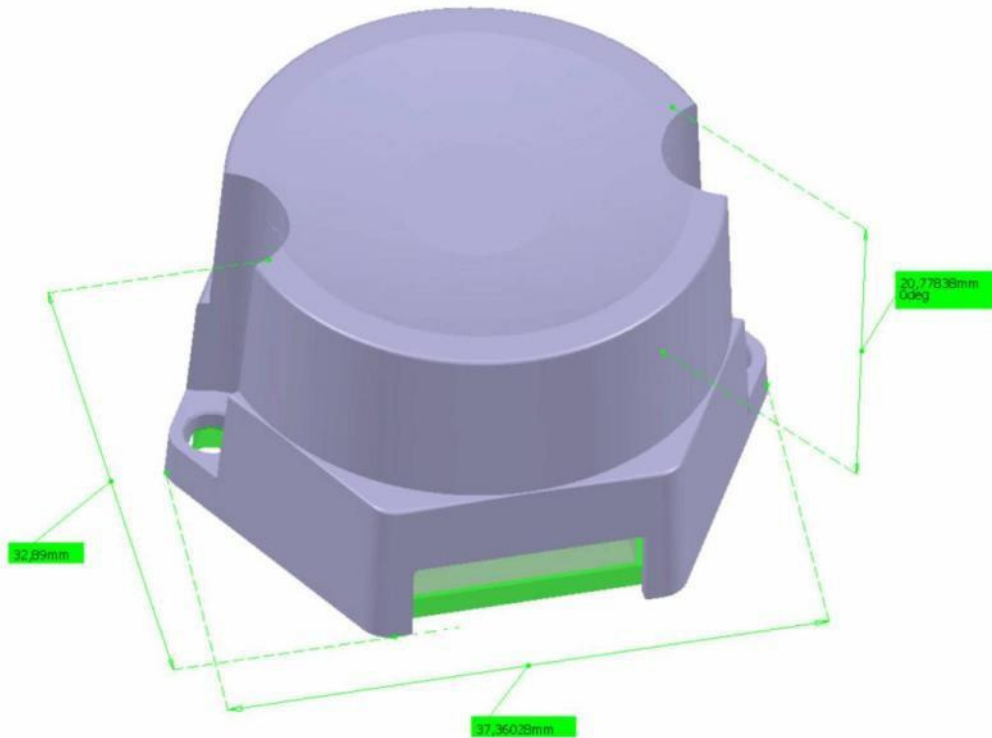
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## Felicia 4W 230VAC Module Solution for light fitting integration




*This LED Module is designed to be used without external driver and is therefore very easy to connect in applications for 230VAC or direct to a wall outlet. The efficiency are the highest available on the market for such applications. Lenses are available when needed from 10 – 60° in viewing angle.*

### **Description**

Optodrive Clara series is designed for high current operation and high flux output applications. Optodrive LED's thermal management performance exceeds other power LED solutions. It incorporates state of the art SMD design and Thermal emission material as well as the most efficient technology. The white color Optodrive LED solution is the first built driver package designed, using high performance power chips and rendering a perfect white light.


### **Light Performance**

The standard light temperature is 2950 and 5350 Kelvin with Colour Rendering Index with a type value better than CRI 90 from 2650 up to 3500K. The light temperatures 5350 K and above have a CRI of 70.

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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  
 Height: 20.8 mm

#### **Electrical**


Number of LED's: 1  
 Power supply: 110 VAC or 230VAC  
 Power: 4-6 W  
 LED current: 40mA or 20 mA +/-10% ea.

