



TALEXmodule STARK DLE GEN2 CLASSIC STARK DLE

Product description

- For downlights
- Luminous flux up to 4,650 lm at $t_p = 65\text{ }^\circ\text{C}$
- High efficacy up to 162 lm/W for the LED module
- High system efficacy up to 139 lm/W at $t_p = 65\text{ }^\circ\text{C}$
- BLO operation mode: Best LED Operation for optimum operation and constant luminous flux at all colour temperatures in combination with Tridonic LED Driver of TOP and ECO series
- High colour consistency (MacAdams 3)
- Fixing holes for M3 screws
- Built-in LED module
- Cooling required
- Flexible operating modes



Standards, page 5

Colour temperatures and tolerances, page 11



With housing



Without housing

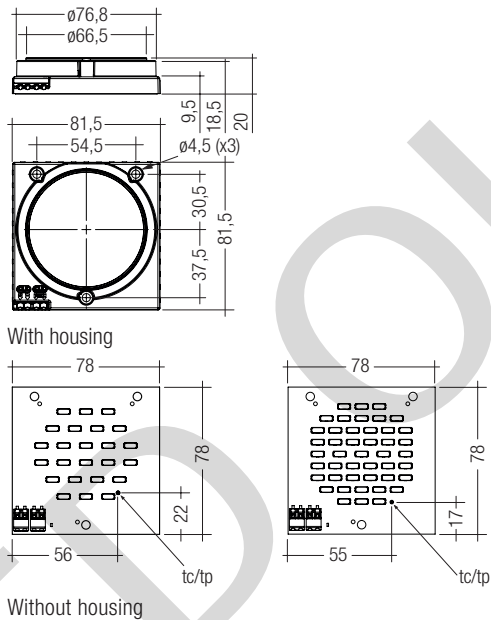




TALEXmodule STARK DLE GEN2 CLASSIC STARK DLE

Technical data

Beam characteristic with housing	80°
Beam characteristic without housing	120°
Ambient temperature range	-25 ... +55 °C
tp rated	65 °C
tc ^①	up to 85 °C
Max. DC forward current ^②	840 mA
Max. permissible LF current ripple	720 mA
Max. permissible peak current	1,500 mA / max. 10 µs
Max. permissible output voltage of LED Driver ^③	50 V
Insulation test voltage	1.1 kV
ESD classification	severity level 4
Risk group (EN 62471:2008)	1
Type of protection	IP00



Ordering data

Type	Article number	Colour temperature	Casing	Packaging	Weight per pc.
STARK-DLE-PURE-G2-LES65-2000-830-CLA	05513764	3,000 K	no	300 pc(s).	0.039 kg
STARK-DLE-PURE-G2-LES65-2000-840-CLA	05513765	4,000 K	no	300 pc(s).	0.039 kg
STARK-DLE-PURE-G2-LES65-3000-830-CLA	05513766	3,000 K	no	300 pc(s).	0.039 kg
STARK-DLE-PURE-G2-LES65-3000-840-CLA	05513767	4,000 K	no	300 pc(s).	0.039 kg
STARK-DLE-G2-LES65-2000-830-CLA	28000268	3,000 K	yes	10 pc(s).	0.065 kg
STARK-DLE-G2-LES65-2000-840-CLA	28000269	4,000 K	yes	10 pc(s).	0.065 kg
STARK-DLE-G2-LES65-3000-830-CLA	28000270	3,000 K	yes	10 pc(s).	0.065 kg
STARK-DLE-G2-LES65-3000-840-CLA	28000271	4,000 K	yes	10 pc(s).	0.065 kg

