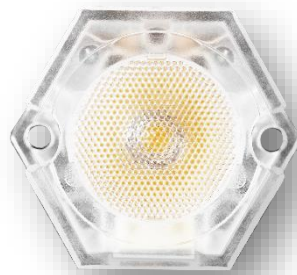




CLARA ED



FELICIA ED

4W



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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.

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 (CRI 93Ra) and is offered in cool, warm and natural white colour options.

- Excellent colour rendering index (Ra 93)
- 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 2screws and 1 plug
- Operates for at least 50,000 hours with good cooling
- Maximum energy efficiency



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Introduction

Applications

The LED module and light engine is named Felicia and it is a design for light fittings and luminaires aiming for various areas. It has been designed in order to meet the demands on high performance optical solutions in both light emitting and in colour rendering.

Mechanically it is constructed with our package design Felicia (35 mm) that has the same footprint as the others in the family both for external drivers as well as built in drivers for 110/230VAC.

Felicia package

The same package is used for Downlight, Spotlight, Tasklight and Medical light fittings etc. The solution is developed to make it easy for the designers and engineers to choose from low to high power, from AC to DC and choose between a variety of lenses in the same luminaire or in similar design. In the design concept there are standard dimmers with the same snap in connector (that fits the whole Optodrive concept™) as well as several heat sink designs with worldwide distribution.

ED design

ED stands for “External driver”. It has a standard plug in connector that fits all different ED designs.

Light output

The colour stability is of high importance in order to ensure that the installations have a uniform light output. Parameters such as binning, lifetime and thermal control are vital for good results.

Technical attributes

- Energy saving and a high lumen output
- High Colour Rendering
- Uniform Colour temperature
- Controlled lifetime
- Simple integration





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Short form Characteristics

Mechanical	
Board dimensions:	34.56 mm diameter
Assembly holes:	2 x 3.8 mm
Wire Connector:	PHR-2 or similar
Height:	14.2 mm

Electrical	
Number of LED's:	1
Power supply:	External Driver Max 50VDC
LED current:	Max 800 mA
Forward Volt:	
Power:	

Light	
CCT:	
CRI:	
Light output:	
SDCM (Mac Adam)	

Environmental operation conditions:	
Temperature range:	-40°C to 65°C (Absolute maximum temp Tc 65°C)
Relative Humidity:	10-75%
Ambient air pressure:	500-1060 HPa



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Article number structure

Article number: Clara ED.18.350.6.9yy-N	
Felicia:	Module name
ED:	External drive
P:	Power (Watt)
mA:	mA that the module are binned at.
n:	Amount of LEDs
9:	CRI >90
Yy:	CCT 27 =2700K, 30 =3000K, 40 =4000K
NN:	Viewing angle code 9 for 9.2°

Clara ED

Article name	Module name	Power supply	Power Watt	Current mA	LED	CRI Ra	CCT Kelvin	Lens angle
Felicia ED.4.350.1.927-25	Felicia	ED	4	350	1	>Ra90	2700	25°
Felicia ED.4.350.1.930-25	Felicia	ED	4	350	1	>Ra90	3000	25°
Felicia ED.4.350.1.940-25	Felicia	ED	4	350	1	>Ra90	4000	25°
Felicia ED.4.350.1.927-130	Felicia	ED	4	350	1	>Ra90	2700	130°
Felicia ED.4.350.1.930-130	Felicia	ED	4	350	1	>Ra90	3000	130°
Felicia ED.4.350.1.940-130	Felicia	ED	4	350	1	>Ra90	4000	130°





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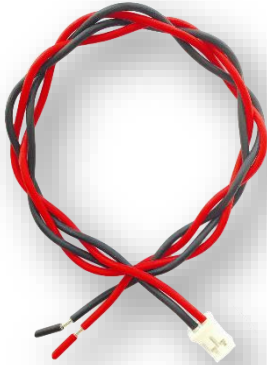
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Wiring diagrams

See separate wiring diagram documentation.



