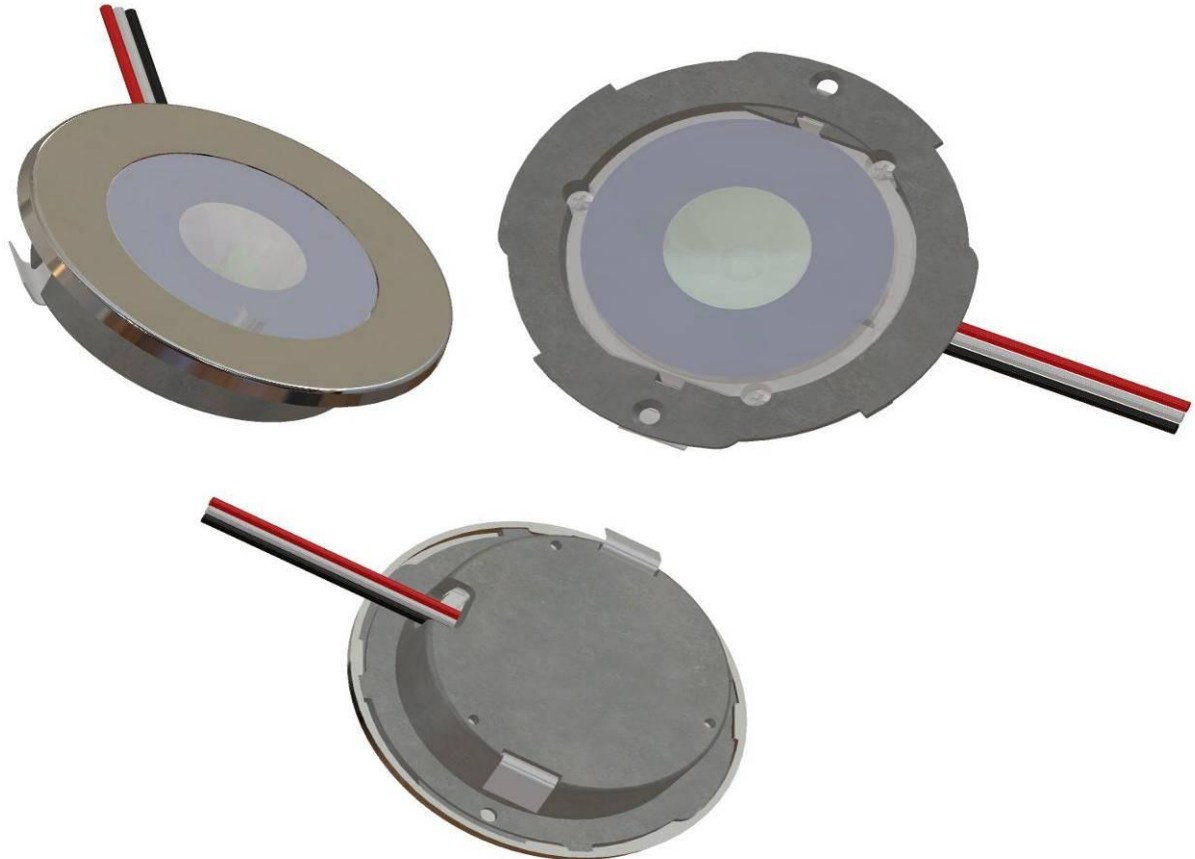
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Halogen Retrofit Module Solution for External driver



This LED module is designed for external driver and is therefore very easy to mount and connect in applications normally made for Halogen with external wall outlet transformer. The efficiency are the highest available on the market for such applications. Lenses are available when needed from 40° in viewing angle.


The Optodrive light source is a complete light unit with the LED and lens all in one. The light that is emitted gives excellent colour definition and is offered in cool, warm and natural white colour options.

