Module STARK QLE G3 CLASSIC

Modules QLE

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Product description

- Ideal for linear and panel lights
- Luminous flux range from 1,230 – 1,830 lm
- LED system solution with outstanding system efficacy up to 149 lm/W, consisting of squared LED modules and dimmable LED Driver LCA 50W 150–400mA lp PRE
- Efficacy of the module up to 169 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3①
- Small luminous flux tolerances
- Colour temperatures 3,000, 4,000 and 5,000 K
- Perfectly uniform light, even if several LED modules are used together in a line
- 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

Typical applications

RoHS

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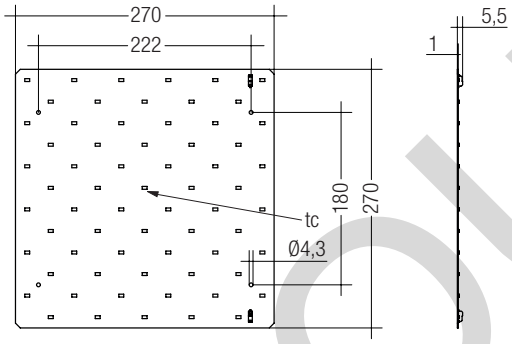
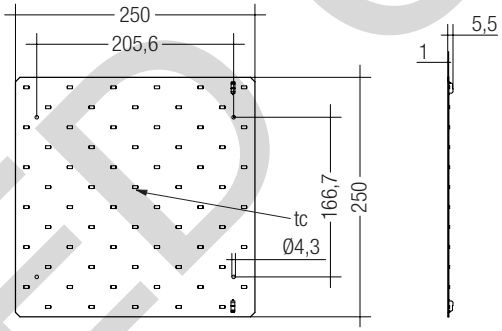
Technical data

Beam characteristic	120°
Ambient temperature range	-30 … +65 °C
tp rated	45 °C
tc	85 °C
Max. DC forward current	900 mA
Max. permissible LF current ripple	990 mA
Max. permissible peak current	1,500 mA / max. 10 µs
Max. permissible output voltage of LED Driver[2]	500 V
Insulation test voltage	2 kV
ESD classification	severity level 4
Risk group (EN 62471:2008)	1
Type of protection	IP00



QLE-G3-270



QLE-G3-250

Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
STARK-QLE-G3-270-1250-830-CLA	**28000384**	3,000 K	40 pc(s).	0.140 kg
STARK-QLE-G3-270-1250-840-CLA	**28000385**	4,000 K	40 pc(s).	0.140 kg
STARK-QLE-G3-270-1250-850-CLA	**28000386**	5,000 K	40 pc(s).	0.140 kg
STARK-QLE-G3-250-1250-830-CLA	**28000387**	3,000 K	40 pc(s).	0.120 kg
STARK-QLE-G3-250-1250-840-CLA	**28000388**	4,000 K	40 pc(s).	0.120 kg

Specific technical data

Type[4]	Photo-metric code	Typ. luminous flux at tp = 25 °C[3]	Typ. luminous flux at tp = 45 °C[3]	Typ. forward current	Min. forward voltage at tp = 45 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 45 °C[3]	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											
STARK-QLE-G3-xxx-1250-830-CLA	830/359	1,270 lm	1,230 lm	250 mA	27.3 V	33.0 V	7.8 W	160 lm/W	157 lm/W	141 lm/W	> 80
STARK-QLE-G3-xxx-1250-840-CLA	840/359	1,300 lm	1,270 lm	250 mA	27.3 V	33.0 V	7.8 W	165 lm/W	162 lm/W	146 lm/W	> 80
STARK-QLE-G3-270-1250-850-CLA	850/359	1,340 lm	1,300 lm	250 mA	27.3 V	33.0 V	7.8 W	169 lm/W	166 lm/W	149 lm/W	> 80
Operating mode HO at 300 mA											
STARK-QLE-G3-xxx-1250-830-CLA	830/359	1,490 lm	1,460 lm	300 mA	27.8 V	33.5 V	9.5 W	155 lm/W	152 lm/W	137 lm/W	> 80
STARK-QLE-G3-xxx-1250-840-CLA	840/359	1,530 lm	1,500 lm	300 mA	27.8 V	33.5 V	9.5 W	160 lm/W	157 lm/W	141 lm/W	> 80
STARK-QLE-G3-270-1250-850-CLA	850/359	1,580 lm	1,540 lm	300 mA	27.8 V	33.5 V	9.5 W	164 lm/W	163 lm/W	147 lm/W	> 80
Operating mode HO at 350 mA											
STARK-QLE-G3-xxx-1250-830-CLA	830/359	1,730 lm	1,670 lm	350 mA	28.3 V	34.0 V	11.3 W	151 lm/W	148 lm/W	133 lm/W	> 80
STARK-QLE-G3-xxx-1250-840-CLA	840/359	1,780 lm	1,730 lm	350 mA	28.3 V	34.0 V	11.3 W	156 lm/W	153 lm/W	138 lm/W	> 80
STARK-QLE-G3-270-1250-850-CLA	850/359	1,830 lm	1,780 lm	350 mA	28.3 V	34.0 V	11.3 W	161 lm/W	158 lm/W	142 lm/W	> 80

