TRIDONIC

Module SLE ADV8 CRI90 MA2

Modules SLE advanced

LES09

LES15

Product description
_ For spotlights and downlights
_ For operating with SELV Driver suitable
_ Excellent thermal management by COB technology
_ Uniform radiation with Dam&Fill technology
_ Integrated LED module
_ Cooling required
_ Flexible operating mode
_ 4,000 K CRI90 module COI approved acc. to AS/NZS1680.2.5:1997
_ Long lifetime: 60,000 hours
_ 5 years guarantee (conditions at https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions)

Optical properties
_ Colour temperatures 2,700, 3,000, 3,500 and 4,000 K
_ Useful luminous flux 4,151 lm at Irated and tp = 25 °C
_ Efficacy of the LED module 153 lm/W at Irated and tp = 25 °C
_ High colour rendering index CRI > 90
_ Small colour tolerance (MacAdam 2) ①

Mechanical properties
_ Module dimension LES09 and LES15
_ Fixing holes for M3 screws

System solution
_ Integrate compatible partner products into your final system solution: https://www.tridonic.com/en/int/products/accessories#partner
_ Combine Tridonic's LED modules and dimmable drivers to achieve an outstanding system efficacy (configuration possible via https://setbuilder.tridonic.com/)

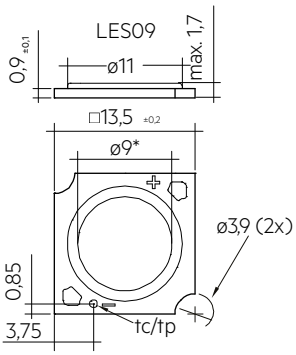
① Integral measurement over the complete module.

Website
http://www.tridonic.com/28004554

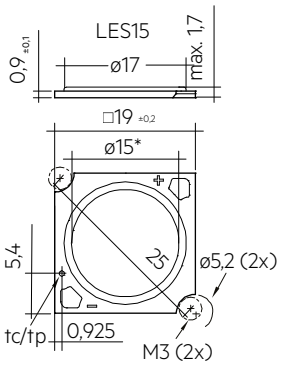
Linear | High bay | Decorative | Downlights | Spotlights | Free-standing | Area | Floor | Wall | Street

Module SLE ADV8 CRI90 MA2

Modules SLE advanced



Dimensions in mm, *optical LES



Dimensions in mm, *optical LES

Ordering data

Type	Article number	Colour temperature	Colour rendering index CRI	Packaging, carton	Weight per pc.
SLE 09mm 1200lm 927 R ADV8 MA2	**28004554**	2,700 K	>90	20 pc(s).	0.001 kg
SLE 09mm 1200lm 930 R ADV8 MA2	**28004555**	3,000 K	>90	20 pc(s).	0.001 kg
SLE 09mm 1200lm 935 R ADV8 MA2	**28004556**	3,500 K	>90	2 pc(s).	0.001 kg
SLE 09mm 1200lm 940 R ADV8 MA2	**28004557**	4,000 K	>90	20 pc(s).	0.001 kg
SLE 15mm 4000lm 927 R ADV8 MA2	**28004535**	2,700 K	>90	20 pc(s).	0.001 kg
SLE 15mm 4000lm 930 R ADV8 MA2	**28004536**	3,000 K	>90	20 pc(s).	0.001 kg
SLE 15mm 4000lm 935 R ADV8 MA2	**28004537**	3,500 K	>90	20 pc(s).	0.001 kg
SLE 15mm 4000lm 940 R ADV8 MA2	**28004538**	4,000 K	>90	20 pc(s).	0.001 kg

Technical data

Beam characteristic	360°
Ambient temperature ta	-30 … +80 °C
tp rated	65 °C
tc	105 °C
Irated for LES09	350 mA
Irated for LES15	800 mA
Imax for LES09	540 mA
Imax for LES15	1,120 mA
Max. permissible LF current ripple for LES09	594 mA
Max. permissible LF current ripple for LES15	1,232 mA
Max. permissible peak current for LES09	640 mA / max. 8 ms
Max. permissible peak current for LES15	1,340 mA / max. 8 ms
Max. working voltage for insulation SELV ②	60 V
Insulation test voltage	0.5 kV
Colour tolerance	2 SDCM
ESD classification	Severity level 4
Risk group (IEC 62471) for LES09	RG1
Risk group (IEC 62471) for LES15	RG1
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	60,000 h
Guarantee (conditions at www.tridonic.com)	5 Year(s)