- *Excellent colour rendering index*
- *Choose between warm white, normal white and cool white light*
- *230 VAC or low voltage*
- *Dome concept – the whole module lights up, not just the LED*
- *Dome concept – a complete light source (LED and lens in one)*
- *Simple fitting – no caps, just 3 screws and 1 plug*
- *Maximum energy efficiency*

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Short form Characteristics

Mechanical

Board dimensions: 34.56 mm diameter
 Assembly holes: 2 x 3.2 mm
 Wire Connector: CP04-03S0 or JST BHS
 Height: 20.8 mm

Electrical

Number of LED's: 1

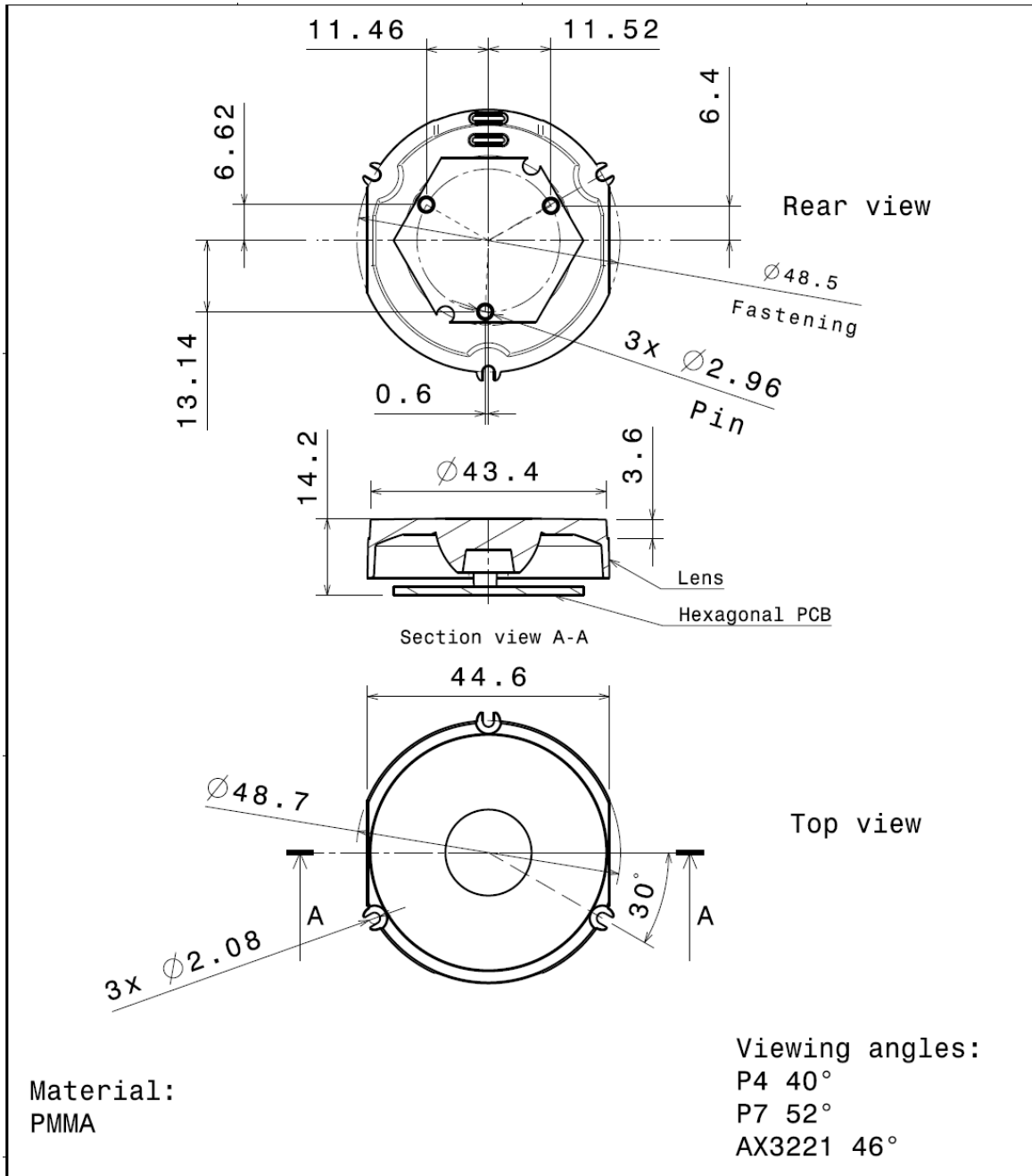
 Power supply: External Driver
 Power: 10 W
 LED current: Connector 1000 mA +/-10% ea.
 Wire direct connect 2800mA

Wiring diagram:

Se separate wiring diagram documentation.

