



L0-145044-xxx-C1800-K256



### INTRODUCTION

Street LED module is an advanced light source designed for the best energy efficient and eco-friendly outdoor lighting, with additional weather protection. It is based on medium power LEDs produced by the leader of the LED technology OSRAM. Using newest technology we provide the best solution for lighting. With a very high value of CRI and simple installation. This solution is the best for street lamps, parking lamps etc.

<b>LED Type</b>	OSRAM OSRON – CSSRM2
<b>LED Quantity</b>	4 x 3 pcs
<b>Dimension</b>	145x43,5 mm
<b>Power Supply Type</b>	Constant Current (CC)
<b>Input Current</b>	max. 1800 mA / channel
<b>Material Thickness</b>	1,5 mm
<b>Cable Connection</b>	Solder Pads
<b>Max Ambient Temperature</b>	45°C
<b>CRI</b>	>70

### FEATURES

LEDs have significant advantages compared to other types of lighting and are easy to use. LEDs are versatile and virtually maintenance free.

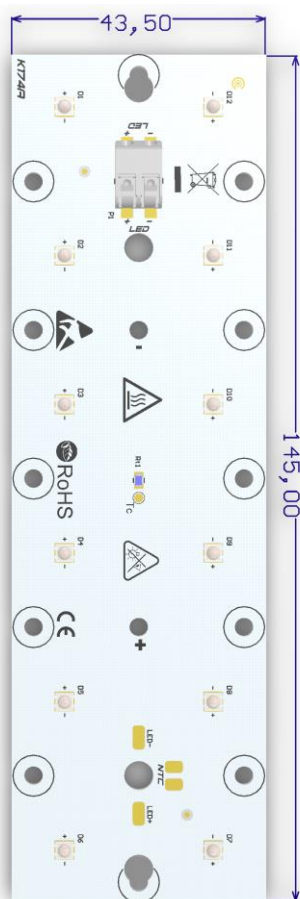
- Efficiency of the module up to 168 lm/W @ 350 mA
- High colour rendering index CRI >70
- Colour temperatures 2700K, 3000K, 4000K, 5000K
- Simple installation

### COMPATIBLE HEAT-SINK

- COOLBLOCK LX-01 2X6 MechaTronix
- COOLBLOCK LX-02 2X6 MechaTronix

### COMPATIBLE OPTICS

- CS12862\_STRADA-IP-2X6-DWC
- CS14055\_STRADA-IP-2X6-T2
- CS14130\_HB-IP-2X6-W
- CS14143\_STRADA-IP-2X6-T3
- CS14144\_STRADA-IP-2X6-ME
- CS14145\_STRADA-IP-2X6-DWC-90
- CS14263\_HB-IP-2X6-WWW
- CS14597\_HB-IP-2X6-O
- CS14891\_HB-IP-2X6-M
- CS14895\_HB-IP-2X6-RS
- CS15020\_STRADA-IP-2X6-VSM
- CS15158\_STRADA-IP-2X6-T4-B
- CS15362\_STRADA-IP-2X6-T3-B
- CS15363\_STRADA-IP-2X6-T2-B
- CS15418\_STRADA-IP-2X6-SCL



## STREET LED MODULES

Street LED modules are specially designed LED light source for street lamp, parking lamps etc. They consist of a suitable optic and LED module, generally in the shape of rectangle or square. Shape of LED light source allow to place them close to each other's, so LED modules may be better adapted to the existing or projected lamp. Street LED allow to use different types of optics with same LED light source. This enable selecting proper angle of illumination. Additionally, in case of some Street LED modules and optics it is possible to change polarization of illumination.

