Lighting

Components – EMEA

Lighting Guide – Spring 2018



Five Years Out

arrow.com

Five Years Out

Lighting is one of the most important elements of our lives. It serves many functions, such as providing safety, assisting in performing household tasks, creating an atmosphere for entertaining, and pulling together the overall solution to what Lighting Designer is trying to achieve.

Above all else, lighting is beautiful, and great lighting will bring the right quality to our life.

For getting this it's important to deal with an increasing complexity of the system, from electronic sensors, digital control, a proper driver and then to wireless solution.
Last but not least a good Data management system will help you to get the opportunity for a new different business.

Arrow Lighting Advanced means all this, from the Design phase, to Connect the Lights and Integrate all this into one solution that accelerate the time to market to our Customers and minimize the initial investment.

Our dedicated Lighting Team across EMEA, ESC engineers and innovators are working to help make the world of Five Years Out brighter than ever before.

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Marco Zanella
Lighting Vertical Director EMEA,
Selling Executive

The advent of LED lighting has provided more consistent and positively scalable lighting outcomes. LEDs offer huge energy savings, design flexibility, and reliability, and are now entering nearly every application in the built environment.

Arrow is the Global Distributor with the full capability, offering the end-to-end support through a solution approach, staying flexible at the same time and leave the customer the full control of the IP.

Light as Efficiency Booster: Industrial Lighting is Becoming More and More Intelligent and Efficient



David White
EMEA Marketing Manager, Arrow



Peter Bach and Nicolai Heber
OSRAM product managers

Q. A lot has changed in the industrial lighting sector. What are the current trends?

Peter Bach: Most notably, the energy efficiency of LED technology has by now significantly surpassed that of conventional T5 fluorescent tubes. So now it makes sense to think about using LEDs in the industrial sector as well – not only for new installations, but also within modernization projects. Another very important factor is the extreme durability of LED lighting, considering that luminaire maintenance at heights of 8 to 16 meters is very costly, especially if machines have to be stopped in order to carry out the maintenance work. Our goal, therefore, is to avoid maintenance work, preferably alltogether, by launching a system of very durable lighting components with very long guarantee periods.

Q. Does this mean that customers have become more demanding?

Peter Bach: Industrial customers are primarily concerned with economic issues. In many areas, LED technology is superior to traditional industrial lighting, especially in terms of total cost of ownership. Moreover, LED luminaires for the industrial sector have meanwhile become less expensive to purchase. This is why more and more industrial customers are now completely switching over to LED technology – and to a corresponding light management system.

Q. So light management systems are required even in rather simple industrial buildings?

Nicolai Heber: In warehouses with high-bay racking, lighting costs can amount to up to 80 percent of the entire energy cost. So it does make sense here to use an intelligent light management system – especially if you consider that the investment for the corresponding technology quickly pays off because you can save a lot of money by applying motion and presence detection systems and special features such as the constant lumen output (CLO) function. But using intelligent control systems also pays off in production facilities, where you can flexibly group and address individual luminaires, luminaire clusters or entire areas via light management or building

management systems. Apart from the potential energy savings, this also represents an added value for the end customer. It may even be that several sites are interconnected and maintained via remote access – which, for example, is where our ENCELIUM system comes into play.

Q. Which product innovations would you point out especially here?

Nicolai Heber: In the industrial sector, the lighting often needs to fulfill special requirements, for instance when high ambient temperatures or, as is the case in refrigerated warehouses, very low ambient temperatures are involved. That is why, this year, we will launch new LED drivers and LED modules which can withstand significantly higher and lower temperatures and which also offer a higher switching capability and robustness, and a longer lifetime. This, in turn, enables us to offer longer guarantee periods. All of this, of course, in combination with corresponding sensor technology, such as our high-bay sensors, which allow daylight and motion detection even in very high buildings, or with HF sensors, which can be integrated into damp-proof luminaires.

Q. What other options are there in terms of saving energy?

Nicolai Heber: The CLO feature, for example, is very important for intelligent energy management. This is a constant lumen output control function, which we are integrating as a standard feature into our DALI drivers as well as into our switchable industrial drivers. It allows compensating for lumen depreciation over time via the driver and thus saves the light that was formerly overplanned. This means that there is no need for unnecessarily high energy consumption at the beginning of the life cycle, with possible savings of up to 20 %. OSRAM will soon be the first lighting manufacturer to offer this function as a free feature also for switchable LED drivers, which means that our customers can plan their lighting projects more efficiently.

