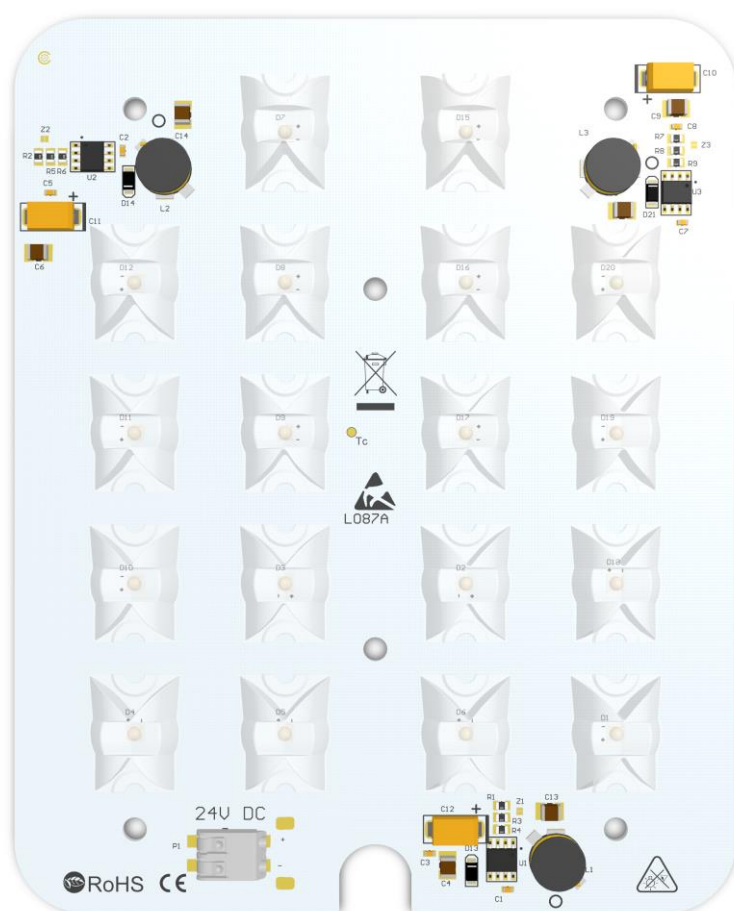




L0-149120-xxx-Vxxxx-L087



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. Push terminal provide quick installation of the entire lighting system. This solution is the best for street lamps, parking lamps etc.

LED Type	OSRAM OSLOM - LCW CQAR
LED Quantity	18 pcs
Dimension	149x120 mm
Power Supply Type	Constant Voltage (CV)
Power Supply Voltage	24 V DC
Material Thickness	1,5 mm
Cable Connection	ADELS 351102
Max Ambient Temperature	45°C
CRI	>70

FEATURES

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

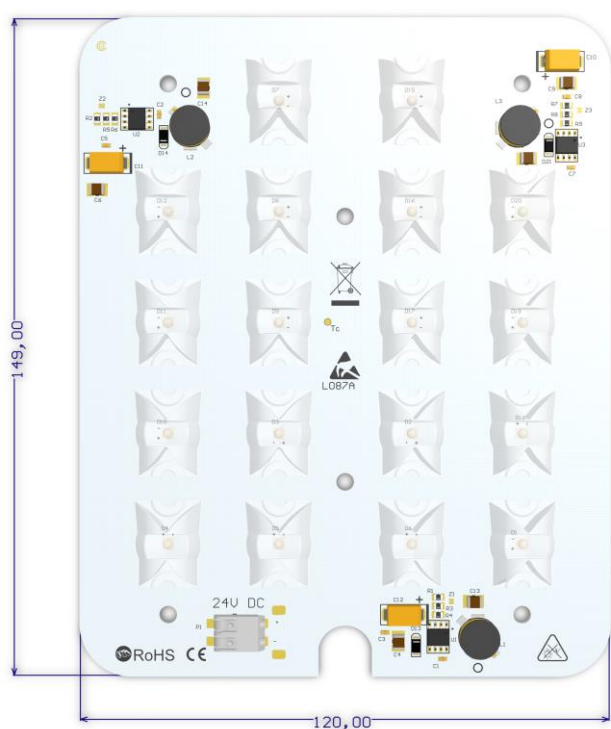
- Efficiency of the module up to 98 lm/W
- Rigid board LED module
- Compatible with Ledil Optics Type STRADA / HIGH BAY IP 2x6
- High colour rendering index CRI >70
- Small colour tolerance
- Small luminous flux tolerances
- Colour temperatures 5000K
- Optional push terminal for quick and simple wiring
- Simple installation
- Long lifetime

