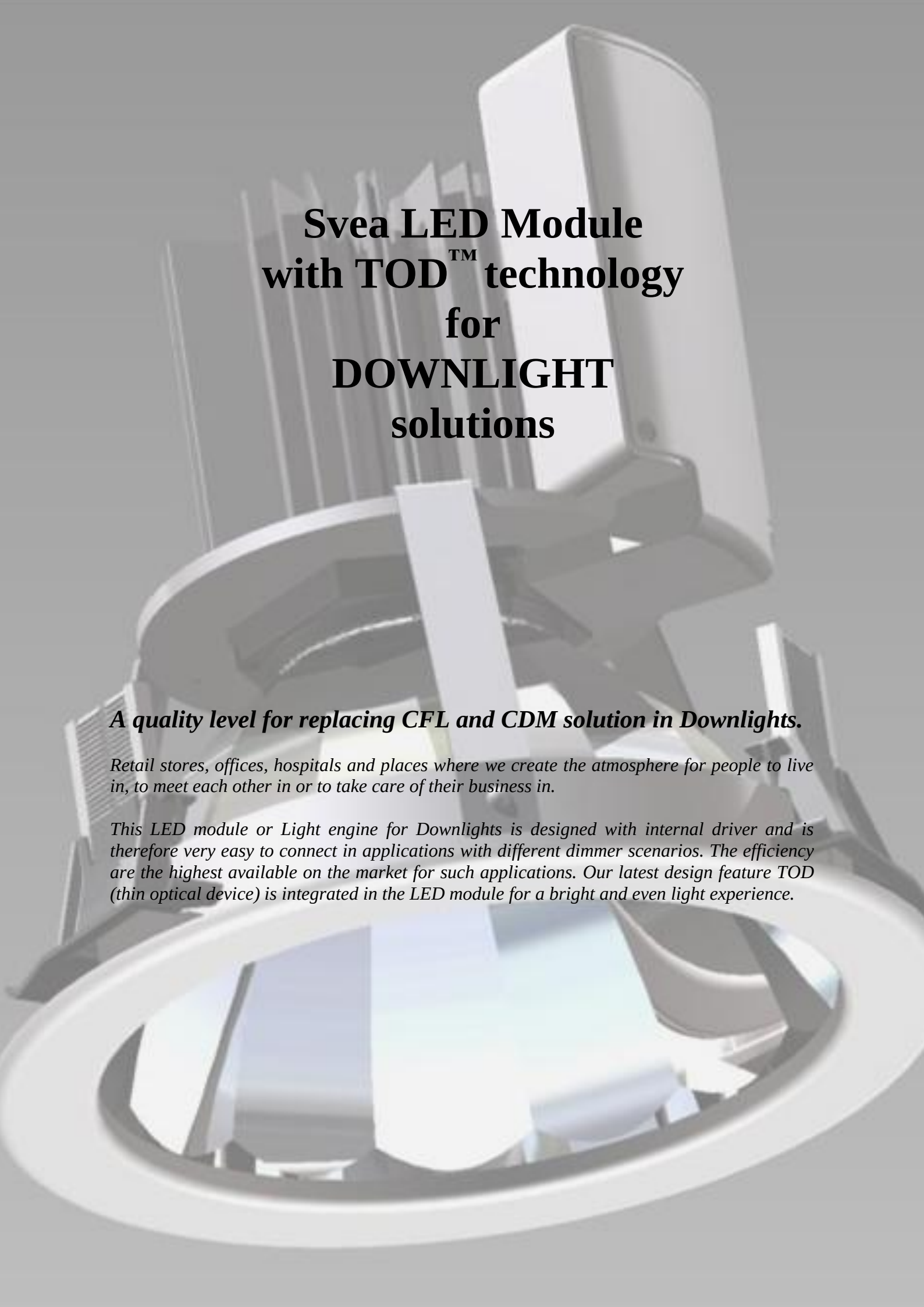


Svea LED Module with TOD™ technology for DOWNLIGHT solutions

A quality level for replacing CFL and CDM solution in Downlights.

Retail stores, offices, hospitals and places where we create the atmosphere for people to live in, to meet each other in or to take care of their business in.

This LED module or Light engine for Downlights is designed with internal driver and is therefore very easy to connect in applications with different dimmer scenarios. The efficiency are the highest available on the market for such applications. Our latest design feature TOD (thin optical device) is integrated in the LED module for a bright and even light experience.

Pages for reference:

Introduction

The LED module and light engine is called Svea TOD (Thin Optical Device) and it is a design for light fittings and luminaires aiming for the downlight area, 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 Svea (90 mm) that have the same footprint as all others in the family both for external drivers as well as built in driver for 110/230VAC.

