Module SLE G6 ART EXC
Module SLE EXCITE

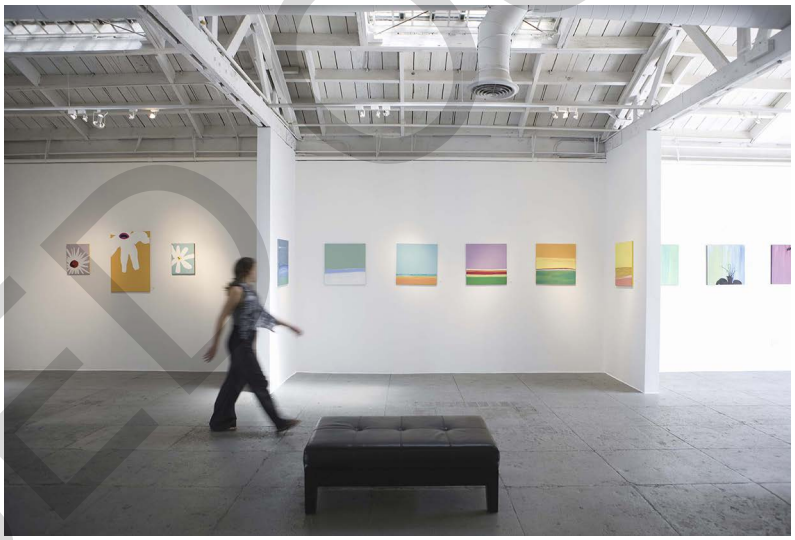
Product description

- Highest light quality in the market with full spectrum technology
- Application: Shop, Art & Culture
- Housing with Snap-On feature for easy reflector mounting
- 50 mm housing with 35 mm mounting hole distance acc. to Zhaga
- Luminous flux up to 6,340 lm at tp = 65 °C
- High efficacy up to 127 lm/W for the LED module at tp = 25 °C
- High system efficacy up to 109 lm/W at tp = 65 °C
- High colour consistency (MacAdam 2)
- 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 4

Colour temperatures and tolerances, page 9

LES19 + LES23 with housing

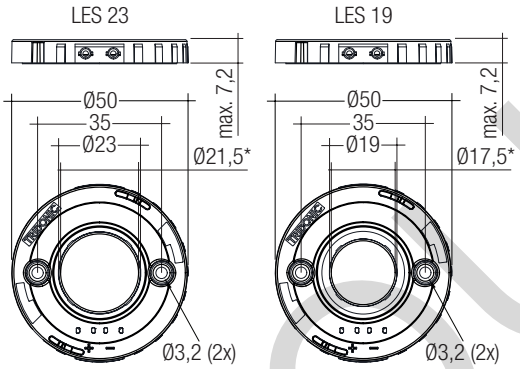


RoHS

Module SLE G6 ART EXC
Module 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	150 °C
Irated for LES19	1,050 mA
Irated for LES23	1,400 mA
Imax for LES19	1,400 mA
Imax for LES23	2,000 mA
Max. DC forward current for LES19[2]	1,680 mA
Max. DC forward current for LES23[2]	2,400 mA
Max. permissible LF current ripple for LES19	1,680 mA
Max. permissible LF current ripple for LES23	2,400 mA
Max. permissible peak current for LES19	2,520 mA / max. 8 ms
Max. permissible peak current for LES23	3,600 mA / max. 8 ms
Max. working voltage for insulation nonSELV[3]	50 V
Max. working voltage for insulation SELV[3]	75 V
Insulation test voltage	0.5 kV
CTI of the printed circuit board	< 600 V
ESD classification	Severity level 4
Risk group (EN 62471:2008) for LES19	RG1
Risk group (EN 62471:2008) for LES23	RG1
Type of protection	IP00



Dimensions in mm, *optische LES

Ordering data

Type	Article number	Colour temperature	Housing	Connection cable	Packaging	Weight per pc.
SLE G6 19mm 5000lm 930 ART H EXC	**89602796**	3,000 K	yes	no	50 pc(s).	0.009 kg
SLE G6 23mm 6000lm 930 ART H EXC	**89602800**	3,000 K	yes	no	50 pc(s).	0.009 kg