APPLICATIONS

- Street lamps
- Parking lamps

VARIANTS

- MCPCB board with LEDs
- MCPCB board with LEDs and optic



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 $T_J = 65^{\circ}\text{C}$

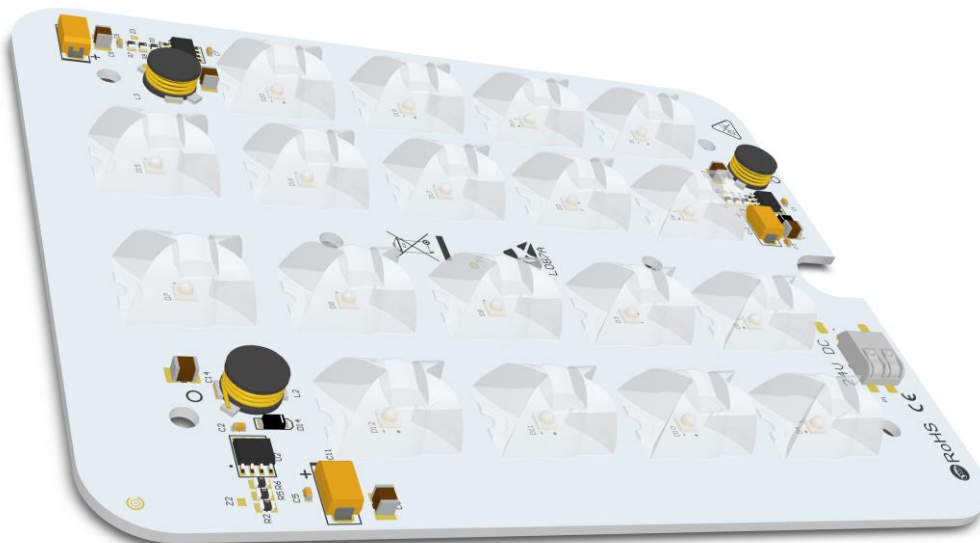
Power [W]	CCT [K]	Typ. CRI	Luminous Flux* [lm]	Module Efficacy* [lm/W]	Luminous Flux** [lm]	Module Efficacy** [lm/W]	Article Number
25,2	2700	82	1997	79	1866	74	L0-149120-827-V0350-L087
		92	1817	72	1698	67	L0-149120-927-V0350-L087
	3000	82	2145	85	2005	80	L0-149120-830-V0350-L087
		92	1952	77	1824	72	L0-149120-930-V0350-L087
	4000	82	2293	91	2143	85	L0-149120-840-V0350-L087
		92	2087	83	1950	77	L0-149120-940-V0350-L087
	5000	82	2466	98	2305	91	L0-149120-850-V0350-L087
36	2700	82	2719	76	2541	71	L0-149120-827-V0500-L087
		92	2474	69	2313	64	L0-149120-927-V0500-L087
	3000	82	2921	81	2730	76	L0-149120-830-V0500-L087
		92	2658	74	2484	69	L0-149120-930-V0500-L087
	4000	82	3123	87	2919	81	L0-149120-840-V0500-L087
		92	2842	79	2656	74	L0-149120-940-V0500-L087
	5000	82	3359	93	3139	87	L0-149120-850-V0500-L087
50,4	2700	82	3629	72	3392	67	L0-149120-827-V0700-L087
		92	3303	66	3087	61	L0-149120-927-V0700-L087
	3000	82	3899	77	3644	72	L0-149120-830-V0700-L087
		92	3548	70	3316	66	L0-149120-930-V0700-L087
	4000	82	4168	83	3896	77	L0-149120-840-V0700-L087
		92	3793	75	3545	70	L0-149120-940-V0700-L087
	5000	82	4483	89	4189	83	L0-149120-850-V0700-L087

* - 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.



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.