Svea package
The same package is used for Down-, Spot-, Task- and Medical light fittings. The solution is developed to make it easy for the design engineers to mix between low to high power and from AC to DC in the same luminaire or in similar design. In the design concept there is standard dimmers with the same snap in connector (that fits the whole Optodrive concept™) as well as several heat sink designs with world wide distribution.

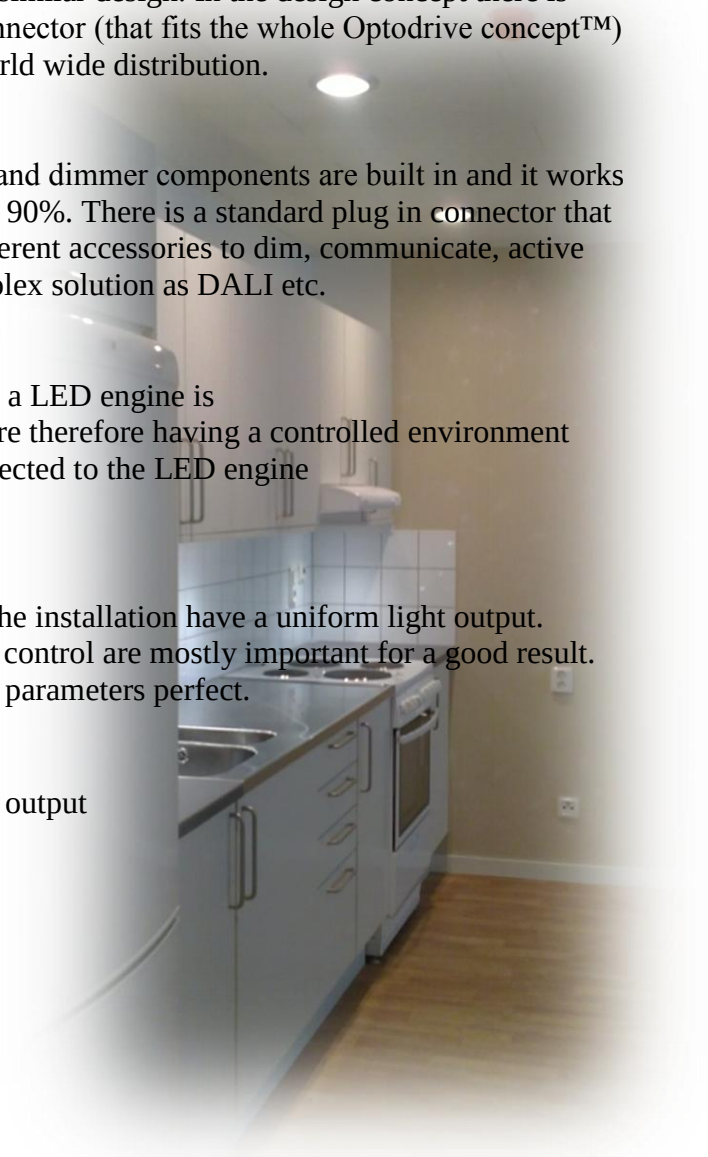
ID design
ID stands for "integrated driver", all driver and dimmer components are built in and it works between 12-36VDC with an efficiency over 90%. There is a standard plug in connector that fit all different ID designs as well as all different accessories to dim, communicate, active cooling etc. This is the best design for complex solution as DALI etc.

Integrated driver
The advantage with a driver that are built in a LED engine is
Lifetime – Connected to the heat sink and are therefore having a controlled environment
Dimming – Dimming via PWM direct connected to the LED engine
Small – No extra boxes

Light output
Colour stability is important to ensure that the installation have a uniform light output. Parameters as binning, lifetime and thermal control are mostly important for a good result. The TOD technology helps you to get these parameters perfect.

Technical attributes

- Energy saving and very good lumen output
- High Colour Rendering
- Uniform Colour temperature
- Controlled lifetime
- Simple integration



Standard article number structure Energy Star Rank

Kelvin vs. Lumen

	2700K	3000K	4000K	5500K
1000lm	Svea ID.17.12-36.12.N-80 T1H**	Svea ID.17.12-36.12.N-80 T1G**	Svea ID.17.12-36.12.S-80 T1E**	Svea ID.10.12-36.12.W-80 U1B**
1500lm	Svea ID.25.12-36.12.N-80 T2H**	Svea ID.25.12-36.12.N-80 T2G**	Svea ID.25.12-36.12.S-80 T2E**	Svea ID.17.12-36.12.W-80 U2B**
2000lm	-	-	-	Svea ID.25.12-36.12.W-80 U3B**

