



CRYSTAL AC



CRYSTAL AC

5W | 10W | 15W

Compact LED-module for downlights.

No Driver is required!





Crystal LED Module:

Crafting Atmosphere with Unmatched Performance

Story: Crystal is specifically crafted for downlights and environments where creating a welcoming and comfortable ambiance is essential—whether it’s for social interactions or professional tasks. These AC LED light engines come with integrated drivers, offering not only exceptional performance but also the flexibility and ease of installation designers seek.



By integrating control electronics into the design, we eliminate the need for external drivers or complex wiring setups. Crystal offers flicker-free dimming and optimized color stability, ensuring a consistent lighting experience in both architectural and commercial settings. Whether you are designing for restaurants, hotels, medical offices, or residential projects, Crystal provides the versatility needed to adapt to any environment.

Key Features:

1. Integrated Smart Drivers

- Built-in drivers providing seamless dimming and flicker-free performance, making it easy to achieve the perfect lighting tone.

2. Effortless Connectivity

- Directly connects to 230VAC with no external drivers required, significantly simplifying installation.

3. Superior Dimming Capabilities

- Our modules support both standard and smart control protocols, ensuring smooth, flicker-free dimming across different environments.

4. High Efficiency

- Engineered for maximum energy efficiency, delivering excellent light output without compromise.

5. Optimized Uniformity

- Our LED modules guarantee consistent color rendering and output, creating uniform lighting across the entire installation.

6. Sustainable and Future-Ready

- Designed in accordance with the latest EU circular economy directives, making it eco-friendly, efficient, and future-proof.



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Short form Characteristics

MODULE CHARACTERISTICS	5W	10W	15W
Power	5 W +/-10% ea.	10 W +/-10% ea.	15 W +/-10% ea.
Voltage		230VAC	
Number of LED's		32	
Colour Rendering Index		>Ra90	
Colour temperature		2700K, 3000K, 4000	
Optics		25° 40° 60° (CRYSTAL)	

MECHANICAL			
Module dimension		Ø 51.0mm	
Height		24.3 mm	
Weight			
Wire connector		CviLux CP04-03S0 or JST BH	

ELECTRICAL			
Input voltage range		220-240V (max 264VAC)	
Dimmable		Yes (phase cut)	
Power factor		>0.95	
Total harmonic distortion		< 15%	
Peak inrush current		TBD	
Surge protection		1.5kV	
Burst protection		2kV	
Over temp. protection		150°C	
Energy class	2700K	F	F
	3000K	F	F
	4000K	F	F

PHOTOMETRICAL			
Flux	~ 450 lm	900-1100 lm	1700-2100lm
Efficiency	90-110lm/W	90-110lm/W	85-105lm/W
SDCM (Mac Adam)		3	
Flicker percent	3%	3%	3%
SVM	0.3	0.3	0.3
PstLM	0.3	0.3	0.3

ENVIRONMENTAL	
Temperature range	-40°C to 85°C (Absolute maximum temp Tc 85°C)
Relative Humidity	10-75%
Ambient air pressure	500-1060 HPa

LIFETIME	
Life length L70B10*	> 50 000h

*Specifications are valid for >Ra95.



Article number structure CRYSTAL

CRYSTAL AC.P.230.32.9YY-NN.FF

AC	AC= 230VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt)
V	Voltage: 230VAC
N	Amount of LEDs
8	CRI: 9=Ra>90
YY	CCT: 27 =2700K, 30 =3000K, 40 =4000K
NN	Viewing angle code
FF	Flickerfree (below 3%)