Specific technical data

Type[6]	Photo-metric code	Forward current	Luminous flux at tp = 25 °C[4]	Luminous flux at tp = 65 °C[4]	Power consumption at tp = 65 °C[4]	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[5]	Colour rendering index CRI
SLE 19mm 5000lm – Operating mode HE at 500 mA											
SLE G6 19mm 5000lm 930 ART EXC	930/249	500 mA	2.130 lm	2.000 lm	16,8 W	30,7 V	37,3 V	125 lm/W	119 lm/W	107 lm/W	98
SLE 19mm 5000lm – Operating mode NM at 1,050 mA											
SLE G6 19mm 5000lm 930 ART EXC	930/249	1.050 mA	4.140 lm	3.890 lm	37,8 W	33,0 V	40,1 V	108 lm/W	103 lm/W	93 lm/W	98
SLE 19mm 5000lm – Operating mode HO at 1,400 mA											
SLE G6 19mm 5000lm 930 ART EXC	930/249	1.400 mA	5.250 lm	4.940 lm	52,5 W	34,3 V	41,7 V	99 lm/W	94 lm/W	85 lm/W	98
SLE 23mm 6000lm – Operating mode HE at 700 mA											
SLE G6 23mm 6000lm 930 ART EXC	930/249	700 mA	3.010 lm	2.830 lm	23,4 W	30,6 V	37,2 V	127 lm/W	121 lm/W	109 lm/W	98
SLE 23mm 6000lm – Operating mode NM at 1,400 mA											
SLE G6 23mm 6000lm 930 ART EXC	930/249	1.400 mA	5.580 lm	5.240 lm	49,9 W	32,6 V	39,6 V	111 lm/W	105 lm/W	95 lm/W	98
SLE 23mm 6000lm – Operating mode HO at 2,000 mA											
SLE G6 23mm 6000lm 930 ART EXC	930/249	2.000 mA	7.490 lm	6.340 lm	74,8 W	34,2 V	41,6 V	99 lm/W	94 lm/W	85 lm/W	98

[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] HE ... high efficiency, NM ... nominal mode, HO ... high output.

Unique light quality – listing of the Ri values*

Colour temperature	Ra8	Ra14	Ri01	Ri02	Ri03	Ri04	Ri05	Ri06	Ri07	Ri08	Ri09	Ri10	Ri11	Ri12	Ri13	Ri14
3,000 K	98	97	98	99	94	96	99	98	98	98	99	97	94	92	99	96

* Approximate values – Deviations can occur caused phosphor mixtures.

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

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 %

1.3 Energy classification

Type	Forward current	Energy classification
SLE G6 19mm 5000lm 930 ART EXC	500 mA	A+
	1,050 mA	A+
	1,400 mA	A
SLE G6 23mm 6000lm 930 ART EXC	700 mA	A+
	1,400 mA	A+
	2,000 mA	A

2. Thermical details

2.1 tp point, ambient temperature and life-time

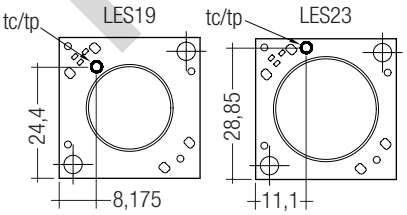
The temperature at tp reference point is crucial for the light output and life-time of a LED product.

For SLE G6 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.

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

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.



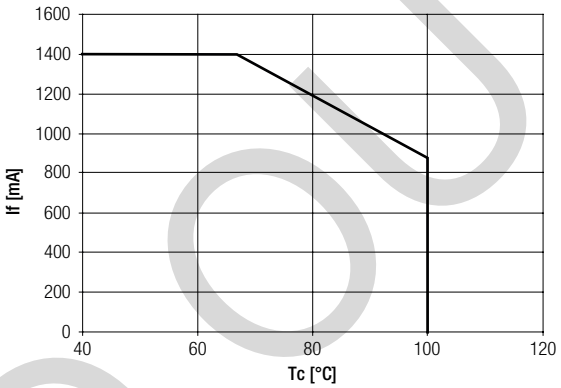
2.2 Storage and humidity

storage temperature	-30 … +80 °C

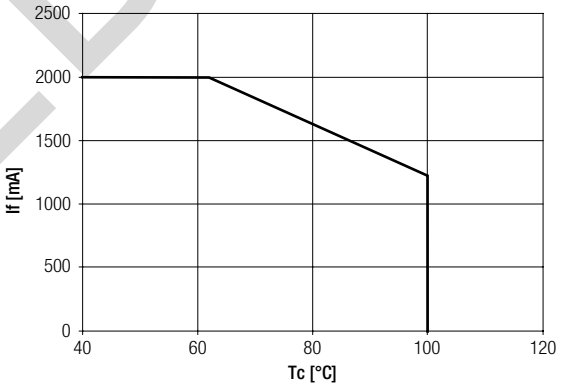
Operation only in non condensing environment.
Humidity during processing of the module should be between 30 to 70 %.

