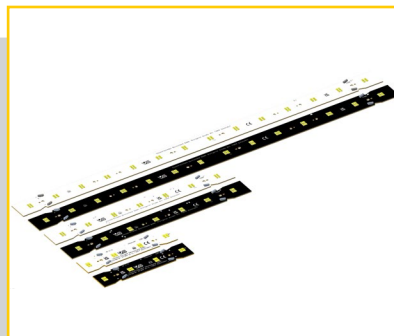


## LED LINE SMD W2.5 LIGHT&DARK



### LED LINE SMD W2.5 LIGHT&DARK

**WU-M-696-W/B, WU-M-696-W/B-LV**  
**WU-M-684-W/B, WU-M-684-W/B-LV**  
**WU-M-685-W/B, WU-M-685-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

- **LONG SERVICE LIFE TIME: 90,000 H (L80, B10)**
- **HIGHLY EFFICIENT: UP TO 205 LM/W  
AT T<sub>p</sub> = 50 °C**
- **3 LENGTHS AVAILABLE: 140 / 280 / 560 MM**
- **SELV AND NON-SELV VARIANTS AVAILABLE**
- **2 PCBs COLOR AVAILABLE: WHITE AND BLACK**
- **ENEC APPROVED**

## LED Line SMD W2.5 Light&Dark

### Technical Notes

- LED built-in module for integration into luminaires

- Dimensions

WU-M-696: 140x25 mm

WU-M-684: 280x25 mm

WU-M-685: 560x25 mm



Driving current:

Non-SELV:

WU-M-696-W/B, WU-M-684-W/B,

WU-M-685-W/B:

150 mA, 200 mA, 350 mA, 500 mA, 700 mA

SELV:

WU-M-696-W/B-LV, WU-M-684-W/B-LV:

100 mA, 150 mA, 200 mA, 250 mA, 350 mA

WU-M-685-W/B-LV:

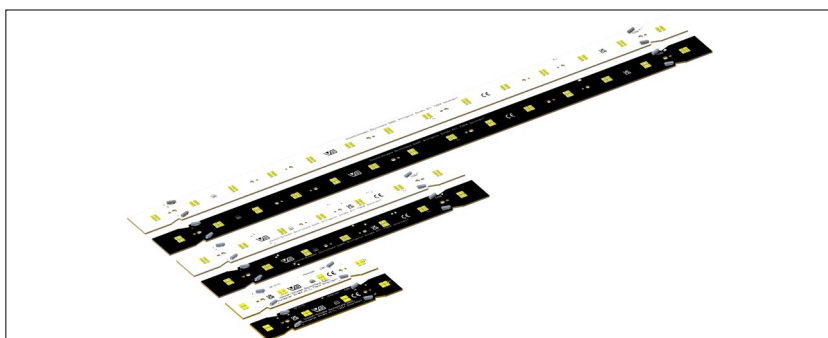
200 mA, 300 mA, 400 mA, 500 mA, 700 mA

- On-board push-in terminals

- Beam angle: 120°

- SELV and Non-SELV application

- Colour rendering index (CRI): Ra80 and Ra90



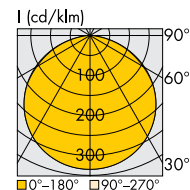
### Typical Light Distribution Curve

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



## Non-SELV variants

### Electrical Characteristics

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

Type	No. of SMDs	Typ. voltage DC					Typ. power consumption				
		150 mA	200 mA	350 mA	500 mA	700 mA	150 mA	200 mA	350 mA	500 mA	700 mA
		V	V	V	V	V	W	W	W	W	W
WU-M-696-W/B	16	10.6	10.7	10.9	11.3	11.7	1.6	2.1	3.8	5.6	8.2
WU-M-684-W/B	28	18.5	18.7	19.1	19.7	20.5	2.8	3.7	6.7	9.9	14.3
WU-M-685-W/B	56	37.0	37.4	38.2	39.4	41.0	5.5	7.5	13.4	19.7	28.7

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 $\geq 100$ Hz (mA)
		$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	$^\circ\text{C}$ min.	$^\circ\text{C}$ max.	
WU-M-696-W/B	700	-20	+80	-20	+70	1200
WU-M-684-W/B	700	-20	+80	-20	+70	1200
WU-M-685-W/B	700	-20	+80	-20	+70	1200

