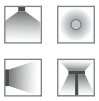


Module QLE G2 380x380mm 5000lm ADV-SE

Modules QLE

Product description

- Ideal for panel and louvre luminaires, cost-effective replacement for 4 x 14 W (18 W) T5 / T8 lamps
- Luminous flux range from 3,520 up to 8,260 lm
- 121 LED packages for excellent homogeneity and illuminiation
- LED system solution with outstanding system efficacy up to 136 lm/W, consisting of squared LED modules and dimmable LED Driver LCAI 65 W 900 – 1750 mA ECO lp
- Efficacy of the module up to 159 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3①
- Small luminous flux tolerances
- Colour temperatures 3,000 K and 4,000 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

Standards, page 3

Colour temperatures and tolerances, page 6

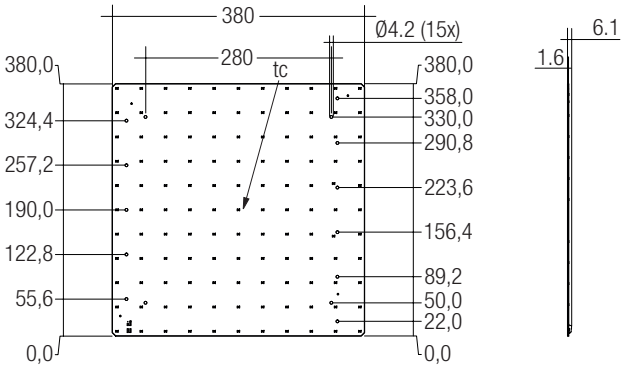
CE RoHS

Module QLE G2 380x380mm 5000lm ADV-SE

Modules QLE

Technical data

Beam characteristic	120°
Ambient temperature range	-30 … +45 °C
tp rated	65 °C
tc	85 °C
Max. DC forward current	1,980 mA
Max. permissible LF current ripple	2,178 mA
Max. permissible peak current	2,460 mA / max. 10 ms
Max. permissible output voltage of LED Driver[2]	420 V
Insulation test voltage	1.84 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	Weight per pc.
QLE G2 380x380mm 5000lm 830 ADV-SE	**89602156**	3,000 K	14 pc(s).	0.283 kg
QLE G2 380x380mm 5000lm 840 ADV-SE	**89602157**	4,000 K	14 pc(s).	0.283 kg

Specific technical data

Type[4]	Photo-metric code	Typ. luminous flux at tp = 25 °C[3]	Typ. luminous flux at tp = 65 °C[3]	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C[3]	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 65 °C	Efficacy of the system at tp = 65 °C	Colour rendering index CRI
Operating mode HE at 825 mA											
QLE G2 380x380mm 5000lm 830 ADV-SE	830/349	3,920 lm	3,720 lm	825 mA	30.5 V	34.7 V	26.0 W	146 lm/W	143 lm/W	126 lm/W	> 80
QLE G2 380x380mm 5000lm 840 ADV-SE	840/349	4,270 lm	4,050 lm	825 mA	30.5 V	34.7 V	26.0 W	159 lm/W	155 lm/W	136 lm/W	> 80
Operating mode BLO at 1,050 mA											
QLE G2 380x380mm 5000lm 830 ADV-SE	830/349	4,850 lm	4,600 lm	1,050 mA	31.8 V	36.2 V	34.1 W	138 lm/W	135 lm/W	119 lm/W	> 80
QLE G2 380x380mm 5000lm 840 ADV-SE	840/349	5,290 lm	5,020 lm	1,050 mA	31.8 V	36.2 V	34.1 W	151 lm/W	147 lm/W	130 lm/W	> 80
Operating mode HO at 1,700 mA											
QLE G2 380x380mm 5000lm 830 ADV-SE	830/349	7,580 lm	7,190 lm	1,700 mA	34.0 V	38.8 V	59.1 W	125 lm/W	121 lm/W	106 lm/W	> 80
QLE G2 380x380mm 5000lm 840 ADV-SE	840/349	8,260 lm	7,840 lm	1,700 mA	34.0 V	38.8 V	59.1 W	136 lm/W	132 lm/W	116 lm/W	> 80

[1] Integral measurement over the complete module.

