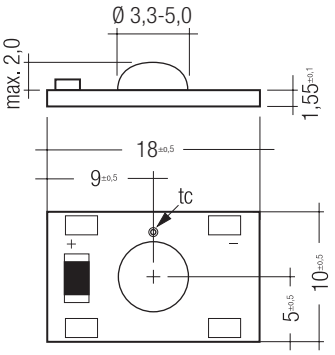
EAC RoHS

Module EOS P211-4

Module EOS



Product description

- General lighting
- Design and effect lighting
- Emergency lighting
- Spotlights
- High-flux LED module
- Narrow colour temperature tolerance band
- Compact design
- Excellent thermal management
- Integrated polarity reversal protection
- Optional spot lens accessory LENS O211-2
- High-power LED module in chip-on-board technology (COB)
- Low thermal resistance $R_{th, j\text{-}hs}$ < 10 K/W
- Attached with premounted thermally conductive adhesive tape
- Available with or without connection cable
- Connection: Cable 200 mm
- Cooling required

Technical data

Beam characteristic	140°
Supply voltage at 700 mA	2 – 4 V
Ambient temperature range	-25 … +55 °C
tp rated	75 °C
tc[2]	75 °C
Max. DC forward current	700 mA
Max. permissible LF current ripple	1,000 mA
Max. permissible peak current	1,250 mA / max. 10 ms
Risk group (EN 62471:2008)	0
Type of protection	IP00

Standards, page 3

Colour temperatures and tolerances, page 6 and 7

Ordering data

Type	Article number	Colour®	Wave length	Colour temperature	Connection cable	Packaging carton	Weight per pc.
1 light point per module							
P211-4 WW	**89600536**	Warm white	–	3,000 K	yes	100 pc(s).	0.001 kg
P211-4 NW	**89600535**	Neutral white	–	4,200 K	yes	100 pc(s).	0.003 kg
P211-4 DL	**89600534**	Daylight white	–	6,500 K	yes	100 pc(s).	0.003 kg
P211-4 R	**89601207**	Red	620 – 627 nm	–	yes	100 pc(s).	0.001 kg
P211-4 G	**89601208**	Green	520 – 530 nm	–	yes	100 pc(s).	0.001 kg
P211-4 B	**89601209**	Blue	455 – 465 nm	–	yes	100 pc(s).	0.001 kg
P211-4 GOLD	**89601461**	GOLD	–	2,700 K	yes	100 pc(s).	0.001 kg
P211-4 PM	**89601462**	Packed meat	–	–	yes	100 pc(s).	0.001 kg
P211-4 WW	**89601354**	Warm white	–	3,000 K	no	100 pc(s).	0.001 kg
P211-4 NW	**89601212**	Neutral white	–	4,200 K	no	100 pc(s).	0.001 kg
P211-4 DL	**89601210**	Daylight white	–	6,500 K	no	100 pc(s).	0.001 kg
P211-4 GOLD	**89601463**	GOLD	–	2,700 K	no	100 pc(s).	0.001 kg
P211-4 PM	**89601464**	Packed meat	–	–	no	100 pc(s).	0.001 kg
P211-4 CW	**89601513**	Crystal white	–	7,500 K	no	100 pc(s).	0.001 kg

Specific technical data

Type	Typ. luminous flux at 350 mA[1] [4]	Typ. luminous flux at 700 mA[1] [4]	Current DC, typ.[2] [3]	Current DC, max.[2] [3]	Power at 350 mA[4] [5]	Power at 700 mA[4] [5]	Colour rendering index CRI
1 light point per module							
P211-4 WW	75.0 lm	125.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 80
P211-4 NW	82.0 lm	128.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 80
P211-4 DL	100.0 lm	150.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 75
P211-4 R	31.0 lm	51.0 lm	350 mA	700 mA	0.9 W	1.8 W	–
P211-4 G	57.0 lm	87.0 lm	350 mA	700 mA	1.2 W	2.4 W	–
P211-4 B	12.5 lm	20.3 lm	350 mA	700 mA	1.2 W	2.4 W	–
P211-4 GOLD	56.0 lm	87.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 90
P211-4 PM	54.0 lm	85.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 80
P211-4 CW	95.0 lm	143.0 lm	350 mA	700 mA	1.2 W	2.4 W	> 70

[1] Tolerance range for optical data: ±15 %.

