

# INNOVATIVE SOLUTIONS FOR LIGHTING APPLICATIONS



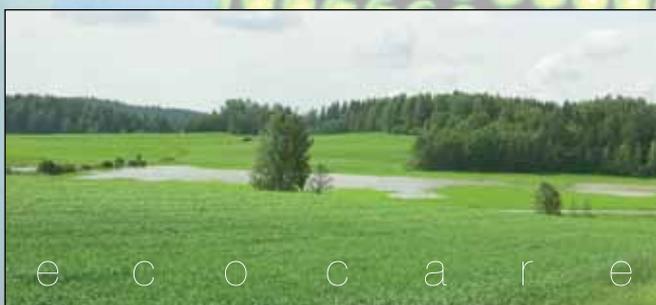
**molex**<sup>®</sup>

## Turning bright ideas into innovative lighting

The lighting industry is growing and evolving at a very rapid pace. There is a paradigm shift away from traditional power-hungry incandescents towards energy efficient, longer life and sustainable lighting solutions. From street lights to giant video screens, solid state lighting systems offer compelling benefits and are already transforming the industry.

It is estimated that residential, commercial and industrial lighting account for approximately 20% of the world's energy consumption. It is for this very reason that governments around the world are backing R&D programs aimed at reducing carbon emissions – tremendous amounts of energy could be saved which will not only reduce CO<sub>2</sub> emissions but also lower the overall energy bill.

Besides energy savings, the long life of LED (Light Emitting Diode) lighting products can also bring noticeable maintenance cost reductions. LEDs last more than 25 times longer than incandescent and 5 times longer than Compact Fluorescent Lamps (CFLs). With proper thermal management, LED fixtures can last 50,000 hours at 70% lumen maintenance under normal usage.



Molex is committed to preserving the global environment



## MOLEX – THE LIGHTING EXPERTS

Molex manufactures some of the most innovative and reliable interconnect products in the world. Our extensive product range includes sealed and unsealed interconnect systems, wire and cable assemblies and customized solutions for a range of lighting segments.

Enjoying a long history of working with leaders in the lighting industry, Molex is fully committed to innovative lighting solutions, while enhancing design flexibility and lowering costs. By drawing upon our core competencies in a wide range of applications from components to fully integrated value added solutions, you can also achieve a faster time to market and a cost competitive advantage.

With a network of design centers worldwide, Molex offers outstanding technical support and comprehensive expertise, providing unlimited possibilities to meet the needs of your future lighting applications.

By combining our best in class electrical, thermal and optical expertise with innovative 'in-house' design and manufacturing capabilities, Molex has created new ranges of LED light modules.

### **LED Light Modules and LED Holders**

Molex offers LED Array holders and Helieon® Sustainable LED Light Modules which are ideal for OEM light-fixture manufacturers to simplify the installation process of energy-efficient LED Arrays. The installation time is reduced by an advanced compression contact design which eliminates hand soldering.

### **Customised Solutions**

Molex connector families can support all your lighting designs. If you are faced with a specific challenge that cannot be solved through our existing portfolio of connectors and integrated products, then let's work together to meet this challenge. We are ready to assist you in a new design or a re-design of your existing lighting application.

Visit our website to view our full range of capabilities for the lighting industry:

[www.molex.com/industry/solidstatelighting.html](http://www.molex.com/industry/solidstatelighting.html)



# ➤ LED Light Solutions: flexible, future-proof options for lighting fixtures

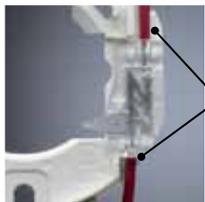
## LED Array Holders

### Using unmatched interconnect technology in a solderless solution for mounting LED Arrays into OEM designs

Molex LED products are ideal for original equipment manufacturers (OEM's) incorporating LED technology into their lighting fixture. Unique compression contacts connect the LED arrays, while eliminating the need for hand soldering. The solderless screw-down connection allows for a lean manufacturing process and easy integration of the latest LED technology into lighting systems. Molex LED array holders are designed with lighting OEM needs in mind to, simplify installation, increase connectivity, and drive down overall costs.



