**TMU040015ELXXXA**

**350 mA CONSTANT CURRENT LED DC MODULE, 17” LINEAR, 1845 LUMENS**

- High Density, high brightness chip array for use in Class 2 Linear applications
- Constant current for maximum efficacy
- On-board connector for ease of assembly
- Available in standard CCT's
- Dimmable when used with a dimmable driver
- 80 CRI standard and 90 CRI available

### General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Operating Voltage @ Max Current</td>
<td>37.2V @ 450mA</td>
</tr>
<tr>
<td>Max Input Current</td>
<td>450 mA</td>
</tr>
<tr>
<td>Nominal DC Power Consumption @ Max Current</td>
<td>16.7W</td>
</tr>
<tr>
<td>Initial Lumens Output @ Max Current</td>
<td>2,290 lumens @ 4000K / 80 CRI / 25°C</td>
</tr>
<tr>
<td>Beam Angle</td>
<td>120°</td>
</tr>
<tr>
<td>CRI</td>
<td>80, 90</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-35 to +100°C / -31 to +212°F</td>
</tr>
<tr>
<td>Operating Ambient Temperature Range (Ta)</td>
<td>-35 to +45°C / -31 to +113°F</td>
</tr>
<tr>
<td>Maximum Case Temperature (Tc)</td>
<td>L70: Tc max=85°C (Ts=90°C) / L90: Tc max=55°C (Ts=60°C)</td>
</tr>
<tr>
<td>Estimated Lumen Maintenance ©</td>
<td>L70: 50,000Hrs / L90: 17,000Hrs</td>
</tr>
<tr>
<td>Color Consistency</td>
<td>Binning per ANSI C78.377-2008 @ 25°C; 4 SDCM</td>
</tr>
<tr>
<td>Overall Size</td>
<td>17” x 0.71” x 0.22” (including connector)</td>
</tr>
<tr>
<td>PCB Material / Module weight</td>
<td>FR-4 / 27 g</td>
</tr>
<tr>
<td>PCB Part Number #</td>
<td>N/A</td>
</tr>
<tr>
<td>Maximum Screw Installation Torque</td>
<td>25 inch - ounces</td>
</tr>
<tr>
<td>Thermal Management</td>
<td>None</td>
</tr>
<tr>
<td>Safety/Compliance</td>
<td>cURus (File # E351548)</td>
</tr>
<tr>
<td>Energy Efficiency Label (EEI-Label)</td>
<td>Class 2 Lighting System</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years @ Max. Tc from date of manufacture</td>
</tr>
</tbody>
</table>

© Measured electrical data per UL file
© TM-21 Reported Numbers

Fulham Co. Inc.: 12705 South Van Ness Ave., Hawthorne, CA 90250 Tel.: 1-323-779-2980 Fax.: 1-323-754-9060. order@fulham.com  www.fulham.com
Specifications subject to change without notice.
Part Numbering Matrix

TMU040015ELXXXA

<table>
<thead>
<tr>
<th>Type</th>
<th>Control</th>
<th>Max. Power</th>
<th>PCB Material</th>
<th>Shape</th>
<th>CRI</th>
<th>Color Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>M = Module (UL Class 2)</td>
<td>U = None</td>
<td>008 = 8W</td>
<td>E = FR-4</td>
<td>L = Linear</td>
<td>8 = 80</td>
<td>9 = 90</td>
</tr>
</tbody>
</table>

