

LED Line SMD **SELV** – L28/56 W2

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700 lm, 1200 lm, 2100 lm



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– 700 lm, 1200 lm, 2100 lm

WU-M-608/609/610 and WU-M-611/612/613

Typical Applications

Built-in luminaires/general illumination

- Office lighting
- Retail, corridor and shelf lighting
- T5/T8 replacement as built-in module
- Furniture lighting
- Backlighting for advertising

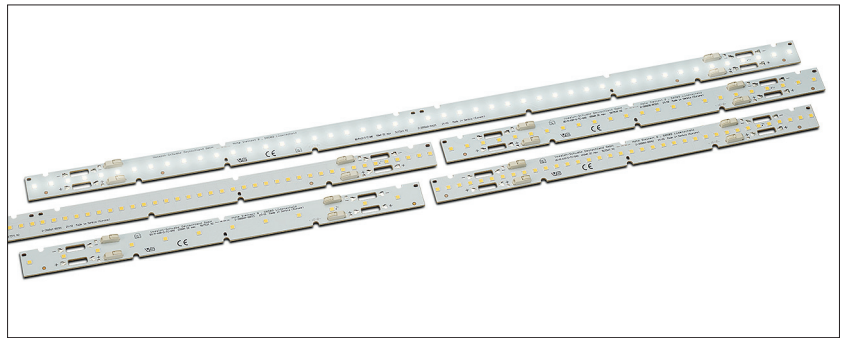
LED Line SMD SELV –
L28/56 W2

- **HIGHLY EFFICIENT: UP TO 178 LM/W
AT T_p = 50 °C**
- **2 LENGTHS AVAILABLE: 280 AND 560 MM**
- **3 DIFFERENT LUMEN PACKAGES**
- **ZHAGA-COMPLIANT DIMENSIONS**
- **LONG SERVICE LIFE TIME: 54,000 H (L80, B10)**

LED Line SMD SELV – L28/56 W2

Technical Notes

- LED built-in module for integration into luminaires
- Dimensions
WU-M-608/609/610: 280x20 mm
WU-M-611/612/613: 560x20 mm
- On-board push-in terminals, optional on top or bottom
- Beam angle: 120°
- Colour rendering index (CRI): R_a 80



Electrical and Optical Characteristics

at t_p = 50 °C

Type	No. of SMDs	Operating current* mA	Typ. voltage DC V	Typ. power consumption W	Correlated colour temperature* and typ. luminous flux** and typ. efficiency**							
					3000 K		4000 K		5000 K		6500 K	
					lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W

LED Line SMD SELV – L28 W2

WU-M-608	12	130	34.5	4.48	720	161	770	172	780	174	740	165
WU-M-608	12	200	36	7.2	1075	149	1150	160	1170	163	1110	154
WU-M-608	12	250	36.9	9.23	1310	142	1410	153	1430	155	1355	147
WU-M-609	24	200	33.7	6.75	1120	166	1200	178	1220	181	1155	171
WU-M-609	24	325	35.1	11.42	1765	155	1895	166	1920	168	1825	160
WU-M-609	24	350	35.4	12.39	1890	153	2030	164	2055	166	1955	158
WU-M-610	36	350	34.1	11.93	1935	162	2075	174	2105	176	2000	168
WU-M-610	36	400	34.5	13.78	2190	159	2355	171	2385	173	2265	164
WU-M-610	36	450	34.8	15.67	2445	156	2625	168	2665	170	2530	161

LED Line SMD SELV – L56 W2

WU-M-611	24	260	34.4	8.95	1430	160	1535	172	1560	174	1480	165
WU-M-611	24	400	35.9	14.37	2135	149	2290	159	2325	162	2205	153
WU-M-611	24	500	36.9	18.43	2605	141	2795	152	2835	154	2690	146
WU-M-612	48	400	33.7	13.48	2225	165	2390	177	2425	180	2300	171
WU-M-612	48	650	35	22.78	3495	153	3755	165	3810	167	3615	159
WU-M-612	48	700	35.3	24.72	3740	151	4020	163	4075	165	3870	157
WU-M-613	72	700	34	23.8	3835	161	4120	173	4175	175	3965	167
WU-M-613	72	800	34.4	27.49	4340	158	4660	170	4725	172	4485	163
WU-M-613	72	900	34.7	31.24	4835	155	5190	166	5265	169	5000	160

* Colour tolerance: 3 MacAdams | ** Voltage, power consumption and lumen tolerance: ± 10% | CRI > 90 on request
Sufficient cooling must be provided. Heat sink may be required so that module temperature will not exceed maximum ratings.