[2] Exceeding the max. operating current leads to an overload on the LED module EOS. This may in turn result in a significant reduction in life-time or even destruction of the EOS.

[3] $R_{th,j\text{-}hs}$ = Thermal Resistance (Junction – Heat Sink). Exceeding the max. temperature limits leads to a reduced life or the module can be damaged. Measuring of the temperature at the tc-point in the thermally stable state.

[4] At tp = 75 °C

[5] Tolerance range for optical and electrical data: ±15 %.

[6] Colour coordinates and tolerances according to CIE 1964. For details please refer to page 6.

Standards
EN 62031
EN 62471

Energy classification

Type	Forward current	Energy classification
P211-4 WW	350 mA	A+
	700 mA	A+
P211-4 NW	350 mA	A+
	700 mA	A+
P211-4 DL	350 mA	A++
	700 mA	A+
P211-4 R	350 mA	A+
	700 mA	A
P211-4 G	350 mA	A+
	700 mA	A
P211-4 B	350 mA	B
	700 mA	B
P211-4 GOLD	350 mA	A+
	700 mA	A
P211-4 PM	350 mA	A+
	700 mA	A
P211-4 CW	350 mA	A++
	700 mA	A+

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

Therefore the EOS P211-4 needs to be mounted onto a heat sink.

Tridonic's excellent thermal design for the EOS products provides the lowest thermal resistance and therefore allowing new compact designs without sacrificing quality, safety and life-time.

tc point, ambient temperature ta, temperature and life-time

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

For EOS P211-4 a max. tc temperature of 75 °C is recommended in order to achieve an optimum between heat sink requirements, light output and life-time.

Compliance with the maximum permissible reference temperature at the tc 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.

Mounting instruction

EOS modules from Tridonic which have to be installed on a heat sink are equipped as standard with thermally conductive adhesive tape on the back of the pc board.

These LED products must be installed with this adhesive tape. To ensure permanent adhesion the fixing/cooling surface must be cleaned before installing the LED modules to remove all dirt, dust and grease.

The contact adhesion surface must have a surface energy of at least 38 mNm. The contact pressure must be at least 10 kg/cm²
(ideally: 40 kg/cm²) for at least 3 seconds.
Processing must take place at an ambient temperature of 23 +/- 5°C.
A dwell time of 24 hours is required after adhesion.
To avoid damaging the modules during processing you must not touch the components or the glob top. A suitable tool must be used.

For more information please call or email your Tridonic contact.

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.

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

Recommended heat sink surface

EOS P211-4, 350 mA

ta	tc	$R_{th, hs-a}$
25 °C	75 °C	39.4 K/W
35 °C	75 °C	30.9 K/W
45 °C	75 °C	22.4 K/W
55 °C	75 °C	13.9 K/W

EOS P211-4, 700 mA

ta	tc	$R_{th, hs-a}$
25 °C	75 °C	17.7 K/W
35 °C	75 °C	13.5 K/W
45 °C	75 °C	9.4 K/W
55 °C	75 °C	5.3 K/W

Notes

Values valid for: natural convection, $R_{th, hs-a}$ = required thermal resistance of heat sink

The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation. A thermal connection between EOS module and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.
Additionally the EOS module has to be fixed on the heat sink with M3 screws with plastic washer to optimise the thermal connection.

