



CLARA



CLARA ED

3LED

The LED Engine is designed to meet the demands from high volume producers and is easily connected to an external driver. Integrated high output optics are suited to support the light outputs for particular applications such as Downlights, Spotlights, Tasklights, Examination Lights etc.



Clara Dome ED

Object:
Datasheet Clara ED

Document no:
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Revision:
2.5

Page:
Page 2 of 20

Author:
MB

Date:
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Pages for reference:

Pages for reference:	2
Introduction.....	3
Short form Characteristics.....	4
Wiring diagrams	6
Article number structure.....	7
Parameters of the Lens system	8
Parameters of the light output.....	9
Temperature Characteristics	12
Binning and Labeling	14
Binning and Labeling	15
Optics performance.....	16
Measurement Control.....	17
Lifetime (Calculated)	18
Precautions for use.....	19





Introduction

Applications

The LED module and light engine is named Clara 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 Clara (~50 mm) that has the same footprint as the others in the family both for external drivers as well as for built-in drivers or 110/230VAC.

Clara 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 designs. 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 the different ED platforms (e.g. Felicia, Steffi, Clara and Svea etc).

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



Please note that the article number structure for the variations of the modules comes separately.



Clara Dome ED

Object:
Datasheet Clara ED

Document no:
n/a

Revision:
2.5

Page:
Page 4 of 20

Author:
MB

Date:
2016-07-11

Short form Characteristics

Mechanical	
Board dimensions:	48.4 mm diameter
Assembly holes:	2 x 3.8 mm
Wire Connector:	PHR-3 or equivalent
Height:	16.4 mm

Electrical	
Number of LED's:	3
Power supply	External driver
LED current	Max 800mA
Input Voltage	
Power:	
Input Current:	
Module current:	
Power factor:	
Total Harmonic Distortion:	
Over temp protection:	

Light	
CCT:	2700K / 3000K / 4000K
CRI:	> 80 Ra / >90 Ra
Light output:	
SDCM (Mac Adam)	4

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



Clara Dome ED

Document no:
n/a

Revision:
2.5

Page:
Page 5 of 20

Object:
Datasheet Clara ED

Author:
MB

Date:
2016-07-11

Dimming Signal:	
PWM high level:	
PWM low level:	
PWM frequency ¹ :	
Efficiency:	
Reversed polarity protection:	
Transient protection:	
Overvoltage protection:	
Dimming-signal:	



Clara Dome ED

Document no:
n/a

Revision:
2.5

Page:
Page 6 of 20

Object:
Datasheet Clara ED

Author:
MB

Date:
2016-07-11

Wiring diagrams

See separate wiring diagram documentation.

Article number	Article name	Length
102877	Wire AC 100	100 mm
103527	Wire AC 220	220 mm
101913	Wire AC 450	450 mm
103222	Wire AC 600	600 mm



Clara Dome ED

Object:
Datasheet Clara ED

Document no:
n/a

Revision:
2.5

Page:
Page 7 of 20

Author:
MB

Date:
2016-07-11

Article number structure

Optodrive™ Article Number consists of two parts:

- 1st part: Module Number
- 2nd part: Bin Code or Rank

Article number: Clara ED.12.350.3.9yy-N	
Clara:	Module name
ED:	External drive
P:	Power (Watt) maximum 12W
mA:	mA that the module are binned at.
n:	Amount of LEDs
8:	CRI >90
Yy:	CCT 27 =2700K, 30 =3000K, 40 =4000K
N:	Viewing angle code 25 for 25°

Clara ED

Module name	Power supply	Watt	Volt	LED	CRI Ra	CCT Kelvin	Lens angle	Article name
Clara	ED	12		2	90+	2700	25°	Clara ED.12.350.2.927-25
Clara	ED	12		3	80+	3000	25°	Clara ED.12.350.3.830-25
Clara	ED	12		3	90+	3000	25°	Clara ED.12.350.3.930-25
Clara	ED	12		3	80+	3000	40°	Clara ED.12.350.3.830-40
Clara	ED	12		3	90+	3000	40°	Clara ED.12.350.3.930-40
Clara	ED	12		3	80+	4000	25°	Clara ED.12.350.3.840-25
Clara	ED	12		3	90+	4000	40°	Clara ED.12.350.3.840-40
Clara	ED	12		3	80+	4000	40°	Clara ED.12.350.3.940-40