Electrical and Optical Specifications

<table>
<thead>
<tr>
<th>LED Module Part Number</th>
<th>Number of LED</th>
<th>Input Current</th>
<th>Nom. Fwd. Voltage</th>
<th>Nom. Rated Power</th>
<th>Nom. Lum. Flux @ 4000K / 90 CRI</th>
<th>Nom. Lum. Flux @ 4000K / 80 CRI</th>
<th>Nom. Efficacy @ 4000K / 80 CRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMU040015ELx40A</td>
<td>36</td>
<td>300 mA</td>
<td>35.6 VDC</td>
<td>10.7W</td>
<td>1295 lm</td>
<td>1620 lm</td>
<td>151 lm/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>350 mA</td>
<td>36.1 VDC</td>
<td>12.6W</td>
<td>1475 lm</td>
<td>1845 lm</td>
<td>146 lm/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400 mA</td>
<td>36.6 VDC</td>
<td>14.6W</td>
<td>1650 lm</td>
<td>2065 lm</td>
<td>141 lm/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>450 mA</td>
<td>37.2 VDC</td>
<td>16.7W</td>
<td>1830 lm</td>
<td>2290 lm</td>
<td>137 lm/W</td>
</tr>
</tbody>
</table>

CCT & CRI vs. Luminous Flux

<table>
<thead>
<tr>
<th>CCT</th>
<th>CRI 80(R9&gt; 0)</th>
<th>CRI 90(R9&gt;50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2700K</td>
<td>0.94</td>
<td>0.73</td>
</tr>
<tr>
<td>3000K</td>
<td>0.96</td>
<td>0.79</td>
</tr>
<tr>
<td>3500K</td>
<td>0.97</td>
<td>0.80</td>
</tr>
<tr>
<td>4000K</td>
<td>1.00</td>
<td>0.82</td>
</tr>
<tr>
<td>5000K</td>
<td>1.03</td>
<td>0.85</td>
</tr>
</tbody>
</table>

NOTES:

1) Performance based on Tc mod = 25°C. See thermal de-rating chart (pg. 4) for higher temperature operation.
2) Standard lumen output and efficacy is calculated for standard options. Reference CCT & CRI vs Luminous Flux chart for lumen ratio calculation.
3) Specifications are subject to change without notice.
4) The LED DC Module can be configured with different LED chip quantities, series and parallel design configurations to meet a specific design requirement.
   Contact Fulham for further assistance.

○Standard Product offering (All other options are made to order with MOQ and lead time)

Indicates maximum rated current. Modules may be operated at a current less than or equal to this value.

Specifications subject to change without notice.
### Thermal Specifications

**With Connectors**

<table>
<thead>
<tr>
<th>Storage Temperature Range</th>
<th>-35 to +100°C / -31 to +212°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Ambient Temperature Range (Ta)</td>
<td>-35 to +45°C / -31 to +113°F</td>
</tr>
<tr>
<td>Maximum Case Temperature (Tc)</td>
<td>L70: Tc max=85°C(Ts=90°C) / L90: Tc max=55°C(Ts=60°C)</td>
</tr>
</tbody>
</table>

### Thermal De-Rating: Tc vs. Luminous Flux vs. Forward Voltage

<table>
<thead>
<tr>
<th>Module Case Temperature (Tc)</th>
<th>Luminous Flux Multiplier</th>
<th>Total Vf Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>25°C</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>30°C</td>
<td>1.000</td>
<td>0.991</td>
</tr>
<tr>
<td>35°C</td>
<td>0.997</td>
<td>0.982</td>
</tr>
<tr>
<td>40°C</td>
<td>0.993</td>
<td>0.973</td>
</tr>
<tr>
<td>45°C</td>
<td>0.993</td>
<td>0.964</td>
</tr>
<tr>
<td>50°C</td>
<td>0.990</td>
<td>0.953</td>
</tr>
<tr>
<td>55°C</td>
<td>0.987</td>
<td>0.944</td>
</tr>
<tr>
<td>60°C</td>
<td>0.987</td>
<td>0.935</td>
</tr>
<tr>
<td>65°C</td>
<td>0.984</td>
<td>0.926</td>
</tr>
<tr>
<td>70°C</td>
<td>0.984</td>
<td>0.917</td>
</tr>
<tr>
<td>75°C</td>
<td>0.980</td>
<td>0.908</td>
</tr>
<tr>
<td>80°C</td>
<td>0.977</td>
<td>0.899</td>
</tr>
<tr>
<td>85°C</td>
<td>0.977</td>
<td>0.889</td>
</tr>
<tr>
<td>90°C</td>
<td>0.974</td>
<td>0.880</td>
</tr>
<tr>
<td>95°C</td>
<td>0.970</td>
<td>0.862</td>
</tr>
<tr>
<td>100°C</td>
<td>0.967</td>
<td>0.853</td>
</tr>
</tbody>
</table>
### TMU040015EL XXXA