Use of external LED constant current driver required.

Reference Numbers Overview

Type	No. of SMDs	Correlated colour temperature / connection options							
		3000 K		4000 K		5000 K		6500 K	
		top (TC)	bottom (BC)	top (TC)	bottom (BC)	top (TC)	bottom (BC)	top (TC)	bottom (BC)

LED Line SMD SELV – L28 W2

WU-M-608-S-TC/BC-xxx	12	567530	567534	567531	567535	567532	567536	567533	567537
WU-M-609-S-TC/BC-xxx	24	567538	567542	567539	567543	567540	567544	567541	567545
WU-M-610-S-TC/BC-xxx	36	567546	567550	567547	567551	567548	567552	567549	567553

LED Line SMD SELV – L56 W2

WU-M-611-S-TC/BC-xxx	24	567554	567558	567555	567559	567556	567560	567557	567561
WU-M-612-S-TC/BC-xxx	48	567562	567566	567563	567567	567564	567568	567565	567569
WU-M-613-S-TC/BC-xxx	72	567570	567574	567571	567575	567572	567576	567573	567577

Minimum order quantity (packaging unit): 150 pcs. (WU-M-608/609/610); 120 pcs. (WU-M-611/612/613)

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LED Line SMD SELV – L28/56 W2

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 (mA)	Max. allowed current load on tracks and connectors (mA)
		°C min.	°C max.	°C min.	°C max.		
WU-M-608	300	-20	+80	-20	+85	400	3600
WU-M-609	500					800	
WU-M-610	700					1200	
WU-M-611	600					800	
WU-M-612	1000					1600	
WU-M-613	1400					2400	

Operating Life

L80/B10

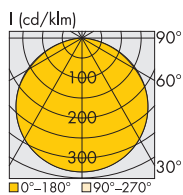
in hours at measured temperature at t_p point

Module type	WU-M-608			WU-M-609			WU-M-610			
	Operating current	130 mA	200 mA	250 mA	200 mA	325 mA	350 mA	350 mA	400 mA	450 mA
40 °C	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000
50 °C	> 54,000	> 54,000	50,000	> 54,000	> 54,000	50,000	> 54,000	> 54,000	> 54,000	> 54,000
75 °C	> 54,000	50,000	45,000	> 54,000	50,000	45,000	> 54,000	45,000	45,000	45,000

Module type	WU-M-611			WU-M-612			WU-M-613			
	Operating current	260 mA	400 mA	500 mA	400 mA	650 mA	700 mA	700 mA	800 mA	900 mA
40 °C	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000
50 °C	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000	> 54,000
75 °C	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	45,000	45,000

Typical Light Distribution Curves

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



Without cover

Light distribution curve for LED Line SMD modules **with covers** see page 7.

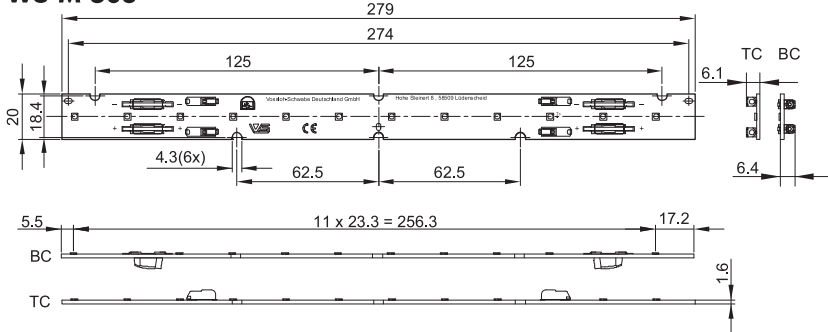
Light distribution curve for LED Line SMD modules **with optics** see page 8.