2.3 Derating curves

SLE G6 19mm 5000lm 930 ART EXC



SLE G6 23mm 6000lm 930 ART EXC



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 G6 will be greatly reduced or the SLE G6 may be destroyed.

2.5 Heat sink values

SLE G6 19mm 5000lm ART EXCITE

ta	tp	Operating current	$R_{th, hs-a}$
25 °C	65 °C	500 mA	4.14 K/W
30 °C	65 °C	500 mA	3.62 K/W
40 °C	65 °C	500 mA	2.57 K/W
50 °C	65 °C	500 mA	1.52 K/W
25 °C	65 °C	1,050 mA	1.62 K/W
30 °C	65 °C	1,050 mA	1.42 K/W
40 °C	65 °C	1,050 mA	1.00 K/W
50 °C	65 °C	1,050 mA	0.58 K/W
25 °C	65 °C	1,400 mA	1.10 K/W
30 °C	65 °C	1,400 mA	0.96 K/W
40 °C	65 °C	1,400 mA	0.67 K/W
50 °C	65 °C	1,400 mA	0.38 K/W

SLE G6 23mm 6000lm ART EXCITE

ta	tp	Operating current	$R_{th, hs-a}$
25 °C	65 °C	700 mA	2.98 K/W
30 °C	65 °C	700 mA	2.60 K/W
40 °C	65 °C	700 mA	1.84 K/W
50 °C	65 °C	700 mA	1.08 K/W
25 °C	65 °C	1,400 mA	1.24 K/W
30 °C	65 °C	1,400 mA	1.08 K/W
40 °C	65 °C	1,400 mA	0.75 K/W
50 °C	65 °C	1,400 mA	0.43 K/W
25 °C	65 °C	2,000 mA	0.76 K/W
30 °C	65 °C	2,000 mA	0.66 K/W
40 °C	65 °C	2,000 mA	0.45 K/W
50 °C	65 °C	2,000 mA	0.25 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 G6 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.
Additionally the SLE G6 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 $\lambda > 1$ 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 µmmK/W.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

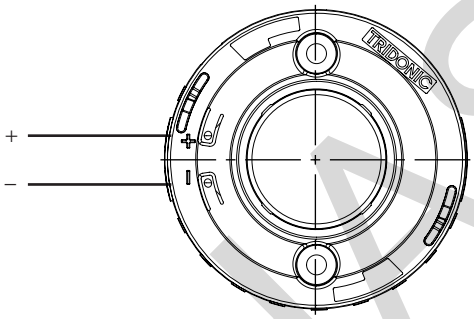
SLE G6 from Tridonic are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED Driver which complies with the relevant standards. The use of LED Drivers from Tridonic in combination with SLE G6 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

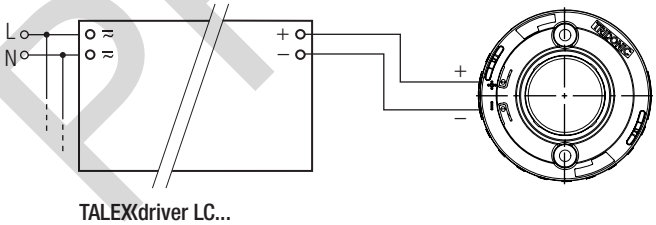
SLE G6 must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.
Wrong polarity can damage the SLE G6.

SLE G6 are basic isolated up to 75 V SELV / 50 V nonSELV 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 75 V SELV / 50 V nonSELV, 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 example



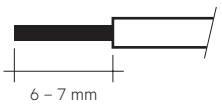
TALEXdriver LC...

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 (6 – 7 mm).

Loosen wire through twisting and pulling.

wire preparation:



3.4 Mounting instruction

SLE G6 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 G6 (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 to the brochure entitled “Technical Design-In-Guide SLE GEN6”.

