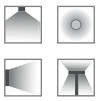


Module QLE Shallow G1 ADV

Module QLE ADVANCED

Product description

- For square and rectangular ultra flat, wall-mounted, ceiling-mounted and suspended luminaries
- Backlighting depth of 30 mm can be realized
- Wide beam chip enables high homogeneity despite low backlighting depth
- Different HE and HO modes available for more flexibility in the luminarie design
- Constant lm/m² possible in combination with CLE Shallow
- Small colour tolerance MacAdam 3⑤
- Colour temperatures 3,000 and 4,000 K
- Long life-time: 50,000 hours
- 5-year guarantee
- System solution with ADV, EXC and PRE drivers (C and lp)

Standards, page 3

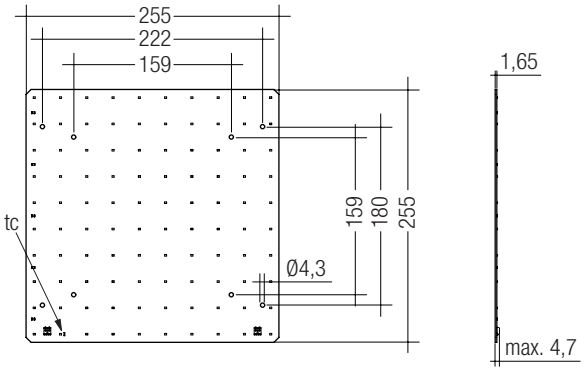
Colour temperatures and tolerances, page 6

RoHS

Module QLE Shallow G1 ADV
Module QLE ADVANCED

Technical data

Beam characteristic	150°
Ambient temperature range	-25 … +45 °C
tp rated	45 °C
tc	85 °C
Irated	400 mA
Imax	1,200 mA
Max. DC forward current	1,360 mA
Max. permissible LF current ripple	1,500 mA
Max. permissible peak current	2,000 mA / max. 10 ms
Max. working voltage for insulation①	250 V
Insulation test voltage	1.5 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 4
Risk group (IEC 62471:2008)②	0
Classification acc. to IEC 62031	Built-in
Type of protection	IP00



Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
QLE Shallow G1 255x255mm 1950lm 830 ADV	**89602493**	3,000 K	20 pc(s).	0.172 kg
QLE Shallow G1 255x255mm 1950lm 840 ADV	**89602494**	4,000 K	20 pc(s).	0.172 kg

Specific technical data

Type④	Photo-metric code	Typ. luminous flux at tp = 25 °C⑤	Typ. luminous flux at tp = 45 °C⑤	Typ. forward current	Min. forward voltage at tp = 45 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 45 °C⑤	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
Operating mode HE at 250 mA											
QLE Shallow G1 255x255mm 1950lm 830 ADV	830/359	1,220 lm	1,180 lm	250 mA	25.6 V	28.1 V	6.7 W	180 lm/W	178 lm/W	164 lm/W	> 80
QLE Shallow G1 255x255mm 1950lm 840 ADV	840/359	1,260 lm	1,230 lm	250 mA	25.6 V	28.1 V	6.7 W	186 lm/W	184 lm/W	169 lm/W	> 80
Operating mode HE at 300 mA											
QLE Shallow G1 255x255mm 1950lm 830 ADV	830/359	1,450 lm	1,410 lm	300 mA	25.9 V	28.4 V	8.1 W	177 lm/W	175 lm/W	161 lm/W	> 80
QLE Shallow G1 255x255mm 1950lm 840 ADV	840/359	1,500 lm	1,460 lm	300 mA	25.9 V	28.4 V	8.1 W	183 lm/W	181 lm/W	167 lm/W	> 80
Operating mode NM at 400 mA											
QLE Shallow G1 255x255mm 1950lm 830 ADV	830/359	1,930 lm	1,870 lm	400 mA	26.5 V	28.9 V	11 W	173 lm/W	170 lm/W	156 lm/W	> 80
QLE Shallow G1 255x255mm 1950lm 840 ADV	840/359	1,990 lm	1,940 lm	400 mA	26.5 V	28.9 V	11 W	178 lm/W	176 lm/W	162 lm/W	> 80
Operating mode HO at 500 mA											
QLE Shallow G1 255x255mm 1950lm 830 ADV	830/359	2,400 lm	2,330 lm	500 mA	26.9 V	29.5 V	14.0 W	169 lm/W	167 lm/W	154 lm/W	> 80
QLE Shallow G1 255x255mm 1950lm 840 ADV	840/359	2,480 lm	2,410 lm	500 mA	26.9 V	29.5 V	14.0 W	175 lm/W	172 lm/W	158 lm/W	> 80
Operating mode HO at 1,200 mA											
QLE Shallow G1 255x255mm 1950lm 830 ADV	830/359	5,400 lm	5,240 lm	1,200 mA	29.4 V	32.1 V	36.6 W	145 lm/W	143 lm/W	132 lm/W	> 80
QLE Shallow G1 255x255mm 1950lm 840 ADV	840/359	5,590 lm	5,420 lm	1,200 mA	29.4 V	32.1 V	36.6 W	150 lm/W	148 lm/W	136 lm/W	> 80