*Molex Solderless LED array holders with optional clear protective cover*



*Molex Solderless LED array holders utilize a dual wire trap that can accommodate a poke in wire connection and allows LEDs to be daisy chained together*



### FEATURES AND BENEFITS

- Compression contacts for solder-less connection to LED Array
  - Multiple mate and un-mate cycles
- Dual-ended wire traps
  - 18 - 20 AWG Wire
  - Wires can be released with simple tool
- Screw mount outside LED Array
  - Assist with voltage isolation and
  - Allows for Class 1 power supply
- Optional snap-in directional optic or clear protective cover
- High temperature thermoplastic housing
- Alignment pegs to assist with installation
- Eliminates cost and risks associated with hand soldering
- Expedites time to market for new lighting fixture designs
- Delivers optimal design flexibility to differentiate lighting fixture products
- Reduces fixture Inventory - allows for build-to-order manufacturing model
- Reduces operator-to-operator variation
- Mitigates quality issues related to cold solder joints

Please contact us for the available versions.





*Helieon® Sustainable Light Module*



*Helieon® Line Voltage Sustainable Light Module*

## **Helieon® Sustainable Light Modules**

The Helieon® lighting system is the first plug-and-play sustainable solid-state lighting module to integrate high-efficiency precision lighting with an easy-to-use socketed solution. Combining unmatched solid state lighting technology from Bridgelux\* and superior interconnect technology from Molex, the Helieon lighting system simplifies the process of designing, building, replacing and upgrading luminaires.

Helieon enables flexibility in changing the look and feel of the lighting installation with the simplicity of replacing a light bulb. By emulating a traditional lighting socket, the Helieon® system delivers an easy and familiar installation experience similar to traditional light sources. Beam angle, color temperature and light output can all be easily changed or upgraded with the simple turn of the wrist. Product options are tailored to match light output levels of traditional light sources, delivering between up to 2000 lumens under application conditions in halogen and fluorescent color temperature options and offer narrow and medium flood-beam patterns.

## **Applications**



*Gimble Adjustable Rack*



*Sconce*

## **Helieon® Line Voltage SLM Assemblies**

Molex's next-generation Helieon® Line-Voltage Sustainable Light-Module (SLM) Assemblies eliminate the need for external electronic components. The modules are TRIAC dimmable and come with the familiar easy-to-replace interface for effortless upgrades, repairs and maintenance.



*Surface Ceiling*

# helieon®

## » Indoor and Outdoor Illumination

Residential • Architectural • Industrial • Retail • Entertainment • Emergency • Safety

LED lighting not only adds ambience and beauty to the exterior décor of a building, it is also an important feature for safety and security reasons. Indoor and outdoor illumination is solely a necessity to see or be seen in the dark; it's an integral part of the design itself.

Lighting applications are getting more sophisticated and must withstand all weather conditions, as well as environmental factors such as temperature variations, pollution, salt spray, humidity, shock, and vibrations. Molex has products that reduce installation costs and improve system reliability in these harsh environments.

Especially within outdoor applications there is a need for high efficacy and low cost products. With a trend towards sealed/encapsulated LED modules, appropriate thermal management is crucial. Molex offers IP67 and 68-rated products with simple plug-and-play options.

Molex is committed to the lighting industry and will continue to develop new and innovative connectors and system integrated interconnect solutions, designed to meet the needs of your illumination challenges applications.





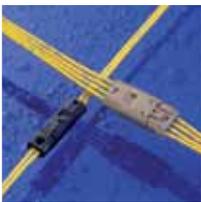
### Micro-Fit 3.0™

- 3.00mm (.118") pitch ideal for space restricted applications up to 5.0A
- Dual cantilever design reduces mating and unmating forces significantly
- 20 to 30 AWG wires sizes for application flexibility
- Lubricated versions offer protection against harsh environments
- Optional overmoulding for rugged strain relief and protection from shock and vibration



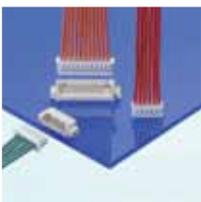
### Brad® Micro-Change® M12 and Brad® Nano-Change® M8

- Rugged and reliable – temperature extremes, shock, vibration and corrosion
- Ultra Lock® connection allows for simple and quick connects and disconnects
- Suitable for outdoor use due to excellent resistance to UV, water, dust and heat
- IP67 / 68 / 69k rated



