

LED LINEAR ALLROUND – 3535 Z15 GEN. 5

BUILT-IN MODULES



LED LINEAR ALLROUND – 3535 Z15 GEN. 5

MSP SC 2R Z15 NTC G5

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 3535 Z15 Gen. 5

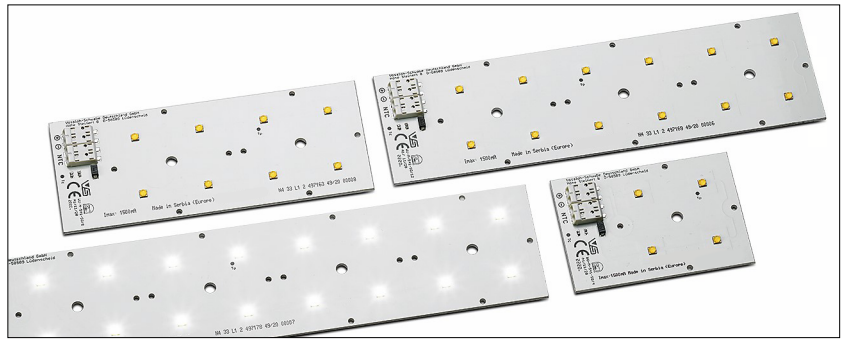
- **HIGHLY EFFICIENT: UP TO 205 LM/W**
AT $T_p = 65^\circ\text{C}$, $I_f = 350\text{ mA}$
- **FLEXIBLE LIGHT DISTRIBUTION BY VARIOUS ATTACHMENT OPTICS**
- **INITIAL COLOUR ACCURACY: 5 SDCM**
- **ON-BOARD SURGE PROTECTION UP TO 10 KV**
(IN COMBINATION WITH VS STREETLIGHT DRIVERS)



LED Linear Allround 3535 Z15 Gen. 5

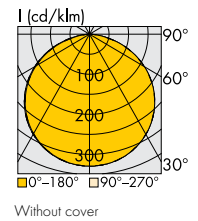
Technical Notes

- LED built-in module for integration into luminaires
- 4, 8, 12 or 16 high-efficiency High Power LEDs
- Dimensions (excl. optics) LxVxH
 - 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: 350mA / 500mA / 700mA / 1050mA / 1400mA
- Push-in terminals for quick and simple wiring
- Design for optimum thermal management
- Degree of protection: IP00
- ESD protection class 3
- Surge protection device on board
- 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.



Electrical Characteristics

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

Type	No. of LEDs	Typ. voltage DC					Temperature coefficient [mV/K]	Typ. power consumption				
		350 mA	500 mA	700 mA	1050 mA	1400 mA		350 mA	500 mA	700 mA	1050 mA	1400 mA
		V	V	V	V	V		W	W	W	W	W
LED Linear Allround 3535 Z15 Gen. 5												
MSP SC 2R/Z15/3535 T/4 NTC G5	4	10.8	11.0	11.2	11.6	11.9	-5.18	3.8	5.5	7.9	12.1	16.6
MSP SC 2R/Z15/3535 T/8 NTC G5	8	21.6	22.0	22.5	23.1	23.8	-10.36	7.6	11.0	15.7	24.3	33.3
MSP SC 2R/Z15/3535 T/12 NTC G5	12	32.4	33.0	33.7	34.7	35.6	-15.54	11.4	16.5	23.6	36.4	49.9
MSP SC 2R/Z15/3535 T/16 NTC G5	16	43.3	44.0	44.9	46.3	47.5	-20.73	15.1	22.0	31.4	48.6	66.5

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	≤ 1050	-30	+85	-40	+85	3000
	≤ 1400	-30	+75			3000

Operating Life

in hours at stated t_c point temperature

Flux maintenance	$I_f \leq 350\text{ mA}$			$I_f 500\text{ mA}$			$I_f 700\text{ mA}$			$I_f 1050\text{ mA}$			$I_f 1400\text{ mA}$		
	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$
L80/B10	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000
L70/B10	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000	145.000

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 3535 Z15 Gen. 5 – Linear Built-in Modules

