

Module SLE G5 XD EXC

Modules SLE EXCITE

Product description

- For spotlights and downlights
- Housing with Snap-On feature for easy reflector mounting
- 35 mm housing with 25 mm mounting hole distance acc. to Zhaga
- ENEC and CB certificates for LES6, LES11 and LES15
- ENEC+ for all module types
- UL certificates for LES6, LES11 and LES15
- Luminous flux up to 7,430 lm at $t_p = 65^\circ\text{C}$
- High efficacy up to 156 lm/W for the LED module at $t_p = 25^\circ\text{C}$
- High system efficacy up to 134 lm/W at $t_p = 65^\circ\text{C}$
- High colour consistency (MacAdam 3)
- Small LES (light emitting surface) diameter enables small beam angle for spotlights
- Excellent thermal management by COB technology
- Uniform radiation with Dam&Fill technology
- Fixing holes for M3 screws
- Integrated LED module
- Cooling required
- Flexible operating modes
- 5-year guarantee

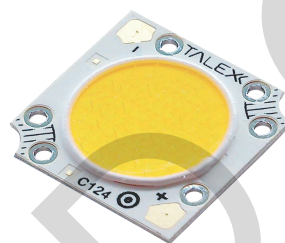


Standards, page 5

Colour temperatures and tolerances, page 11



LES15 with housing



LES15



LES11



LES06



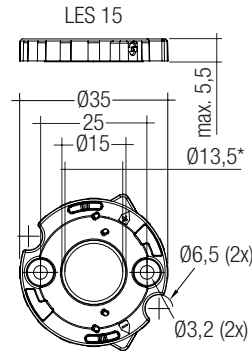


Module SLE G5 XD EXC

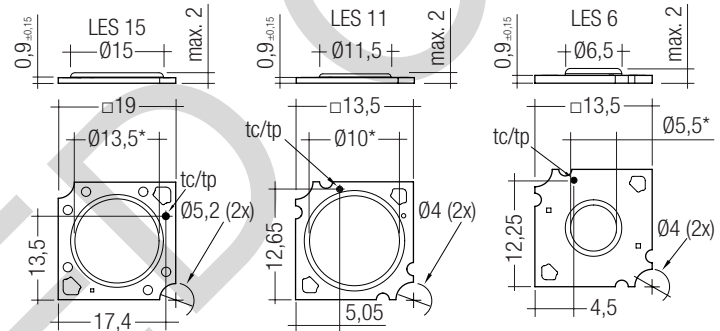
Modules SLE EXCITE

Technical data

Beam characteristic	115°
Ambient temperature range	-25 ... +50 °C
tp rated	65 °C
tc ^①	Up to 100 °C
Max. allowed Silicontemperature / Tjunction_max	150 °C / 140 °C
Max. DC forward current for LES6 XD ^②	350 mA
Max. DC forward current for LES11 XD ^②	900 mA
Max. DC forward current for LES15 XD ^②	1,750 mA
Max. permissible LF current ripple for LES6 XD	400 mA
Max. permissible LF current ripple for LES11 XD	1,000 mA
Max. permissible LF current ripple for LES15 XD	2,000 mA
Max. permissible peak current for LES6 XD	800 mA / max. 10 ms
Max. permissible peak current for LES11 XD	2,000 mA / max. 10 ms
Max. permissible peak current for LES15 XD	4,000 mA / max. 10 ms
Max. permissible output voltage of LED Driver for	50 V
LES6 XD ^③	
Max. permissible output voltage of LED Driver for	50 V
LES11 XD ^③	
Max. permissible output voltage of LED Driver for	50 V
LES15 XD ^③	
Insulation test voltage for LES6 XD	0.5 kV
Insulation test voltage for LES11 XD	0.5 kV
Insulation test voltage for LES15 XD	0.5 kV
ESD classification	Severity level 4
Risk group (EN 62471:2008) for LES6 (3,000 K)	RG1
Risk group (EN 62471:2008) for LES6 (4,000 K)	RG2 at d = 200 mm, RG1 at d ≥ 0.6 m
Risk group (EN 62471:2008) for LES11	RG1
Risk group (EN 62471:2008) for LES15	RG1
Type of protection	IP00