#### **Dimming**

TBD

#### **Environmental operating conditions:**

Temperature range: -40°C to 85°C  
 Relative Humidity: 10-75%  
 Ambient air pressure: 500-1060 HPa

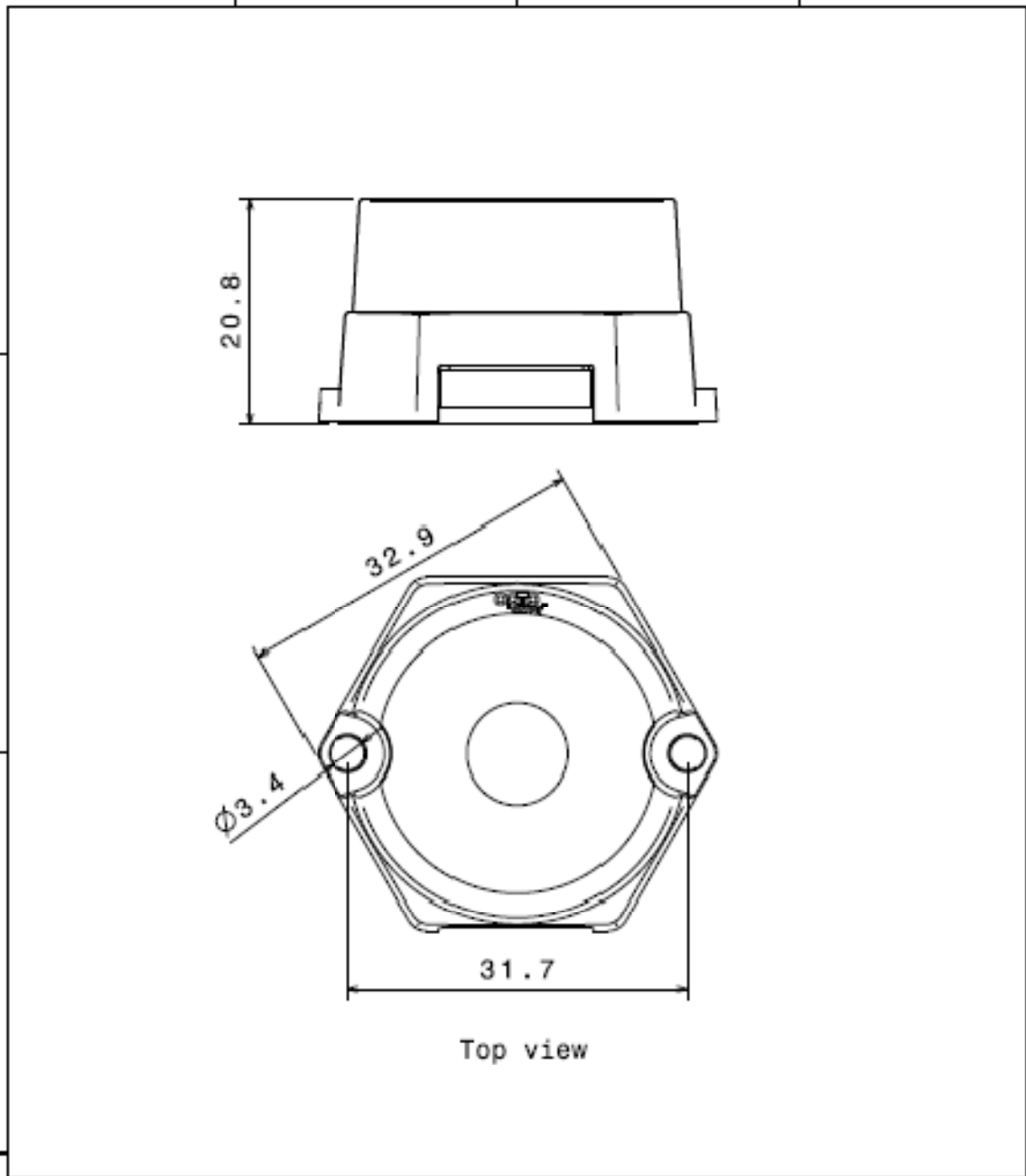
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***Wiring diagram:***

Se separate wiring diagram documentation.

