

**Advantages:**

- high efficiency power LED Xlamp MC-E of CREE Lighting
- high quality aluminium-ceramic substrate (MCPCB)
- optional connector for quick installation of wires without soldering and wire stripping
- operating current up to 700 mA
- safe low operating voltage
- classic circular shape (diameter 30mm)
- possibility of connecting modules into lighting chains
- module adapted to wide range of optics
- simple and comfortable installation with screws
- wide range of available CCTs

**Applications :**

- universal module for general illumination
- museum, exhibition and shop windows illumination
- mobile light sources (e.g. flash lights)
- architectural, decorative and accenting illumination

**Technical data<sup>1)</sup>**

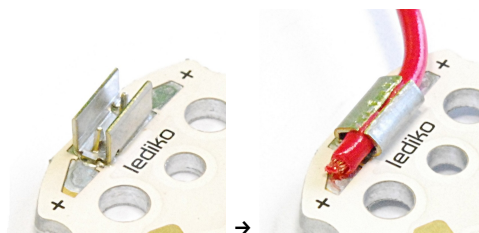
| LED Module         | Colour        | Number of LED | Advisable power type | Operating voltage |         | Operating current | Power   | Viewing angle <sup>2)</sup> | CCT      | Luminous flux         | Luminous flux       |
|--------------------|---------------|---------------|----------------------|-------------------|---------|-------------------|---------|-----------------------------|----------|-----------------------|---------------------|
|                    |               |               |                      | [V] min           | [V] max | [mA] max          | [W] max | [°]                         | [K] typ. | [lm] typ. (I = 350mA) | [lm] typ. (I = max) |
| LUMO 1MC-E ALU CW1 | Cool white    | 1             | Current              | 12,8              | 15,6    | 700               | 9,5     | 110                         | 6500     | 430                   | 730                 |
| LUMO 1MC-E ALU CW2 | Cool white    | 1             | Current              | 12,8              | 15,6    | 700               | 9,5     | 110                         | 6500     | 370                   | 630                 |
| LUMO 1MC-E ALU NW  | Neutral white | 1             | Current              | 12,8              | 15,6    | 700               | 9,5     | 110                         | 4300     | 370                   | 630                 |
| LUMO 1MC-E ALU WW  | Warm white    | 1             | Current              | 12,8              | 15,6    | 700               | 9,5     | 110                         | 3000     | 320                   | 544                 |

1) All data concern particular module. Values of parameters in the table are average and can differ in particular copies of modules.

2) An angle at which LED intensity is 50% of maximum intensity at mechanical axis of LED.

**Qualities**

- LED module with MC-E diode, power consumption up to 10W, a substitute to 4 standard LED modules with XR or XP diodes
- size, arrangement of holes and soldering points are suitable for a lot of types of lens and reflectors
- lighting system with MC-E diodes requires up to 4 times smaller number of lenses or reflectors than a system with less powerful diodes
- aluminium-ceramic substrate (MCPCB) with high thermal conductivity of the ceramic layer: 2,2W/m·K
- optional thermally conductive tape helping the installation
- modules optimized to constant current switching power supply
- optional connector for quick installation of wires without soldering or wire stripping



## Absolute maximum ratings<sup>1)</sup>

| LED Module         | Operating temperature [°C] |     | Operating current [mA] | Reverse voltage [V] | Junction temperature [°C] |
|--------------------|----------------------------|-----|------------------------|---------------------|---------------------------|
|                    | min                        | max | max                    | max                 | max                       |
| LUMO 1MC-E ALU CW1 | -40                        | 85  | 700                    | 20                  | 145                       |
| LUMO 1MC-E ALU CW2 | -40                        | 85  | 700                    | 20                  | 145                       |
| LUMO 1MC-E ALU NW  | -40                        | 85  | 700                    | 20                  | 145                       |
| LUMO 1MC-E ALU WW  | -40                        | 85  | 700                    | 20                  | 145                       |

<sup>1)</sup> Table of physical work parameters, that must not be exceeded because of possibility of lifetime reduction or permanent damage of LED module.