Kelvin vs. Power

	2700K	3000K	4000K	5500K
10W	Svea ID.10.12-36.12.N-80 T1H**	Svea ID.10.12-36.12.N-80 T1G**	Svea ID.10.12-36.12.S-80 T1E**	Svea ID.10.12-36.12.W-80 U2B**
17W	Svea ID.17.12-36.12.N-80 T2H**	Svea ID.17.12-36.12.N-80 T2G**	Svea ID.17.12-36.12.S-80 T2E**	Svea ID.17.12-36.12.W-80 U2B**
25W	Svea ID.25.12-36.12.N-80 T2H**	Svea ID.25.12-36.12.N-80 T2G**	Svea ID.25.12-36.12.S-80 T2E**	Svea ID.25.12-36.12.W-80 U2B**

Standard article number structure McAdam 7step

Kelvin vs. Lumen

	2700K	3000K	4000K	5500K
1000lm	Svea ID.17.12-36.12.N-80 T1H2-H3*	Svea ID.17.12-36.12.N-80 T1G2-G3*	Svea ID.17.12-36.12.S-80 T1E2-E3*	Svea ID.10.12-36.12.W-80 U1B2-B3*
1500lm	Svea ID.25.12-36.12.N-80 T2 H2-H3*	Svea ID.25.12-36.12.N-80 T2G2-G3*	Svea ID.25.12-36.12.S-80 T2E2-E3*	Svea ID.17.12-36.12.W-80 U2B2-B3*
2000lm	-	-	-	Svea ID.25.12-36.12.W-80 U3B2-B3*

Kelvin vs. Power

	2700K	3000K	4000K	5500K
10W	Svea ID.10.12-36.12.N-80 T1 H2-H3*	Svea ID.10.12-36.12.N-80 T2G2-G3*	Svea ID.10.12-36.12.S-80 T1E2-E3*	Svea ID.10.12-36.12.W-80 U2B2-B3*
17W	Svea ID.17.12-36.12.N-80 T2 H2-H3*	Svea ID.17.12-36.12.N-80 T2G2-G3*	Svea ID.17.12-36.12.S-80 T2E2-E3*	Svea ID.17.12-36.12.W-80 U2B2-B3*
25W	Svea ID.25.12-36.12.N-80 T2 H2-H3*	Svea ID.25.12-36.12.N-80 T2G2-G3*	Svea ID.25.12-36.12.S-80 T2E2-E3*	Svea ID.25.12-36.12.W-80 U2B2-B3*

Standard article number structure McAdam 3step

Kelvin vs. Lumen

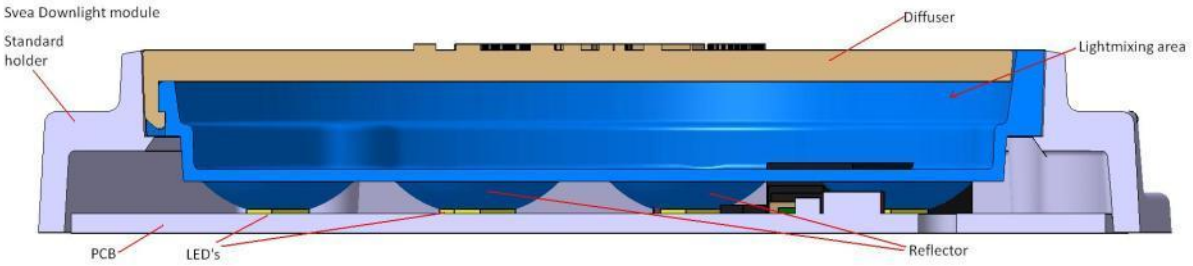
	2700K	3000K	4000K	5500K
1000lm	Svea ID.17.12-36.12.N-80 T1H2*	Svea ID.17.12-36.12.N-80 T1G3*	Svea ID.17.12-36.12.S-80 T1E2*	Svea ID.10.12-36.12.W-80 U1B3*
1500lm	Svea ID.25.12-36.12.N-80 T2 H2*	Svea ID.25.12-36.12.N-80 T2G3*	Svea ID.25.12-36.12.S-80 T2E2*	Svea ID.17.12-36.12.W-80 U2B3*
2000lm	-	-	-	Svea ID.25.12-36.12.W-80 U3B3*

Kelvin vs. Power

	2700K	3000K	4000K	5500K
10W	Svea ID.10.12-36.12.N-80 T1 H2-H3*	Svea ID.10.12-36.12.N-80 T1G3*	Svea ID.10.12-36.12.S-80 T1E2*	Svea ID.10.12-36.12.W-80 U2B3*
17W	Svea ID.17.12-36.12.N-80 T2 H2-H3*	Svea ID.17.12-36.12.N-80 T2G3*	Svea ID.17.12-36.12.S-80 T2E2*	Svea ID.17.12-36.12.W-80 U2B3*
25W	Svea ID.25.12-36.12.N-80 T2 H2-H3*	Svea ID.25.12-36.12.N-80 T2G3*	Svea ID.25.12-36.12.S-80 T2E2*	Svea ID.25.12-36.12.W-80 U2B3*

