LINEARlight POWER FLEX

Flexible High Light Output LED Modules

LINEARlight POWER FLEX LED modules are suitable alternatives to conventional sources used in linear and curved architecture and display lighting applications. The module consists of high brightness, white LEDs uniformly spaced on a flexible, self-adhesive substrate.

LINEARlight POWER FLEX modules have a service life of 60,000 hours (L_{50}) with proper thermal management. The module is optimally paired with OPTOTRONIC® 24Vdc power supplies. Connector accessories are also available to simplify installation. To facilitate easy installation, optional connector assemblies and mounting tracks are available in 18" and 56" lengths. These may be paired with diffuser accessories to modify and soften light distribution.

Key Features & Benefits

- High lumen output for use in various conventional lighting applications
- Flexible circuit board with self-adhesive backing allows for easy installation in complex contours
- Modules can be conveniently field cut to achieve a customized fit every 6 LEDs
- Dimmable by pulse width modulation, a method that maintains consistent lumen output and color
- Electrical mounting tracks and optical diffusers available for easy installation
- Long life: up to 60,000 hours (L_{50}) when temperature at Tc point is maintained at 40°C minimizing maintenance frequency

Product Offering

Ordering Abbreviation	Wattage	Color
LNRPWRFLX/LM10P/W3F-827	72	2700K
LNRPWRFLX/LM10P/W3F-830	72	3000K
LNRPWRFLX/LM10P/W3F-835	72	3500K
LNRPWRFLX/LM10P/W3F-840	72	4000K
LNRPWRFLX/LM10P/W3F-854	48	5400K

Application Information

Applications

- Backlighting complex contours
- Border marking
- Cove lighting
- Display shelves
- Edge lighting
- Path and contour marking
- Recessed lighting

Specifications and Certifications

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The OSRAM LINEARlight POWER FLEX is UL2108 Listed for US and Canada Class 2 Unit. (UL file # E247649)

RoHS compliant

Listed in the Sign Components Manual (SAM)

Specification Data

Catalog # Type

Project

Comments

Prepared by Date

Ordering Information

Item Number	Ordering Abbreviation	Module Length (ft)	No. of LEDs	Power (W)	Voltage (Vdc)	Module Current (A)	Color Temperature	Lumens (lm)*	Lumens/ft	Watts/ft
70268	LNRPWRFLX/LM10P/W3F-827	9	120	72	24	3	2700K	1900	211	8
70331	LNRPWRFLX/LM10P/W3F-830	9	120	72	24	3	3000K	1900	211	8
70325	LNRPWRFLX/LM10P/W3F-835	9	120	72	24	3	3500K	2450	272	8
70328	LNRPWRFLX/LM10P/W3F-840	9	120	72	24	3	4000K	2450	272	8
70098	LNRPWRFLX/LM10P/W3F-854	9	120	48	24	2	5400K	2800	311	5.3

* All data is related to entire module measured at Tc point of 25°C. Data reflects statistical mean values. Actual data may differ depending on variances in the manufacturing process. End users need to take into account the lumen depreciation as the temperature rises with various thermal management solutions installed.

Ordering Guide

LNRPWRFLX	/	LM10P	/	W3F	8	27	
LINEARlight POWER FLEX		Identification Code		White 3rd Generation Fine Bin	CRI 8>80	Color Temperature 27 = 2700K 30 = 3000K 35 = 3500K	 40 = 4000K 54 = 5400K

Power Supply Information

Max. No. of Modules & Max. Length per Power Supply

	OT17 (51622)	OT20 (51512)	OT50 (51598)	OT75 (51514)	OT96 (51510, 51511)	OT240 (51515)
All 72 W products	4 22"	5 2.3'	0.65 (13) 6.1'	1.0 (20) 9.2'	1.3 (26) 11.9'	1.1 (22) 10.1'
All 48 W products	7 3.2'	8 3.7'	1 (20) 9.2'	1.6 (31) 14.2'	2 (40) 18.3'	1.7 (33) 15.1'

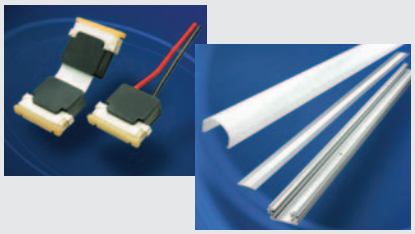
Notes:
1. A coupon (Smallest Electrical Unit - SEU) is a sub-section of the module containing 6 LEDs and at a length of 5.5". Please reference this bulletin's "Assembly Diagram" for details.
2. OPTOTRONIC® power supplies are optimally paired with SYLVANIA LED modules and are specifically designed with protection features for safe operation.
3. The module is designed to work with Constant Voltage power supplies only. Reference the Power Supply PIB # ECS050 for product specific information.
4. These values are an approximation based on the typical "Power" values listed under the "Ordering Information" parameters. To accurately determine the maximum LED load, evaluate the application based on the application note "Determining the Maximum LED Load on a Constant Voltage Power Supply" LED026. This document can be found at www.sylvania.com.
5. LINEARlight POWER FLEX modules can be dimmed when used with the OT DIM, or OTRGBDIM controllers. Because of the power consumed by these controllers, an additional de-rating of the overall "maximum" load must be factored into the above chart. To determine this de-rating (wattage) value please reference Step 8 of this same App. Note #LED026.
6. The OT240 has 3 channels at 80 W each. Values represented in Chart are "per channel".
7. Parallel runs may be required to achieve the numbers listed above. Please reference this bulletin's "Wiring Diagram" for product specific wiring instructions.

