



CLARA AC COB



CLARA AC 50

5W | 8W | 10W | 16W

Compact LED-module for downlights and spotlights.

No Driver is required!





Key features

Story

Designed for downlight and other places where the need is to create a good atmosphere for people to dwell in whether they take care of business or socialize.

These LED modules or LED-light engines for downlights and spotlights are designed with internal drivers and are therefore very easy to connect into applications with different dimming scenarios. The light output efficiency is the highest available on the market for these types of applications.

Key features

- High efficiency
- Available with 4 beam angles
- Optimized Uniformity
- Lens with Connector
- Anti-glare
- Architectural Lighting
- Commercial Lighting





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Introduction

Clara package

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.

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.

AC design

All driver and dimmer components are built-in.

The advantage with an AC driver that has been built-in is:

- Lifetime – Connected to a heat sink and therefore has a controlled environment
- Dimming – Dimming via standard trailing edge dimmers
- Small – No extra boxes
- Simple – Easily adapted into the production line

Light output

Colour stability is important to ensure that the installation has a uniform light output. Parameters such as binning, lifetime and thermal control are vital for good results.



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Short form Characteristics

MODULE CHARACTERISTICS	5W	7W	10W	16W
	Standard	Non standard	Standard	Non standard
Power	5W +/-10%	8W +0%-10%	10W +/-10% ea.	16W +/-10% ea.
Voltage	230 VAC	230 VAC	230 VAC	230 VAC
Number of Chips	31	31	31	31
CRI	>Ra85 or >Ra95			
Colour temperature	2700K, 3000K, 4000K			
Optics	Se separate information			

MECHANICAL

Module dimension	54.0x46.0 mm hexagonal (CLARA)			
Height	Depending on optics			
Weight	TBD			
Assembly holes	2 x 3.8 mm (CLARA)			
Wire connector	CviLux CP04-03S0 or JST BH			

ELECTRICAL

Input voltage range	220-240V			
Power factor	0.8			
Total harmonic distortion	<15%			
Peak inrush current	600mA			
Inrush current duration	< 35µs			
Type of current	AC			
Surge protection	1.5kV on board			
Burst protection	2kV on board			
Over temp. protection	150°C			
Energy class	G			

PHOTOMETRICAL

Flux nominal	425 lm	595lm	850 lm	1360 lm
Efficiency	85 lm/W	85 lm/W	85 lm/W	85 lm/W
SDCM (Mac Adam)	3			
SVM	0.5			
PstLM	0.6			

ENVIRONMENTAL

Relative Humidity	10-75%			
Temperature range	-40°C to 85°C (Absolute maximum temp Tc 85°C)			
Ambient air pressure	500-1060 hPa			
Life length L70B10*	>50 000h			





Article number structure CLARA

CLARA AC.P.230.31.8YY-NN

AC	AC= 230VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt)
V	Voltage: 230VAC
N	Amount of LEDs (31)
8	CRI: 8=Ra>80, 9=Ra>90
YY	CCT: 27 =2700K, 30 =3000K, 40 =4000K
NN	Viewing angle code (NN with out optic)
FF	Flickerfree according to EPREL