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*Dimensions LED Module:*




Top view

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DRAWN BY pv		DATE 27.01.2009		DRAWING TITLE Felicia1-A integ.Lens-pcb assembly		
CHECKED BY fk		DATE 28.07.2008		SIZE A4	DRAWING NUMBER	REV 1.0
DESIGNED BY hh		DATE 23.07.2008		SCALE 2:1	WEIGHT(g)	SHEET 1/1

Measurement given in mm

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## Parameters of the Lens system

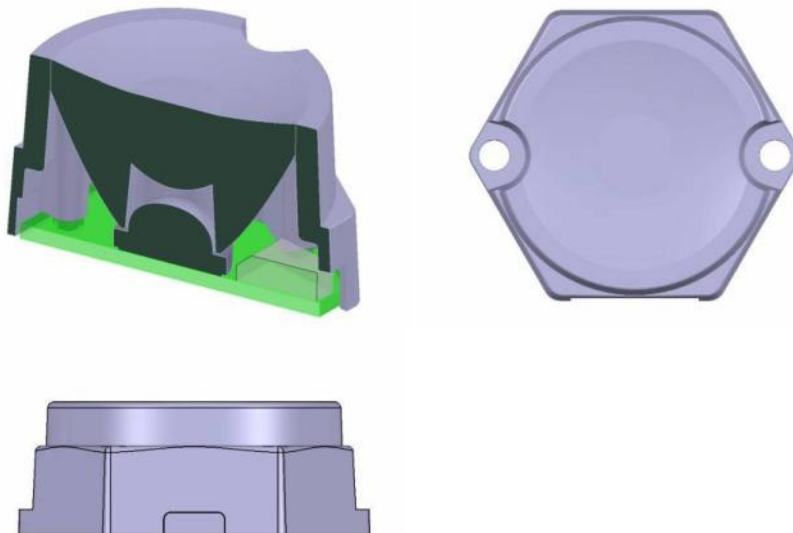
The lens system is mounted and fixated on to the PCB with press fit solution to keep the parts connected to each other. They can be separated from each other without damage. The light parameters are according to the following:

Version	Viewing Angle	FWHM Angle
Felicia Smooth Spot <sup>(1)</sup>	14°	±7°
Felicia Diffuser <sup>(1)</sup>	20°	±10°
Felicia Medium	30°	±15°
Felicia Wide <sup>(1)</sup>	60°	±30°
Felicia Wide Asymmetric of Centre 10°	AS	-

(1) Versions are in development

Lens material 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 two screws
- Compact dimensions



### Parameters of the light output

#### White

Electro-Optical characteristics LED at  $I_F=20\text{mA}$ , 230VAC,  $T_A=25^\circ\text{C}$

Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	W2 rank <sup>(1)</sup>	$\Phi_V$	177		200	lm
	X1 rank <sup>(1)</sup>	$\Phi_V$	200		230	lm
	X2 rank <sup>(1)</sup>		230		260	lm
Correlated Color Temperature	B* rank <sup>(2)</sup>	CCT	5000	5350	5700	K
CRI		$R_a$	-	70	-	-
Power		$P_o$		4		W
Thermal resistance		$R_{\theta_{J-B}}$		7		$^\circ\text{C/W}$

Electro-Optical characteristics LED at  $I_F=40\text{mA}$ , 110VAC,  $T_A=25^\circ\text{C}$