Article name and versions

Standard version CRI90

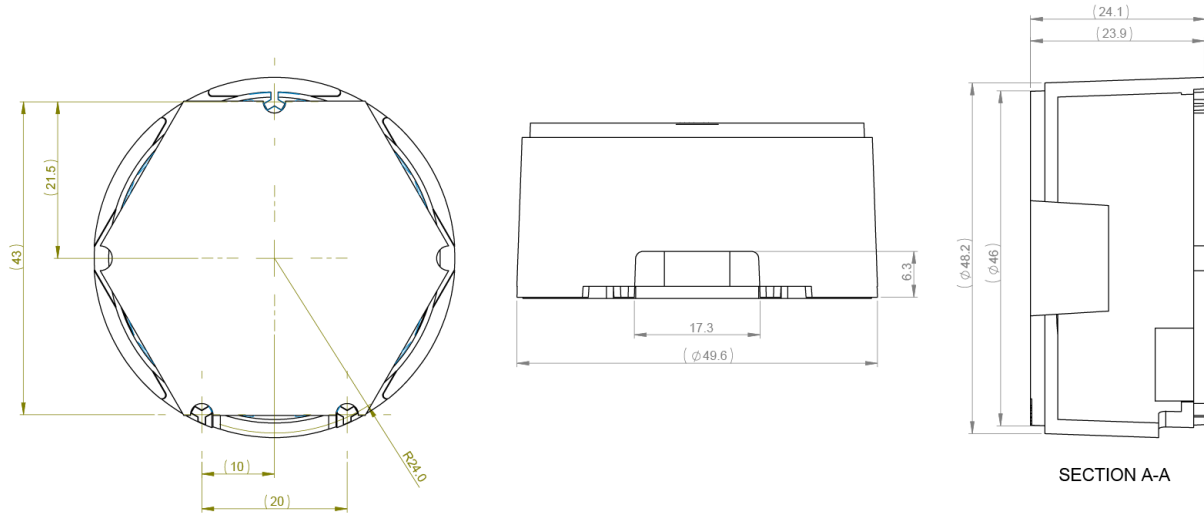
ARTICLE NAME	POWER	CURRENT	LEDS	CRI	CCT	LENS
Crystal AC.5.230.32.927-25	5	230	32	90	2700	25°
Crystal AC.5.230.32.930-25	5	230	32	90	3000	25°
Crystal AC.5.230.32.940-25	5	230	32	90	4000	25°
Crystal AC.10.230.32.927-25	10	230	32	90	2700	25°
Crystal AC.10.230.32.930-25	10	230	32	90	3000	25°
Crystal AC.10.230.32.940-25	10	230	32	90	4000	25°
Crystal AC.15.230.32.927-25	15	230	32	90	2700	25°
Crystal AC.15.230.32.930-25	15	230	32	90	3000	25°
Crystal AC.15.230.32.940-25	15	230	32	90	4000	25°
Crystal AC.5.230.32.927-40	5	230	32	90	2700	40°
Crystal AC.5.230.32.930-40	5	230	32	90	3000	40°
Crystal AC.5.230.32.940-40	5	230	32	90	4000	40°
Crystal AC.10.230.32.927-40	10	230	32	90	2700	40°
Crystal AC.10.230.32.930-40	10	230	32	90	3000	40°
Crystal AC.10.230.32.940-40	10	230	32	90	4000	40°
Crystal AC.15.230.32.927-40	15	230	32	90	2700	40°
Crystal AC.15.230.32.930-40	15	230	32	90	3000	40°
Crystal AC.15.230.32.940-40	15	230	32	90	4000	40°
Crystal AC.5.230.32.927-60	5	230	32	90	2700	60°
Crystal AC.5.230.32.930-60	5	230	32	90	3000	60°
Crystal AC.5.230.32.940-60	5	230	32	90	4000	60°
Crystal AC.10.230.32.927-60	10	230	32	90	2700	60°
Crystal AC.10.230.32.930-60	10	230	32	90	3000	60°
Crystal AC.10.230.32.940-60	10	230	32	90	4000	60°
Crystal AC.15.230.32.927-60	15	230	32	90	2700	60°
Crystal AC.15.230.32.930-60	15	230	32	90	3000	60°
Crystal AC.15.230.32.940-60	15	230	32	90	4000	60°

Crystal AC – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	45	35.6	22.7	9.6	
Outer box	270	46.5	37.5	39.6	14.0