	Felicia ED with P7 Cool white	Felicia ED P7-II Warm white
Circuit diagram		
Max IF	2800mA (700mA per chip)	1400mA (700mA per chip)
Typ IF	1400mA (350mA per chip)	700mA (350mA per chip)
VF	3~4V	6~8V
CRI	70	77
Luminous Flux	Typ 750lm (@2800mA)	Typ 330lm (@700mA)

Dimensions LED Module:



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DRAWN BY PV	DATE 30.03.2009
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DRAWING TITLE		Steffi Lens	
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CHECKED BY TK	DATE 12.01.2009
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SIZE A4	DRAWING NUMBER 10763	REV 1
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DESIGNED BY HH	DATE 12.01.2009
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SCALE 1:1	WEIGHT(g)	SHEET 1/1
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Measurement given in mm

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Parameters of the Lens system

The lens system is mounted and fixated on to the PCB with Press-Fit. The light parameters are according to the following:


<i>Version P4</i>	<i>Viewing Angle</i>	<i>FWHM Angle</i>
Steffi Wide	40°	±20°
Steffi Super Wide	60° (TBD)	±30° (TBD)
Steffi Asymmetric Wide	TBD	TBD

<i>Version P7</i>	<i>Viewing Angle</i>	<i>FWHM Angle</i>
Steffi Wide	52°	±26°
Steffi Super Wide	60° (TBD)	±30° (TBD)
Steffi Asymmetric Wide	TBD	TBD

<i>Version Acriche (230VAC)</i>	<i>Viewing Angle</i>	<i>FWHM Angle</i>
Steffi Wide	46°	±23°
Steffi Super Wide	60° (TBD)	±30° (TBD)
Steffi Asymmetric Wide	TBD	TBD

Lens material is an optical grade PMMA, allows use of high current and temperature conditions.

- Best available optical efficiency, up to 90%
- Very even color distribution over the whole beam angle
- Integrated holder. Fastening to heat sink with three screws

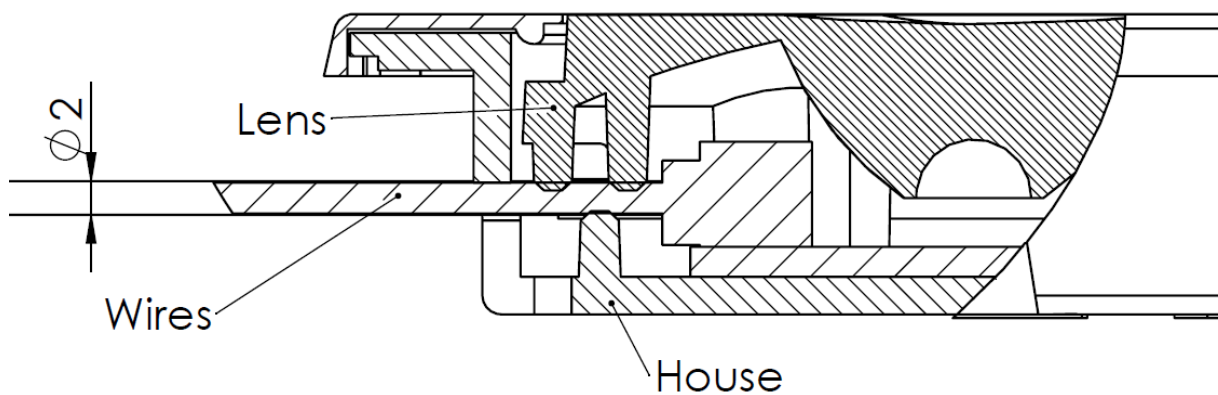
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Wiring diagram