[2] If mounted with M4 screws and plastic washers.

[3] Tolerance range for optical and electrical data: ±10 %.

[4] HE … high efficiency, BLO … best lamp operation, HO … high output.

1. Standards

IEC 62031
IEC 62471
IEC 61547
IEC 55015
IEC 61000-4-2

1.1 Photometric code

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

1st digit		2nd + 3rd digit	4th digit	5th digit	6th 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)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.2 Energy classification

Type	Forward current	Energy classification
QLE G2 380x380mm 5000lm 830 ADV-SE	825 mA	A++
	1.050 mA	A++
	1.700 mA	A+
QLE G2 380x380mm 5000lm 830 ADV-SE	825 mA	A++
	1.050 mA	A++
	1.700 mA	A+

2. Thermical details

2.1 tp 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 65 °C has to be complied in order to achieve an optimum between light output and life-time.

Compliance with the maximum permissible reference temperature at the tp 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	-30 … +80 °C

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.

2.4 Heat sink values

ta	tp	Forward current	$R_{th, hs-a}$	Cooling area
25 °C	65 °C	825 mA	3.12 K/W	214 cm²
25 °C	65 °C	1,050 mA	2.05 K/W	325 cm²
25 °C	65 °C	1,700 mA	1.15 K/W	579 cm²
35 °C	65 °C	825 mA	2.34 K/W	285 cm²
35 °C	65 °C	1,050 mA	1.59 K/W	420 cm²
35 °C	65 °C	1,700 mA	0.91 K/W	736 cm²
45 °C	65 °C	825 mA	1.57 K/W	425 cm²
45 °C	65 °C	1,050 mA	1.06 K/W	629 cm²
45 °C	65 °C	1,700 mA	0.61 K/W	1,097 cm²

Notes
The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation. Depending on the heat sink a heat conducting paste or heat conducting film might be necessary to keep the specified tp temperature.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

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 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.

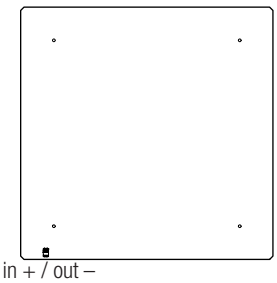
Wrong polarity can damage the QLE.

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.

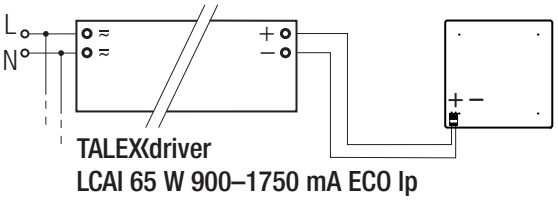
QLE modules can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.

QLE modules are basic isolated up to 420 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 420 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

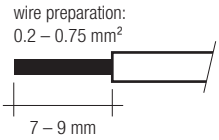


Wiring examples



3.3 Wiring type and cross section

The wiring can be solid cable with a cross section of 0.2 to 0.75 mm².
For the push-wire connection you have to strip the insulation (7–9 mm).



Inserting stranded wires / removing wires by lightly pressing on the push button.

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 4 screws per module.
In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.

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 maintenace 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 inital luminous flux, respectivly 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.

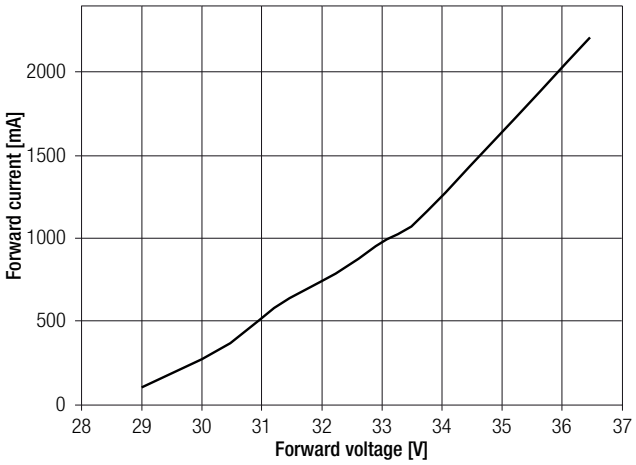
4.2 Lumen maintenance

Inserting stranded wires / removing wires by lightly pressing on the push button.