Dimensions LED Module CRYSTAL

Clara Crystal 40° lens

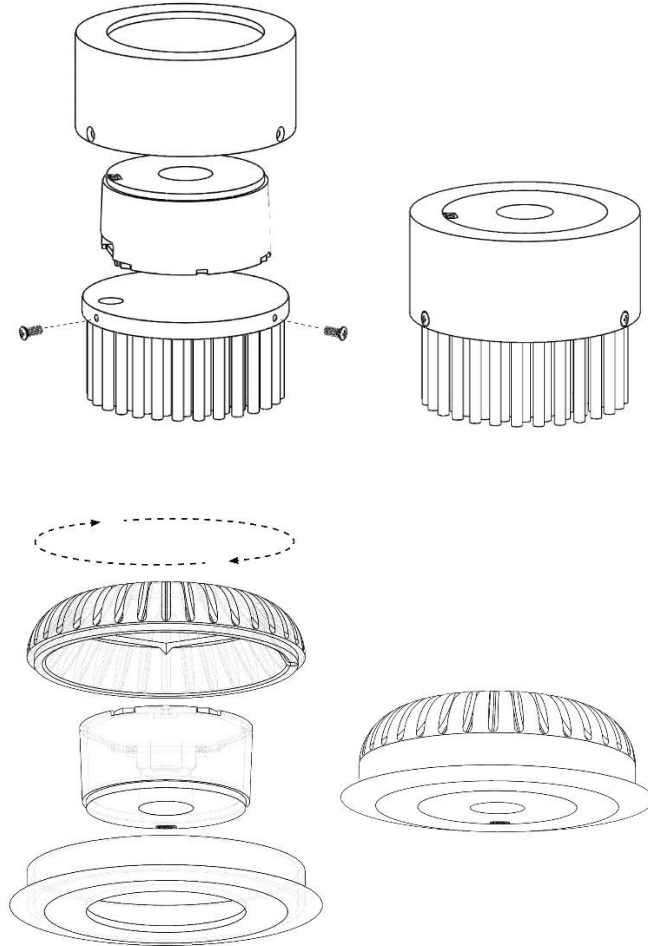


Parameters of the Lens system

Crystal AC

Version	Viewing angle	FWHM angle
Crystal AC	25°	
Crystal AC	40°	
Crystal AC	60°	

Mounting instructions



Wiring

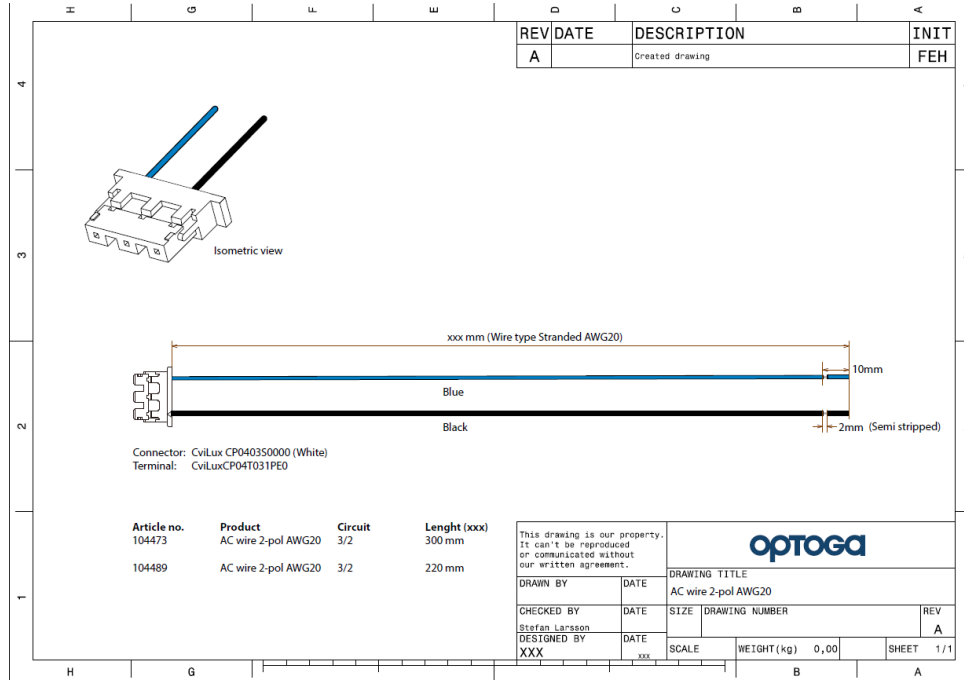
ARTICLE NUMBER	ARTICLE NAME	LENGTH
102877	Wire AC 100	100 mm
103527	Wire AC 220	220 mm
101913	Wire AC 450	450 mm (std)
103222	Wire AC 600	600 mm

See separate wiring diagram documentation in Datasheet Accessories AC.