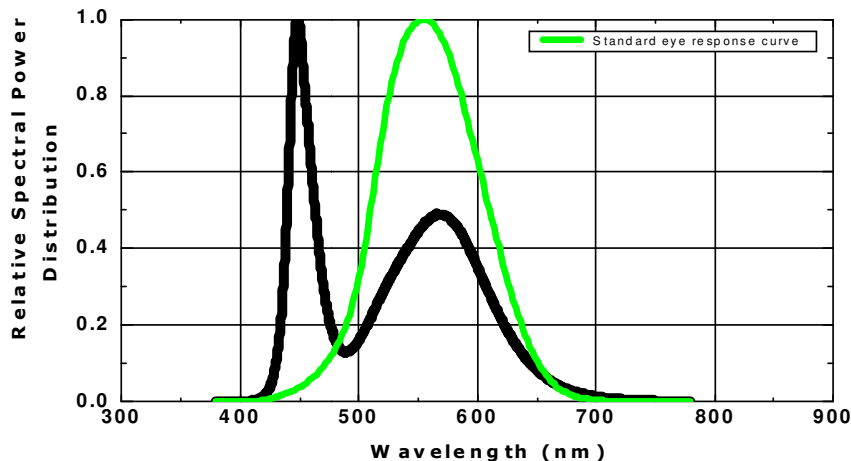
Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	W2 rank <sup>(1)</sup>	$\Phi_V$	177		200	lm
	X1 rank <sup>(1)</sup>	$\Phi_V$	200		230	lm
	X2 rank <sup>(1)</sup>		230		260	lm
Correlated Color Temperature	B* rank <sup>(2)</sup>	CCT	5000	5350	5700	K
CRI		$R_a$	-	70	-	-
Power		$P_o$	4	5	6	W
Thermal resistance		$R_{\theta_{J-B}}$		7		$^\circ\text{C/W}$

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

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

### Colour Spectrum

#### White



## Warm White

*Electro-Optical characteristics LED at  $I_F=20\text{mA}$ , 230VAC,  $T_A=25^\circ\text{C}$*

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	W1 rank <sup>(1)</sup>	$\Phi_V$	154		177	lm
	W2 rank <sup>(1)</sup>	$\Phi_V$	177		200	lm
Correlated Color Temperature	$G^{*(2)}$	CCT	2900	2950	3000	K
	$G^{*(2)}$	CCT	3000	3100	3200	K
CRI		$R_a$	80	-	-	-
Power		$P_o$	4	5	6	W
Thermal resistance		$R\theta_{J-B}$	7			$^\circ\text{C}/\text{W}$

*Electro-Optical characteristics LED at  $I_F=40\text{mA}$ , 110VAC,  $T_A=25^\circ\text{C}$*

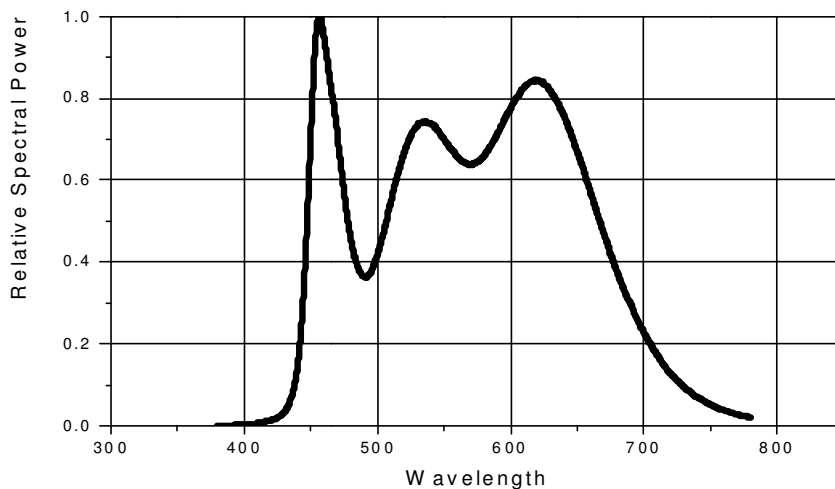
Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	W1 rank <sup>(1)</sup>	$\Phi_V$	154		177	lm
	W2 rank <sup>(1)</sup>	$\Phi_V$	177		200	lm
Correlated Color Temperature	$G^{*(2)}$	CCT	2900	2950	3000	K
	$G^{*(2)}$	CCT	3000	3100	3200	K
CRI		$R_a$	80	-	-	-
Power		$P_o$	4	5	6	W
Thermal resistance		$R\theta_{J-B}$	7			$^\circ\text{C}/\text{W}$