#### Certification Chart

<table>
<thead>
<tr>
<th>Classification</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>RoHS COMPLIANT</td>
<td>TMU040015EL XXXA</td>
</tr>
<tr>
<td>c US</td>
<td>YES</td>
</tr>
<tr>
<td>Energy Efficiency Label (EEI-Label)</td>
<td>N/A</td>
</tr>
<tr>
<td>Class 2 Lighting System</td>
<td>YES</td>
</tr>
</tbody>
</table>

#### Energy Star™ TM-21 Calculator Data

<table>
<thead>
<tr>
<th>Tc Module</th>
<th>Reported L70</th>
<th>Reported L90</th>
</tr>
</thead>
<tbody>
<tr>
<td>55°C</td>
<td>52,000 Hrs</td>
<td>17,000 Hrs</td>
</tr>
<tr>
<td>85°C</td>
<td>50,000 Hrs</td>
<td>16,000 Hrs</td>
</tr>
<tr>
<td>105°C</td>
<td>33,000 Hrs</td>
<td>10,000 Hrs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc Module</th>
<th>Calculated L70</th>
<th>Calculated L90</th>
</tr>
</thead>
<tbody>
<tr>
<td>55°C</td>
<td>52,000 Hrs</td>
<td>17,000 Hrs</td>
</tr>
<tr>
<td>85°C</td>
<td>50,000 Hrs</td>
<td>16,000 Hrs</td>
</tr>
<tr>
<td>105°C</td>
<td>33,000 Hrs</td>
<td>10,000 Hrs</td>
</tr>
</tbody>
</table>

**Product Image:** 17” Linear DC Module

**Top View**
NOTES:

1) Hardware not included.
Guidelines

Termination Notes
- Connector Type: BJB Single Pole SMD Terminal Block, Part #: 46.101.1001
- URus Rating: 9A/300V; cUR Rating: 3A/300V
- Use solid wire size 24 – 18 AWG, rated at a minimum 50V, minimum 105°C, and stripped to length 8 mm (0.31 inches).
- To release wire, twist and pull the wire simultaneously.

Optional Accessories - Interconnect Pins
- Single Interconnect Pin: Wago Part Number 2060-951
  Metal pin(s) to interconnect LED modules that are compatible with connector.
  For more detail information, please visit Wago's website: http://www.wago.com/infomaterial/pdf/60291132.pdf

Fastening Notes
- If fastening by screw hole, use any screw with diameter less than 0.185 in (4.7mm). Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation. Suggested screw sizes: #6 or M4 Pan Head screw.
- If fastening using double-sided tape, start with clean, oil-free and dust-free surface. Peel backing and place LED module on mounting surface. Firmly press down on the module to ensure good adherence. Follow the double-side tape manufacturer’s installation instructions.
- BJB P2F (Push-to-Fix) fixing elements for PCBs can be used to fasten LED modules to mounting surface.

Environmental Rating
- LED DC Modules are rated for dry locations.

