

# LED LINEAR ALLROUND 5050 TUNEABLE WHITE BUILT-IN MODULES



## LED LINEAR ALLROUND 5050 TUNEABLE WHITE

### MSP SC 2R NTC G1

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 4 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 5050 Tuneable White

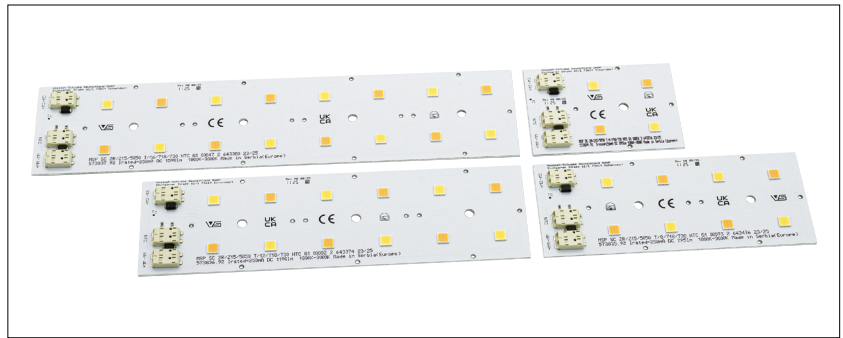
- **HIGHLY EFFICIENT: UP TO 199 LM/W**  
AT  $T_p = 65^\circ\text{C}$ ,  $I_f = 250\text{ mA}$
- **FLEXIBLE LIGHT DISTRIBUTION BY VARIOUS ATTACHMENT OPTICS**
- **INITIAL COLOUR ACCURACY: 5 SDCM**
- **ON-BOARD SURGE PROTECTION UP TO 10 KV**  
(IN COMBINATION WITH VS STREETLIGHT DRIVERS)
- **ENEC AND VDE**  
(ACC. TO EN 62031)



## LED Linear Allround 5050 Tuneable White

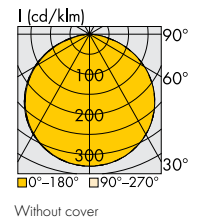
### Technical Notes

- LED built-in module for integration into luminaires
- 4, 8, 12 or 16 high-efficiency High Power LEDs
- Dimensions (excl. optics) LxWxH
  - 4 LEDs: 70.6x49.5x5 mm
  - 8 LEDs: 121.4x49.5x5 mm
  - 12 LEDs: 172.2x49.5x5 mm
  - 16 LEDs: 223x49.5x5 mm
- Driving currents: 250mA / 350mA / 500mA / 700mA
- Push-in terminals for quick and simple wiring
- Suitable for 5050-optimized 2x2 optics made by VS
- Design for optimum thermal management
- Degree of protection: IP00
- ESD protection class 2 (up to 4 kV)
- NTC resistor for external driver feedback of module temperature (type: NCP18xH103J03RB)



### Typical Light Distribution Curve

Data are available in .ldt format for download under [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com).



### Electrical Characteristics

at  $T_p = 65^\circ\text{C}$

| Type                                                  | No. of LEDs per channel | Typ. voltage DC |        |        |        | Temperature coefficient [mV/K] | Typ. power consumption |        |        |        |
|-------------------------------------------------------|-------------------------|-----------------|--------|--------|--------|--------------------------------|------------------------|--------|--------|--------|
|                                                       |                         | 250 mA          | 350 mA | 500 mA | 700 mA |                                | 250 mA                 | 350 mA | 500 mA | 700 mA |
|                                                       |                         | V               | V      | V      | V      |                                | W                      | W      | W      | W      |
| <b>LED Linear Allround 5050 Tuneable White Gen. 1</b> |                         |                 |        |        |        |                                |                        |        |        |        |
| MSP SC 2R/Z15/5050 T/4/yzz/yzz NTC G1                 | 2                       | 11.0            | 11.2   | 11.5   | 11.9   | -6                             | 2.7                    | 3.9    | 5.8    | 8.3    |
| MSP SC 2R/Z15/5050 T/8/yzz/yzz NTC G1                 | 4                       | 22.0            | 22.4   | 23.0   | 23.7   | -12                            | 5.5                    | 7.8    | 11.5   | 16.6   |
| MSP SC 2R/Z15/5050 T/12/yzz/yzz NTC G1                | 6                       | 33.0            | 33.6   | 34.5   | 35.6   | -18                            | 8.2                    | 11.8   | 17.3   | 24.9   |
| MSP SC 2R/Z15/5050 T/16/yzz/yzz NTC G1                | 8                       | 44.0            | 44.8   | 46.0   | 47.5   | -24                            | 11.0                   | 15.7   | 23.0   | 33.2   |