Approval marks

Standards

EN 62031, EN 62471, IEC 62717, IEC 61000-4-2, UL 8750

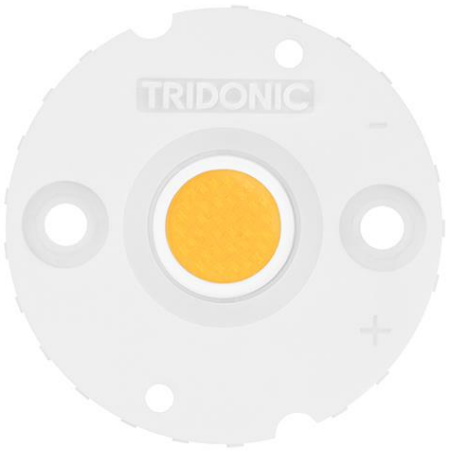
Specific technical data

Type[3]	Article number	Photometric code[4]	Useful luminous flux at tp = 25 °C [5]	Expected luminous flux at tp rated[6]	Typ. forward current	Min. forward voltage at tp rated	Max. forward voltage at tp = 25 °C	Power consumption Pon at tp = 25 °C [7]	Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Colour rendering index CRI
SLE 09mm 1200lm – Operating mode HE at 250 mA											
SLE 09mm 1200lm 927 R ADV8 MA2	**28004554**	927/259	–	1,101 lm	250 mA	30.3 V	36.0 V	–	–	134 lm/W	>90
SLE 09mm 1200lm 930 R ADV8 MA2	**28004555**	930/259	–	1,151 lm	250 mA	30.3 V	36.0 V	–	–	140 lm/W	>90
SLE 09mm 1200lm 935 R ADV8 MA2	**28004556**	935/259	–	1,207 lm	250 mA	30.3 V	36.0 V	–	–	147 lm/W	>90
SLE 09mm 1200lm 940 R ADV8 MA2	**28004557**	940/259	–	1,219 lm	250 mA	30.3 V	36.0 V	–	–	148 lm/W	>90
SLE 09mm 1200lm – Operating mode NM at 350 mA											
SLE 09mm 1200lm 927 R ADV8 MA2	**28004554**	927/259	1,605 lm	1,486 lm	350 mA	30.9 V	36.8 V	11.9 W	135 lm/W	126 lm/W	>90
SLE 09mm 1200lm 930 R ADV8 MA2	**28004555**	930/259	1,660 lm	1,536 lm	350 mA	30.9 V	36.8 V	11.9 W	139 lm/W	131 lm/W	>90
SLE 09mm 1200lm 935 R ADV8 MA2	**28004556**	935/259	1,731 lm	1,602 lm	350 mA	30.9 V	36.8 V	11.9 W	145 lm/W	136 lm/W	>90
SLE 09mm 1200lm 940 R ADV8 MA2	**28004557**	940/259	1,776 lm	1,644 lm	350 mA	30.9 V	36.8 V	11.9 W	149 lm/W	140 lm/W	>90
SLE 09mm 1200lm – Operating mode HO at 500 mA											
SLE 09mm 1200lm 927 R ADV8 MA2	**28004554**	927/259	–	2,091 lm	500 mA	31.9 V	37.9 V	–	–	121 lm/W	>90
SLE 09mm 1200lm 930 R ADV8 MA2	**28004555**	930/259	–	2,167 lm	500 mA	31.9 V	37.9 V	–	–	125 lm/W	>90
SLE 09mm 1200lm 935 R ADV8 MA2	**28004556**	935/259	–	2,299 lm	500 mA	31.9 V	37.9 V	–	–	133 lm/W	>90
SLE 09mm 1200lm 940 R ADV8 MA2	**28004557**	940/259	–	2,304 lm	500 mA	31.9 V	37.9 V	–	–	133 lm/W	>90
SLE 15mm 4000lm – Operating mode HE at 400 mA											
SLE 15mm 4000lm 927 R ADV8 MA2	**28004535**	927/259	–	1,841 lm	400 mA	29.6 V	35.2 V	–	–	143 lm/W	>90
SLE 15mm 4000lm 930 R ADV8 MA2	**28004536**	930/259	–	1,888 lm	400 mA	29.6 V	35.2 V	–	–	147 lm/W	>90
SLE 15mm 4000lm 935 R ADV8 MA2	**28004537**	935/259	–	1,975 lm	400 mA	29.6 V	35.2 V	–	–	154 lm/W	>90
SLE 15mm 4000lm 940 R ADV8 MA2	**28004538**	940/259	–	2,030 lm	400 mA	29.6 V	35.2 V	–	–	158 lm/W	>90
SLE 15mm 4000lm – Operating mode NM at 800 mA											
SLE 15mm 4000lm 927 R ADV8 MA2	**28004535**	927/259	3,651 lm	3,378 lm	800 mA	30.8 V	36.6 V	27.1 W	135 lm/W	126 lm/W	>90
SLE 15mm 4000lm 930 R ADV8 MA2	**28004536**	930/259	3,784 lm	3,501 lm	800 mA	30.8 V	36.6 V	27.1 W	139 lm/W	131 lm/W	>90
SLE 15mm 4000lm 935 R ADV8 MA2	**28004537**	935/259	3,946 lm	3,652 lm	800 mA	30.8 V	36.6 V	27.1 W	145 lm/W	137 lm/W	>90
SLE 15mm 4000lm 940 R ADV8 MA2	**28004538**	940/259	4,151 lm	3,842 lm	800 mA	30.8 V	36.6 V	27.1 W	153 lm/W	144 lm/W	>90
SLE 15mm 4000lm – Operating mode HO at 1,050 mA											
SLE 15mm 4000lm 927 R ADV8 MA2	**28004535**	927/259	–	4,531 lm	1,050 mA	31.3 V	37.3 V	–	–	127 lm/W	>90
SLE 15mm 4000lm 930 R ADV8 MA2	**28004536**	930/259	–	4,655 lm	1,050 mA	31.3 V	37.3 V	–	–	130 lm/W	>90
SLE 15mm 4000lm 935 R ADV8 MA2	**28004537**	935/259	–	4,872 lm	1,050 mA	31.3 V	37.3 V	–	–	136 lm/W	>90
SLE 15mm 4000lm 940 R ADV8 MA2	**28004538**	940/259	–	5,018 lm	1,050 mA	31.3 V	37.3 V	–	–	140 lm/W	>90

② If mounted with M4 screws with 7 mm head diameter.
③ HE … High Efficiency, NM … Nominal Mode, HO … High Output.
④ The detailed explanation, see data sheet section 1.1.
⑤ Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.
⑥ Measurement uncertainty ± 10 %. Based on calculation.
⑦ Tolerance of power consumption Pon ± 10 %. Measurement uncertainty ± 5 %.