Q. Lighting in modern industrial facilities must not only be energy-efficient, but also high-quality.

Nicolai Heber: Exactly. This is true, for instance, for the logistics industry, where scanner systems are applied. In this area, the lighting must not only be bright, but its quality must also be high, so that these systems, most of which are very sensitive, can work properly. Our LED drivers ensure a low output ripple current of under 1 %. This means that negative effects on scanner systems and other machines can be prevented – at any dimming level.

Q. Are industrial customers today more sensitive to comfort factors, such as color temperature?

Nicolai Heber: Quality of light, in fact, is also very important in the industrial sector – in the automotive industry, for example, where people are manufacturing precision parts. It is absolutely essential here to not only have a bright, but high-quality lighting that enables you to concentrate and to work without making mistakes. This is why Human Centric Lighting is also playing an increasingly important role in the industrial sector.

Q. How do you see the future of industrial lighting?

Nicolai Heber: I believe that, when industrial facilities need to be modernized, we will see more and more customers using dimmable instead of switchable lighting solutions. Moreover, they can now also use a ZigBee gateway to apply a wireless solution, which means that no new wiring has to be installed. On the whole, thanks to LED technology, everything is becoming more intelligent. Therefore, we will also see an increased use of LED driver data, such as energy consumption, dimming level, or remaining lifetime. These data can be applied, for example, for energy efficiency optimization, or for predictive planning and more cost-efficient execution of maintenance work.

Lighting | Suppliers by Product Category

	High Brightness LEDs	High Power Lighting Class (>=1W) LEDs	LED Driver Semi	LED Light Engines/Modules	Lenses & Optics	PSU/Driver Module AC/DC	PSU/Driver Module DC/DC	Heatsink	Thermal Interface	Connectivity	Circuit Protection	
Cree	•	•		•								Light Sources and Sensors
Everlight	•	•		•								
LiteOn	•	•										
Lumileds	•	•		•								
Osram Semiconductor	•	•		•								
Samsung	•	•		•								
Vishay	•	•										
Carclo					•							Lens and Optical Products
Fraen					•							
Fusion Optix					•							
Gaggione					•							
Khatod					•							
Ledil					•							
Lightech						•						Power Solutions
Meanwell						•						
Moons						•	•					
Osram Digital Solutions				•		•						
Recom			•			•	•					
Analog Devices			•									Driver Electronics
Cypress			•									
Diodes			•									
Dialog Semiconductor			•									
Fairchild			•									
Infineon			•									
International Rectifier			•									
ISSI			•									
Micrel			•									
Microchip			•									
NXP/Freescale			•									
ON Semiconductor			•									
Renesas			•									
STMicroelectronic			•									
Texas Instruments			•									
3M – Innotape									•			Thermal Solutions
Assmann								•	•			
Aavid Thermaloy									•			
Fischer Elektronik								•	•			
Panasonic									•			
Amphenol LTW										•		PEMCO
AVX										•		
Bourns											•	
Ideal										•		
Littelfuse											•	
Molex										•		
Phoenix Contact										•		
TE Connectivity										•		
Wago – Connectivity										•		