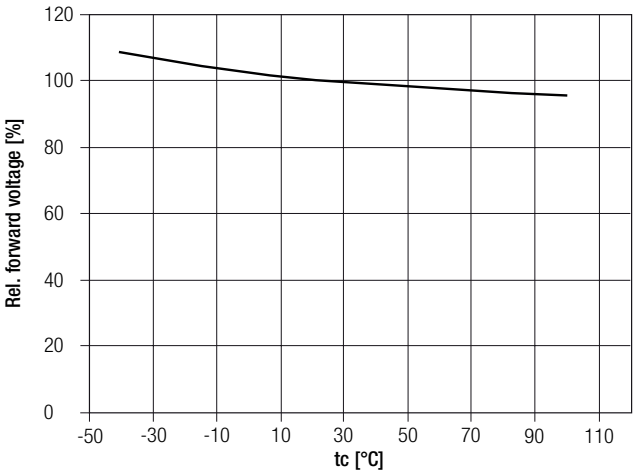
Forward current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
825 mA	45 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	55 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	65 °C	33,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	75 °C	17,000 h	40,000 h	33,000 h	50,000 h	50,000 h	50,000 h
1,050 mA	45 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	55 °C	40,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	65 °C	22,000 h	50,000 h	41,000 h	50,000 h	50,000 h	50,000 h
	75 °C	11,000 h	35,000 h	22,000 h	48,000 h	34,000 h	50,000 h
1,700 mA	45 °C	26,000 h	50,000 h	48,000 h	50,000 h	50,000 h	50,000 h
	55 °C	12,000 h	31,000 h	26,000 h	50,000 h	38,000 h	50,000 h
	65 °C	8,000 h	15,000 h	14,000 h	31,000 h	22,000 h	50,000 h
	75 °C	4,000 h	9,000 h	8,000 h	18,000 h	13,000 h	30,000 h

5. Electrical values

5.1 Forward current vs. forward voltage



5.2 Forward voltage vs. tc temperature



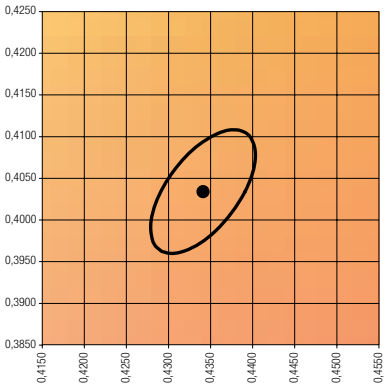
6. Photometric charcteristics

6.1 Coordinates and tolerances according to CIE 1931

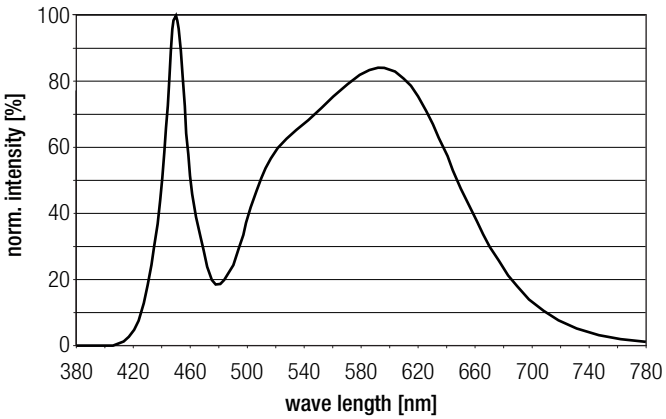
The specified colour coordinates are measured integral by a current impulse with typical values of module and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