[1] Integral measurement over the complete module.

[2] If mounted with M4 screws.

[3] Tolerance range for optical data: ±7.5 % and electrical data: ±10 %.

[4] HE … high efficiency, 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-G3-xxx-1250-830-CLA	250 mA	A++
	300 mA	A++
	350 mA	A++
QLE-G3-xxx-1250-840-CLA	250 mA	A++
	300 mA	A++
	350 mA	A++
QLE-G3-270-1250-850-CLA	250 mA	A++
	300 mA	A++
	350 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 the STARK 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

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 STARK QLE will be greatly reduced or the STARK QLE may be destroyed.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

The STARK QLE from Tridonic is 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 the STARK QLE guarantees the necessary protection for safe and reliable operation.

If a LED Driver other than from Tridonic is used, it must provide the following protection:
- Short-circuit protection
- Overload protection
- Overtemperature protection

The STARK QLE 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.

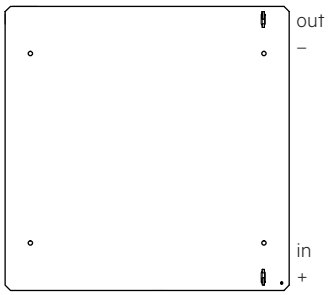
Wrong polarity can damage the STARK QLE.

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.

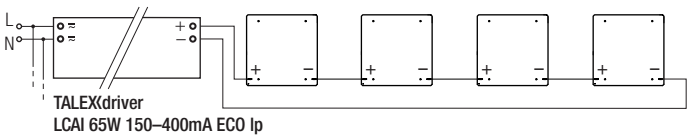
The STARK QLE can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.

The STARK QLE is basic isolated up to 500 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 500 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



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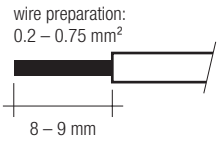
3.3 Wiring type and cross section

The wiring can be in stranded wires with ferrules or solid with a cross section of 0.2 to 0.75 mm².
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 STARK 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.

4.2 Lumen maintenance for STARK QLE

Forward current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	45 °C	53,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	26,000 h	39,000 h	55,000 h	>60,000 h	>60,000 h	>60,000 h
300 mA	45 °C	52,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	26,000 h	38,000 h	54,000 h	>60,000 h	>60,000 h	>60,000 h
350 mA	45 °C	50,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h	>60,000 h
	65 °C	25,000 h	37,000 h	52,000 h	>60,000 h	>60,000 h	>60,000 h

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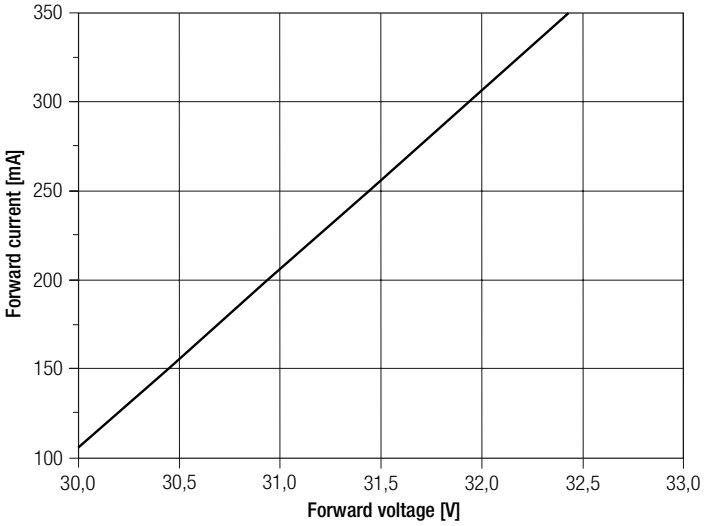
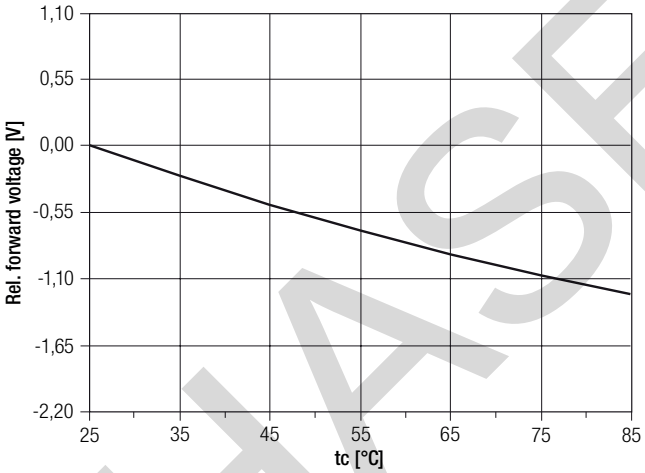
5. Electrical values

