

TALEXmodule STARK SLE GEN3 CLASSIC EM STARK SLE

Product description

- Combined LED module for general and emergency lighting
- For spotlights and downlights
- Luminous flux up to 5,100 lm at $t_p = 65\text{ °C}$
- High efficacy up to 136 lm/W for the LED module at $t_p = 25\text{ °C}$
- High system efficacy up to 113 lm/W at $t_p = 65\text{ °C}$
- High colour consistency (MacAdams 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 3

Colour temperatures and tolerances, page 8

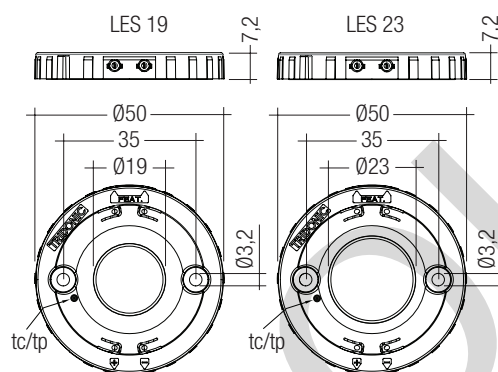




TALEXmodule STARK SLE GEN3 CLASSIC EM STARK SLE

Technical data

Beam characteristic	115°
Ambient temperature range	-25 ... +50 °C
tp rated	65 °C
tc ^①	up to 90 °C
Max. DC forward current for LES19 [®]	1,050 mA
Max. DC forward current for LES23 [®]	1,600 mA
Max. permissible LF current ripple for LES19	1,200 mA
Max. permissible LF current ripple for LES23	1,920 mA
Max. permissible peak current for LES19	3,000 mA / max. 10 µs
Max. permissible peak current for LES23	3,000 mA / max. 10 µs
Max. permissible output voltage of LED Driver for LES19 [®]	110 V
Max. permissible output voltage of LED Driver for LES23 [®]	110 V
Insulation test voltage for LES19	1.22 kV
Insulation test voltage for LES23	1.22 kV
ESD classification	severity level 4
Risk group (EN 62471:2008)	1
Type of protection	IP00



With housing – Dimensions in mm

Ordering data

Type	Article number	Colour temperature	Housing	Connection cable	Packaging	Weight per pc.
STARK-SLE-G3-19-2000-830-CLA-EM	89601868	3,000 K	yes	no	50 pc(s).	0.010 kg
STARK-SLE-G3-19-2000-840-CLA-EM	89601869	4,000 K	yes	no	50 pc(s).	0.017 kg
STARK-SLE-G3-23-3000-830-CLA-EM	89601870	3,000 K	yes	no	50 pc(s).	0.009 kg
STARK-SLE-G3-23-3000-840-CLA-EM	89601871	4,000 K	yes	no	50 pc(s).	0.014 kg