ED wires	Name	Connectors	Wires	Lenght
103481	Wire ED	2/0	2	L=200mm
103323	Wire ED	2/0	2	L=325mm (std)
100135	Wire ED	2/0	2	L=1000mm
100202	Wire ED	2/0	2	L=1500mm



Parameters of the Lens system

The lens system is mounted and fixated on to the PCB with double sided adhesive tape. The light parameters are according to the following:

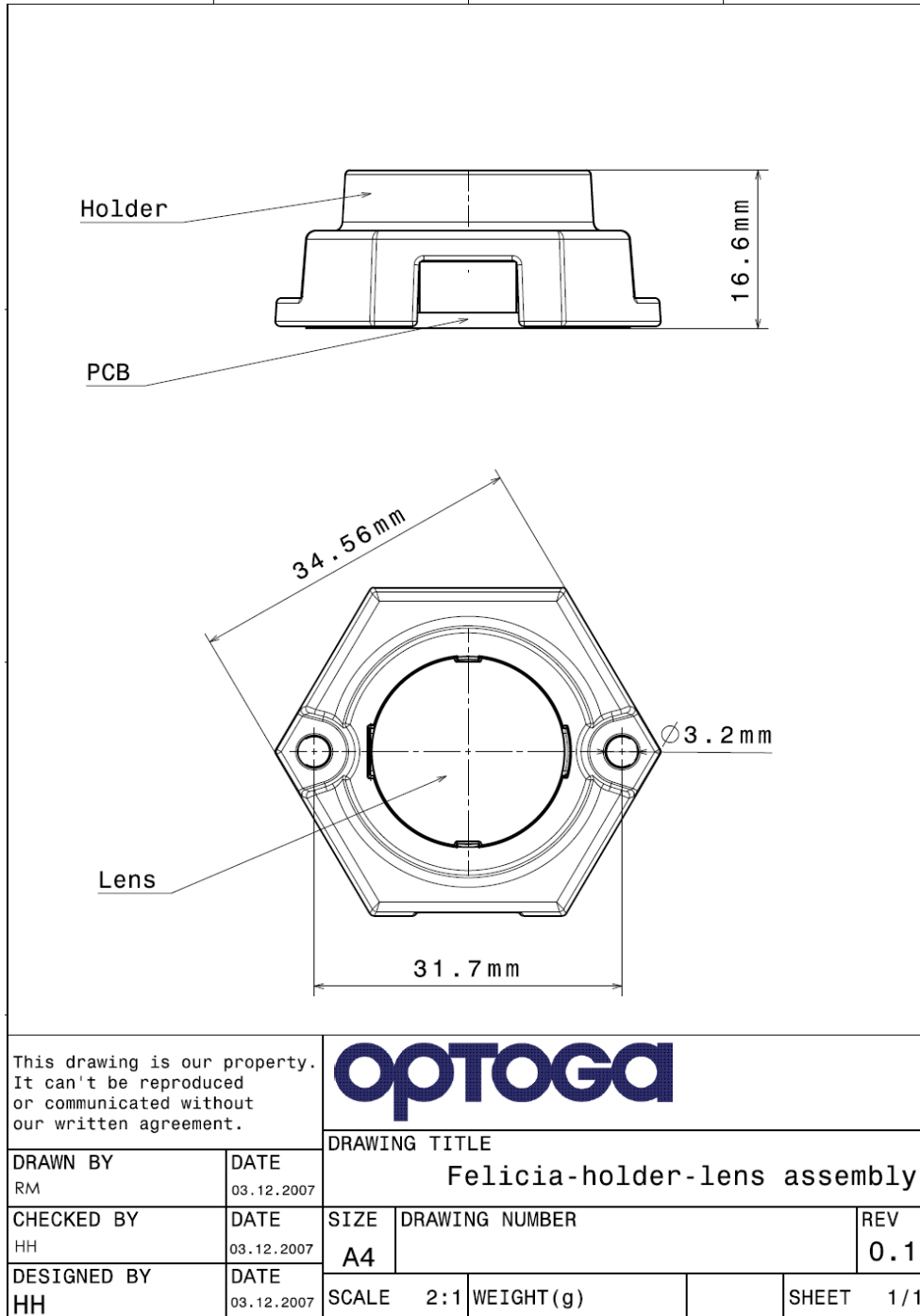
Version	Viewing Angle	FWHM Angle
Felicia Real Spot	10°	±5°
Felicia Smooth Spot	11°	±5.5°
Felicia Medium	26°	±13°
Felicia Rectangular	36° x 24°	±18° x 12°

Lens material is an optical grade PC with high UV and temperature resistance (130°C/220°F).

