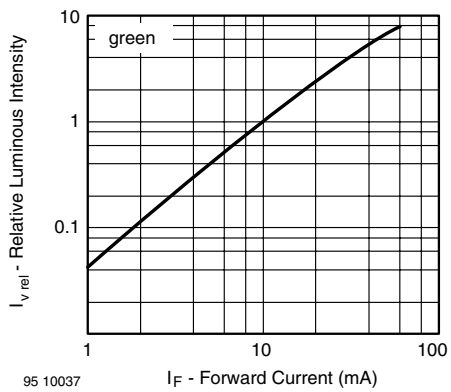


Figure 17. Relative Luminous Intensity vs. Forward Current

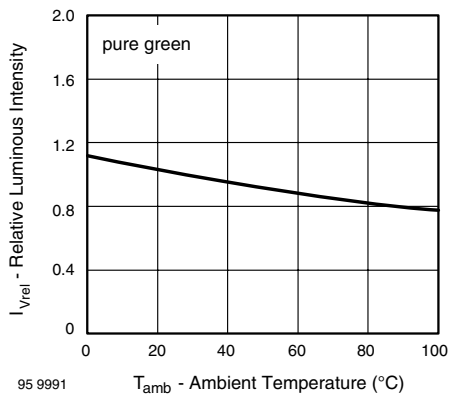


Figure 20. Rel. Luminous Intensity vs. Ambient Temperature

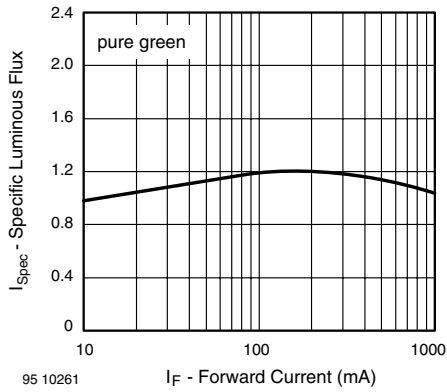


Figure 21. Specific Luminous Intensity vs. Forward Current

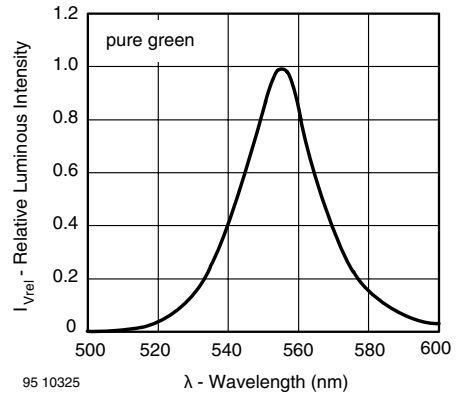


Figure 23. Relative Intensity vs. Wavelength

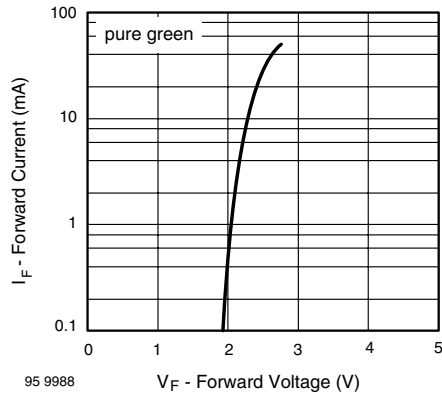
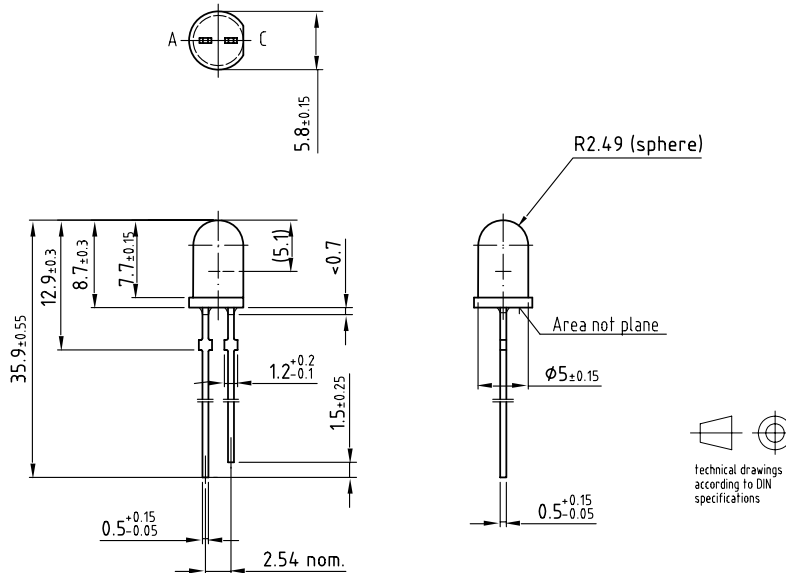


Figure 22. Relative Luminous Intensity vs. Forward Current

## PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5258.04-4  
Issue: 6; 04.07.03

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**Vishay Semiconductors****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 Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors 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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany





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