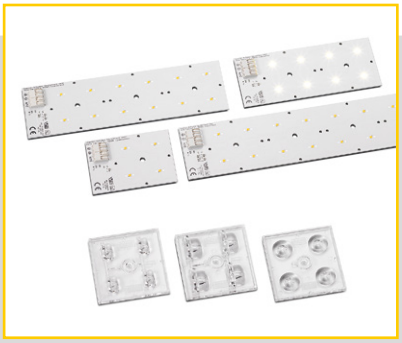
LED LINEAR ALLROUND – CSP

BUILT-IN MODULES



LED LINEAR ALLROUND – CSP

WU-M-614/xx

These modules were designed for built-in into luminaire casings. They enable a modular luminaire design.

The modules are available in four shapes (4, 8, 12 or 16 LEDs) and in up to 3 white colour tones.

Typical Applications
(depending on the choice of optics)

- Integration in luminaires
- Street lighting, urban street lighting
- Tunnel lighting
- Flood and area lighting
- Indoor lighting
- Industrial lighting for:
  - Production halls
  - Warehouses
- Lighting for sports facilities

LED Linear Allround – CSP

- **HIGHLY EFFICIENT: UP TO 176 LM/W AT T_P = 60 °C, I_F = 350 mA**
- **FLEXIBLE LIGHT DISTRIBUTION BY VARIOUS ATTACHMENT OPTICS**
- **HUGE RANGE OF CCT & CRI VARIANTS**
- **INITIAL COLOUR ACCURACY: 5 SDCM**
- **PROTECTION AGAINST TRANSIENT MAIN PEAKS: 4 KV**
- **ZHAGA-COMPLIANT MOUNTING DIMENSION**

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LED Linear Allround CSP

Technical Notes

- LED built-in module for integration into luminaires
- 4, 8, 12 or 16 high-efficiency High Power LEDs
- Dimensions (excl. optics) LxWxH
  4 LEDs: 71.1x49.5x6 mm
  8 LEDs: 121.9x49.5x6 mm
  12 LEDs: 172.7x49.5x6 mm
  16 LEDs: 223.5x49.5x6 mm
- Push-in terminals for quick and simple wiring (WAGO series 2060)
- Suitable for CSP-optimized 2x2 optics made by VS
- Design for optimum thermal management
- Degree of protection: IP00
- ESD protection class 2
- NTC resistor for external driver feedback of module temperature Type: NCP18xH103J03RB
- Inverse-polarity protection

Electrical Characteristics

at t_p = 60 °C

Type	No. of	Voltage DC (V) 350 mA			500 mA			700 mA			Temperature coefficient	Power consumption (W) 350 mA			500 mA			700 mA		
WU-M	LEDs	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	mV/K	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.
614/4	4	10.4	10.7	11.1	10.5	10.9	11.2	10.7	11.1	11.4	–8.57	3.6	3.8	3.9	5.3	5.4	5.6	7.5	7.7	8
614/8	8	20.8	21.5	22.3	21	21.8	22.6	21.4	22.2	23	–17.14	7.3	7.5	7.8	10.5	10.9	11.3	15	15.5	16.1
614/12	12	31.1	32.2	33.3	31.5	32.6	33.7	32.1	33.2	34.3	–25.72	10.9	11.3	11.6	15.8	16.3	16.9	22.5	23.2	24
614/16	16	41.5	42.9	44.4	42.1	43.5	45	42.8	44.2	45.7	–34.29	14.5	15	15.5	21	21.8	22.5	29.9	31	32

Use of external LED constant current driver required.

Maximum Ratings

Exceeding the maximum ratings can lead to destruction of the module.

Type	Operation current	Operation temperature range at t_c point		Storage temperature range		Max. allowed repetitive peak current
	mA	°C min.	°C max.	°C min.	°C max.	mA
All types	350	–30	+85	–30	+85	800
	500	–30	+85	–30	+85	800
	700	–30	+70	–30	+85	800

Note: Do not exceed the operating current of 700 mA DC.