Specific technical data

Type [®]	Photo-metric code	Forward current	Luminous flux at tp = 25 °C [®]	Luminous flux at tp = 65 °C [®]	Power consumption module [®]	Min. forward voltage module at tp = 65 °C	Max. forward voltage module 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 [®]	Colour rendering index CRI	Energy classification
STARK-DLE-PURE-G2-LES65-2000 – Module without housing – Operating mode HE at 350 mA												
STARK-DLE-PURE-G2-LES65-2000-830-CLA	830/369	350 mA	1,230 lm	1,180 lm	8.1 W	20.7 V	24.8 V	152 lm/W	146 lm/W	131 lm/W	80	A++
STARK-DLE-PURE-G2-LES65-2000-840-CLA	840/369	350 mA	1,300 lm	1,190 lm	8.1 W	20.7 V	24.8 V	160 lm/W	147 lm/W	132 lm/W	80	A++
STARK-DLE-PURE-G2-LES65-2000 – Module without housing – Operating mode BLO and HO												
STARK-DLE-PURE-G2-LES65-2000-830-CLA	830/369	700 mA	2,310 lm	2,200 lm	17.3 W	22.4 V	26.5 V	134 lm/W	127 lm/W	114 lm/W	80	A+
STARK-DLE-PURE-G2-LES65-2000-840-CLA	840/369	700 mA	2,440 lm	2,330 lm	17.3 W	22.4 V	26.5 V	141 lm/W	135 lm/W	121 lm/W	80	A+
STARK-DLE-PURE-G2-LES65-3000 – Module without housing – Operating mode HE at 350 mA												
STARK-DLE-PURE-G2-LES65-3000-830-CLA	830/369	350 mA	2,290 lm	2,190 lm	15.1 W	39.0 V	46.4 V	152 lm/W	145 lm/W	131 lm/W	80	A++
STARK-DLE-PURE-G2-LES65-3000-840-CLA	840/369	350 mA	2,440 lm	2,330 lm	15.1 W	39.0 V	46.4 V	162 lm/W	154 lm/W	139 lm/W	80	A++
STARK-DLE-PURE-G2-LES65-3000 – Module without housing – Operating mode BLO												
STARK-DLE-PURE-G2-LES65-3000-830-CLA	830/369	–	3,430 lm	3,270 lm	25.0 W	41.2 V	48.6 V	137 lm/W	131 lm/W	118 lm/W	80	A+
STARK-DLE-PURE-G2-LES65-3000-840-CLA	840/369	–	3,650 lm	3,480 lm	25.0 W	41.2 V	48.6 V	146 lm/W	139 lm/W	125 lm/W	80	A++
STARK-DLE-PURE-G2-LES65-3000 – Module without housing – Operating mode HO at 700 mA												
STARK-DLE-PURE-G2-LES65-3000-830-CLA	830/369	700 mA	4,290 lm	4,090 lm	32.4 W	42.1 V	49.5 V	132 lm/W	126 lm/W	114 lm/W	80	A+
STARK-DLE-PURE-G2-LES65-3000-840-CLA	840/369	700 mA	4,650 lm	4,360 lm	32.4 W	42.1 V	49.5 V	144 lm/W	135 lm/W	121 lm/W	80	A+
STARK-DLE-G2-LES65-2000 – Module with housing – Operating mode HE at 350 mA												
STARK-DLE-G2-LES65-2000-830-CLA	830/369	350 mA	1,110 lm	1,060 lm	8.1 W	20.7 V	24.8 V	137 lm/W	131 lm/W	118 lm/W	80	A+
STARK-DLE-G2-LES65-2000-840-CLA	840/369	350 mA	1,170 lm	1,120 lm	8.1 W	20.7 V	24.8 V	144 lm/W	138 lm/W	124 lm/W	80	A++
STARK-DLE-G2-LES65-2000 – Module with housing – Operating mode BLO and HO												
STARK-DLE-G2-LES65-2000-830-CLA	830/369	700 mA	2,080 lm	2,000 lm	17.3 W	22.4 V	26.5 V	120 lm/W	116 lm/W	104 lm/W	80	A+
STARK-DLE-G2-LES65-2000-840-CLA	840/369	700 mA	2,190 lm	2,000 lm	17.3 W	22.4 V	26.5 V	127 lm/W	116 lm/W	104 lm/W	80	A+
STARK-DLE-G2-LES65-3000 – Module with housing – Operating mode HE at 350 mA												
STARK-DLE-G2-LES65-3000-830-CLA	830/369	350 mA	2,060 lm	1,970 lm	15.1 W	39.0 V	46.4 V	136 lm/W	130 lm/W	117 lm/W	80	A+
STARK-DLE-G2-LES65-3000-840-CLA	840/369	350 mA	2,190 lm	2,090 lm	15.1 W	39.0 V	46.4 V	145 lm/W	138 lm/W	125 lm/W	80	A++
STARK-DLE-G2-LES65-3000 – Module with housing – Operating mode BLO												
STARK-DLE-G2-LES65-3000-830-CLA	830/369	–	3,090 lm	3,000 lm	25.0 W	41.2 V	48.6 V	124 lm/W	120 lm/W	108 lm/W	80	A+
STARK-DLE-G2-LES65-3000-840-CLA	840/369	–	3,280 lm	3,000 lm	25.0 W	41.2 V	48.6 V	131 lm/W	120 lm/W	108 lm/W	80	A++

[®] See Derating curves in data sheet section 2.3.

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

[®] The detailed explanation, see data sheet section 3.1.

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

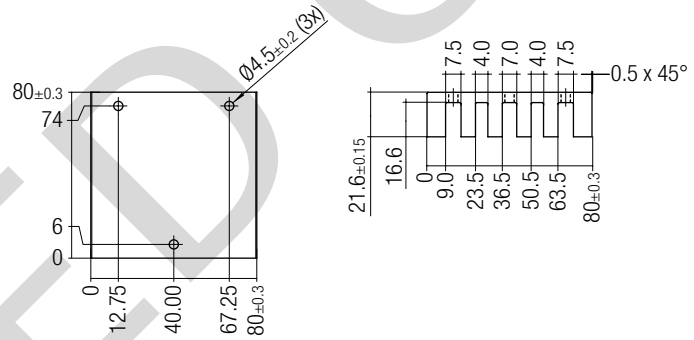
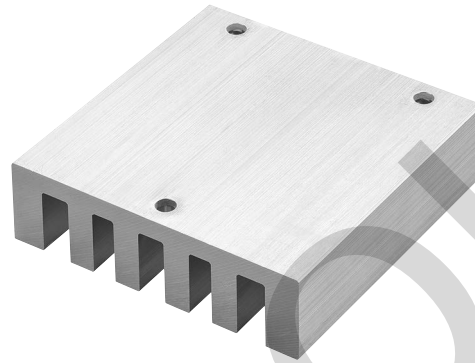
[®] Assumed efficiency for the LED Driver is 0.9.

[®] All values at tp = 65 °C.

[®] HE ... high efficiency, BLO ... best LED operation (see page 4), HO ... high output.

