

LED LINE CSP TUNEABLE

L28/56 W2



LED LINE CSP TUNEABLE – L28/56 W2

WU-M-524 / -525

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 CSP Tuneable W2

- **COLOUR DYNAMIC FROM 2700 TO 6000 K**
- **LONG SERVICE LIFE TIME: > 60,000 H (L90, B10)**
- **HIGHLY EFFICIENT: UP TO 132 LM/W
AT T_p = 50 °C**
- **2 LENGTHS AVAILABLE: 280 / 560 MM**
- **DIFFUSE OR SEMI-TRANSPARENT COVERS**
- **ZHAGA-COMPLIANT HOLE DISTANCE**

LED Line CSP Tuneable – L28/56 W2

Technical Notes

- LED built-in module for integration into luminaires
- Dimensions
WU-M-524: 280x20 mm
WU-M-525: 560x20 mm
- Driving current: 350 mA / 500 mA / 700 mA
- On-board push-in connector (WAGO 2060)
- Colour tolerance: 3-step MacAdam or 4-step MacAdam at colour mixing



Electrical Characteristics

bei $t_c1 / t_c2 (t_p) = 50\text{ °C}$

Type	Number of LEDs*	Typ. voltage DC**			Temperature coefficient mV/K	Typ. power consumption**		
		350 mA V	500 mA V	700 mA V		350 mA W	500 mA W	700 mA W
WU-M-524	30	8.3	8.5	8.8	-12.87	2.9	4.3	6.2
WU-M-525	60	16.6	17.1	17.6	-25.74	5.8	8.6	12.3

* per channel | ** Tolerance of voltage and power: $\pm 10\%$ / data per channel

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 °C		Storage temperature range °C		Max. allowed repetitive peak current mA
		min.	max.	min.	max.	
All types	350	-20	+85	-20	+85	1260
	500	-20	+85	-20	+85	1240
	700	-20	+85	-20	+85	1210

Operating Life

L90/B10

in hours at measured temperature at t_p point

Type	350 mA			500 mA			700 mA		
	40 °C	50 °C	75 °C	40 °C	50 °C	75 °C	40 °C	50 °C	75 °C
WU-M-524	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000
WU-M-525	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000	> 60,000

Optical Characteristics

at $t_c1 / t_c2 (t_p) = 50\text{ °C}$; without secondary optics

Type	Ref. No.	Colour	Correlated colour temperature K	Luminous flux* (lm) and efficiency (lm/W) at									CRI		Beam angle* °
				350 mA			500 mA			700 mA			min. R_a	typ. R_a	
				min. lm	typ. lm	typ. lm/W	min. lm	typ. lm	typ. lm/W	min. lm	typ. lm	typ. lm/W			

LED Line CSP Tuneable – 280 mm – 30 LEDs per channel

WU-M-524	559733	Tuneable White	2700	355	371	128	500	522	122	685	716	116	80	85	120
			6000	407	425	146	572	598	140	784	812	132			

LED Line CSP Tuneable – 560 mm – 60 LEDs per channel

WU-M-525	559734	Tuneable White	2700	713	745	128	1003	1048	123	1374	1436	116	80	85	120
			6000	808	844	146	1136	1188	139	1558	1628	132			

* Measurement tolerance: $\pm 7\%$

Minimum order quantity (packaging unit): 75 pcs.

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LED Line CSP Tuneable – L28/56 W2

Tuneable Characteristics

at $t_c1 / t_c2 (t_p) = 50\text{ }^\circ\text{C}$; without secondary optics

CCT (K) for type WU-M-524 / WU-M-525									
Channel 1 / 2700 K	700 mA	2762 K	3033 K	3251 K	3437 K	3599 K	3742 K	3868 K	3980 K
	600 mA	2762 K	3072 K	3316 K	3521 K	3696 K	3848 K	3980 K	4096 K
	500 mA	2762 K	3125 K	3402 K	3629 K	3819 K	3980 K	4117 K	4236 K
	400 mA	2762 K	3200 K	3521 K	3775 K	3980 K	4148 K	4289 K	4408 K
	300 mA	2762 K	3316 K	3696 K	3980 K	4198 K	4371 K	4510 K	4627 K
	200 mA	2762 K	3521 K	3980 K	4289 K	4510 K	4678 K	4809 K	4916 K
	100 mA	2762 K	3980 K	4510 K	4809 K	5004 K	5143 K	5248 K	5330 K
	0 mA		6023 K	6023 K	6023 K	6023 K	6023 K	6023 K	6023 K
	Operating current	0 mA	100 mA	200 mA	300 mA	400 mA	500 mA	600 mA	700 mA
Channel 2 / 6000 K									