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LED Linear Allround CSP

Optical Characteristics

at t_p = 60 °C

Type WU-M-	Ref. No.	Colour	Correlated colour temperature K	Luminous flux* (lm) and typ. efficiency (lm/W) 350 mA min. lm	350 mA typ. lm	350 mA typ. lm/W	500 mA min. lm	500 mA typ. lm	500 mA typ. lm/W	700 mA min. lm	700 mA typ. lm	700 mA typ. lm/W	CRI** R_a	Photometric code
LED Linear Allround CSP – 4 LEDs														
614/4-730	**568312**	warm white	3000 -90/+185	595	615	164	800	830	153	1035	1075	139	≥ 70	730/579
614/4-740	**568313**	neutral white	4000 -235/+230	625	650	173	845	880	161	1095	1135	147	≥ 70	740/579
614/4-750	**568314**	cool white	5000 -265/+360	635	660	176	855	890	164	1105	1150	149	≥ 70	750/579
614/4-830	**568315**	warm white	3000 -90/+185	525	555	147	710	750	137	915	965	125	≥ 80	830/579
614/4-840	**568316**	neutral white	4000 -235/+230	540	575	152	730	770	141	945	995	128	≥ 80	840/579
614/4-850	**568317**	cool white	5000 -265/+360	595	620	165	805	835	154	1040	1080	140	≥ 80	850/579
LED Linear Allround CSP – 8 LEDs														
614/8-730	**568318**	warm white	3000 -90/+185	1190	1235	164	1605	1660	153	2075	2150	139	≥ 70	730/579
614/8-740	**568319**	neutral white	4000 -235/+230	1255	1305	173	1690	1755	161	2185	2270	147	≥ 70	740/579
614/8-750	**568320**	cool white	5000 -265/+360	1270	1320	176	1710	1780	164	2210	2300	149	≥ 70	750/579
614/8-830	**568321**	warm white	3000 -90/+185	1055	1110	147	1420	1495	137	1835	1935	125	≥ 80	830/579
614/8-840	**568322**	neutral white	4000 -235/+230	1085	1145	152	1460	1545	141	1890	1995	128	≥ 80	840/579
614/8-850	**568323**	cool white	5000 -265/+360	1195	1245	165	1610	1675	154	2080	2165	140	≥ 80	850/579
LED Linear Allround CSP – 12 LEDs														
614/12-730	**568324**	warm white	3000 -90/+185	1785	1850	164	2405	2495	153	3110	3225	139	≥ 70	730/579
614/12-740	**568325**	neutral white	4000 -235/+230	1880	1955	173	2535	2635	161	3280	3405	147	≥ 70	740/579
614/12-750	**568326**	cool white	5000 -265/+360	1900	1980	176	2565	2670	164	3315	3450	149	≥ 70	750/579
614/12-830	**568327**	warm white	3000 -90/+185	1580	1665	147	2130	2245	137	2750	2900	125	≥ 80	830/579
614/12-840	**568328**	neutral white	4000 -235/+230	1625	1720	152	2190	2315	141	2835	2990	128	≥ 80	840/579
614/12-850	**568329**	cool white	5000 -265/+360	1790	1865	165	2415	2510	154	3120	3245	140	≥ 80	850/579
LED Linear Allround CSP – 16 LEDs														
614/16-730	**568330**	warm white	3000 -90/+185	2380	2465	164	3210	3325	153	4145	4295	139	≥ 70	730/579
614/16-740	**568331**	neutral white	4000 -235/+230	2510	2605	173	3380	3510	161	4370	4540	147	≥ 70	740/579
614/16-750	**568332**	cool white	5000 -265/+360	2535	2640	176	3420	3560	164	4420	4600	149	≥ 70	750/579
614/16-830	**568333**	warm white	3000 -90/+185	2105	2220	147	2840	2995	137	3665	3870	125	≥ 80	830/579
614/16-840	**568334**	neutral white	4000 -235/+230	2170	2290	152	2925	3085	141	3775	3990	128	≥ 80	840/579
614/16-850	**568335**	cool white	5000 -265/+360	2385	2485	165	3215	3350	154	4160	4330	140	≥ 80	850/579

On account of the complex manufacturing process of the modules, the above values only represent statistical variables.
The values do not necessarily correspond exactly to the actual parameters of every single product, which can vary from the typical specification.
* Measurement tolerance of luminous flux: ±7% | ** Measurement tolerance CRI: ±2

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LED Linear Allround CSP

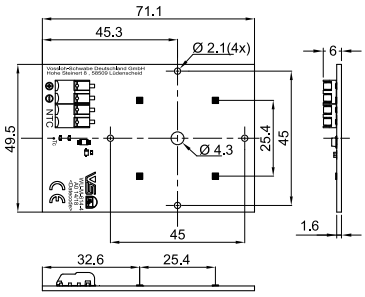
Operating Life

Lumen degradation	Operating life in hours at measured temperature at t_p point								
	I_F 350 mA			I_F 500 mA			I_F 700 mA		
	40 °C	60 °C	85 °C	40 °C	60 °C	85 °C	40 °C	60 °C	70 °C
L80/B10	> 60,000	> 60,000	54,000	> 60,000	> 60,000	47,000	> 60,000	51,000	46,000
L70/B10	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000