Wiring diagram

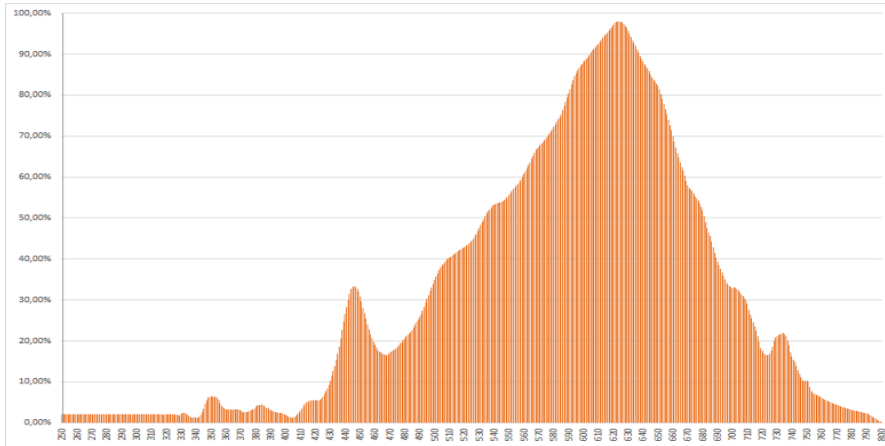
Standard





Photometrical

Colour Spectrum 2700K



Colour Rendering Index (CRI) 2700K

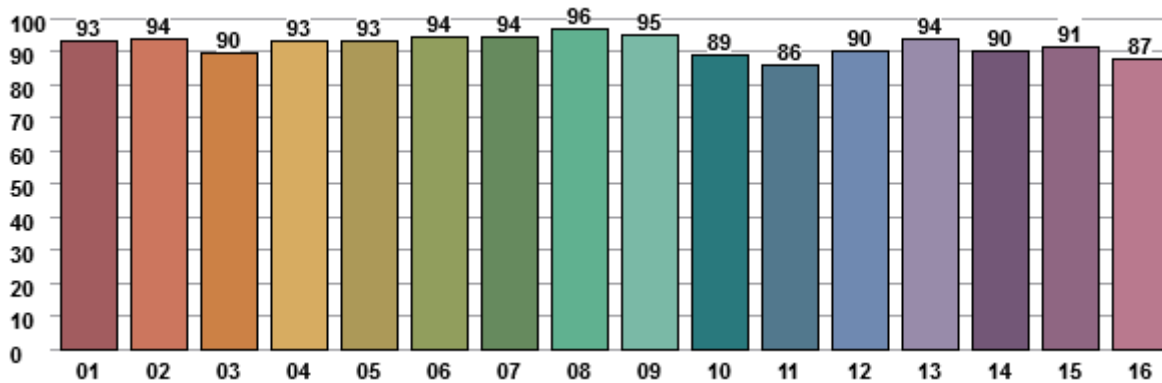
Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
94.0	95.3	95.4	93.2	94.7	94.2	93.1	95.5	90.6	76.2	87.3	94.4	79.9	95.3	95.3

TM-30-15

Main Parameters

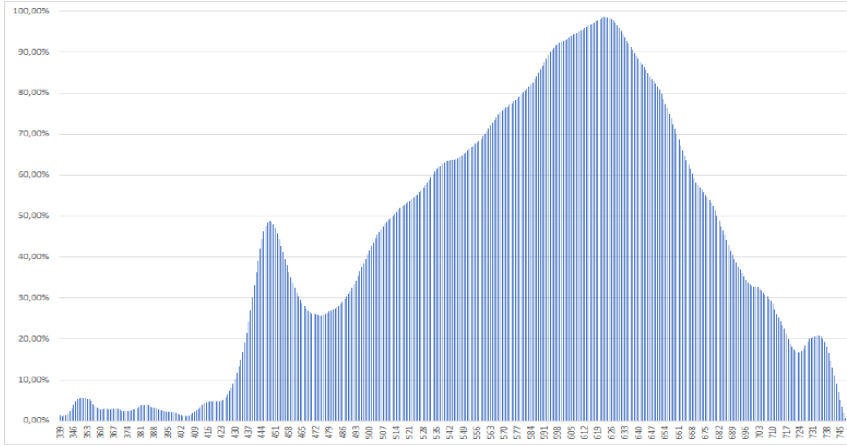
Fi	92
Rg	101
Rfskin	96

Hue Bin Fidelity Index (Rfh,j)