① If mounted with M4 screws.

② Measured at max. DC forward current.

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

④ HE … high efficiency, NM … nominal mode, HO … high output.

⑤ Integral measurement over the complete module.

1. Standards

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

1.1 Photometric code

Key for photometric code, e. g. 830 / 459

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	Energy classification
QLE Shallow G1 255x255mm 1950lm 8x0 ADV	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	-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.

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 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.

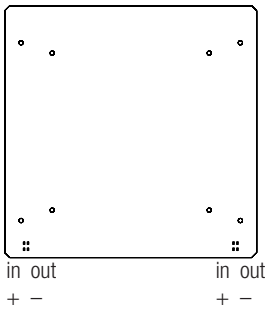
Wrong polarity can damage the QLE.

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.

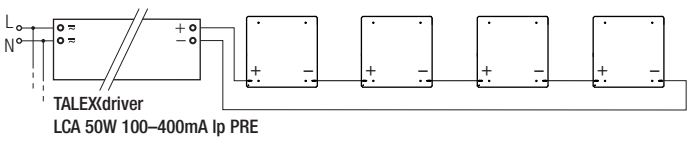
QLE module can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.

QLE modules are basic isolated up to 250 V (if mounted with M4 screws with 7 mm screw head diameter) 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

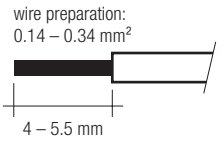


Wiring examples



3.3 Wiring type and cross section

The wiring can be in solid with a cross section of 0.14 to 0.34 mm².
For the push-wire connection you have to strip the insulation (8–9 mm).



To remove the wires use a suitabel tool (Wago 206-859) 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 M4 screws or ACL CLIP 4.3mm per module.

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.

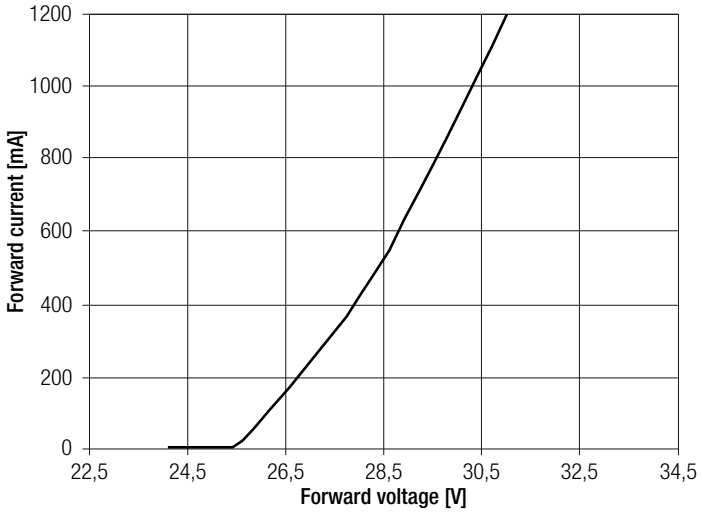
Life-time declarations are informative and represent no warranty claim.