- 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



Dimensions LED Module:



Parameters of the light output

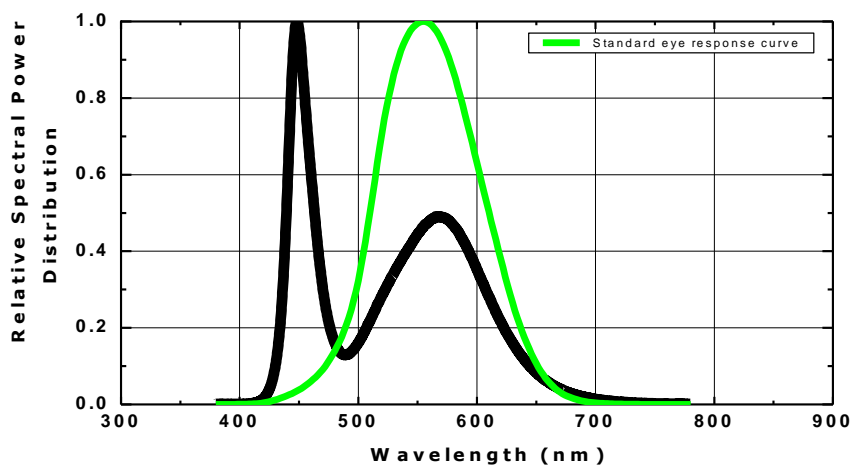
White LED

Felicia ED.4.350.1.W-NN ^{(1) (2)(3)}						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank ⁽²⁾	Φ_V	80		90	lm
	U2 rank ⁽²⁾	Φ_V	90		100	lm
	U3 rank ⁽²⁾		100		110	lm
Correlated Colour Temperature	B* rank ⁽³⁾	CCT	5300		6000	K
CRI		R _a	-	70	-	R _a
Power		P _o		1.1		W

- (1)See detailed information in chapter "Parameter of lens system" Replace NN with viewing angle accordingly
 (2)See detailed information in chapter "Luminous Flux Bin" Mark the minimum intensity code
 (3)See detailed information in chapter "Binning structure graphical representation" Mark the colour shortform letter.
 (4)Electro-Optical characteristics LED at I_F=350mA, T_A=25°C

Colour Spectrum

White





Normal White LED

Felicia ED.4.350.1.S-NN ⁽¹⁾ (2)(3)						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	T2 rank ⁽²⁾	Φ_V	70		80	lm
	U1 rank ⁽²⁾	Φ_V	80		90	lm
Correlated Colour Temperature	E * ⁽³⁾	CCT	3700		4200	K
CRI		R _a	-	93	-	Ra
Power		P _O		1.1		W

(1)See detailed information in chapter "Parameter of lens system" Replace NN with viewing angle accordingly

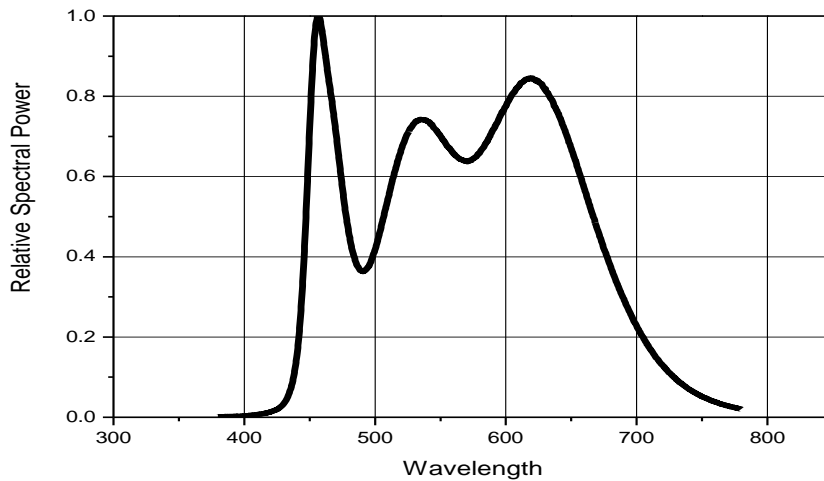
(2)See detailed information in chapter "Luminous Flux Bin" Mark the minimum intensity code

(3)See detailed information in chapter "Binning structure graphical representation" Mark the colour shortform letter.