\* Per channel. Voltage and power consumption tolerance:  $\pm 10\%$ . Use of external LED constant current driver required.

### Maximum Ratings

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

| Type      | Operation current mA | Operation temperature range at $T_c$ point |                       | Storage temperature range |                       | Max. allowed repetitive peak current mA |
|-----------|----------------------|--------------------------------------------|-----------------------|---------------------------|-----------------------|-----------------------------------------|
|           |                      | $^\circ\text{C min.}$                      | $^\circ\text{C max.}$ | $^\circ\text{C min.}$     | $^\circ\text{C max.}$ |                                         |
| All types | 700                  | -20                                        | +85                   | -30                       | +85                   | 800                                     |

### Operating Life

| Lumen degradation | Operating life in hours at stated $T_c$ point temperature |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |
|-------------------|-----------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                   | 250 mA                                                    |                     |                     | 350 mA              |                     |                     | 500 mA              |                     |                     | 600 mA              |                     |                     |
|                   | 60 $^\circ\text{C}$                                       | 70 $^\circ\text{C}$ | 80 $^\circ\text{C}$ | 60 $^\circ\text{C}$ | 70 $^\circ\text{C}$ | 80 $^\circ\text{C}$ | 60 $^\circ\text{C}$ | 70 $^\circ\text{C}$ | 80 $^\circ\text{C}$ | 60 $^\circ\text{C}$ | 70 $^\circ\text{C}$ | 80 $^\circ\text{C}$ |
| L80/B10           | > 102.000                                                 | > 102.000           | > 102.000           | > 102.000           | > 102.000           | > 102.000           | > 47.000            | > 47.000            | > 47.000            | > 47.000            | > 47.000            | > 47.000            |

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

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# LED Linear Allround 5050 Tuneable White – Linear Built-in Modules