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 guidlines 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 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

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

SLE G6 19mm 5000lm ART EXCITE

Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
500 mA	65 °C	51,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	44,000 h	>60,000 h	>60,000 h	>60,000 h
	85 °C	39,000 h	58,000 h	>60,000 h	>60,000 h
1,050 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
1,400 mA	65 °C	37,000 h	55,000 h	59,000 h	>60,000 h
	75 °C	32,000 h	48,000 h	51,000 h	>60,000 h
	85 °C	28,000 h	42,000 h	45,000 h	>60,000 h

SLE G6 23mm 6000lm ART EXCITE

Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
700 mA	65 °C	51,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	44,000 h	>60,000 h	>60,000 h	>60,000 h
	85 °C	39,000 h	58,000 h	>60,000 h	>60,000 h
1,400 mA	65 °C	43,000 h	>60,000 h	>60,000 h	>60,000 h
	75 °C	38,000 h	57,000 h	>60,000 h	>60,000 h
	85 °C	33,000 h	50,000 h	53,000 h	>60,000 h
2,000 mA	65 °C	37,000 h	55,000 h	59,000 h	>60,000 h
	75 °C	32,000 h	48,000 h	51,000 h	>60,000 h
	85 °C	28,000 h	42,000 h	45,000 h	>60,000 h

5. Electrical values

5.1 Declaration of electrical parameters

Irated ... Nominal operating current the module is designed for.

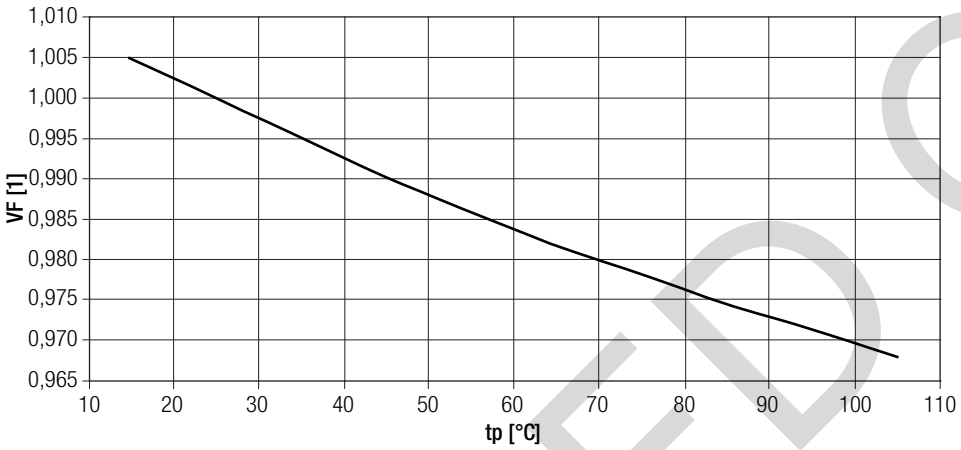
Imax ... Max. permissible continuous operating current.

Max. DC forward current ... Max. permissible continuous operating current incl. The tolerances of the LED driver. LED module may be destroyed if this value is exceeded.

Max. permissible LF current ripple ... Max. output current of the LED driver incl. Tolerances and LF current ripple must not exceed this value.

Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Forward voltage vs. tp temperature



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

6. Photometric charcteristics

6.1 Coordinates and tolerances according to CIE 1931

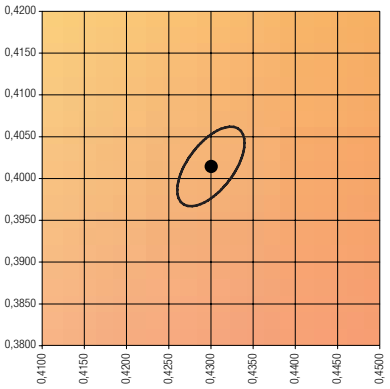
The specified colour coordinates are measured integral after a settling time of 100 ms. The current impuls depends on the module type.

Module type	Current impulse
Module SLE G6 19mm 5000lm ART EXC	1,050 mA
Module SLE G6 23mm 6000lm ART EXC	1,400 mA

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

3,000 K

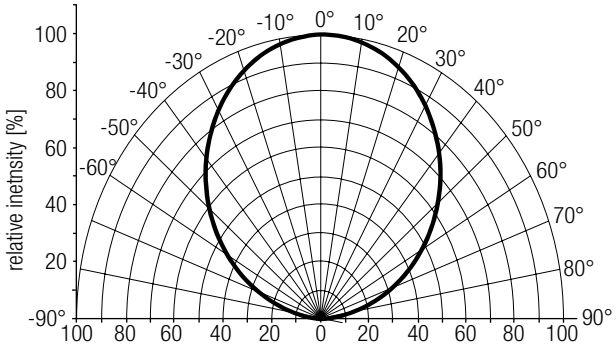
	x0	y0
Centre	0.4300	0.4016



MacAdam ellipse: 2SDCM

6.2 Light distribution

The optical design of the SLE product line ensures optimum homogenity 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