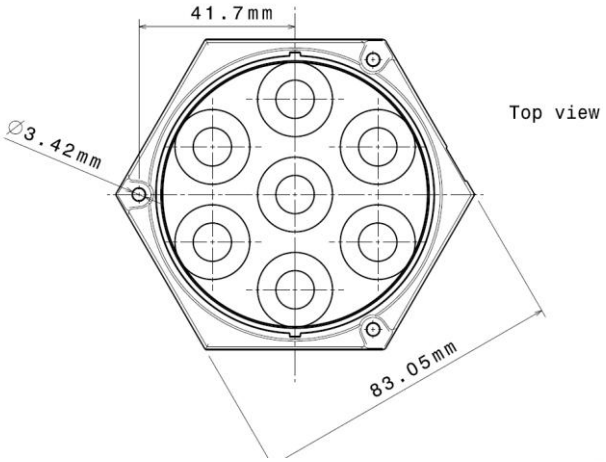
Thin Optical Device technology (TOD™):

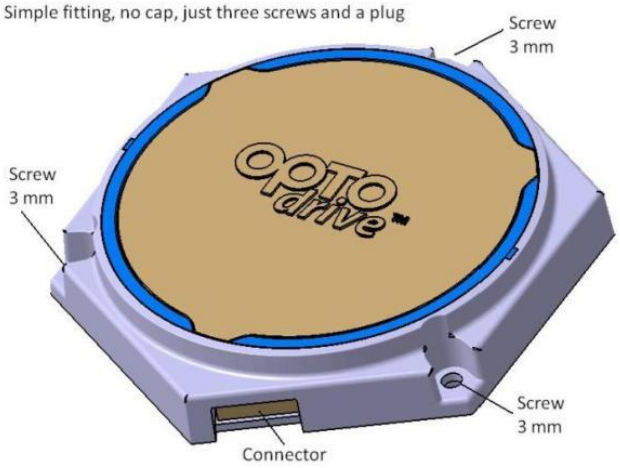
The TOD technology is design to blend the light coming from the LED's inside so the hot spots even out on the top diffuser. This technology is to reduce the problems with glare that makes the LED's impossible to use in applications as downlights especially if you looked into the light in the beam angle.



The standard application with CFL or other similar solution have often got very high reflector and the space required are very deep. With this solution where the whole LED module just requires 15mm there is more space to create a functional heat sink than other similar products.

Dimensions Light Engine





Short form Characteristics

Mechanical Characteristics:

Board dimensions:	83 mm diameter
Assembly holes:	3 x 3.42 mm
Connector:	PHR-3 or similar
	PHR-5 (Changeable Colour temperature unit)
Height	15.1 mm

Electrical characteristics:

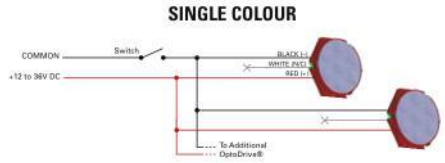
Power	12 - 36VDC 10W
	12 - 36VDC 17W
	12 - 36VDC 25W

Dimming Signal (1 or 2 channels):

PWM high level:	4 – 7V
PWM low level:	0 – 0,5V
PWM frequency[1]:	100 – 20kHz
Efficiency:	>90
Reversed polarity protection:	Yes
Transient protection:	Yes
Overvoltage protection-	
Dimming signal:	Yes

Wiring diagram:

Se separate wiring diagram in DimLight documentation at www.optodrive.se under accessories how to dim and communicate with the Light engine.



Optical Efficiency:

25W

Bin code	Efficiency
T1	50 lm/W
T2	57 lm/W
U1	65 lm/W

17W

Bin code	Efficiency
T1	57 lm/W
T2	65 lm/W
U1	74 lm/W

10W

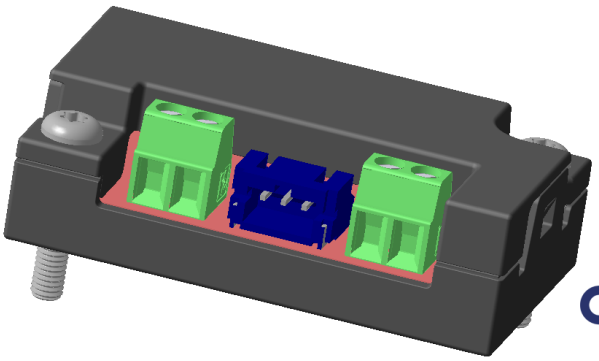
Bin code	Efficiency
T1	66 lm/W
T2	76 lm/W
U1	86 lm/W

The optical efficiency includes the electrical efficiency and the optical losses in the lens unit. The values are to be considered as ±10% tolerances @ 25°C.