Optical Characteristics

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

Type	Ref. No.	Colour	Correl. colour temp. K	Luminous flux* (lm) and typ. efficiency (lm/W)									
				350 mA		500 mA		700 mA		1050 mA		1400 mA	
				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
LED Linear Allround 3535 Z15 Gen. 5 - 4 LEDs													
MSP SC 2R/Z15/3535 T/4/722 NTC G5	574339	WW	2200	600	158	825	150	1105	141	1545	127	1935	116
MSP SC 2R/Z15/3535 T/4/727 NTC G5	574340	WW	2700	700	185	965	175	1290	164	1800	148	2255	136
MSP SC 2R/Z15/3535 T/4/730 NTC G5	574341	WW	3000	745	196	1025	186	1370	175	1915	158	2400	144
MSP SC 2R/Z15/3535 T/4/735 NTC G5	on req.	WW	3500	755	199	1040	189	1395	177	1945	160	2435	146
MSP SC 2R/Z15/3535 T/4/740 NTC G5	on req.	NW	4000	775	205	1070	195	1435	182	2000	165	2505	151
MSP SC 2R/Z15/3535 T/4/750 NTC G5	on req.	CW	5000	775	205	1070	195	1435	182	2000	165	2505	151
MSP SC 2R/Z15/3535 T/4/765 NTC G5	on req.	CW	6500	765	202	1055	192	1415	180	1975	162	2470	149
LED Linear Allround 3535 Z15 Gen. 5 - 8 LEDs													
MSP SC 2R/Z15/3535 T/8/722 NTC G5	574343	WW	2200	1200	158	1655	150	2210	141	3090	127	3865	116
MSP SC 2R/Z15/3535 T/8/727 NTC G5	574344	WW	2700	1400	185	1930	175	2580	164	3605	148	4510	136
MSP SC 2R/Z15/3535 T/8/730 NTC G5	574345	WW	3000	1485	196	2050	186	2745	175	3835	158	4795	144
MSP SC 2R/Z15/3535 T/8/735 NTC G5	on req.	WW	3500	1510	199	2080	189	2785	177	3890	160	4870	146
MSP SC 2R/Z15/3535 T/8/740 NTC G5	574346	NW	4000	1555	205	2145	195	2870	182	4005	165	5010	151
MSP SC 2R/Z15/3535 T/8/750 NTC G5	on req.	CW	5000	1555	205	2145	195	2870	182	4005	165	5010	151
MSP SC 2R/Z15/3535 T/8/765 NTC G5	on req.	CW	6500	1530	202	2110	192	2825	180	3945	162	4940	149
LED Linear Allround 3535 Z15 Gen. 5 - 12 LEDs													
MSP SC 2R/Z15/3535 T/12/722 NTC G5	574347	WW	2200	1800	158	2480	150	3320	141	4635	127	5800	116
MSP SC 2R/Z15/3535 T/12/727 NTC G5	574348	WW	2700	2095	185	2895	175	3870	164	5405	148	6765	136
MSP SC 2R/Z15/3535 T/12/730 NTC G5	574349	WW	3000	2230	196	3075	186	4115	175	5750	158	7195	144
MSP SC 2R/Z15/3535 T/12/735 NTC G5	on req.	WW	3500	2265	199	3125	189	4180	177	5835	160	7305	146
MSP SC 2R/Z15/3535 T/12/740 NTC G5	574350	NW	4000	2330	205	3215	195	4300	182	6005	165	7520	151
MSP SC 2R/Z15/3535 T/12/750 NTC G5	574351	CW	5000	2330	205	3215	195	4300	182	6005	165	7520	151
MSP SC 2R/Z15/3535 T/12/765 NTC G5	on req.	CW	6500	2295	202	3170	192	4240	180	5920	162	7410	149
LED Linear Allround 3535 Z15 Gen. 5 - 16 LEDs													
MSP SC 2R/Z15/3535 T/16/722 NTC G5	574354	WW	2200	2395	158	3305	150	4425	141	6180	127	7730	116
MSP SC 2R/Z15/3535 T/16/727 NTC G5	574355	WW	2700	2795	185	3855	175	5160	164	7210	148	9020	136
MSP SC 2R/Z15/3535 T/16/730 NTC G5	574356	WW	3000	2975	196	4100	186	5490	175	7665	158	9595	144
MSP SC 2R/Z15/3535 T/16/735 NTC G5	on req.	WW	3500	3020	199	4165	189	5570	177	7780	160	9735	146
MSP SC 2R/Z15/3535 T/16/740 NTC G5	574357	NW	4000	3105	205	4285	195	5735	182	8010	165	10025	151
MSP SC 2R/Z15/3535 T/16/750 NTC G5	on req.	CW	5000	3105	205	4285	195	5735	182	8010	165	10025	151
MSP SC 2R/Z15/3535 T/16/765 NTC G5	on req.	CW	6500	3065	202	4225	192	5655	180	7895	162	9880	149