## Drawing and mechanical dimensions

Shape: round

Dimensions: diameter 30mm, substrate thickness 1,6mm

Hight: 6,1mm

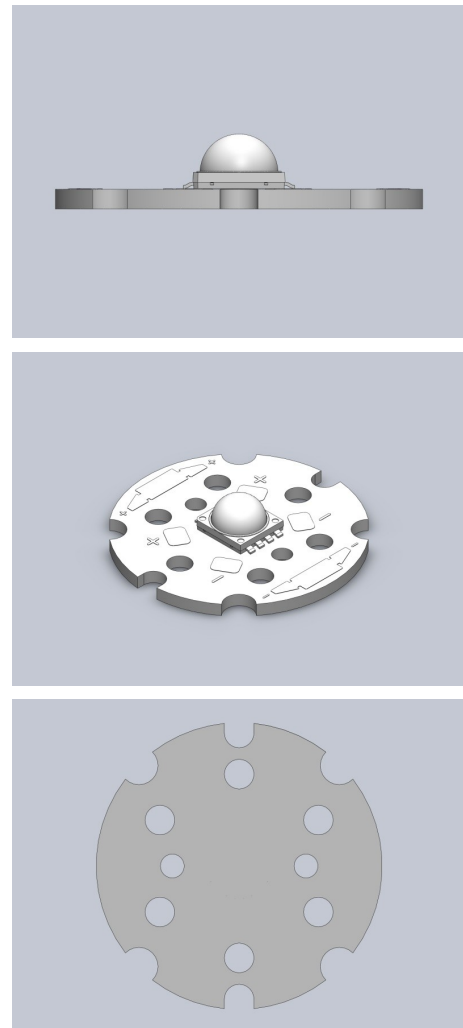
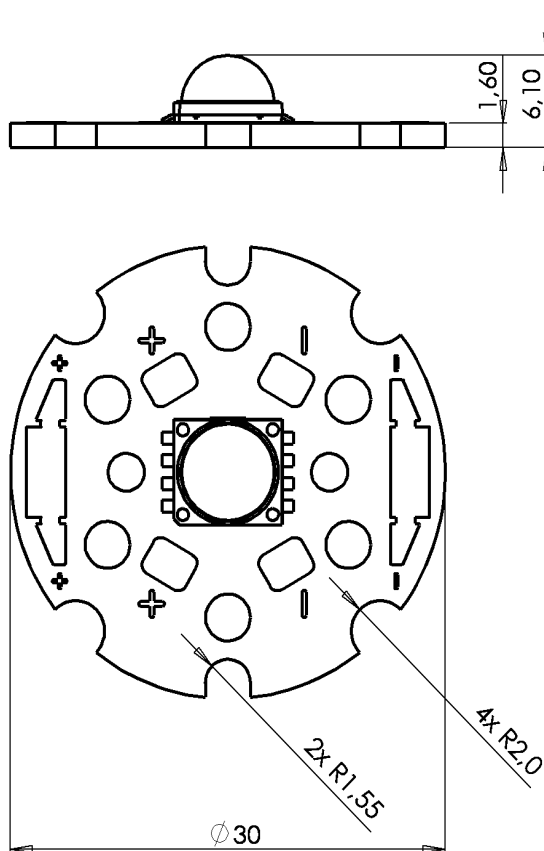


Fig. 1. LUMO 1MC ALU drawing (in mm).

## Thermal parameters and cooling

1. Temperature is one of the main factors influencing the lifetime of LED diodes. Typically at the temperature of the junction up to 85°C and when all requirements of a producer are fulfilled, a diode maintains 70% of luminous flux for typically 50 000 hours which is almost 6 years of shining 24h per day. Reducing the temperature can significantly prolong this period.
2. Because of thermal resistance between the junction, a diode  $R_{TH\ j-b}$  case as well as between a diode case and heat sink  $R_{TH\ b-r}$ , the temperature of the heat sink must be lower than the temperature of the junction. The required thermal resistance of the external heat sink can be calculated on the basis of the formula given in point 6 or using the chart.
3. Thermal resistance given by producers of heat sinks is normally defined in laboratory conditions. Choosing an external heat sink it is important to take into consideration conditions in which it is going to work. Thermal resistance of an heat sink is strongly dependent on a lot of factors, such as its position, airflow, etc. It is advisable to check eMperimentally if a particular heat sink fulfils thermal needs in real conditions of its work.
4. Thermal parameters of LUMO 1MC ALU module:

| Thermal resistance         | Symbol                                    | For diodes MC-E |
|----------------------------|---|-----------------|
| LED junction – thermal pad | $R_{TH\ j-b}$                             | 3 K/W           |
| thermal pad – heat sink    | $R_{TH\ b-r}$                             | 1,5 K/W         |
| LED junction – heat sink   | $R_{TH\ j-r} = R_{TH\ j-b} + R_{TH\ b-r}$ | 4,5 K/W         |