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LED Line SMD SELV – L28/56 W2

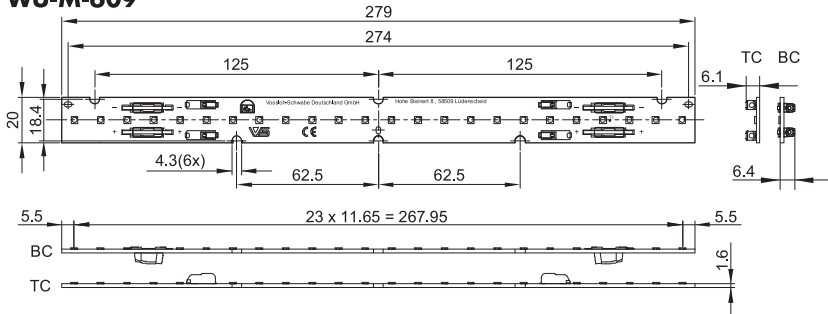
Mechanical Dimensions

WU-M-608

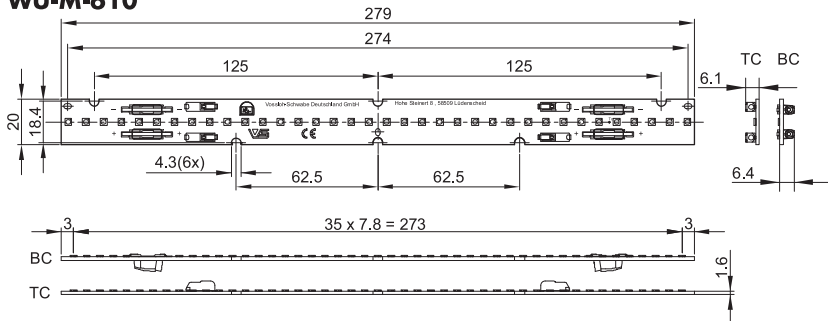


TC = Top Connection
BC = Bottom Connection

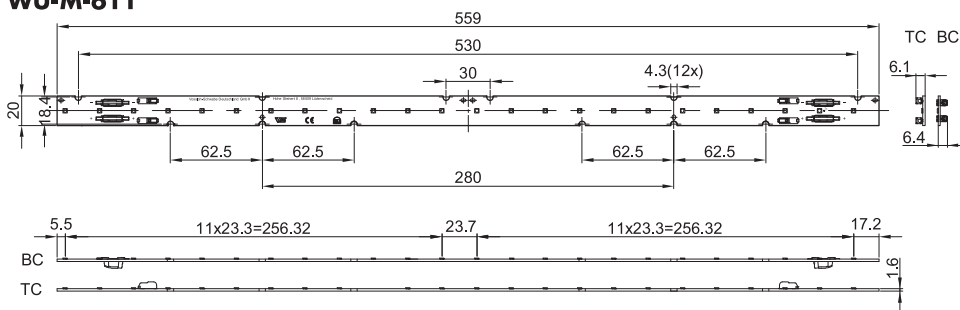
WU-M-609



WU-M-610



WU-M-611

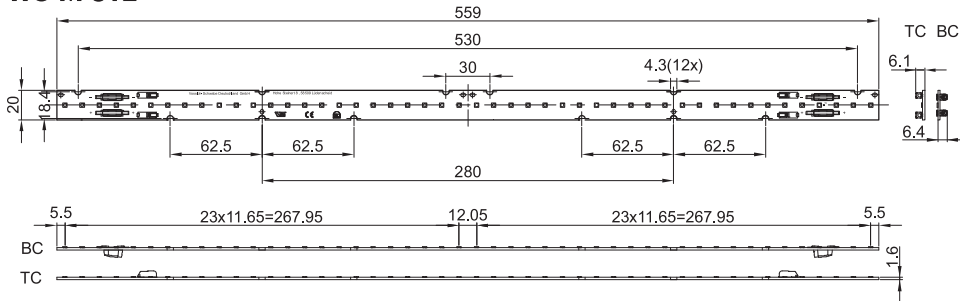


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LED Line SMD SELV – L28/56 W2

