

LED LINE SMD
W2.5 LIGHT&DARK
FULL SPECTRUM



LED LINE SMD W2.5 LIGHT&DARK
FULL SPECTRUM

WU-M-684-SL-W/B, WU-M-684-SL-W/B-LV

Typical Applications

Built-in luminaires/general illumination

- Office lighting
- Retail, corridor and shelf lighting
- Residential lighting



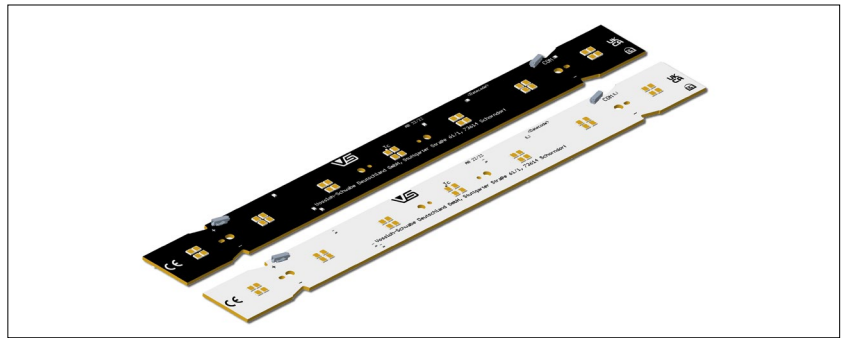
**LED Line SMD W2.5 Light&Dark
Full Spectrum**

- **LONG SERVICE LIFE TIME: >36,000 H (L80, B10)**
- **HIGH COLOUR RENDERING INDEX: CRI>95**
- **AVAILABLE IN DIFFERENT COLOUR TEMPERATURES**
- **OPTIMISED FOR SELV APPLICATIONS**
- **NARROW COLOUR TOLERANCE: 3-STEP MACADAM**
- **ENEC APPROVED**
- **PRODUCT GUARANTEE: 5 YEARS**

LED Line SMD W2.5 Light&Dark Full Spectrum

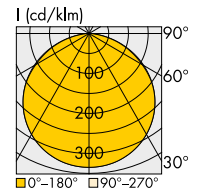
Technical Notes

- LED built-in module for integration into luminaires
- Dimensions
WU-M-684-SL: 280x25 mm
- Driving current:
Non-SELV: WU-M-684-SL-W/B:
150 mA, 200 mA, 250 mA, 350 mA, 500 mA
SELV: WU-M-684-SL-W/B-LV:
100 mA, 150 mA, 200 mA, 250 mA, 275 mA
- On-board push-in terminals
- SELV and Non-SELV application
- Colour rendering index (CRI): Ra95
- R9 colour rendering value: min. 80
- Colour tolerance: 3-step MacAdam
- Two PCB colours available: black and white



Typical Light Distribution Curve

Data are available in .ldt format for download under www.vossloh-schwabe.com.



Covers and Optics

Please visit our homepage for details for suitable optics:

- www.vossloh-schwabe.com/en/products/optics-reflectors/linear-optics/linear-optics-1r-for-smd-w2-lightdark-system

Linear LED Constant Current Drivers

Please visit our homepage for details for suitable LED constant current drivers www.vossloh-schwabe.com

Non-SELV variants

Electrical Characteristics

at $t_p = 50^\circ\text{C}$

Type	No. of SMDs	Temperature-coefficient [mV/K]	Typ. voltage DC					Typ. power consumption				
			150 mA	200 mA	250 mA	350 mA	500 mA	150 mA	200 mA	250 mA	350 mA	500 mA
WU-M-684-SL-W/B	28	-8.17	19.9	20.1	20.3	20.7	21.3	3.0	4.0	5.1	7.3	10.6

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

Maximum Ratings

Exceeding the maximum ratings can lead to reduction of service life or destruction of the module.