Wireless & Connectivity | Suppliers by Product Category

	GNSS	Cellular	Sigfox/LoRa	DECT	WLAN	Bluetooth	Combo BT/WLAN	802.15.4/ZigBee	Sub GHz	6LowPAN	Thread	Wireless M-Bus/ KNX-RF	RF Amplifiers	RF ID/NFC	TransferJet	Design Services	Antennas/Balun	
Amber Wireless						•		•	•	•		•				•		Modules
Anaren					•	•		•	•									
Connect One		•			•													
Cypress (incl. Broadcom)					•	•	•											
Digi International		•			•			•	•		•					•		
GNS	•																•	
H&D wireless					•		•									•		
Intel					•		•											
IMST			•					•	•	•		•				•		
Lantronix		•			•													
Laird Technology (incl. LSR)			•		•	•	•	•	•	•						•	•	
Linear Technology								•		•								
Longthink					•													
Microchip (incl. Atmel)			•		•	•	•	•	•	•				•				
Murata			•		•	•	•	•	•	•				•	•		•	
NXP						•		•		•								
Panasonic					•	•	•	•	•	•								
Redpine Signals					•		•	•										
Rigado						•		•			•						•	
Silex					•		•											
Silicon Labs					•	•		•	•		•	•						
Siretta		•															•	
STMicroelectronics	•		•		•	•			•									
TDK-EPC						•												
Telit	•	•	•		•	•		•	•			•						
Toshiba															•			
Analog Devices		•						•	•	•		•	•			•		Chipset/Components
Cypress (incl. Broadcom)					•	•	•											
Infineon	•							•				•	•					
Intel	•	•		•	•	•	•											
Linear Technology								•		•			•					
Microchip (incl. Atmel)			•		•	•	•	•	•	•		•	•					
Microsemi									•									
Molex																	•	
NXP (incl. Freescale)						•		•	•	•	•	•	•	•				
ON Semiconductor			•					•	•	•	•	•						
Pulse																	•	
Redpine Signals					•		•	•								•		
Silicon Labs					•	•		•	•	•	•	•						
STMicroelectronics	•				•	•		•	•	•		•		•			•	
TE Connectivity																	•	
Toshiba						•								•	•			
Vishay																	•	

Lighting Product Categories

Light Sources & Sensors

Focusing on solid state lighting, Arrow has several industry leading LED manufacturers in its portfolio. From signalization LEDs to high power LED arrays, we have all Solid State Light components according to the required level of integration of the light source. For every possible light specification there is the right LED solution based on High Power, High Brightness, or LED Module. Obtaining the desired colour and luminous flux is also simple thanks to our LED binning services.

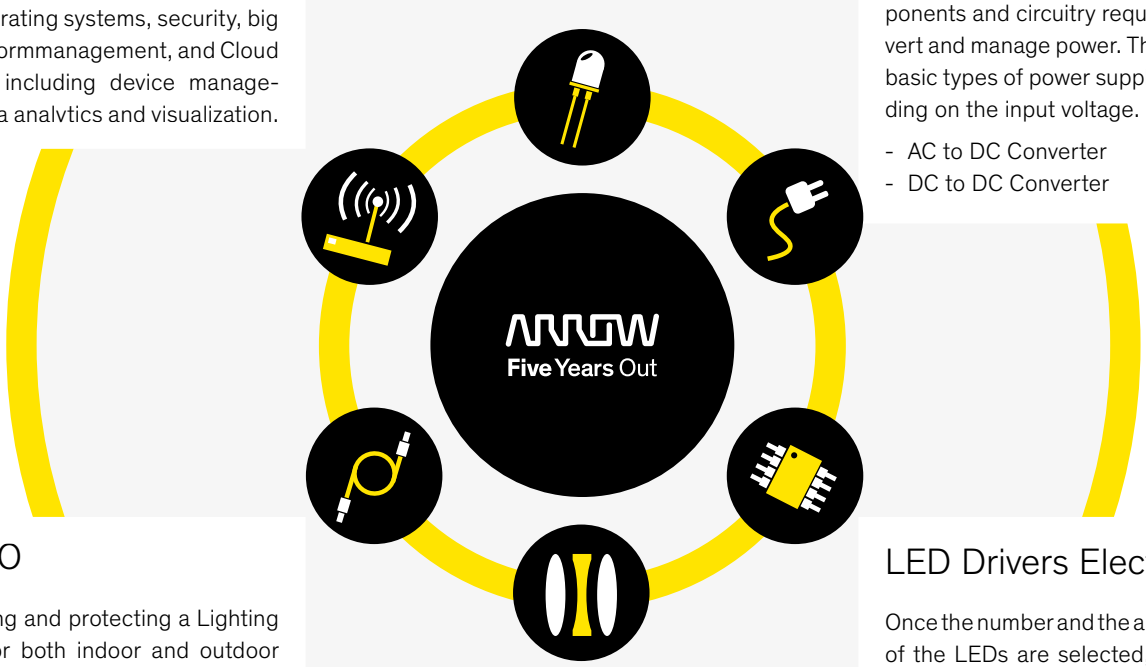
Wireless & Connectivity

Arrow has extensive product offerings from leading suppliers in all aspects of IoT systems including sensors, low power microcontrollers, wireless connectivity, networking protocols gateways, operating systems, security, big data platformmanagement, and Cloud solutions including device management. data analytics and visualization.