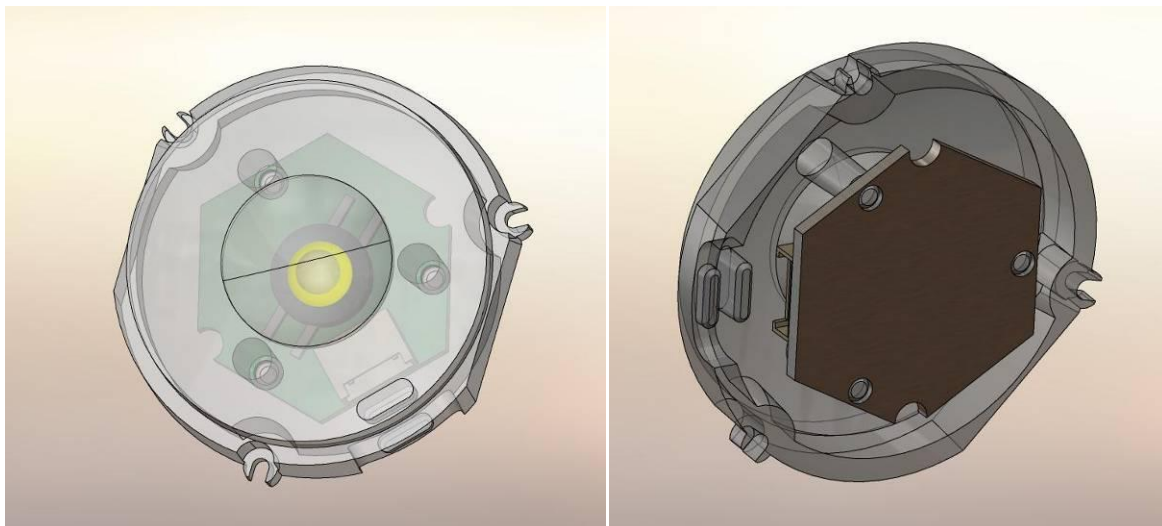
See separate wiring diagram documentation.
TBD


Strain relief

To achieve good and reliable connection the lens is containing a built in strain relief for the wire. The diameter of the wire is important and it can be adjusted by increase or decrease the meeting lower part of the housing.



The housing is the customer or end-user part to be designed to meet this design. A 3D file in IGS as a solid can be provided for design purposes, strictly under NDA.



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Parameters of the light output

Warm White

Electro-Optical characteristics LED at $I_F=700\text{mA}$, $T_A=25^\circ\text{C}$

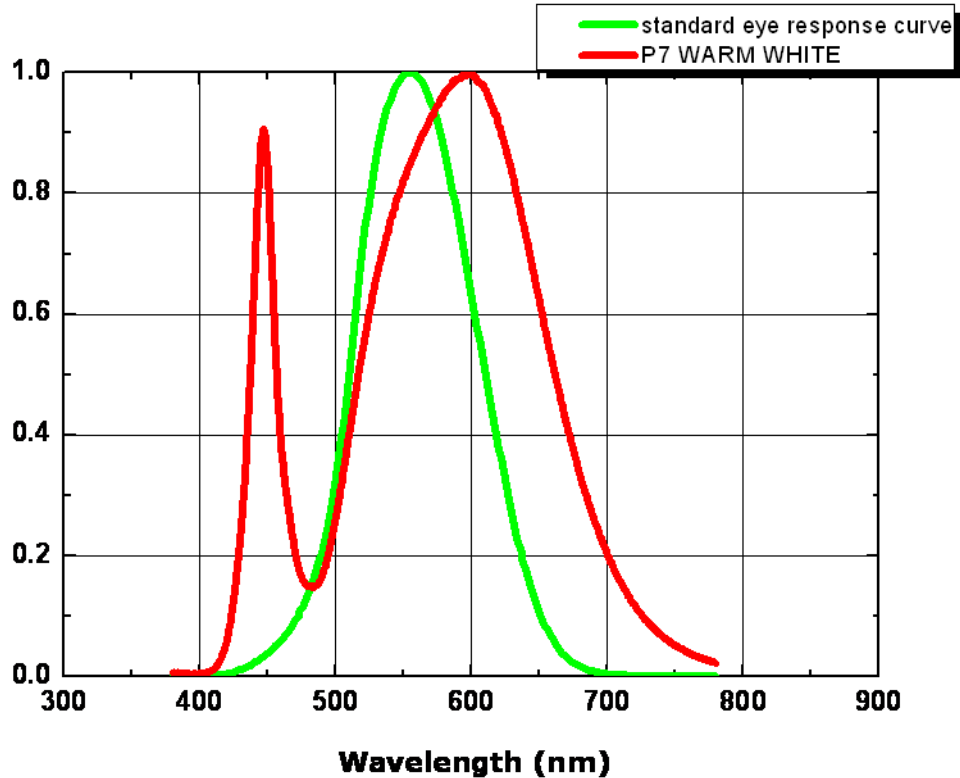
Parameter	Symbol	Value			Unit	
		Min	Typ	Max		
Luminous Flux	Y rank ⁽¹⁾	Φ_V	260		340	lm
	Z rank ⁽¹⁾	Φ_V	340		440	lm
Correlated Color Temperature	W* ⁽²⁾	CCT	2900		3000	lm
	V* ⁽²⁾	CCT	3000		3200	lm
CRI	R_a		-	77	-	-
Power	P_O			10	11.2	W
Thermal resistance	$R\theta_{J-B}$			3		$^\circ\text{C}/\text{W}$