## CALCULATED PARAMETERS AT $T_J = 25^{\circ}\text{C}$ AND $T_J = 65^{\circ}\text{C}$

	Input Current [mA]	Forward Voltage [V]	Power [W]	CCT [K]	Min. CRI	Luminous Flux* [lm]	Module Efficacy* [lm/W]	Luminous Flux** [lm]	Module Efficacy** [lm/W]	Article Number
Singiel colour - K256	4 x 350	8,7	12,1	2700	80	1622	134	1546	130	L0-145044-827-C1800-K256
					90	1440	119	1364	115	L0-145044-927-C1800-K256
				3000	70	1934	157	1868	151	L0-145044-730-C1800-K256
					80	1691	139	1612	136	L0-145044-830-C1800-K256
					90	1511	124	1431	120	L0-145044-930-C1800-K256
				4000	70	2001	162	1934	157	L0-145044-740-C1800-K256
					80	1760	145	1678	141	L0-145044-840-C1800-K256
					90	1651	136	1564	132	L0-145044-940-C1800-K256
				5000	70	2069	168	1999	162	L0-145044-750-C1800-K256
					80	1829	151	1744	147	L0-145044-850-C1800-K256
	4 x 700	9,1	25,4	2700	80	3005	118	2861	115	L0-145044-827-C1800-K256
					90	2674	105	2528	101	L0-145044-927-C1800-K256
				3000	70	3601	142	3480	137	L0-145044-730-C1800-K256
					80	3133	123	2983	120	L0-145044-830-C1800-K256
					90	2805	110	2652	106	L0-145044-930-C1800-K256
				4000	70	3728	147	3602	142	L0-145044-740-C1800-K256
					80	3261	128	3104	125	L0-145044-840-C1800-K256
					90	3065	121	2898	116	L0-145044-940-C1800-K256
				5000	70	3854	152	3724	147	L0-145044-750-C1800-K256
					80	3389	133	3226	129	L0-145044-850-C1800-K256
	4 x 1000	9,4	37,5	2700	80	4086	109	3884	106	L0-145044-827-C1800-K256
					90	3637	97	3433	93	L0-145044-927-C1800-K256
				3000	70	5123	131	4950	127	L0-145044-730-C1800-K256
					80	4260	114	4049	110	L0-145044-830-C1800-K256
					90	3814	102	3600	98	L0-145044-930-C1800-K256
				4000	70	5303	136	5124	131	L0-145044-740-C1800-K256
					80	4434	118	4214	115	L0-145044-840-C1800-K256
					90	4169	111	3935	107	L0-145044-940-C1800-K256
				5000	70	5483	140	5298	136	L0-145044-750-C1800-K256
					80	4608	123	4380	119	L0-145044-850-C1800-K256
	4 x 1400	9,7	54,3	2700	80	5377	99	5099	96	L0-145044-827-C1800-K256
					90	4785	88	4506	85	L0-145044-927-C1800-K256
				3000	70	6500	122	6280	118	L0-145044-730-C1800-K256
					80	5606	103	5316	100	L0-145044-830-C1800-K256
					90	5018	92	4725	89	L0-145044-930-C1800-K256
				4000	70	6728	127	6500	122	L0-145044-740-C1800-K256
					80	5835	107	5533	104	L0-145044-840-C1800-K256
					90	5485	101	5165	97	L0-145044-940-C1800-K256
				5000	70	6956	131	6721	126	L0-145044-750-C1800-K256
					80	6063	112	5750	108	L0-145044-850-C1800-K256

\* - Parameters were calculated for temperatures  $T_J = 25^{\circ}\text{C}$

\*\* - Parameters were calculated for temperatures  $T_J = 65^{\circ}\text{C}$

Value of these parameters were calculated for default bin and with tolerances of 15%.

	Input Current [mA]	Forward Voltage [V]	Power [W]	CCT [K]	Min. CRI	Luminous Flux* [lm]	Module Efficacy* [lm/W]	Luminous Flux** [lm]	Module Efficacy** [lm/W]	Article Number
Dynamic White - K256	2 x 350	8,7	6,1	3000-5000	70	1001	163	967	157	L0-145044-7DW-C1800-K256
				2700-5000	80	863	142	823	138	L0-145044-8DW-C1800-K256
				2700-4000	90	773	127	732	123	L0-145044-9DW-C1800-K256
	2 x 700	9,1	12,7	3000-5000	70	1864	147	1801	142	L0-145044-7DW-C1800-K256
				2700-5000	80	1599	126	1522	122	L0-145044-8DW-C1800-K256
				2700-4000	90	1435	113	1357	109	L0-145044-9DW-C1800-K256
	2 x 1000	9,4	18,8	3000-5000	70	2652	136	2562	132	L0-145044-7DW-C1800-K256
				2700-5000	80	2174	116	2066	112	L0-145044-8DW-C1800-K256
				2700-4000	90	1951	104	1842	100	L0-145044-9DW-C1800-K256
	2 x 1400	9,7	27,2	3000-5000	70	3364	127	3250	122	L0-145044-7DW-C1800-K256
				2700-5000	80	2860	105	2712	102	L0-145044-8DW-C1800-K256
				2700-4000	90	2567	95	2418	91	L0-145044-9DW-C1800-K256