Type	Operating current (mA)	Operation temperature range at t_c point		Storage temperature range		Max. allowed repetitive peak current for frequencies ≥ 100 Hz
		$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	
WU-M-684-SL-W/B	500	-20	+80	-20	+70	600

Operating Life

in hours at measured temperature at t_p point

Type	150 mA			200 mA			250 mA			350 mA			500 mA		
	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$
WU-M-684-SL-W/B 28 LEDs – 280 mm															
L80/B10	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000

The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

LED Line SMD W2.5 Light&Dark Full Spectrum

Optical Characteristics – CRI > 95

at $t_p = 50\text{ }^\circ\text{C}$, without secondary optics

CRI: $R_a > 95$

Type	Ref. No. PCB colour		Colour	Correlated colour temp.* K	Typ. luminous flux** and typ. efficiency** at										Photometric code
	White (W)	Black (B)			150 mA		200 mA		250 mA		350 mA		500 mA		
					lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
WU-M-684-SL-W/B 28 LEDs – 280 mm															
WU-M-684-SL-W/B-930	on request	on request	WW	3000	350	117	465	115	580	114	800	110	1130	106	
WU-M-684-SL-W/B-940	572490	572491	NW	4000	380	126	505	125	625	123	865	119	1220	115	
WU-M-684-SL-W/B-950	on request	on request	CW	5000	380	126	505	125	625	123	865	119	1220	115	
WU-M-684-SL-W/B-965	572561	572504	CW	6500	365	122	485	121	605	119	840	115	1180	111	

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

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux and efficiency: $\pm 10\%$

Packaging unit 36 pcs.

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.

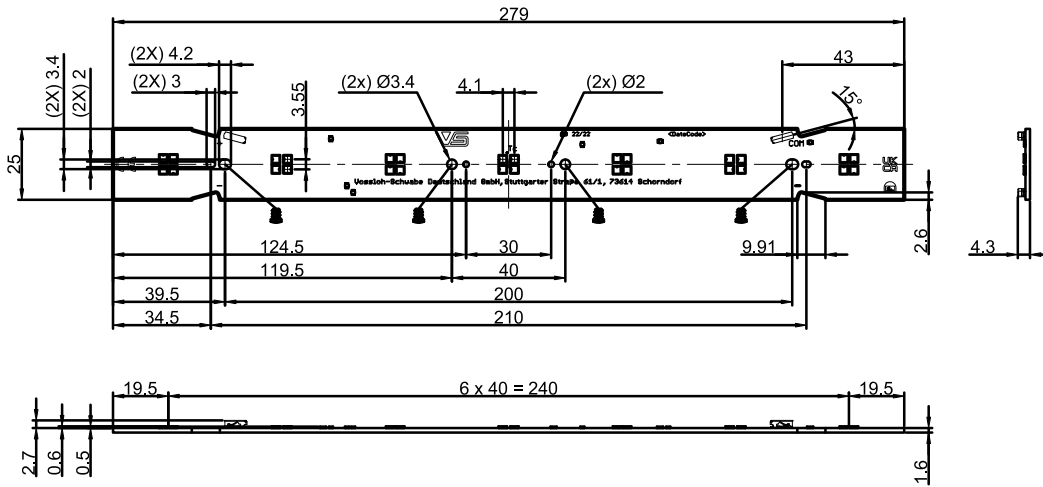
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LED Line SMD W2.5 Light&Dark Full Spectrum


Mechanical Dimensions

STC = Small Top Connection

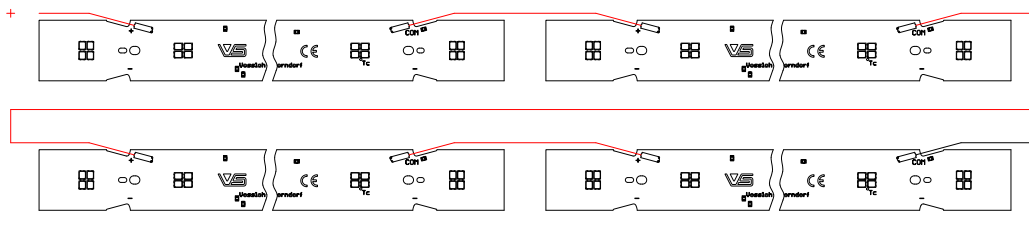
WU-M-684-SL-W/B



Connection Example

- The number of modules that can be connected in series depends on the available output voltage of the LED driver.
- The clearance and creepage distances are designed for working voltages up to 250 V DC (basic insulation) and 150 V DC (reinforced insulation).
- In case of assembly of the LED modules in profiles (e.g. aluminium) where the profile touches the top edge of the PCB the clearance and creepage distances are reduced to 150 V DC (basic insulation).
- Only the marked holes  are fixing holes for screws M3. Please do not use other holes for fixation!