Minimum and Maximum Ratings

Parameter	Values
Operating Temperature at Tc point	-20... +85°C (-4 to +185°F)
Storage Temperature	-20... +85°C (-22 to +185°F)
Voltage Range	23...25 Vdc
Maximum Reverse Voltage	0 Vdc

Notes:
1. Exceeding maximum ratings may damage the LED module and cause potential safety hazards.
2. Elevated operating temperatures can be expected to negatively impact the service life in terms of lumen output.

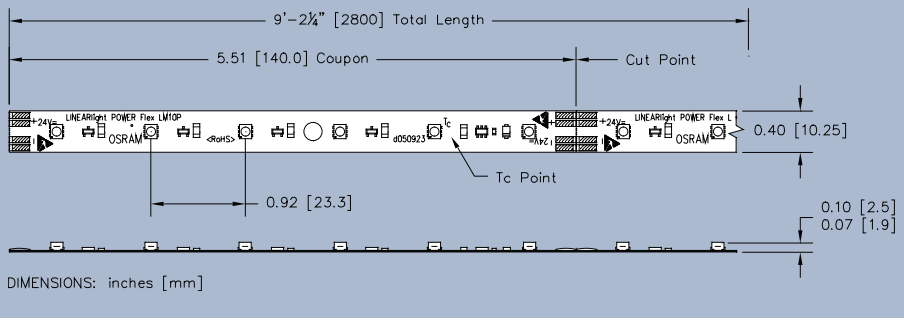
Accessories



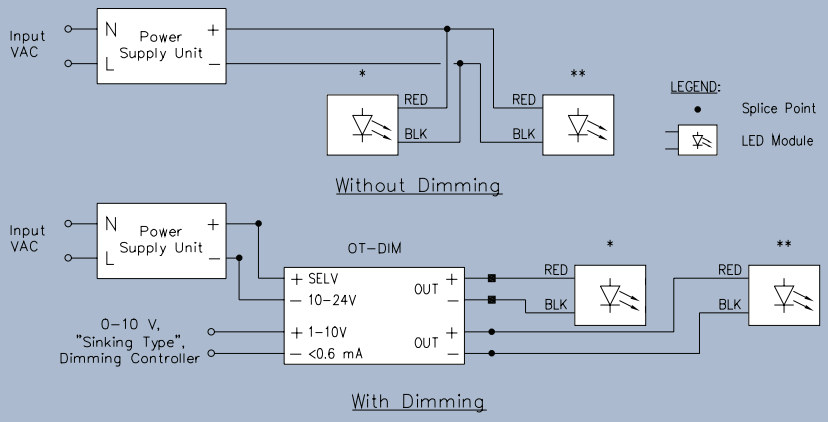
Item Number	Ordering Abbreviaion	Description	Length (in.)	Width (in.)	Wire Length (in.)	Lens	Order Qty.
70269	LM2PINFLEXCONN	Input Connector	20.21	0.64	19.69	—	10
70263	LM2CONN5FLEXCONNBB	Board to Board (short)	1.43	0.64	0.39	—	10
70131	LINEARlightFLEXCONNBB	Board to Board (long)	6	0.64	0.39	—	10
71236	LINEARlight Track 1.5P	Mounting Track	18	1.4	—	Prismatic	10
71237	LINEARlight Track 4.7P	Mounting Track	56	1.4	—	Prismatic	6
71238	LINEARlight Track 1.5D	Mounting Track	18	1.4	—	Diffuse	10
71239	LINEARlight Track 4.7D	Mounting Track	56	1.4	—	Diffuse	6

Note: For FLEX Connector installation instructions reference “FLEX Connectors User’s Guide” LED069 found at wwww.sylvania.com.

Assembly Diagram



Wiring Diagram



* For the 72 W modules, the maximum operable length on a single feed is 10 coupons.

* For the 48 W modules, the maximum operable length on a single feed is 20 coupons.

** Remaining load must be connected on subsequent power feeds.

Reference the “Power Supply Information” section of this PIB for module load per power supply requirements.

To help reduce the effects of any potential voltage drop, if possible, it is best to locate the power supply near the middle of the run.

Safety Information

WARNING: ONLY QUALIFIED PERSONNEL SHOULD PERFORM INSTALLATION.

TO AVOID ELECTRICAL SHOCK OR COMPONENT DAMAGE, DISCONNECT POWER BEFORE ATTEMPTING INSTALLATION OF THE POWER SUPPLIES AND/OR MODULES.

Failure to install the power supplies and/or LED modules in accordance with the National Electric Code (NEC), all applicable Federal, State and local electric codes as well as the specific Underwriters Laboratories (UL) safety standards for the installation, location and application may cause serious personal injury, death, property damage and/or product malfunction.

