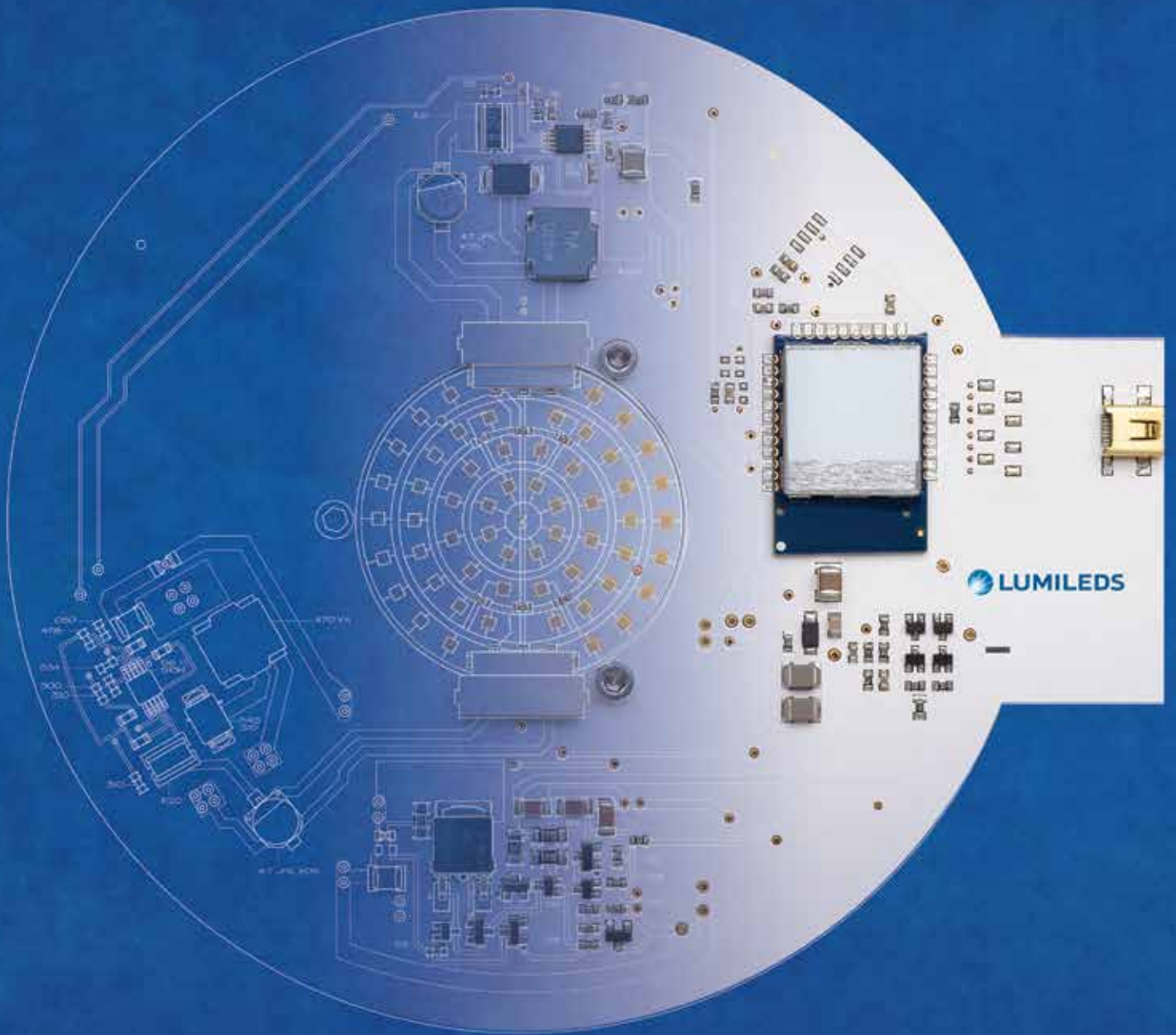




Every feature you want,
and a few you didn't know you needed.



Matrix Platform

Infinitely configurable, integrated LED light engines tailored to the most demanding design requirements. Yours.

Luminaire manufacturers often view their design challenges as unique, yet virtually all share a common imperative: the need to get to market fast with highly differentiated lighting solutions capable of outpacing the competition. Fortunately, there's a proven solution that brings increased agility and next-generation designs within reach:

Matrix Platform from Lumileds.