\* - Parameters were calculated for temperatures  $T_J = 25^\circ\text{C}$

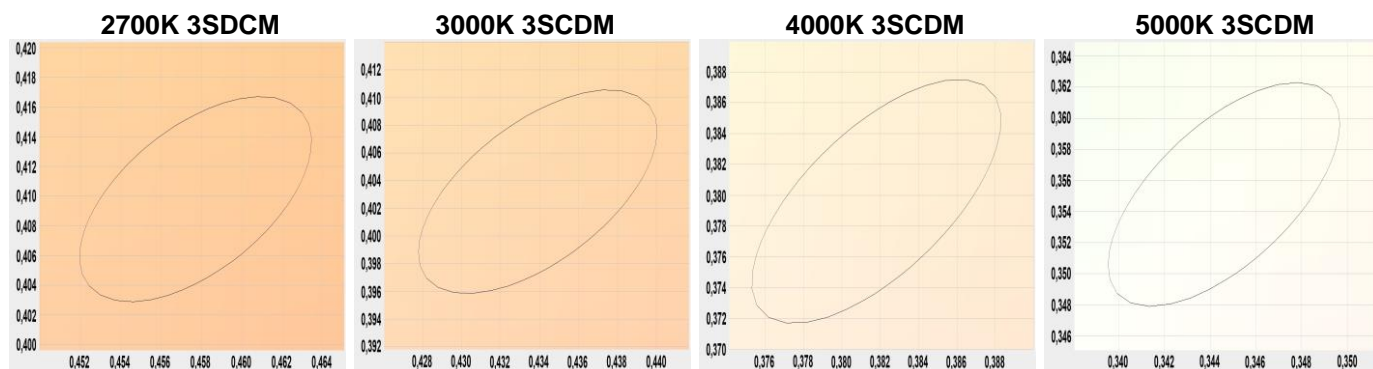
\*\* - Parameters were calculated for temperatures  $T_J = 65^\circ\text{C}$

Value of these parameters were calculated for default bin and with tolerances of 15%.

Parameters shown in table above are default and for temperatures  $T_J = 25^\circ\text{C}$  and  $T_J = 65^\circ\text{C}$ . Some of these parameters are temperature dependent and can be different during long time of operation. So it is impossible to order modules with the same parameters after some time. LED technology is developed fast and producers are creating new LEDs with better features very quick. If you need LED modules with different value of some parameters, we provide other LEDs with different colour temperature and features. It is possible to make modification of LED modules or create a new one. In such cases and for more information, please contact us before ordering. Please have all of this in mind when ordering LED modules.

## MACADAM ELLIPSE

Producing LEDs with the same colour temperature is almost impossible. LEDs with similar colours are divided into bins. MacAdam Ellipses are used to describe differences in colour of LEDs with the same bin. When most people can't see very small differences in colours, these colours are in first step level of MacAdam Ellipse (1SDCM). If the differences are getting bigger, then number of step is increasing. Second zone of MacAdam ellipse (2SDCM) is twice bigger than first one and so on. Differences in colour for 3000K LEDs can be up to  $\pm 30\text{K}$  in 1SDCM. If bin is in 4SDCM, then colour differences should be less than  $\pm 100\text{K}$ . LEDs with smaller number of SDCM are better. Most common LEDs are in 4<sup>th</sup> to 7<sup>th</sup> step level, in other words human eyes certainly can see colour differences in LEDs that are ostensibly the same colour. In most of our projects have been used LEDs in 3<sup>rd</sup> step level, so differences in colour aren't as big as fourth step level of MacAdam Ellipse.



**SAFETY**

Most of LEDs generate high intensity light even when dimmed. If LED light has high intensity, it is classified as laser. These LEDs must have appropriate marking. Combination of LEDs or even weak LEDs with optics can be very dangerous, because optics can focus beam and looking into LEDs beam is unhealthy and may cause irreversible injury to eye's retina. Never look into the beam without protection glasses with appropriate filter.

Additionally LED light can change intensity almost immediately. If people are photosensitive, LED light may be a trigger to epileptic seizures and alter the perception, especially when light changes very fast.

**PROTECTION MEASURES AGAINST DAMAGE**

LED modules are delicate, even small mechanical stress may damage modules. Especially sensitive are LEDs. Such stresses should be avoided. If it is impossible, it should be reduced to minimum. Mechanical stresses such as pressure, bending, breaking, drilling, etc. may cause irreversible damage. Damaged LED modules aren't suitable for use.