Specific technical data

Type [®]	Photo-metric code	Forward current	Luminous flux at tp = 25 °C ^④	Luminous flux at tp = 65 °C ^④	Power consumption ^⑤ ®	Forward voltage	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
STARK-SLE-19-2000 – Operating mode HE at 350 mA										
STARK-SLE-G3-19-2000-830-CLA-EM	830/349	350 mA	1,400 lm	1,300 lm	11.9 W	34.1 V	118 lm/W	109 lm/W	98 lm/W	80
STARK-SLE-G3-19-2000-840-CLA-EM	840/349	350 mA	1,600 lm	1,500 lm	11.9 W	34.1 V	134 lm/W	126 lm/W	113 lm/W	80
STARK-SLE-19-2000 – Operating mode HO at 1,050 mA										
STARK-SLE-G3-19-2000-830-CLA-EM	830/349	1,050 mA	3,700 lm	3,250 lm	40.9 W	38.9 V	90 lm/W	79 lm/W	71 lm/W	80
STARK-SLE-G3-19-2000-840-CLA-EM	840/349	1,050 mA	4,100 lm	3,750 lm	40.9 W	38.9 V	100 lm/W	92 lm/W	83 lm/W	80
Emergency mode – 350 mA (EM powerLED 2 W)										
STARK-SLE-G3-19-2000-830-CLA-EM	830/349	350 mA	225 lm	–	–	5.9 V	–	–	–	–
STARK-SLE-G3-19-2000-840-CLA-EM	840/349	350 mA	240 lm	–	–	5.9 V	–	–	–	–
STARK-SLE-23-3000 – Operating mode HE at 500 mA										
STARK-SLE-G3-23-3000-830-CLA-EM	830/349	500 mA	2,050 lm	1,900 lm	16.9 W	33.8 V	121 lm/W	112 lm/W	101 lm/W	80
STARK-SLE-G3-23-3000-840-CLA-EM	840/349	500 mA	2,300 lm	2,100 lm	16.9 W	33.8 V	136 lm/W	124 lm/W	112 lm/W	80
STARK-SLE-23-3000 – Operating mode HO at 1,400 mA										
STARK-SLE-G3-23-3000-830-CLA-EM	830/349	1,400 mA	4,900 lm	4,450 lm	52.8 W	37.7 V	94 lm/W	84 lm/W	76 lm/W	80
STARK-SLE-G3-23-3000-840-CLA-EM	840/349	1,400 mA	5,600 lm	5,100 lm	52.8 W	37.7 V	107 lm/W	97 lm/W	87 lm/W	80
Emergency mode – 700 mA (EM powerLED 4 W)										
STARK-SLE-G3-23-3000-830-CLA-EM	830/349	700 mA	420 lm	–	–	6.4 V	–	–	–	–
STARK-SLE-G3-23-3000-840-CLA-EM	840/349	700 mA	440 lm	–	–	6.4 V	–	–	–	–

^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.

[®] All values at tp = 65 °C.

[®] HE ... high efficiency, HO ... high output.

1. Standards

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

1.1 Glow wire test

according to EN 62031 with increased temperature of 960 °C passed.

1.2 Photometric code

Key for photometric code, e. g. 830 / 349

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	Kelvin x 100	initial	(max. 6000h)	Code Luminous flux
8 80 – 89				7 ≥ 70 %
9 ≥90				8 ≥ 80 % 9 ≥ 90 %

1.3 Energy classification

Type	Forward current	Energy classification
SLE-G3-19-2000-830-CLA-EM	350 mA	A+
	1,050 mA	A
SLE-G3-19-2000-830-CLA-EM	350 mA	A+
	1,050 mA	A+
SLE-G3-23-3000-830-CLA-EM	500 mA	A+
	1,400 mA	A
SLE-G3-23-3000-840-CLA-EM	500 mA	A+
	1,400 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 TALEX product.

For TALEXmodule STARK SLE G3 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.

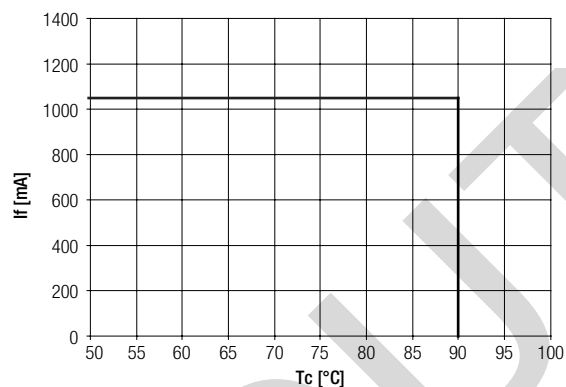
2.2 Storage and humidity

storage temperature	-30 ... +80 °C
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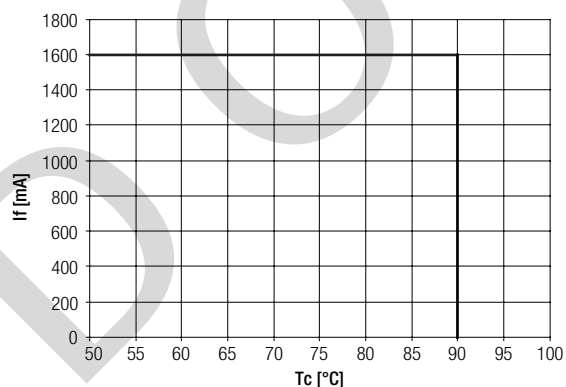
Operation only in non condensing environment.
Humidity during processing of the module should be between 30 to 70 %.