Wire order information:

Article number	Article name	Length
103481	Wire ED L 200	200mm
103323	Wire ED L 325	325mm





Parameters of the Lens system

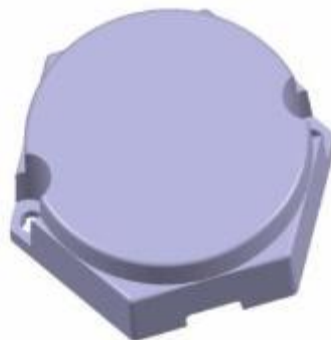
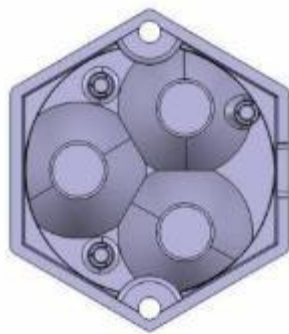
The lens system is mounted and fixated onto the PCB with a double press-fit. The light parameters are according to the following:

Version	Viewing Angle	FWHM Angle
Clara Spot	10°	±5°
Clara Medium	25°	±12.5°
Clara Wide	50°	±25°
Clara Cover	130°	±65 °

Versions that are under development

Lens material optical grade PMMA.

- Allows use of high current and temperature conditions
- Best available optical efficiency with up to 90%
- Very even colour distribution over the whole beam angle
- Integrated holder. Fastening to heat sink with two screws
- Compact dimensions





Parameters of the light output

2700, 3000 & 4000K

Clara ED.12.350.3.y27-NN ^{(1) (2)(3)}						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	T2 rank ⁽²⁾	Φ_v	210		250	lm
	U1 rank ⁽²⁾	Φ_v	240		270	lm
	U2 rank ⁽²⁾	Φ_v	265		300	lm
Correlated Colour Temperature	H rank ⁽³⁾	CCT	2600	2700	2800	K
CRI		R _a	80		97	Ra
Power		P _o		3.3		W

Clara ED.12.350.3.y30-NN ^{(1) (2)(3)}						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank ⁽²⁾	Φ_v	240		270	lm
	U2 rank ⁽²⁾	Φ_v	265		300	lm
	U3 rank ⁽²⁾		305		340	lm
Correlated Colour Temperature	G rank ⁽³⁾	CCT	2900	3000	3100	K
CRI		R _a	80		97	Ra
Power		P _o		3.3		W

Clara ED.12.350.3.y40-NN ^{(1) (2)(3)}						
3 LED	Rank / Binning	Symbol	Value ⁽⁴⁾			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank ⁽²⁾	Φ_v	240		270	lm
	U2 rank ⁽²⁾	Φ_v	265		300	lm
	U3 rank ⁽²⁾		305		340	lm
Correlated Colour Temperature	E rank ⁽³⁾	CCT	3900	4000	4100	K
CRI		R _a	80		97	Ra
Power		P _o		3.3		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 IF=350mA, TA=25°C