### Mizu-P25™

- Unique seal stopper provides IP67 protection and low insertion force
- Ideal for tight packaging applications
- User-friendly friction lock for secure connection and latch protection
- Innovative spring-beam female terminal design for high-vibration applications
- Raised split-beam male terminal design prevents incorrect terminal insertion



### PicoBlade™ 1.25mm (.049") Pitch Connector System

- 1.25mm (.049") pitch system designed for high-density harness applications
- Provides the same 1.0A of current as similar 2.00mm (.079") pitch systems
- Uses 45% less PCB real estate as compared to typical 2.00mm wire-to-board systems
- Wire-to-board and wire-to-wire options
- Single row system, SMT and through hole headers



### Pico-EZmate™

- Compact and low-profile, offering a mated height of 1.55mm (.061") for 2- to 5-circuit and 1.65mm (.065") for 6-circuit versions
- The receptacle is mated vertically with the header, which enables easy placement in tight packaging applications.
- Includes secure locking features between the receptacle housing and header
- Audible click to ensure mating

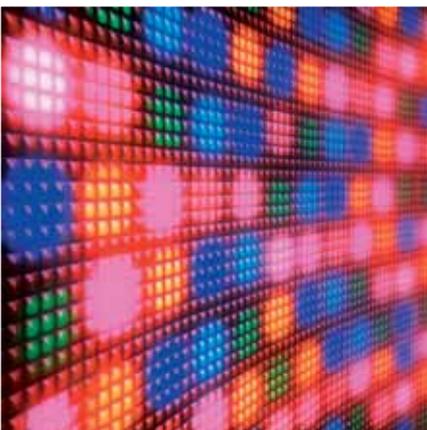
## ▶ Displays and Signage

Billboards • Scoreboards • Motorway • Channel Letter • Video • Industrial • Emergency

In every city around the world the emergence of electronic signs and displays have changed our landscape – whether walking through Piccadilly Circus or Times Square, you'll see electronic billboards displaying interactive ad-vertising and branding messages. At sports stadiums and outdoor concerts, giant video displays bring you closer to the stars; and massive illuminated channel letter signs dominate the skyline, spelling out company names and messages for you to read.

Such outdoor applications must be able to withstand extreme weather conditions and be very rugged and reliable. Advertisers won't pay, if a sign breaks down and does not deliver the message. Additionally, for open air concerts set up and dismantle of screens and message boards must be quick and easy meeting the necessary time constraints, while readability, effective and sharp luminance are integral demands for corporate channel letter signs. And, of course, power consumption is another major consideration.

Molex is working with key players in the display and signage industry to help them meet these demands. We continue to develop new and innovative interconnect solutions for sign and display applications, which are fully-sealed, plug-and-play solutions that can be pre-assembled or terminated on site.





### Multi-Drop Sealed Connector and Cable System

- Weather-proof – assembled system is fully sealed to IP66 and IP67 ratings
- UV protected housings, gel mats and connector interfacial seal
- 50-cycle durability and retention studs offer strain relief
- Flexible, modular assembly design
- Cable-pierce technology allows for quick and easy field termination
- Lead-in chamfers on housings for blind mating



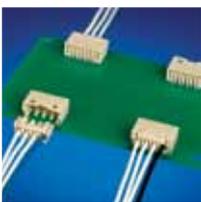
### Mini-Fit H20™

- IP67-rated with pre-installed seals for all weather conditions
- Compact connections in wire-to-wire applications up to 9.0A per circuit
- Assemblies pre-installed with interface and wire seals
- “Wingless” design prevents seal damage during installation or removal
- Positive locking ensures secure connection and prevents accidental unmating
- UV stabilised moulded material for direct sunlight applications
- User-friendly terminal extraction and insertion eases in-field maintenance



### Flexi-Mate™

- Wire-to-board, board-to-board, terminator connectors
- Low profile design: 3.00mm (.118”) height
- Pin crush free
- Rated at 2.0A, 500V



### IllumiMate™

- Meets needs of compact applications thanks to ultra-narrow mated width (6.20mm)
- Inner dual positive lock design for space savings and secure mating retention
- Dual-contact terminal design for added electrical contact assurance
- Fully shrouded housing provides protection to terminal contact area