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

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

## Colour Spectrum

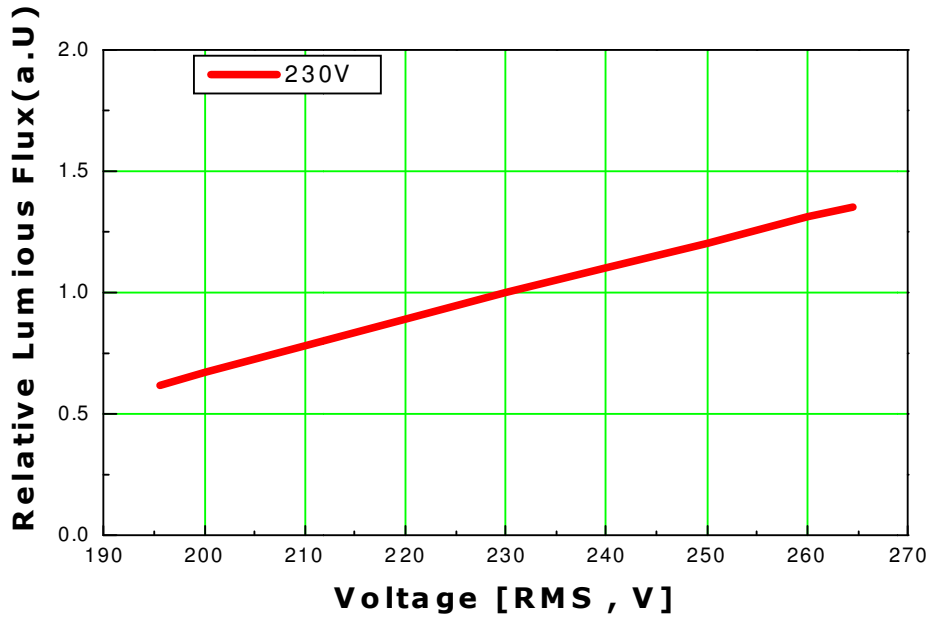
Warm White



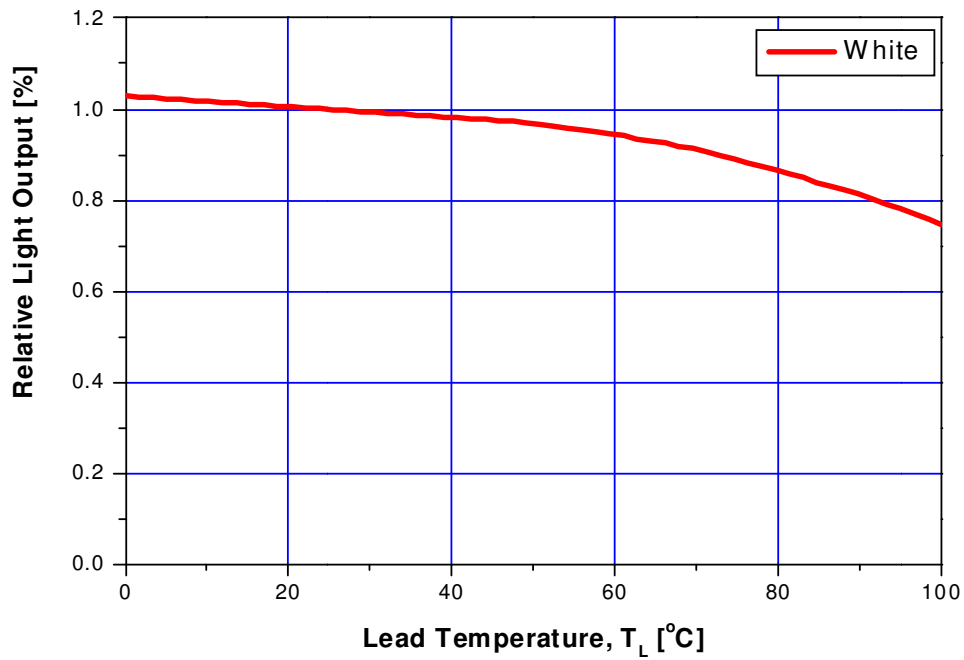
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## Module Performance