(4)Electro-Optical characteristics LED at I_F=350mA, T_A=25°C

Colour Spectrum

Neutral White





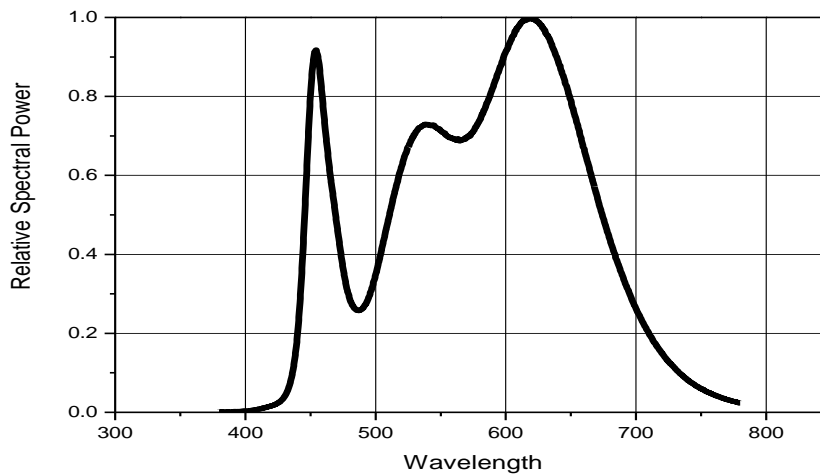
Warm White

Felicia ED.4.350.1.N-NN ⁽¹⁾ (2)(3)						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	T2 rank ⁽²⁾	Φ_V	70		80	lm
	U1 rank ⁽²⁾	Φ_V	80		90	lm
Correlated Colour Temperature	H * ⁽³⁾	CCT		2700		K
	G * ⁽³⁾	CCT		3000		K
CRI		R_a	-	93	-	Ra
Power		P_o		1.1		W

- (1)See detailed information in chapter "Parameter of lens system" Replace NN with viewing angle accordingly
- (2)See detailed information in chapter "Luminous Flux Bin" Mark the minimum intensity code
- (3)See detailed information in chapter "Binning structure graphical representation" Mark the colour shortform letter.
- (4)Electro-Optical characteristics LED at $I_F=350mA$, $T_A=25^\circ C$