4.2 Lumen maintenance for QLE

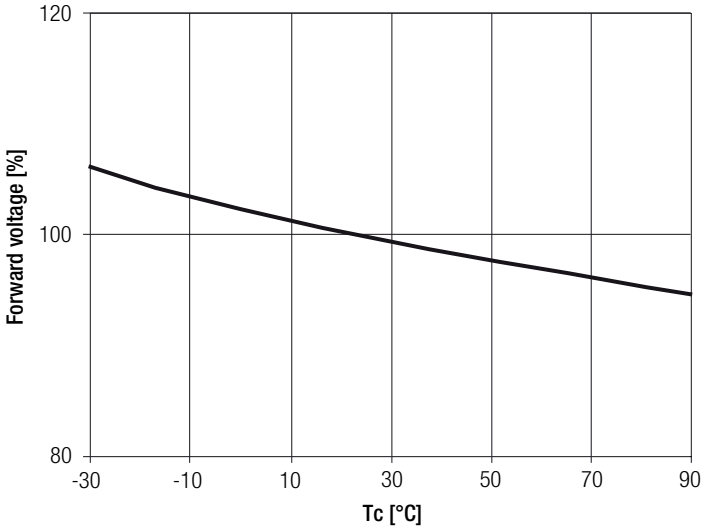
QLE Shallow G1 255x255mm ADV							
Forward current	**tp temperature**	**L90 / F10**	**L90 / F50**	**L80 / F10**	**L80 / F50**	**L70 / F10**	**L70 / F50**
400 mA	45 °C	>100,000 h	>100,000 h	>100,000 h	>100,000 h	>100,000 h	>100,000 h
	55 °C	69,000 h	>100,000 h	>100,000 h	>100,000 h	>100,000 h	>100,000 h
	65 °C	43,000 h	63,000 h	67,000 h	99,000 h	89,000 h	>100,000 h
	75 °C	27,000 h	40,000 h	42,000 h	63,000 h	56,000 h	83,000 h

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 charcteristics

6.1 Coordinates and tolerances according to CIE 1931

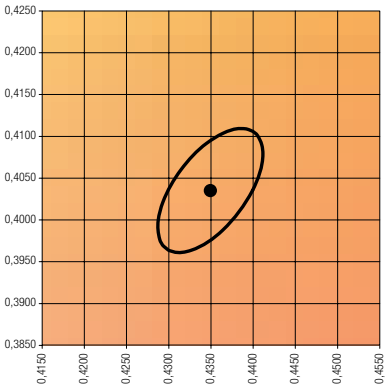
The specified colour coordinates are measured integral after a settling time of 100 ms. The current impuls depends on the module type.

Module type	Current impulse
QLE Shallow G1 255x255mm 1950lm 8x0 ADV	400 mA

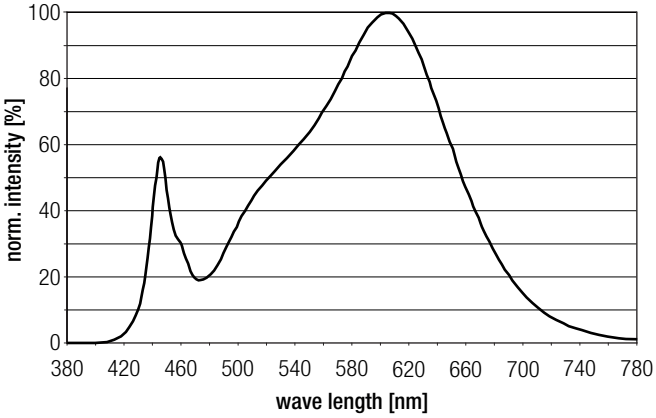
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