## Optical Characteristics

at  $T_p = 65^\circ\text{C}$ , CRI\*\*  $\geq 70$

| Type                                              | Ref. No. | Colour | Correl. colour | Luminous flux* (lm) and typ. efficiency (lm/W) |           |         |           |         |           |         |           | Photometric code             |                              |
|---------------------------------------------------|----------|--------|----------------|------------------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|------------------------------|------------------------------|
|                                                   |          |        | temp. K        | 250 mA                                         |           | 350 mA  |           | 500 mA  |           | 700 mA  |           | I <sub>f</sub> =250 & 350 mA | I <sub>f</sub> =500 & 600 mA |
|                                                   |          |        |                | typ. lm                                        | typ. lm/W | typ. lm | typ. lm/W | typ. lm | typ. lm/W | typ. lm | typ. lm/W |                              |                              |
| LED Linear Allround 5050 Tuneable White - 4 LEDs  |          |        |                |                                                |           |         |           |         |           |         |           |                              |                              |
| MSP SC 2R/Z15/5050 T/4/718/730 NTC G1             | 573834   | WW     | 1800           | 395                                            | 143       | 530     | 135       | 725     | 126       | 955     | 115       | 589                          | 599                          |
|                                                   |          | WW     | 3000           | 545                                            | 199       | 740     | 189       | 1010    | 175       | 1330    | 160       | 579                          | 589                          |
| LED Linear Allround 5050 Tuneable White - 8 LEDs  |          |        |                |                                                |           |         |           |         |           |         |           |                              |                              |
| MSP SC 2R/Z15/5050 T/8/718/730 NTC G1             | 573835   | WW     | 1800           | 785                                            | 143       | 1065    | 135       | 1445    | 126       | 1910    | 115       | 589                          | 599                          |
|                                                   |          | WW     | 3000           | 1095                                           | 199       | 1480    | 189       | 2015    | 175       | 2660    | 160       | 579                          | 589                          |
| LED Linear Allround 5050 Tuneable White - 12 LEDs |          |        |                |                                                |           |         |           |         |           |         |           |                              |                              |
| MSP SC 2R/Z15/5050 T/12/718/730 NTC G1            | 573836   | WW     | 1800           | 1180                                           | 143       | 1595    | 135       | 2170    | 126       | 2865    | 115       | 589                          | 599                          |
|                                                   |          | WW     | 3000           | 1640                                           | 199       | 2220    | 189       | 3025    | 175       | 3990    | 160       | 579                          | 589                          |
| LED Linear Allround 5050 Tuneable White - 16 LEDs |          |        |                |                                                |           |         |           |         |           |         |           |                              |                              |
| MSP SC 2R/Z15/5050 T/16/718/730 NTC G1            | 573837   | WW     | 1800           | 1570                                           | 143       | 2125    | 135       | 2895    | 126       | 3820    | 115       | 589                          | 599                          |
|                                                   |          | WW     | 3000           | 2190                                           | 199       | 2960    | 189       | 4030    | 175       | 5320    | 160       | 579                          | 589                          |

\* Colour tolerance: 5 MacAdam | \*\* Production tolerance of luminous flux and efficiency:  $\pm 10\%$

## Optical Characteristics

at  $T_p = 65^\circ\text{C}$ , CRI\*\*  $\geq 80$

| Type                                              | Ref. No. | Colour | Correl. colour | Luminous flux* (lm) |           |         |           | and typ. efficiency (lm/W) |           |         |           | Photometric code |           |                              |                              |
|---------------------------------------------------|----------|--------|----------------|---------------------|-----------|---------|-----------|----------------------------|-----------|---------|-----------|------------------|-----------|------------------------------|------------------------------|
|                                                   |          |        | temp. K        | typ. lm             | typ. lm/W | typ. lm | typ. lm/W | typ. lm                    | typ. lm/W | typ. lm | typ. lm/W | typ. lm          | typ. lm/W | I <sub>I</sub> =250 & 350 mA | I <sub>I</sub> =500 & 600 mA |
| LED Linear Allround 5050 Tuneable White - 4 LEDs  |          |        |                |                     |           |         |           |                            |           |         |           |                  |           |                              |                              |
| MSP SC 2R/Z15/5050 T/4/822/840 NTC G1             | 573893   | WW     | 2200           | 410                 | 149       | 550     | 141       | 750                        | 131       | 990     | 119       | 579              | 589       |                              |                              |
|                                                   |          | NW     | 4000           | 525                 | 190       | 705     | 180       | 960                        | 167       | 1270    | 153       | 579              | 589       |                              |                              |
| LED Linear Allround 5050 Tuneable White - 8 LEDs  |          |        |                |                     |           |         |           |                            |           |         |           |                  |           |                              |                              |
| MSP SC 2R/Z15/5050 T/8/822/840 NTC G1             | 573894   | WW     | 2200           | 815                 | 149       | 1105    | 141       | 1500                       | 131       | 1980    | 119       | 579              | 589       |                              |                              |
|                                                   |          | NW     | 4000           | 1045                | 190       | 1415    | 180       | 1925                       | 167       | 2540    | 153       | 579              | 589       |                              |                              |
| LED Linear Allround 5050 Tuneable White - 12 LEDs |          |        |                |                     |           |         |           |                            |           |         |           |                  |           |                              |                              |
| MSP SC 2R/Z15/5050 T/12/822/840 NTC G1            | 573895   | WW     | 2200           | 1225                | 149       | 1655    | 141       | 2255                       | 131       | 2975    | 119       | 579              | 589       |                              |                              |
|                                                   |          | NW     | 4000           | 1570                | 190       | 2120    | 180       | 2885                       | 167       | 3810    | 153       | 579              | 589       |                              |                              |
| LED Linear Allround 5050 Tuneable White - 16 LEDs |          |        |                |                     |           |         |           |                            |           |         |           |                  |           |                              |                              |
| MSP SC 2R/Z15/5050 T/16/822/840 NTC G1            | 573896   | WW     | 2200           | 1630                | 149       | 2205    | 141       | 3005                       | 131       | 3965    | 119       | 579              | 589       |                              |                              |
|                                                   |          | NW     | 4000           | 2090                | 190       | 2830    | 180       | 3850                       | 167       | 5080    | 153       | 579              | 589       |                              |                              |