Clara Dome ED

Object:
Datasheet Clara ED

Document no:
n/a

Revision:
2.5

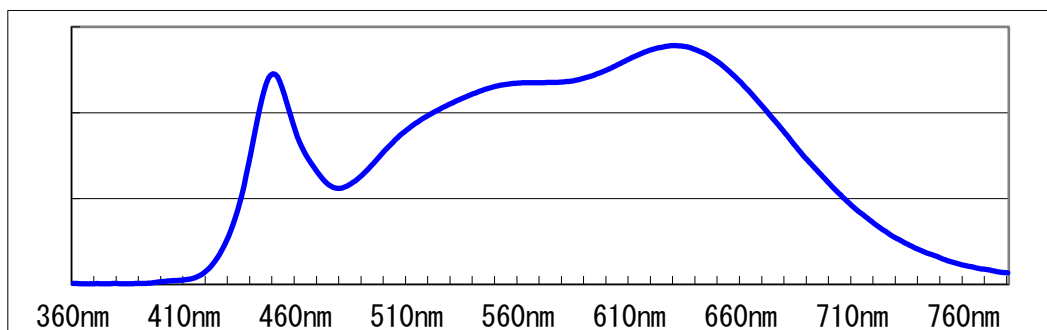
Page:
Page 10 of 20

Author:
MB

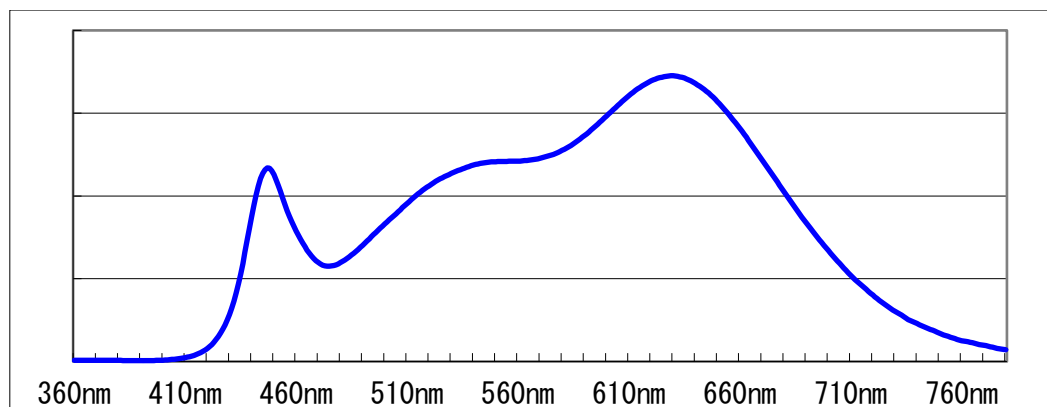
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2016-07-11