(1) See detailed information in chapter "Luminous Flux Bin"

(2) See detailed information in chapter "Binning structure graphical representation"

Colour Spectrum

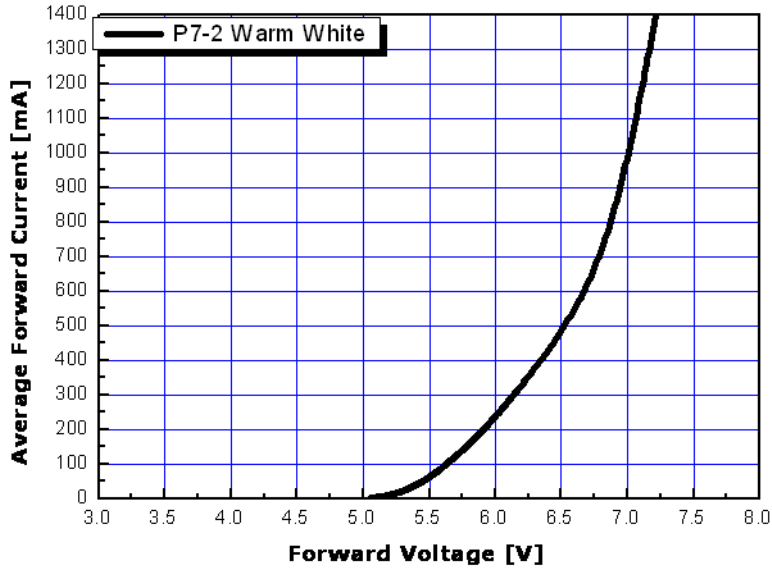
Warm White



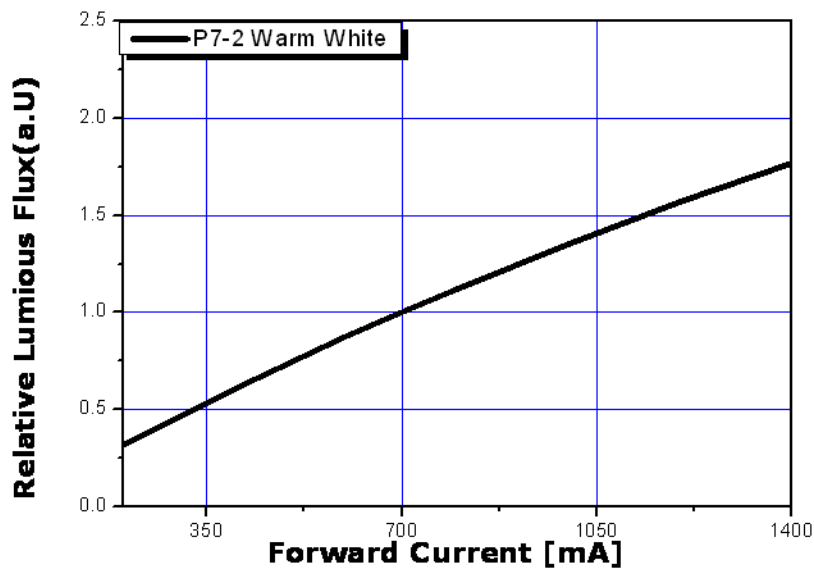
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Module Performance Warm White