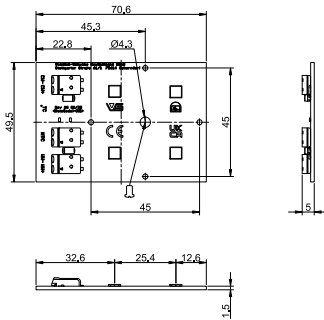
\* Colour tolerance: 5 MacAdam | \*\* Production tolerance of luminous flux and efficiency:  $\pm 10\%$

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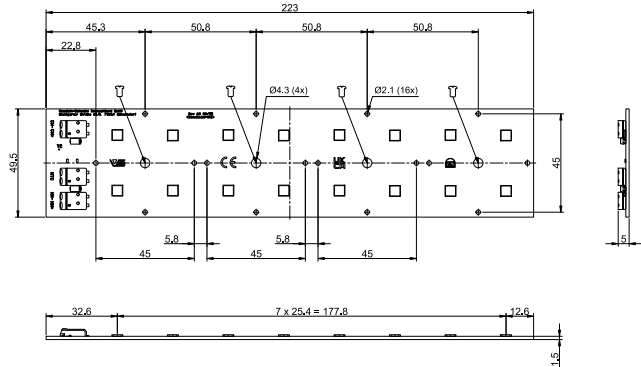
# LED Linear Allround 5050 Tuneable White – Linear Built-in Modules

## Mechanical Dimensions

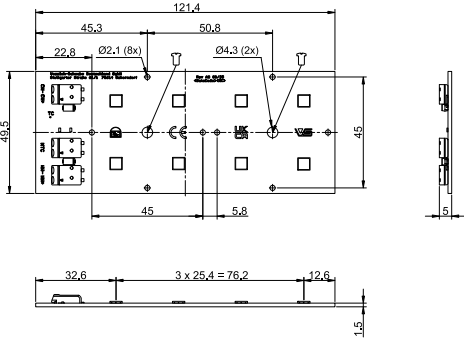
**MSP SC 2R/Z15/5050 T/4/yzz/yzz NTC G1**



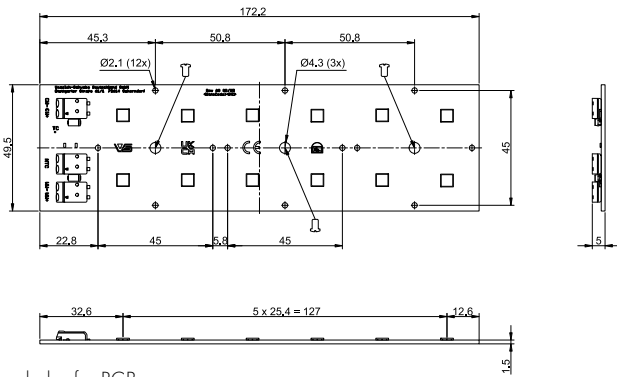
**MSP SC 2R/Z15/5050 T/16/yzz/yzz NTC G1**



