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

**Nominal colour temperature**

<table>
<thead>
<tr>
<th>Colour</th>
<th>Type</th>
<th>Luminous flux (Φ)</th>
<th>Forward voltage (V)</th>
<th>Luminous efficacy</th>
<th>Power consumption</th>
<th>CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiC20-282-827-865-1100lm</td>
<td>TW*</td>
<td>2700</td>
<td>570</td>
<td>610</td>
<td>8.3</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>TW*</td>
<td>6500</td>
<td>610</td>
<td>655</td>
<td>8.3</td>
<td>8.8</td>
</tr>
<tr>
<td>LiC20-282-827-865-1100lm</td>
<td></td>
<td>2700</td>
<td>1060</td>
<td>1150</td>
<td>8.6</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>TW*</td>
<td>6500</td>
<td>1150</td>
<td>1230</td>
<td>8.6</td>
<td>9.2</td>
</tr>
<tr>
<td>LiC20-282-827-865-1100lm</td>
<td></td>
<td>2700</td>
<td>1540</td>
<td>1660</td>
<td>9.0</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>TW*</td>
<td>6500</td>
<td>1660</td>
<td>1790</td>
<td>9.0</td>
<td>9.5</td>
</tr>
</tbody>
</table>

*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

**Direct current supply only**

<table>
<thead>
<tr>
<th>Operating Current [mA]</th>
<th>Operating Voltage / channel [V]</th>
<th>L-iC-282</th>
<th>Nominal</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† At 800 mA, Tc = 65 °C, 50 % / 50 % channel balance

‡ At 1200 mA, Tc = 25 °C, min / max CCT

**Maximum rated voltage in circuit** 250 V

**Insulation test voltage** 1.5 kV

**Max. permissible peak current** 1.2 A (Duty 1/10 pulse width 10ms)

**IP rating** IP00

**Photometric specifications**

- Colour consistency at initial time: 3 MacAdam steps
- Colour Rendering Index: > 80
- Beam angle: 115°
- Photobiological risk group: RG1 unlimited

**Photometric specifications**

- Beam angle: 115°
- Photobiological risk group: RG1 unlimited

**Lifetime specifications**

<table>
<thead>
<tr>
<th>Operating current</th>
<th>Temperature</th>
<th>L70B50</th>
<th>L70B10</th>
<th>L80B50</th>
<th>L80B10</th>
<th>L90B50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficient 400 mA</td>
<td>Tc = 65 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
</tr>
<tr>
<td></td>
<td>Tc = 85 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 45 000</td>
</tr>
<tr>
<td>Nominal 800 mA</td>
<td>Tc = 65 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
</tr>
<tr>
<td></td>
<td>Tc = 85 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 40 000</td>
</tr>
<tr>
<td>Maximum 1200 mA</td>
<td>Tc = 65 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 44 000</td>
</tr>
<tr>
<td></td>
<td>Tc = 85 °C</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 50 000</td>
<td>&gt; 34 000</td>
</tr>
</tbody>
</table>

**Operating Conditions and Characteristics**

- Tp point (performance measurements): Tc = 65°C
- Max. temperature at Tc point: 85 °C
- Ambient temperature range: -20...+50 °C
- Storage temperature: -20...+80 °C
- Humidity: No condensation
LiC20-282

Dimensions

<table>
<thead>
<tr>
<th>Length</th>
<th>279.8 ± 0.2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>20 ± 0.2 mm</td>
</tr>
<tr>
<td>Thickness of PCB</td>
<td>1.6 ± 0.2 mm</td>
</tr>
<tr>
<td>Height</td>
<td>6.2 ± 0.2 mm</td>
</tr>
</tbody>
</table>

Packing details

<table>
<thead>
<tr>
<th>Packing details</th>
<th>1 Tray</th>
<th>1 Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num. of modules</td>
<td>60</td>
<td>300</td>
</tr>
<tr>
<td>ESD foam trays, antistatic bag and carton box</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thermal Management

Tc [Tp] Point : See the below red mark.

Connection examples

1 x LiC20-562 and 1 x LiC20-282 modules connected in series with Helvar 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).

<table>
<thead>
<tr>
<th>Lengths</th>
<th>QUANTITY OF BELOW MODULES</th>
<th>Luminous flux (Φ) typical at Tc = 65 °C [lm]</th>
<th>Forward voltage Tc = 65 °C [V]</th>
<th>Power Tc = 65 °C [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>– 600 mm 2 ft</td>
<td>1</td>
<td>2000</td>
<td>16.8</td>
<td>11.8</td>
</tr>
<tr>
<td>– 900 mm 2.5 ft</td>
<td>1</td>
<td>3000</td>
<td>25.2</td>
<td>17.7</td>
</tr>
<tr>
<td>– 1 m 3.5 ft</td>
<td>1</td>
<td>3700</td>
<td>30.9</td>
<td>21.6</td>
</tr>
<tr>
<td>– 1.2 m 4 ft</td>
<td>2</td>
<td>4000</td>
<td>33.7</td>
<td>23.6</td>
</tr>
<tr>
<td>– 1.3 m 4.5 ft</td>
<td>2</td>
<td>4700</td>
<td>39.3</td>
<td>27.5</td>
</tr>
<tr>
<td>– 1.5 m 5 ft</td>
<td>2</td>
<td>5000</td>
<td>42.1</td>
<td>29.5</td>
</tr>
</tbody>
</table>

* Tunable white values with 50%/50% channel balance **Tolerance for the values of CCT, luminous flux and forward voltage in the table is ±10%
### Specification diagrams

#### LUMINOUS FLUX VS FORWARD CURRENT

- **Relative luminous flux [lm]**
- **Forward current [mA]**

**Tc** = 65 °C

**Tc** = 85 °C

#### FORWARD VOLTAGE VS FORWARD CURRENT

- **Forward voltage [V]**
- **Forward current [mA]**

- Max Vf at Tc = 25 °C, min / max CCT
- Nom Vf at Tc = 65 °C, 50 % / 50 % channel balance

#### DERATING CURVE

- **Maximum forward current [mA]**
- **Tc temperature [°C]**

Data is subject to change without notice. www.helvar.com
LiC20-282 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 to 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 instructions and the precautions given in the product datasheets while handling and assembling Helvar LED modules.

**Storage conditions**

- Unused LED modules are recommended to stored carefully in an original sealed ESD package preventing moisture, pollutants or ESD to 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.

**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 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.
## Information and conformity

### Conformity & standards

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Standard(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Led modules for general lighting - safety specifications</td>
<td>IEC / EN 62031</td>
</tr>
<tr>
<td>Photobiological safety of lamps and lamp systems</td>
<td>IEC / EN 62471 TR IEC / EN 62778</td>
</tr>
<tr>
<td>Compliant with relevant EU directives</td>
<td></td>
</tr>
<tr>
<td>CE marked</td>
<td></td>
</tr>
<tr>
<td>RoHS / REACH compliant</td>
<td></td>
</tr>
</tbody>
</table>

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