2.3 Derating curves

TALEXmodule STARK SLE G3 19-2000 CLASSIC EM



TALEXmodule STARK SLE G3 23-3000 CLASSIC EM



2.4 Thermal design and heat sink

The rated life of TALEX products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the TALEXmodule STARK SLE G3 will be greatly reduced or the TALEXmodule STARK SLE G3 may be destroyed.

2.5 Heat sink values

TALEXmodule STARK-SLE-G3-19-2000 CLASSIC EM

ta	tp	Operation mode	Colour temperature	R _{th, hs-a}
25 °C	65 °C	HE	3,000 / 4,000 K	6.25 K/W
30 °C	65 °C	HE	3,000 / 4,000 K	5.46 K/W
40 °C	65 °C	HE	3,000 / 4,000 K	3.89 K/W
50 °C	65 °C	HE	3,000 / 4,000 K	2.31 K/W
25 °C	65 °C	HO	3,000 / 4,000 K	0.88 K/W
30 °C	65 °C	HO	3,000 / 4,000 K	0.76 K/W
40 °C	65 °C	HO	3,000 / 4,000 K	0.53 K/W
50 °C	65 °C	HO	3,000 / 4,000 K	0.29 K/W

TALEXmodule STARK-SLE-G3-23-3000 CLASSIC EM

ta	tp	Operation mode	Colour temperature	R _{th, hs-a}
25 °C	65 °C	HE	3,000 / 4,000 K	3.66 K/W
30 °C	65 °C	HE	3,000 / 4,000 K	3.19 K/W
40 °C	65 °C	HE	3,000 / 4,000 K	2.26 K/W
50 °C	65 °C	HE	3,000 / 4,000 K	1.34 K/W
25 °C	65 °C	HO	3,000 / 4,000 K	0.52 K/W
30 °C	65 °C	HO	3,000 / 4,000 K	0.44 K/W
40 °C	65 °C	HO	3,000 / 4,000 K	0.30 K/W
50 °C	65 °C	HO	3,000 / 4,000 K	0.16 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 TALEXmodule STARK SLE G3 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.

Additionally the TALEXmodule STARK SLE G3 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 $b < 50 \text{ µmmK/W}$.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

TALEXmodule SLE G3 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 TALEX LED Drivers from Tridonic in combination with TALEXmodule SLE G3 guarantees the necessary protection for safe and reliable operation.

If a LED Driver other than Tridonic TALEXconverter is used, it must provide the following protection:

- Short-circuit protection
- Overload protection
- Overtemperature protection

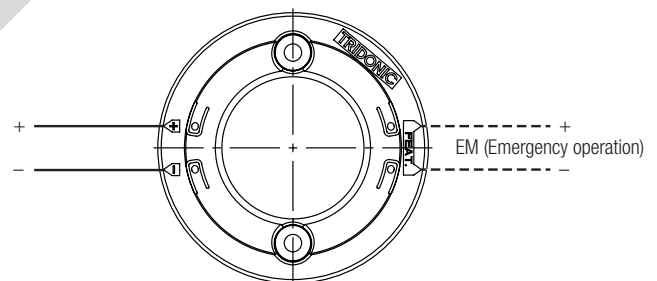


TALEXmodule SLE G3 must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module. Wrong polarity can damage the TALEXmodule SLE G3.