### Operating Life

in hours at measured temperature at  $t_p$  point

Type	150 mA			200 mA			350 mA			500 mA			700 mA		
	40 $^\circ\text{C}$	50 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	50 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	50 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	50 $^\circ\text{C}$	80 $^\circ\text{C}$	40 $^\circ\text{C}$	50 $^\circ\text{C}$	80 $^\circ\text{C}$
<b>WU-M-696-W/B</b>															
L80/B10	> 90,000	> 90,000	> 86,000	> 90,000	> 90,000	> 86,000	> 72,000	> 72,000	> 57,000	> 72,000	> 72,000	> 57,000	> 72,000	> 72,000	> 56,000
<b>WU-M-684-W/B,</b>															
L80/B10	> 90,000	> 90,000	> 86,000	> 90,000	> 90,000	> 85,000	> 72,000	> 72,000	> 56,000	> 72,000	> 72,000	> 53,000	> 72,000	> 72,000	> 51,000
<b>WU-M-685-W/B</b>															
L80/B10	> 90,000	> 90,000	> 86,000	> 90,000	> 90,000	> 85,000	> 72,000	> 72,000	> 56,000	> 72,000	> 72,000	> 53,000	> 72,000	> 72,000	> 51,000

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

## Optical Characteristics – CRI > 80

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

CRI:  $R_a > 80$

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		350 mA		500 mA		700 mA		
					lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-696-W/B 16LEDs - 140mm</b>															
WU-M-696-W/B-830	<b>572538</b>	<b>572542</b>	WW	3000	305	194	405	190	705	184	995	176	1365	167	830/349
WU-M-696-W/B-840	<b>572539</b>	<b>572543</b>	NW	4000	325	205	430	201	745	195	1050	186	1445	176	840/349
WU-M-696-W/B-850	<b>on request</b>	<b>on request</b>	CW	5000	325	205	430	201	745	195	1050	186	1445	176	850/349
WU-M-696-W/B-865	<b>on request</b>	<b>on request</b>	CW	6500	315	200	420	196	725	190	1025	182	1410	172	865/349
<b>WU-M-684-W/B 28LEDs - 280mm</b>															
WU-M-684-W/B-830	<b>572104</b>	<b>572106</b>	WW	3000	535	194	710	190	1230	184	1740	176	2395	167	830/349
WU-M-684-W/B-835	<b>572913</b>	<b>on request</b>	NW	3500	545	196	720	193	1245	186	1760	178	2420	169	835/349
WU-M-684-W/B-840	<b>572105</b>	<b>572107</b>	NW	4000	570	205	750	201	1300	195	1840	186	2530	176	840/349
WU-M-684-W/B-850	<b>on request</b>	<b>573143</b>	CW	5000	570	205	750	201	1300	195	1840	186	2530	176	850/349
WU-M-684-W/B-865	<b>572200</b>	<b>572202</b>	CW	6500	555	200	735	196	1270	190	1795	182	2470	172	865/349
<b>WU-M-685-W/B 56LEDs - 560mm</b>															
WU-M-685-W/B-830	<b>572120</b>	<b>572122</b>	WW	3000	1075	194	1425	190	2460	184	3475	176	4785	167	830/349
WU-M-685-W/B-840	<b>572121</b>	<b>572123</b>	NW	4000	1135	205	1505	201	2605	195	3675	186	5060	176	840/349
WU-M-685-W/B-850	<b>on request</b>	<b>573241</b>	CW	5000	1135	205	1505	201	2605	195	3675	186	5060	176	850/349
WU-M-685-W/B-865	<b>572205</b>	<b>572207</b>	CW	6500	1110	200	1470	196	2540	190	3585	182	4935	172	865/349