**MSP SC 2R/Z15/5050 T/8/yzz/yzz NTC G1**

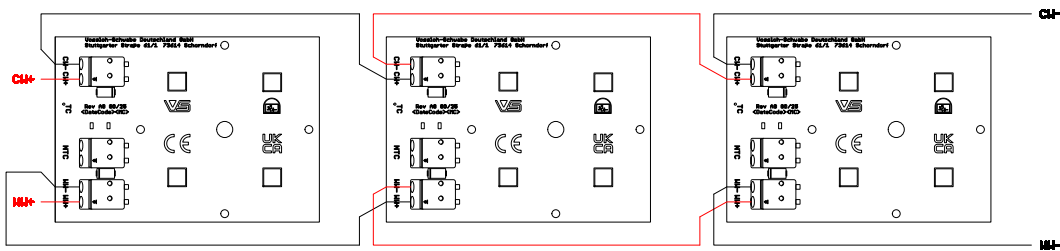


**MSP SC 2R/Z15/5050 T/12/yzz/yzz NTC G1**

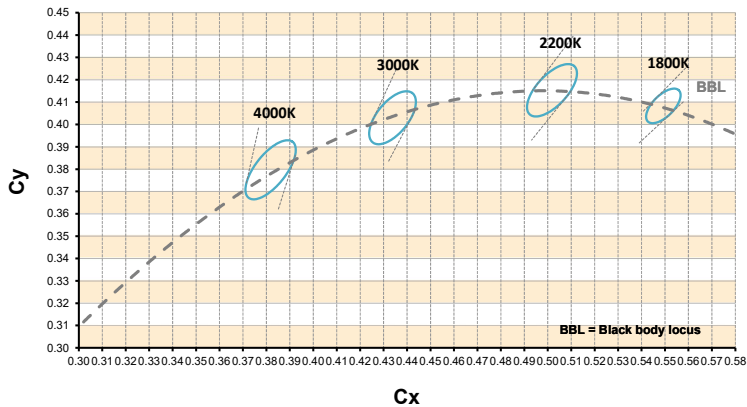


All holes Ø 2.1 mm are fixing holes for optics. | All holes Ø 4.3 mm are fixing holes for PCB.