Voltage vs. Current



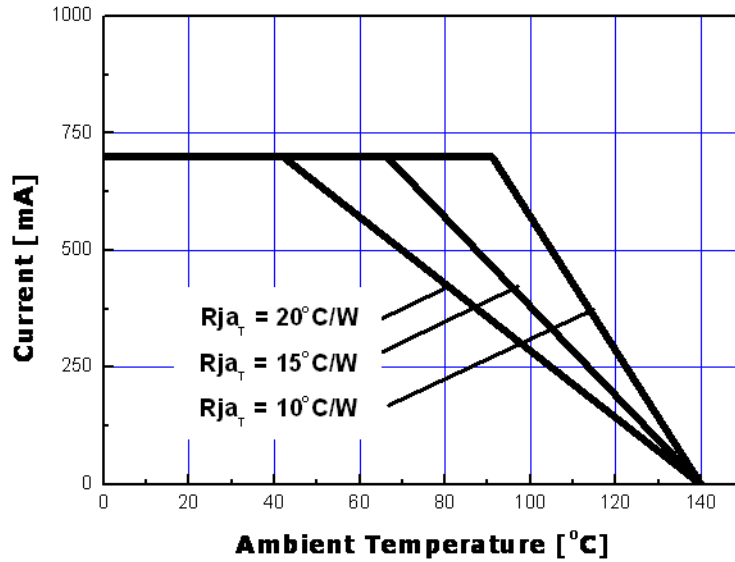
Current vs Flux



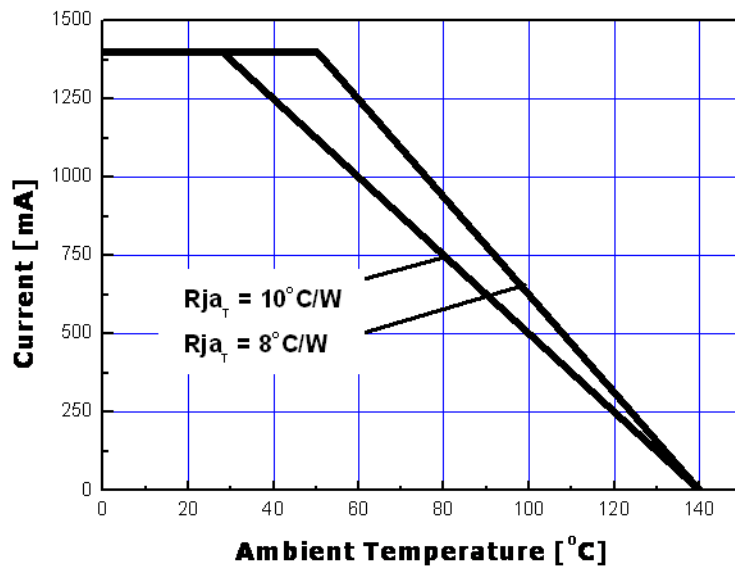
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Ambient Temperature vs Allowable Forward Current

Warm White (TJMAX = 140 °C, @700mA)



Warm White (TJMAX = 140 °C, @1400mA)