Housing for SLE

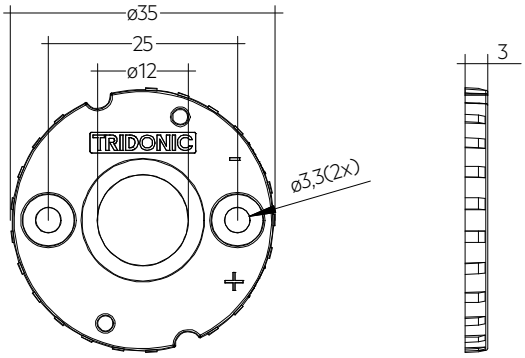
Accessory



LES09

Product description
_ Housing for SLE
_ Diameter: 35 mm
_ Material: Lexan Resin 943
_ M3 screws with flat head, max. head diameter of 6 mm and max. torque for fixing is 0.5 Nm

Website
http://www.tridonic.com/28003024



SLE G7 HOUSING LES09

Ordering data

Type	Article number	Packaging, bag	Weight per pc.
SLE G7 HOUSING LES 09	**28003024**	500 pc(s).	0.002 kg
SLE G7 HOUSING LES 13/15	**28003026**	500 pc(s).	0.002 kg

1. Standards

EN 62031
EN 62471
IEC 62717
IEC 61000-4-2
UL 8750 (for CLASS2 circuits and dry locations)

1.1 Glow wire test for housing variants

according to IEC 60695-2-11 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	MacAdam initial	MacAdam after 25% of the lifetime (max.6000h)	Luminous flux after 25% of the lifetime (max.6000h)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.3 Risk group

Type	Risk group (IEC 62471)
LES09	RG1
LES15	RG1

1.4 Energy classification

Type	Colour tempera-ture	Forward current	Energy classifi-cation	Energy consumption
SLE 09mm – Without housing				
SLE 09mm 1200lm 927 R ADV8 MA2	2,700 K	350 mA	E	12 kWh / 1,000 h
SLE 09mm 1200lm 930 R ADV8 MA2	3,000 K	350 mA	E	12 kWh / 1,000 h
SLE 09mm 1200lm 935 R ADV8 MA2	3,500 K	350 mA	E	12 kWh / 1,000 h
SLE 09mm 1200lm 940 R ADV8 MA2	4,000 K	350 mA	D	12 kWh / 1,000 h
SLE 15mm – Without housing				
SLE 15mm 4000lm 927 R ADV8 MA2	2,700 K	800 mA	E	27 kWh / 1,000 h
SLE 15mm 4000lm 930 R ADV8 MA2	3,000 K	800 mA	E	27 kWh / 1,000 h
SLE 15mm 4000lm 935 R ADV8 MA2	3,500 K	800 mA	E	28 kWh / 1,000 h
SLE 15mm 4000lm 940 R ADV8 MA2	4,000 K	800 mA	D	28 kWh / 1,000 h

2. Thermical details

2.1 tp point, ambient temperature and lifetime

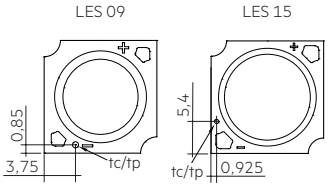
The temperature at tp reference point is crucial for the light output and lifetime of a LED product.

For SLE a tp temperature of 65 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and lifetime.

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 0 to 85 %.

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

2.4 Heat sink values

SLE 09mm 1200lm xxx ADV8

ta	tp	Operating current	$R_{th, hs-a}$
25 °C	65 °C	250 mA	4.6 K/W
35 °C	65 °C	250 mA	3.4 K/W
45 °C	65 °C	250 mA	2.2 K/W
25 °C	65 °C	350 mA	3.1 K/W
35 °C	65 °C	350 mA	2.3 K/W
45 °C	65 °C	350 mA	1.5 K/W
25 °C	65 °C	500 mA	2.1 K/W
35 °C	65 °C	500 mA	1.6 K/W
45 °C	65 °C	500 mA	1.0 K/W

SLE 15mm 4000lm xxx ADV8

ta	tp	Operating current	$R_{th, hs-a}$
25 °C	65 °C	400 mA	2.4 K/W
35 °C	65 °C	400 mA	1.8 K/W
45 °C	65 °C	400 mA	1.2 K/W
25 °C	65 °C	800 mA	1.3 K/W
35 °C	65 °C	800 mA	1.0 K/W
45 °C	65 °C	800 mA	0.6 K/W
25 °C	65 °C	1,050 mA	0.9 K/W
35 °C	65 °C	1,050 mA	0.7 K/W
45 °C	65 °C	1,050 mA	0.5 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 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.
Additionally the SLE 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.

The SLE H ADV8 T modules will be delivered with thermal interface foil of type GRAFTECH HT-1205A.
The bottom side of the thermal pad is glued to the module, the upper side is not adhesive. This makes it easier to position the module when it is connected to the heat sink.

The thermal pad is an integral part of the LED module and must not be confused with a protective foil. The thermal pad must not pulled off!

For further information about the thermal interface foil please refer to the data sheet of the product GRAFTECH HT-1205A.