The shortest distance from inspiration to innovation.

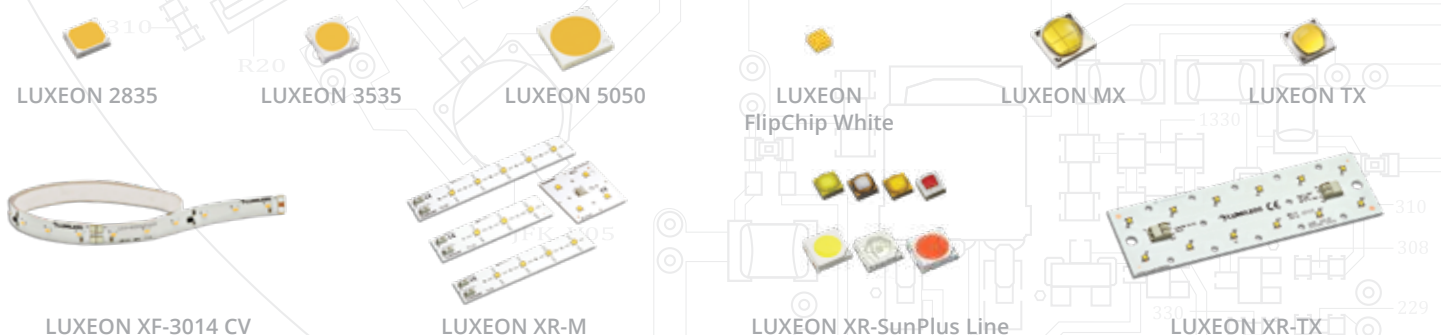
Matrix Platform challenges status quo manufacturing models by combining industry-leading LUXEON LEDs with the power of proprietary Advanced Technologies—then custom configuring them on substrates to fit manufacturers' specific requirements. The result is a game-changing solution tailored to meet the most demanding design specifications and yield maximum supply chain value.

Matrix Platform Advanced Technologies pave the way for design and manufacturing breakthroughs.

What truly sets Matrix Platform apart is its portfolio of exclusive Advanced Technologies. Tapping into decades of optical, electrical, mechanical and thermal expertise—as well as global LED design and manufacturing experience—Lumileds has once again raised the bar with its first wave of Advanced Technologies.

- **Oberon Intelligent Assembly** featuring the industry's only LED-mixing system that guarantees board-to-board consistency
- **Integrated Light Guides** incorporating thin or ultra-thin optics for non-pixelated light emission and controllable light distribution that ensure visual comfort
- **Integrated Drivers** with application-specific topologies custom fitted to a manufacturer's needs
- **Connectivity and Controls** intelligently integrated to support a full spectrum of wired and wireless protocols
- **Color Tuning Electronics** including patented dim to warm circuitry that pairs perfectly with single channel drivers for improved aesthetics and functionality

Shown below are some LUXEON LEDs that can be incorporated into next-generation Matrix Platform designs, as well as some readily available solutions.



Matrix Platform Advanced Technologies

FEATURE TECHNOLOGY

TECHNOLOGY OVERVIEW



Oberon Intelligent Assembly

This proprietary pick-and-place system features the industry's only algorithmic LED mixing technology—guaranteeing consistent characteristics and performance board to board.

Unlike contract manufacturers that mix based on flux or V_f value of a binned LED, Oberon eliminates bins and selects LEDs based on specific test data. This results in higher flux, tighter color control, matched V_f strings and board-to-board consistency for applications where uniformity is important—from outdoor streetlights to indoor retail.



Integrated Light Guides

These advanced components soften high-intensity LED pixels to create a more uniform light surface, an increasingly important end game as luminaire form factors become smaller and smaller.

Based on decades of experience developing technology for progressively thinner LED-based television screens, Lumileds has engineered ultra-thin Integrated Light Guides capable of delivering an unprecedented level of light control. The result is luminaires that minimize pixelation to create more visually pleasing light and enhanced ambiance.



Integrated Drivers

These application-specific topologies are designed to address the trend of incorporating more electronic components—including the all-important power source—into a fully integrated, driver-on-board LED system. Integrated Drivers can also be tailored to unique manufacturer requirements, helping amp up system-level optimization.