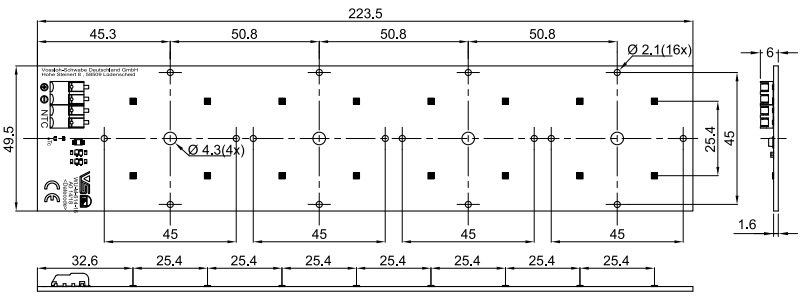
These values do not refer to the colour temperature. | Lxx/Byy (lumen maintenance at xx%, failure rate yy%)

Mechanical Dimensions

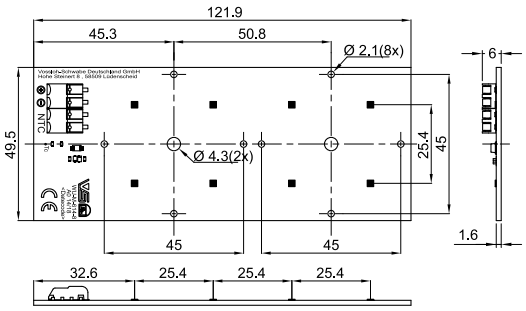
WU-M-614-4



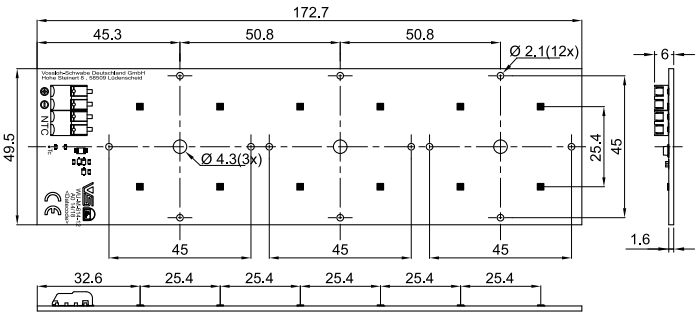
WU-M-614-16



WU-M-614-8



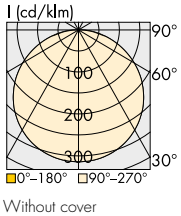
WU-M-614-12



All holes Ø 2.1 mm are fixing holes for optics. | All holes Ø 4.3 mm are fixing holes for PCB.

Typical Light Distribution Curve

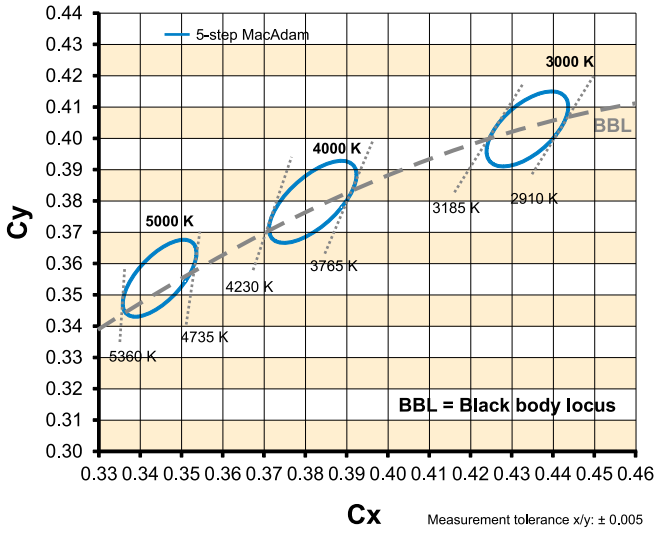
Data are available in .ldt format for download under www.vossloh-schwabe.com.



