



#### Module QLE G1 488x239mm 2500lm ADV-SE

Modules QLE

#### Product description

- Ideal for linear and panel lights
- Excellent homogeneity: the new QLE is designed to provide best homogeneity with 600 x 600 mm and 625 x 625 mm fitting
- Time saving: less mounting/wiring effort as modules are rectangular – only 2 modules mounted in a 600 x 600 mm luminaire
- Luminous flux range from 1,870 – 4,070 lm
- LED system solution with competitive system efficacy up to 140 lm/W, consisting of two rectangular LED modules and LED Driver LC 65W 350mA fixC Ip ADV
- Efficacy of the module up to 163 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3<sup>rd</sup>
- Small luminous flux tolerances
- Colour temperatures 3,000, 4,000, 5,000 and 6,500 K
- Self cooling (no additional heat sink required)
- Push terminals for quick and simple wiring of LED module to LED module
- Simple installation (e.g. screws)
- Long life-time: 50,000 hours
- 5-year guarantee



Complete system



**Standards**, page 4

**Colour temperatures and tolerances**, page 7



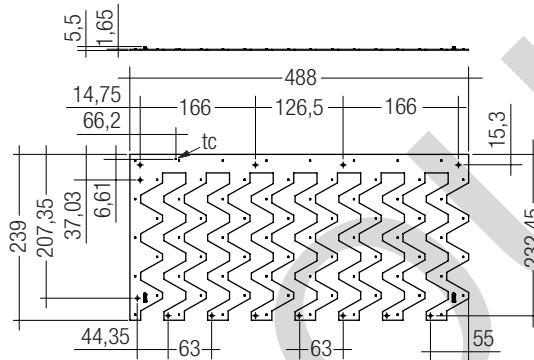


#### Module QLE G1 488x239mm 2500lm ADV-SE

Modules QLE

#### Technical data

Beam characteristic	150°
Ambient temperature range	-25 ... +45 °C
tp rated	45 °C
tc	85 °C
Imax	500 mA
Max. DC forward current	600 mA
Max. permissible LF current ripple	650 mA
Max. permissible peak current	800 mA / max. 10 ms
Max. permissible output voltage of LED Driver <sup>2)</sup>	250 V
Insulation test voltage	1.5 kV
ESD classification	severity level 4
Risk group (EN 62471:2008)	0
Type of protection	IP00



#### Ordering data

Type	Article number	Colour temperature	Packaging carton <sup>®</sup>	Weight per pc.
<b>QLE G1 488x239mm 2500lm 830 ADV-SE</b>	<b>89600862</b>	3,000 K	10 pc(s).	0.157 kg
<b>QLE G1 488x239mm 2500lm 840 ADV-SE</b>	<b>89600863</b>	4,000 K	10 pc(s).	0.157 kg
<b>QLE G1 488x239mm 2500lm 850 ADV-SE</b>	<b>89600877</b>	5,000 K	10 pc(s).	0.157 kg
<b>QLE G1 488x239mm 2500lm 865 ADV-SE</b>	<b>89602495</b>	6,500 K	10 pc(s).	0.157 kg

<sup>®</sup> Orders only in full carton quantities.