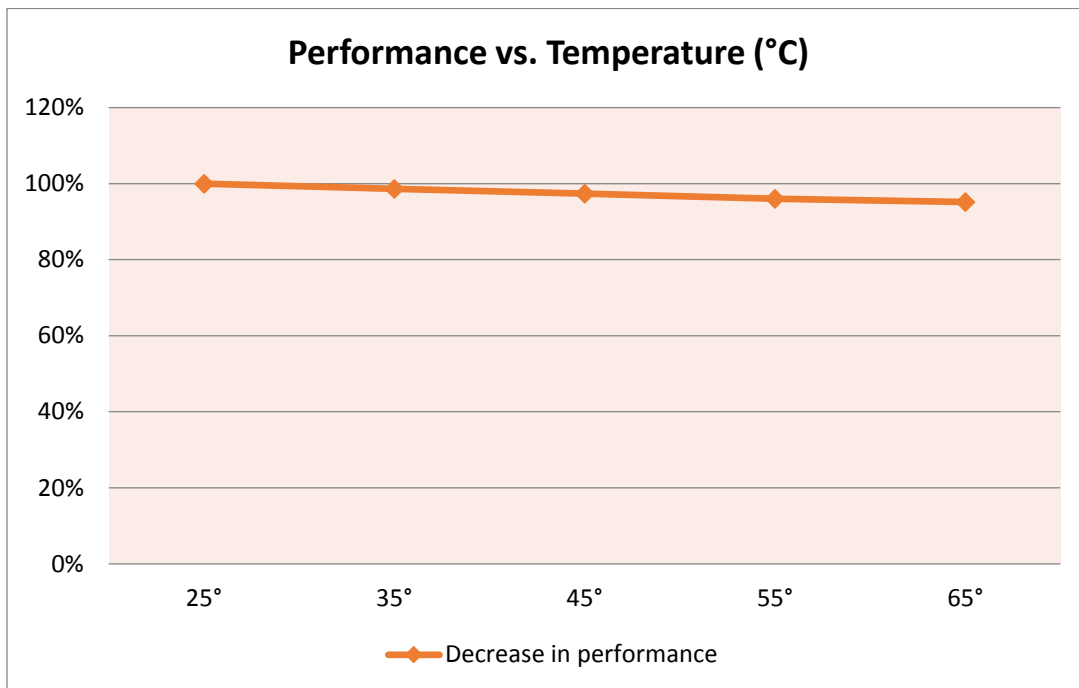
Colour Spectrum

Warm White



Electro Optical data

Temperature Characteristics



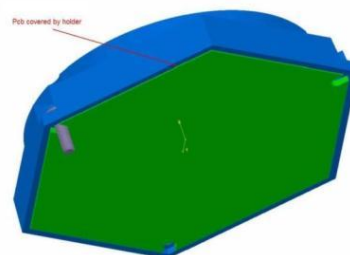
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Thermal information

the thermal area (green) has to be properly connected to an even and fine surface of a heat sink. Without this arrangement the unit will be overheated and will not be able to survive.

Maximum Temperature

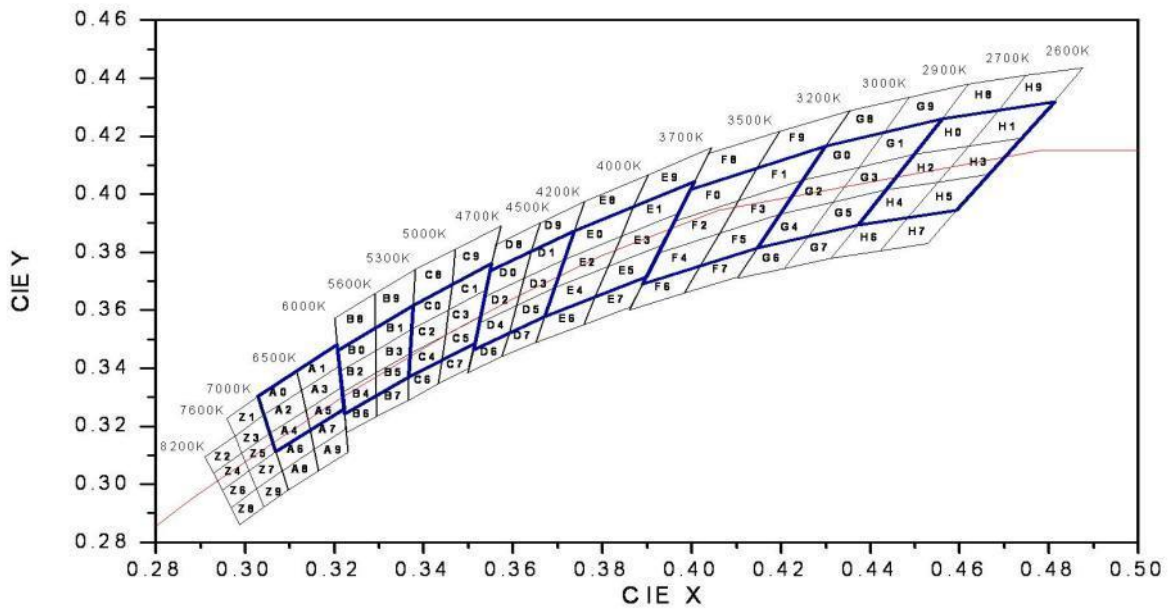
Secure the temperature in your application not to exceed 65°C. Read more in the section on how to measure temperatures.





