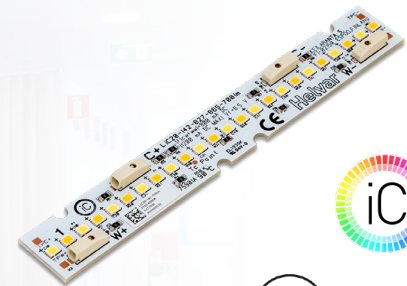


## Tunable White Linear LED Module, L-iC Series

Product code: 5177

**800 mA, 5.5 V**

- 140 mm Tunable White module, adjustable colour temperature between 2700K and 6500 K
- High efficacy up to 195 lm/W at Tc = 25 °C
- Narrow width of 20 mm to suit various applications
- Accurate initial colour consistency of MacAdam (SDCM) 3-step
- Modular product platform for design flexibility
- Designed for easy installation and series connection
- Zhaga compliant dimensions
- Helvar Components LMC diffuser covers and mounting parts available



	Nominal colour temperature [K]	Useful luminous flux at		Forward voltage (V <sub>f</sub> )		Luminous efficacy		Power consumption	CRI
		Tc = 65 °C	Tc = 25 °C	Tc = 65 °C	Tc = 25 °C	Tc = 65 °C	Tc = 25 °C	Tc = 65 °C	
		Typ. [lm]	Typ. [lm]	Typ. [V]	Max. [V]	Typ. [lm/W]	Typ. [lm/W]	Typ. [W]	
<i>Efficient @ 400 mA</i>									
<b>LiC20-142-827-865-700lm</b>	2700	380	410	5.5	5.9	173	182	2.2	> 80
	<b>TW*</b>	360	390	5.3	5.7	172	181	2.1	
	6500	410	440	5.5	5.9	185	195	2.2	
<i>Nominal @ 800 mA</i>									
<b>LiC20-142-827-865-700lm</b>	2700	710	770	5.8	6.1	154	165	4.6	> 80
	<b>TW*</b>	780	840	5.5	5.9	178	188	4.4	
	6500	770	820	5.8	6.1	167	176	4.6	
<i>Maximum @ 1200 mA</i>									
<b>LiC20-142-827-865-700lm</b>	2700	1030	1110	6.0	6.4	144	152	7.2	> 80
	<b>TW*</b>	1170	1260	5.7	6.0	172	184	6.8	
	6500	1110	1200	6.0	6.4	155	164	7.2	

*\*) Tunable white values with 50 % / 50 % channel balance*

*Tolerance for the values of CCT, luminous flux and forward voltage in the table is < ±10 %*

### Electrical specifications

<i>Direct current supply only</i>	L-iC-282	
	Nominal	Max.
<b>Operating Current [mA]</b>	<b>800</b>	1200
<b>Operating Voltage / channel [V]</b>	<b>5.5<sup>1)</sup></b>	6.4 <sup>2)</sup>

<sup>1)</sup> At 800 mA, Tc = 65 °C, 50 % / 50 % channel balance

<sup>2)</sup> At 1200 mA, Tc = 25 °C, min / max CCT

Maximum rated voltage in circuit	250 V <sup>1)</sup>
Insulation test voltage	1.5 kV
Max. permissible peak current	1.2 A (Duty 1/10 pulse width 10ms)
IP rating	IP00

<sup>1)</sup> More details on page 4

## Photometric specifications

Colour consistency at initial time	3 MacAdam steps
Colour Rendering Index	> 80
Beam angle	115°
Photobiological risk group	RG1 unlimited
Energy efficiency class (2019/2015)	C

## Operating Conditions and Characteristics

Tp point (performance measurements)	Tc = 65°C
<b>Max. temperature at Tc point</b>	<b>85 °C</b>
Ambient temperature range	-20...+50 °C
Storage temperature	-20...+80 °C
Humidity	No condensation