3,000 K

	x0	y0
Centre	0.4344	0.4032

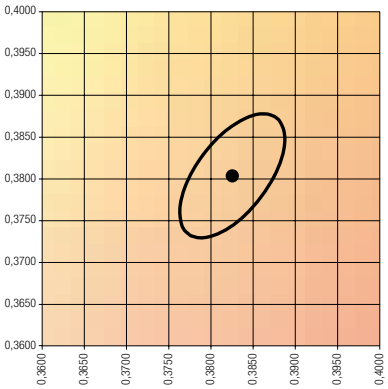


MacAdam Ellipse: 3SDCM

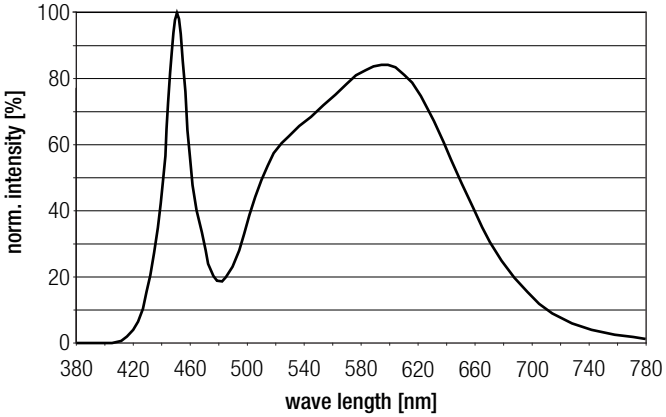


4,000 K

	x0	y0
Centre	0.3828	0.3803

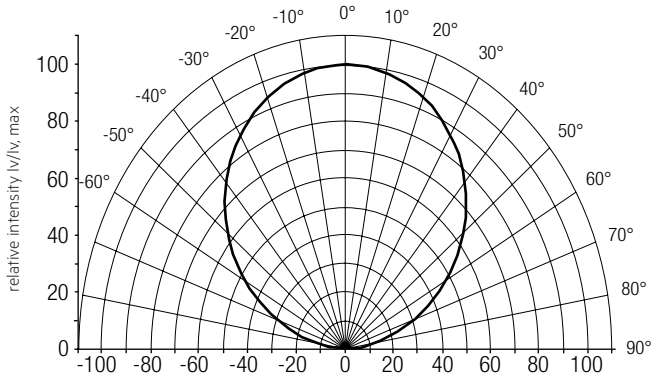


MacAdam Ellipse: 3SDCM



6.2 Light distribution

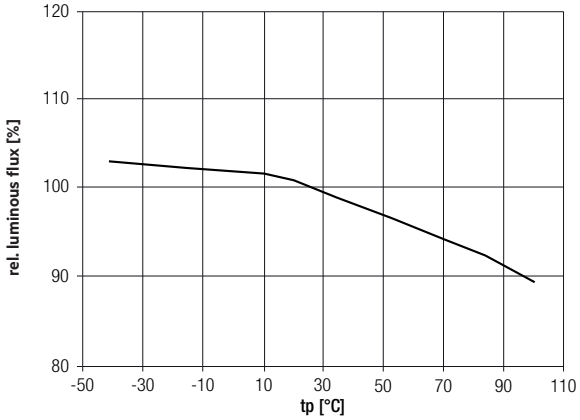
The optical design of the QLE product line ensures optimum homogenity for the light distribution.



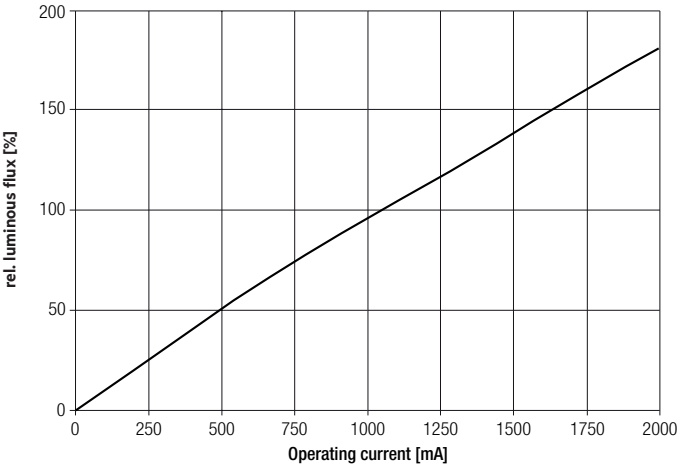
The colour temperature is measured over the complete module. The single LED light points can be outside of 3SDCM.
To ensure an ideal mixture of colours and a homogenious light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 5 cm) should be used.

3D-Data, photometric data and Design-in guide available on request or go to www.tridonic.com

6.3 Relative luminous flux vs. tp temperature



6.4 Relative luminous flux vs. operating current



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