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.

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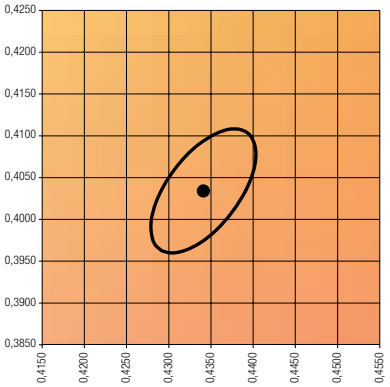
6. Photometric charcteristics

6.1 Coordinates and tolerances according to CIE 1931

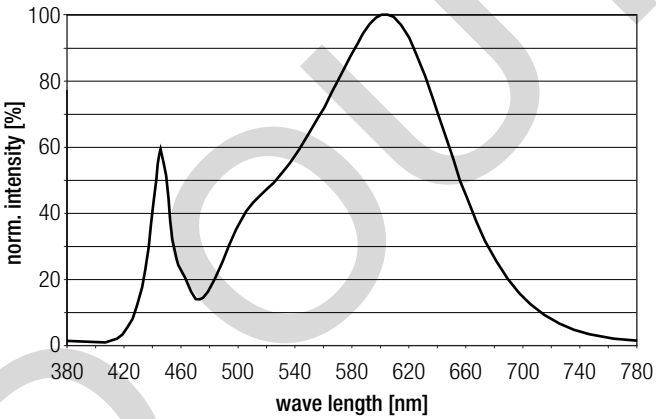
The specified colour coordinates are measured integral by a current impulse of 250 mA and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