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

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

## Optical Characteristics – CRI > 90

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

CRI:  $R_a > 90$

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		350 mA		500 mA		700 mA		
					lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-696-W/B 16LEDs - 140mm</b>															
WU-M-696-W/B-930	<b>573018</b>	<b>573154</b>	WW	3000	260	165	345	162	600	157	845	150	1165	142	930/349
WU-M-696-W/B-940	<b>573063</b>	<b>572911</b>	NW	4000	275	173	360	170	625	164	885	157	1220	149	940/349
WU-M-696-W/B-950	<b>on request</b>	<b>on request</b>	CW	5000	275	173	360	170	625	164	885	157	1220	149	950/349
WU-M-696-W/B-965	<b>572540</b>	<b>572544</b>	CW	6500	265	166	350	163	605	158	850	151	1170	143	965/349
<b>WU-M-684-W/B 28LEDs - 280mm</b>															
WU-M-684-W/B-927	<b>573207</b>	<b>573208</b>	WW	2700	440	158	580	155	1000	150	1415	144	1950	136	927/349
WU-M-684-W/B-930	<b>572108</b>	<b>572110</b>	WW	3000	460	165	605	162	1050	157	1480	150	2040	142	930/349
WU-M-684-W/B-940	<b>572109</b>	<b>572111</b>	NW	4000	480	173	635	170	1095	164	1550	157	2135	149	940/349
WU-M-684-W/B-950	<b>on request</b>	<b>on request</b>	CW	5000	480	173	635	170	1095	164	1550	157	2135	149	950/349
WU-M-684-W/B-965	<b>572201</b>	<b>572203</b>	CW	6500	460	166	610	163	1055	158	1490	151	2050	143	965/349
<b>WU-M-685-W/B 56LEDs - 560mm</b>															
WU-M-685-W/B-930	<b>572124</b>	<b>572126</b>	WW	3000	915	165	1210	162	2095	157	2960	150	4075	142	930/349
WU-M-685-W/B-940	<b>572125</b>	<b>572127</b>	NW	4000	960	173	1270	170	2195	164	3100	157	4265	149	940/349
WU-M-685-W/B-950	<b>on request</b>	<b>on request</b>	CW	5000	960	173	1270	170	2195	164	3100	157	4265	149	950/349
WU-M-685-W/B-965	<b>572206</b>	<b>572208</b>	CW	6500	920	166	1220	163	2110	158	2980	151	4100	143	965/349

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

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

## 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.

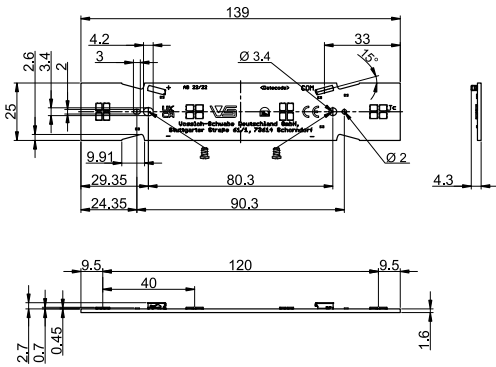
The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