Dimensions in mm, *optical LES



Dimensions in mm, *optical LES

Ordering data

Type	Article number	Colour temperature	Housing	Connection cable	Packaging	Weight per pc.
SLE G5 6mm 1200lm 930 XD R EXC	89602184	3,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 6mm 1200lm 940 XD R EXC	89602185	4,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 11mm 3000lm 930 XD R EXC	89602176	3,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 11mm 3000lm 940 XD R EXC	89602177	4,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 15mm 5000lm 930 XD R EXC	89602168	3,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 15mm 5000lm 940 XD R EXC	89602169	4,000 K	no	no	20 pc(s).	0.001 kg
SLE G5 6mm 1200lm 930 XD C EXC	89602180	3,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 6mm 1200lm 940 XD C EXC	89602181	4,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 11mm 3000lm 930 XD C EXC	89602172	3,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 11mm 3000lm 940 XD C EXC	89602173	4,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 15mm 5000lm 930 XD C EXC	89602164	3,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 15mm 5000lm 940 XD C EXC	89602165	4,000 K	no	yes	20 pc(s).	0.004 kg
SLE G5 15mm 5000lm 930 XD H EXC	89602304	3,000 K	yes	no	50 pc(s).	0.003 kg
SLE G5 15mm 5000lm 940 XD H EXC	89602305	4,000 K	yes	no	50 pc(s).	0.003 kg