3,000 K

	x0	y0
Centre	0.4344	0.4032

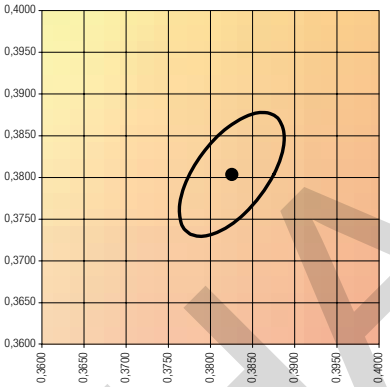


MacAdam Ellipse: 3SDCM

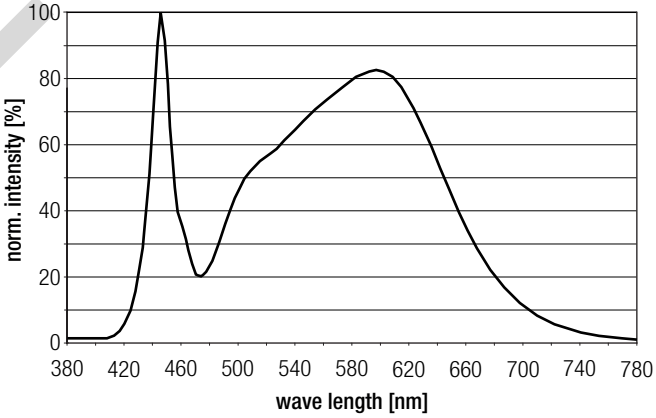


4,000 K

	x0	y0
Centre	0.3828	0.3803



MacAdam Ellipse: 3SDCM



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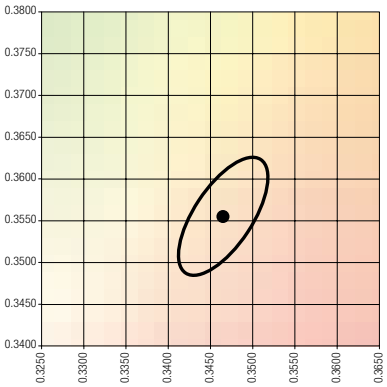
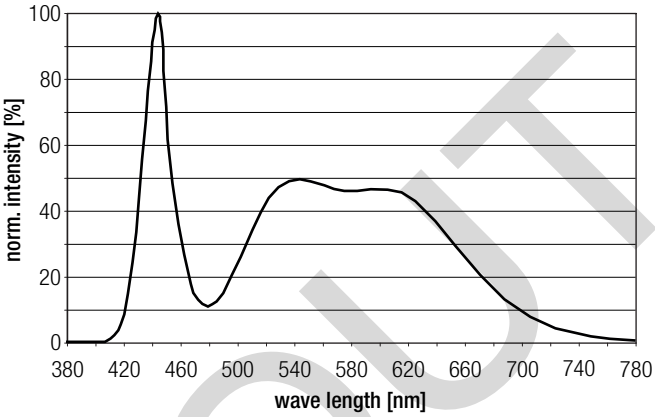
5,000 K

	x0	y0
Centre	0.3452	0.3558

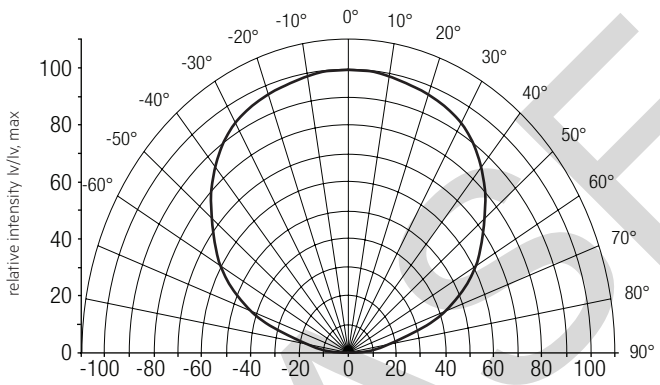


MacAdam Ellipse: 3SDCM



6.2 Light distribution

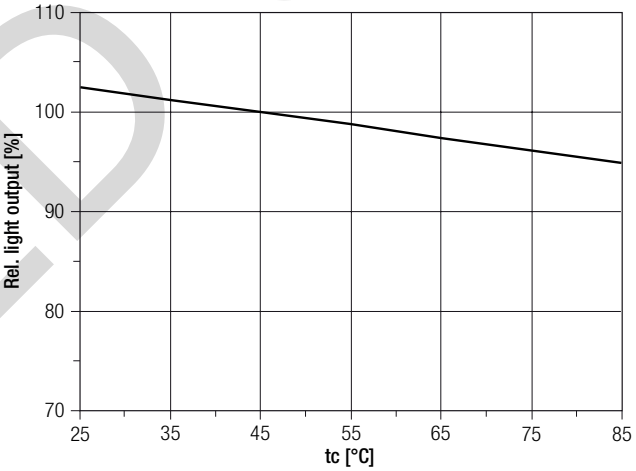
The optical design of the STARK QLE product line ensures optimum homogenity for the light distribution.



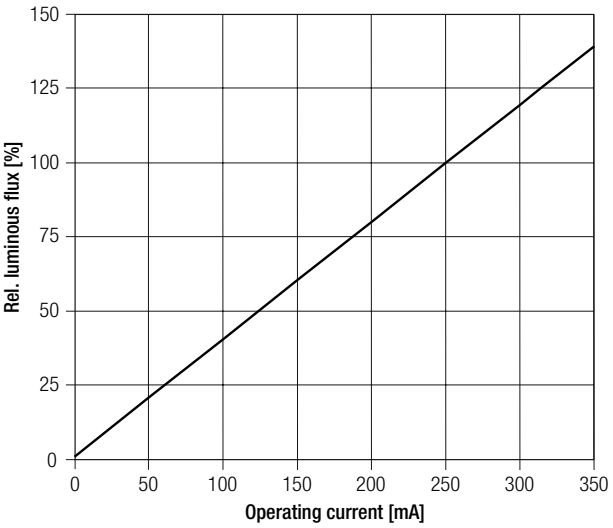
The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 7.
To ensure an ideal mixture of colours and a homogenious light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 6 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



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