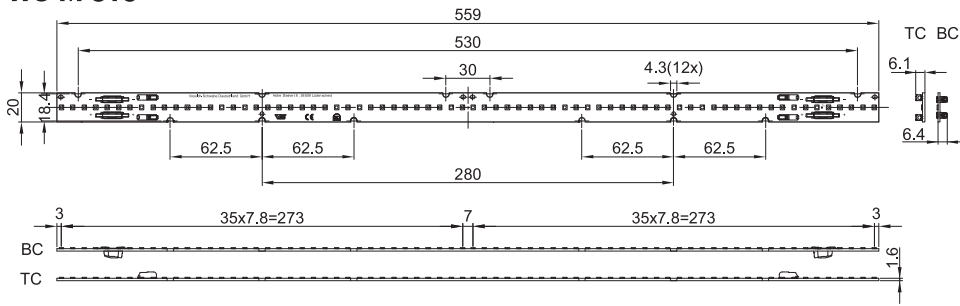
Mechanical Dimensions

WU-M-612




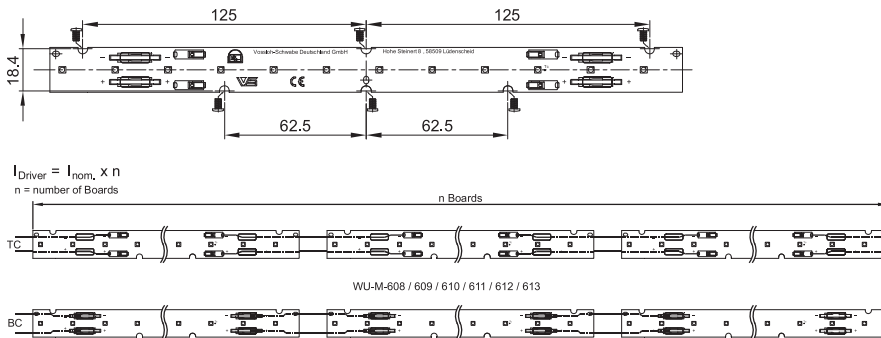
TC = Top Connection
BC = Bottom Connection

WU-M-613



Connection Example

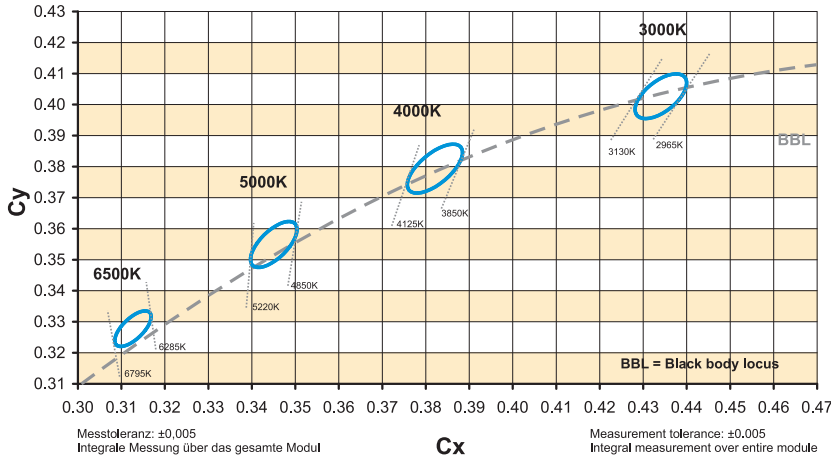
- The maximum number of modules that can be connected in one line (parallel connection of all boards) depends on the chosen operating current. The max. allowed current load on tracks and connectors is 3.6 A.
- The clearance and creepage distances are designed for working voltages up to 350 V DC (basic insulation) and 185 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 175 V DC (basic insulation) and 50 V DC (reinforced insulation).
- Max. diameter of screw head (M4): Ø 8 mm
- Only the marked holes  are fixing holes for screws M4. Please do not use other holes for fixation!



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LED Line SMD SELV – L28/56 W2

Bins



Fixing Clip

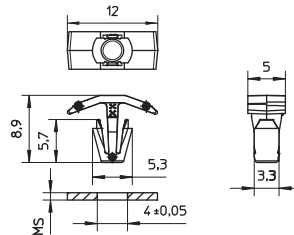
For fastening LED PCBs to luminaire sheets without needing screws

PCB hole dia.: 4.3–4.5 mm

Vibration resistant version

Material: PC, white (UL-94 V2)

Weight: 0.2 g, Packaging unit: 1000 pcs. (.11 = 10,000 pcs.)



Type	Ref. No.	For luminaire sheet thickness (MS) mm
98050	562870	0.5–1.0*

* PCB thickness: 1.6 mm

Linear LED Constant Current Drivers

Please visit our homepage for details for suitable

LED constant current drivers: www.vossloh-schwabe.com

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LED Line SMD SELV – L28/56 W2

Cover W2 for clip fixing or tape fixing

A semi-transparent or a diffuse cover is available for the modules LED Line SMD W2 which protects the SMD board. The cover reduces glare and makes a homogeneous light distribution.

Easy assembly by clip fixing of the cover under the fixing screws of the SMD board or by tape fixing.