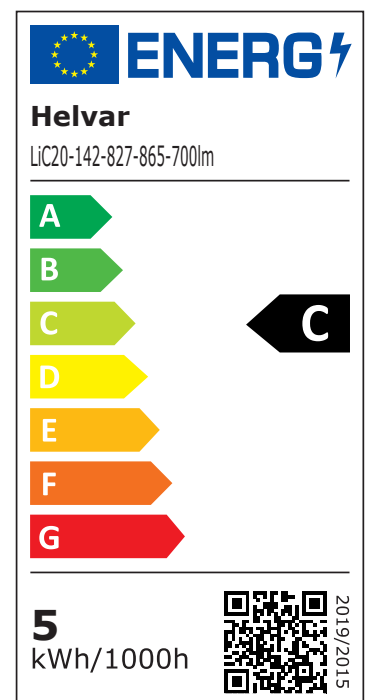
## Lumen maintenance specifications

Operating current	Temperature	L70B50	L70B10	L80B50	L80B10	L90B50
<b>Efficient 400 mA</b>	Tc = 65 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 50 000
	Tc = 85 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 45 000
<b>Nominal 800 mA</b>	Tc = 65 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 50 000
	Tc = 85 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 40 000
<b>Maximum 1200 mA</b>	Tc = 65 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 44 000
	Tc = 85 °C	> 50 000	> 50 000	> 50 000	> 50 000	> 34 000

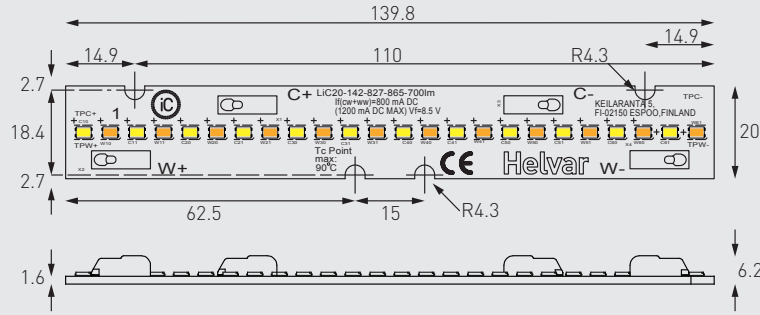
Lumen depreciation estimations in hours. Specified LxxBxx values are statistical and based on LED components' lumen maintenance values. Actual lumen maintenance may vary over individual LED modules.

## EPREL parameters

EPREL ID	1766262
Date of first placement on the market	10-10-2019
Angle for useful luminous flux	Sphere 360 degrees
Is the product equipped with an integrated light source?	No
Total luminous flux	780 lm
Is this product a light source?	Yes
Beam angle in degrees	115
On-mode power P <sub>on</sub>	4.4 W
Networked standby power P <sub>net</sub>	0
Lifetime L70B50	72 000
Power Factor	—
Connected light source	No
Useful luminous flux Φ <sub>use</sub>	780 lm
Non-directional or directional light source	NDLS
Mains or non- mains light source	NMLS
Colour-tuneable light source	Yes
Chromaticity coordinates x i y	x: 0.385 , y: 0.369 (middle point in CCT range)
Dimmable	Yes (with dimmable control gear)
Peak luminous intensity	— cd
R9 colour rendering index value	20
Survival factor	> 0.9
Lumen maintenance factor X <sub>LMF</sub>	> 0.96
Colour consistency in McAdam ellipses	3
Flicker metric P <sub>stLM</sub>	—
Standby power P <sub>sb</sub>	—
Stroboscopic effect metric SVM	—
Form of the product	Linear
Energy efficiency class 2019/2015	C (780 lm / 4.4 W x 0.926 = 164.2 lm/W)
Minimum purchase quantity	120 pcs
Displacement factor D <sub>f</sub>	—



## Dimensions



Length	139.8 ± 0.2 mm
Width	19.8 ± 0.2 mm
Thickness of PCB	1.6 ± 0.2 mm
Height	6.2 ± 0.2 mm

Packing details	1 Tray	1 Box
Num. of modules	120	600

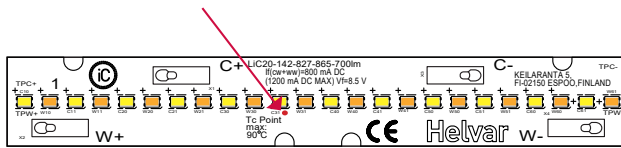
ESD foam trays, antistatic bag and carton box

## Wiring specifications

Connector type	Push-in connector
Wire size	0.2 - 0.75 mm <sup>2</sup> , solid core 0.2 - 0.34 mm <sup>2</sup> , stranded
Wire strip length	7 - 9 mm
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598

## Thermal Management

Tc (Tp) Point : See the below red mark.