Integrated Drivers dramatically simplify fixture design and reduce space requirements, offering manufacturers the flexibility to design more streamlined, elegant luminaires. This technology's benefits extend beyond aesthetics, providing system-level cost savings made possible by smaller form factors.



Connectivity and Controls

This sophisticated functionality allows lighting designers to bring cutting-edge luminaires to market that can be controlled remotely, using an app or other device.

To proactively address connectivity expectations in the IoT (Internet of Things) era, Lumileds has leveraged driver-based integration best practices to pioneer state-of-the-art Connectivity and Controls technology. Thanks to a robust selection of supported wired and wireless protocols intelligently integrated into the electronics of the LED system, manufacturers can count on an accelerated time to market.



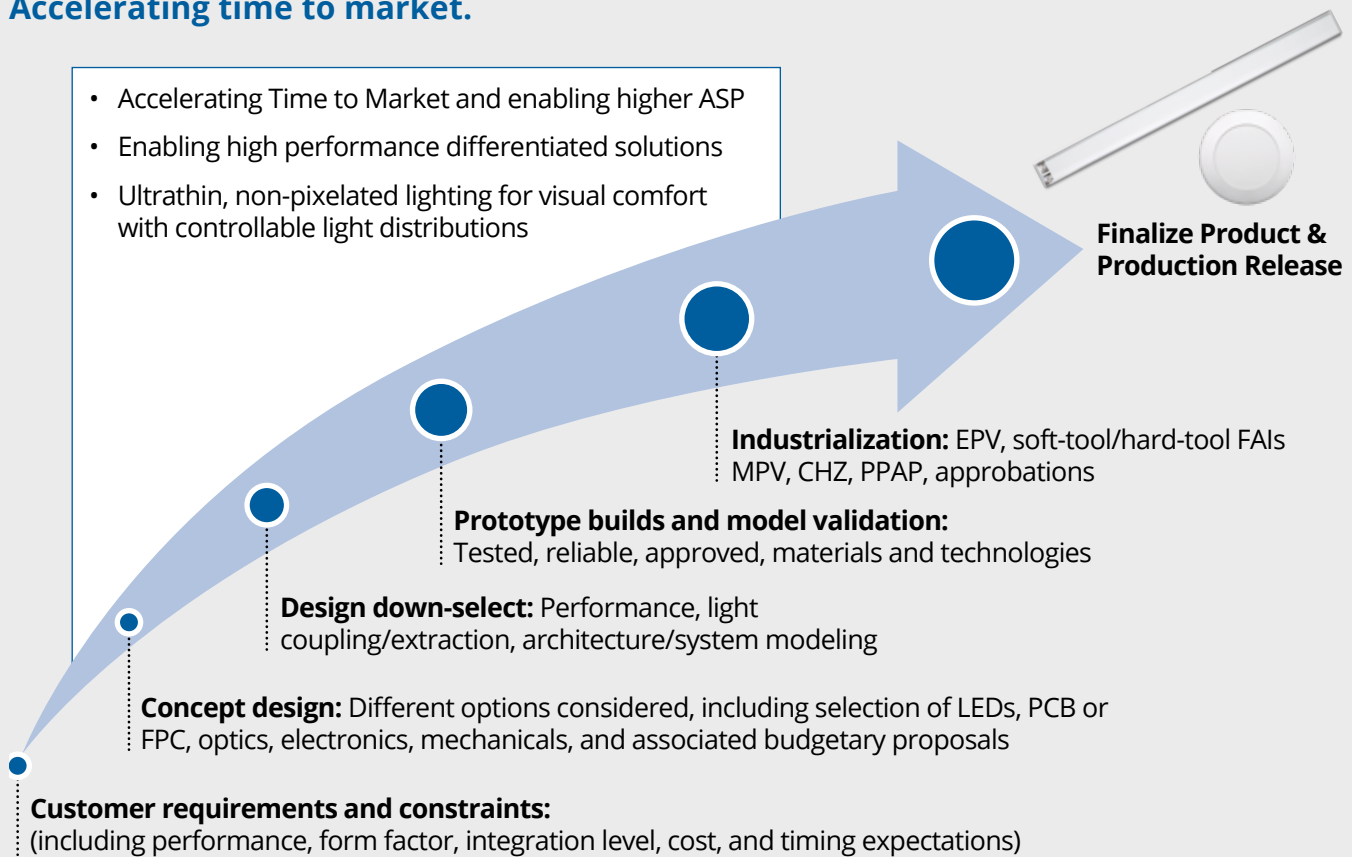
Color Tuning Electronics

This patented circuitry technology allows LEDs to mimic the warm, yellow dimming pattern that is the hallmark of halogen bulbs by controlling both a warm and a cool LED with two drivers that pair seamlessly with simple single channel drivers.