Full article name and versions

ARTICLE NAME	POWER	CURRENT	LEDs	CRI	CCT	LENS	Energy Class
Clara AC.5.230.31.927-50.FF	5	230	31	95	2700	50°	G
Clara AC.5.230.31.930-50.FF	5	230	31	95	3000	50°	G
Clara AC.5.230.31.940-50.FF	5	230	31	95	4000	50°	G
Clara AC.5.230.31.927-NN.FF	5	230	31	95	2700	No lens	G
Clara AC.5.230.31.930-NN.FF	5	230	31	95	3000	No lens	G
Clara AC.5.230.31.940-NN.FF	5	230	31	95	4000	No lens	G
Clara AC.7.230.31.927-50.FF	7	230	31	95	2700	50°	G
Clara AC.7.230.31.930-50.FF	7	230	31	95	3000	50°	G
Clara AC.7.230.31.940-50.FF	7	230	31	95	4000	50°	G
Clara AC.7.230.31.927-NN.FF	7	230	31	95	2700	No lens	G
Clara AC.7.230.31.930-NN.FF	7	230	31	95	3000	No lens	G
Clara AC.7.230.31.940-NN.FF	7	230	31	95	4000	No lens	G
Clara AC.10.230.31.927-50.FF	10	230	31	95	2700	50°	G
Clara AC.10.230.31.930-50.FF	10	230	31	95	3000	50°	G
Clara AC.10.230.31.940-50.FF	10	230	31	95	4000	50°	G
Clara AC.10.230.31.927-NN.FF	10	230	31	95	2700	No lens	G
Clara AC.10.230.31.930-NN.FF	10	230	31	95	3000	No lens	G
Clara AC.10.230.31.940-NN.FF	10	230	31	95	4000	No lens	G
Clara AC.16.230.31.927-50.FF	16	230	31	95	2700	50°	G



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Clara AC.16.230.31.930-50.FF	16	230	31	95	3000	50°	G
Clara AC.16.230.31.940-50.FF	16	230	31	95	4000	50°	G
Clara AC.16.230.31.927-NN.FF	16	230	31	95	2700	No lens	G
Clara AC.16.230.31.930-NN.FF	16	230	31	95	3000	No lens	G
Clara AC.16.230.31.940-NN.FF	16	230	31	95	4000	No lens	G
Clara AC.5.230.31.827-50.FF	5	230	31	85	2700	50°	F
Clara AC.5.230.31.830-50.FF	5	230	31	85	3000	50°	F
Clara AC.5.230.31.840-50.FF	5	230	31	85	4000	50°	F
Clara AC.5.230.31.827-NN.FF	5	230	31	85	2700	No lens	F
Clara AC.5.230.31.830-NN.FF	5	230	31	85	3000	No lens	F
Clara AC.5.230.31.840-NN.FF	5	230	31	85	4000	No lens	F
Clara AC.7.230.31.827-50.FF	7	230	31	85	2700	50°	F
Clara AC.7.230.31.830-50.FF	7	230	31	85	3000	50°	F
Clara AC.7.230.31.840-50.FF	7	230	31	85	4000	50°	F
Clara AC.7.230.31.827-NN.FF	7	230	31	85	2700	No lens	F
Clara AC.7.230.31.830-NN.FF	7	230	31	85	3000	No lens	F
Clara AC.7.230.31.840-NN.FF	7	230	31	85	4000	No lens	F
Clara AC.10.230.31.827-50.FF	10	230	31	85	2700	50°	F
Clara AC.10.230.31.830-50.FF	10	230	31	85	3000	50°	F
Clara AC.10.230.31.840-50.FF	10	230	31	85	4000	50°	F
Clara AC.10.230.31.827-NN.FF	10	230	31	85	2700	No lens	F
Clara AC.10.230.31.830-NN.FF	10	230	31	85	3000	No lens	F
Clara AC.10.230.31.840-NN.FF	10	230	31	85	4000	No lens	F
Clara AC.16.230.31.827-50.FF	10	230	31	85	2700	50°	G
Clara AC.16.230.31.830-50.FF	10	230	31	85	3000	50°	G
Clara AC.16.230.31.840-50.FF	10	230	31	85	4000	50°	G
Clara AC.16.230.31.827-NN.FF	10	230	31	85	2700	No lens	G
Clara AC.16.230.31.830-NN.FF	10	230	31	85	3000	No lens	G
Clara AC.16.230.31.840-NN.FF	10	230	31	85	4000	No lens	G