Specific technical data

Type ^②	Photo-metric code	Forward current	Luminous flux at tp = 25 °C ^④	Luminous flux at tp = 65 °C ^④	Power consumption ^{④ ⑤}	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Luminous efficacy module at tp = 25 °C	Luminous efficacy module at tp = 65 °C	Luminous efficacy system at tp = 65 °C ^⑥	Colour rendering index CRI
SLE 6mm 1200lm XD – Operating mode HE at 180 mA											
SLE G5 6mm 1200lm 930 XD EXC	930/359	180 mA	700 lm	640 lm	6.4 W	33.0 V	40.5 V	108 lm/W	100 lm/W	90 lm/W	90
SLE G5 6mm 1200lm 940 XD EXC	940/359	180 mA	750 lm	700 lm	6.4 W	33.0 V	40.5 V	115 lm/W	109 lm/W	98 lm/W	90
SLE 6mm 1200lm XD – Operating mode NM at 250 mA											
SLE G5 6mm 1200lm 930 XD EXC	930/359	250 mA	930 lm	830 lm	9.2 W	34.0 V	41.5 V	99 lm/W	90 lm/W	81 lm/W	90
SLE G5 6mm 1200lm 940 XD EXC	940/359	250 mA	980 lm	920 lm	9.2 W	34.0 V	41.5 V	104 lm/W	100 lm/W	90 lm/W	90
SLE 6mm 1200lm XD – Operating mode HO at 350 mA											
SLE G5 6mm 1200lm 930 XD EXC	930/359	350 mA	1,210 lm	1,070 lm	13.4 W	35.0 V	42.5 V	88 lm/W	80 lm/W	72 lm/W	90
SLE G5 6mm 1200lm 940 XD EXC	940/359	350 mA	1,290 lm	1,180 lm	13.4 W	35.0 V	42.5 V	94 lm/W	88 lm/W	79 lm/W	90
SLE 11mm 3000lm XD – Operating mode HE at 500 mA											
SLE G5 11mm 3000lm 930 XD EXC	930/359	500 mA	1,940 lm	1,740 lm	17.9 W	33.0 V	40.5 V	106 lm/W	97 lm/W	87 lm/W	90
SLE G5 11mm 3000lm 940 XD EXC	940/359	500 mA	2,130 lm	1,920 lm	17.9 W	33.0 V	40.5 V	116 lm/W	107 lm/W	97 lm/W	90
SLE 11mm 3000lm XD – Operating mode NM at 700 mA											
SLE G5 11mm 3000lm 930 XD EXC	930/359	700 mA	2,570 lm	2,290 lm	25.9 W	34.0 V	41.5 V	98 lm/W	88 lm/W	80 lm/W	90
SLE G5 11mm 3000lm 940 XD EXC	940/359	700 mA	2,830 lm	2,530 lm	25.9 W	34.0 V	41.5 V	108 lm/W	98 lm/W	88 lm/W	90
SLE 11mm 3000lm XD – Operating mode HO at 900 mA											
SLE G5 11mm 3000lm 930 XD EXC	930/359	900 mA	3,120 lm	2,780 lm	34.5 W	35.0 V	42.5 V	89 lm/W	81 lm/W	73 lm/W	90
SLE G5 11mm 3000lm 940 XD EXC	940/359	900 mA	3,440 lm	3,060 lm	34.5 W	35.0 V	42.5 V	98 lm/W	89 lm/W	80 lm/W	90
SLE 15mm 5000lm XD – Operating mode HE at 1,050 mA											
SLE G5 15mm 5000lm 930 XD EXC	930/359	1,050 mA	4,070 lm	3,590 lm	37.9 W	33.0 V	40.5 V	106 lm/W	95 lm/W	85 lm/W	90
SLE G5 15mm 5000lm 940 XD EXC	940/359	1,050 mA	4,450 lm	4,180 lm	37.9 W	33.0 V	40.5 V	116 lm/W	110 lm/W	99 lm/W	90
SLE 15mm 5000lm XD – Operating mode NM at 1,400 mA											
SLE G5 15mm 5000lm 930 XD EXC	930/359	1,400 mA	5,160 lm	4,530 lm	52.1 W	34.0 V	41.5 V	98 lm/W	87 lm/W	78 lm/W	90
SLE G5 15mm 5000lm 940 XD EXC	940/359	1,400 mA	5,620 lm	5,260 lm	52.1 W	34.0 V	41.5 V	107 lm/W	101 lm/W	91 lm/W	90
SLE 15mm 5000lm XD – Operating mode HO at 1,750 mA											
SLE G5 15mm 5000lm 930 XD EXC	930/359	1,750 mA	6,120 lm	5,350 lm	67.1 W	35.0 V	42.5 V	90 lm/W	80 lm/W	72 lm/W	90
SLE G5 15mm 5000lm 940 XD EXC	940/359	1,750 mA	6,660 lm	6,220 lm	67.1 W	35.0 V	42.5 V	98 lm/W	93 lm/W	83 lm/W	90

^① See derating curves in data sheet section 2.3.

^② Max. DC forward current varies over the temperature of the LED module. See derating curves in data sheet section 2.3.

^③ The detailed explanation, see data sheet section 3.1.

^④ Tolerance range for optical and electrical data: ±10 %.

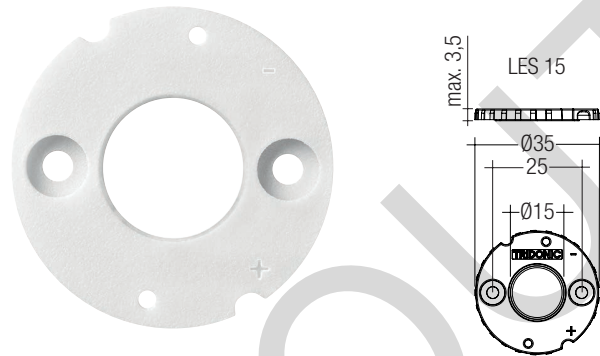
^⑤ Assumed efficiency for the LED Driver is 0.9.

^⑥ All values at tp = 65 °C.

^⑦ HE ... high efficiency, NM ... nominal mode, HO ... high output.