## Connection examples

2 x LiC20-562 and 1 x LiC20-142 modules connected in series with Helvar Components LC50iC-DA-100-1200 LED driver at 800 mA driving current. With LC50iC-DA-100-1200 LED Driver, the nominal output current of 800 mA is reached with 800 mA LED-Iset resistor (T90800, resistance value 6.2 kΩ) or via NFC.

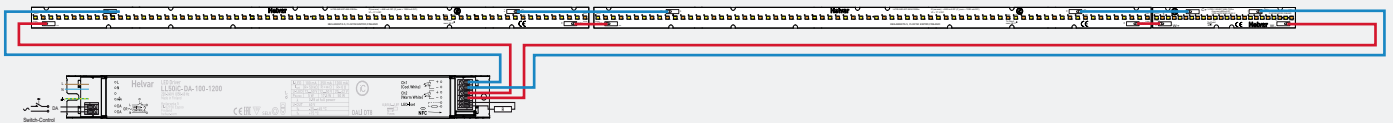


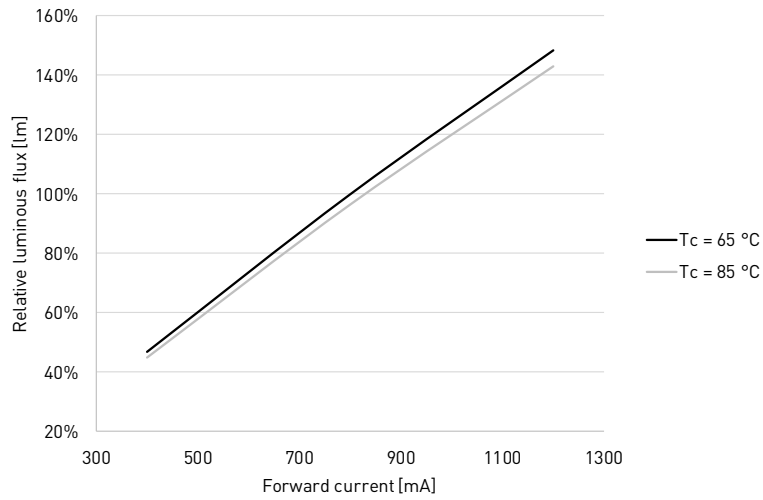
Table below showing some lengths that can be achieved when connecting modules in series with LC50iC-DA-100-1200 at 700 mA driving current (using 700 mA LED-Iset resistor (T90700) (7.15 kΩ resistor) or via NFC).

Lengths	QUANTITY OF BELOW MODULES			Luminous flux (Φ <sub>v</sub> ) typical <sup>1</sup> at Tc = 65 °C <sup>2</sup> [lm]	Forward voltage Tc = 65 °C <sup>2</sup> [V]	Power Tc = 65 °C <sup>2</sup> [W]
	LiC20-562	LiC20-282	LiC20-142			
~ 600 mm 2 ft	1	0	0	2000	16.8	11.8
~ 900 mm 2.5 ft	1	1	0	3000	25.2	17.7
~ 1 m 3.5 ft	1	1	1	3700	30.9	21.6
~ 1.2 m 4 ft	2	0	0	4000	33.7	23.6
~ 1.3 m 4.5 ft	2	0	1	4700	39.3	27.5
~ 1.5 m 5 ft	2	1	0	5000	42.1	29.5

