LINEAR LED BUILT-IN MODULES

T5/T8 REPLACEMENT

LUGA LINE RX GEN. 2 LED MODULES COB FOR LINEAR LIGHTING

DML068*GR (280 mm)**
DML028*GR (93 mm)**

Typical Applications
Built-in luminaires/general illumination

- Office lighting
- Retail lighting
- T5/T8 replacement as built-in module
- Furniture lighting

LUGA Line RX Gen. 2

- **LONG SERVICE LIFETIME: UP TO 100,000 H (L70, B10)**
- **NARROW COLOUR TOLERANCE: 3 MACADAM**
- **HIGHLY EFFICIENT: UP TO 180 LM/W AT T_P = 65 °C**
- **SPECIAL COLOURS (3000 K / 4000 K) WITH BRILLIANT WHITE EFFECT (PEARL WHITE)**
- **COB TECHNOLOGY (CHIP-ON-BOARD)**
  homogeneous light field (no individual light points visible), perfect for use with reflectors
- **VDE PENDING**

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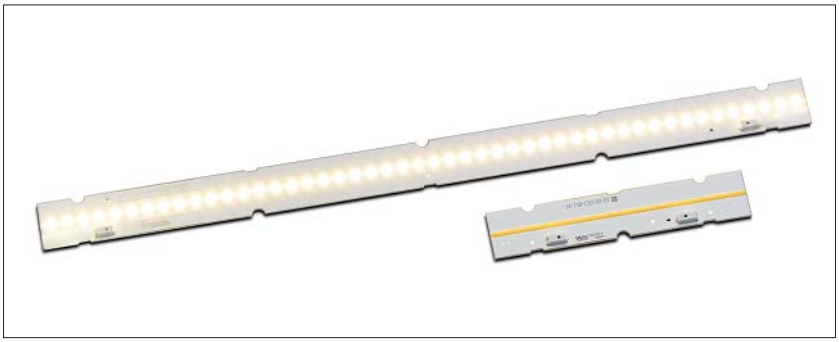

Technical Notes

- LED built-in module for integration into luminaires
- Dimensions: 280x18.4 mm and 93x18.4 mm
- Driving current: up to 1050 mA
- On-board push-in terminals (WAGO 2059)
- Colour accuracy initially: 3 SDCM per BIN; 4 SDCM colour shift after 50,000 hrs.

Electrical Characteristics

at t_p = 65 °C

Type	Typ. voltage DC* (V)					Temperature coefficient	Typ. power consumption* (W)				
	250 mA	350 mA	500 mA	700 mA	1050 mA	mV/K	250 mA	350 mA	500 mA	700 mA	1050 mA
DML068***GR	16.5	16.8	17.2	17.8	18.8	–6.3	4.1	5.9	8.6	12.4	19.8
DML028***GR	5.6	5.6	5.7	5.9	6.2	–2.1	1.4	2	2.9	4.1	6.6

*Voltage and power tolerance: ±10 %

Maximum Ratings

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

Type	Operating current	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
	mA	°C min.	°C max.	°C min.	°C max.	°C min.	°C max.		V
All types	≤ 500	–40	+110	–40	+40	–40	+105	1400	420
	700	–40	+105						
	1050	–40	+85						

Optical Characteristics

at t_p = 65 °C

Type	Ref. No.	Colour	Correlated colour temperature*	Typ. luminous flux** and efficiency at										Beam angle	Typ. CRI	Photo-metric
				250 mA		350 mA		500 mA		700 mA		1050 mA				
			K	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	lm	lm/W	°	R_a	code
DML068																
DML068C27GR	**563239**	warm white	2700	670	163	920	156	1265	147	1695	137	2320	117	120	82	827/349
DML068C30GR	**563240**	warm white	3000	690	168	945	160	1300	151	1740	140	2385	120	120	82	830/349
DML068C30GBR	**563241**	warm white	3000 (below BBL)	670	163	920	156	1265	147	1695	137	2320	117	120	82	830/349
DML068C35GR	**563242**	neutral white	3500	705	172	965	164	1330	155	1780	144	2440	123	120	82	835/349
DML068C40GR	**563243**	neutral white	4000	725	177	990	168	1370	159	1825	147	2505	127	120	84	840/349
DML068C40GBR	**563244**	neutral white	4000 (below BBL)	700	171	960	163	1320	153	1770	143	2425	122	120	84	840/349
DML068C50GR	**563245**	cool white	5000	740	180	1010	171	1395	162	1865	150	2560	129	120	84	850/349
DML068C65GR	**563246**	cool white	6500	740	180	1010	171	1395	162	1865	150	2560	129	120	84	865/349
DML068C31GPR	**565238**	pearl white	3100	680	166	930	158	1280	149	1715	138	2350	119	120	82	831/349
DML068S31GPR	**563247**	pearl white	3100	560	137	770	131	1060	123	1420	115	1945	98	120	95	931/349
DML028																
DML028C27GR	**563508**	warm white	2700	215	154	290	145	400	138	530	129	730	111	120	82	827/349
DML028C30GR	**563509**	warm white	3000	215	154	300	150	415	143	555	135	755	114	120	82	830/349
DML028C30GBR	**563510**	warm white	3000 (below BBL)	215	154	290	145	400	138	530	129	730	111	120	82	830/349
DML028C35GR	**563511**	neutral white	3500	220	157	305	153	420	145	565	138	770	117	120	82	835/349
DML028C40GR	**563512**	neutral white	4000	230	164	315	158	435	150	580	141	795	120	120	84	840/349
DML028C40GBR	**563513**	neutral white	4000 (below BBL)	220	157	305	153	420	145	565	138	770	117	120	84	840/349
DML028C50GR	**563514**	cool white	5000	230	164	320	160	440	152	590	144	805	122	120	84	850/349
DML028C65GR	**563515**	cool white	6500	230	164	320	160	440	152	590	144	805	122	120	84	865/349
DML028S31GPR	**563516**	pearl white	3100	175	125	240	120	335	116	445	109	615	93	120	95	931/349