# LED Line SMD W2.5 Light&Dark

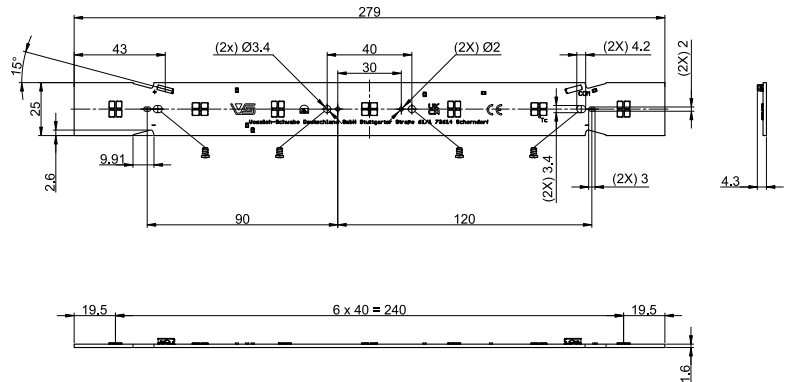
## Mechanical Dimensions

STC = Small Top Connection

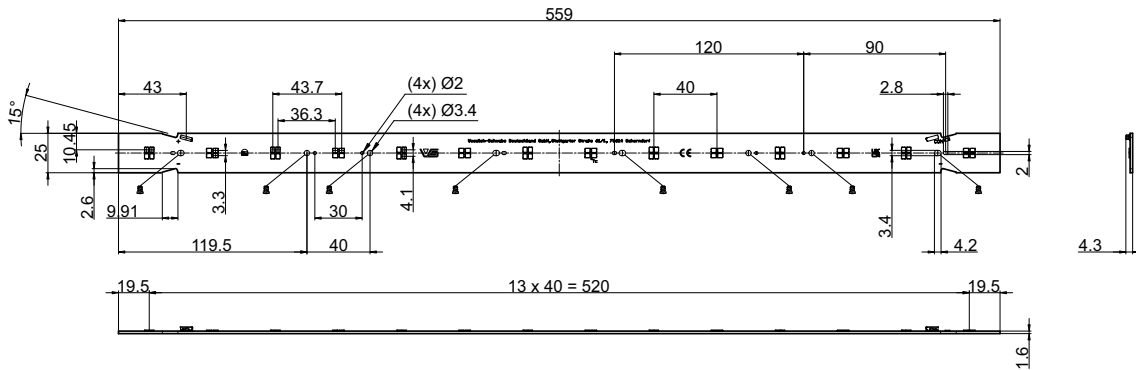
### WU-M-696-W/B




### WU-M-684-W/B



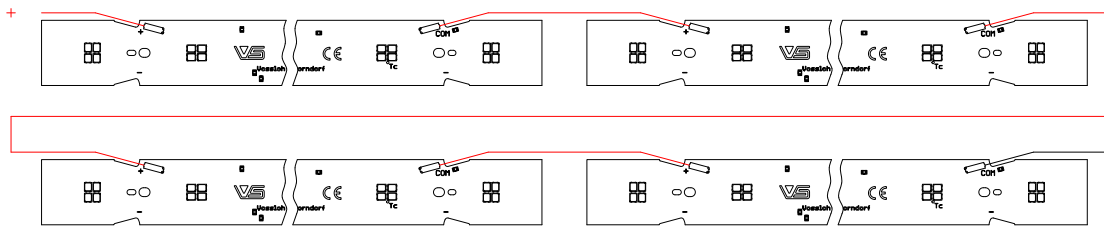
### WU-M-685-W/B



## 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  $t_p = 50\text{ °C}$

Type	No. of SMDs	Typ. voltage DC					Typ. power consumption				
		100 mA V	150 mA V	200 mA V	250 mA V	350 mA V	100 mA W	150 mA W	200 mA W	250 mA W	350 mA W
WU-M-696-W/B-LV	16	21.3	21.7	22.1	22.5	23.4	2.1	3.2	4.4	5.6	8.2
WU-M-684-W/B-LV	28	37.4	37.9	38.6	39.4	41.0	3.7	5.7	7.7	9.9	14.3

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

Type	No. of SMDs	Typ. voltage DC					Typ. power consumption				
		200 mA V	300 mA V	400 mA V	500 mA V	700 mA V	200 mA W	300 mA W	400 mA W	500 mA W	700 mA W
WU-M-685-W/B-LV	56	37.4	37.9	38.6	39.4	41.0	7.5	11.4	15.4	19.7	28.7

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 $\geq 100\text{ Hz}$ (mA)
		$^{\circ}\text{C min.}$	$^{\circ}\text{C max.}$	$^{\circ}\text{C min.}$	$^{\circ}\text{C max.}$	
WU-M-696-W/B-LV	350	-20	+80	-20	+70	600
WU-M-684-W/B-LV	350	-20	+80	-20	+70	600
WU-M-685-W/B-LV	700	-20	+80	-20	+70	1200

### Operating Life

in hours at measured temperature at  $t_p$  point

Type	100 mA			150 mA			200 mA			250 mA			350 mA		
	40 °C	50 °C	80 °C	40 °C	50 °C	80 °C	40 °C	50 °C	80 °C	40 °C	50 °C	80 °C	40 °C	50 °C	80 °C
<b>WU-M-696-W/B-LV 16LEDs - 140mm</b>															
L80/B10	> 90,000	> 90,000	> 86,000	> 90,000	> 90,000	> 86,000	> 72,000	> 72,000	> 57,000	> 72,000	> 72,000	> 57,000	> 72,000	> 72,000	> 56,000
<b>WU-M-684-W/B-LV 28LEDs - 280mm</b>															
L80/B10	> 90,000	> 90,000	> 85,000	> 90,000	> 90,000	> 85,000	> 72,000	> 72,000	> 55,000	> 72,000	> 72,000	> 54,000	> 72,000	> 72,000	> 52,000
<b>WU-M-685-W/B-LV 56LEDs - 560mm</b>															
L80/B10	> 90,000	> 90,000	> 86,000	> 90,000	> 90,000	> 85,000	> 72,000	> 72,000	> 56,000	> 72,000	> 72,000	> 53,000	> 72,000	> 72,000	> 51,000