Non-SELV



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SELV variants

Electrical Characteristics

at $t_p = 50^\circ\text{C}$

Type	No. of SMDs	Temperature-coefficient [mV/K]	Typ. voltage DC					Typ. power consumption				
			100 mA V	150 mA V	200 mA V	250 mA V	275 mA V	100 mA W	150 mA W	200 mA W	250 mA W	275 mA W
WU-M-684-SL-W/B-LV	28	-16.34	40.3	41.1	41.8	42.5	42.9	4.0	6.2	8.4	10.6	11.8

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

Maximum Ratings

Exceeding the maximum ratings can lead to reduction of service life or destruction of the module.

Type	Operating current (mA)	Operation temperature range at t_c point		Storage temperature range		Max. allowed repetitive peak current for frequencies ≥ 100 Hz
		$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	
WU-M-684-SL-W/B-LV	275	-20	+80	-20	+70	300

Operating Life

in hours at measured temperature at t_p point

Type	100 mA			150 mA			200 mA			250 mA			275 mA		
	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$	50 $^\circ\text{C}$	60 $^\circ\text{C}$	80 $^\circ\text{C}$
WU-M-684-SL-W/B-LV 28 LEDs - 280 mm															
L80/B10	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000	> 36,000

Optical Characteristics - CRI > 95

at $t_p = 50^\circ\text{C}$, without secondary optics

CRI: $R_a > 95$

Type	Ref. No. PCB colour		Colour	Correlated colour temp.* K	Typ. luminous flux** and typ. efficiency** at										Photometric code
	White (W)	Black (B)			100 mA		150 mA		200 mA		250 mA		275 mA		
					lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
WU-M-684-SL-W/B-LV 28 LEDs - 280 mm															
WU-M-684-SL-W/B-LV-930	573158	on request	WW	3000	465	115	690	112	910	109	1130	106	1235	105	
WU-M-684-SL-W/B-LV-940	572484	572492	NW	4000	505	125	745	121	985	118	1220	115	1335	113	
WU-M-684-SL-W/B-LV-950	on request	on request	CW	5000	505	125	745	121	985	118	1220	115	1335	113	
WU-M-684-SL-W/B-LV-965	572505	572506	CW	6500	485	121	720	117	955	114	1180	111	1290	109	

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

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux and efficiency: $\pm 10\%$

Packaging unit 36 pcs.

Product Guarantee

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- 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.

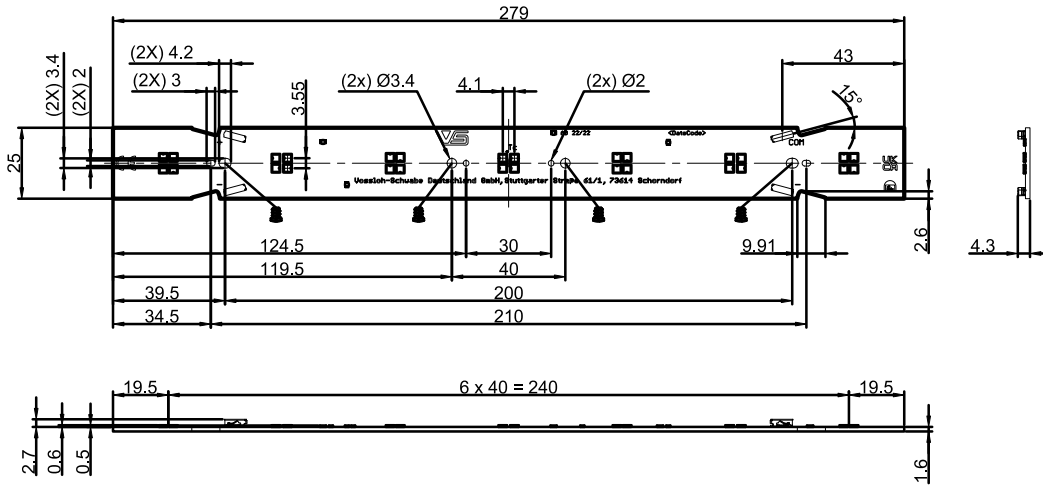
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LED Line SMD W2.5 Light&Dark Full Spectrum