Electrostatic Sensitive Product (ESD)
- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

Thermal Management
- Proper thermal management should be employed to ensure life and reliability of product. Max Tc of module should not be exceeded.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

Polarity Notes
- LED DC Modules are polarity sensitive.
- Ensure that “positive” from LED Driver is connected to “positive” of LED modules and that “negative” from LED Driver is connected to “negative” of LED modules.
- Polarities of modules are marked with “+” for positive and “-” for negative.
NOTES:

1) The Color and Binning and Optical Spectrum charts are for reference only. For more detailed info, contact factory.
2) Reference Samsung Chromaticity Diagram for Color and Binning. Binning per ANSI C78.377-2008 @ 25°C, 4 SDCM.
3) The Optical Spectrum values vary depending on product type and color rank.
4) Driver not included.
TMU040015ELXXXA
Compatible Fulham LED Drivers

<table>
<thead>
<tr>
<th>Fulham Part Number</th>
<th>Driver Description</th>
<th># of Modules per Driver</th>
<th>Total Nominal Module Lumen Output and Wattage @ 4000K/80CRI/25°C</th>
<th>Wiring Diagram</th>
<th>HotSpot2 Compatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC11200350-15C</td>
<td>350 mA, 15W CC Driver, 120VAC Input</td>
<td>1</td>
<td>1845 lm, 12.6W</td>
<td>A</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T111200350-15L</td>
<td>350 mA, 15W CC Driver, 120VAC Input, TRIAC Dimmable</td>
<td>1</td>
<td>1845 lm, 12.6W</td>
<td>A</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV0350-15U/F</td>
<td>350 mA, 15W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>1</td>
<td>1845 lm, 12.6W</td>
<td>A</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T111200350-17CB</td>
<td>350 mA, 17W CC Driver, 120VAC Input, TRIAC Dimmable</td>
<td>1</td>
<td>1845 lm, 12.6W</td>
<td>A</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T111200700-30C/L</td>
<td>700 mA, 30W CC Driver, 120VAC Input, TRIAC Dimmable</td>
<td>2 (2p)</td>
<td>3690 lm, 25.2W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV0700-30L</td>
<td>700 mA, 30W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>2 (2p)</td>
<td>3690 lm, 25.2W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV0900-40L</td>
<td>900 mA, 40W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>2 (2p)</td>
<td>4580 lm, 33.4W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV1400-60L</td>
<td>1400 mA, 60W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>4 (4p)</td>
<td>7380 lm, 50.4W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV1800-88L</td>
<td>1800 mA, 88W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>4 (4p)</td>
<td>9160 lm, 66.8W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>T1M1UNV2100-88L</td>
<td>2100 mA, 88W CC Driver, Universal Input, 0-10V Dimmable</td>
<td>6 (6p)</td>
<td>11,070 lm, 75.6W</td>
<td>C</td>
<td>FHS2-UNV-56S</td>
</tr>
<tr>
<td>FHSAC1-UNV-40BLS/C/L</td>
<td>Programmable, 40W CC Driver + Emergency System, Universal Input, 0-10VDimmable (Set to 350 mA)</td>
<td>1</td>
<td>1845 lm, 12.6W</td>
<td>A</td>
<td>N/A</td>
</tr>
<tr>
<td>FHSAC1-UNV-40BLS/C/L</td>
<td>Programmable, 40W CC Driver + Emergency System, Universal Input, 0-10VDimmable (Set to 700 mA)</td>
<td>2 (2p)</td>
<td>3690 lm, 25.2W</td>
<td>C</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Wiring Diagram

A - Single Channel Driver, 1 LED Module connected

B - Single Channel Driver LED modules connected in series

C - Single Channel Driver, LED Modules connected in parallel

D - Single Channel Driver LED Modules connected in series & parallel

NOTES:
1) Subject to rated loading conditions.
2) Lumen output and efficacy data is based on 4000K 80CRI, refer to CCT and CRI vs. Luminous Flux table for other options.
3) Modules are polarity sensitive. Ensure that “positive” from LED Driver is connected to “positive” of LED modules and that “negative” from LED Driver is connected to “negative” of LED modules.
4) List is subject to change without notice.
5) Connect 0-10V dimmer only to 0-10V dimmable drivers.
6) Modules wired in a series-parallel combination is designated by (Xs, Yp), where X is the number of modules wired in series and Y is the number of modules wired in parallel.
7) Total nominal module lumen output and wattage does not include driver efficiency. Please refer to LED driver spec sheet to calculate overall system efficacy.

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