### Voltage vs. Luminous Flux

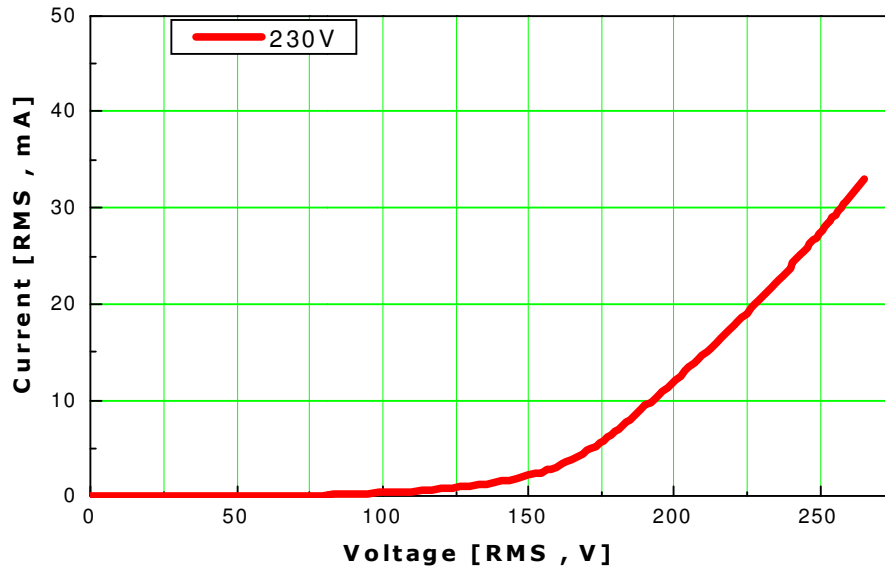


### Lead Temperature Characteristics

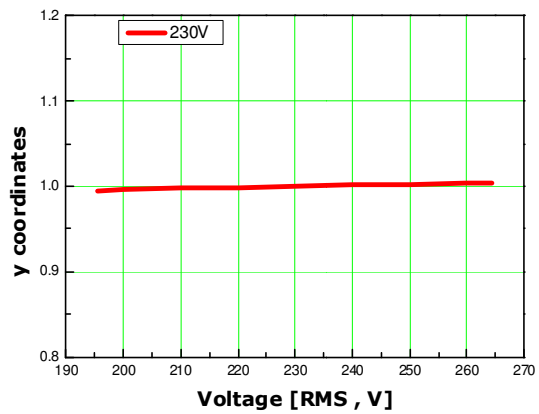
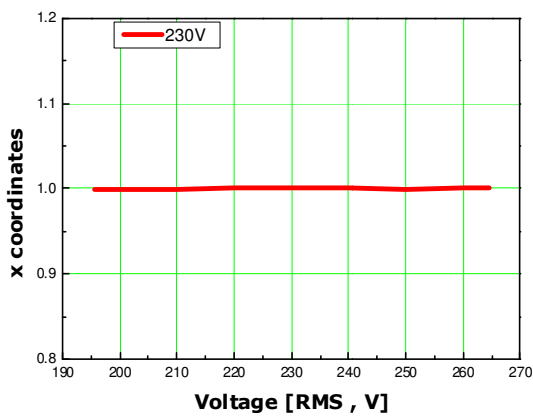