#### Specific technical data

Type <sup>®</sup>	Photo-metric code	Typ. luminous flux at tp = 25 °C <sup>®</sup>	Typ. luminous flux at tp = 45 °C <sup>®</sup>	Typ. forward current	Min. forward voltage at tp = 45 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 45 °C <sup>®</sup>	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 45 °C	Efficacy of the system at tp = 45 °C	Colour rendering index CRI
<b>Operating mode HE at 250 mA</b>											
<b>QLE G1 488x239mm 2500lm 830 ADV-SE</b>	830/359	1,930 lm	1,870 lm	250 mA	49.4 V	55.6 V	13.0 W	145 lm/W	143 lm/W	129 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 840 ADV-SE</b>	840/359	1,990 lm	1,930 lm	250 mA	49.4 V	55.6 V	13.0 W	150 lm/W	148 lm/W	133 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 850 ADV-SE</b>	850/359	2,160 lm	2,090 lm	250 mA	49.4 V	55.6 V	13.0 W	163 lm/W	161 lm/W	145 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 865 ADV-SE</b>	865/359	2,030 lm	2,000 lm	250 mA	49.4 V	55.6 V	13.0 W	153 lm/W	151 lm/W	136 lm/W	> 80
<b>Operating mode HE at 300 mA</b>											
<b>QLE G1 488x239mm 2500lm 830 ADV-SE</b>	830/359	2,280 lm	2,220 lm	300 mA	50.2 V	56.5 V	15.9 W	141 lm/W	140 lm/W	127 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 840 ADV-SE</b>	840/359	2,360 lm	2,290 lm	300 mA	50.2 V	56.5 V	15.9 W	146 lm/W	144 lm/W	131 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 850 ADV-SE</b>	850/359	2,550 lm	2,480 lm	300 mA	50.2 V	56.5 V	15.9 W	158 lm/W	156 lm/W	142 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 865 ADV-SE</b>	865/359	2,400 lm	2,330 lm	300 mA	50.2 V	56.5 V	15.9 W	149 lm/W	147 lm/W	132 lm/W	> 80
<b>Operating mode BLO at 350 mA</b>											
<b>QLE G1 488x239mm 2500lm 830 ADV-SE</b>	830/359	2,640 lm	2,560 lm	350 mA	51.0 V	57.4 V	18.8 W	137 lm/W	137 lm/W	126 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 840 ADV-SE</b>	840/359	2,720 lm	2,640 lm	350 mA	51.0 V	57.4 V	18.8 W	142 lm/W	141 lm/W	130 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 850 ADV-SE</b>	850/359	2,860 lm	2,860 lm	350 mA	51.0 V	57.4 V	18.8 W	152 lm/W	152 lm/W	140 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 865 ADV-SE</b>	865/359	2,770 lm	2,690 lm	350 mA	51.0 V	57.4 V	18.8 W	145 lm/W	144 lm/W	130 lm/W	> 80
<b>Operating mode HO at 500 mA</b>											
<b>QLE G1 488x239mm 2500lm 830 ADV-SE</b>	830/359	3,640 lm	3,530 lm	500 mA	53.3 V	60.0 V	28.1 W	127 lm/W	125 lm/W	117 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 840 ADV-SE</b>	840/359	3,750 lm	3,640 lm	500 mA	53.3 V	60.0 V	28.1 W	131 lm/W	130 lm/W	122 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 850 ADV-SE</b>	850/359	4,070 lm	3,950 lm	500 mA	53.3 V	60.0 V	28.1 W	142 lm/W	140 lm/W	131 lm/W	> 80
<b>QLE G1 488x239mm 2500lm 865 ADV-SE</b>	865/359	3,830 lm	3,720 lm	500 mA	53.3 V	60.0 V	28.1 W	133 lm/W	133 lm/W	120 lm/W	> 80

<sup>®</sup> Integral measurement over the complete module.

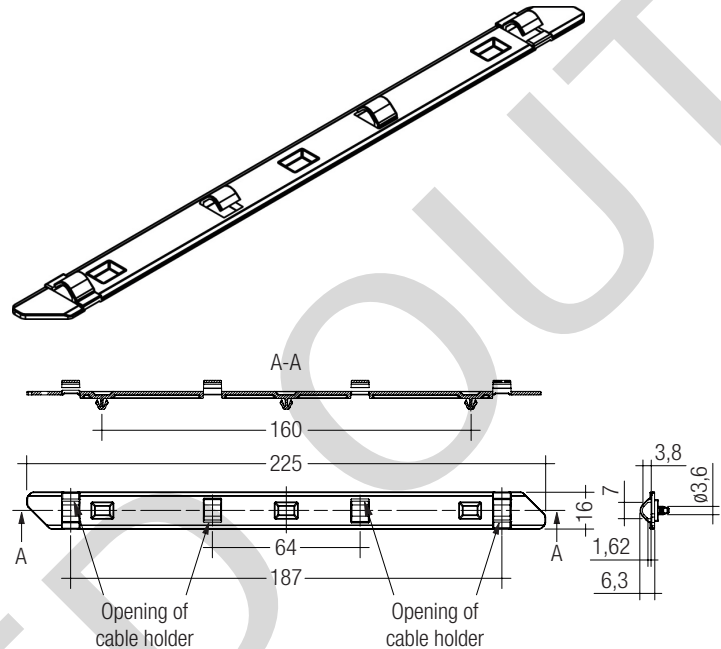
<sup>®</sup> If mounted with M4 screws and plastic washers.