Accessories to be built in (light fixture)

Dimmers:

- DALI
- Puls
- Switch
- 0-10V
- Colour control unit
- Temp and speed control for optimal cooling



The dimmers are for digital dimming and can be set up in a network. The dimmers work for all types of Optodrive modules with built-in driver. Please find all details in separate datasheet under accessories at www.optodrive.se/accessories.pab

Parameters of light output

White LED

Electro-Optical characteristics LED at I_F=550mA, T_A=25ºC

Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank(1)	Φ_V	1600		1800	lm
	U2 rank(1)	Φ_V	1800		1950	lm
	U3 rank(1)		1950		2100	
Correlated Color Temperature	B* rank(2)	CCT	5300		6000	Kelvin
CRI		R_a	-	70	-	-
Power		Po		25		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

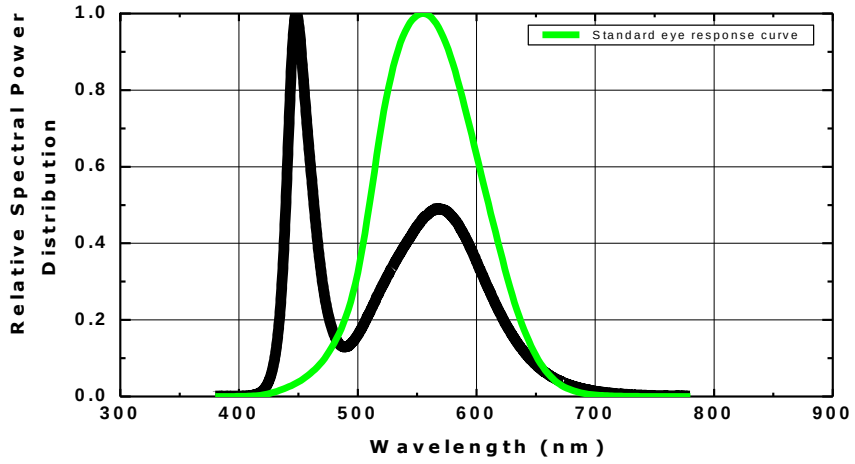
Electro-Optical characteristics LED at I_F=400mA, T_A=25ºC

Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank(1)	Φ_V	1300		1450	lm
	U2 rank(1)	Φ_V	1450		1550	lm
	U3 rank(1)		1550		1700	
Correlated Color Temperature	B* rank(2)	CCT	5300		6000	Kelvin
CRI		R_a	-	70	-	-
Power		Po		17		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

Colour Spectrum

White



Neutral White LED

Electro-Optical characteristics LED at I_F=550mA, T_A=25ºC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank(1)	Φ_V	1250		1450	lm
	T2rank(1)	Φ_V	1450		1600	lm
	U1 rank(1)	Φ_V	1600		1800	lm
Correlated Color Temperature	E*(2)	CCT	3700		4200	Kelvin
	D*(2)	CCT	4200		4700	Kelvin
CRI		R_a	80			-
Power		Po		25		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

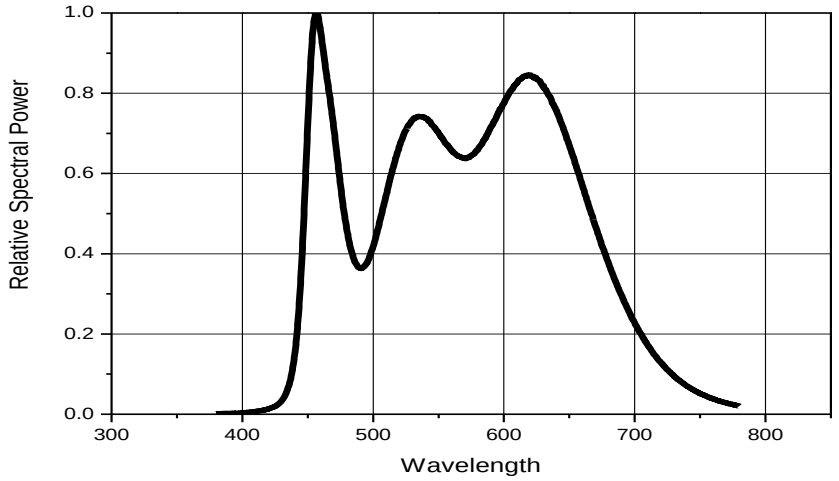
Electro-Optical characteristics LED at I_F=400mA, T_A=25ºC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank(1)	Φ_V	1000		1150	lm
	T2rank(1)	Φ_V	1150		1300	lm
	U1 rank(1)		1300		1450	
Correlated Color Temperature	E*(2)	CCT	3700		4200	Kelvin
	D*(2)	CCT	4200		4700	Kelvin
CRI		R_a	80		-	-
Power		Po		17		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