* Colour tolerance: 3 MacAdam | ** Production tolerance of luminous flux and efficiency: ± 15 % | Min. CRI R_a: > 80 / > 90

Minimum order quantity (packaging unit): 30 pcs. (DML068); 60 pcs. (DML028)

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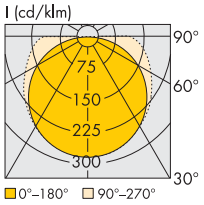
Operating Life

at t_p = 65 °C

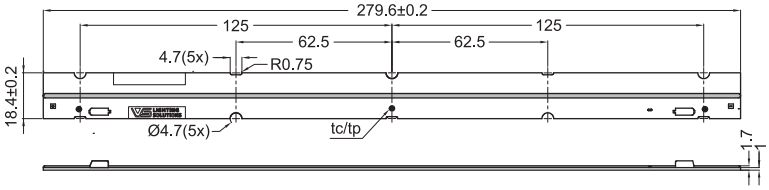
Lumen maintenance	DML068/028***GR I_F 250 mA	I_F 350 mA	I_F 500 mA	I_F 700 mA	I_F 1050 mA
L90/B10	67,000 hrs.	64,000 hrs.	59,000 hrs.	50,000 hrs.	32,000 hrs.
L80/B10	> 100,000 hrs.	96,000 hrs.	88,500 hrs.	75,000 hrs.	48,000 hrs.
L70/B10	> 100,000 hrs.	> 100,000 hrs.	> 100,000 hrs.	100,000 hrs.	64,000 hrs.

Typical Light Distribution Curve

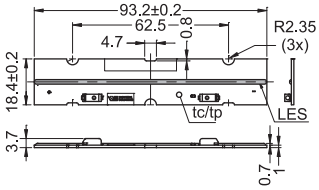


Mechanical Dimensions

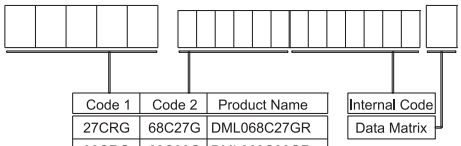
DML068



DML028



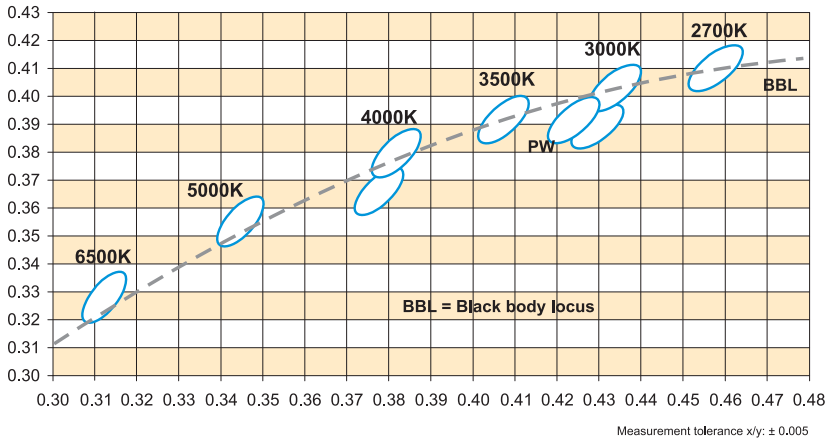
Product Code



Code 1	Code 2	Product Name
27CRG	68C27G	DML068C27GR
30CRG	68C30G	DML068C30GR
30BRG	68B30G	DML068C30GBR
35CRG	68C35G	DML068C35GR
40CRG	68C40G	DML068C40GR
40BRG	68B40G	DML068C40GBR
50CRG	68C50G	DML068C50GR
65CRG	68C65G	DML068C65GR
31SRG	68S31G	DML068S31GR
27CRG	28C27G	DML028C27GR
30CRG	28C30G	DML028C30GR
30BRG	28B30G	DML028C30GBR
35CRG	28C35G	DML028C35GR
40CRG	28C40G	DML028C40GR
40BRG	28B40G	DML028C40GBR
50CRG	28C50G	DML028C50GR
65CRG	28C65G	DML028C65GR
31SRG	28S31G	DML028S31GR

- 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 420 V DC (basic insulation) and 215 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 270 V DC (basic insulation) and 150 V DC (reinforced insulation).
- Max. diameter of screw head (M4): Ø 8 mm
  Torque: min. 0.3 Nm; max. 0.5 Nm

Bins



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LUGA Line RX Gen. 2

Linear LED Constant Current Drivers

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

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 sould 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
- Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the modules.
- LED modules will be connected with two on-board push-in terminals (WAGO 2059).
- 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.
  - 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: ± 7 %
  - voltage: ± 3 %
  - CRI: ± 1 %
- 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
  – Teflon
  Owing 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. Assessment of risk groups in acc. 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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