Serious threat to LEDs is ESD. People generate very high electrostatic voltage. Such voltage decreases lifetime of LEDs and in worst case may destroy electronic components. Best way to avoid damage is use of electrostatic protection. Do not touch electronic components.

Additionally LED modules can be damaged by some chemical substances. Depends of elements the damage may be different. It is important not to use chemical substances like acids, organic acids, sulphur, alkalis, organic solvents, mineral oils, vegetable oils and synthetic oils, etc. We are not responsible for any loss, or damage resulting from improper use of modules! Guarantee become void in such cases.

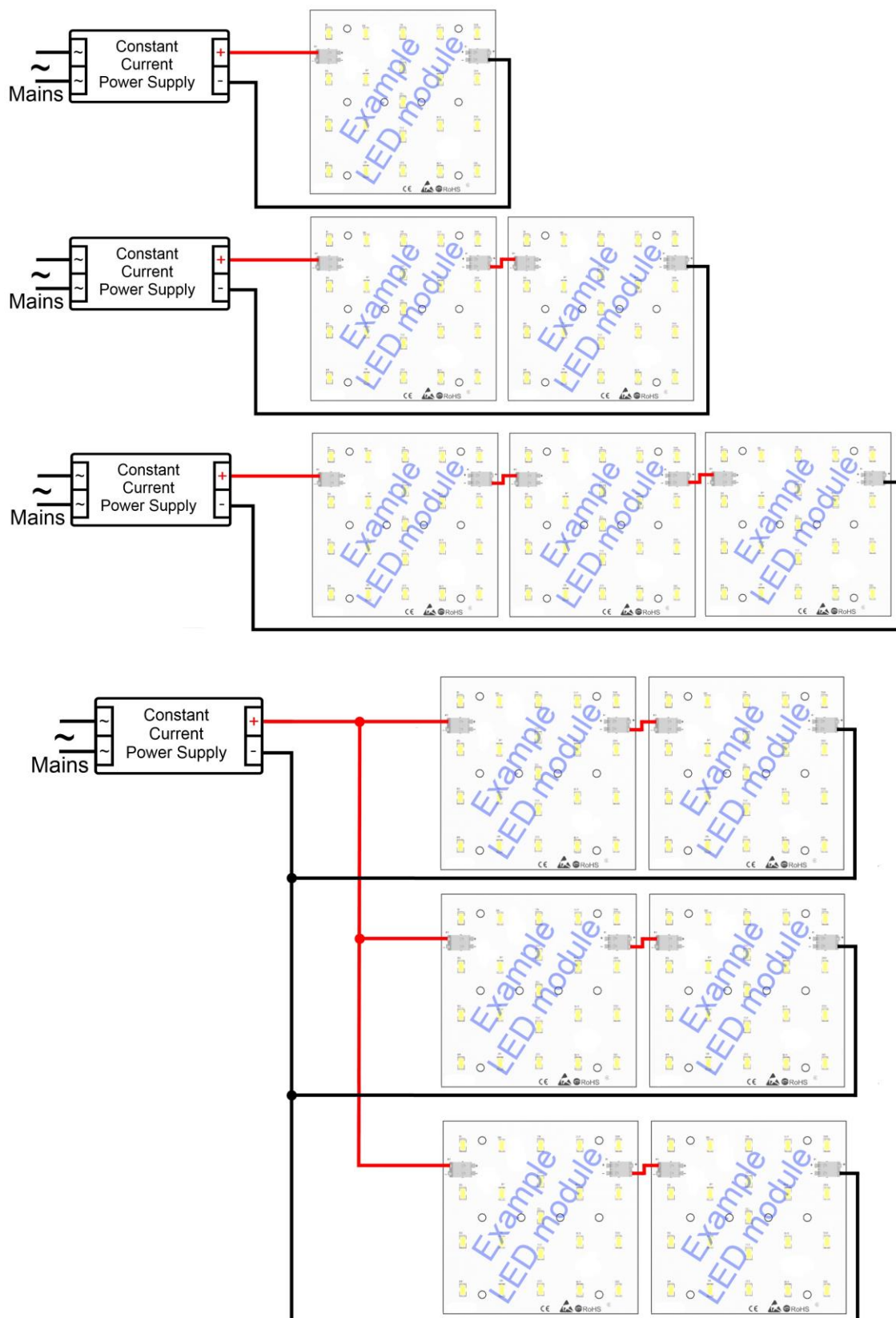
Do not operate LED modules, when they aren't working properly. If modules are working incorrectly, turn off power supply. Damaged LED modules may cause electric shock or short circuit.