<sup>®</sup> Tolerance range for optical and electrical data: ±10 %.

<sup>®</sup> HE ... high efficiency, BLO ... best lamp operation, HO ... high output.

**Product description**

- For easy and quick fixing of QLE modules
- Fast snap on mounting (sheet thickness 0.5 – 1.0 mm)
- For drilling hole 4 mm
- No tools required for fixing the cable on the bar, for example sensor wiring
- Conducting wires  $\varnothing 1.5$  mm for module wiring under the bar
- Clip made of Polycarbonat

**Ordering data**

Type	Article number	Colour	Packaging carton <sup>®</sup>	Weight per pc.
ACQ MOUNTING BRACKET PUSH-FIX	28001632	White	100 pc(s).	0.01 kg

<sup>®</sup> Minimum sales quantity 100 pcs.

## 1. Standards

IEC 62031  
IEC 62471  
IEC 62717  
IEC 61000-4-2

### 1.1 Photometric code

Key for photometric code, e. g. 830 / 449

1 <sup>st</sup> digit	2 <sup>nd</sup> + 3 <sup>rd</sup> digit	4 <sup>th</sup> digit	5 <sup>th</sup> digit	6 <sup>th</sup> digit
Code CRI	Colour temperature in Kelvin x 100	McAdam initial	McAdam after 25% of the life-time (max.6000h)	Luminous flux after 25% of the life-time (max.6000h)
7 70 – 79				Code Luminous flux
8 80 – 89				7 ≥ 70 %
9 ≥90				8 ≥ 80 %
				9 ≥ 90 %

### 1.2 Energy classification

Type	Forward current	Energy classification
QLE G1 488x239mm 2500lm 8xx ADV-SE	250 mA	A++
	300 mA	A++
	350 mA	A++
	500 mA	A+

## 2. Thermal details

### 2.1 tc point, ambient temperature and life-time

The temperature at tp reference point is crucial for the light output and life-time of a LED product.

For QLE a tp temperature of 45 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and life-time.

Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

The tc and tp temperature of LED modules from Tridonic are measured at the same reference point.

### 2.2 Storage and humidity

Storage temperature	-40 ... +85 °C
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Operation only in non condensing environment.

Humidity during processing of the module should be between 0 to 70 %.

### 2.3 Thermal design and heat sink

The rated life of LED products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the QLE will be greatly reduced or the QLE may be destroyed.

## 3. Installation / wiring

### 3.1 Electrical supply/choice of LED control gear

QLE modules from Tridonic are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED Driver which complies with the relevant standards. The use of LED Driver from Tridonic in combination with QLE modules guarantees the necessary protection for safe and reliable operation.

If a LED Driver other than Tridonic is used, it must provide the following protection:

- Short-circuit protection
- Overload protection
- Overtemperature protection



QLE modules must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.

Wrong polarity can damage the QLE.

With parallel wiring tolerance-related differences in output are possible (thermal stress of the module) and can cause differences in brightness. If one module fails, the remaining modules may be overloaded.

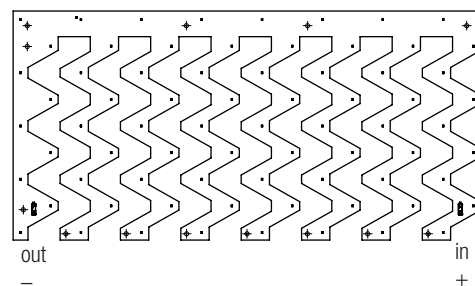
QLE modules can be operated either from SELV LED Driver or from LED Driver with LV output voltage.



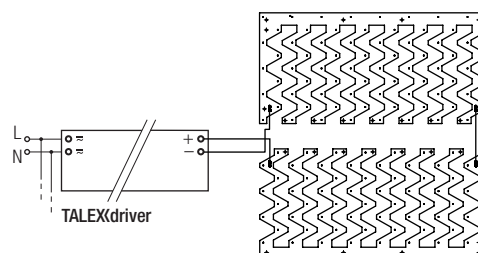
QLE modules are basic isolated up to 250 V against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 250 V, an additional isolation between LED module and heat sink is required (for example by isolated thermal pads) or by a suitable luminaire construction.