Product description

- The adapter plate does not replace a heat sink



Ordering data

Type	Article number	Packaging	Weight per pc.
DLE GEN2 Adapter	28000420	1 pc(s).	0.250 kg

1. Standards

EN 62031
EN 62471
EN 61547
EN 55015
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 / 369

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 67 – 76				Code Luminous flux
8 77 – 86				7 ≥ 70 %
9 87 – ≥90				8 ≥ 80 % 9 ≥ 90 %

1.3 Energy classification

Type	Forward current	Energy classification
DLE-PURE-G2-LES65-2000-830-CLA	350 mA	A++
	700 mA	A+
DLE-PURE-G2-LES65-2000-840-CLA	350 mA	A++
	700 mA	A+
DLE-PURE-G2-LES65-3000-830-CLA	350 mA	A++
	700 mA	A+
DLE-PURE-G2-LES65-3000-840-CLA	350 mA	A++
	700 mA	A+
DLE-G2-LES65-2000-830-CLA	350 mA	A+
	700 mA	A+
DLE-G2-LES65-2000-840-CLA	350 mA	A++
	700 mA	A+
DLE-G2-LES65-3000-830-CLA	350 mA	A+
	BLO (550 mA)	A+
DLE-G2-LES65-3000-840-CLA	350 mA	A++
	BLO (550 mA)	A++

2. Thermal details

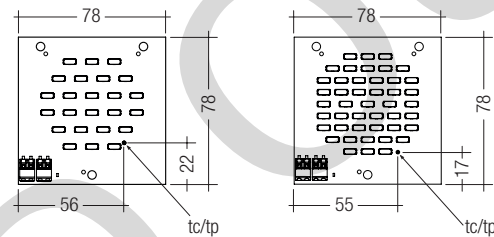
2.1 tp point, ambient temperature and life-time

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

For TALEXmodule STARK DLE G2 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	-40 ... +100 °C
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Operation only in non condensing environment.

Humidity during processing of the module should be between 0 to 60 %.

2.3 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 DLE G2 will be greatly reduced or the TALEXmodule STARK DLE G2 may be destroyed.

2.4 Heat sink values

TALEXmodule STARK-DLE-G2-LES65-2000 CLASSIC

ta	tp	Operation mode	R _{th, hs-a}
25°C	65°C	HE	8.34 K/W
35°C	65°C	HE	6.25 K/W
45°C	65°C	HE	4.17 K/W
55°C	65°C	HE	2.08 K/W
25°C	65°C	BLO and HO	3.61 K/W
35°C	65°C	BLO and HO	2.71 K/W
45°C	65°C	BLO and HO	1.81 K/W
55°C	65°C	BLO and HO	0.90 K/W

TALEXmodule STARK-DLE-G2-LES65-3000 CLASSIC

ta	tp	Operation mode	R _{th, hs-a}
25°C	65°C	HE	4.49 K/W
35°C	65°C	HE	3.37 K/W
45°C	65°C	HE	2.24 K/W
55°C	65°C	HE	1.12 K/W
25°C	65°C	BLO	2.63 K/W
35°C	65°C	BLO	1.97 K/W
45°C	65°C	BLO	1.31 K/W
55°C	65°C	BLO	0.66 K/W
25°C	65°C	HO	1.96 K/W
35°C	65°C	HO	1.47 K/W
45°C	65°C	HO	0.98 K/W
55°C	65°C	HO	0.49 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 DLE G2 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.

Additionally the TALEXmodule STARK DLE G2 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. $50 \mu\text{m}$ 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

TALEXmodule DLE G2 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 DLE G2 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



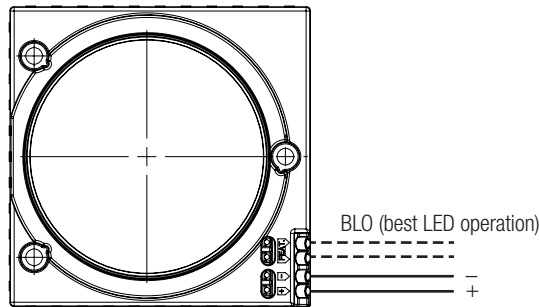
TALEXmodule DLE G2 must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module. Wrong polarity can damage the TALEXmodule DLE G2.



TALEXmodule DLE G2 are basic isolated up to 320 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 320 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 $> 60 \text{ V}$ 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.