Power Supplies for Lighting

When used in an LED lighting application, the term power supply refers to a complete pre-packaged assembly including driver, integrated transformer, and all the associated electronic components and circuitry required to convert and manage power. There are two basic types of power supplies, depending on the input voltage.

- AC to DC Converter
- DC to DC Converter



PEMCO

Connecting and protecting a Lighting system for both indoor and outdoor applications.

LED holders, wire to board and board to board connectors, connecting to the power source as well as circuit protection for modern day lighting designs.

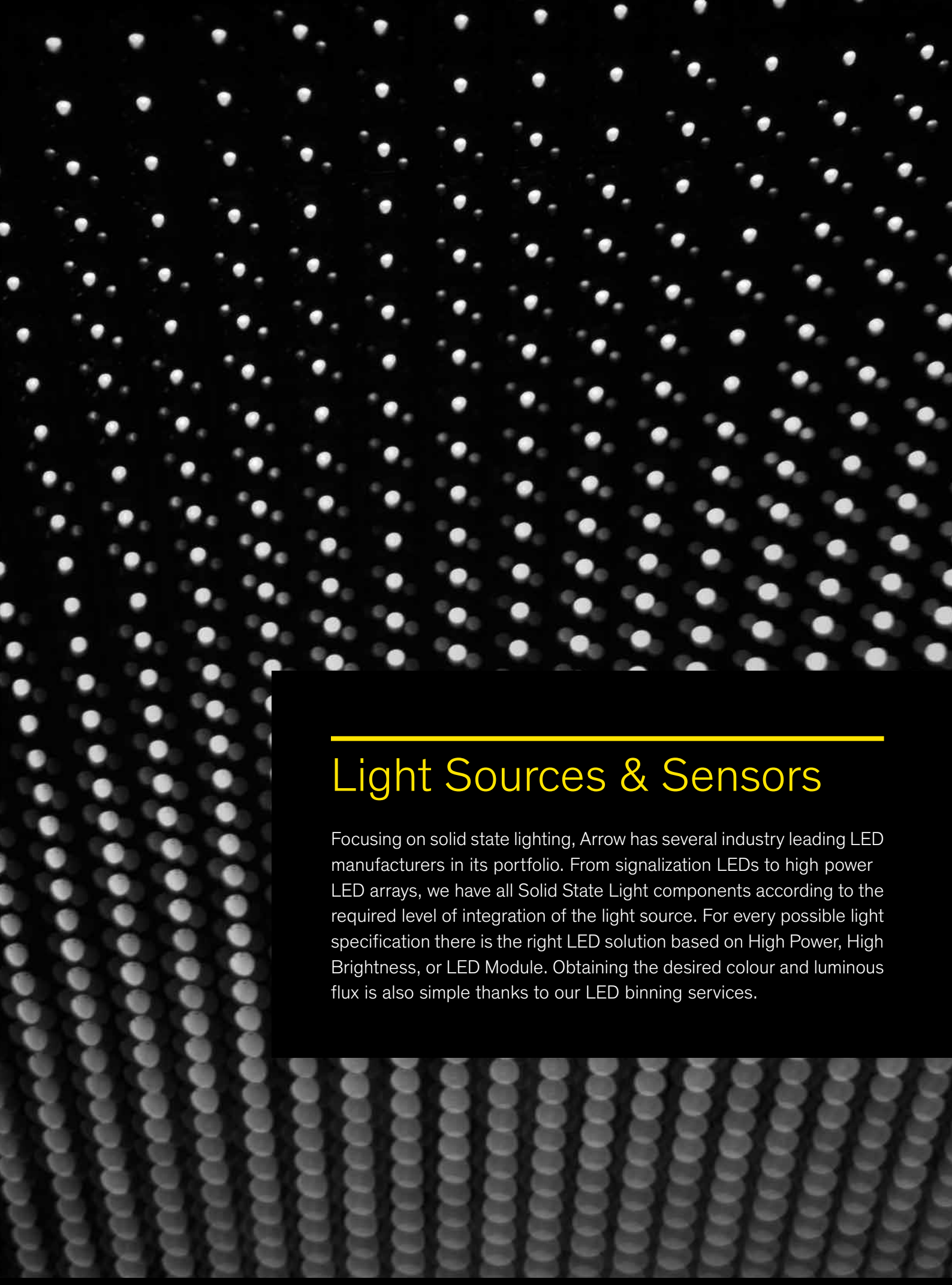
LED Drivers Electronics

Once the number and the arrangement of the LEDs are selected, Arrow can offer all possible combinations of products and reference designs in order to provide the right voltage and the right current for your light. These drivers take as an input an AC or a DC current and deliver the DC current at the right voltage level.