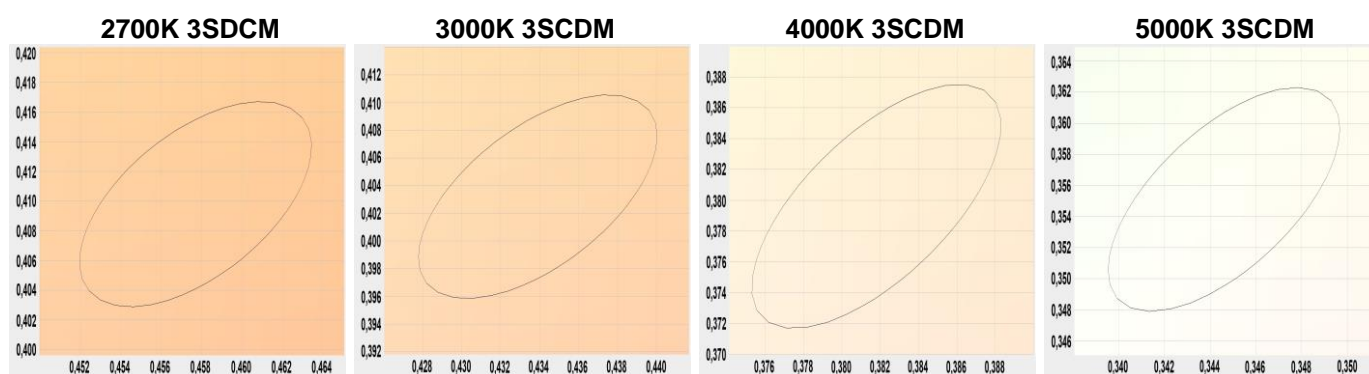
Serious threat to LEDs is ESD. People generate very high electrostatic voltage. Such voltage decreases lifetime of LEDs and in worst case may destroy electronic components. Best way to avoid damage is use of electrostatic protection. Do not touch electronic components.

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.

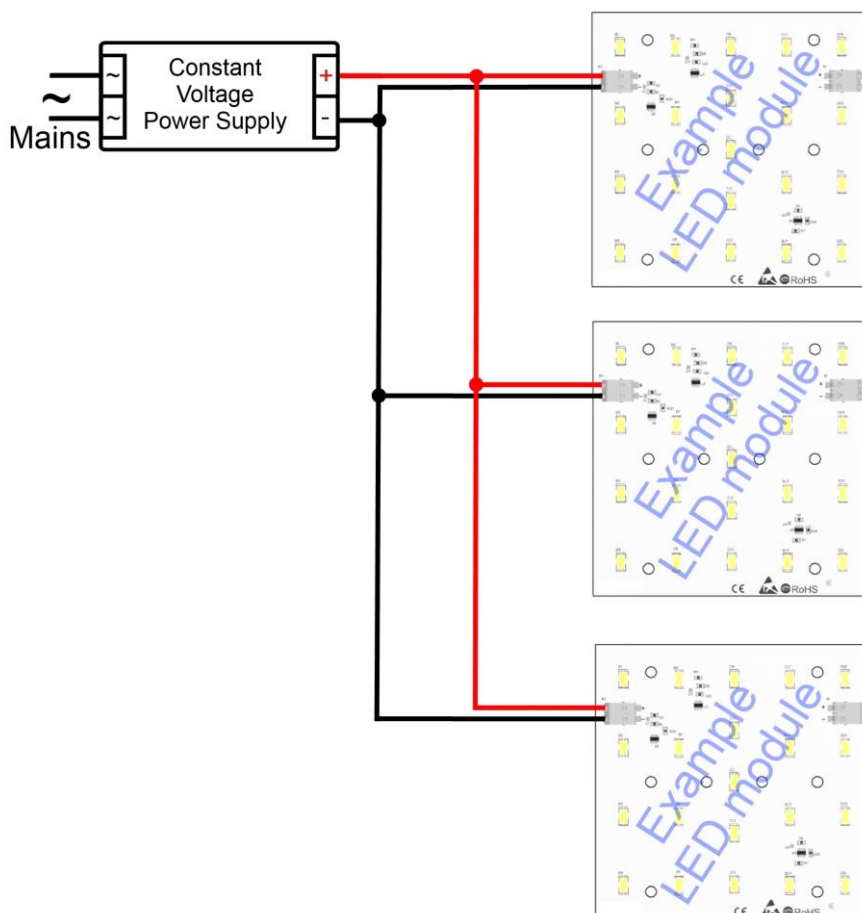
MACADAM ELLIPSE

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 4th to 7th 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 3rd step level, so differences in colour aren't as big as fourth step level of MacAdam Ellipse.