Standard versions are CRI90 in 5 and 10W



Köpingsvägen 4
SE-732 31 ARBOGA

Ph: +46 (0)589-490 950
Fax: +46 (0)589-490 950

Web: www.optoga.se
E-mail: info@optoga.se



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Packaging data

Clara AC 50° – Packaging information

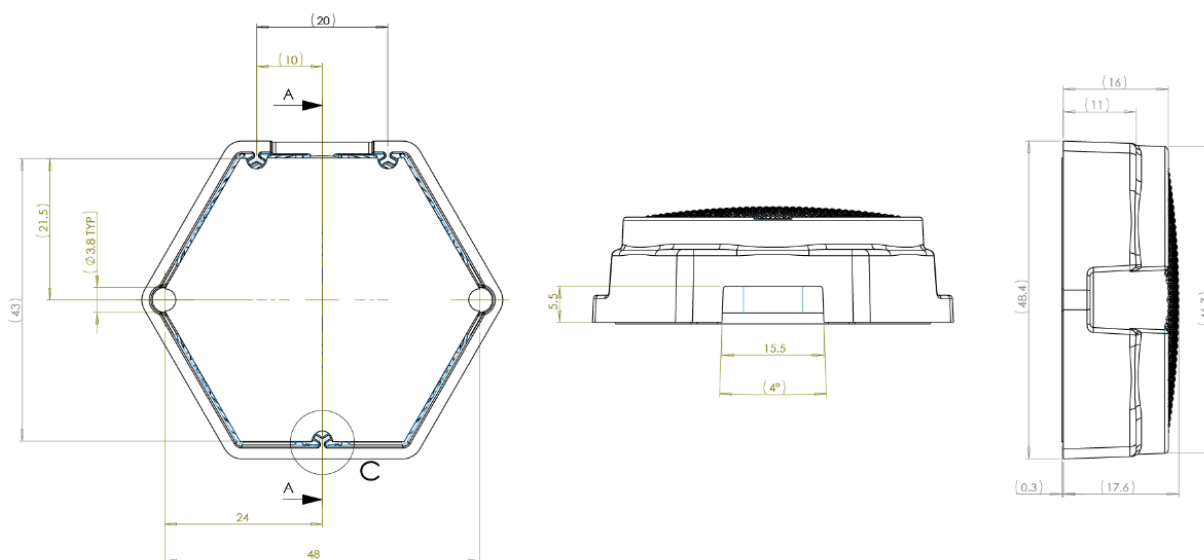
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	45	35.6	22.7	9.6	
Outer box	360	46.5	37.5	39.6	13.92

Clara AC NN – Packaging information

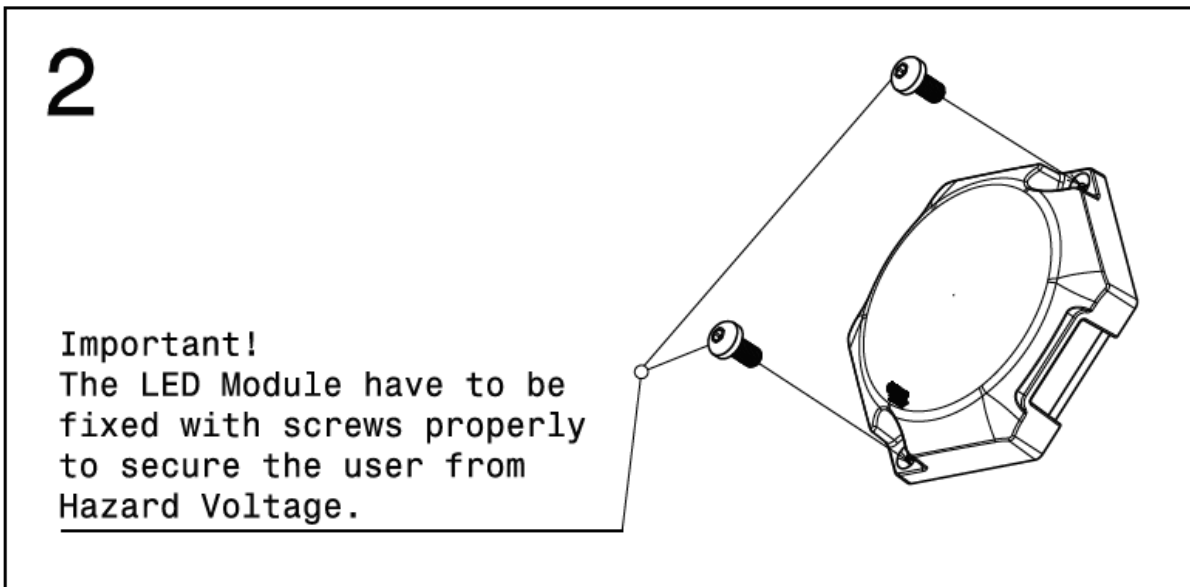
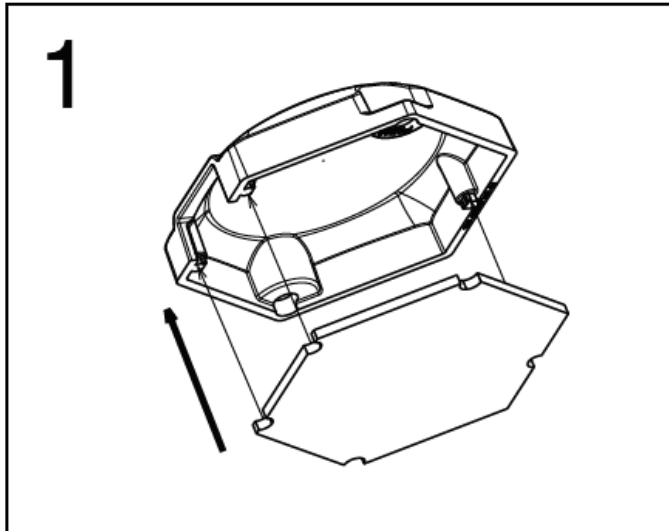
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	45	35.6	22.7	9.6	
Outer box	360	46.5	37.5	39.6	13.92