Technical Notes for Cover

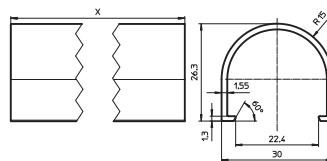
Material: PMMA

High transmission:

- 92% semi-transparent
- 84% diffuse

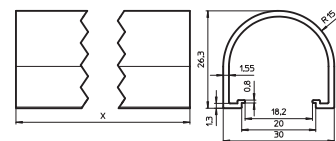
For clip fixing

Recommended diameter of fixing screw head: 7 mm



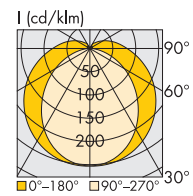
For tape fixing

No screws for PCB and cover fixing needed

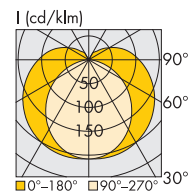


Type	Ref. No. for clip fixing	Type	Ref. No. for tape fixing	Length X mm	Version	Efficiency %	Weight g	Packaging unit pcs.
89830	568591	89800	562549	597	semi-transparent	92	81.8	240
89831	568593	89801	562551	1200	semi-transparent	92	164.4	192
89832	568595	89802	562553	1500	semi-transparent	92	205.5	192
89833	568597	89803	562555	1800	semi-transparent	92	246.6	192
89834	568865	—	on request	3000	semi-transparent	92	410	192
89830	568592	89800	562550	597	diffuse	84	81.8	240
89831	568594	89801	562552	1200	diffuse	84	164.4	192
89832	568596	89802	562554	1500	diffuse	84	205.5	192
89833	568598	89803	562556	1800	diffuse	84	246.6	192
89834	568866	—	on request	3000	diffuse	84	410	192

Length tolerance: 597 mm ± 1 mm (ends finished), 1200 / 1500 / 1800 / 3000 mm + 10 mm (ends raw)



With semi-transparent cover



With diffuse cover

End caps for cover for clip fixing

End caps with or without wire hole for push-fit into the cover

Material: PC, transparent

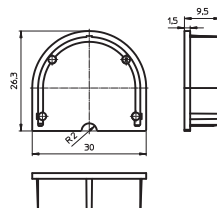
Weight: 2 g, Packaging unit: 250 pcs.

Type: 898

Ref. No.: 562500 end cap with wire hole

Ref. No.: 562499 end cap without wire hole

End cap with wire hole



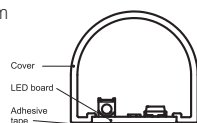
Preassembled module SMD board including W2 adhesive cover

The cover and PCB are fixed together with double-side adhesive assembled.

No screws for PCB and cover fixing needed!

Length: assembled 597 mm

Packaging unit: 242 pcs.



Type	Ref. No.	Cover	SMD board
89800	on request	semi-transparent	on request
89800	on request	diffus	on request

With W2 SMD boards (colour temperature and lengths) on request

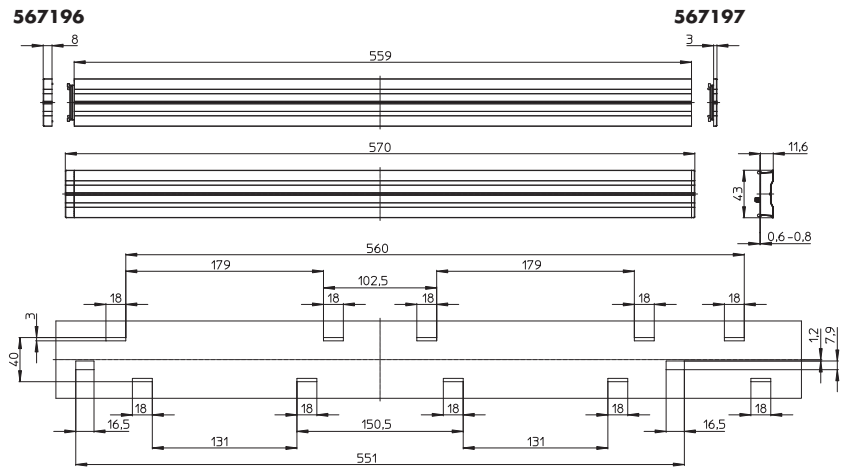
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W2 Optics