Product description

- Housing for LES 15
- Diameter: 35 mm
- Material: Lexan Resin 943



Ordering data

Type	Article number	Packaging bag	Weight per pc.
SLE housing for LES 15	28001039	100 pc(s).	0.002 kg

1. Standards

EN 62031
 EN 62471
 IEC 62717
 IEC 61000-4-2
 UL 8750 - certificate number: E366084

1.1 Glow wire test

according to EN 62031 with increased temperature of 850 °C passed.

1.2 Photometric code

Key for photometric code, e. g. 830 / 359

1 st digit	2 nd + 3 rd digit	4 th digit	5 th digit	6 th 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 %

1.3 Energy classification

Type	Forward current	Energy classification
SLE G5 6mm 1200lm 930 XD EXC	180 mA	A+
	250 mA	A+
	350 mA	A
SLE G5 6mm 1200lm 940 XD EXC	180 mA	A+
	250 mA	A+
	350 mA	A+
SLE G5 11mm 3000lm 930 XD EXC	500 mA	A+
	700 mA	A+
	900 mA	A
SLE G5 11mm 3000lm 940 XD EXC	500 mA	A+
	700 mA	A+
	900 mA	A+
SLE G5 15mm 5000lm 930 XD EXC	1,050 mA	A+
	1,400 mA	A
	1,750 mA	A
SLE G5 15mm 5000lm 940 XD EXC	1,050 mA	A+
	1,400 mA	A+
	1,750 mA	A+

2. Thermal details

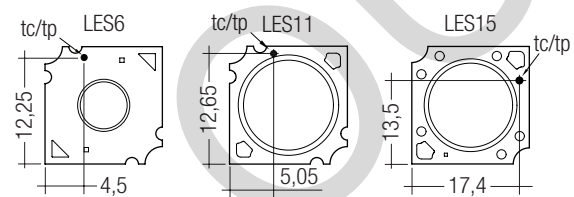
2.1 tp point, ambient temperature and life-time

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

For SLE G5 a tp temperature of 65 °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 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.

To check the tc / tp temperature, the temperature sensor has to be mounted on the PCB at the marked position as stated in the drawing.



2.2 Storage and humidity

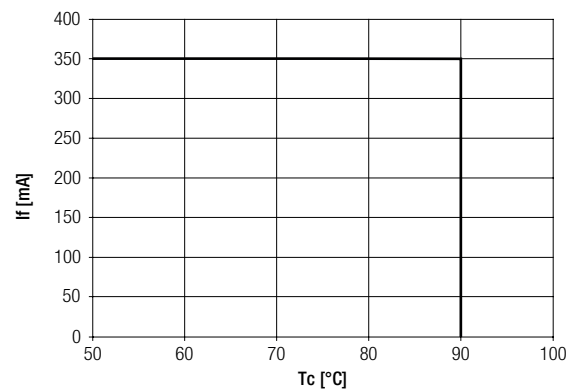
storage temperature	-30 ... +80 °C
---------------------	----------------

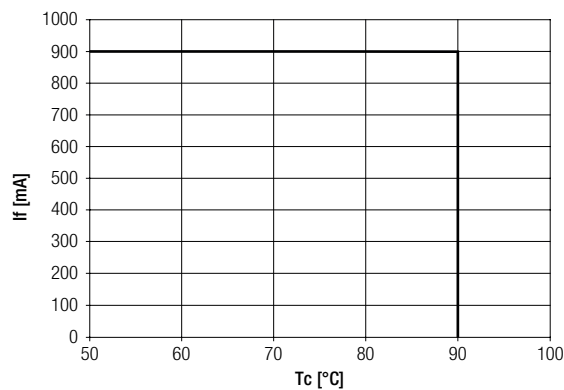
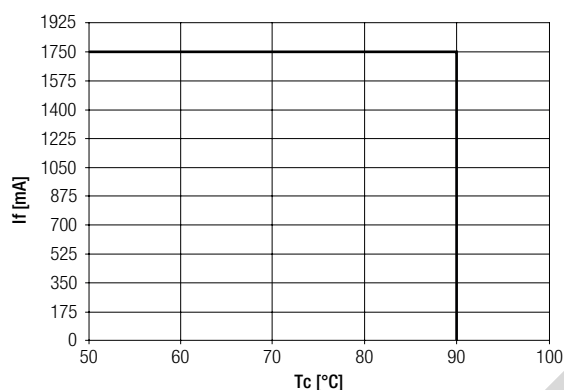
Operation only in non condensing environment.