Colour Spectrum

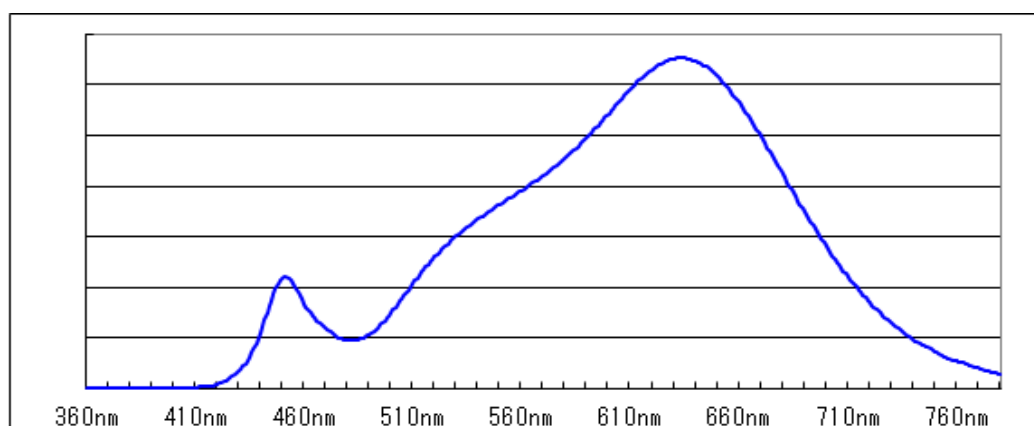
4000Kelvin



3000Kelvin



2700Kelvin





Clara Dome ED

Document no:
n/a

Revision:
2.5

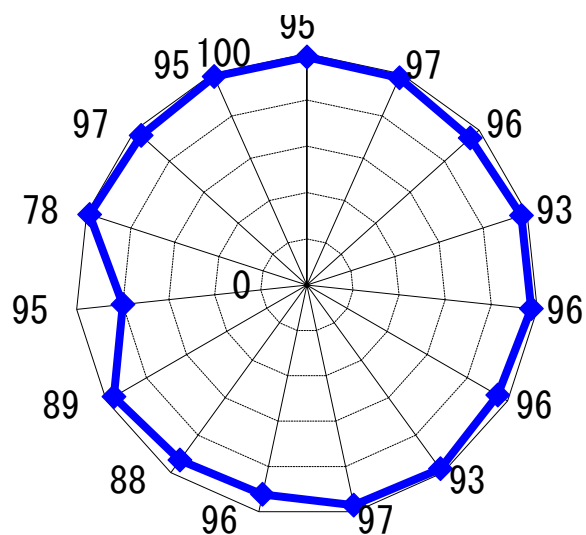
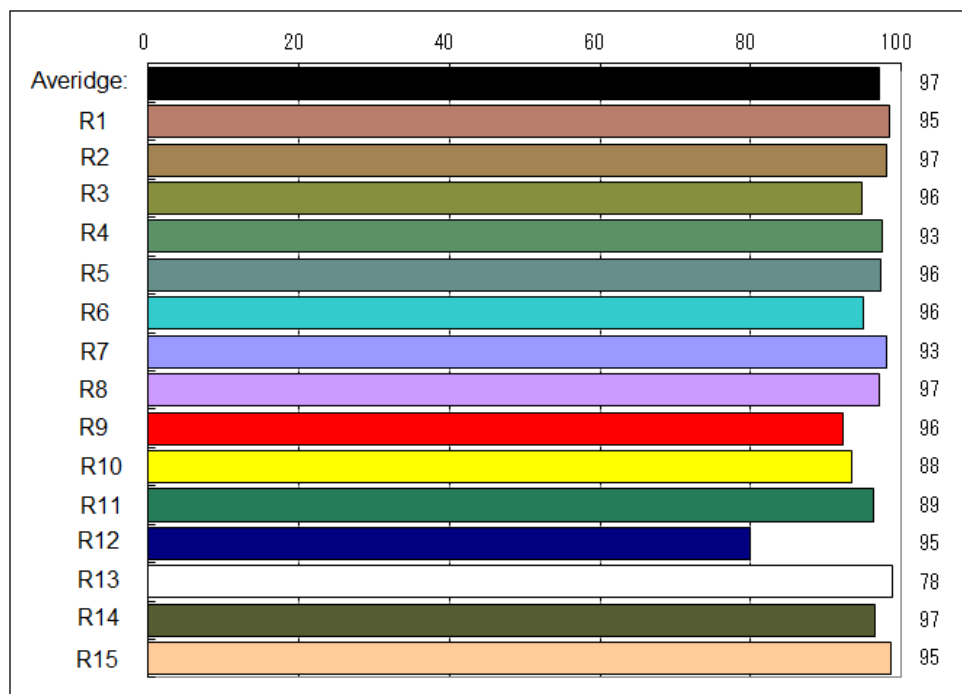
Page:
Page 11 of 20