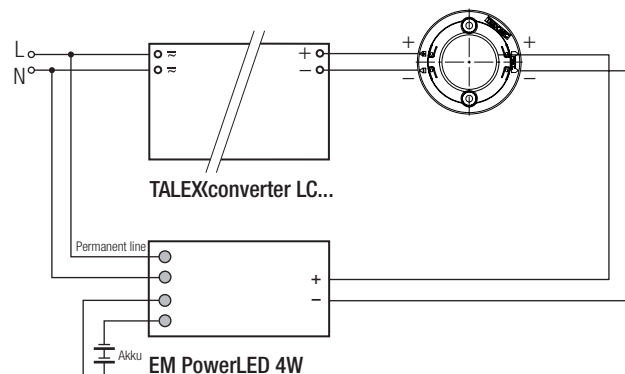


TALEXmodule SLE G3 are basic isolated up to 110 V against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 110 V, an additional isolation between LED module and heat sink is required (for example by 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 example

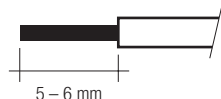


3.3 Wiring type and cross section

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 (5 – 6 mm).

Removing wires by lightly pressing on the push button.

wire preparation:



3.4 Mounting instruction



TALEXmodule SLE G4 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 TALEX modules.

None of the components of the TALEXmodule SLE G4 (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 GEN4".



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

TALEX(module STARK SLE G3 19-2000 CLASSIC EM

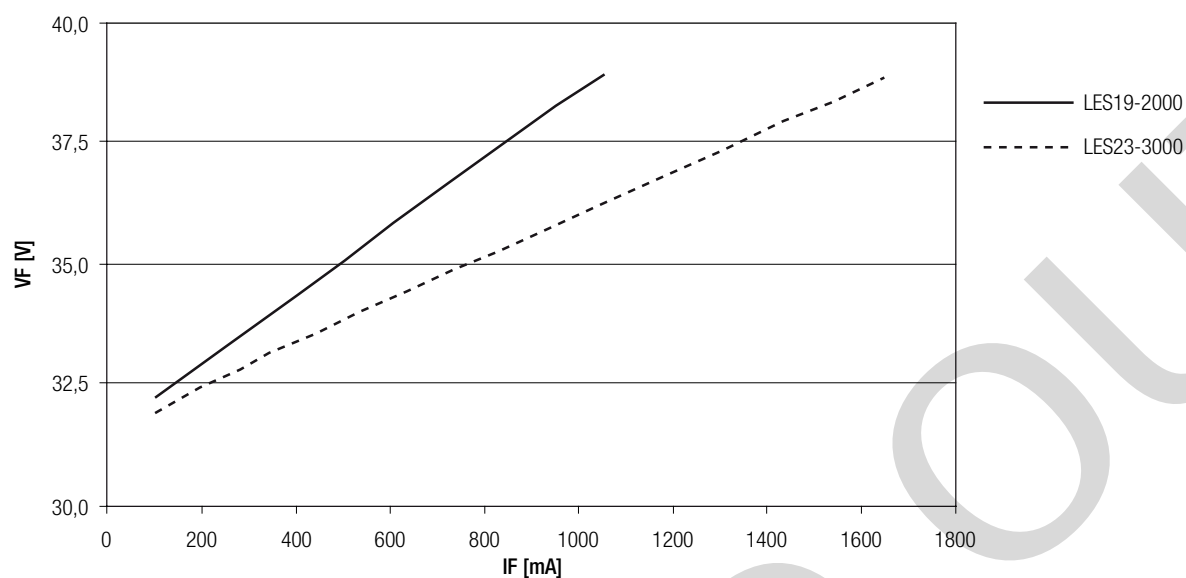
Operating mode	tp temperature in °C	L90 / F10 in h	L90 / F50 in h	L80 / F10 in h	L80 / F50 in h	L70 / F10 in h	L70 / F50 in h
HE	65 °C	55,000 h	60,000 h	60,000 h	60,000 h	60,000 h	60,000 h
	75 °C	41,000 h	60,000 h	60,000 h	60,000 h	60,000 h	60,000 h
	85 °C	31,000 h	47,000 h	60,000 h	60,000 h	60,000 h	60,000 h
HO	65 °C	24,000 h	36,000 h	51,000 h	60,000 h	60,000 h	60,000 h
	75 °C	18,000 h	27,000 h	38,000 h	57,000 h	60,000 h	60,000 h
	85 °C	14,000 h	20,000 h	29,000 h	43,000 h	46,000 h	60,000 h