3. Installation / wiring

3.1 Electrical supply/choice of LED driver

SLE 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 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

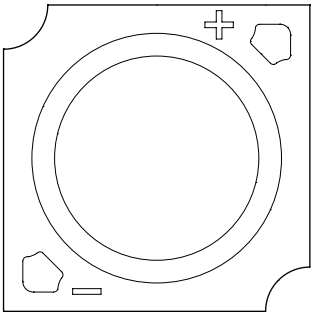
SLE must be supplied by a constant current LED driver.
Operation with a constant voltage LED driver will lead to an irreversible damage of the module.
Wrong polarity can damage the SLE.

SLE must not be operated with nonSELV LED driver.

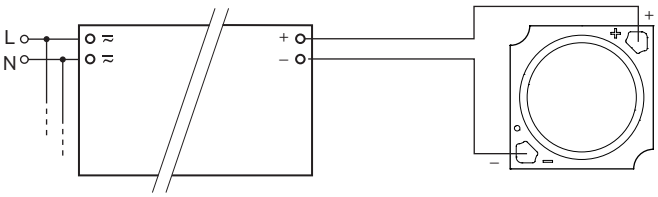
SLE are basic insulated up to 60 V SELV against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an additional insulation between LED module and heat sink is required (for example by insulated 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

LES09 + LES15



Wiring example



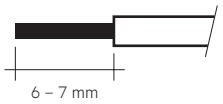
Driver LC ...

3.3 Wiring type and cross section for housing variants

For wiring use solid wire from 0.5 to 0.75 mm² or stranded wire with soldered ends 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 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 (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.3 Nm (LES9, LES13, LES15)
0.5 Nm (LES17, LES21)

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 (notice working temperature) or rounded head screw with collar (ISO 7380-2) with head diameter ≤ 6.9 mm must be used for LED modules without housing (for LES13, LES15).

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. Lifetime

4.1 Lifetime, lumen maintenance and failure rate

The light output of an LED module decreases over the lifetime, 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 lifetime 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

Lifetime declarations are informative and represent no warranty claim. Preliminary calculated lifetime data until LM80 test reports are available

SLE 09mm 1200lm ADV8

Operating current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
250 mA	65 °C	>60k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	18k h	22k h	10k h	51k h	>60k h	>60k h
350 mA	65 °C	>60k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	18k h	>22k h	41k h	51k h	>60k h	>60k h
500 mA	65 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	9k h	14k h	20k h	31k h	33k h	50k h

SLE 15mm 4000lm ADV8

Operating current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
400 mA	65 °C	>60k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	18k h	22k h	41k h	51k h	>60 kh	>60k h
800 mA	65 °C	>60k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	18k h	22k h	41k h	51k h	>60 kh	50k h
1,050 mA	65 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	85 °C	57k h	>60k h	>60k h	>60k h	>60k h	>60k h
	105 °C	9k h	14k h	20k h	31k h	33k h	50k h

5. Electrical values

5.1 Declaration of electrical parameters

Irated … Nominal operating current the module is designed for.

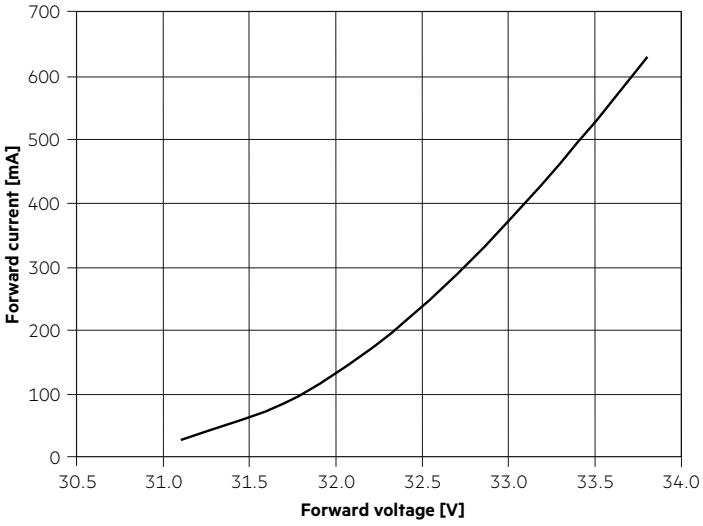
Imax … Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

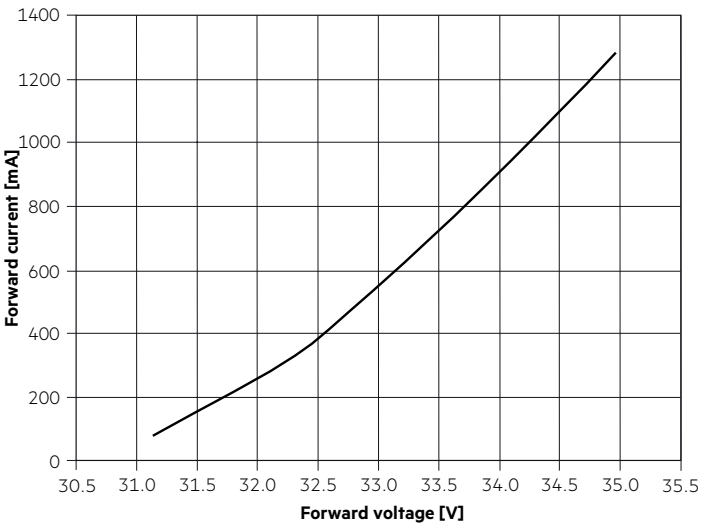
Max. permissible peak current … The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