Without cover

Light distribution curve for LED Linear Allround CSP modules **with optics** see page 5.

Bins



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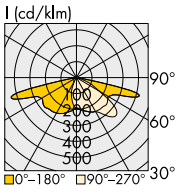
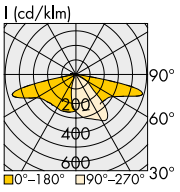
2x2 Streetlight Optics for LED Linear Allround CSP

Technical Notes for Optics

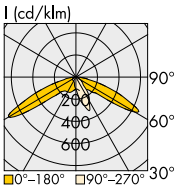
- Highly efficient up to 95%
- Material: PMMA
- Dimensions (LxWxH) for
  M-Class: 50x50x8 mm
  P-Class: 50x50x6.3 mm
  Area: 50x50x4.2 mm
- Max. allowed temperature: 80 °C
- Fixing hole for M3/M4 screw
- Max. torque on screws
  M3: 0.5 Nm; M4: 1.4 Nm
- Packaging unit: 400 pcs.



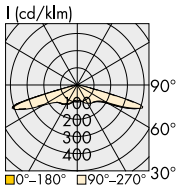
M-Class – M3S



M-Class – M3M



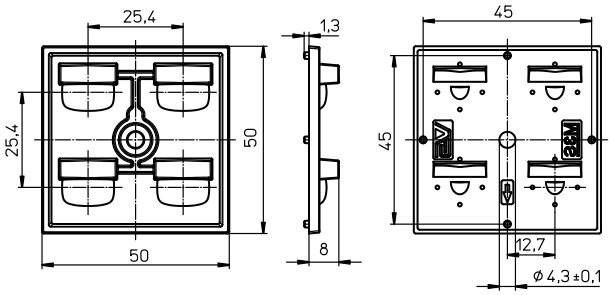
P-Class – P2M



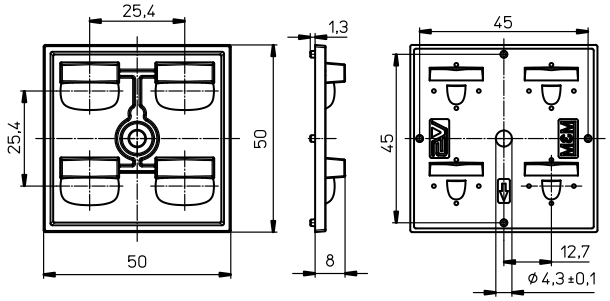
Area – A5

Light distribution	Optics type	**Ref. No.**	Efficiency %
M-Class	M3S	**568555**	94
M-Class	M3M	**568309**	94
P-Class	P2M	**568310**	93
Area	A5	**568380**	95

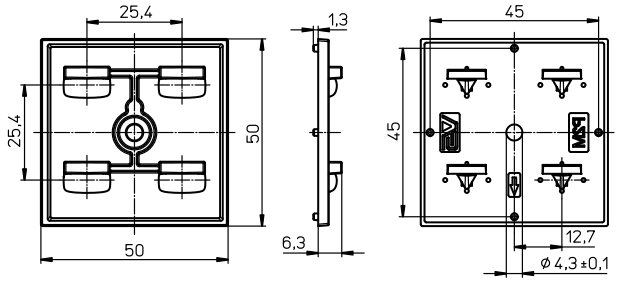
Mechanical Dimensions



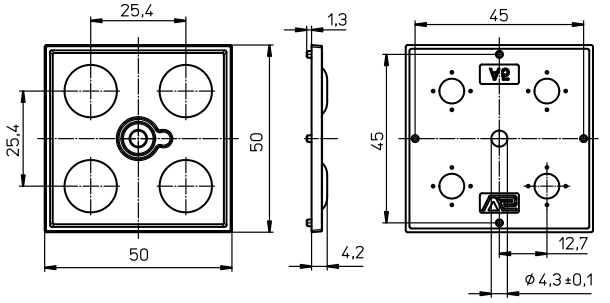
M-Class – M3S



M-Class – M3M



P-Class – P2M



Area – A5

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LED Linear Allround CSP

Assembly and Safety Information

Installation must be carried out under observation of the relevant regulations and standards. The LED modules are designed for operation within a casing or luminaire. Safety regulations acc. to EN 60598 has to be observed. Installation must be carried out in a voltage-free state (i.e.disconnection from the mains).