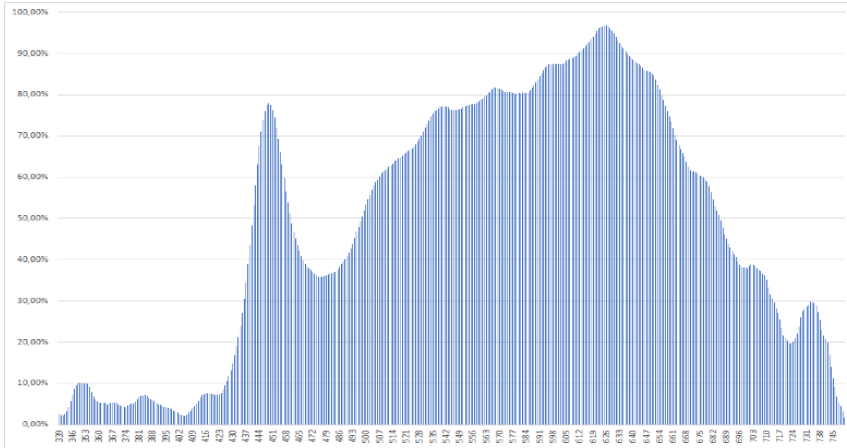




Colour Spectrum 3000K

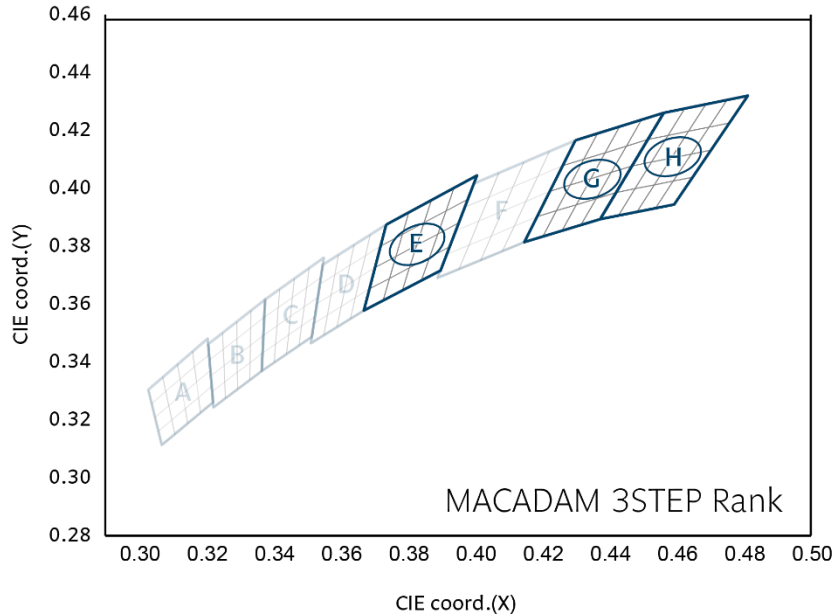


Colour Spectrum 4000K



Binning 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
8	>80
9	>90

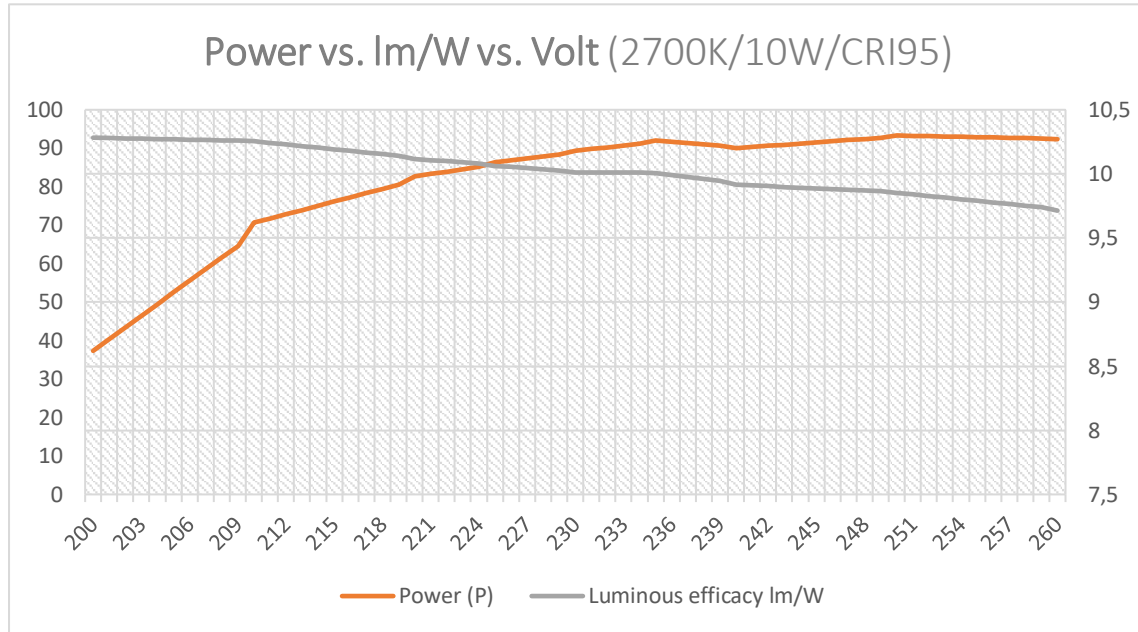
Short form letters for CCT (K)

Colour Code	CCT
27	2700K
30	3000K
35	3500K