**CONNECTIONS**

Connecting few Steer LED modules allows to adapt lamp in most effective way. Push terminals provide quick installation of the entire lamp. The LED modules must be operated with power supply that is suitable for LEDs. When connecting a few LED modules use of appropriate power supply is important. Power supply should have sufficient maximum power to maintain all LED modules. Power supply must be connected properly. Wrong polarization can destroy modules in very short time. We are not responsible for any loss, or damage resulting from improper use of modules! Guarantee become void in such cases.



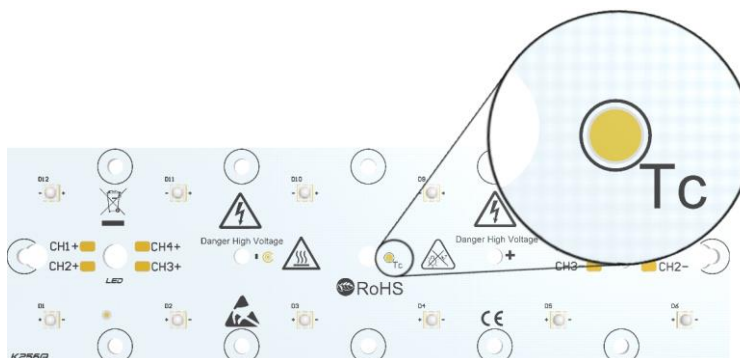
### WIRING DIAGRAM FOR STREET LED CC MODULES WITH SERIAL WIRING AND SERIAL-PARALLEL WIRING



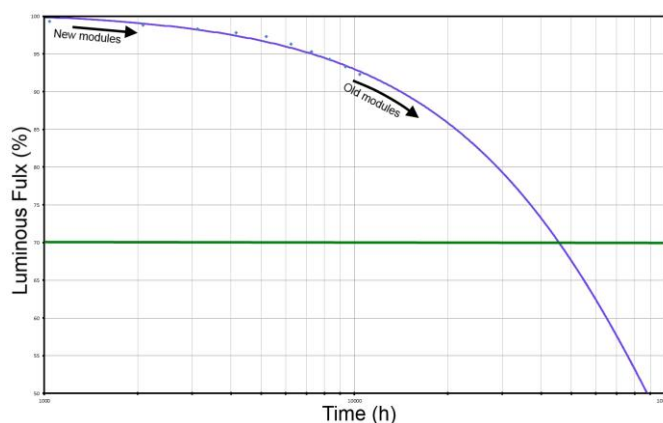
Street LED modules may be connected with serial or serial - parallel wiring. Above connections are example and may be different from the actual.

**COOLING**

The modules are usually self-cooling but if temperature on  $T_c$  point exceeds  $70^{\circ}\text{C}$ , then a heat-sink is required. Temperature test point ( $T_c$ ) for measurement should be localized in the middle of the board near LED's thermal pad. The temperature at the  $T_c$  point can be measured with thermocouple or simple temperature probe. Example of  $T_c$  point is shown on the photo below.



The lifetime of the module depends to operating temperature and used LEDs. If temperature at  $T_c$  will be lower than  $65^{\circ}\text{C}$ , the value of luminous flux shouldn't be less than 80% of its nominal value after 50.000h. If temperature is too high then lifetime can be significantly decreased or damage LEDs. Another disadvantage of high temperature is reduction of relative luminous intensity. LED modules produces heat. They must be provided with good air ventilation. Modules without air ventilation can overheat. Overheat can damage or destroy some elements or entire LED modules. We are not responsible for any loss, or damage resulting from improper use of modules! Guarantee become void in such cases.



Most common problem using new modules in old installation is differences in brightness of modules. This is result of luminous flux degradation over time of use. Degradation is normal effect and applies to all LEDs. This effect is different for each LEDs and can be only predicted by testing and estimation. It is complicate issue that mostly depends on temperature and current. Good solution to this problem is reduce of current in new modules, but degradation will be different for each modules. Above characteristic is examples for LEDs in temperature above  $100^{\circ}\text{C}$  and different from the actual.

**CONTACT**

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Subject to technical changes and errors.