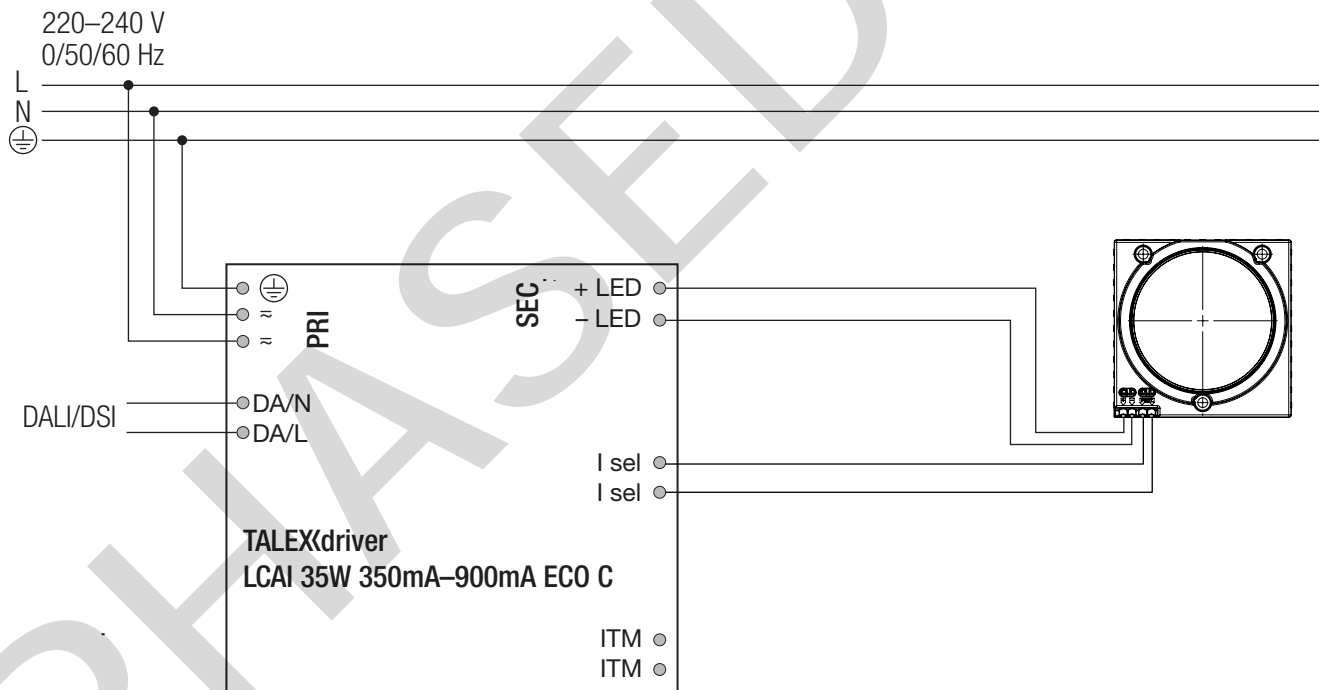
3.2 BLO function (Best LED Operation)

The BLO function is available for LED Driver of the ECO and TOP series.
The function ensures that the LED light module is operated with an optimal balance between luminous flux, efficiency and power.
To achieve this the I-select terminal of the LED Driver is connected to the FEAT terminal of the LED light module. The current is set via the resistor which is integrated at the FEAT terminal. Connecting a resistor to the I-select terminal of the LED Driver is not necessary anymore.



TALEXmodule STARK SLE G3 has no temperature monitoring (NTC).
The temperature monitoring is available with Tridonic LED Driver series TOP (up to 35 W) and ECO with the ITM feature in combination with the thermal sensor KTY82/210.

Wiring diagram: Example with TALEXconverter LCAI 35W 350mA–900mA ECO C

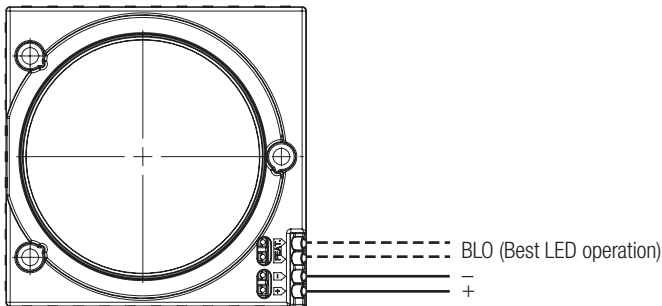


Control gears for BLO function

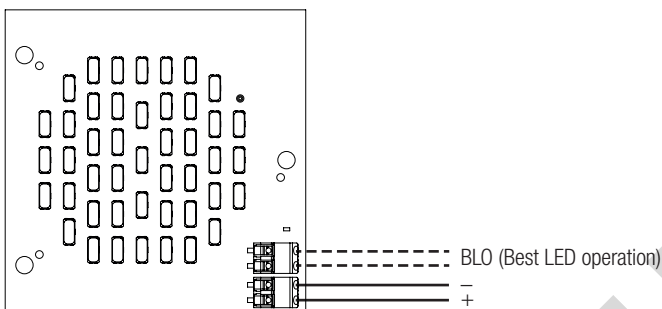
Module	Forward current	Power consumption module	Min. forward voltage module	Max. Forward voltage module	Dimmable LED Driver	Non-dimmable LED Driver
DLE-xxxx-G2-LES65-2000	700 mA	17.3 W	22.4 V	26.5 V	LCAI 20W 350-900mA ECO	LCI 20W 350-900mA TOP
DLE-xxxx-G2-LES65-3000	550 mA	25.0 W	41.2 V	48.6 V	LCAI 35W 350-900mA ECO	LCI 35W 350-900mA TOP

3.3 Wiring

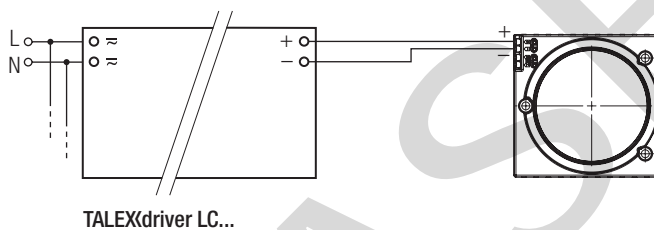
Wiring with housing



Wiring without housing



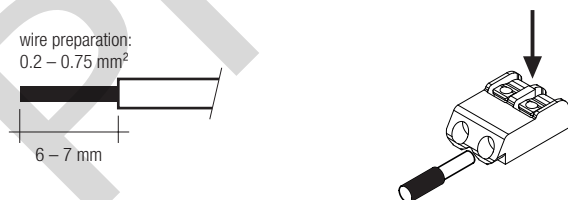
Wiring example



3.4 Wiring type and cross section

The wiring can be solid or stranded wires with a cross section of 0.2 to 0.75 mm². For the push-wire connection you have to strip the insulation (6–7 mm). Loosen wire through twisting and pulling.