Mechanical Dimensions

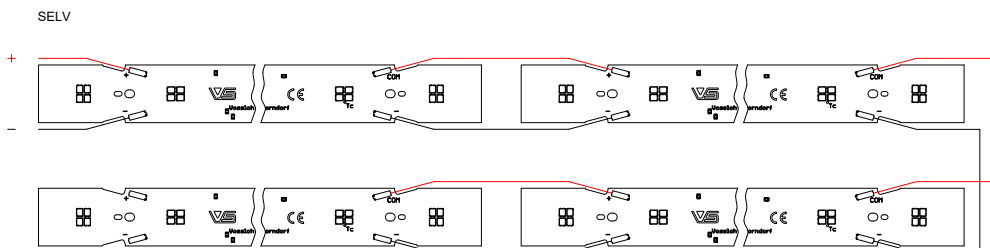
STC = Small Top Connection

WU-M-684-SL-W/B-LV



Connection Example

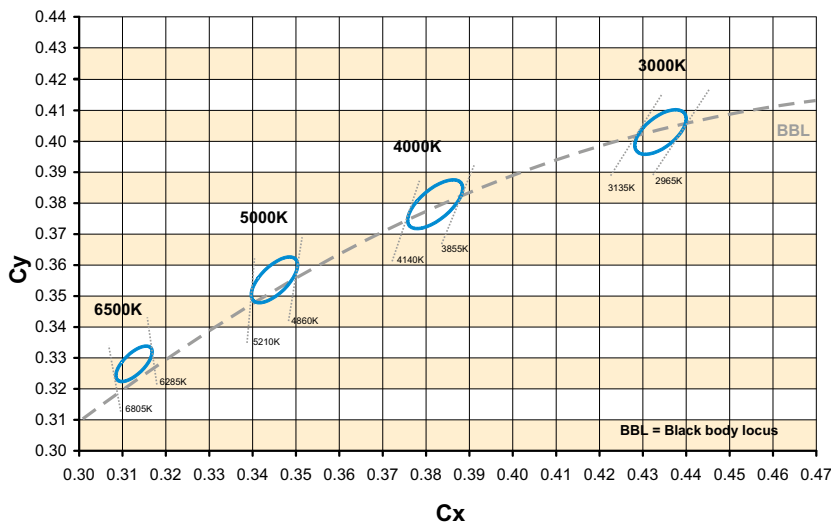
- The maximum number of modules that can be connected in one line (parallel connection of all boards) depends on the chosen operating current. The max. allowed current load on tracks and connectors is 1.1 A.
- The clearance and creepage distances are designed for working voltages up to 250 V DC (basic insulation) and 150 V DC (reinforced insulation)
- Only the marked holes  are fixing holes for screws M3. Please do not use other holes for fixation!



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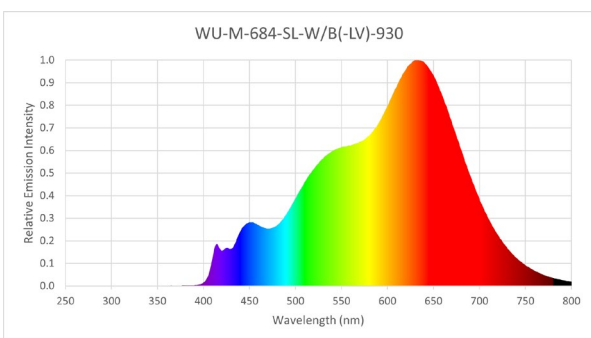
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Bins