Colour Spectrum

Neutral White



Warm White

Electro-Optical characteristics LED at I_F=550mA, T_A=25ºC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank(1)	Φ_V	1250		1450	lm
	T2rank(1)	Φ_V	1450		1600	lm
Correlated Color Temperature	H*(2)	CCT	2600		2900	Kelvin
	G*(2)	CCT	2900		3200	Kelvin
CRI		R_a	80		-	-
Power		Po		25		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

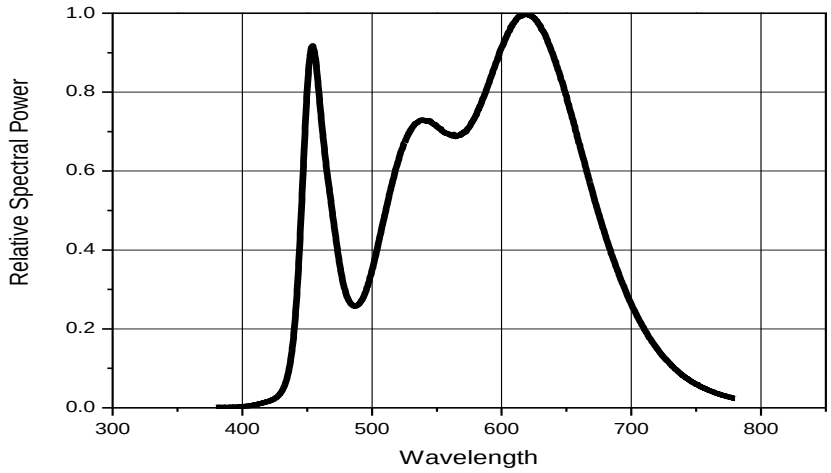
Electro-Optical characteristics LED at I_F=400mA, T_A=25ºC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank(1)	Φ_V	1000		1150	lm
	T2rank(1)	Φ_V	1150		1300	lm
Correlated Color Temperature	H*(2)	CCT	2600		2900	Kelvin
	G*(2)	CCT	2900		3200	Kelvin
CRI		R_a	80		-	-
Power		Po		17		W

*(1)See detailed information in chapter" **Luminous Flux Bin"***
*(2)See detailed information in chapter" **Binning structure graphical representation"***

Colour Spectrum

Warm White



Short form for binning & labeling

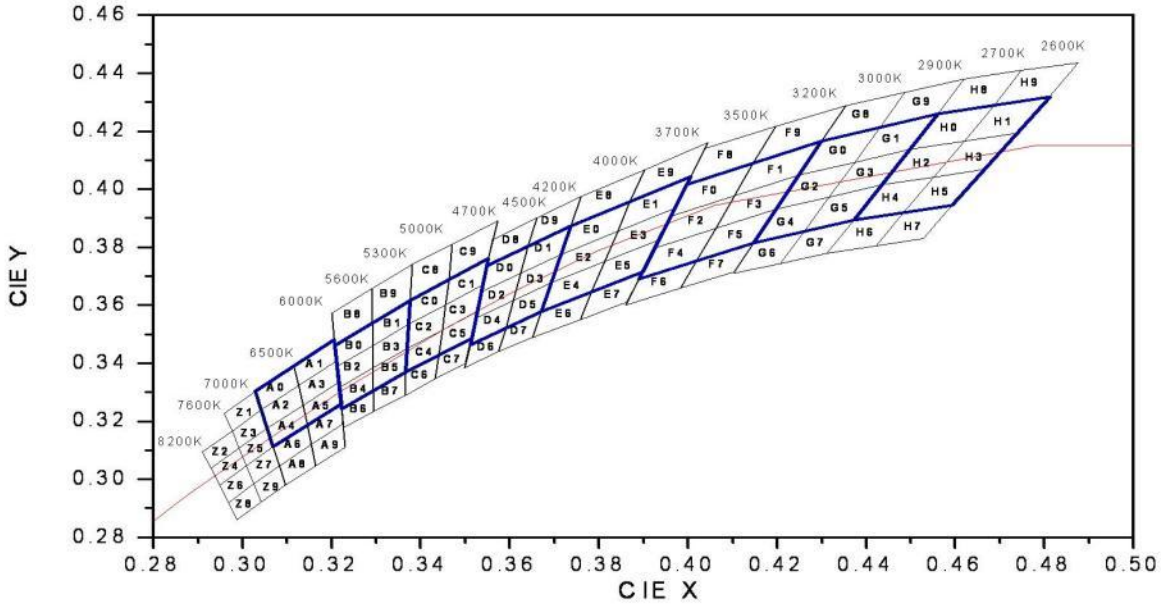
Colour

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

Luminous Flux Bins
pro LED @ 350mA measured for each individual 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 ~ 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