At voltages > 60 V an additional protection against direct touch (test finger) to the light emitting side of the module has to be guaranteed. This is typically achieved by means of a non removable light distributor over the module.

### 3.2 Wiring



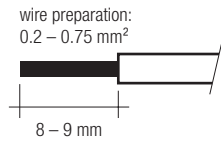
### Wiring examples



### 3.3 Wiring type and cross section

The wiring can be in stranded wires with ferrules or solid with a cross section of 0.2 to 0.75 mm<sup>2</sup>.

For the push-wire connection you have to strip the insulation (8–9 mm).



To remove the wires use a suitabel tool (e.g. Microcon release pin) or through twist and pull.

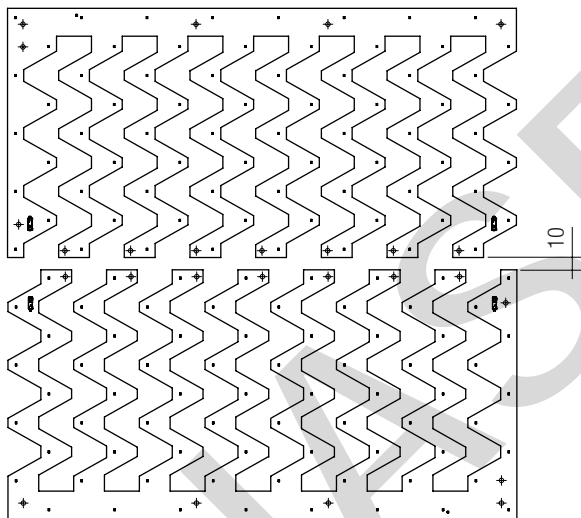
### 3.4 Mounting instruction



None of the components of the QLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.5 Nm.

The LED modules are mounted with 12 screws per module. In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.



For best homogenous appearance use 10 mm distance between the modules.



Chemical substance may harm the LED module. Chemical reactions could lead to colour shift, reduced luminous flux or a total failure of the module caused by corrosion of electrical connections.

Materials which are used in LED applications (e.g. sealings, adhesives) must not produce dissolver gas. They must not be condensation curing based, acetate curing based or contain sulfur, chlorine or phthalate.

Avoid corrosive atmosphere during usage and storage.

### 3.5 EOS/ESD safety guidelines



The device / module contains components that are sensitive to electrostatic discharge and may only be installed in the factory and on site if appropriate EOS/ESD protection measures have been taken. No special measures need be taken for devices/modules with enclosed casings (contact with the pc board not possible), just normal installation practice. Please note the requirements set out in the document EOS / ESD guidelines (Guideline\_EOS\_ESD.pdf) at: <http://www.tridonic.com/esd-protection>

## 4. Life-time

### 4.1 Life-time, lumen maintenance and failure rate

The light output of an LED Module decreases over the life-time, this is characterized with the L value.

L70 means that the LED module will give 70 % of its initial luminous flux. This value is always related to the number of operation hours and therefore defines the life-time of an LED module.

As the L value is a statistical value and the lumen maintenance may vary over the delivered LED modules.

The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value. In addition the percentage of failed modules (fatal failure) is characterized by the C value.

The F value is the combination of the B and C value. That means for F degradation and complete failures are considered, e.g. L70F10 means 10 % of the LED modules may fail or be below 70 % of the initial luminous flux.

Life-time declarations are informative and represent no warranty claim.