Matrix temperature

f(soldering time) for the modules

Temperature	Max. time without heat sink	Max. time with optimized heat sink
330 °C	15 s	–
340 °C	12 s	–
350 °C	10 s	–
360 °C	5 s	15 s
370 °C	3 s	12 s
380 °C	2 s	10 s
390 °C	1 s	5 s

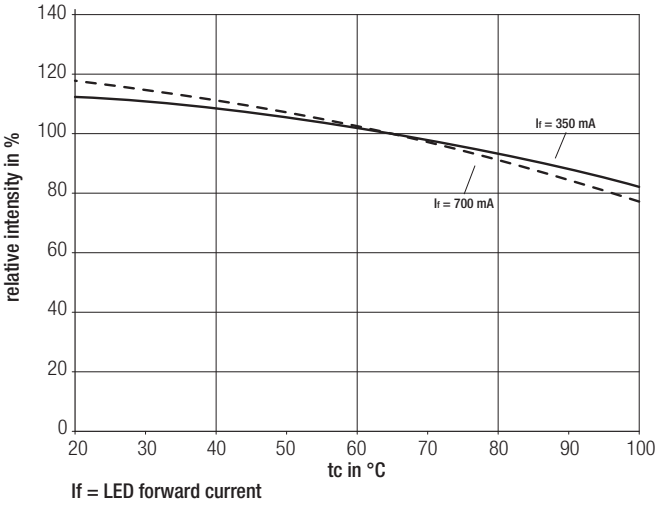
The values apply for soldering without heat sink. To reduce the duration of soldering it is recommended to pre-heat the module at ta max., e.g. on a plate.

Storage and humidity

storage temperature	-25 ... +80 °C

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

relative luminous flux vs. tc point



If = LED forward current

Lumen maintance

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

tc temperature in °C	luminous flux in %	operating time in h
25	80	60,000
	70	81,000
	50	132,000
45	80	44,000
	70	64,000
	50	110,000
65	80	32,000
	70	50,000
	50	91,000
75	80	25,000
	70	41,000
	50	81,000

Electrical supply/choice of LED Driver

EOS modules 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 Driver from Tridonic in combination with EOS modules guarantees the necessary protection for safe and reliable operation.
The EOS modules are only for the operation with SELV < 60 V.
The operation at LED Drivers with outputvoltage > 60 V is with an additional preparations possible. Further information on request.

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

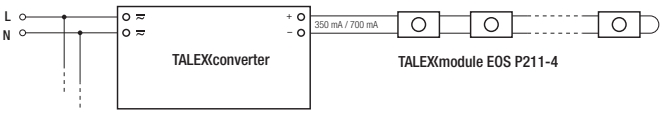
- Short-circuit protection
- Overload protection

EOS P211-4 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. The EOS P211-4 are protected against reversed polarity.

Wiring
Cable: AWG24; length 200 mm

Colour	red (white-red)	black (white-black)
Function	+	–

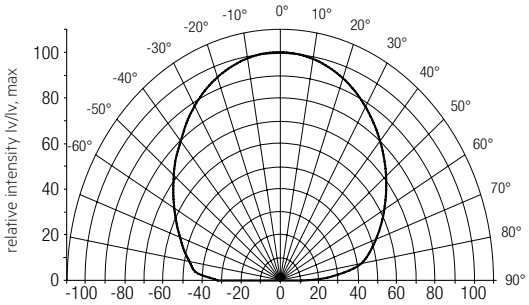
Wiring example < 60 V



Optical characteristics EOS P211-4

The optical design of the EOS lens system ensures an optimum of homogenity for the light distribution.

Light distribution Iv/Ivmax.