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Binning and Labelling

Short form letter for colour

Colour Code	Colour
N	Warm White

Luminous Flux Bins pro LED

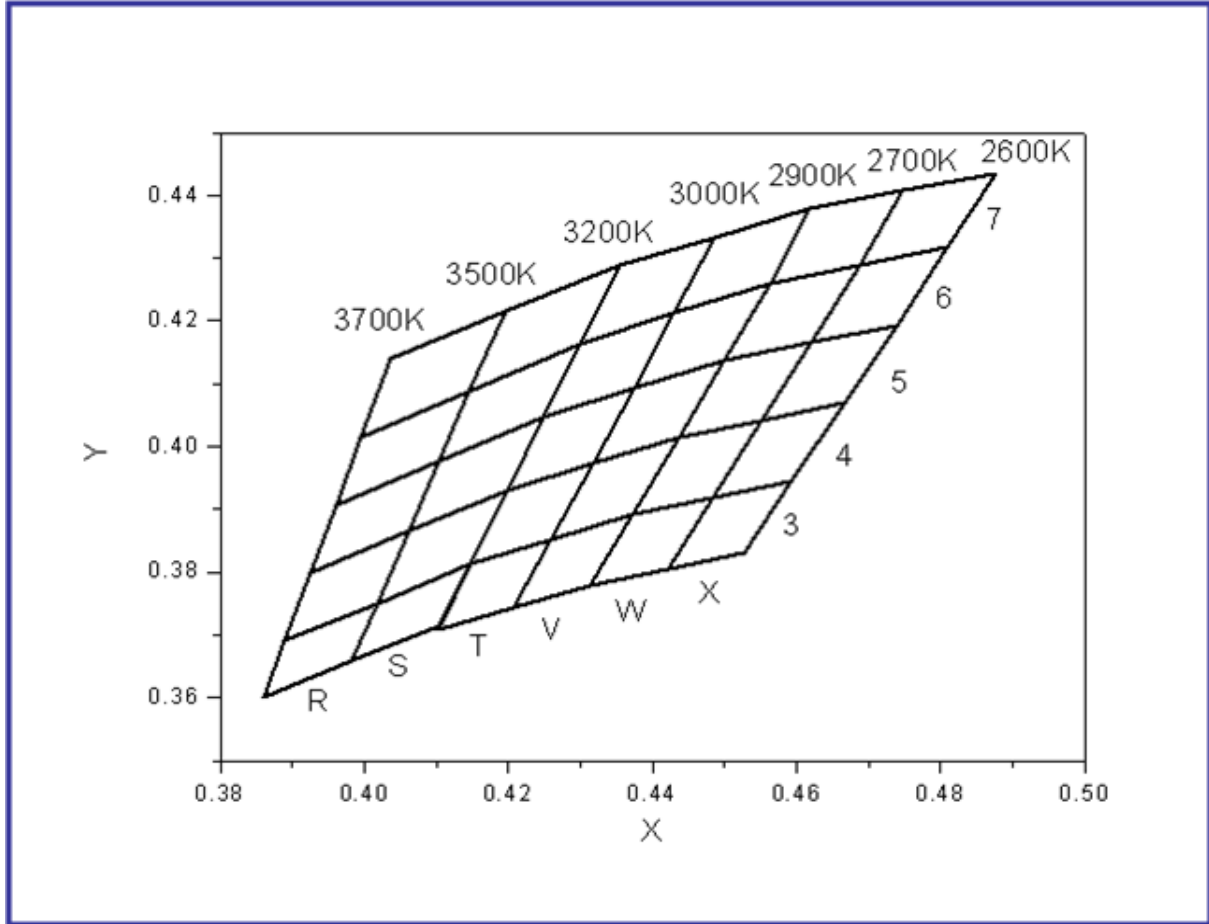
Bin Code	Luminous Flux [lm]
Y	260.0 ~ 340.0
Z	340.0 ~ 440.0


Forward Voltage

Vf Rank	Forward Voltage [Vf]
O	6.0~6.5
P	6.5~7.0
Q	7.0~7.5
R	7.5~8.0

Binning structure graphical representation

Warm White Binning (2600 – 3700K)



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Measurement Control

The recommended maximum value is 65°C on Tc or measuring point. If this value is exceeded we can't guarantee the function and the life time. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also control the performance on the whole set up. By the help of the junction temperature (Tj) the average lifetime of the product is known.