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

## Optical Characteristics – CRI > 80

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

CRI:  $R_a > 80$

Type	Ref. No.		Colour	Correlated colour temp.* K	Typ. luminous flux** and typ. efficiency** at										Photometric code
	PCB colour				100 mA		150 mA		200 mA		250 mA		350 mA		
	White (W)	Black (B)			lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-696-W/B-LV 16LEDs - 140mm</b>															
WU-M-696-W/B-LV-830	572493	572497	WW	3000	405	190	605	186	800	182	995	176	1365	167	830/349
WU-M-696-W/B-LV-840	572494	572498	NW	4000	430	201	640	197	845	192	1050	186	1445	176	840/349
WU-M-696-W/B-LV-850	on request	on request	CW	5000	430	201	640	197	845	192	1050	186	1445	176	850/349
WU-M-696-W/B-LV-865	on request	on request	CW	6500	420	196	625	192	825	187	1025	182	1410	172	865/349
<b>WU-M-684-W/B-LV 28LEDs - 280mm</b>															
WU-M-684-W/B-LV-830	572096	572098	WW	3000	710	190	1060	186	1400	182	1740	176	2395	167	830/349
WU-M-684-W/B-LV-835	573089	573267	WW	3500	725	194	1080	190	1430	185	1775	180	2440	170	835/349
WU-M-684-W/B-LV-840	572097	572099	NW	4000	750	201	1120	197	1480	192	1840	186	2530	176	840/349
WU-M-684-W/B-LV-850	on request	on request	CW	5000	750	201	1120	197	1480	192	1840	186	2530	176	850/349
WU-M-684-W/B-LV-865	572209	572211	CW	6500	735	196	1090	192	1445	187	1795	182	2470	172	865/349

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

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

Type	Ref. No.		Colour	Correlated colour temp.* K	Typ. luminous flux** and typ. efficiency** at										Photometric code
	PCB colour				200 mA		300 mA		400 mA		500 mA		700 mA		
	White (W)	Black (B)			lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-685-W/B-LV 56LEDs - 560mm</b>															
WU-M-685-W/B-LV-830	572112	572114	WW	3000	1425	190	2115	186	2805	182	3475	176	4785	167	830/349
WU-M-685-W/B-LV-840	572113	572115	NW	4000	1505	201	2240	197	2965	192	3675	186	5060	176	840/349
WU-M-685-W/B-LV-850	on request	on request	CW	5000	1505	201	2240	197	2965	192	3675	186	5060	176	850/349
WU-M-685-W/B-LV-865	572213	572215	CW	6500	1470	196	2185	192	2890	187	3585	182	4935	172	865/349

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

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

## Optical Characteristics – CRI > 90

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

CRI:  $R_a > 90$

Type	Ref. No.		Colour	Correlated colour temp.* K	Typ. luminous flux** and typ. efficiency** at										Photometric code
	PCB colour				100 mA		150 mA		200 mA		250 mA		350 mA		
	White (W)	Black (B)			lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-696-W/B-LV 16LEDs - 140mm</b>															
WU-M-696-W/B-LV-930	572495	572499	WW	3000	345	162	515	159	680	155	845	150	1165	142	930/349
WU-M-696-W/B-LV-940	572496	572500	NW	4000	360	170	540	166	715	162	885	157	1220	149	940/349
WU-M-696-W/B-LV-950	on request	on request	CW	5000	360	170	540	166	715	162	885	157	1220	149	950/349
WU-M-696-W/B-LV-965	572541	572545	CW	6500	350	163	520	160	685	156	850	151	1170	143	965/349
<b>WU-M-684-W/B-LV 28LEDs - 280mm</b>															
WU-M-684-W/B-LV-930	572100	572102	WW	3000	605	162	900	159	1195	155	1480	150	2040	142	930/349
WU-M-684-W/B-LV-940	572101	572103	NW	4000	635	170	945	166	1250	162	1550	157	2135	149	940/349
WU-M-684-W/B-LV-950	on request	on request	CW	5000	635	170	945	166	1250	162	1550	157	2135	149	950/349
WU-M-684-W/B-LV-965	572210	572212	CW	6500	610	163	905	160	1200	156	1490	151	2050	143	965/349