Humidity during processing of the module should be between 30 to 70 %.

2.3 Derating curves

SLE G5 6mm 1200lm 9x0 XD EXCITE



SLE G5 11mm 3000lm 9x0 XD EXCITE**SLE G5 15mm 5000lm 9x0 XD EXCITE****2.4 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 SLE G5 will be greatly reduced or the SLE G5 may be destroyed.

2.5 Heat sink values**SLE G5 6mm 1200lm 9x0 XD EXCITE**

ta	tp	Operating current	R _{th, hs-a}
25 °C	65 °C	180 mA	9.04 K/W
30 °C	65 °C	180 mA	7.83 K/W
40 °C	65 °C	180 mA	5.42 K/W
50 °C	65 °C	180 mA	3.01 K/W
25 °C	65 °C	250 mA	5.78 K/W
30 °C	65 °C	250 mA	4.98 K/W
40 °C	65 °C	250 mA	3.39 K/W
50 °C	65 °C	250 mA	1.79 K/W
25 °C	65 °C	350 mA	3.53 K/W
30 °C	65 °C	350 mA	3.01 K/W
40 °C	65 °C	350 mA	1.98 K/W
50 °C	65 °C	350 mA	0.94 K/W

SLE G5 11mm 3000lm 9x0 XD EXCITE

ta	tp	Operating current	R _{th, hs-a}
25 °C	65 °C	500 mA	2.85 K/W
30 °C	65 °C	500 mA	2.42 K/W
40 °C	65 °C	500 mA	1.56 K/W
50 °C	65 °C	500 mA	0.69 K/W
25 °C	65 °C	700 mA	1.66 K/W
30 °C	65 °C	700 mA	1.38 K/W
40 °C	65 °C	700 mA	0.81 K/W
50 °C	65 °C	700 mA	0.24 K/W
25 °C	65 °C	900 mA	1.03 K/W
30 °C	65 °C	900 mA	0.83 K/W
40 °C	65 °C	900 mA	0.42 K/W
50 °C	65 °C	900 mA	0.01 K/W

SLE G5 15mm 5000lm 9x0 XD EXCITE

ta	tp	Operating current	R _{th, hs-a}
25 °C	65 °C	1,050 mA	1.35 K/W
30 °C	65 °C	1,050 mA	1.15 K/W
40 °C	65 °C	1,050 mA	0.73 K/W
50 °C	65 °C	1,050 mA	0.32 K/W
25 °C	65 °C	1,400 mA	0.85 K/W
30 °C	65 °C	1,400 mA	0.70 K/W
40 °C	65 °C	1,400 mA	0.41 K/W
50 °C	65 °C	1,400 mA	0.13 K/W
25 °C	65 °C	1,750 mA	0.55 K/W
30 °C	65 °C	1,750 mA	0.45 K/W
40 °C	65 °C	1,750 mA	0.23 K/W
50 °C	65 °C	1,750 mA	0.02 K/W

Notes

The actual cooling can differ because of the material, the structural shape, outside influences and the installation situation. A thermal connection between SLE G5 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.

Additionally the SLE G5 has to be fixed on the heat sink with M3 screws to optimise the thermal connection.