Typ. luminous flux (lm) for type WU-M-524									
Channel 1 / 2700 K	700 mA	716 lm	840 lm	962 lm	1082 lm	1199 lm	1313 lm	1425 lm	1425 lm
	600 mA	620 lm	744 lm	867 lm	986 lm	1103 lm	1218 lm	1330 lm	1330 lm
	500 mA	522 lm	647 lm	769 lm	888 lm	1005 lm	1120 lm	1232 lm	1232 lm
	400 mA	422 lm	547 lm	669 lm	788 lm	905 lm	1020 lm	1132 lm	1132 lm
	300 mA	320 lm	444 lm	566 lm	685 lm	803 lm	918 lm	1030 lm	1030 lm
	200 mA	215 lm	340 lm	462 lm	582 lm	699 lm	813 lm	925 lm	925 lm
	100 mA	109 lm	233 lm	355 lm	475 lm	592 lm	707 lm	819 lm	819 lm
	0 mA	0 lm	125 lm	247 lm	366 lm	483 lm	598 lm	710 lm	710 lm
	Operating current	0 mA	100 mA	200 mA	300 mA	400 mA	500 mA	600 mA	700 mA
Channel 2 / 6000 K									

Typ. luminous flux (lm) for type WU-M-525									
Channel 1 / 2700 K	700 mA	1436 lm	1683 lm	1926 lm	2163 lm	2396 lm	2624 lm	2846 lm	3064 lm
	600 mA	1244 lm	1491 lm	1734 lm	1971 lm	2204 lm	2432 lm	2654 lm	2872 lm
	500 mA	1048 lm	1295 lm	1537 lm	1775 lm	2008 lm	2235 lm	2458 lm	2675 lm
	400 mA	847 lm	1094 lm	1337 lm	1574 lm	1807 lm	2034 lm	2257 lm	2475 lm
	300 mA	642 lm	889 lm	1132 lm	1369 lm	1602 lm	1829 lm	2052 lm	2270 lm
	200 mA	432 lm	680 lm	922 lm	1160 lm	1392 lm	1620 lm	1842 lm	2060 lm
	100 mA	218 lm	466 lm	708 lm	946 lm	1178 lm	1406 lm	1628 lm	1846 lm
	0 mA	0 lm	247 lm	490 lm	727 lm	960 lm	1188 lm	1410 lm	1628 lm
	Operating current	0 mA	100 mA	200 mA	300 mA	400 mA	500 mA	600 mA	700 mA
Channel 2 / 6000 K									

Melanopic action factor* for type WU-M-524 / WU-M-525									
Channel 1 / 2700 K	700 mA	0.36	0.42	0.46	0.50	0.52	0.55	0.56	0.59
	600 mA	0.36	0.43	0.48	0.51	0.54	0.56	0.59	0.59
	500 mA	0.36	0.44	0.49	0.53	0.56	0.59	0.60	0.61
	400 mA	0.36	0.45	0.51	0.55	0.59	0.60	0.61	0.63
	300 mA	0.36	0.48	0.54	0.59	0.61	0.63	0.64	0.65
	200 mA	0.36	0.51	0.59	0.62	0.64	0.66	0.67	0.68
	100 mA	0.36	0.59	0.64	0.67	0.69	0.70	0.71	0.72
	0 mA	0 lm	0.78	0.78	0.78	0.78	0.78	0.78	0.78
	Operating current	0 mA	100 mA	200 mA	300 mA	400 mA	500 mA	600 mA	700 mA
Channel 2 / 6000 K									

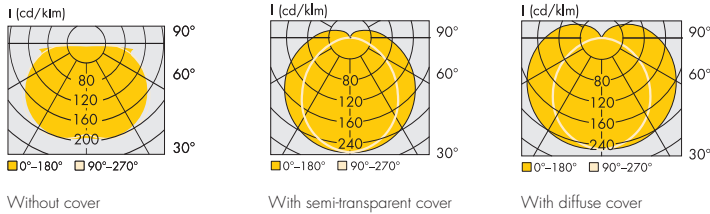
* according to DIN SPEC 5031-100:2015-08