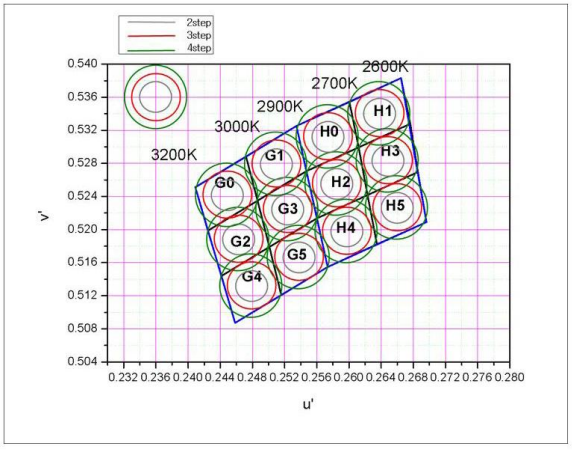
Binning structure graphical representation IEC 1931



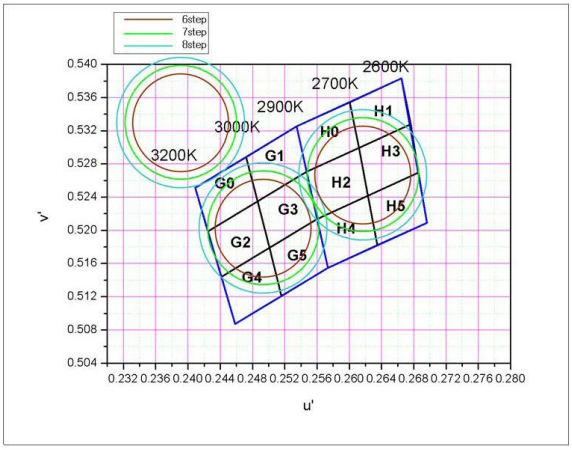
**** Note Blue area is Energy Star Rank***

McAdam structure graphical representation IEC 1976

1bin: 3step



6bin: 7step



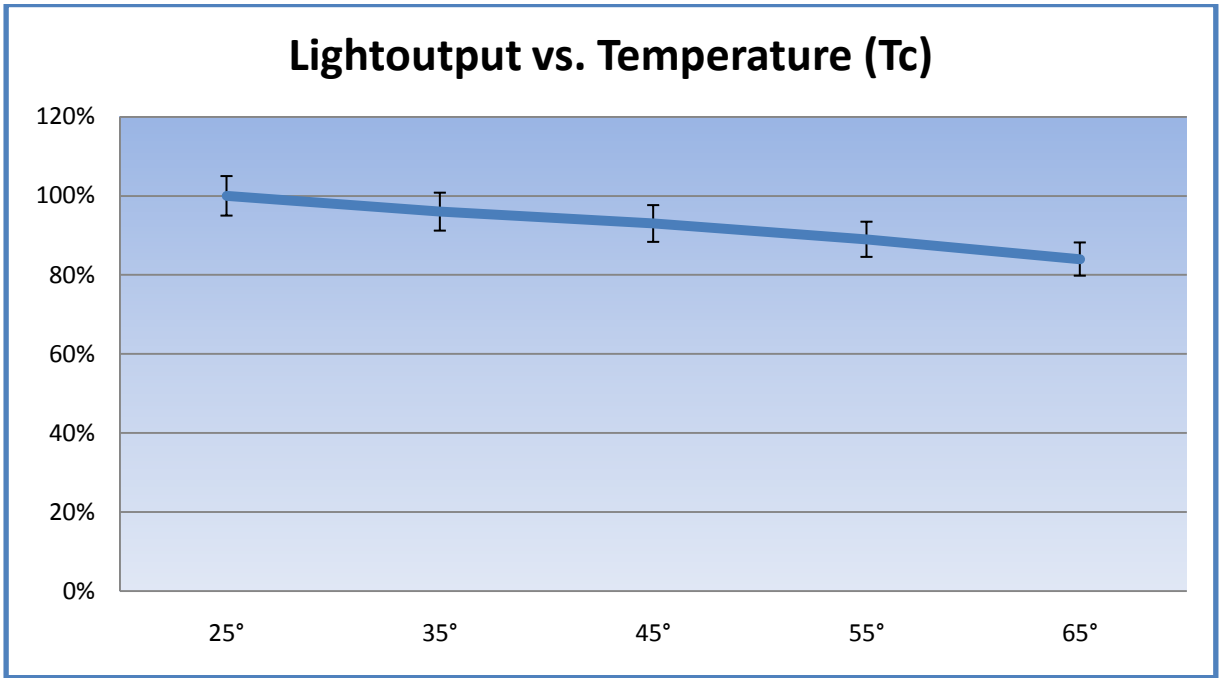
Note that the bin code from the top is transferred from IEC 1931 to IEC 1976 on the two McAdam graphs down below.

