

LUGA LINE COB HORTICULTURE

BLOOM & LEAF



LUGA LINE COB HORTICULTURE LED MODULES FOR LINEAR PLANT LIGHTING

DML059*FC1**

Typical Applications

- Greenhouse
- Vertical Lighting
- Interlight for high-growth plants
- Cultivation of young plants
- Multilayer Systems
- Full spectrum solution "Vertical Farm"

LUGA Line COB Horticulture

- **HIGH-EFFICIENT COB TECHNOLOGY**
- **SPECTRA OPTIMIZED FOR VEGETATIVE (LEAF) & GENERATIVE (BLOOM) GROWTH**
- **VERY LONG SERVICE LIFETIME**
- **HIGH PHOTON FLUX: UP TO 35 $\mu\text{mol/s}$**
- **HIGH PHOTON EFFICACY: UP TO 2.5 $\mu\text{mol/J}$**

LUGA Line COB Horticulture

Technical Notes

- LED built-in module for integration into luminaires
- Dimensions: 280x15 mm
- Typ. driving current: 350 mA, 500 mA, 700 mA, 1050 mA (max.)
- Beam angle: 120°



Spectrum "Leaf"

Recommendation for plants and vegetables which should have an optimized vegetative growth. Due increased spectral emission in the infrared (> 700 nm), as well as in the green (500–560 nm) spectral range, the growth of the plants or the vegetables can be positively influenced. The slightly pink-coloured full spectrum light (white light with a colour rendering > 80) also shows an improved compatibility for the employees in the vicinity of the illumination solution.

Spectrum "Bloom"

"Bloom" shows an optimized effect on ornamental plants and young seedlings, which need support in the flowering or in the initial growth stage. The spectrum is characterized by its focus on the blue and red spectral range, which provides maximum efficiency in photosynthesis.

Electrical Characteristics

at $t_p = 65\text{ °C}$

Type	Typ. voltage DC* (V)				Temperature coefficient mV/K	Typ. power consumption* (W)			
	350 mA	500 mA	700 mA	1050 mA		350 mA	500 mA	700 mA	1050 mA
DML059***FC1	14.7	15.4	16.4	17.9	-7	5.1	7.7	11.4	18.8

*Voltage and power tolerance: $\pm 10\%$

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		Ambient temperature range		Storage temperature range		Max. allowed repetitive peak current (mA)	Max. permitted output voltage of operating device V
		°C min.	°C max.	°C min.	°C max.	°C min.	°C max.		
DML059***FC1	≤ 700	-40	+95	-40	+40	-40	+105	1800	150
	> 700	-40	+85						

Optical Characteristics

at $t_p = 65\text{ °C}$

Type	Ref. No.	Colour	Correlated colour temp.* K	Operation current mA	Typ. photon flux and efficiency**				Typ. luminous flux and efficiency**		Typ. CRI R_a	Photo-metric code
					PAR $\mu\text{mol/s}$	$\mu\text{mol/J}$	PBAR $\mu\text{mol/s}$	$\mu\text{mol/J}$	lm	lm/W		
DML059HAWFC1 (Bloom)	568582	pink	1900	350	12.1	2.4	12.7	2.5	615	120	55	519
				500	16.9	2.2	17.8	2.3	860	111		
				700	23.1	2.0	24.2	2.1	1170	102		
				1050	33.1	1.8	34.8	1.9	1680	89		
DML059HAJFC1 (Leaf)	568583	pinkish white	2700	350	10.5	2.0	12.2	2.4	500	97	85	827
				500	14.7	1.9	17.1	2.2	700	91		
				700	20.0	1.7	23.2	2.0	950	83		
				1050	28.7	1.5	33.3	1.8	1370	73		

* Colour tolerance: 3 MacAdam | ** Production tolerance of photon flux and luminous flux: $\pm 10\%$, efficiency calculated from typical values | PAR: 400–700 nm; PBAR: 280–800 nm

Minimum order quantity: 60 pcs.

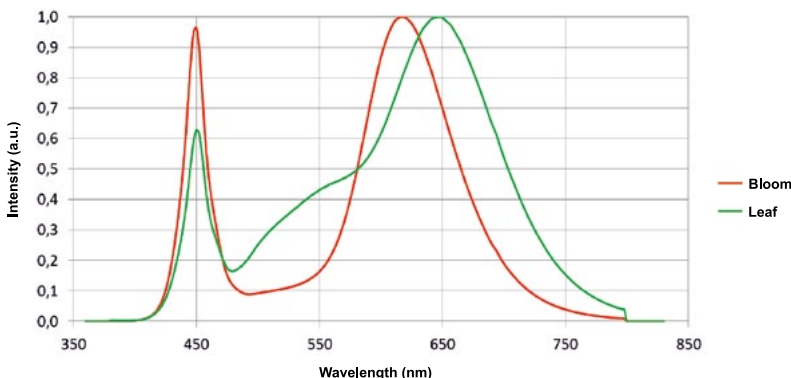
The values contained in this data sheet can change due to technical innovations. Any such changes will be made without separate notification.