2200, 2700, 3000 and 3500 K = warm white (WW), 4000 K = neutral white (NW), 5000 and 6500 K = cool white (CW)

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

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LED Linear Allround 3535 Z15 Gen. 5 – Linear Built-in Modules

Optical Characteristics

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

Type	Ref. No.	Colour	Correl. colour temp. K	Luminous flux* (lm) and typ. efficiency (lm/W)									
				350 mA		500 mA		700 mA		1050 mA		1400 mA	
				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
LED Linear Allround 3535 Z15 Gen. 5 - 4 LEDs													
MSP SC 2R/Z15/3535 T/4/827 NTC G5	on req.	WW	2700	645	170	890	161	1190	151	1660	137	2075	125
MSP SC 2R/Z15/3535 T/4/830 NTC G5	on req.	WW	3000	645	170	890	161	1190	151	1660	137	2075	125
MSP SC 2R/Z15/3535 T/4/835 NTC G5	on req.	WW	3500	675	179	935	170	1250	159	1745	144	2185	131
MSP SC 2R/Z15/3535 T/4/840 NTC G5	574342	NW	4000	690	182	950	172	1270	162	1775	146	2220	133
MSP SC 2R/Z15/3535 T/4/850 NTC G5	on req.	CW	5000	700	185	965	175	1290	164	1800	148	2255	136
MSP SC 2R/Z15/3535 T/4/865 NTC G5	on req.	CW	6500	690	182	950	172	1270	162	1775	146	2220	133
LED Linear Allround 3535 Z15 Gen. 5 - 8 LEDs													
MSP SC 2R/Z15/3535 T/8/827 NTC G5	on req.	WW	2700	1285	170	1775	161	2375	151	3320	137	4155	125
MSP SC 2R/Z15/3535 T/8/830 NTC G5	574967	WW	3000	1285	170	1655	161	2375	151	3320	137	4155	125
MSP SC 2R/Z15/3535 T/8/835 NTC G5	on req.	WW	3500	1355	179	1865	170	2500	159	3490	144	4365	131
MSP SC 2R/Z15/3535 T/8/840 NTC G5	574968	NW	4000	1375	182	1900	172	2540	162	3545	146	4440	133
MSP SC 2R/Z15/3535 T/8/850 NTC G5	on req.	CW	5000	1400	185	1930	175	2580	164	3605	148	4510	136
MSP SC 2R/Z15/3535 T/8/865 NTC G5	on req.	CW	6500	1375	182	1900	172	2540	162	3545	146	4440	133
LED Linear Allround 3535 Z15 Gen. 5 - 12 LEDs													
MSP SC 2R/Z15/3535 T/12/827 NTC G5	on req.	WW	2700	1930	170	2665	161	3565	151	4975	137	6230	125
MSP SC 2R/Z15/3535 T/12/830 NTC G5	574352	WW	3000	1930	170	2665	161	3565	151	4975	137	6230	125
MSP SC 2R/Z15/3535 T/12/835 NTC G5	on req.	WW	3500	2030	179	2800	170	3750	159	5235	144	6550	131
MSP SC 2R/Z15/3535 T/12/840 NTC G5	574353	NW	4000	2065	182	2845	172	3810	162	5320	146	6660	133
MSP SC 2R/Z15/3535 T/12/850 NTC G5	on req.	CW	5000	2095	185	2895	175	3870	164	5405	148	6765	136
MSP SC 2R/Z15/3535 T/12/865 NTC G5	on req.	CW	6500	2065	182	2845	172	3810	162	5320	146	6660	133
LED Linear Allround 3535 Z15 Gen. 5 - 16 LEDs													
MSP SC 2R/Z15/3535 T/16/827 NTC G5	on req.	WW	2700	2575	170	3550	161	4750	151	6635	137	8305	125
MSP SC 2R/Z15/3535 T/16/830 NTC G5	on req.	WW	3000	2575	170	3550	161	4750	151	6635	137	8305	125
MSP SC 2R/Z15/3535 T/16/835 NTC G5	on req.	WW	3500	2710	179	3735	170	5000	159	6980	144	8735	131
MSP SC 2R/Z15/3535 T/16/840 NTC G5	on req.	NW	4000	2750	182	3795	172	5080	162	7095	146	8880	133
MSP SC 2R/Z15/3535 T/16/850 NTC G5	on req.	CW	5000	2795	185	3855	175	5160	164	7210	148	9020	136
MSP SC 2R/Z15/3535 T/16/865 NTC G5	on req.	CW	6500	2750	182	3795	172	5080	162	7095	146	8880	133