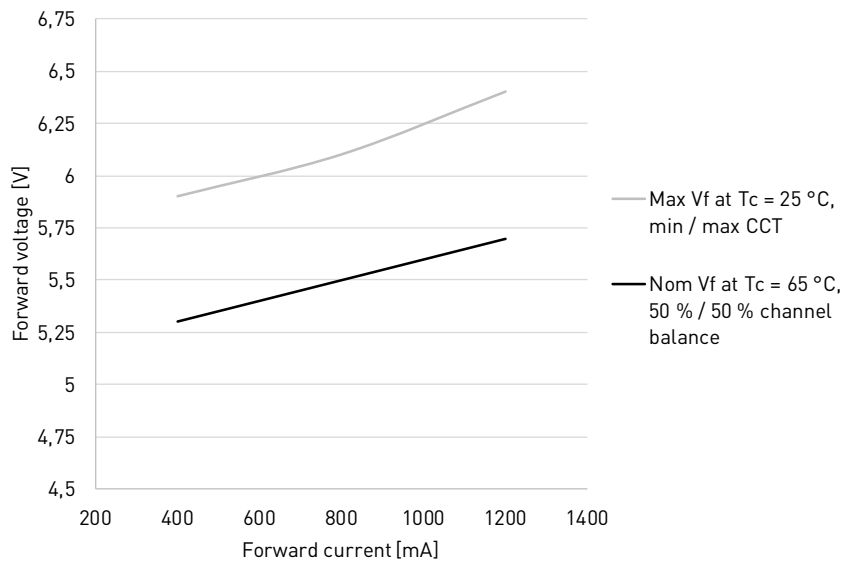
1) Tunable white values with 50 % / 50 % channel balance. 2) Tolerance for the values of CCT, luminous flux and forward voltage in the table is < ±10 %

## Specification diagrams

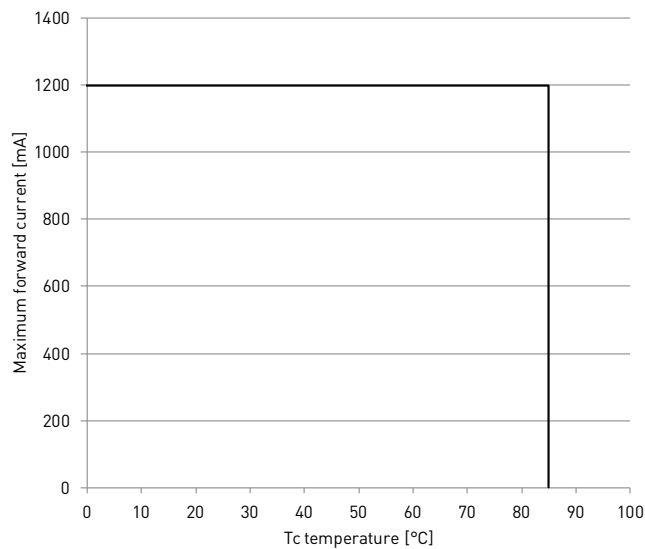
### LUMINOUS FLUX VS FORWARD CURRENT



### FORWARD VOLTAGE VS FORWARD CURRENT



### DERATING CURVE



LiC20-142 LED module is suited for built-in usage in luminaires. In order to have safe and reliable operation, the LED luminaires will need to comply with the relevant standards and regulations (e.g. IEC/EN 60598-1). The LED luminaire shall be designed to adequately protect the LED modules from dust, moisture and pollution. The luminaire manufacturer is responsible for the correct choice and installation of the LED module / LED driver combination according to the application and product datasheets. Operating conditions of the LED modules may never exceed the specifications as per the product datasheets.

## HANDLING OF THE LED MODULES

LED modules contain components (LED packages, chips) that are sensitive for mechanical stress, electrostatic discharge (ESD) and chemical contaminants. Improper handling of the modules might cause damage or even destruction of the LED modules. Damaged LEDs may show some unusual characteristics such as increase in leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current. Please follow following instructions and the precautions given in the product datasheets while handling and assembling Helvar Components LED modules.