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

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

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

Type	Ref. No.		Colour	Correlated colour temp.*	Typ. luminous flux** and typ. efficiency**										Photometric code
	PCB colour				200 mA		300 mA		400 mA		500 mA		700 mA		
	White (W)	Black (B)			lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	
<b>WU-M-685-W/B-LV 56LEDs - 560mm</b>															
WU-M-685-W/B-LV-930	<b>572116</b>	<b>572118</b>	WW	3000	1210	162	1805	159	2385	155	2960	150	4075	142	930/349
WU-M-685-W/B-LV-940	<b>572117</b>	<b>572119</b>	NW	4000	1270	170	1885	166	2500	162	3100	157	4265	149	940/349
WU-M-685-W/B-LV-950	<b>on request</b>	<b>on request</b>	CW	5000	1270	170	1885	166	2500	162	3100	157	4265	149	950/349
WU-M-685-W/B-LV-965	<b>572214</b>	<b>572216</b>	CW	6500	1220	163	1815	160	2400	156	2980	151	4100	143	965/349

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

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

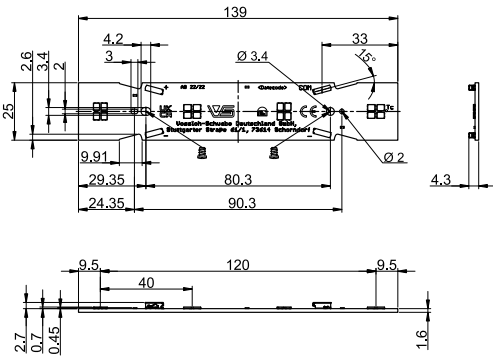
## Product Guarantee

- 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.