2700, 3000 and 3500 K = warm white (WW), 4000 K = neutral white (NW), 5000 and 6500 K = cool white (CW)

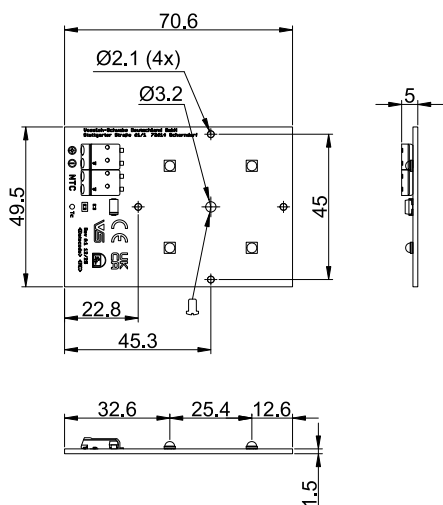
* Colour tolerance: 5 MacAdam | ** Production tolerance of luminous flux and efficiency: $\pm 10\%$

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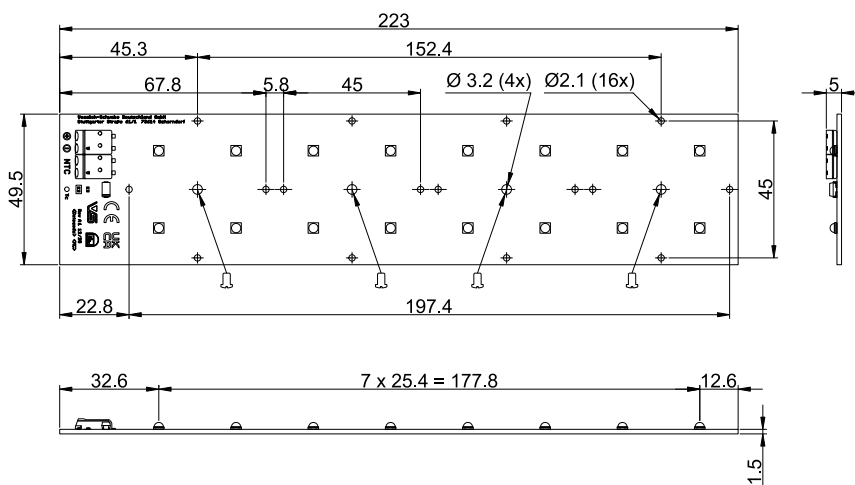
LED Linear Allround 3535 Z15 Gen. 5 – Linear Built-in Modules