Dimensions LED Module CLARA

Clara 50° lens



Mounting and de-mounting instructions



Never connect or disconnect the LED module with the power ON. Read the information under "Precautions for use" before handling the device.



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Wiring diagram

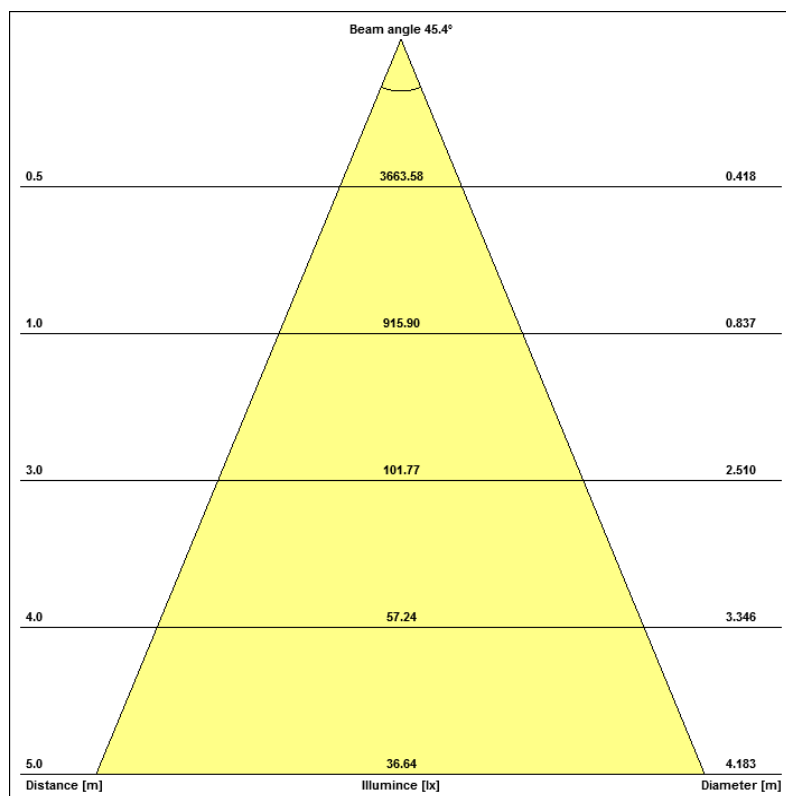
ARTICLE NUMBER	ARTICLE NAME	LENGTH
102877	Wire AC 100	100 mm
103527	Wire AC 220	220 mm
101913	Wire AC 450	450 mm (std)
103222	Wire AC 600	600 mm

See separate wiring diagram documentation in Datasheet Accessories AC.