### Harnesses

- Molex offers high-end design services for fully integrated solutions
- From simple jumpers to higher signal density, higher speeds and power assemblies
- Molex harness capabilities complement its connector offering providing a total interconnect solution to meet customer cost and performance needs.
- Complete electrical and functional testing
- UL/CSA/ISO certified manufacturing locations

## ► Transportation Lighting

Interior & Exterior • Safety & Emergency • Aesthetics & Comfort • High-Visibility

In the transportation industry, which encompasses automotive, trucks, buses, aircraft, marine and rail, energy efficiency and performance in reducing electrical load are critical design requirements. Beyond efficiency, life expectancy and maintenance specifications, LEDs are ideal for these harsh environments where temperature extremes, shock and vibration, and all weather conditions are encountered.

As the benefits of LED technology have become more clear, the use of interior and exterior LED lighting has increased exponentially. In the automotive industry, for instance, manufacturers are developing LED daylight running lights to help improve traffic safety as well as enhance styling.

Sophisticated lighting designs to enrich aesthetics and comfort or express brand identity are penetrating all modes of transport. The potentials of LED lighting in other transportation industries are limitless – from mood lighting on trains to safety and emergency lighting in aeroplanes.

Lower power consumption, longer lamp life and resistance to vibration, combine to make LED technology a perfect solution for the transportation lighting industry. Molex has developed a range of interconnection products to meet these rigorous demands.





### **MX150™ Sealed Connector System**

- Rugged – high connector and terminal retention forces
- Waterproof – environmentally sealed to IP67 and IP6k9k rating
- Supports both low-level signal and power applications up to 22.0A
- Superior electrical and mechanical performance capabilities
- Integral locking latch with secondary, pre-loaded CPA option



### **Stac64™ receptacles and terminals**

- Stackable connection system of readily available PCB headers
- Support both low-level signals as well as up to 30.0A power
- 20-circuit-header housings molded in standard USCAR colour schemes
- Modular-housing design with standard, moulded dovetail features
- High-temperature thermoplastic housing can withstand IR and wave soldering



### **2.54mm (.100") pitch C-Grid® and SL™**

- C-Grid® dual row, board-to-board system
  - Shrouded and unshrouded breakaway headers
  - Single or dual row, vertical and right angle versions available
  - Three plating variations
- SL™ (Stackable Linear) modular, single row, wire-to-wire and -board system
  - Flexible design, 2 to 25 circuits available
  - Compliant pin press-fit, secures and maintains retention
  - Positive latching, secure mating of header and receptacle



### **DuraClick™ wire-to-board connector system**

- Circuit sizes of 2, 4, 6 and 8
- Secure mating and PCB retention, even in high-vibration applications
- Audible 'click' and tactile feel to confirm mating
- Space savings versus outer-lock types



### **Bulb Sockets**

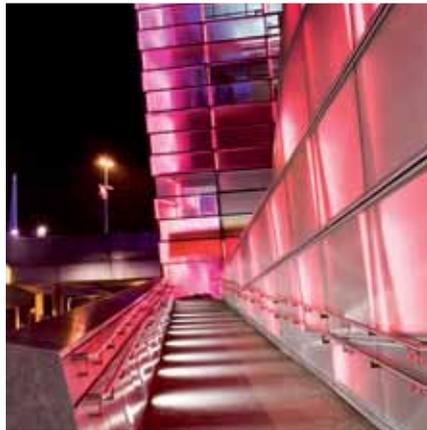
- Compact one-piece designs
- Wide variety of keying and colour options
- Durable high temperature material
- Withstands high vibration and prevents lamp fogging
- Waterproof sealing options, reliability in harsh environments
- Single and double filament styles

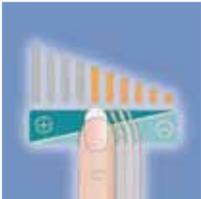
## ► Illuminating the Future Intelligent Lighting Controls

Rising energy costs, environmental regulation and awareness of corporate and social responsibility issues, will continue to make an impact on the lighting industry. The integration of lighting control systems with network devices will play an integral role in cost reductions, allowing the end user more flexibility and control over their environment.

Intelligent lighting controls are already making our lives easier and safer, while lowering our carbon footprint. New commercial, industrial and residential buildings are incorporating local area networks into lighting systems to monitor maintenance requirements, determine occupancy, and offer daylight controls and dimming systems – all simple and effective ways to reducing power consumption.