Use of thermal interface material with thermal conductivity of $\lambda > 1 \text{ W/mK}$ and layer thickness of interface material with max. 50 μm or a similar interface material where the quotient of layer thickness and thermal conductivity $b < 50 \mu\text{mmK/W}$.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

SLE G5 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 Drivers from Tridonic in combination with SLE G5 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



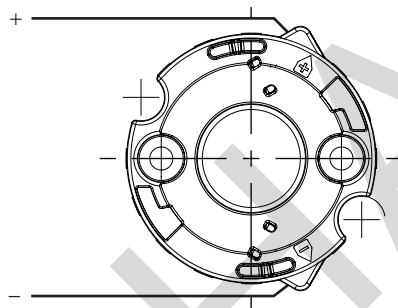
SLE G5 must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module. Wrong polarity can damage the SLE G5.



SLE G5 are basic isolated up to 50 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 50 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.

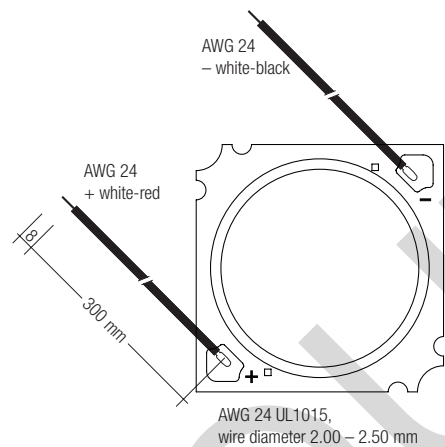
3.2 Wiring

Wiring with housing (LES15)

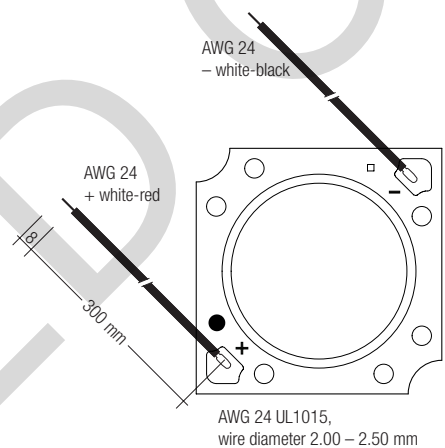


Wiring without housing

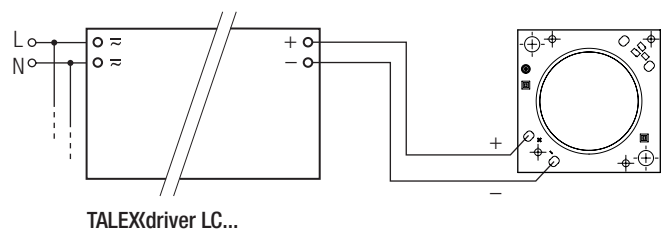
LES6 and LES11



LES15



Wiring example

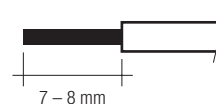


3.3 Wiring type and cross section

The wiring has to be solid cable with a cross section of 0.5 to 0.75 mm² or with stranded wire with soldered ends with a cross section of 0.5 mm². For the push-wire connection you have to strip the insulation (7 – 8 mm).

Removing wires by lightly pressing on the push button.

wire preparation:



3.4 Mounting instruction



SLE G5 from Tridonic which have to be installed on a heat sink have to be connected with heat-conducting paste or heat conducting adhesive film and fixed with M3 screws.

The fixing/cooling surface must be cleaned by removing all dirt, dust and grease before installing the LED modules.

None of the components of the SLE G5 (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 2 screws per module. In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used for LED modules without housing.

For further information please refer to the brochure entitled "Technical Design-In-Guide SLE GEN5".



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.

For further information for EOS/ESD safety guidelines and the ESD classification please refer to the brochure entitled <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.