40	4000K
50	5000K

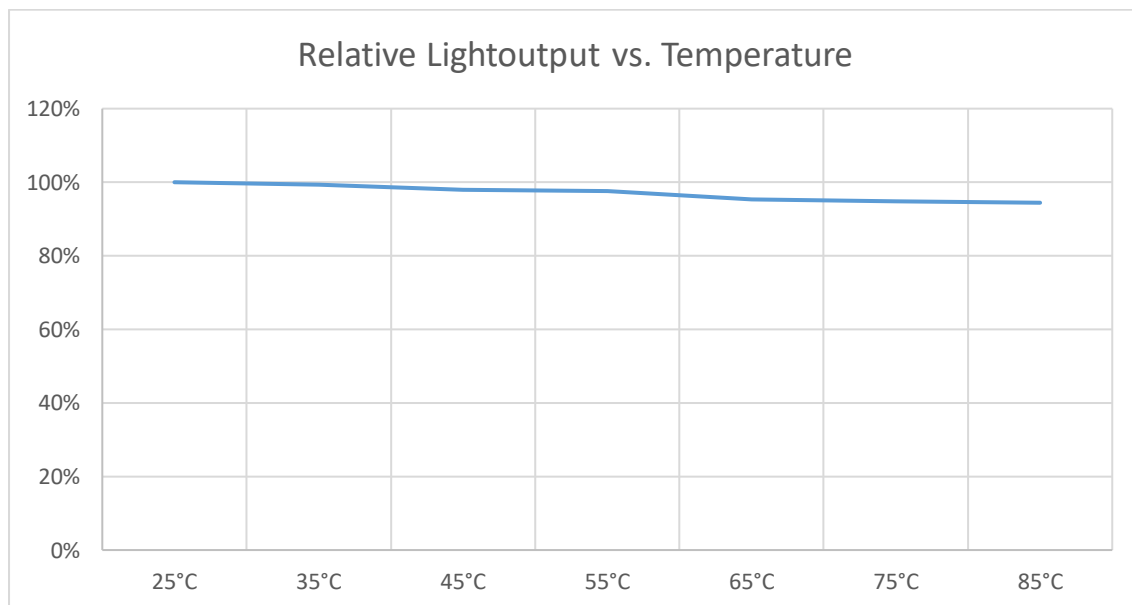


Electrical Optical Data

Voltage effect on light exchange



Temperature Characteristics



Consider the thermal properties where the LED module is to be mounted. Temperature is an important factor for lifetime longevity as well as for degradation of luminous flux.