Object:
Datasheet Clara ED

Author:
MB

Date:
2016-07-11

CRI 1-15



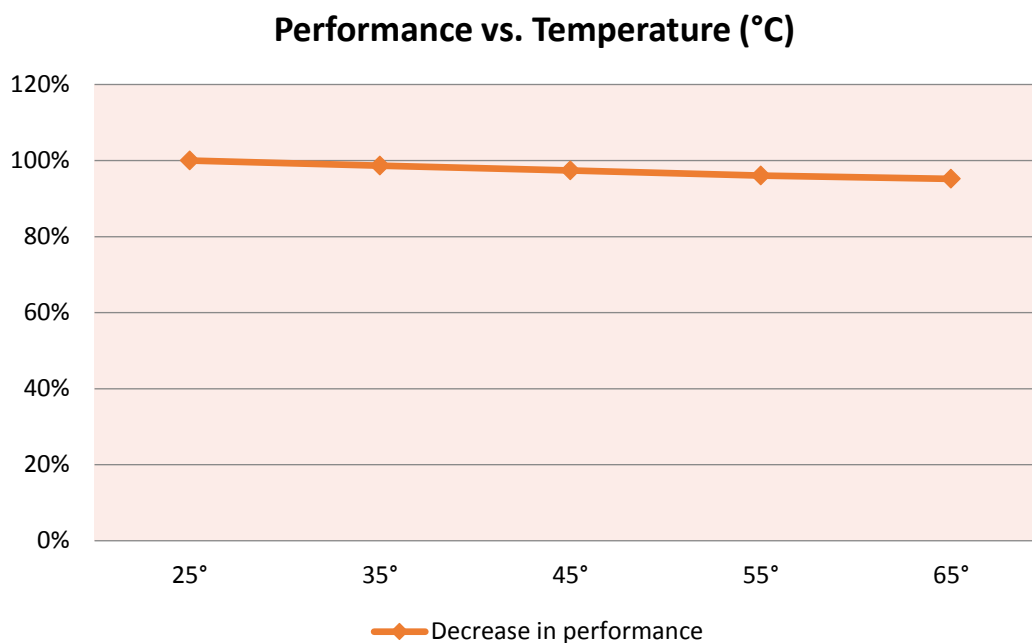
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Temperature Characteristics



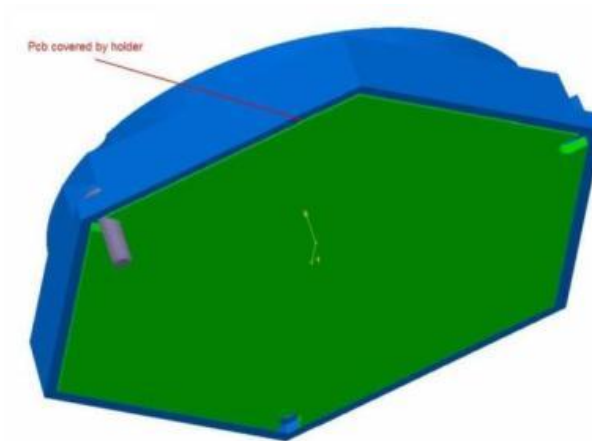
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

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 and Labeling

Short form letters for colours

Colour Code	Colour
W	White
S	Neutral White
N	Warm White
B	Blue
G	Green
R	Red
A	Amber