Press down the "push button" and remove the cable from front.



3.5 Mounting instruction



TALEXmodule STARK DLE G2 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 before installing the TALEX modules to remove all dirt, dust and grease.

None of the components of the TALEX(module STARK DLE G2 (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.



Max. torque for fixing with M3 screws: 0.5 Nm.
Max. torque for fixing with M4 screws: 1.2 Nm.
Don't use countersunk screw.

For further information please refer to to the brochure entitled "Technical Design-In-Guide DLE GEN2".



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.

3.6 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 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.

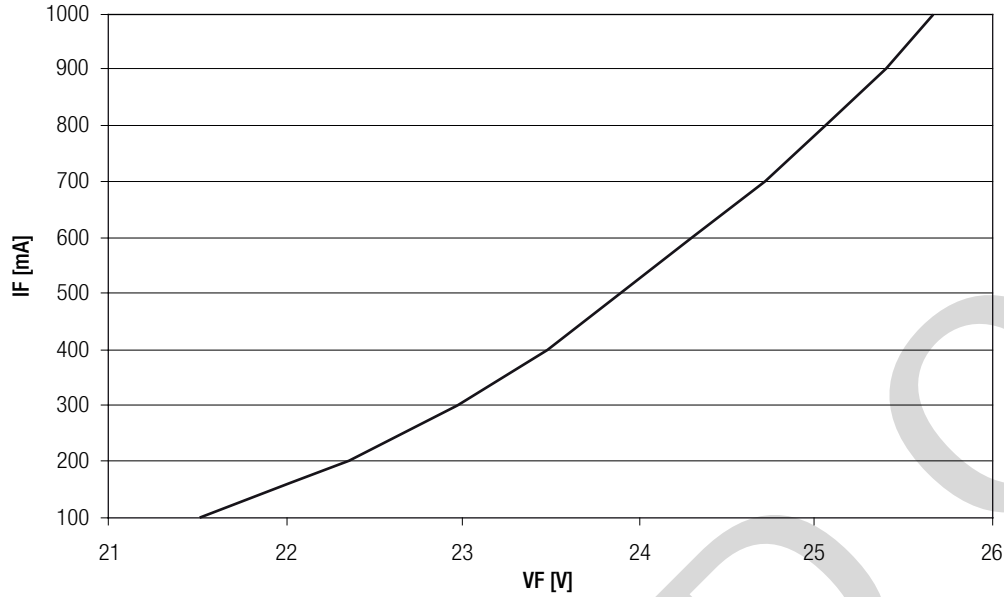
4.2 Lumen maintenance

Operating current	tp temperature	L80 / F10	L80 / F50	L70 / F10	L70 / F50
350 mA	65 °C	31,000 h	40,000 h	50,000 h	65,000 h
	75 °C	24,000 h	32,000 h	39,000 h	51,000 h
	85 °C	20,000 h	25,000 h	31,000 h	41,000 h
550 mA	65 °C	26,000 h	35,000 h	41,000 h	57,000 h
	75 °C	20,000 h	27,000 h	32,000 h	43,000 h
	85 °C	15,000 h	21,000 h	24,000 h	34,000 h
700 mA	65 °C	21,000 h	31,000 h	35,000 h	50,000 h
	75 °C	16,000 h	23,000 h	26,000 h	37,000 h
	85 °C	12,000 h	17,000 h	20,000 h	28,000 h

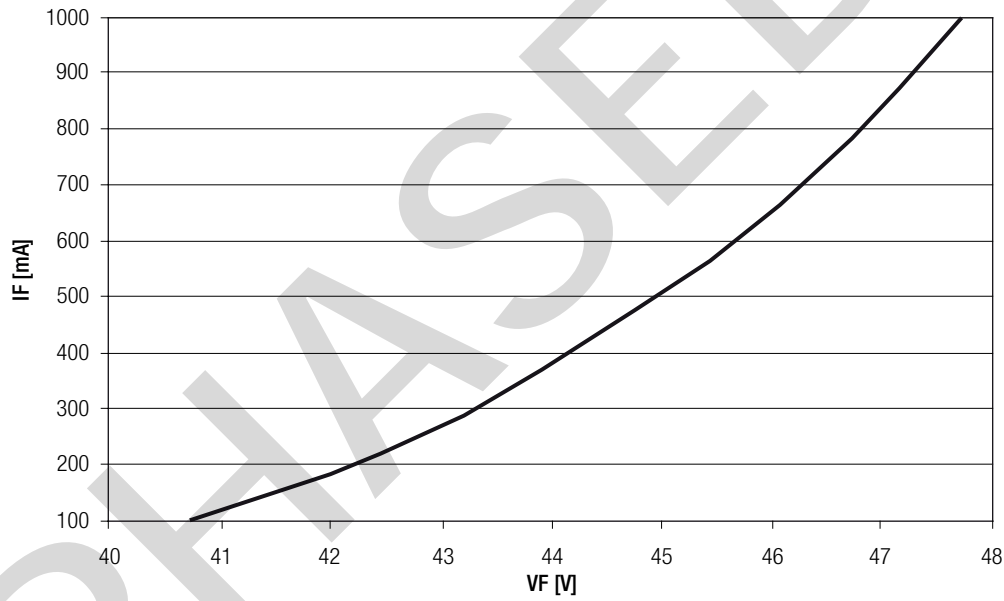
5. Electrical values

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

TALEX(module STARK DLE G2 2000 CLASSIC



TALEX(module STARK DLE G2 3000 CLASSIC



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

6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

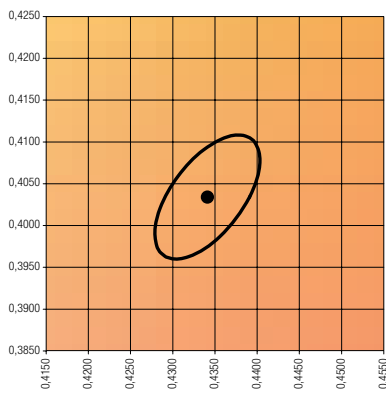
The specified colour coordinates are measured integral after a settling time of 100 ms. The current impuls depends on the module type.