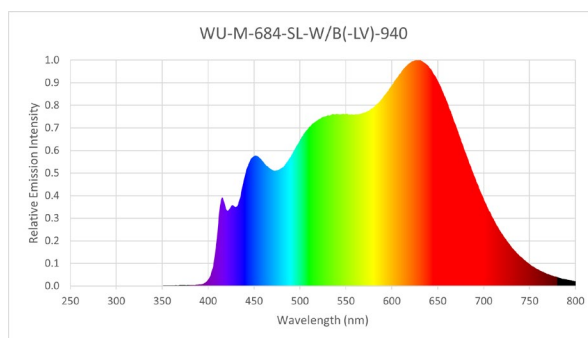


Spectral Power Distribution

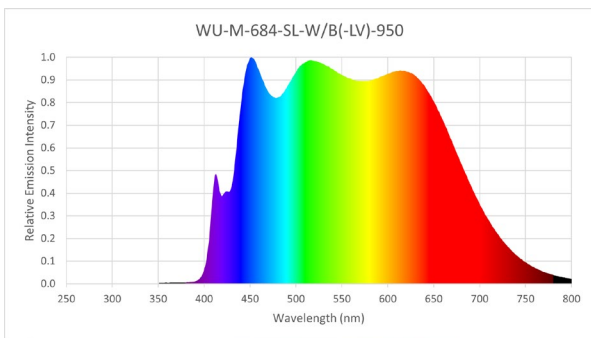
WU-M-684-SL-W/B(-LV)-930



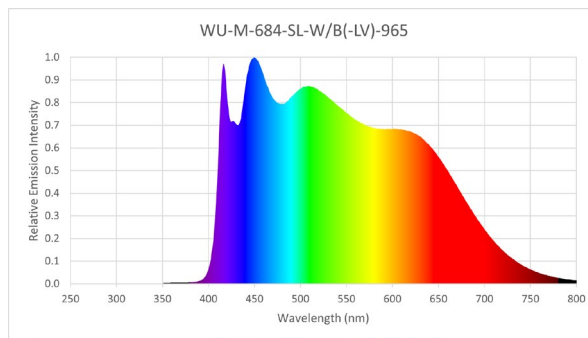
WU-M-684-SL-W/B(-LV)-940



WU-M-684-SL-W/B(-LV)-950



WU-M-684-SL-W/B(-LV)-965




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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. Installation must be carried out in a voltage-free state (i.e. disconnection from the mains). The following advice must be observed; non-observance can result in the destruction of the LED assembly modules, fire and/or other hazards.

- Consider safety regulations acc. EN 60598 in the luminaire design, especially when the operating LED driver is not galvanic isolated.
 - In mode of operation regard to sufficient isolation.
 - Live parts must not be touched in operation mode.



Danger of death!!!
- ESD (electrostatic discharge) protection measures must be observed when handling and installing the LED modules. See VS's application notes on ESD protection.
- Adequate anti-static electricity measures, including the use of conductive shoes, ionizers, work bench grounding, wrist straps, flooring and stools should be used.
- LED assembly modules must not be subjected to any undue mechanical stress, e. g.:
 - do not treat as bulk cargo
 - avoid shear and compressive forces during handling and installation
 - do not damage circuit paths
 - avoid any pressure on the light emitting surface
- Safe operation only possible by the use of external constant current sources (I_{max} , see table "Electrical Characteristics").
- Operation only with power supply units that feature the following protection:
 - Short-circuit protection
 - Overload protection
 - Overheating protection
- The module can be fixed with M3 screws. Fixation only with flat or cylinder head screws (M3) (no countersank screws) Max. torque: 1.2 Nm (M3)
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- For interconnection the LED modules is equipped with push-in terminals (WAGO 2065).
- Safety regulations acc. to EN 60598 (or further standards) has to be observed if the maximum output voltage exceed the permitted touchable value.
- Measurement tolerances:
 - luminous flux: $\pm 7\%$
 - voltage: $\pm 3\%$
 - CRI: ± 1
- The following points must be observed when connecting LED modules in parallel:
 - All LED strings that are wired in parallel must contain the same number of LEDs (symmetrical loading).
 - Owing to differing forward biases, there can be a difference of up to 10% in brightness between modules connected in parallel.
- To ensure problem-free operation, the specified maximum temperature at the 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.

- 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.
- Due to the manufacturing process, the PCBs of the LED assembly modules can have sharp edges and corners. Care must therefore be taken during handling and installation to avoid injury.
- 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.
- 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 1

WU-M-684-SL-W/B

CCT K	Max. operating current for risk group 1 mA	E threshold for higher operating currents to be risk group 1 lx
≤ 4000	500	1130
5000	500	928
6500	500	773

WU-M-684-SL-W/B-LV:

CCT K	Max. operating current for risk group 1 mA	E threshold for higher operating currents to be risk group 1 lx
≤ 4000	275	1130
5000	275	928
6500	275	773

Applied Standards

EN 62031
LED modules for general lighting – Safety specifications



EN 62471
Photobiological safety of lamps and lamp systems

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