### 4.2 Lumen maintenance for QLE

Forward current	tp tempera- ture						
		L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	45 °C	28,000 h	36,000 h	59,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	24,000 h	31,000 h	51,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	20,000 h	26,000 h	43,000 h	56,000 h	>60,000 h	>60,000 h
	45 °C	27,000 h	36,000 h	59,000 h	>60,000 h	>60,000 h	>60,000 h
300 mA	55 °C	23,000 h	30,000 h	50,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	20,000 h	26,000 h	43,000 h	56,000 h	>60,000 h	>60,000 h
	45 °C	27,000 h	35,000 h	57,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	23,000 h	30,000 h	49,000 h	>60,000 h	>60,000 h	>60,000 h
350 mA	65 °C	20,000 h	25,000 h	42,000 h	54,000 h	>60,000 h	>60,000 h
	45 °C	25,000 h	33,000 h	54,000 h	>60,000 h	>60,000 h	>60,000 h
	55 °C	22,000 h	28,000 h	46,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	19,000 h	24,000 h	40,000 h	52,000 h	>60,000 h	>60,000 h

Lumen maintenance values are based on LM80 data. Table may be updated when more recent results are available.

### 4.3 Switching capability

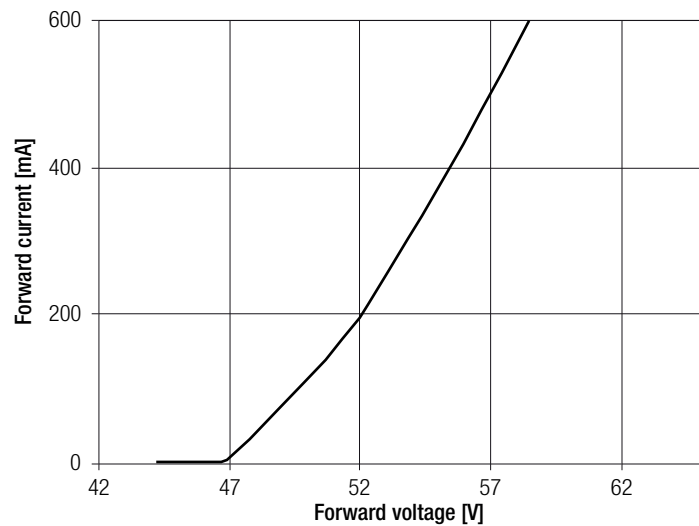
50,000 cycles

Tested according to IEC 62717 Cl 10.3.3

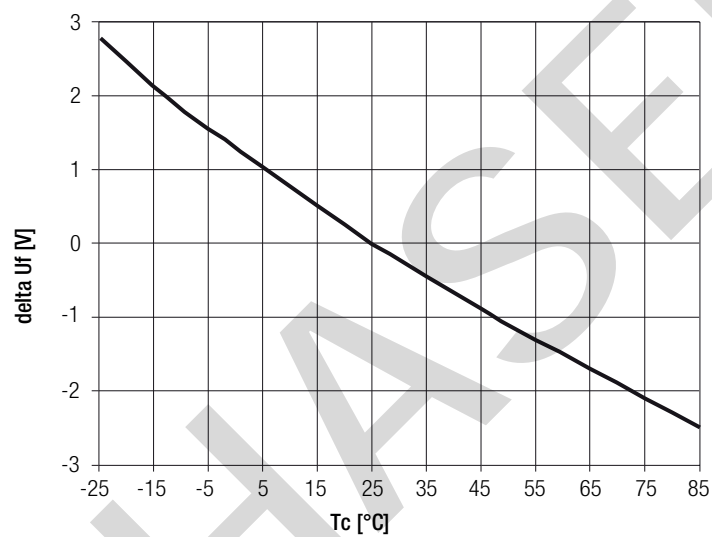
30 s on / 30 s off at I<sub>max</sub>

## 5. Electrical values

### 5.1 Typ. forward voltage vs. forward current



### 5.2 Forward voltage vs. tp temperature



The diagrams are based on statistic values.  
The real values can be different.

## 6. Photometric characteristics

### 6.1 Coordinates and tolerances according to CIE 1931

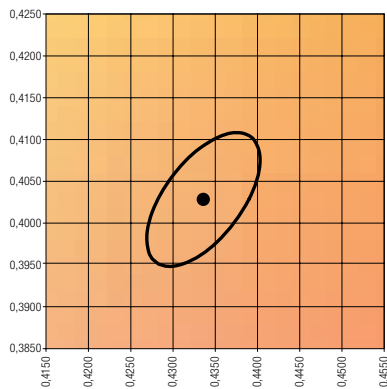
The specified colour coordinates are integratel measured by a current impulse of 350 mA and a duration of 100 ms.