- LED built-in modules must not be subjected to any undue mechanical stress, e. g.:
  - handle LED modules carefully
  - avoid shear and compressive forces onto
  - the optics during handling and installation
  - avoid vibrations of more than 2 kHz, 40 G
- The module must be fixed onto a thermally conductive surface with 1 to 4 M3 screws (respectively M4). Max. allowed torque for M3: 0.5 Nm and M4: 1.2 Nm
  - In case of using VS 2x2-array lenses the max. allowd torque to be applied to the screws M3 is 0.5 Nm and for M4 it is 1.4 Nm.
  - In this regard please observe also the usage of proper thermal interface material. Make sure not to go below the min. contact pressure needed. The installation instructions of the selected interface materials have to be followed.
- When installing/screwing the module into a luminaire, please ensure that the cables are not squeezed between luminaire/heat sink and LED module. Also ensure that the mounting surface is clean and flat. For a reliable thermal attachment, we recommend the mounting surface flatness of ≤ 0.2 mm.
- Safe operation only possible by the use of external constant current sources ($I_{max.}$ see table "Electrical Characteristics").
- Operation is dependent on constant current drivers that should provide the following protective measures:
  - short-circuit protection
  - overload protection
  - overheating protection
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- The maximum output of the power supply must be observed.
- For optimal load of used constant current driver the modules can only be connected in series. The quantity of LED modules is limited by the sum of forward voltage and the capacity of used constant current driver. Safety regulations acc. to EN 60598 has to be observed if the sum of forward voltage exceed the permitted touchable value.
- The clearance and creepage distances of LED modules WU-M-614/xx-X are designed for working voltages up to 500 V DC (basic insulation) acc. to EN 62031/EN 60598.
- If a system consists of multiple LED Linear Allround modules connected to a single driver, only one module will be monitored by the NTC. That means that one module is in "master" mode operated and the rest are operated in "slave" mode.
- Please ensure standard ESD (electrostatic discharge) protection measures are employed when handling and installing LED modules. Electrostatic discharge can damage LEDs.
- To ensure problem-free operation, the specified maximum temperature at the t_c and t_p point (see "Operating Life") must be observed (measured in accordance with EN 60598-1). To satisfy this point, it is necessary to put measures in place to ensure any heat is dissipated from the LED module to the environment.
- To ensure good thermal contact, it is recommended to use proper thermal interface material (e.g. thermal paste, phase change or thermal pads).
- When mounting LED Linear Allround modules directly on the luminaire housing, we reccommend to use aluminum of at least 3 mm thickness. Thicker material will improve the heatflow through the luminaire, resulting in a lower t_p temperature on the module itself.
- Use anodised or painted surfaces rather than blank surfaces to enhance the heat-transfer via thermal radiation.
- Try to limit as far as possible the number of thermal interfaces in the primary heat path towards ambient air. For the primary heat path use solely materials with high thermal conductivity (e.g. aluminum).
- The LED Linear Allround modules are built-in modules and have no IP-classification (IP00). They are not designed for operation in "open air". In the event of outdoor applications or applications in damp locations, care must be taken to protect LED assembly modules against humidity, splashes and jets of water. Any corrosion damage resulting from humidity or contact with condensation will not be recognised as a defect or manufacturing fault. LED assembly modules are not specially protected against foreign bodies or dust. Depending on the type of application, further protection must be ensured to prevent dust and foreign bodies from entering.
- A parallel connection of the modules is not allowed.
- Operating LED modules in the presence of certain chemical substances or in chemically enriched (aggressive) environments can impair module functionality or even cause total module failure. Detailed information can be found in our "Chemical Incompatibility" PDF on our website www.vossloh-schwabe.com

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LED Linear Allround CSP

Assembly and Safety Information

- The photobiological safety of the LED modules must be classified into risk groups in accordance with EN 62471: 2008.
  - general lighting
    exempt group: WU-M-614/xx-X
  - other applications
    risk group 2: WU-M-614/xx-X

Assessment in acc. with IEC/TR 62778:
Given a clearance of more than d_{min}, within which the lighting intensity limit of E_{thr} = 962 lx is attained, the classification goes down to Risk Group 1.

Applied Standards

EN 62031
LED modules for general lighting – Safety specifications

EN 62471
Photobiological safety of lamps and lamp systems

Product Guarantee

- 5 years
- The conditions for the Product Guarantee of the Vossloh-Schwabe Group shall apply as published on our homepage (www.vossloh-schwabe.com).
  We will be happy to send you these conditions upon request.

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