LUGA Line COB Horticulture

Spectral Characteristics

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

Type	Spectral distribution related to $\mu\text{mol/s}$				Ratios		
	400–500 nm (blue)	500–600 nm (green)	600–700 nm (red)	> 700 nm (far red)	blue – red	blue – green	red – far red
Bloom	16.9%	24.0%	56.6%	4.5%	1 : 3.2	1 : 1.4	1 : 0.1
Leaf	10.1%	22.5%	53.7%	13.7%	1 : 5.3	1 : 2.2	1 : 0.3



* All characteristics shown are for reference only and will not be guaranteed

Operating Life

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

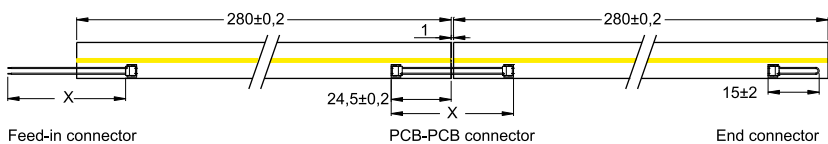
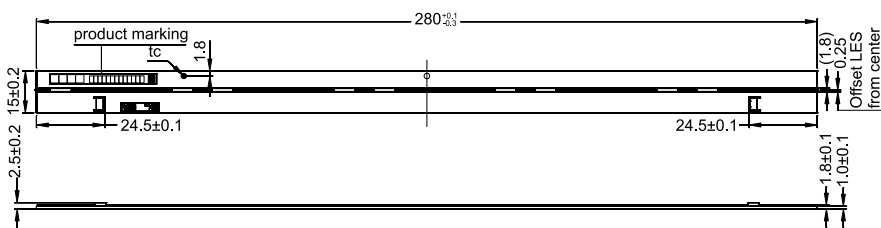
Lumen maintenance	DML059***FC1		
	$I_f \leq 500\text{ mA}$	$I_f 700\text{ mA}$	$I_f 1050\text{ mA}$
L90/B10	60,000 Std.	55,000 Std.	50,000 Std.
L80/B10	80,000 Std.	75,000 Std.	70,000 Std.
L70/B10	90,000 Std.	85,000 Std.	80,000 Std.

Clearance and creepage distances

The clearance and creepage distances are designed for working voltages up to:

Type	Basic insulation V DC	Reinforced insulation V DC
DML059***FC1	150	150

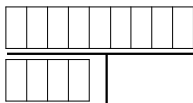
Mechanical Dimensions



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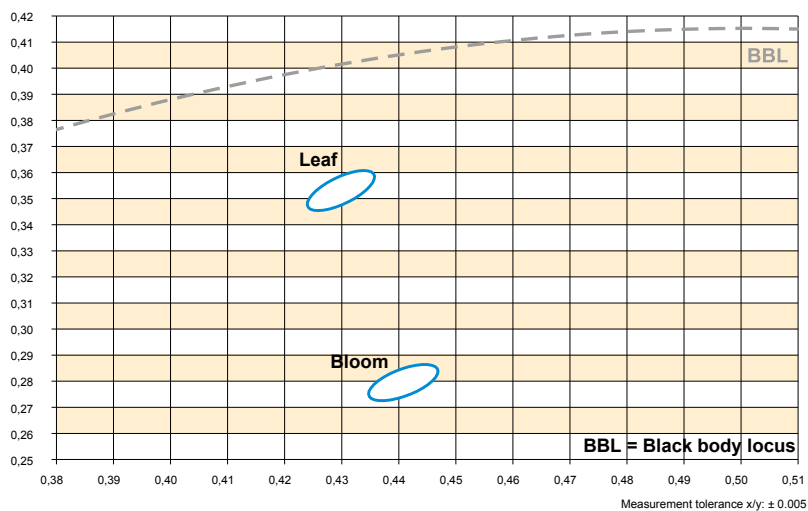
LUGA Line COB Horticulture – LED Modules COB for Linear Plant Lighting

Product Code



Product	Product Code
DML059HAWFC1 (Bloom)	59AWHCF
DML059HAJFC1 (Leaf)	59AJHCF

Bins



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Accessories for LUGA Line COB Horticulture