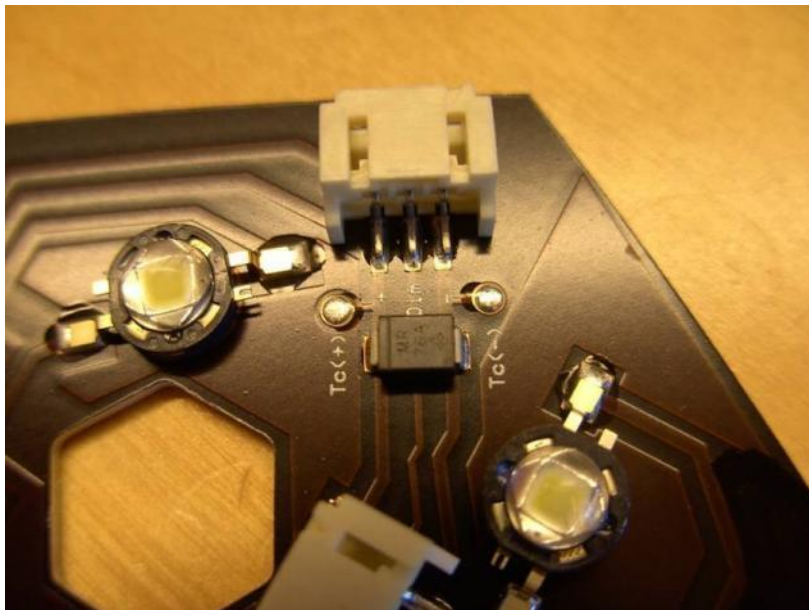
The thermal connection is measured in temperature vs. Power.

Measurement points


When the measurement takes place we verify the temperature on different places where the life time expected is depending on maximum temperature.

Measurement points

- TC (- and +)
- LED legs at the soldering point




This measurement is to be done when the heat sink is connected properly!

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Lifetime (Calculated)

The lifetime is calculated at the maximum temperature recommended at the Tc (measuring point). It is important not to exceed this recommendation; you find more information under the chapter “measurement control”.

Unit	Tc Maximum	50 % degradation	30 % degradation
Steffi 4W (700mA)	65° C	>100 000 hours	67 500 Hours
(Steffi 10 W (1400 mA))	65° C	70 000 hours	37 500 hours)

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Precaution for use

- This device should not be used in any type of fluid such as water, oil, organic solvent etc.
- When cleaning is required, only use water together with mild soap on the outside of the lens. Cleaning inside of the LED module is prohibited.
- The appearance and specifications of the product may be modified for improvement without notice.
- Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
- Opening of the LED module are prohibited due to risk of EMC, dust, grease and other exposures that are out of control.
- The LED Module should always be mounted at a proper heat sink before it's connected with its proper leads. This due to electrical hazard.

ROHS Compliant

All our LED modules are meeting the Restriction of Hazardous Substances (RoHS)!

There has been a growing consensus that Lead Free Systems should increase for the safety of our environment. It is a very serious problem that lead and other harmful materials are being used in commercial and industrial products, causing more and more environmental problems. This has lead to regulations such as RoHS (Restriction of the use of certain Hazardous Substances) from the EU and the Japan Ministry of Trade and Industry (MITI). All LED module makers providing products to these countries should comply with these restrictions. In order to meet RoHS regulation, Optoga is strictly implementing a ban on lead and other hazardous materials in its products. This is in compliance with our responsibilities as good corporate citizens.

Would you like to know more about the benefits of OptoDrive LED?

At www.optodrive.se you can read more about OptoDrive. You can also easily notify us of your interest here (www.optodrive.se/order.pab). Of course you can also call +46 (0) 589 490 950.

Optoga AB

The company started business in November 2004. The company's staff has more than 30 years of shared experience in electronic components. Optoga develops and supplies LEDs, LED drivers, LED modules and software solutions to the lighting industry, automotive manufacturers and electronics companies.

By developing products with integrated LEDs and drive electronics, Optoga has taken the initiative to replace fluorescent, incandescent and halogen lamps with LED-based light sources.

OPTOGA