Binning structure graphical representation

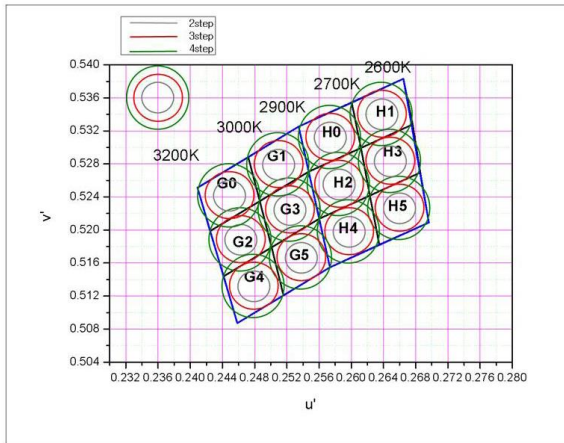
Binning structure graphical representation IEC 1931



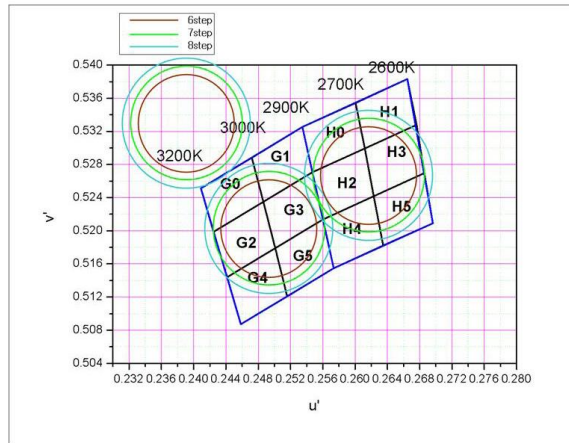
* Note that Blue area is Energy Star Rank

Mac Adam structure graphical representation IEC 1976

1bin: 3step



6bin: 7step

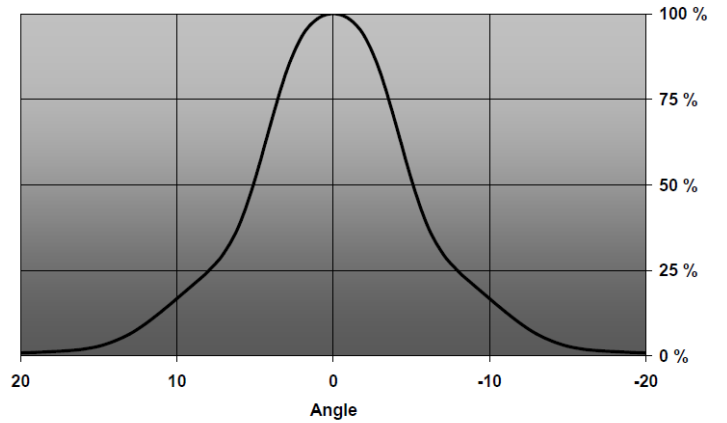


Note that the bin code from the top is transferred from IEC 1931 to IEC 1976 on the two MacAdam graphs above.