Module type	Current impulse
TALEXmodule STARK-DLE-G2-LES65-2000 CLASSIC	700 mA
TALEXmodule STARK-DLE-G2-LES65-3000 CLASSIC	700 mA

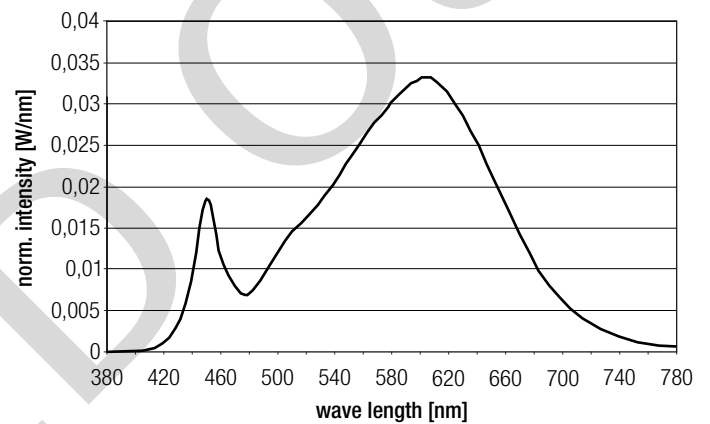
The ambient temperature of the measurement is $t_a = 25\text{ }^\circ\text{C}$.
The measurement tolerance of the colour coordinates are ± 0.01 .