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### Current vs. Voltage



### Voltage vs X/Y shift according to CIE1931



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## Binning and Labelling

### Short form letter for colour

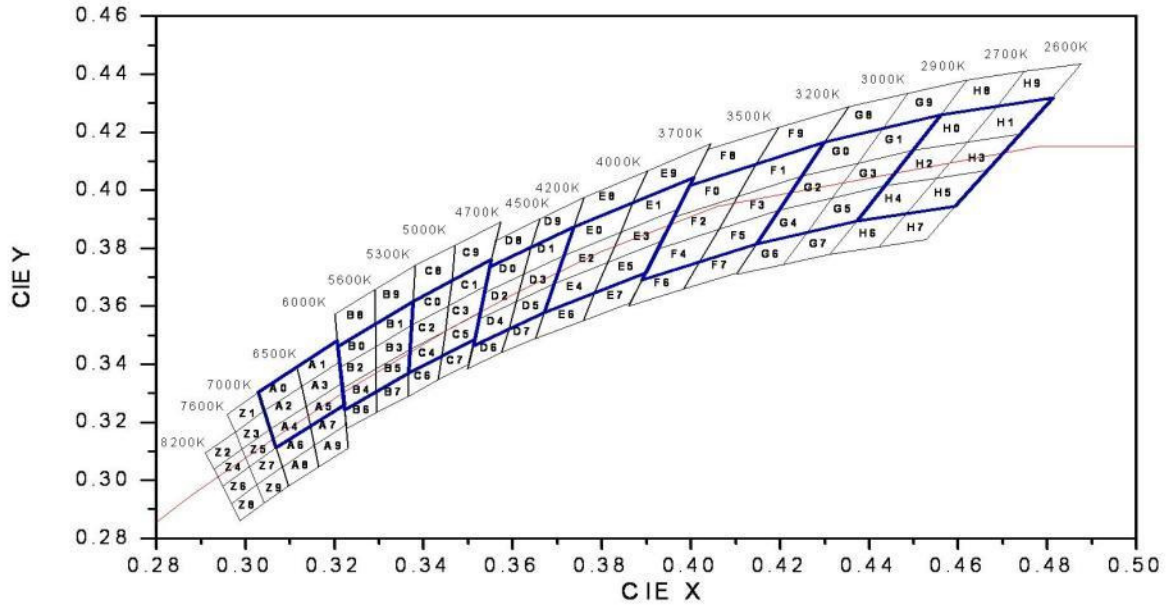
Colour Code	Colour
W	White
N	Warm White

### Luminous Flux Bins pro LED

Bin Code	Luminous Flux [lm]	
J	6 ~ 8.5	
K	8.5 ~ 11.0	
L	11.0 ~ 14.5	
M	14.5 ~ 19.0	
O	19.0 ~ 24.5	
P	24.5 ~ 32.0	
Q	32.0 ~ 41.5	
R	41.5 ~ 54.0	
S	S1	54.0 ~ 60.0
	S2	60.0 ~ 70.0
T	T1	70.0 ~ 80.0
	T2	80.0 ~ 91.0
U	U1	91.0 ~ 100.0
	U2	100.0 ~ 118.5
V	V1	118.5 ~ 136.0
	V2	136.0 ~ 154.0
W	W1	154.0 ~ 177.0
	W2	177.0 ~ 200.0
X	X1	200.0 ~ 230.0
	X2	230.0 ~ 260.0
Y	260.0 ~ 340.0	