TALEX(module STARK SLE G3 23-3000 CLASSIC EM

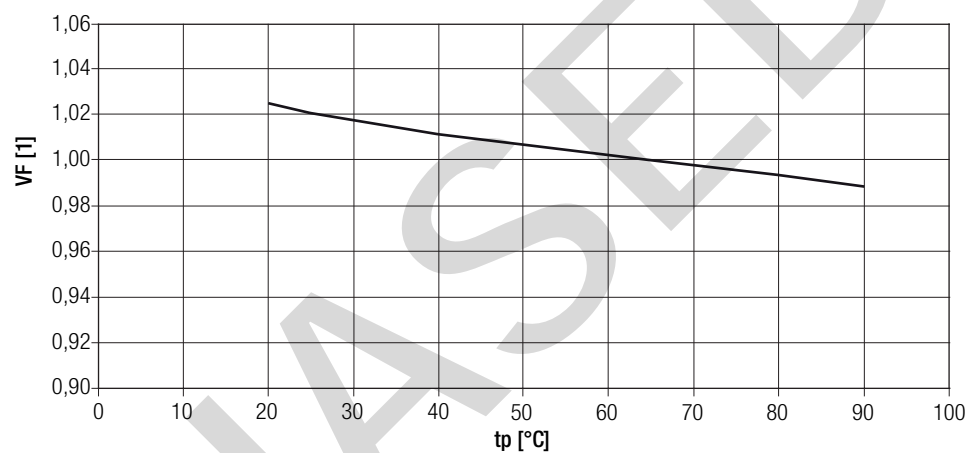
Operating mode	tp temperature in °C	L90 / F10 in h	L90 / F50 in h	L80 / F10 in h	L80 / F50 in h	L70 / F10 in h	L70 / F50 in h
HE	65 °C	57,000 h	60,000 h	60,000 h	60,000 h	60,000 h	60,000 h
	75 °C	42,000 h	60,000 h	60,000 h	60,000 h	60,000 h	60,000 h
	85 °C	32,000 h	48,000 h	60,000 h	60,000 h	60,000 h	60,000 h
HO	65 °C	32,000 h	48,000 h	60,000 h	60,000 h	60,000 h	60,000 h
	75 °C	24,000 h	36,000 h	50,000 h	60,000 h	60,000 h	60,000 h
	85 °C	18,000 h	27,000 h	38,000 h	57,000 h	60,000 h	60,000 h

5. Electrical values

5.1 Typ. forward voltage vs. forward current at $t_p = 65^\circ\text{C}$



5.2 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

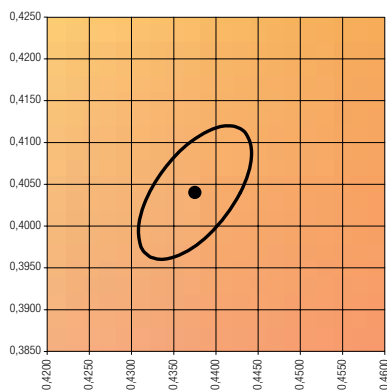
The specified colour coordinates are measured integral after a settling time of 200 ms. The current impuls depends on the module type.