### Storage conditions

- Unused LED modules are recommended to stored carefully in an original sealed ESD package preventing moisture, pollutants or ESD to cause damage the module.
- Storage temperature range: -20...+80 °C

### Opening the package / resealing

- LED modules are kept in stable protected environment in the packaging, open the package only when you are ready to use the LED modules. If resealing of the original package is required remove excess air from the packaging and place the moisture absorber (silica-gel bag) in to the packaging and seal the ESD back with adhesive tape.

### ESD precautions at luminaire assembly site

The LEDs are sensitive to the electrostatic discharge (ESD) and surge current. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices.

- IEC / EN 61340-5-1: Protection of electronic devices from electrostatic phenomena – General Requirements describes procedures for protection for damage caused by electrostatic discharge while handling electronic devices, following list lists basic protective measures described in the standard.

### ESD protection measures in handling and assembling LED modules

- Employee training for correct handling .
- Personnel grounding via wrist band / footwear.
- ESD protective clothing / shoes.
- Handle LED modules only in ESD protected areas and workplaces.

## CHEMICAL CONSIDERATIONS

Chemical substances may cause damage the LED module by causing discoloration, loss of luminous flux or total failure of the module.

Avoid materials and substances containing:

- VOCs - Volatile Organic Compounds that may occur in adhesives or sealings, verify that the materials used in the luminaires are not causing VOCs
- Halogen compounds
- Chlorine
- Acetates
- Sulphuric compounds.

Never look directly into an operational LED module without suitable protective eye wear!

## ELECTRIC & THERMAL CONSIDERATIONS

### Wiring insulation

- According to recommendations in IEC / EN 60598.

### Wire connections

- Please refer to LED driver datasheets connections diagram.
- Wrong polarity might damage the LED modules.

### Choosing the LED driver

- To guarantee the safe and reliable operation of the LiC20 series LED-modules the LED driver must be provided with open and short circuit protection.
- LiC20 series modules are designed to be used with constant current output type LED driver.

### Electrical design, electrical safety

During the design it is luminaire manufacturers responsibility to follow the international and national electric design regulations and recommendations for the electric safety and luminaire protection. Electric safety classification and protection class is depending on:

- Actual luminaire design and safety classification
- LED driver insulation
- LED driver output isolation.

ALWAYS CHECK AND FOLLOW EXACT REGULATIONS FROM LATEST RELEVANT IEC / EN STANDARDS.

### Maximum ambient and tc temperature

- The maximum ambient temperature is a guideline given for built-in components such as LED modules. However, integrator must always ensure proper thermal management (i.e. mounting base of the module, possible heatsink, air flow etc.) so that the tc point does not exceed the tc max limit.
- Reliable operation is only guaranteed if the maximum tc point temperature is not exceeded under the conditions of use.
- Lifetime is only guaranteed if the maximum tc point temperature specified for lifetime is not exceeded under the conditions of use.

## MECHANICAL CONSIDERATIONS

- While handling the LED modules avoid mechanical stress or pressure applied to the light emitting surface of the LEDs.
- Avoid dropping the modules.
- Bending of the modules is not permitted.
- Avoid touching the light emitting surface.
- Mechanical modifications (e.g. drilling, milling or sawing the module) are not permitted.

## INSTALLATION CONSIDERATIONS

The LiC20 series modules are basic isolated against ground and can be installed on properly insulated metal parts of the luminaire. We recommend using Helvar Components LMC mounting parts, plastic screws, clips or a combination of M4 metal screws and insulating plastic washers for safe operation.

Please follow regulations from IEC/EN 60598-1 for creepage and clearance requirements. More information in LS/LP Series installation guide, available on product website's Download & Links section.

## Conformity & standards

Led modules for general lighting - safety specifications	IEC / EN 62031
Photobiological safety of lamps and lamp systems	IEC / EN 62471 TR IEC / EN 62778
Compliant with relevant EU directives	
CE marked	
RoHS / REACH compliant	

All data were deemed correct at time of creation. Helvar Components is not liable for errors or omissions.

## Symbols



Built-in LED module that is designed to form a replaceable part built into a luminaire or an enclosure and not intended to be mounted outside a luminaire etc. without special precautions.