CONNECTIONS

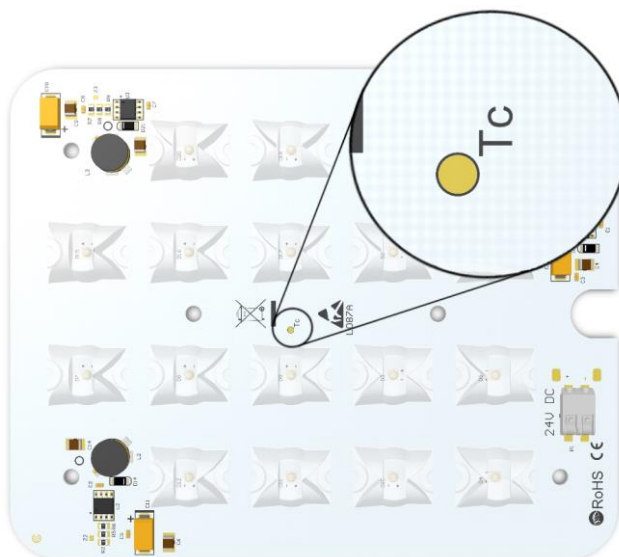
Connecting few Steer LED modules allows to adapt lamp in most effective way. Push terminals provide quick installation of the entire lamp. The LED modules must be operated with power supply that is suitable for LEDs. When connecting a few LED modules use of appropriate power supply is important. Power 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 LED CV MODULES WITH PARALLEL WIRING

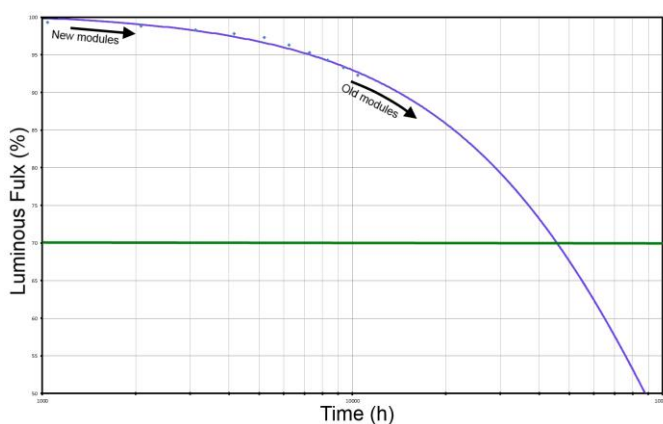
Advantages of this solution is very low voltage of power supply and uniform distribution of light. It meets requirements of SELV. Higher current supply is required to proper operation. Higher current increases temperature and decreases lifetime. Above connection is example and may be different from the actual. Connecting LED CV modules with serial wiring is unacceptable. Such connection may damage or destroy modules. We are not responsible for any loss, or damage resulting from improper use of modules! Guarantee become void in such cases. 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°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°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°C and different from the actual.

STANDARDS AND DIRECTIVES

In the process of designing and manufacturing the following standards and directives were taken into account:

- 2014/35/EU– Low-voltage Directive: on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- 2014/30/EU– EMC Directive: on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
- 2011/65/EC – RoHS Directive: restriction of hazardous substances in electrical and electronic equipment
- EN 62031:2010/A1:2013-06 – Safety requirements for LED modules
- EN 60598-1:2015-04 – General requirements and tests for luminaires
- EN 60598-2-2:2012 – Luminaires - Part 2. Special requirements; Main section 2: Recessed luminaires
- EN 62471:2010 – Photo-biological safety of lamps and lamps systems
- EN 61347-1:2015-09 – General and safety requirements
- EN 61347-2-13:2015-04 – Special requirements for DC and AC powered electronic operating equipment for LED modules
- EU Regulation No: 874/2012 – Energy labelling of electrical lamps and luminaires

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Subject to technical changes and errors.