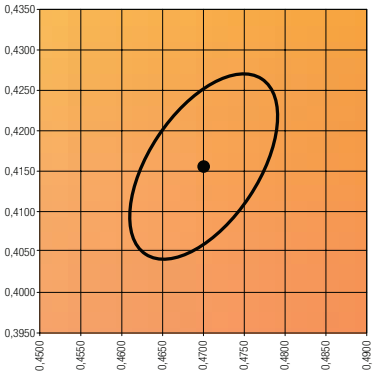
Colour	**Ivmax. (cd) 350 mA**	**Ivmax. (cd) 700 mA**
Warm white (WW)	19	31
Neutral white (NW)	22	35
Daylight white (DL)	25	44
Red (R)	11	20
Green (G)	13	22
Blue (B)	3	5
Gold (GOLD)	14	22
Packed meat (PM)	14	20
Crystal white (CW)	24	42

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

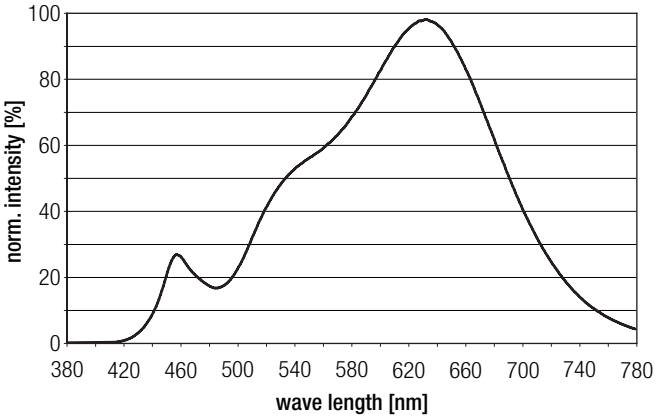
Coordinates and tolerances according to CIE 1964

2,700 K

	x0	y0
Centre	0.4700	0.4160

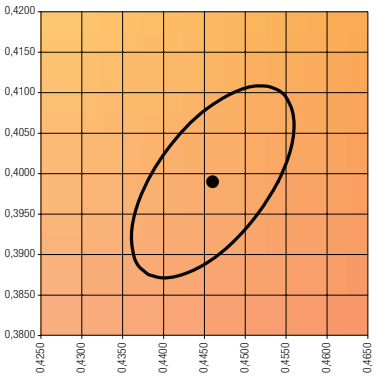


MacAdam ellipse: 5SDCM



3,000 K

	x0	y0
Centre	0.4460	0.3990



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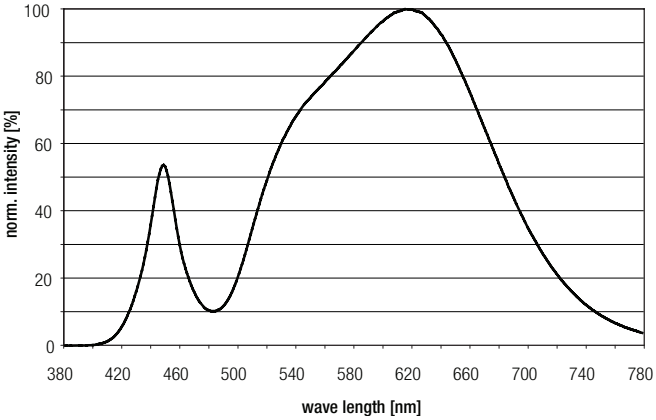
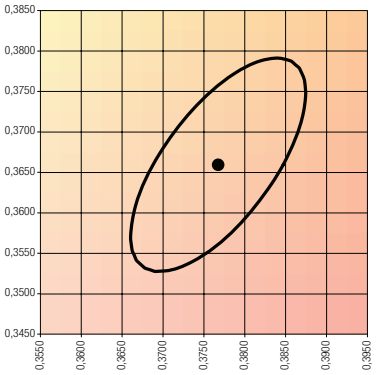