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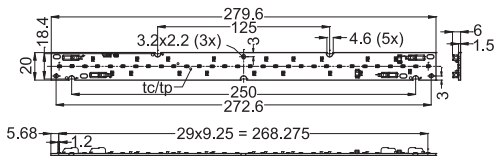
LED Line CSP Tuneable – L28/56 W2

Typical Light Distribution Curves

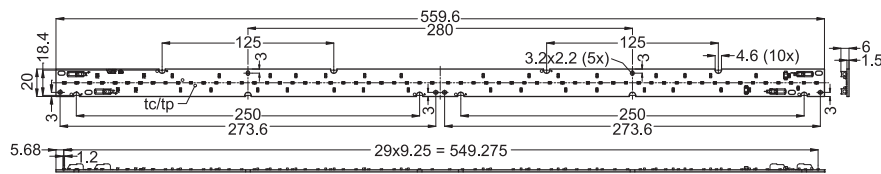
Data are available in .ldt format for download under www.vossloh-schwabe.com.



Mechanical Dimensions



WU-M-524



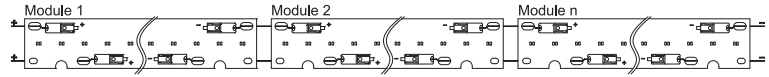
WU-M-525

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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 550 V DC (basic insulation) and 150 V DC (reinforced insulation) with plastic screws or fixing clips. In case of assembly of the LED modules with metal screws the clearance and creepage distances are reduced to 120 V DC (basic insulation) and 90 V DC (reinforced insulation).
- Max. diameter of screw head (M4): \varnothing 8 mm



WU-M-524 / WU-M-525

Fixing Clips

For fastening LED PCBs to luminaire sheets without needing screws

Vibration resistant version

Weight: 0.2 g, Packaging unit: 1000 pcs. (562870.11 = 10,000 pcs.)

Type	Ref. No.	For luminaire sheet thickness (MS) mm	For PCB thickness mm
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PCB hole dia.: 3.4 mm

Material: PA, natural (UL-94 V-2)

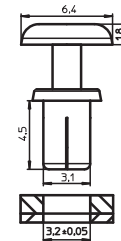
98010	562560	0.5–1.3	1.5
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PCB hole dia.: 4.3–4.5 mm

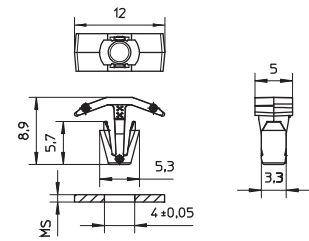
Material: PC, white (UL-94 V2)

98050	562870	0.5–1.0	1.6
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562560



562870



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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Cover W2 for clip fixing or tape fixing

A semi-transparent or a diffuse cover is available for the modules LED Line CSP Tuneable – L28/56 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

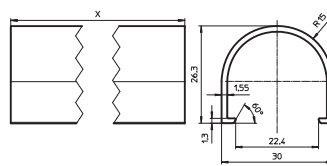
High transmission:

92% semi-transparent

84% diffuse

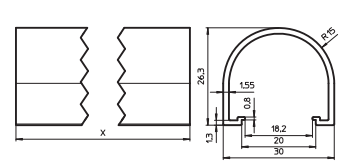
For clip fixing

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)

End Caps

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

Material: PC, transparent

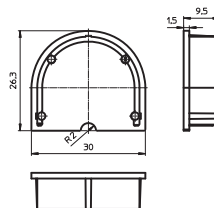
Weight: 2 g, Packaging unit: 250 pcs.

Type: 898

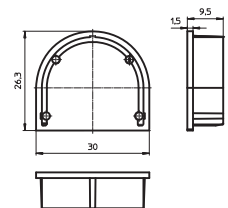
Ref. No.: 562500 end cap with wire hole

Ref. No.: 562499 end cap without wire hole

End cap with wire hole



End cap without wire hole



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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.
- ESD (electrostatic discharge) protection measures must be observed when handling and installing the LED modules. LED modules correspond to ESD level 1. 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 must 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 2060).
- Safety regulations acc. to EN 60598 (or further standards) has to be observed if the maximum output voltage exceed the permitted touchable value.
- 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

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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