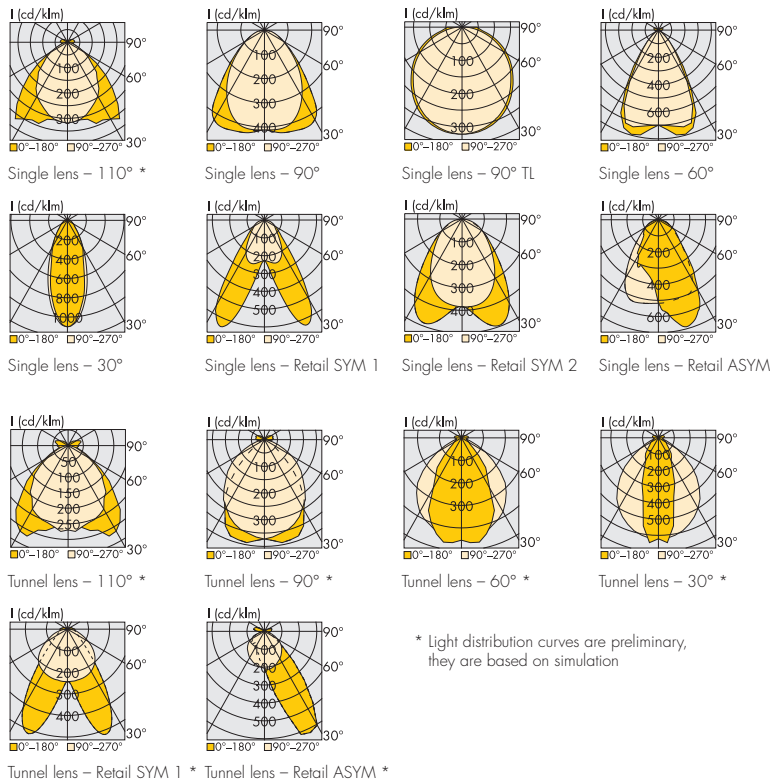
For LED Line SMD SELV – L28/56 W2

Technical Notes

Highly efficient of up to 93%
 Constant Light Colour (CLC): very low colour temperature deviations over beam angle
 Extended Luminous Area (ELA): light emission over the entire surface of the optics
 Material: PMMA, clear or translucent (TL)
 Max. allowed temperature: 80 °C
 Dimensions (LxWxH): 559x43x11.6 mm
 Optics can be stringed together for module chains
 Single lens version for WU-M-608/609/611/612 with bottom connection (BC) only
 Tunnel lens version for WU-M-608/609/610/611/612/613 with bottom connection (BC) only
 Clip fixation for metal sheets with wall thickness of 0.6–0.8 mm or aluminium profiles



Light distribution	Optics type	Ref. No.	Weight g
Single lens			
Extra Wide 110°	97005	568236	124
Wide 90°	97000	568075	115
Wide 90° TL	97000	568412	115
Medium 60°	97003	568238	107
Narrow 30°	97002	568239	104
Retail SYM 1	97001	568240	108
Retail SYM 2	97001	568413	108
Retail ASYM	97004	568237	104
Tunnel lens			
Extra Wide 110°	97105	568248	130
Wide 90°	97100	568243	118
Medium 60°	97103	568246	116
Narrow 30°	97102	568245	114
Retail SYM 1	97101	568244	118
Retail ASYM	97104	568247	114



* Light distribution curves are preliminary, they are based on simulation

End Caps

Lateral attachment on the optics
 (on the side of the groove or tongue)
 Material: PC, clear or translucent (TL)

End cap type	For optics type	Ref. No.	Weight g
Tongue side	970	567196	1.85
Groove side	970	567197	1.45
Tongue side TL	970	568601	1.85
Groove side TL	970	568602	1.45

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LED Line SMD SELV – L28/56 W2

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.
- 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 could 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 M4 screws. Fixation only with flat or cylinder head screws (M4) (no countersunk screws)
Max. torque: 1.2 Nm (M4)
- 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.
- 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

Type	CCT K	Max. operating current for risk group 1 mA	E threshold for higher operating currents to be risk group 1 (lx)
WU-M-608	≤ 4000	282	1130
	5000	179	657
	6500	174	545
WU-M-609	≤ 4000	564	1130
	5000	358	657
	6500	348	545
WU-M-610	≤ 4000	846	1130
	5000	537	657
	6500	522	545
WU-M-611	≤ 4000	564	1130
	5000	358	657
	6500	348	545
WU-M-612	≤ 4000	1128	1130
	5000	716	657
	6500	696	545
WU-M-613	≤ 4000	1692	1130
	5000	1074	657
	6500	1044	545

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LED Line SMD **SELV** – L28/56 W2

Applied Standards

EN 62031

LED modules for general lighting – Safety specifications



pending

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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