Optics Performance Downlight

Wide Version 60°	
	TBD
Wide Version 80°	
	TBD
X-Wide Version 100°	
	TBD

Electro Optical data

Temperature Characteristics



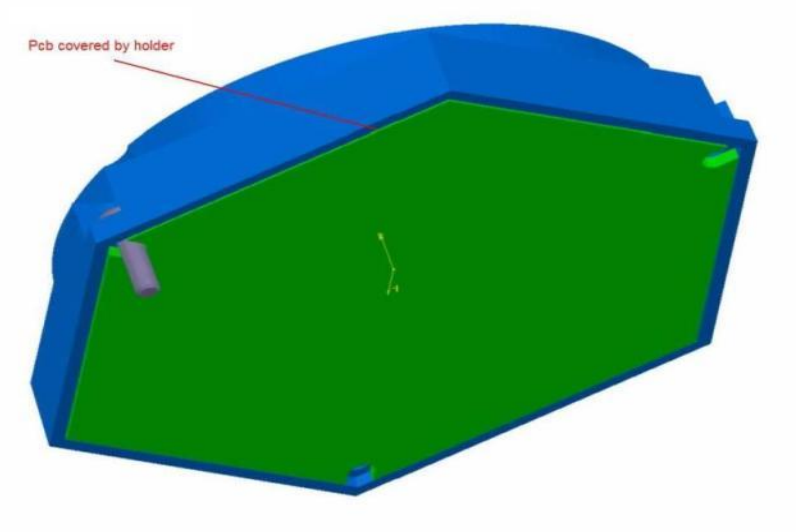
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Thermal information

the thermal area (green) should 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 measurement control.



Measurement Control

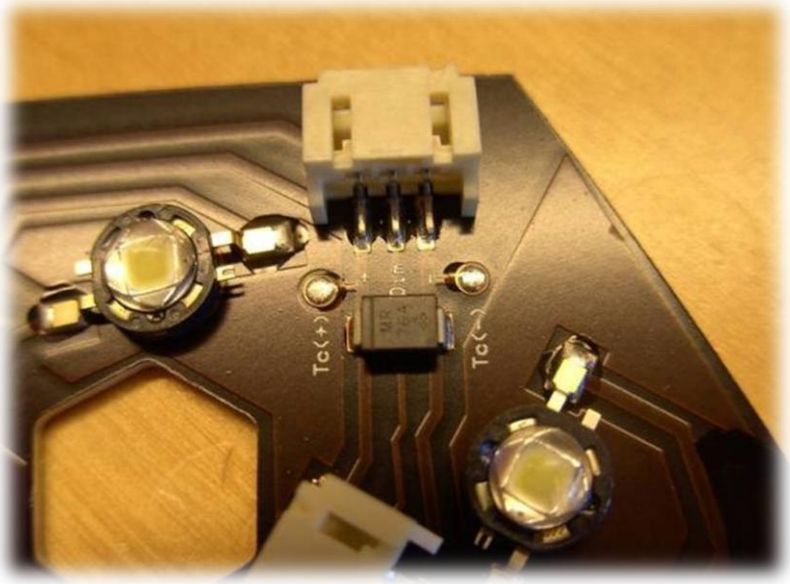
The recommended maximum value is 65°C on Tc or measuring point. If this value is exceeded we can't guarantee the function and the life time. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also control the performance on the whole set up. By the help of the junction temperature (Tj) the average lifetime of the product is known.

The thermal connection is measured in temperature vs. Power.

Measurement points

Measurement points

- TC (- and +)
- LED legs at the soldering point



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

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”.

25W unit

Tc maximum 65°C	*30 000 hours 30% degradation*
	60 000 hours 50% degradation

17W unit

Tc maximum 65°C	*62 500 hours 30% degradation*
	>100 000 hours 50% degradation

10 W unit

Tc maximum 65°C	*62 500 hours 30% degradation*
	>100 000 hours 50% degradation

Precaution for use

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

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 lead 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 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.

Would you like to know more about the benefits of OptoDrive LED?

At www.optodrive.se you can read more about OptoDrive. You can also easily notify us of your interest here (www.optodrive.se/order.pab). Of course you can also call +46 (0) 589 490 950.

Optoga AB

The company started business in November 2004. The company's staff has more than 30 years of shared experience in electronic components. Optoga develops and supplies LEDs, LED drivers, LED modules and software solutions to the lighting industry, automotive manufacturers and electronics companies.

By developing products with integrated LEDs and drive electronics, Optoga has taken the initiative to replace fluorescent, incandescent and halogen lamps with LED-based light sources.

optoga

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