Parameters of the Lens system

Clara 50 system





Photometrical

Flux

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	5W	Φ_V		450		lm
	8W	Φ_V		720		lm
	10W	Φ_V		950		lm
	16W	Φ_V		1440		lm
Correlated Colour Temperature	27*(2)	CCT		2700		K
	30*(2)	CCT		3000		K
	40*(2)	CCT		4000		K
CRI		R_a	93	95	-	-
Power		P_o		5		W
		P_o		7		W
		P_o		10		W
		P_o		16		W

Electro-Optical characteristics LED module at $I_F=xxmA$, 230VAC, $T_A=25^\circ C$

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



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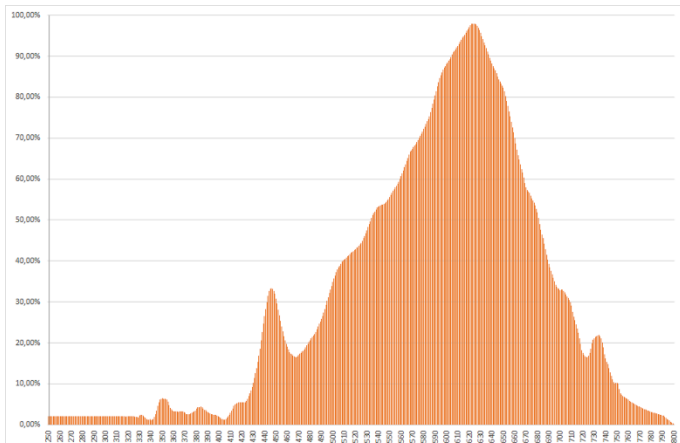
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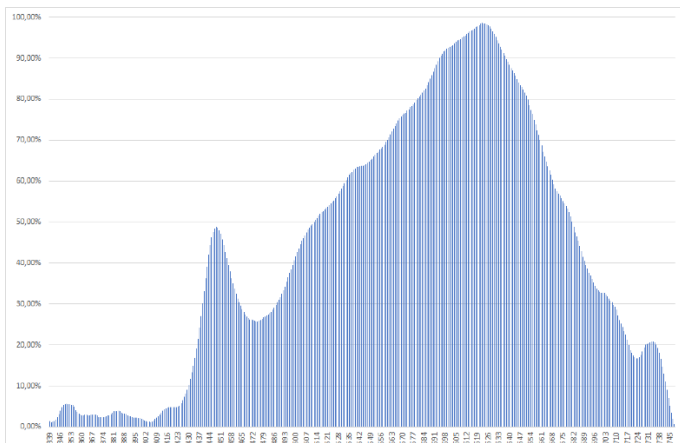
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Colour Spectrum