Ideal for interior and accent lighting, this emerging technology allows manufacturers to balance the brightness of each fixture to create a desired warm effect on dimming. By augmenting existing single LED driver fixtures with this incremental functionality, manufacturers can quickly and easily extend product offerings with LED luminaires that achieve previously elusive dim to warm lighting.

What is the value of partnering with Lumileds on integrated light guides? Accelerating time to market.

- Accelerating Time to Market and enabling higher ASP
- Enabling high performance differentiated solutions
- Ultrathin, non-pixelated lighting for visual comfort with controllable light distributions



Matrix Platform Integrated Light Guide Solutions



Applications

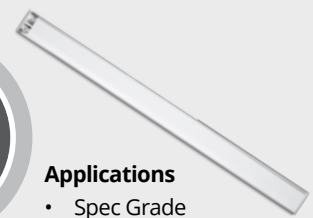
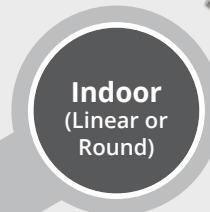
- Garage/Area
- High Bay & Low Bay

Performance → Proven Experience Exceeding DLC Premium Specifications

- LUXEON 5050 160up 4070
- T5 distribution, batwing ~55deg
- Flux ~25,000 lumens
- Conditions: 2A, 88V, 172W, $T_j=85^{\circ}\text{C}$
- Efficacy ~128 lm/W

Performance

- LUXEON 5050 16up 4070
- 4,200 lumens, 150 lm/W
- 28V, 525mA, 28W

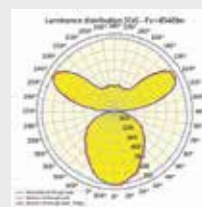


Applications

- Spec Grade
- Recessed Slot Linear
- Surface Mountable
- Pendant, Suspended

Performance

- Dual Light Distribution with single light guide
- 14.5 inch round
- LUXEON 3535L 145up
- Total output ~4,800 lumens
- ~60% down, ~40% up



Integrated Drivers – Matrix Platform Advanced Technology

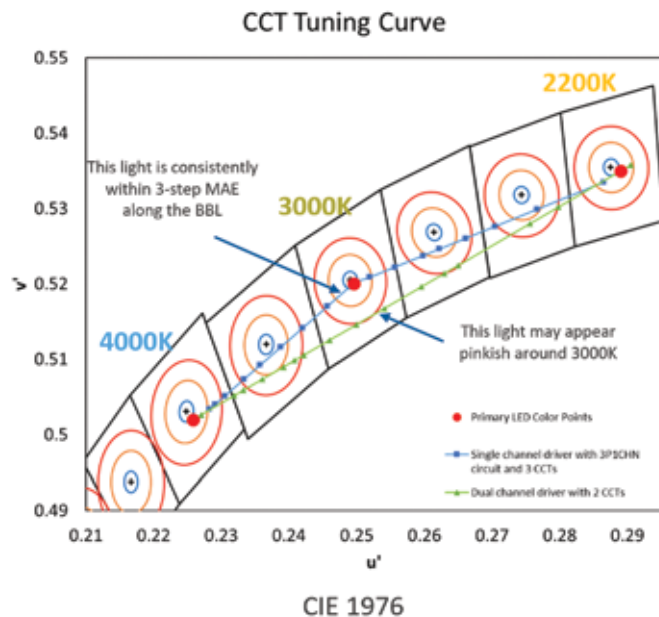
Solving fixture integration needs with application specific driver topologies