SLE 09mm 1200lm ADV8

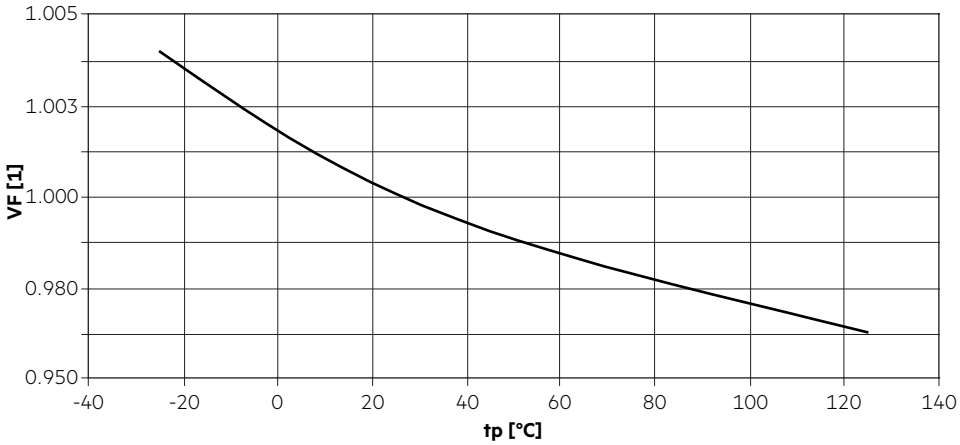


SLE 15mm 4000lm ADV8

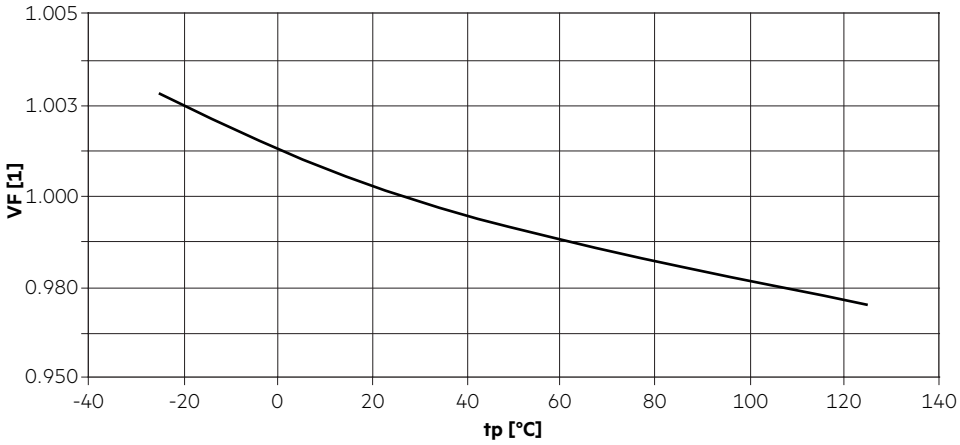


5.3 Forward voltage vs. tp temperature

SLE 09mm 1200lm ADV8



SLE 15mm 4000lm ADV8



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

6. Photometric characteristics

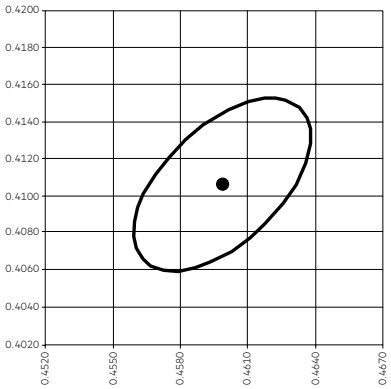
6.1 Coordinates and tolerances according to CIE 1931 and colour rendering

The specified colour coordinates are measured integral after a settling time of 100 ms. The current impuls depends on the module type.
The ambient temperature of the measurement is ta = 25 °C. The measurement tolerance of the colour coordinates are ± 0.005.

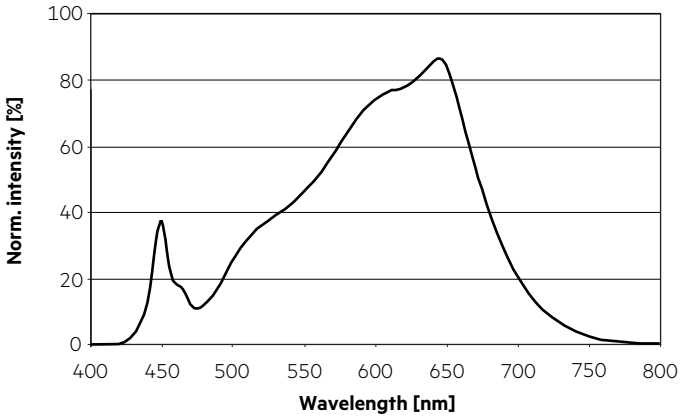
Module type	Current impulse
SLE 09mm 1200lm xxx ADV8	350 mA
SLE 15mm 4000lm xxx ADV8	800 mA