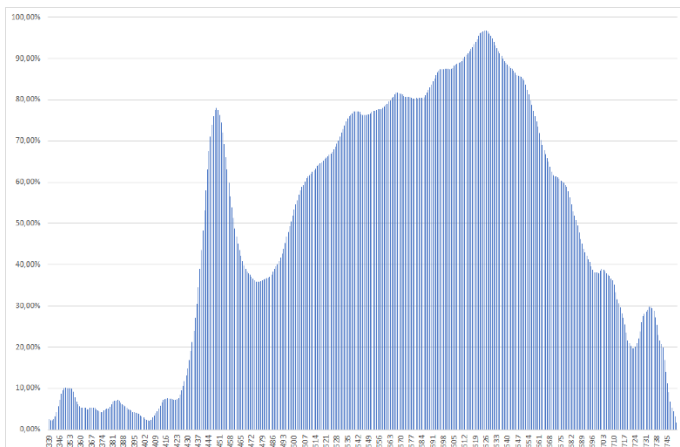
2700K



3000K



4000K



Köpingsvägen 4
SE-732 31 ARBOGA

Ph: +46 (0)589-490 950
Fax: +46 (0)589-490 950

Web: www.optoga.se
E-mail: info@optoga.se



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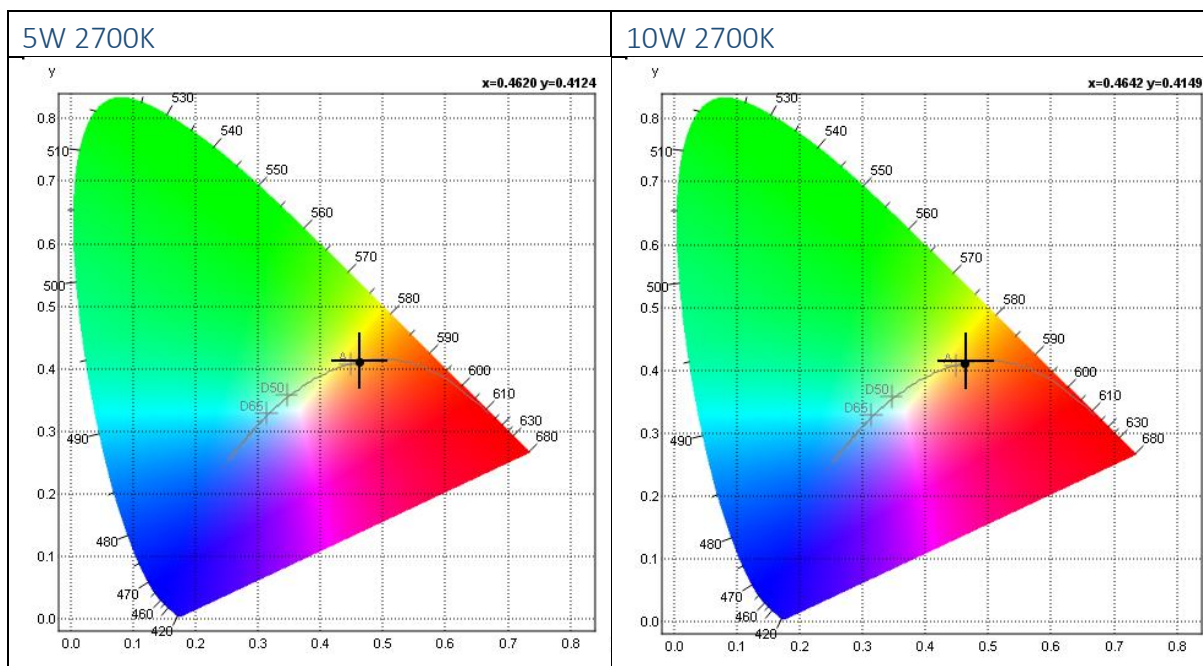
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CIE1931



Measurement results including CRI

CIE 1931 2° observer	
x	0.4525
y	0.4037
u'	0.2608
v'	0.5236
L	100.00
a	28.24
b	62.21
X	667.60
Y	595.64
Z	212.08

Other	
CCT	2751
Chromaticity Error	0.003
Color Peak	630.26
Color Peak Value	13.94
Color Dominant	584.6
Luminous Intensity	
Purity	
Radiometric	2.2613
PAR	
PPFD	
Luminous Efficacy	89.7821

Rendering Indices	
Ra	96.4
R1	97.8
R2	98.7
R3	97.6
R4	97.0
R5	97.5
R6	97.4
R7	94.8
R8	90.3
R9	78.9
R10	95.7
R11	97.2
R12	88.2
R13	98.3
R14	97.7