SIMPLIFYING FIXTURE DESIGN FOR MORE COST EFFECTIVE, STREAMLINED, ELEGANT LUMINAIRES		
CUSTOMER NEEDS	INTEGRATED DRIVER TOPOLOGY	USE CASE AND CUSTOMER BENEFITS
Create the highest possible efficiency fixture	High Efficiency AC/DC constant current	Customer was able to create a 94% high efficiency dimmable solution with universal input (120-277V AC) by matching the driver circuitry to the exact performance parameter of the LED; fixture efficiency was achieved that was not possible with standard brick driver technology.
Performance with full dimmability and a low profile fixture	Isolated AC/DC constant current	Customer implemented the isolated AC/DC constant current driver topology, which enabled them to support 100%-1% dimming and universal input (120-277V AC). Small form factor enabled improved styling and bi-directional light as there was no brick driver blocking the desired lighting design.
Develop a smart fixture	Isolated AC/DC constant voltage	The on-board driver powers both the LEDs and sensors/communications. Onboard multichannel driver drove multiple LED channels for CCT tuning, as well as a BLE mesh control module and an occupancy sensor.
Size reduction of a multi-fixture track light	DC/DC constant current	Customer was able to achieve a >50% reduction in fixture size resulting in superior styling, a lower overall system cost with deep 100%-0.1% dimming.
Cost down of a 120V downlight	AC Direct	Achieved a significant reduction in fixture size and a decrease in their bill of materials.

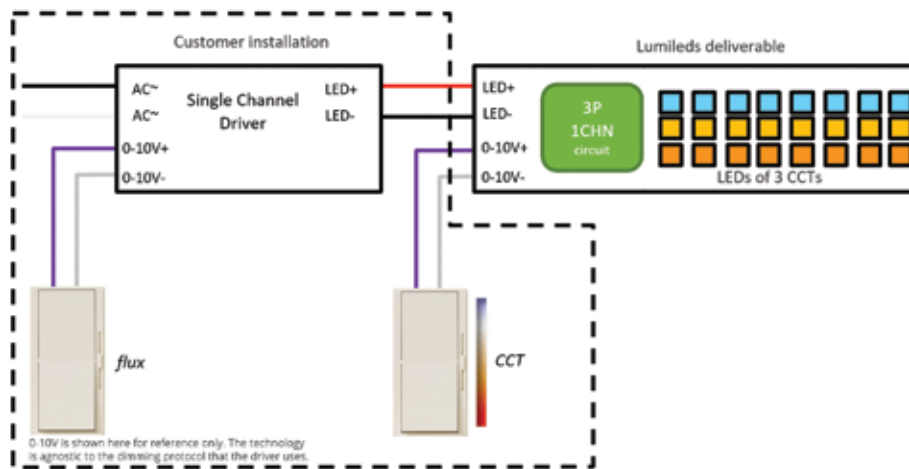
Matrix Platform Built to Specification: 3-point tuning with a single channel driver functionality achieved with the Lumileds proprietary wide range CCT tuning technology

Benefit of 3-Point CCT Tuning



- Matrix Platform Solution with tri-color LUXEON 3030 2D (2200K, 3000K and 4000K)
 - Driven by single-channel constant current LED driver
 - Independent dimming and CCT tuning using two 0-10V dimmers
 - Superior Black Body Line tuning performance in wide range CCT tuning applications
 - The control circuit can be customized to support other protocols, such as DALI
 - Alternate geometric shapes can be achieved for differentiated luminaire aesthetics
- Three-point tuning can be achieved with any three color points and can be implemented with integrated light guides

Typical Application for Color Tunability



- One standalone PCB per fixture for single channel to triple channel conversion
- Works with constant current outputs (PWM current output not supported)
- Ratios between the three channels determined by dedicated LED CCT control

Connectivity, Sensor and Control – Matrix Platform Advanced Technology

- A wide selection of wireless and wired protocols, intelligently integrated per customer requirement
 - Bluetooth, Wi-Fi, ZigBee, Thread, Z-Wave, proprietary
 - 0-10V, DALI
- Sensor options enabling energy saving, intelligence and IoT
 - Occupancy detection
 - Daylight sensing
 - And more.
- Embedded “LED data”
 - Customer freed from module-level calibration
 - Lumen maintenance and color compensation
 - Lifetime prediction

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world safer, better and more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.



©2018 Lumileds Holding B.V. All rights reserved.
LUXEON is a registered trademark of the Lumileds Holding B.V. in the United States and other countries.

lumileds.com

BR30 Matrix Platform Advanced Technologies Brochure
2018016

Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided “as is,” and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the download or use of the provided materials, information and data. A listing of Lumileds product/patent coverage may be accessed at lumileds.com/patents.