4.2 Lumen maintenance

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

SLE G5 6mm 1200lm 9x0 XD EXCITE

Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
180 mA	65 °C	47,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	41,000 h	>60,000 h	>60,000 h	>60,000 h
	85 °C	36,000 h	54,000 h	57,000 h	>60,000 h
250 mA	65 °C	42,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	37,000 h	55,000 h	59,000 h	>60,000 h
	85 °C	32,000 h	49,000 h	52,000 h	>60,000 h
350 mA	65 °C	36,000 h	54,000 h	57,000 h	>60,000 h
	75 °C	31,000 h	47,000 h	50,000 h	>60,000 h
	85 °C	27,000 h	41,000 h	44,000 h	>60,000 h

SLE G5 11mm 3000lm 9x0 XD EXCITE

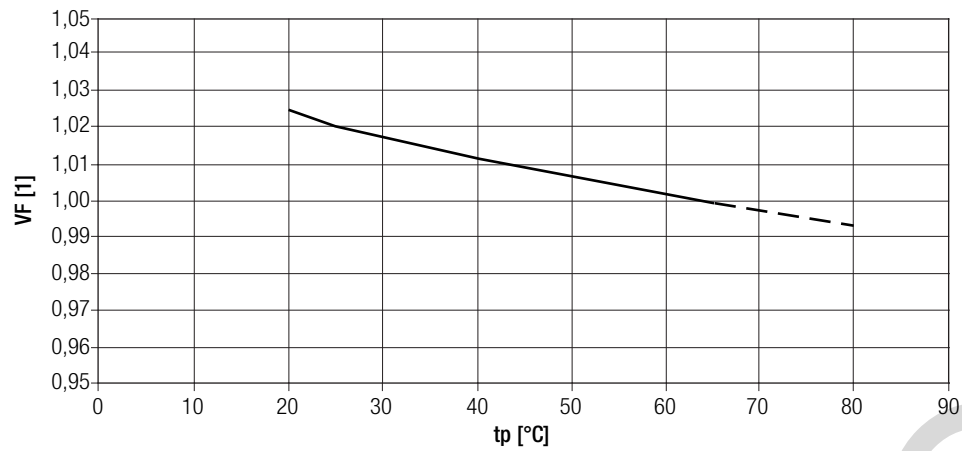
Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
500 mA	65 °C	45,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	40,000 h	59,000 h	>60,000 h	>60,000 h
	85 °C	35,000 h	52,000 h	56,000 h	>60,000 h
700 mA	65 °C	40,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	35,000 h	53,000 h	56,000 h	>60,000 h
	85 °C	31,000 h	46,000 h	49,000 h	>60,000 h
900 mA	65 °C	35,000 h	53,000 h	56,000 h	>60,000 h
	75 °C	31,000 h	46,000 h	49,000 h	>60,000 h
	85 °C	27,000 h	41,000 h	43,000 h	>60,000 h

SLE G5 15mm 5000lm 9x0 XD EXCITE

Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
1,050 mA	65 °C	45,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	39,000 h	59,000 h	>60,000 h	>60,000 h
	85 °C	34,000 h	52,000 h	55,000 h	>60,000 h
1,400 mA	65 °C	40,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	35,000 h	53,000 h	56,000 h	>60,000 h
	85 °C	31,000 h	46,000 h	49,000 h	>60,000 h
1,750 mA	65 °C	36,000 h	54,000 h	57,000 h	>60,000 h
	75 °C	31,000 h	47,000 h	50,000 h	>60,000 h
	85 °C	27,000 h	41,000 h	44,000 h	>60,000 h

5. Electrical values

5.1 Forward voltage vs. T_p temperature



The diagrams 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 measured integral after a settling time of 100 ms. The current impuls depends on the module type.