5. LED junction temperature when an external heat sink is used: 
$$T_j = T_a + P_m (R_{TH\ j-r} + R_{TH\ r-a})$$

6. Maximal required resistance of a thermal heat sink: 
$$R_{TH\ r-a} = \frac{T_j - T_a}{P_m} - R_{TH\ j-r}$$

$T_j$  Temperature of the diode junction [°C]

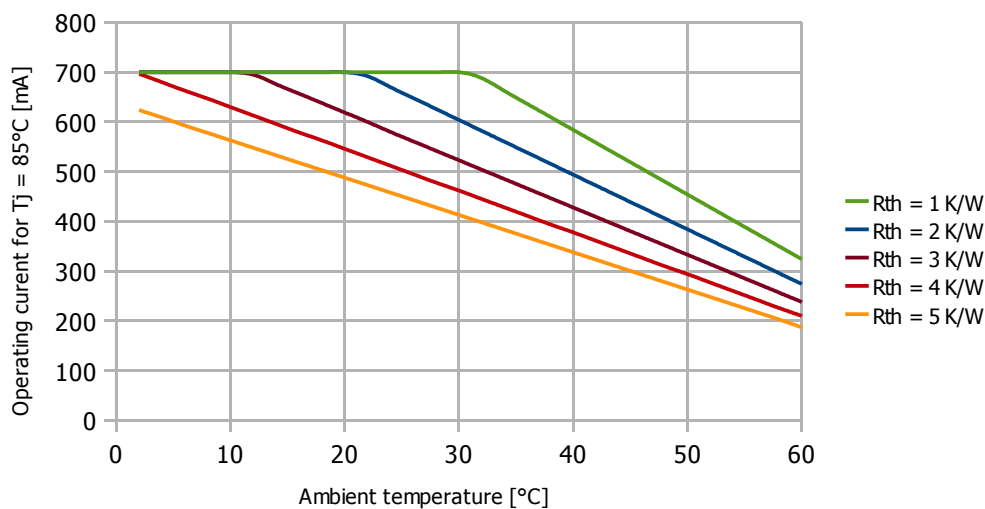
$T_a$  Temperature of the environment [°C]

$P_m$  Power supply of the module [W]

$R_{TH\ j-r}$  Thermal resistance between the LED junction and the heat sink [K/W]

$R_{TH\ r-a}$  Thermal resistance between the heat sink and the air [K/W]

7. The relationship given in point 6 does not include thermal resistance between the LED module and the heat sink. If the module is fastened to a flat surface of the heat sink, and thermally conductive paste is used between the elements, there is no need to take this parameter into consideration. If a thermally conductive tape or another thermally conductive material is used, it is necessary to include its thermal resistance when calculating the thermal resistance of the heat sink.
8. The following graph shows maximum recommended LED current of the module with MC-E diode for different thermal resistance of the external heat sink which guarantees that the LED junction keeps the temperature of 85°C.



## Safety information

1. Modules must not be weight mechanically to work safe.
2. Montage elements must not destroy LEDs or paths on the board.
3. Modules do not have any short circuit, overcharge or thermal protection. It is absolutely necessary for LED power supplies to have such protections.
4. Installation of modules (with driving circuits) must be done according to all valid electric and safe standards.
5. It is necessary to keep proper polarization of driving voltages. Wrong polarization may cause LED damage.
6. It is important to take into consideration the bad influence of electrostatic charge on LED diodes. Before installation charges on your skin should be neutralized by touching metal parts of grounded elements (e.g. copper pipe, tap, etc.).
7. It is recommended to keep chip temperature below 85°C. In order to draw heat away from LED junction external heat sinks can be used. Parameters and dimensions of heat sink can be calculated using proper formulas. Each application, depending on number of LEDs, power, montage and many other parameters, needs to be considered separately. LEDIKO provides optimal solutions for each customer.
8. LEDs may not have corrosion resistant elements. A user should provide safe work conditions of the circuit. LEDIKO products can not be subject to complaint on the basis of damage caused by humidity or chemical conditions.
9. LEDIKO modules are not appropriate to be used outdoor or in conditions that may cause damage to electric parts (e.g. low or high temperature, humidity, inappropriate chemical conditions). In such applications it is necessary to use a special case.
10. The case should fulfil following requirements:
  - optical transparency from the light emitted side,
  - UV protection (in case of eMCosure to sunlight),
  - drawing heat away, to keep safe work environment of the circuit,
  - resistance to the heat produced by LEDs,
  - low permeability in all climate conditions.