Module type	Current impuls
TALEXmodule STARK-SLE-G3-19-2000 CLASSIC EM	700 mA
TALEXmodule STARK-SLE-G3-23-3000 CLASSIC EM	1,050 mA

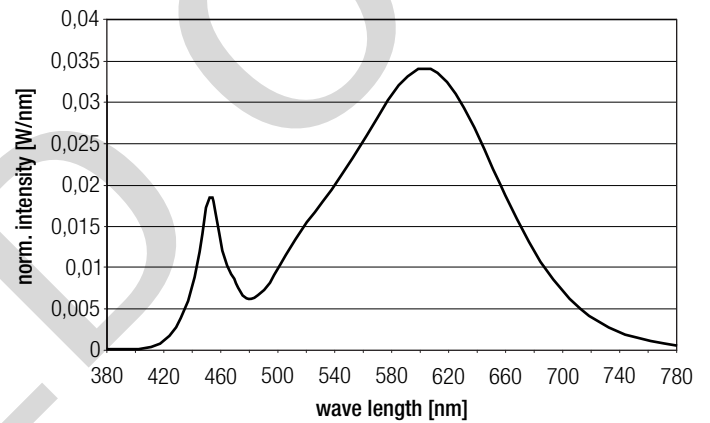
The ambient temperature of the measurement is $t_a = 25^\circ\text{C}$.
The measurement tolerance of the colour coordinates are ± 0.01 .