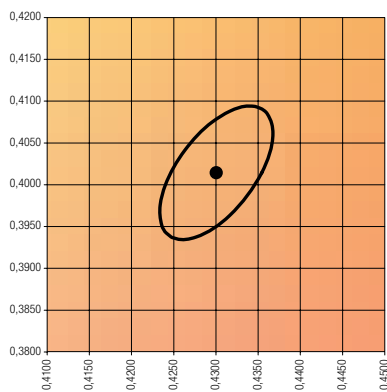
Module type	Current impulse
TALEXmodule SLE G5 6mm 1200lm 9x0 XD EXC	350 mA
TALEXmodule SLE G5 11mm 3000lm 9x0 XD EXC	900 mA
TALEXmodule SLE G5 15mm 5000lm 9x0 XD EXC	1,750 mA

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

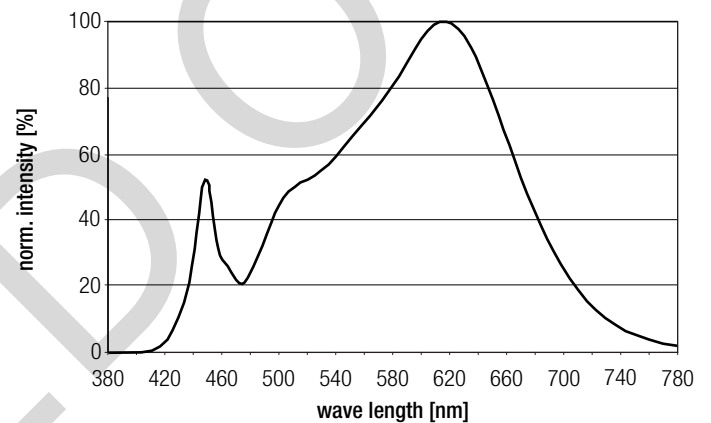
The measurement tolerance of the colour coordinates are ± 0.01 .

3,000 K

	x0	y0
Centre	0.4300	0.4016

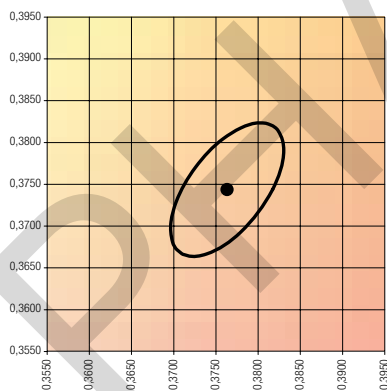


MacAdam ellipse: 3SDCM

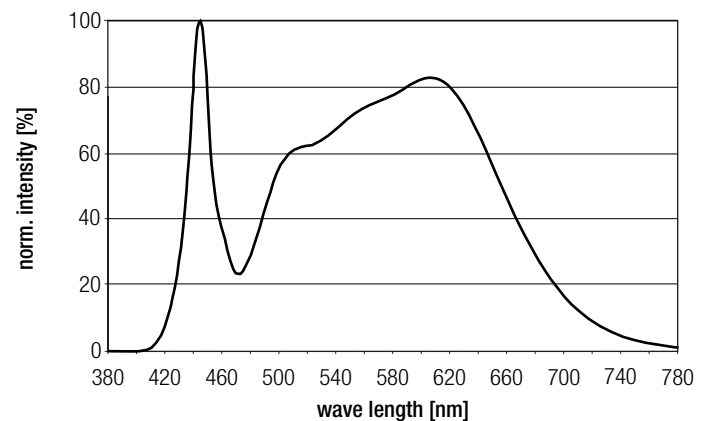


4,000 K

	x0	y0
Centre	0.3761	0.3740

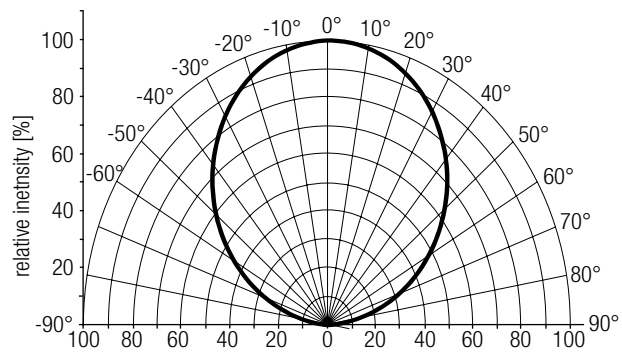


MacAdam ellipse: 3SDCM



6.2 Light distribution

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



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. tp temperature