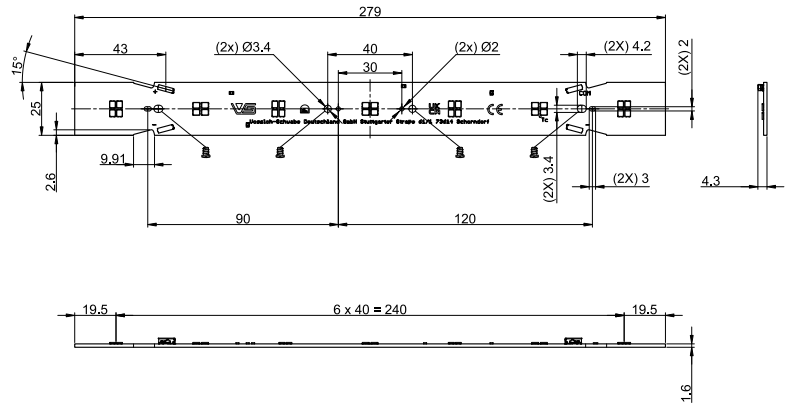
## Mechanical Dimensions

## STC = Small Top Connection

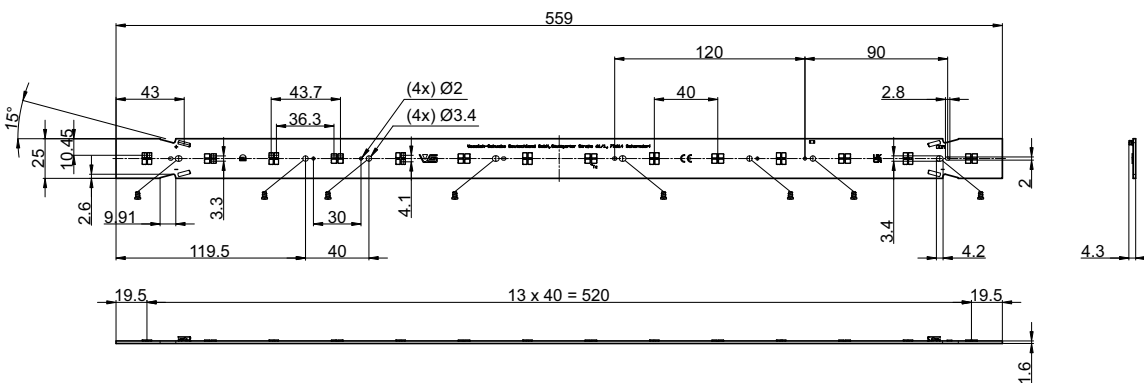
### WU-M-696-W/B-LV



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




### WU-M-685-W/B-LV

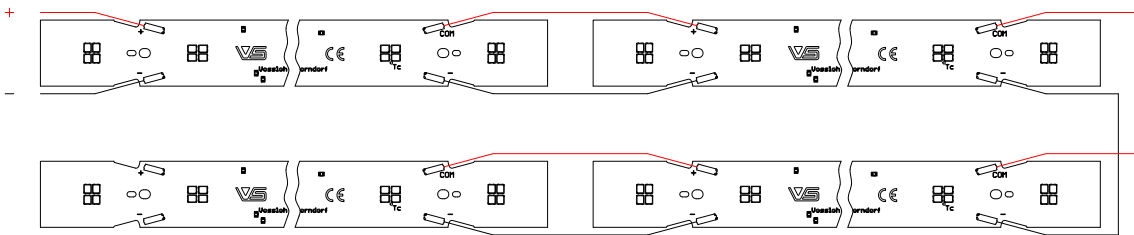


The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

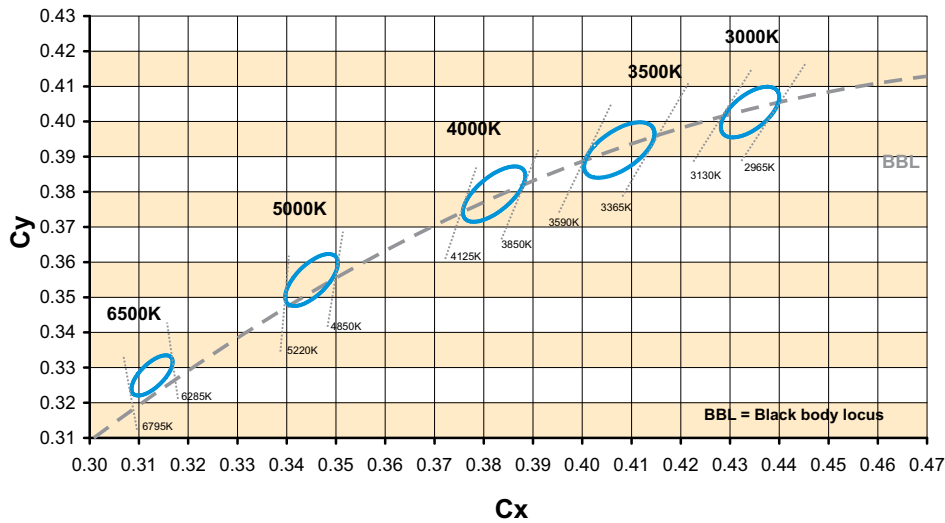
## Connection Example

- 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 1.8 A.  
 $I_{\text{Driver}} = I_{\text{Module}} \times n$  (the number of modules)
- 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!

SELV



## Bins



## Lineare LED Constant Current Drivers

Please visit our homepage for details for suitable LED constant current drivers: [www.vossloh-schwabe.com](http://www.vossloh-schwabe.com)

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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 luminair 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 in life!!!

- 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 countersunk 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:  $\pm 1$
- 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](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

### WU-M-684-W/B, WU-M-685-W/B, WU-M-685-W/B-LV, WU-M-696-W/B:

CCT K	Max. operating current for risk group 1 mA	E threshold for higher operating currents to be risk group 1 lx
$\leq 4000$	700	1221
5000	700	1009
6500	700	793

### WU-M-684-W/B-LV, WU-M-696-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
$\leq 4000$	350	1221
5000	350	1009
6500	350	793

### Applied Standards

EN 62031

LED modules for general lighting – Safety specifications

EN 62471

Photobiological safety of lamps and lamp systems