## Wiring example



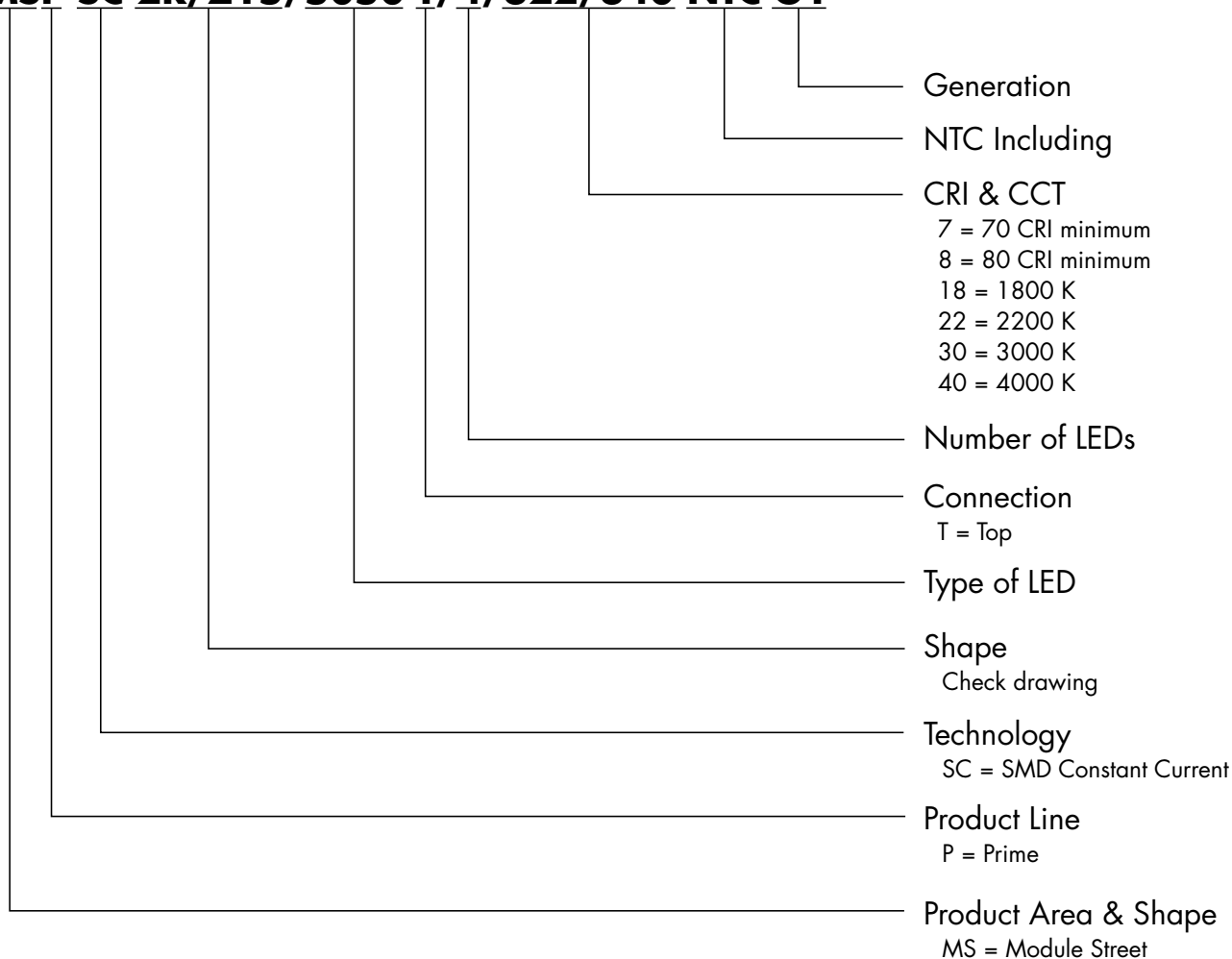
## Bins



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## Nomenclature example

**MSP SC 2R/Z15/5050 T/4/822/840 NTC G1**



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## 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. allowed 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.
- The wiring can be done by solid or stranded wires having a cross section of 0.2–0.75 mm<sup>2</sup>; stripped length of lead ends of 7–9 mm. For inserting/removing stranded wires press lightly on the push button.
- 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  $\leq 0.2$  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 MSP SC 2R/Z15/5050 T/x/yzz/yzz NTC G1 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 recommend 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).
- To ensure problem-free operation, the specified maximum temperature at the  $t_c$  and  $t_p$  point (see "Operating Life") must be observed (and measured in accordance with EN 60598-1). To satisfy this point, it may be necessary to put measures in place to ensure any heat is dissipated from the PCB to the environment.
- 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](http://www.vossloh-schwabe.com)
- The photobiological safety of the LED modules must be classified into risk groups in accordance with EN 62471: 2008.  
Rating in accordance with IEC / TR 62778: risk group 1

| CCT<br>K | Max. operating<br>current for risk group 1<br>mA | E threshold for higher operating<br>currents to be risk group 1<br>lx |
|----------|--------------------------------------------------|-----------------------------------------------------------------------|
| 3000     | 670.3                                            | 2467.42                                                               |
| 4000     | 415.4                                            | 1474.67                                                               |
| 5000     | N/A                                              | N/A                                                                   |
| 6500     | N/A                                              | N/A                                                                   |

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## 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](http://www.vossloh-schwabe.com)).
- We will be happy to send you these conditions upon request.