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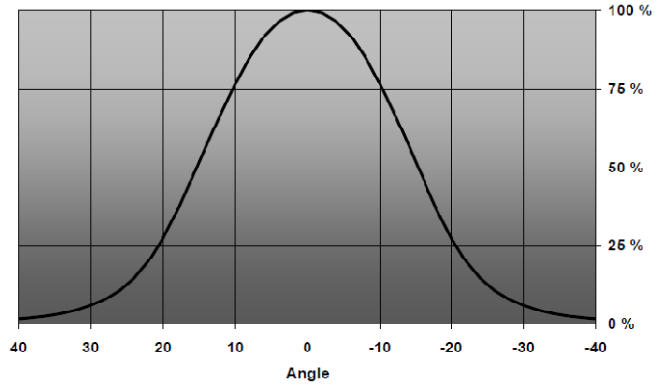
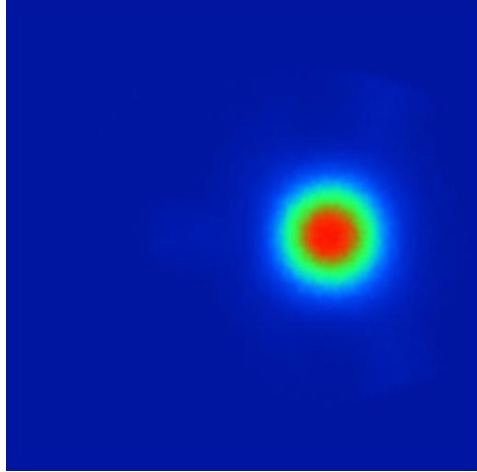
*Binning structure graphical representation IEC 1931*



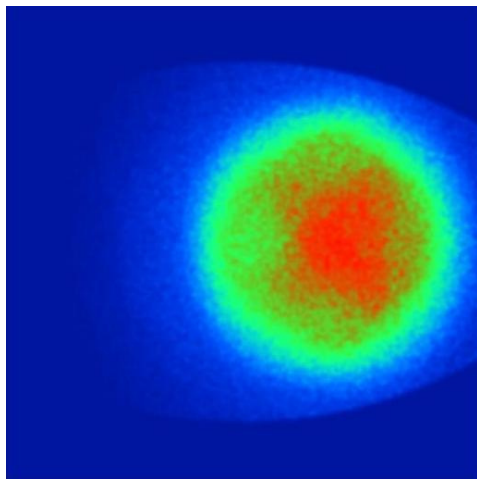
*\* Note Blue area is Energy Star Rank*

*Optics performance*


*Medium Version*



*Wide Asymmetric Version of centre 10°*



TBD

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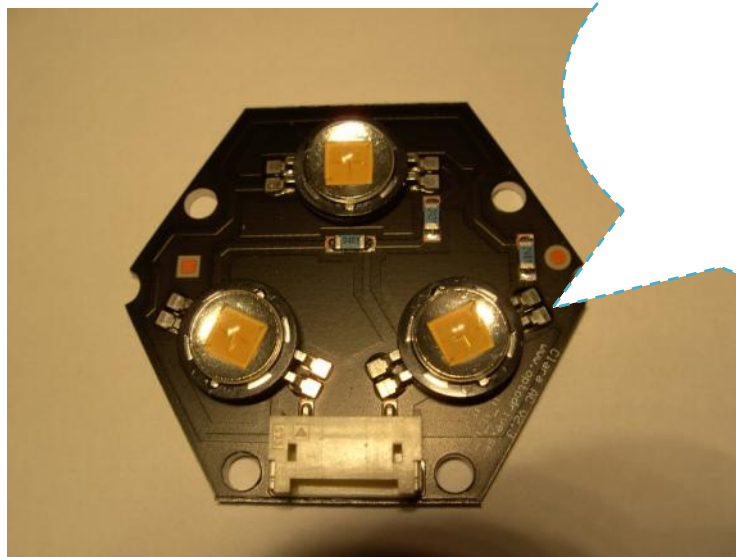
### *Measurement Control*

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.



**ts**


*the soldering  
Tc point not*

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

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*Lifetime*

TBD

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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 the LEDs are illuminating, operating current should be decided after considering the package maximum temperature.
- 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.

### *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 led 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 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.

### **Design for Environment:**

According to the EU-directive 2002/95/EC (RoHS) the following substances must not be used in this product

- Lead (Pb) alloys
- Mercury (Hg)
- Cadmium (Cd)
- Chromium (6+) compounds