4,200 K

	x0	y0
Centre	0.3770	0.3660



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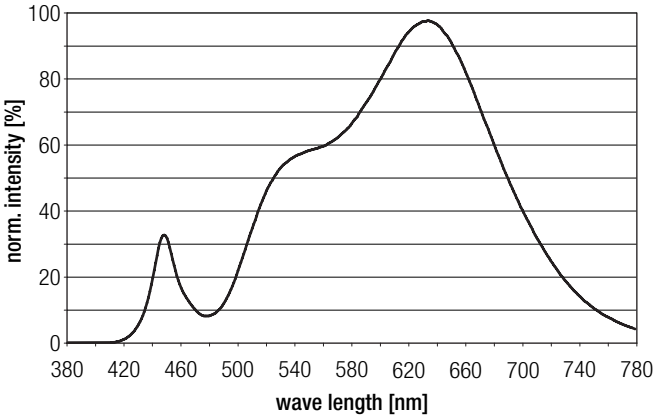
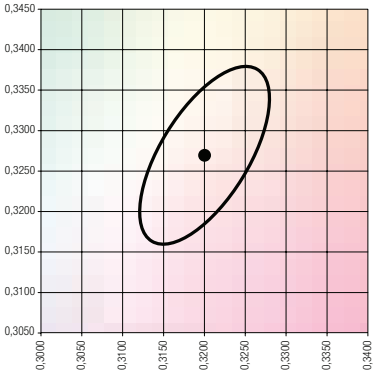


6,500 K

	x0	y0
Centre	0.3200	0.3270



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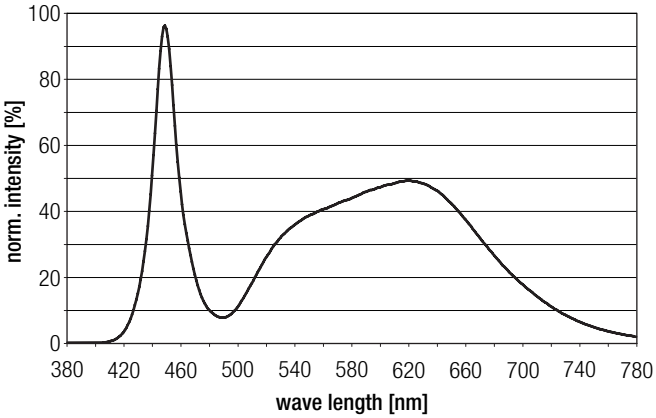
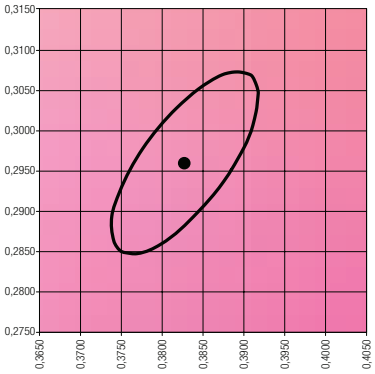


PM

	x0	y0
Centre	0.3827	0.2960



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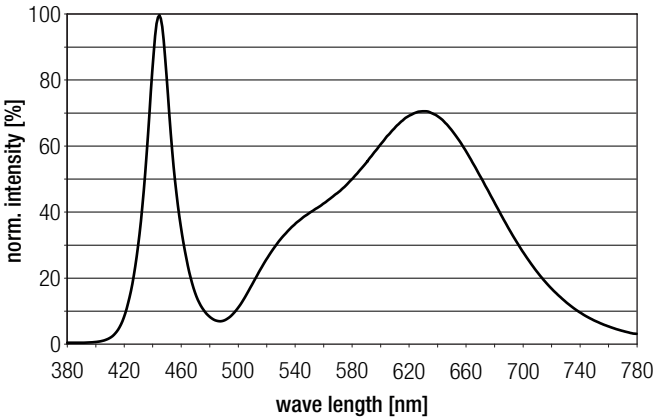
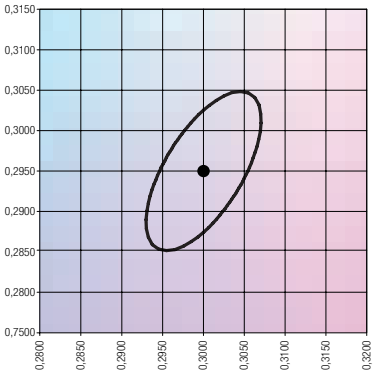


CW

	x0	y0
Centre	0.3000	0.2950



MacAdam ellipse: 5SDCM