2,700 K – CRI90

	x0	y0
Centre	0.4599	0.4106

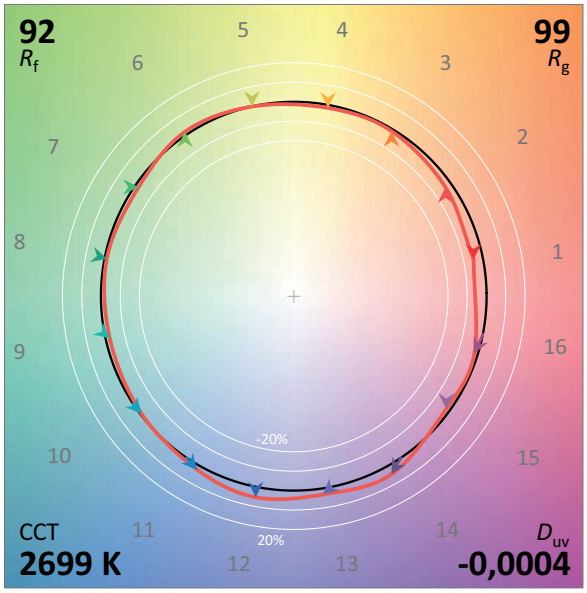


MacAdam ellipse: 2SDCM



CRI	
Ra	R9
93	62

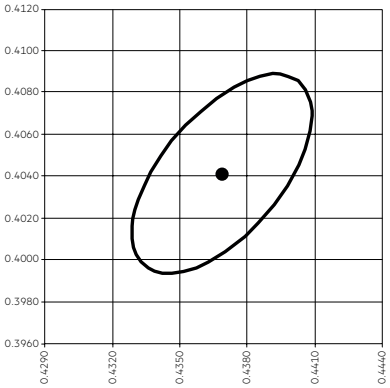
Colour vector graphic



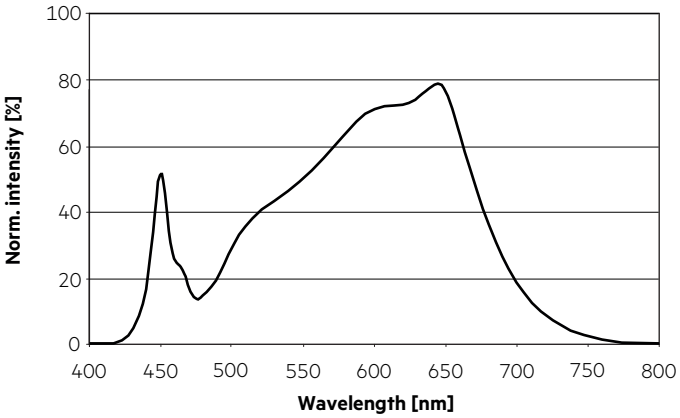
Reference source
Test source

3,000 K – CRI90

	x0	y0
Centre	0.4369	0.4041

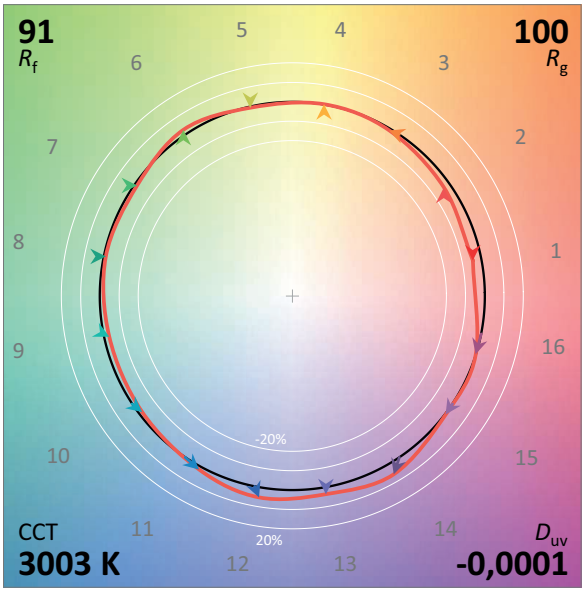


MacAdam ellipse: 2SDCM



CRI	
Ra	R9
92	64

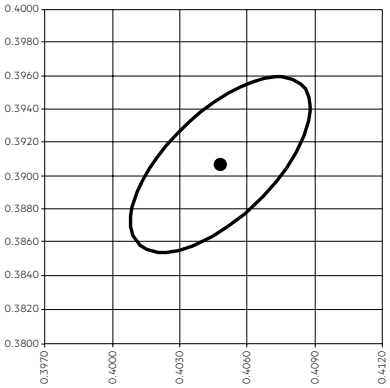
Colour vector graphic



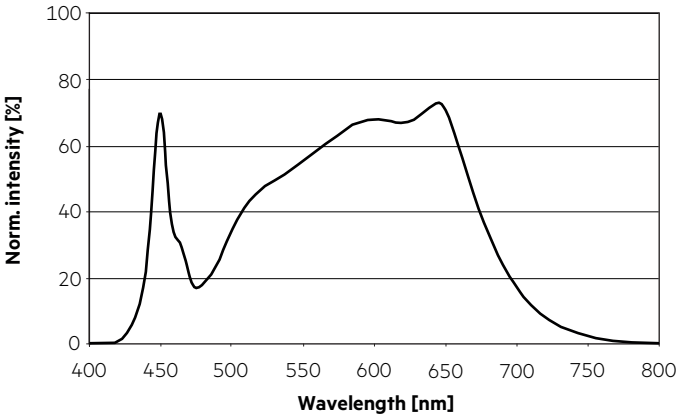
Reference source
Test source

3,500 K – CRI90

	x0	y0
Centre	0.4053	0.3907

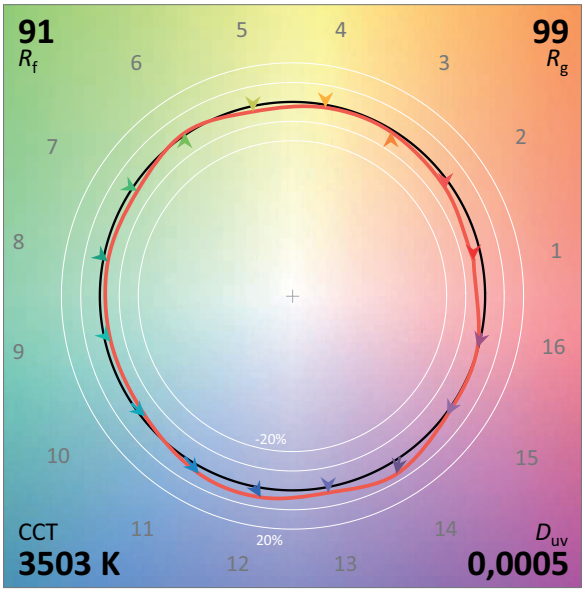