## Montage information

1. LED modules must be connected to power supply according to all valid electric and safe standards. Before switching power on it is required to check all electric connections and make sure that power supply has proper electric parameters.

2. It is very important to mount the module to an element which helps to draw heat away (e.g. aluminium plate, heat sink). If using screws in order to montage, a separator, such as silicone, mica, silicone paste or other material that conducts heat, is required between heat sink and the substrate of the module. Such a separator needs to be used, because it helps to transfer heat from the substrate to the heat sink and improves LED work conditions. The module can also be mounted to the heat sink using special thermally conductive glue or tape.

3. Depending on the power of the LED module supply it is necessary to use a heat sink with proper thermal resistance. When the LED module is supplied with 4,5W power (current 350mA) it is necessary to use a heat sink with maximal resistance of 5K/W, which corresponds to e.g. a piece of aluminium metal plate 4mm thick, surface of 144cm<sup>2</sup> (e.g. a square metal plate 12x12cm). When the LED module supply exceeds 5W, an element which draws heat away needs to be carefully chosen. In most cases it is necessary to use a heat sink of a big surface or active cooling.

4. Fastening the LED module is possible due to two screws or special thermally conductive glue or thermally conductive two-sided tape. When the LED module is supplied with more than 5W, it is advisable to use the screws and thermally conductive paste.

5. It is advisable to supply the LED modules using special constant current power supplies. When stabilized voltage supply is needed, it is necessary to use an extra DC-DC converter stabilizing the diode current.

## Order particulars

| LED Module         | Colour        | CCT    | Min. luminous flux (350mA) |
|--------------------|---------------|--------|----------------------------|
| LUMO 1MC-E ALU CW1 | Cool white    | 6500 K | 430 lm                     |
| LUMO 1MC-E ALU CW2 | Cool white    | 6500 K | 370 lm                     |
| LUMO 1MC-E ALU NW  | Neutral white | 4300 K | 370 lm                     |
| LUMO 1MC-E ALU WW  | Warm white    | 3000 K | 320 lm                     |

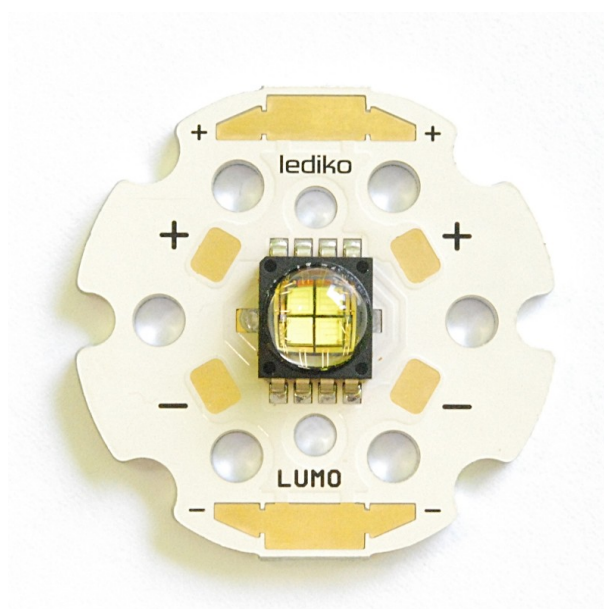
### When placing an order please state:

- 1) Name and surname,
- 2) Company name,
- 3) Company Tax Identification Number,
- 4) Address of the company or private address for individual customers,
- 5) City and post code,
- 6) Index of elements: number of elements, product code,
- 7) Sending address (if different from the company address).

**We encourage you to contact us and place orders.**

**Phone: +48 71 79 85 785**

[www.lediko.com](http://www.lediko.com)



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