3,000 K

	x0	y0
Centre	0.4369	0.4041

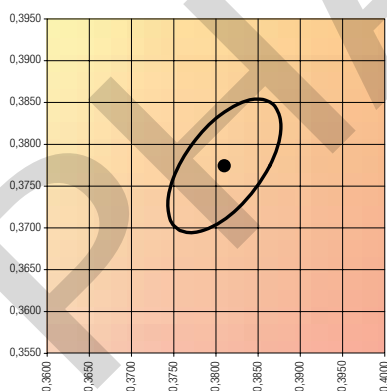


MacAdam ellipse: 3SDCM

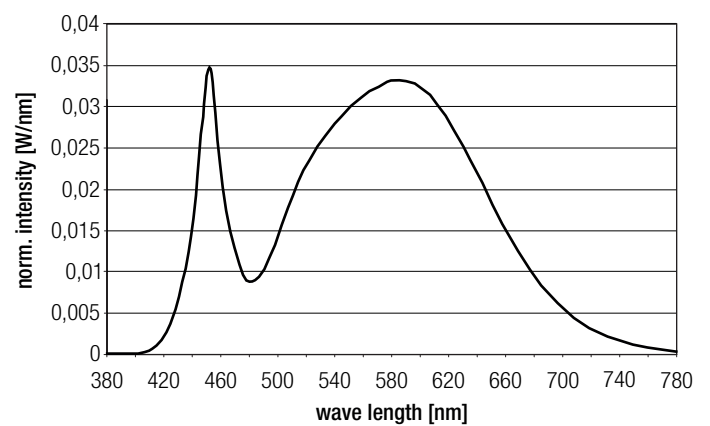


4,000 K

	x0	y0
Centre	0.3804	0.3767

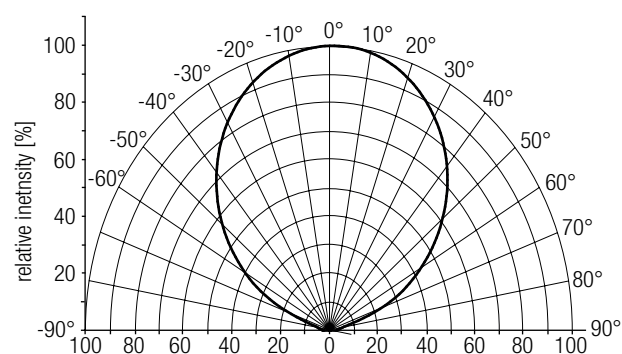


MacAdam ellipse: 3SDCM



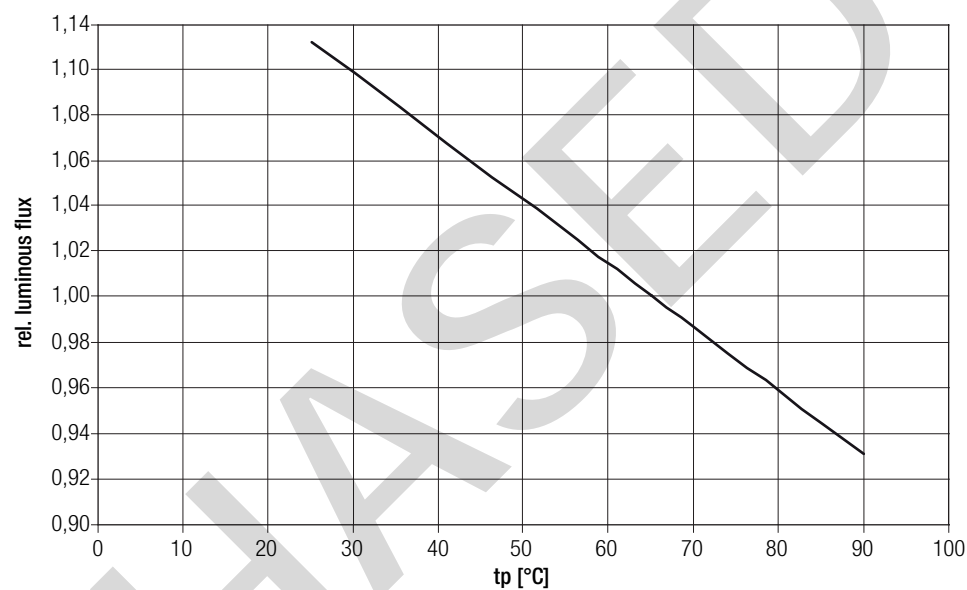
6.2 Light distribution

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



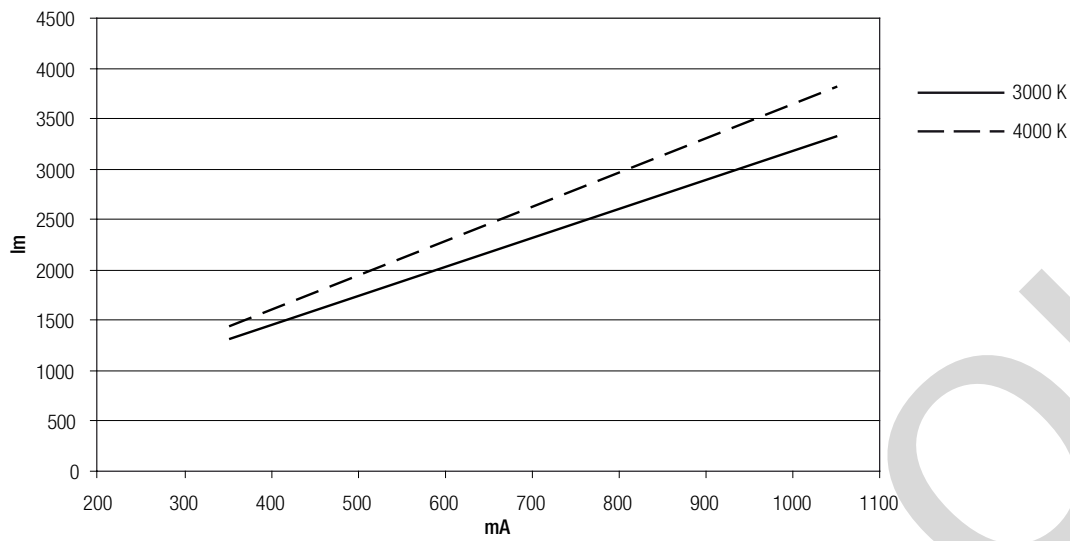
For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

6.3 Relative luminous flux vs. tp temperature



6.4 Relative luminous flux vs. operating current

TALEX(module STARK SLE G3 19-2000 CLASSIC EM at $t_p = 65^\circ\text{C}$



TALEX(module STARK SLE G3 23-3000 CLASSIC EM at $t_p = 65^\circ\text{C}$