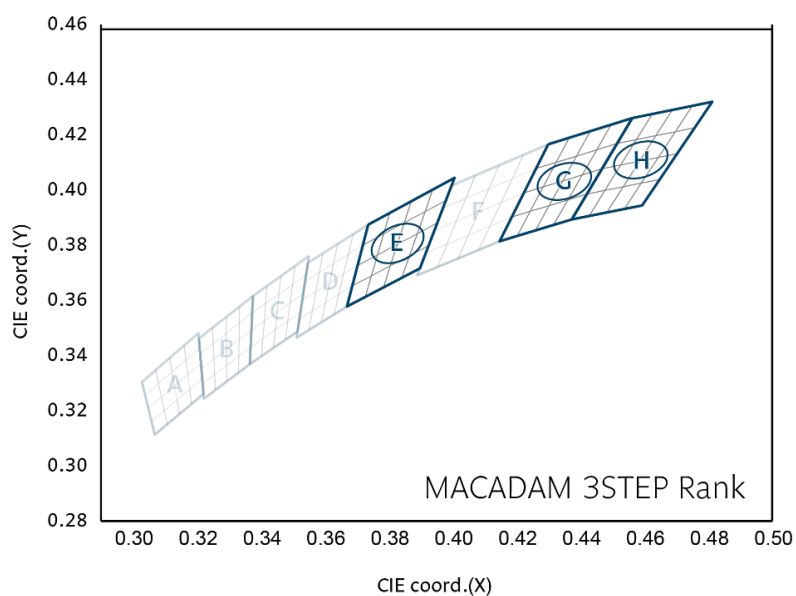
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SE-732 31 ARBOGA

Ph: +46 (0)589-490 950
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E-mail: info@optoga.se

CCT structure graphical representation

Binning structure graphical representation IEC 1976



* Note that the Blue boxes represent Energy Star Rank

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

Colour Rendering Index (CRI)

CRI Code	CRI (min) Ra
9	>95

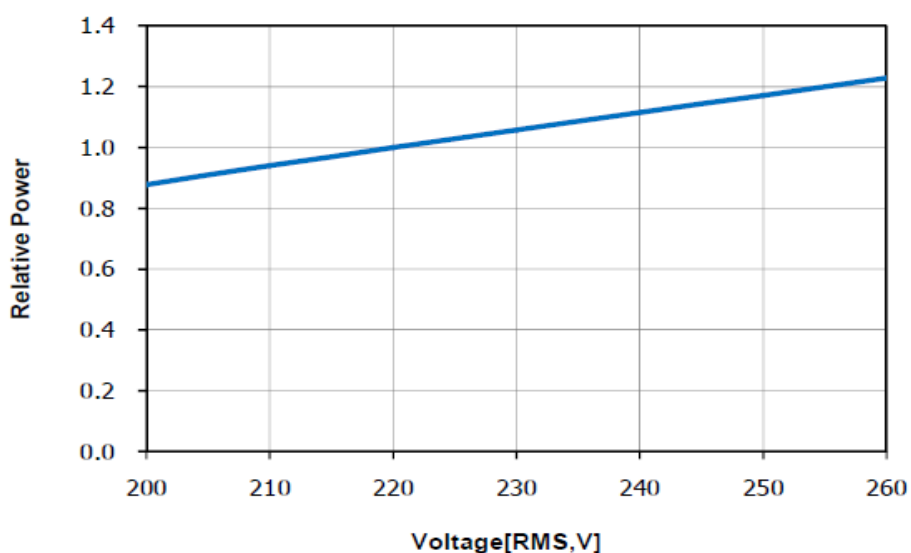
Short form letters for CCT (K)