The ambient temperature of the measurement is  $t_a = 25^\circ\text{C}$ .

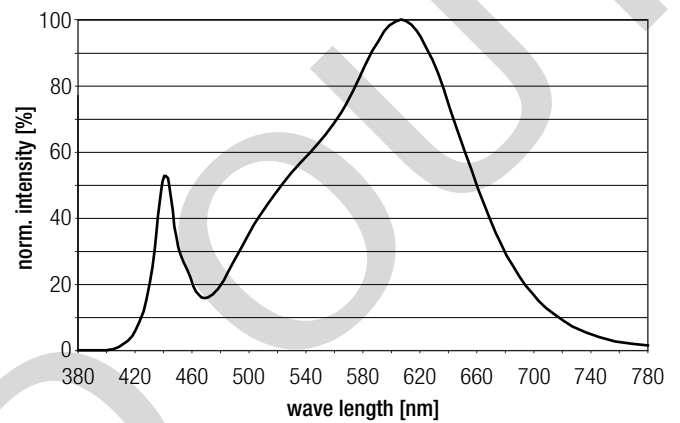
The measurement tolerance of the colour coordinates are  $\pm 0.01$ .

#### 3,000 K

	x0	y0
Centre	0.4339	0.4032

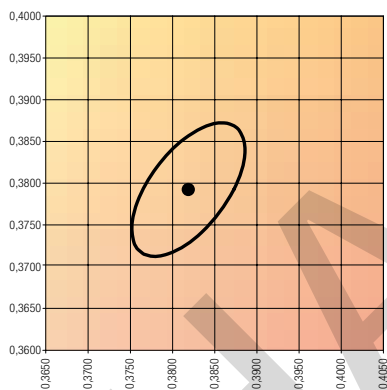


— MacAdam Ellipse: 3SDCM

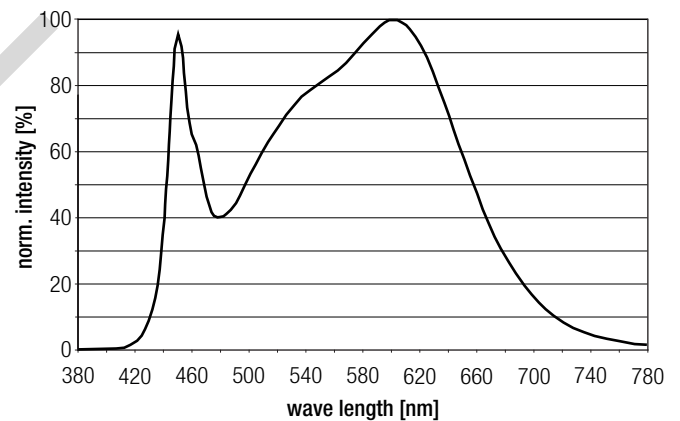


#### 4,000 K

	x0	y0
Centre	0.3818	0.3795

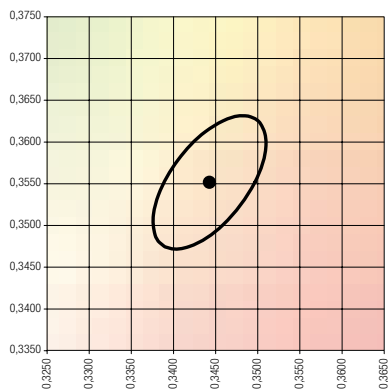


— MacAdam Ellipse: 3SDCM

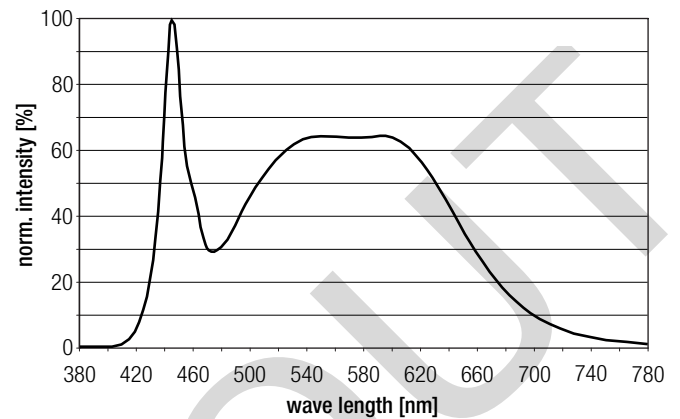


**5,000 K**

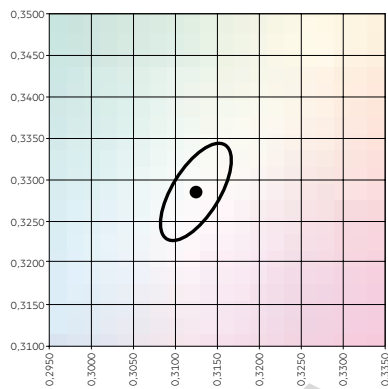
	x0	y0
Centre	0.3446	0.3551



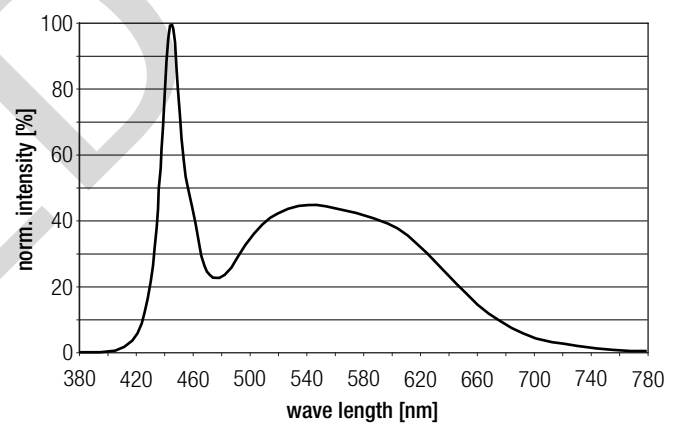
— MacAdam Ellipse: 3SDCM

**6,500 K**

	x0	y0
Centre	0.3123	0.3282