A variety of lighting control methods are available to provide solutions to suit virtually any lighting setting. Molex is working with leaders in the field of electronic technology in the application and development of control gear for lighting products.





### Capacitive Touch User-Interface

- Rotary/linear sliders, discrete switch and proximity sensing applications
- Robust and durable technology, no moving parts to wear out
- Resistant to harsh chemical exposure, contaminants and EMI
- Various substrate options – polyester, polyimide or PCB
- Elegant design possibilities with unique backlighting, colours and textures
- Seamless overlays for hygienic, easy cleaning



### Capacitor Holders

- Horizontal PCB mounting halves overall design height
- Innovative design protects capacitor in severe shock and vibration environments
- Flexible through-hole or press-fit mounting options
- Easy and cost-effective assembly, requires just two terminals



### Passive-Safety Pole Connector

- Meets EN12767 for passive safety of road-side lighting and signage
- Ensures power will be safely disconnected on impact or within 0.4 seconds
- Integrated cover, retention wire and locking clip
- Connector and cable delivered pre-assembled with IP68-rating



### Terminal Blocks

- Multiple pitches, rows, levels, configurations and styles available
  - Beau™ barrier terminal strips
  - ESE and Beau™ Eurostyle™ terminal blocks
  - Eurostyle™ 2-screw barrier strips
  - Multi-Terminal Connectors (MTC)



### Standard Antennas

- Based on diverse manufacturing and RF technologies, standard antennas offer high performance and ease of integration for demanding wireless applications
- Antennas based on the market-leading Molex LDS (Laser Direct Structuring) technology
- Molex's 2.4GHz SMD antenna - the smallest on-ground Molded Interconnect Device (MID) chip antenna available in the market
- Molex's class-leading multi-frequency standalone antennas for Wi-Fi bands and cellular bands
- "All under one roof" manufacturing approach for excellent quality and cost competitive products

## ➤ LED PCB and Flex Assemblies

### Dependable and Efficient LED Packaging Solutions for Any Application

Individual LEDs have a very broad range of performance outputs, input requirements, and environmental specifications, driving the need for a customized solution for the entire assembly design. Molex has the knowledge and experience in designing and manufacturing LED assemblies for various applications

across different industries (from Automotive to Illumination, from Decorative and Ambient Lighting to Medical).

The application requirements often dictate different types of substrates, all of which can be supported by Molex technology. Polyimide and Polyester flexible substrates, along with PCB rigid boards, or combinations of the three are used for the assemblies to control the signals, drive power and to be part of the thermal design. While each substrate material has inherent benefits, the ability to use the combination of the three mounted with a variety of standard and custom connector solutions or cables, provides customers with a total solution to meet their needs, all from Molex.





### **Polyester Circuitry**

Light-emitting diodes (LEDs) bonded to Molex flexible polyester circuitry provides a cost-effective, durable, lightweight, lowprofile option for adding simple electronic components. Integrating LED circuitry with a graphic overlay or a Molex membrane switch can provide a complete interface solution. By adding a light-guide, Molex can help improve the backlighting and enhance the features of your application.



### **Copper Flex Products**

Molex copper flex circuit assemblies provide solutions to your packaging problems. From high speed signals to power requirements, flex can provide solutions where standard rigid boards or cables cannot. In tight spaces, harsh environments or where the ability to bend or flex the substrate is impossible, flex offers the only solution that can provide a unitized approach to packaging problems. Using a copper flex value add solution, can allow an assembly that has no separate boards, connectors and cables. No separate boards, connectors and cable. Flex provides that total solution with power and signal all in one unit and at a low total applied cost.



### **Rigid Printed Circuit Board Assemblies**

Molex is the expert when it comes to LED PCB assembly solutions. Today, with our design engineering teams and TS 16949 facilities, we are a volume manufacturer of LED PCB assemblies. We offer clean sheet mechanical and electrical design, development and test support, including modeling, thermal and environmental testing. Our engineering teams work with you to ensure that you have the right materials and LED board design to optimize cost and optimize lighting performance. Whether it is a small indicator board or a complete LED module, we can offer global manufacturing, material sourcing, tooling and testing to meet your LED product requirements.



[www.molex.com](http://www.molex.com)

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