Lifetime (Calculated)

TM 21 Interpolation

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

Predicted light output based on LED lifetime (LM80) performance <u>ONLY</u>				
	55°C	65°C	75°C	85°C
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L80B10	>50 000h	>50 000h	>50 000h	>50 000h
L90B10	>50 000h	>50 000h	45 000h	37 000h

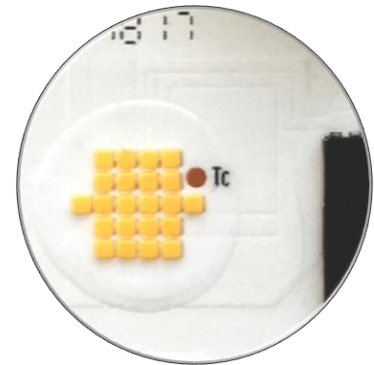
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

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!

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.

Maximum Temperature

Secure the temperature in your application not to exceed 65°C. Read more in the section "Measurement control".



Verification of Conformity

Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
SURGE	IEC 61000-4-5	1 kv
Fast transient BURST	IEC 61547	2 kv
SAFETY	IEC 62031:2008	
Photo Biological Safety	IEC 62471:2008	
Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
EMC	IEC 61000-3-2:2006	
EMC	IEC 61000-3-3:2008	
ESD*	IEC 61000-4-2	8 kv Air discharge 4 kv Contact discharge

* 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 2002/95/EC(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 fitting routine tests

According to EN/IEC 60598-1 should the routine test be performed as a dielectric strength test or insulation test. Only the insulation test of 500Vdc should be performed according to standard, 1s with min 2MΩ.

No dielectric tests are allowed to be performed on OptoDrive LED Modules.



DIMMERS tested

Brand	Model	Max W	Min W	Min %	Flicker (perceived)	Noise
ION	ID350WMKII	11,1	0,3	3%	No	No
ABB/Busch Jaeger	6523URJGL-214-103	9,6	0,7	7%	No	No
Elko	400GLI	9,8	1,2	12%	No	No
Niko	310-0190X	11,5	0,2	2%	No	No
Vadsbo	VD200	8,9	0,2	2%	No	No
Qlight	Monodim 350	10,7	1,9	25%	No	No
Schneider	SBD315RC	10,6	1,6	15%	Yes	No
SG	820320 LEDIM400	10,5	0,2	2%	No	No
Elko	315 GLE	10,4	1,9	18%	Yes	No
Gira	2262 00 / i01	10,1	1,3	13%	No	No
ABB/Busch Jaeger	2247U	10	1,2	12%	No	No
Q-light	Duo touchdim	10,5	3,3	31%	No	No
Q-light	Zerodim 350	10,5	0,8	8%	No	No
Ehmann	T14.03.1	8,2	2,7	33%	No	No
Vadsbo	VD300	10,7	0,5	3%	Yes	No
Gelia	EF700DC	10,3	3,9	3%	No	No
Schnider	SBD200LED	10,5	2,4	3%	No	No
ION	ID350WMKII	11,1	0,3	3%	No	No
Berker	2873	10,1	1,6	3%	No	No
Plejd	Dim-01	11,3	0,3	3%	No	No

It is important to understand that these are numbers tested with standard dimmers in a laboratory environment and can only be considered as reference information. Please always perform a test in its actual application. We take no responsibility for changes, differences and updates to dimmers and performance etc. due to this. In the test some of them had low or high level flicker but no problem changing up or down to make the perceived flicker go away. There is always flicker beyond the ability of the eyes to detect such and to minimize it, we recommend using DALI, Casambi, INGY or the like together with our DimIn system which almost completely removes this flicker.



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



Crystal AC

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Page:
Page 19 of 20

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Datasheet Crystal AC.P.230.1.9yy-NN

Author:
SL

Date:
2024-10-20

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

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.



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