MacAdam ellipse: 2SDCM



CRI	
Ra	R9
93	70

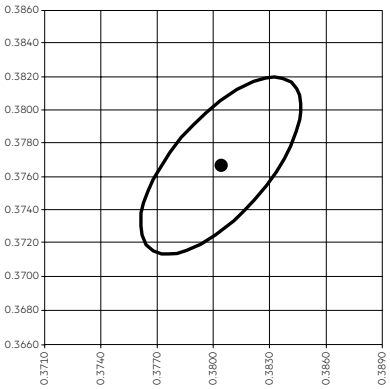
Colour vector graphic



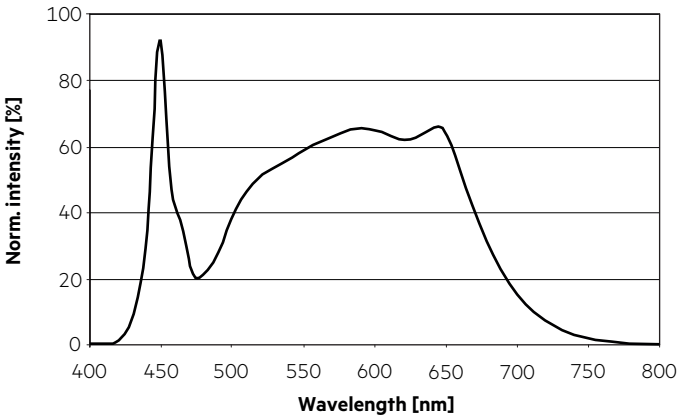
Reference source
Test source

4,000 K – CRI90

	x0	y0
Centre	0.3804	0.3767

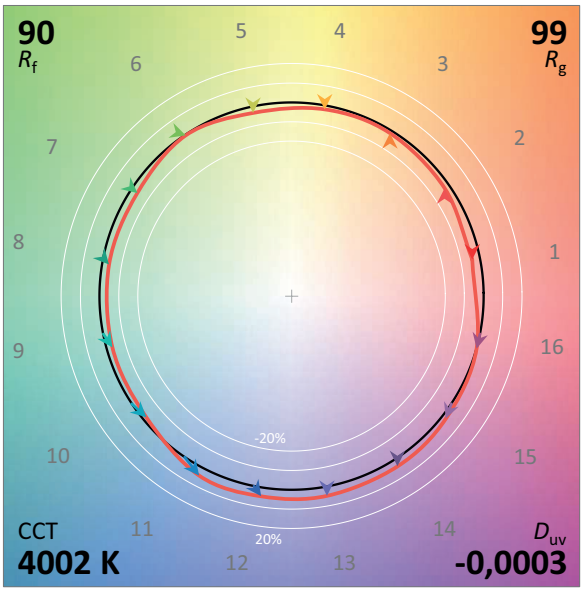


MacAdam ellipse: 2SDCM



CRI	
Ra	R9
93	72

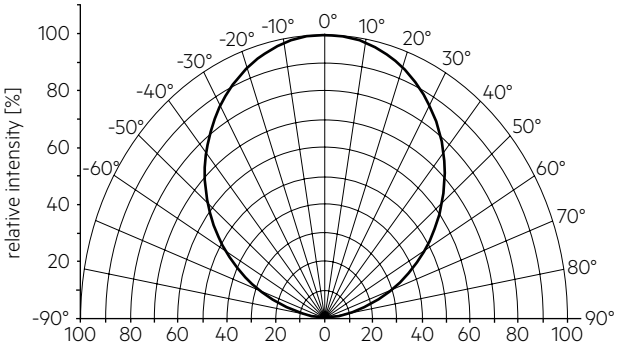
Colour vector graphic



Reference source
Test source

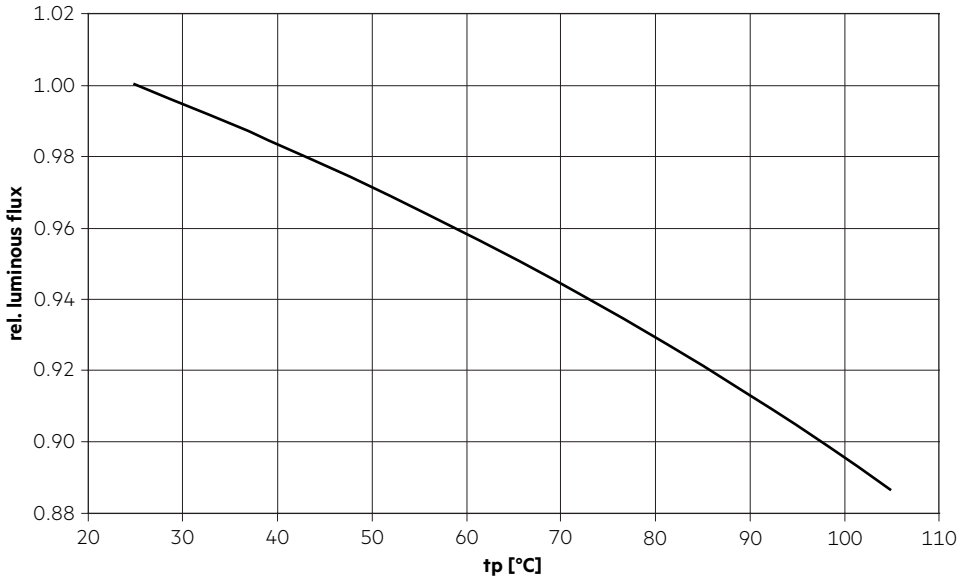
6.2 Light distribution

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

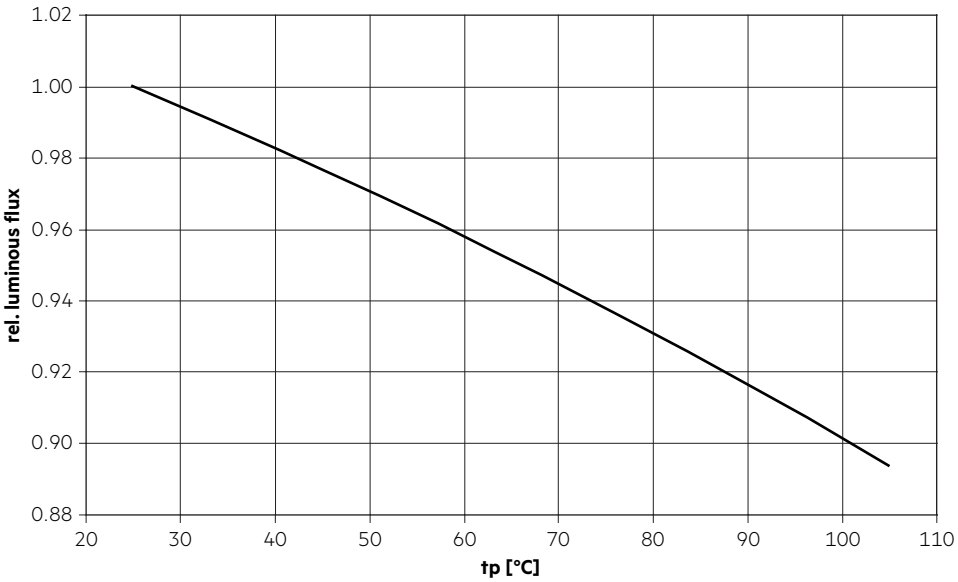


6.3 Relative luminous flux vs. tp temperature