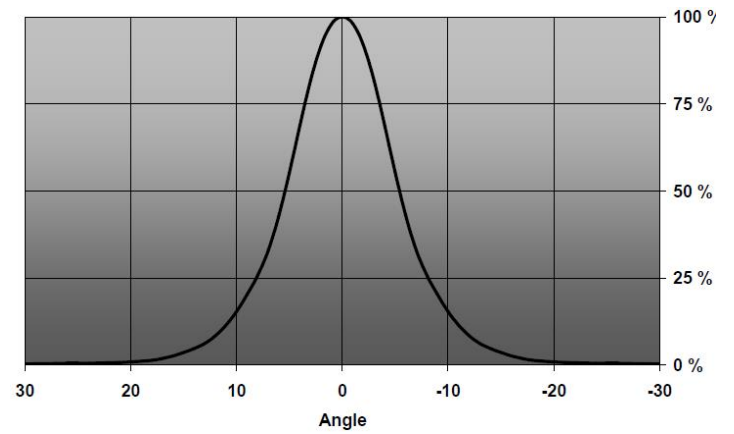


Optics

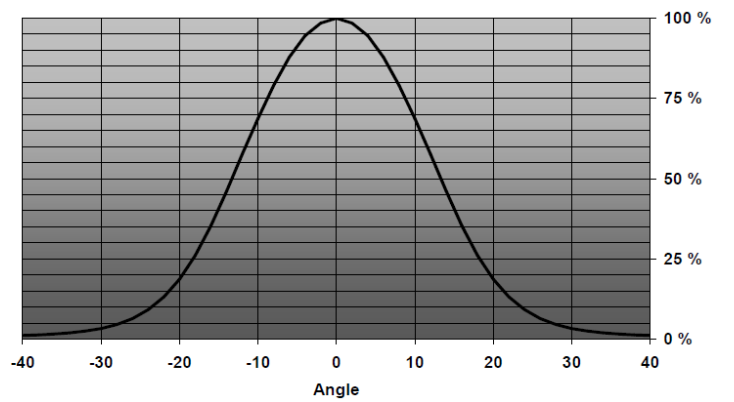
Real Spot Version



Smooth Spot Version



Medium Version





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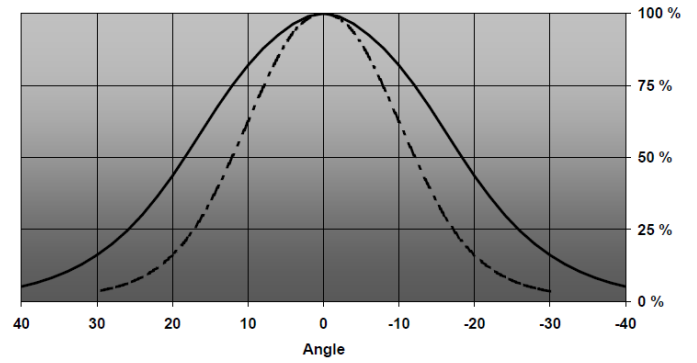
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Rectangular Version





Measurement Control

The recommended maximum value is 65°C on Tc or measuring point. If this value is exceeded we cannot guarantee the function and the lifetime of the product. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also in order to control the performance on the complete setup. By measuring 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 you verify that the temperature on the marked measurement points are satisfying. Pending on the result you know what lifetime to expect from the module.

This step will be implemented after the heat sink has been 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
Felicia (350mA)	65° C	>100 000 hours	67 500 Hours
Felicia (700 mA)	65° C	70 000 hours	37 500 hours



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Test and Performance

EMC (Emission and Immunity)

Safety of Laser products

The product meets the demands of safety According to IEC 60825-1 Safety of Laser products and it is identified as a Laser Product Class 1.

Test Performed	Environmental	Standard
IEC 60825-1	Safety of laser products	IEC 60825-1:1993 + A1:1997 + A2:2001

We are at your service if you have any furthermore questions or require more detailed information.



Precautions for use

- This device should not be used in any type of fluids such as water, oil, organic solvent etc.
- When cleaning is required, use only water together with mild soap on the outside of the lens. Cleaning inside of the LED module is strictly 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 is prohibited due to risk of EMC, dust, grease and other exposures that will damage it.
- The LED Module should always be mounted to a proper heat sink before it's connected with its proper leads.

Handling in regards to static electricity

- The Optodrive products have integrated circuits (IC) on board that may be damaged if exposed to static electricity. Please handle the products only while using equipment that prevents static electricity. Do not handle them without having ESD protection.
- The Optodrive products are not be installed into the end product without proper ESD protection.

Storage before use

- Use only properly rated test equipment and tools for the rated voltage and current of the product being tested.
- It is strongly suggested to wear rubber insulated gloves and rubber bottom shoes while handling the product.
- Do not wear any conductive items (such as jewelry) which could accidentally contact electric circuits.
- Faults, lightning, or switching transients can cause voltage surges in excess of the normal ratings.
- Internal component failure can cause excessive voltages.
- Stored or residual electricity in long wire could be hazardous.



RoHS Compliant

All our LED modules meet the Restrictions 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 module makers providing products to these countries should comply with these restrictions. In order to meet the 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



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Do you want to know more about benefits of OptoDrive LED?

Read more about OptoDrive at www.optodrive.se. You can contact us via info@optoga.com. Obviously, you can also call us on +46 (0)589 490 950.

Optoga AB

Optoga was founded in November 2004 in Arboga, Sweden and has many years of experience in electronics design. The company develops and supplies LEDs and LED-module solutions for the lighting industry, vehicle manufacturers and electronics companies.

With the OptoDrive LED-module, Optoga has taken the initiative to replace strip lights, incandescent and halogen bulbs with LED-based sources.



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