1. The LED module itself and all its components shall not be subjected to mechanical stress and assembly must not damage or destroy conducting paths on the circuit board.
2. Installation of LED modules shall be made with regard to all applicable electrical and safety standards. Only qualified personnel should be allowed to perform installations.
3. Observe correct electrical polarity, incorrect polarity may destroy the module. (Depending on the product, incorrect polarity may lead to emission of red, or no light.)
4. Ensure the power supply is of adequate power to operate the total load.
5. When mounting on metallic or otherwise conductive surfaces, an electrical isolation is required at soldering points between the module and the mounting surface.
6. Electrostatic Discharge (ESD) precautions shall be incorporated when handling or installing the module. (For more information, reference document # LED093 ESD Protection for LED Systems.)

Safety Information (continued)

7. The module, as manufactured, has no conformal coating and therefore offers no inherent protection against corrosion. The ability to customize the length of the module by cutting at specifically marked points is a key feature of the product and hence the reason for no factory installed conformal coating. For these reasons, it is recommended that the user complete all module modification first (cutting, wiring) and then apply a conformal coating in the final stages of installation.
8. Damage by corrosion and improper heat sinking will not be honored as a materials defect claim. It is the user's responsibility to ensure adequate heat sink and protection against corrosive agents such as moisture, condensation and other harmful elements.

Assembly Information

1. Solder connections should only be performed on designated solder pads (marked "24V +/-"). During soldering, do not exceed the maximum soldering time of 10 seconds and the maximum soldering temperature of 260°C.
2. The Smallest Electrical Unit (SEU) or "coupon" can be removed by cutting with scissors between the designated solder pads (reference "Assembly Diagram" for location).
3. The mounting of the module is facilitated by means of the double-sided adhesive on the back-surface of the module. Care must be taken to provide a clean and dry mounting surface, free of oils or silicone coatings as well as dirt particles. The mounting substrate must have sufficient structural integrity. Take care to completely remove the adhesive backing. Once the module is appropriately positioned, press on the module with about 20N/cm^2 (refer to application techniques of 3M adhesive transfer tapes).
4. The minimum bending radius is 2 cm. The module may be bent over a smaller radius but only in regions of the circuit board containing no electronic components. Such bends should be made only once and fixed in position to avoid cyclic fatigue.
5. The thermal expansion coefficient along the length of the module is 17 x 10^{-6}cm/cm/K. When installing in environments with large variations in temperature (e.g. outdoor applications) and operating length of more than 2m, the use of metallic mounting surfaces is necessary. Otherwise it is advisable to use an additional thicker adhesive tape to absorb the stress of any mismatch in expansion coefficients.
6. Installation of the LINEARlight POWER FLEX must include provisions for thermal management to avoid premature failure of the product and to obtain expected service life. Service life (i.e. lumen depreciation) is primarily a function of LED temperature, which is to be monitored on the circuit board at the designated "Tc point". (A Tc point temperature of 40°C should be sufficient to enable a service life of 50,000 hrs.)
7. Concerning fixture design, it is important to understand that once heat is transferred to a "heat sink", that heat must still be allowed to escape the "system". A heat sink transferring the thermal energy to the inside of an enclosed cavity may ultimately be of little use.
8. It is recommended that OEMs design a prototype fixture and test that fixture in an appropriate environment while monitoring the temperature at the Tc point, which should be allowed enough time to reach thermal equilibrium. Tc point temperature can be measured with a standard thermocouple in direct contact with the circuit board at the Tc point or by use of ML4C Series non-reversible OMEGALABELS (www.omega.com) or equivalent.
9. Definition of a UL 2108 listed Low Voltage Lighting System as it pertains to this module includes: 1. A UL Listed Class 2 power supply. 2. An appropriate number of OSRAM's LINEARlight POWER FLEX LED modules based on the recommended max number of modules listed. 3. The connectors/cable systems.

   The power supply must be mounted, wired, and grounded in accordance with all applicable NEC and ANSI standards.

   All modular connections on the secondary side of the power supply must be made using SYLVANIA connectors. If additional wires and/or splice connections are necessary, wires are to be UL Listed, minimum 22 AWG and splice connectors must be UL rated and chosen of appropriate size for number of wires to be connected. WARNING: the low voltage secondary circuit shall not be grounded.
10. For applications involving exposure to humidity and dust, the module must be protected by a fixture, or housing with a suitable protection class. The module can be protected against condensation by treatment with an appropriate circuit board grade conformal coating. The conformal coating should have the following features:

    a. Optical transparency
    b. UV – resistance
    c. Thermal expansion matching the thermal expansion of the module 15-30 x 10^-6cm/cm/K
    d. Low permeability of steam for all climate conditions
    e. Resistance against corrosive environment

This information shall not supersede the requirement to follow all other safety, assembly and any other instructions listed in this document.

The Acrylic Protective Lacquer (APL) from the company Electrolube (www.electrolube.com) has been tested and meets the conditions for this product (or equivalent). Please reference "Assembly Information" for any preparation instructions.

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