SLE 09mm 1200lm ADV8

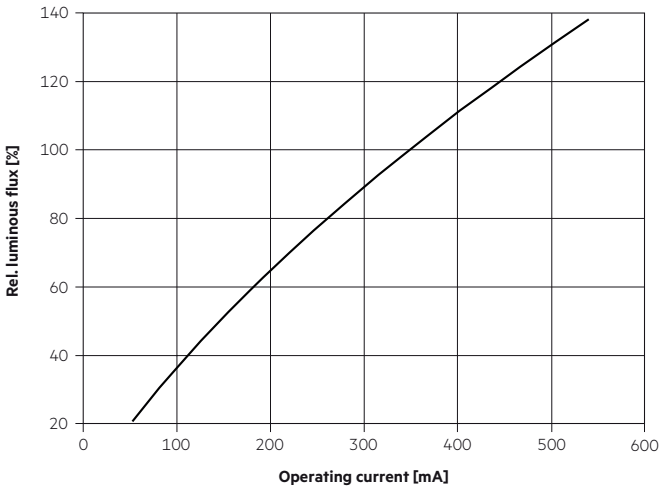


SLE 15mm 4000lm ADV8

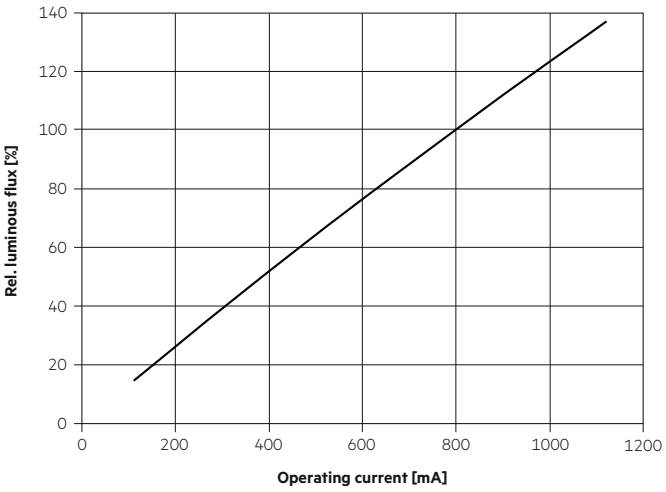


6.4 Relative luminous flux vs. operating current

SLE 09mm 1200lm ADV8



SLE 15mm 4000lm ADV8



7. Miscellaneous

7.1 Additional information

Additional technical information at www.tridonic.com → Technical Data

Energy label and further information at www.tridonic.com in the certificates tab of the corresponding product page and at the EPREL data base https://eprel.ec.europa.eu/

Guarantee conditions at www.tridonic.com → Services

Lifetime declarations are informative and represent no warranty claim.