Colour Code	CCT
27	2700K
30	3000K
40	4000K

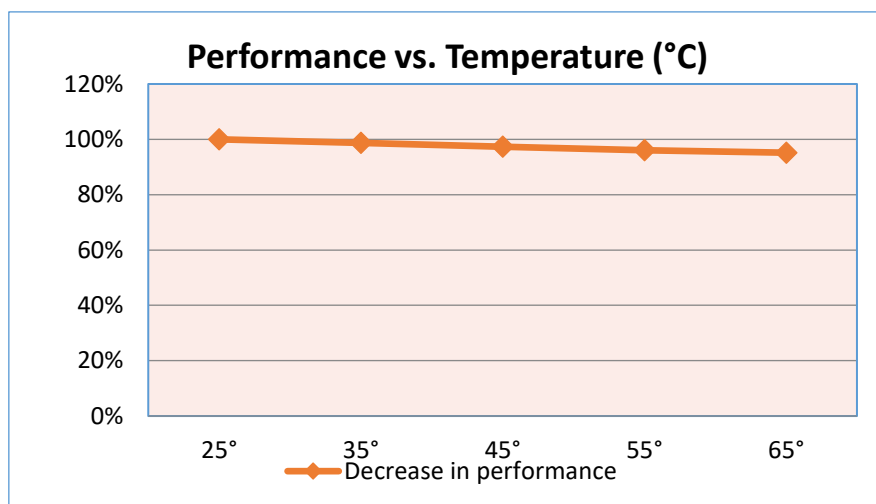
Electro Optical data

Current vs. Voltage

With increasing voltage the light output and the heat increases.



Temperature Characteristics

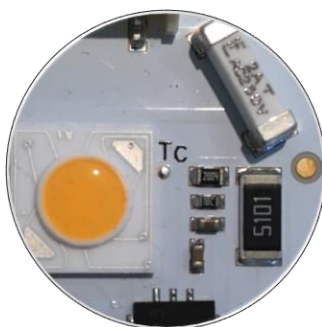


Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Lifetime (Calculated)

Measurement points

When the measurement takes place you verify that the temperature on the marked measurement points is 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!



The lifetime is calculated at the maximum temperature recommended at the Tc (measuring point). It is important not to exceed this recommendation.

Projected lifetime based on TM-21

The power load used with the LED module is according to the “lumen maintenance projection”. It is a LM80 projected lifetime based on discrete LEDs tested in the stated temperature environment at a 30mA power load.

	55°C	65°C	75°C	85°C
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L95B10	>50 000h	>50 000h	>50 000h	>50 000h
L90B10	>50 000h	>50 000h	45 000h	37 000h



Measurement Control

The recommended maximum value is 85°C on T_c 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 (T_j) temperature of the LED and also in order to control the performance on the complete setup. By measuring the junction temperature (T_j) the average lifetime of the product is known.

The thermal connection is measured in temperature vs. Power.

Maximum Temperature

Secure the temperature in your application not to exceed 85°C. Read more in the section “Measurement control”.



Verification of Conformity

The module are under testing at Intertek Semco according to IEC 62031.

SAFETY (LVD)	IEC 62031:2008	
SURGE	IEC 61000-4-5	1 kv
Fast transient BURST	IEC 61000-4-5	2 kv
ESD*	IEC 61000-4-2	8 kv Air discharge 4 kv Contact discharge
Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
Photo Biological Safety	IEC 62471:2008	
Flicker	IEC 61547	N/A

* Please consult the document ESD standards on Optodrive ED, ID and AC

Production Setup

Production in accordance with IPC-6012-B and IPC-A-600G class 2

The LED Module is in accordance to EU Directive for ROHS

The bare PCB is isolation tested with 3000VDC/10mA for 10 seconds

PCB Material Setup

In all questions regarding the bare PCB please use “Material Data sheet Optodrive” as a guideline.

Light fittning

Light fitting standard according to EN/IEC-60598-1 production control specifications function test. The insulation test of 500Vdc should be performed 1s with min 2MΩ. No dielectric test should be performed.



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.
- Optodrive LED Modules meet IEC61547:2009 and IEC61000-4-2. We recommend the light fixture manufacturer to take the mentioned standards under consideration.

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 III Compliant

All our LED modules meet the Restrictions of Hazardous Substances (RoHS III)!

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 III 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 (RoHS III) the following substances must not be used in this product

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Chromium VI (Cr⁶⁺)
- Polybrominated biphenyls PBB
- Polybrominated diphenyl ethers PBDE
- Bis(2-ethylhexyl) phthalate DEPH
- Butyl benzyl phthalate BBP
- Dibutyl phthalate DBP
- Diisobutyl phthalate DIBP



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Read more about OptoDrive at www.optoga.com.

You can contact us via info@optoga.com.

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.



Köpingsvägen 4 • SE-732 31 Arboga • SWEDEN

Tel +46 (0) 589 490 950

info@optoga.com • www.optoga.com

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