Mechanical Dimensions

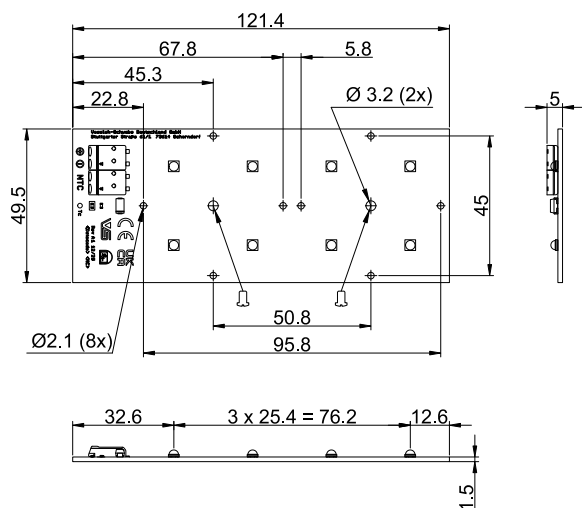
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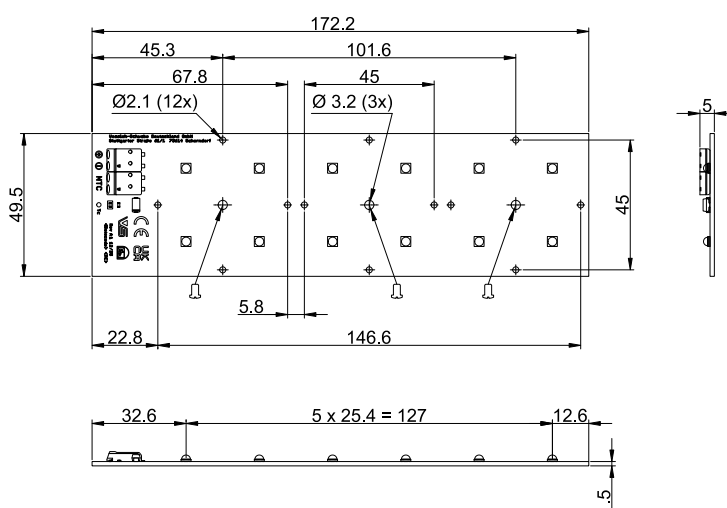
MSP SC 2R/Z15/3535 T/16/yz NTC G5



MSP SC 2R/Z15/3535 T/8/yz NTC G5

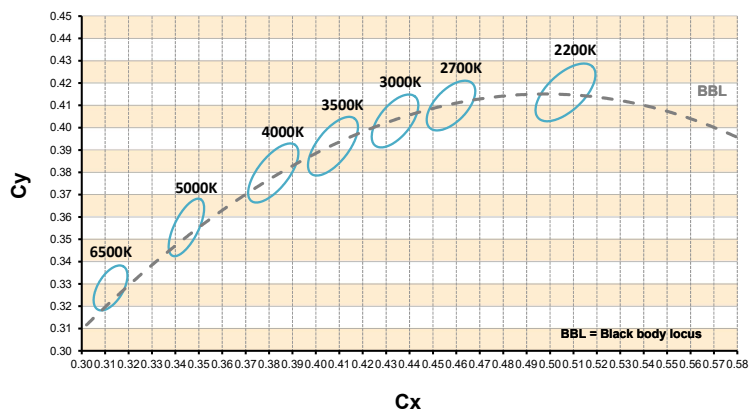


MSP SC 2R/Z15/3535 T/12/yz NTC G5



All holes Ø 2.1 mm are fixing holes for optics. | All holes Ø 3.2 mm are fixing holes for PCB.

Bins



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Nomenclature example

MSP SC 2R/Z15/Z19/3535 T/4/840 NTC G5

Generation

NTC including

CCT

22 = 2200 K

27 = 2700 K

30 = 3000 K

35 = 3500 K

40 = 4000 K

50 = 5000 K

65 = 6500 K

CRI

7 = 70 CRI minimum

8 = 80 CRI minimum

Number of LEDs

Connection

T = Top

Type of LED

Shape

Check drawing

Technology

SC = SMD Constant Current

Product Line

P = Prime

Product Area & Shape

MS = Module Street

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 mm²; 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 ≤ 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/Z15/3535 T/x/yz NTC G5 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
- 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 2

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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).
We will be happy to send you these conditions upon request.

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