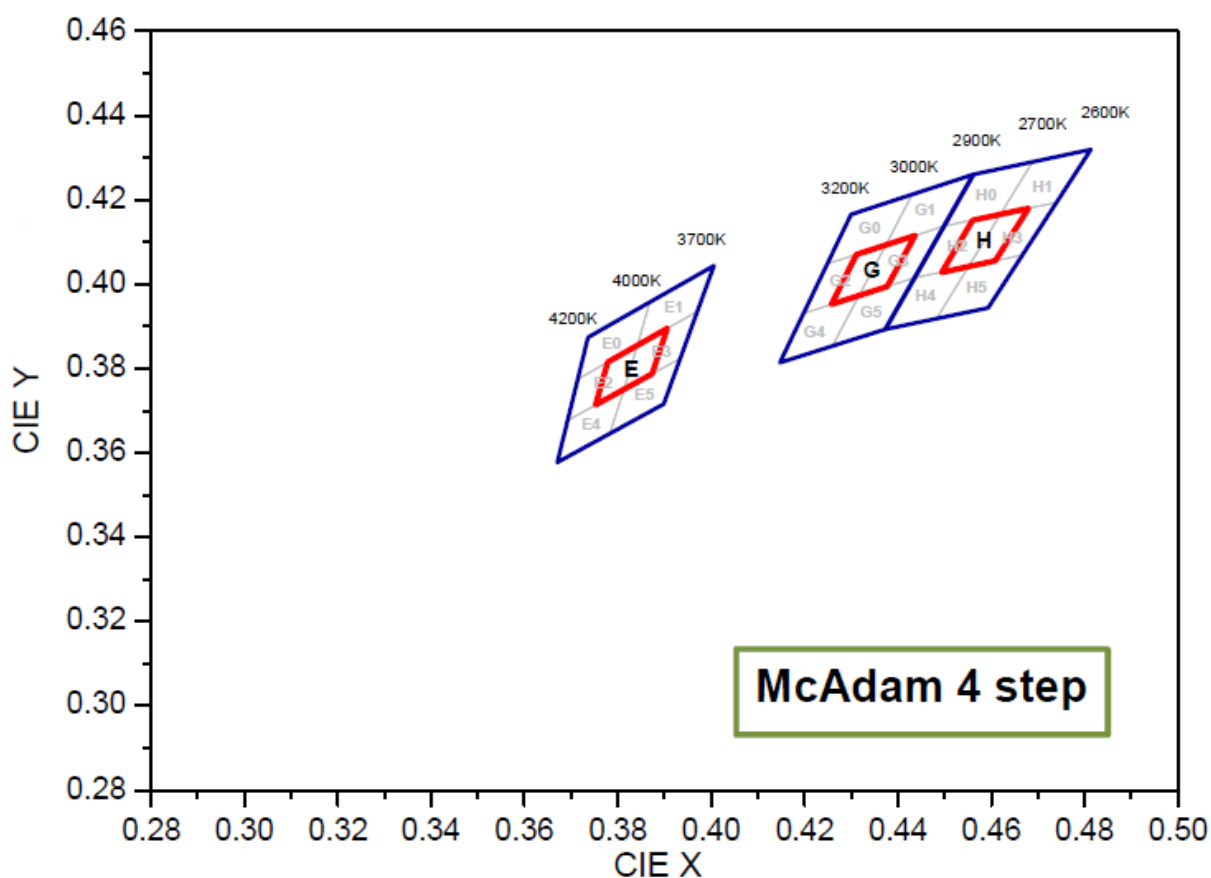
Luminous Flux Bins pro LED

Bin Code		Luminous Flux [lm]
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 ~ 109.0
	U3	109.0 ~ 118.5
V	V1	118.5 ~ 130.0
	V2	130.0 ~ 140.0
	V3	140.0 ~ 154.0
W	W	154.0 ~ 200.0

Binning and Labeling

Binning structure graphical representation IEC 1931

Note the availability and representation on the IEC 1976 graph shown below.