Connectors with other lead lengths on request

Feed-in connector

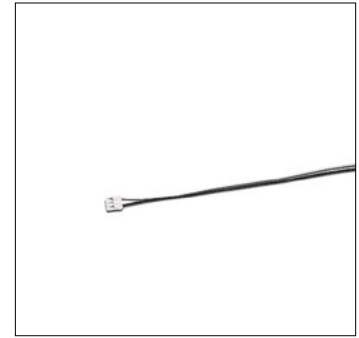
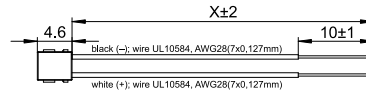
Feed in connector for power supply

Colour: – black
+ white

Max. permissible current: 1.5 A

Number of strands: 2 (Strand diameter: 0.09 mm²/AWG28)

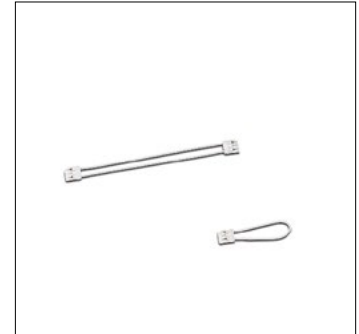
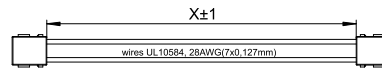
Ref. No.: 551131 X = 310 mm



PCB-PCB connector

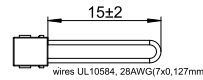
Max. permissible current: 1.5 A

Ref. No.: 551129 X = 43 mm



End connector

Ref. No.: 551132



Plastic holder for LUGA Line modules

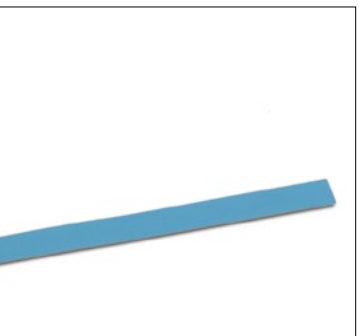
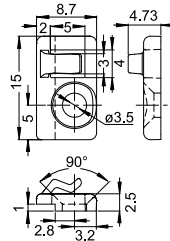
For fixing LUGA Line modules

Fixing hole for countersunk screw M3

With cable holder

Min. 2.5 pcs. per LUGA Line module needed

Ref. No.: 551039



Thermally Conductive Adhesive Transfer Tapes

Dimension: 278x13 mm

Ref. No.: 548179

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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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.

- 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, otherwise malfunctions or damage to the LEDs may occur.
- 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
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- For interconnection of the LED modules three different connectors are available:
 - Feed-in cable (Ref. No. 550952, 551131)
 - PCB-PCB-connector (Ref. No. 551129, 549992, 549993)
 - End-connector (Ref. No. 551132)
- Safety regulations acc. to EN 60598 (or further standards) has to be observed if the maximum output voltage exceed the permitted touchable value.
- Max. number of modules connected in series: 5
- 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.
 - All modules that are wired in parallel must be thermally connected (same temperatures at all LED modules).
- To ensure problem-free operation, the specified maximum temperature at the t_c 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.
- Measurement tolerances (in addition to production tolerance):
 - luminous flux: $\pm 7\%$
 - voltage: $\pm 3\%$
 - CRI: $\pm 1\%$
- LED modules must be attached in such a way as to ensure that any temperature-related material tension between the (ceramic) LED module and the substrate of the luminaire (e.g. aluminium) can be balanced out. VS recommends using (non-adhesive) thermally conductive paste in combination with mechanical fixing clips, which must allow the module to expand in a lateral direction on the substrate surface. In addition, Vossloh-Schwabe provides a thermally conductive adhesive transfer pad (Ref. No. 548179) that can also balance out any material stresses. Care must be taken to check whether the luminaire/application is suitable for use with adhesive transfer pads given the respective material and ambient conditions. A space of at least 0.5 mm must be left between any two modules.
- Products equipped with adhesive transfer tape must only be applied to dry and clean surfaces that are free from grease, oil, silicone or other soiling. It is therefore recommended to clean the substrate with isopropyl alcohol (IPA). Please ensure a full-surface bond over the entire contact area when sticking the module to the substrate. The following substances are regarded as critical for creating an adhesive bond:
 - Polyefins (polyethylene, polypropylene)
 - Rubber
 - Powder-coated materials
 - Silicone rubber
 - TeflonOwing to the varying application options and different types of surface as well as ambient conditions, VS accepts no liability for the quality of the adhesive bond achieved when mounting these products. Prior to sticking a VS product care must be taken to check whether the material in question is actually suitable for the intended purpose under consideration of all possible application-relevant influences. Supplementary holders must be used if necessary.
- 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.

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Assembly and Safety Information

- 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 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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