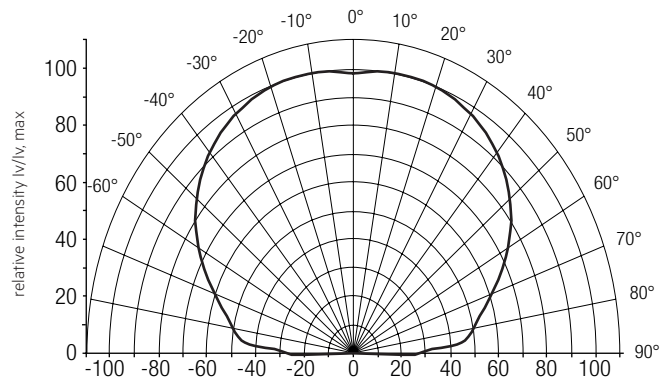
— MacAdam Ellipse: 3SDCM





## 6.2 Light distribution

The optical design of the product line ensures optimum homogeneity for the light distribution.

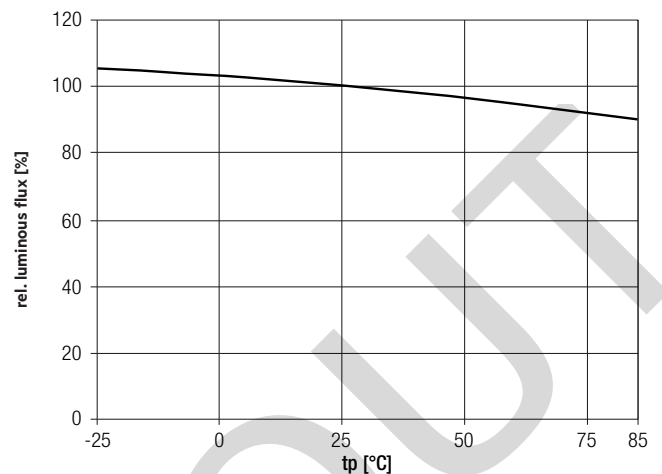


The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 7.

To ensure an ideal mixture of colours and a homogenous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 6 cm) should be used.

For further information see Design-in Guide, 3D data and photometric data on [www.tridonic.com](http://www.tridonic.com) or on request.

## 6.3 Relative luminous flux vs. tc temperature



## 6.4 Relative luminous flux vs. operating current