* Note that the Blue area is Energy Star Rank

Short form in diagram	Colour Code	CCT
H	27	2700K
G	30	3000K
E	40	4000K



Clara Dome ED

Object:
Datasheet Clara ED

Document no:
n/a

Revision:
2.5

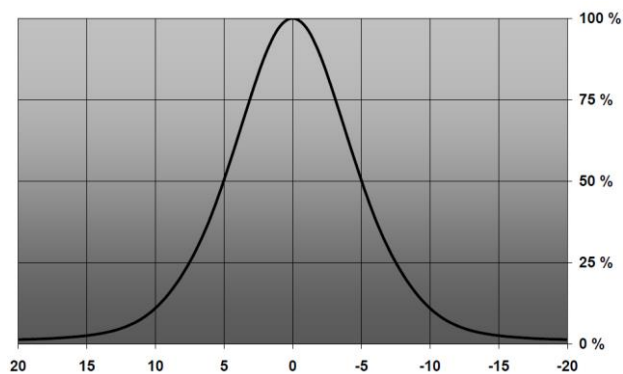
Page:
Page 16 of 20

Author:
MB

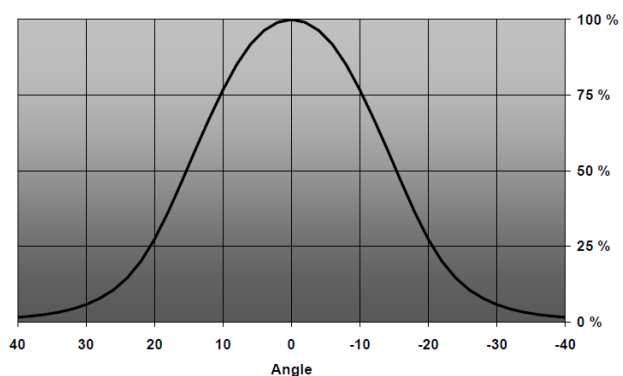
Date:
2016-07-11

Optics performance

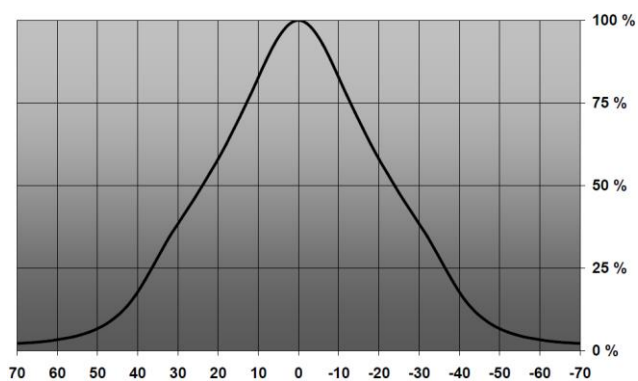
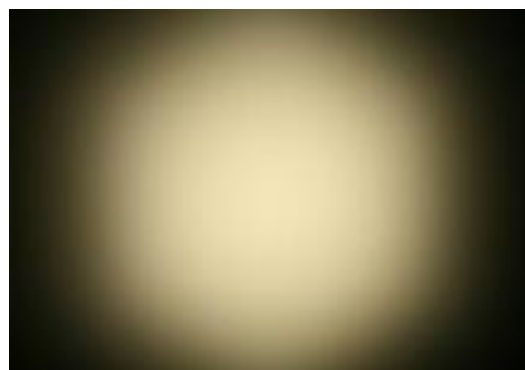
Spot version



Medium version



Wide version



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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 temperature (Tj) 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.

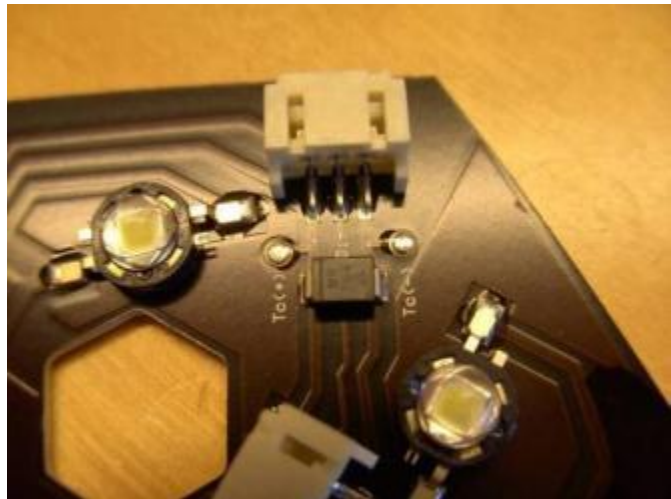
Measurement points

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.

Measurement points

- TC

This step will be implemented after the heat sink has been connected properly!





Clara Dome ED

Document no:
n/a

Revision:
2.5

Page:
Page 18 of 20

Object:
Datasheet Clara ED

Author:
MB

Date:
2016-07-11

Lifetime (Calculated)

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

Unit	T _c Maximum	50% degradation L50	30% degradation L70
Clara (350mA)	65° C	>80 000 hours	67 500 Hours
Clara (700 mA)	65° C	50 000 hours	37 500 hours



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. This is due to electrical hazard.

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

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

Read more about OptoDrive™ at www.optodrive.se. You can also register your interest via info@optoga.se.

Obviously, you can also call us on +46 (0)589 490 950.

Optoga AB

Founded in November 2004, Optoga has over 30 years of experience in electronic components. The company develops and supplies LEDs, LED drivers, LED modules and software solutions for the lighting industry, vehicle manufacturers and electronics companies.

By developing products with integrated LED and driver electronics, Optoga has taken the initiative to replace strip lights, incandescent and halogen bulbs with LED-based light sources.

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The logo for Optoga, featuring the word "optoga" in a bold, lowercase, sans-serif font. The 'o' is stylized with a small gap at the top.