3,000 K

	x0	y0
Centre	0.4344	0.4032

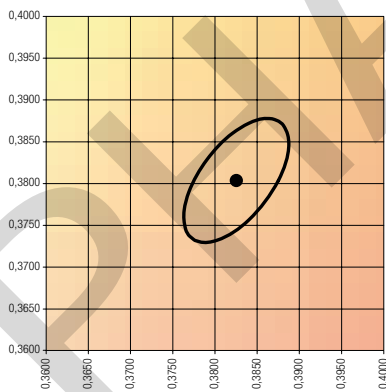


MacAdam ellipse: 3SDCM

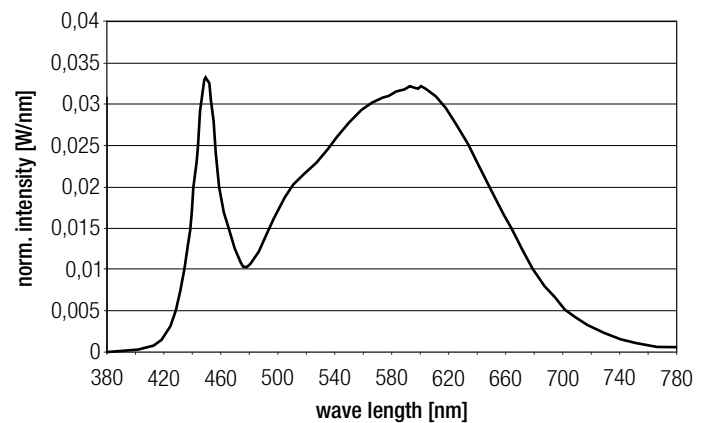


4,000 K

	x0	y0
Centre	0.3828	0.3803

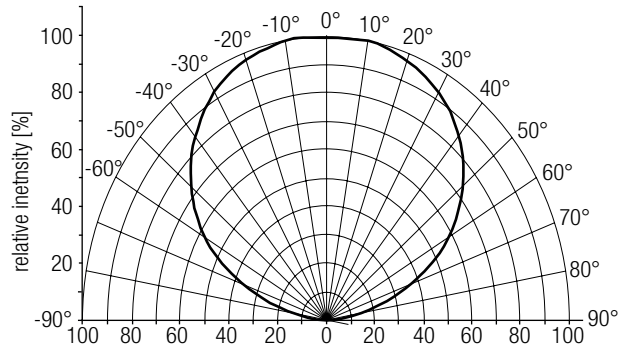


MacAdam ellipse: 3SDCM



6.2 Light distribution

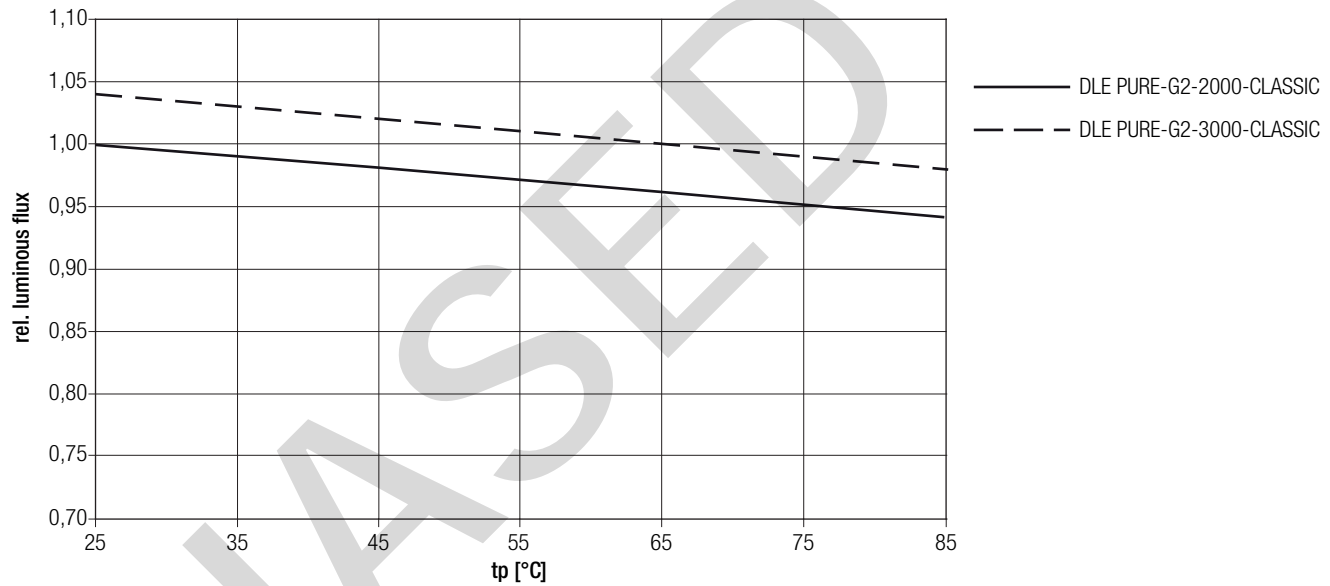
The optical design of the TALEX(module DLE product line ensures optimum homogeneity for the light distribution.



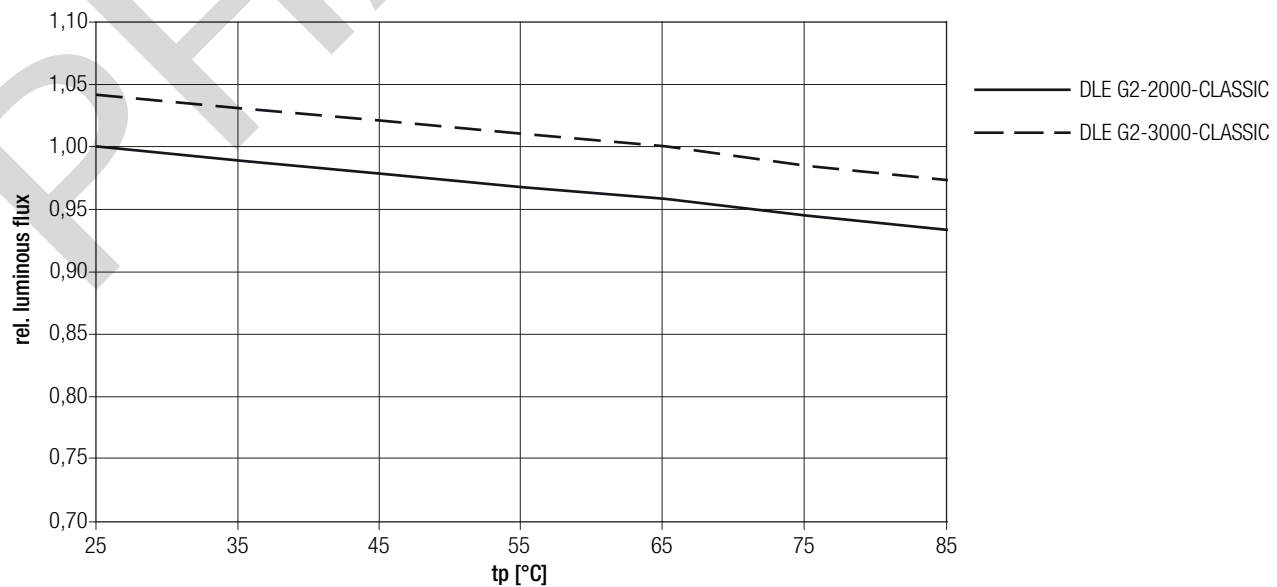
For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

6.3 Relative luminous flux vs. tp temperature

TALEX(module STARK DLE PURE G2 – without housing)