3,000 K

	x0	y0
Centre	0.4349	0.4037

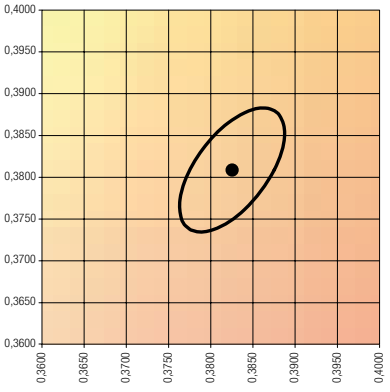


MacAdam Ellipse: 3SDCM

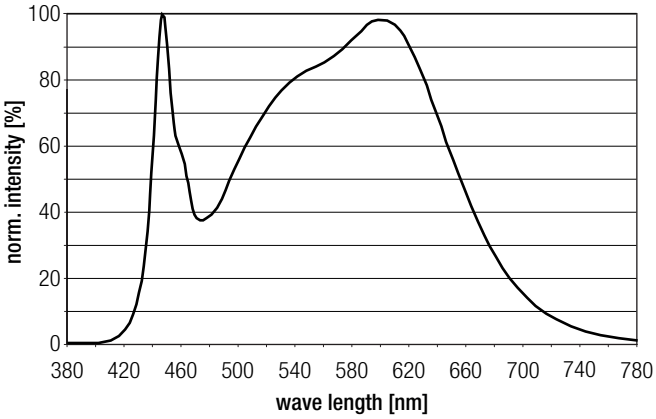


4,000 K

	x0	y0
Centre	0.3828	0.3811

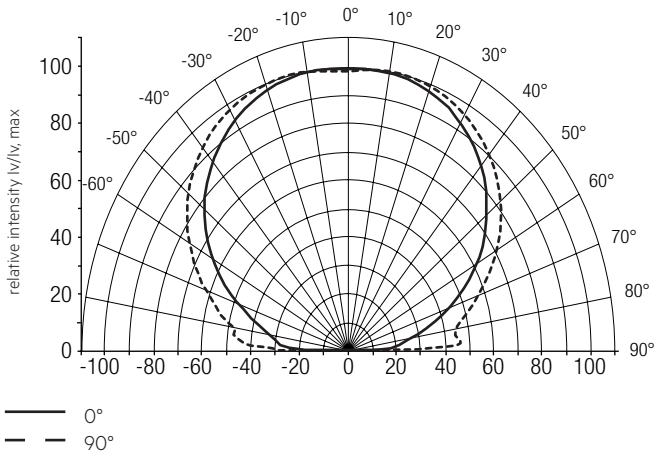


MacAdam Ellipse: 3SDCM



6.2 Light distribution

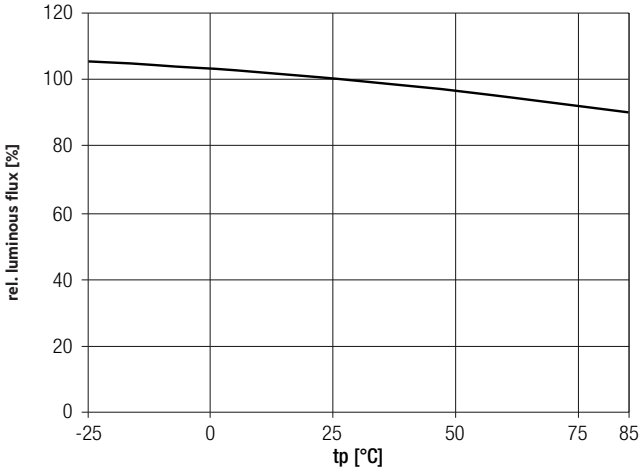
The optical design of the QLE product line ensures optimum homogenity for the light distribution.



The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3.
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. 3 cm) should be used.

For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

6.3 Relative luminous flux vs. tc temperature



6.4 Relative luminous flux vs. operating current