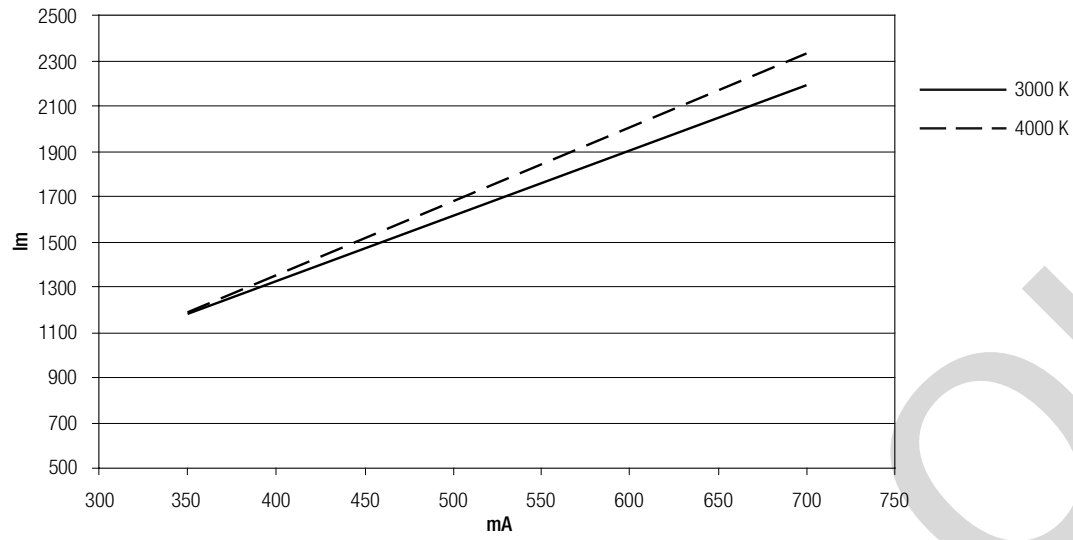


TALEX(module STARK DLE G2 – with housing)

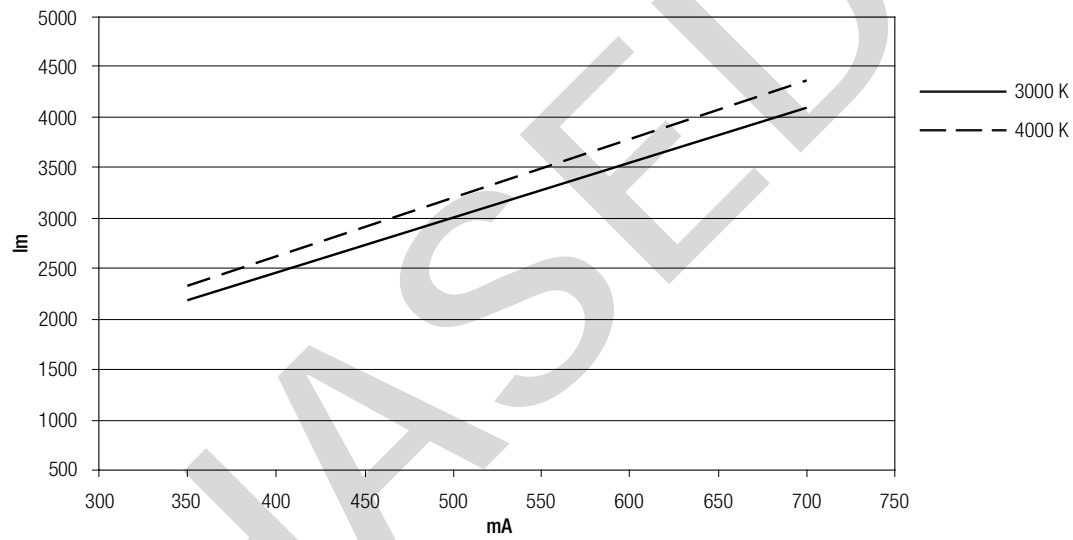


6.4 Relative luminous flux vs. operating current

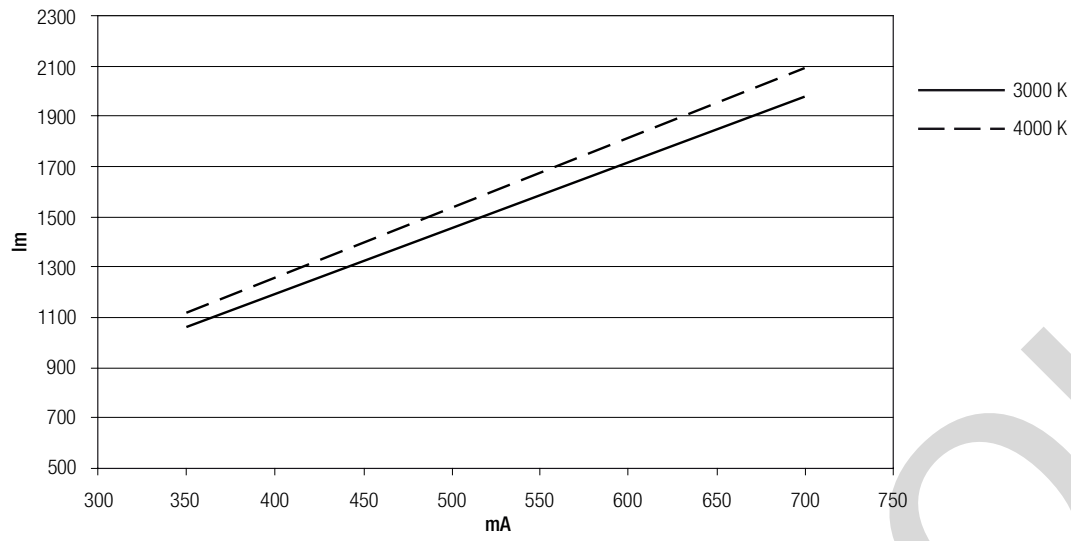
TALEXmodule STARK DLE PURE G2 2000 CLASSIC at $t_p = 65^\circ\text{C}$ – without housing



TALEXmodule STARK DLE PURE G2 3000 CLASSIC at $t_p = 65^\circ\text{C}$ – without housing



TALEXmodule STARK DLE G2 2000 CLASSIC at $t_p = 65^\circ\text{C}$ – with housing



TALEXmodule STARK DLE G2 3000 CLASSIC at $t_p = 65^\circ\text{C}$ – without housing