Lenses & Optics

Optics are the elements that shape and direct the light generated by the LED. Optics can be defined as devices used to control light output so that it is a usable source. There are three basic categories of LED optics:

- Primary – usually attached directly to the LED
- Secondary – usually fit directly over or around the LED
- Tertiary – usually some type of external device



Light Sources & Sensors

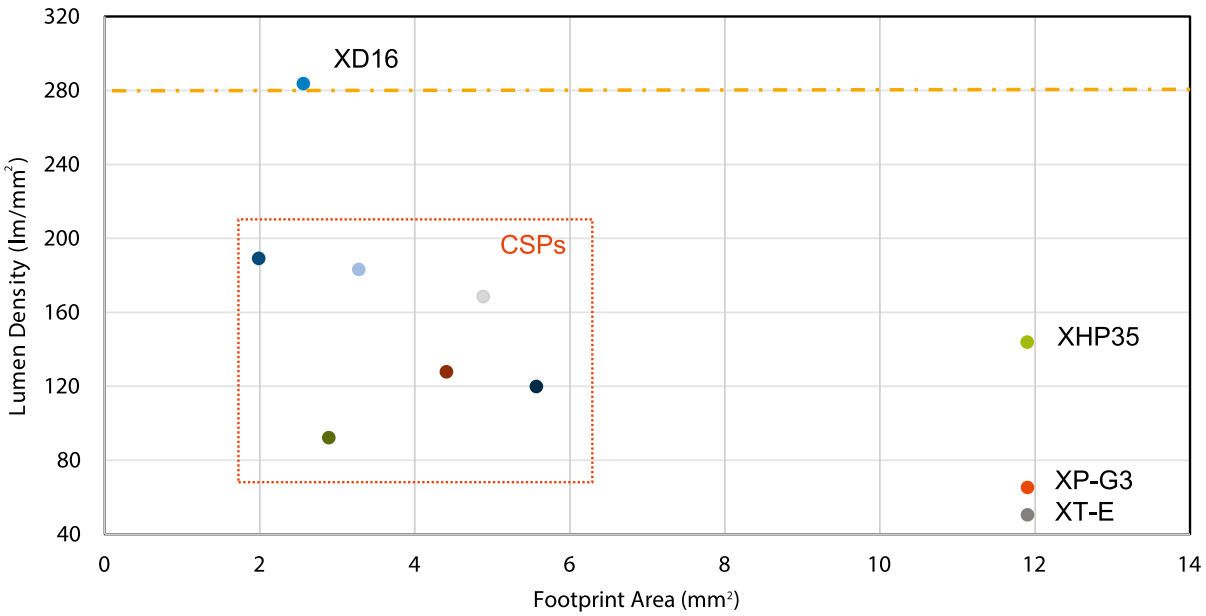
Focusing on solid state lighting, Arrow has several industry leading LED manufacturers in its portfolio. From signalization LEDs to high power LED arrays, we have all Solid State Light components according to the required level of integration of the light source. For every possible light specification there is the right LED solution based on High Power, High Brightness, or LED Module. Obtaining the desired colour and luminous flux is also simple thanks to our LED binning services.

Cree has the broadest portfolio of application-optimized LEDs that sets the industry's benchmarks for performance, light quality and reliability. Cree's innovative LEDs enable innovative new designs for a broad spectrum of lighting applications such as color-tuning, street, portable and industrial.

XLamp® Extreme Density LEDs

- Industry's best lumen density – 2× most CSP LEDs
- Reduces system-level optical loss when placed close together
- Proven package addresses challenges with luminaire assembly, thermal design and reliability associated with other LED technologies

Extreme Density LEDs Deliver Industry's Best Lumen Density



Typical Flux, 5000 K, 70 CRI, Tj = 25 °C

XLamp® XD16 LEDs

XLamp	Package		Footprint	Voltage Class	Max. Current	Max. Power
XD16	Discrete		1.6 mm	3 V	2 A	6 W

Buy now.

Directional LEDs

- Extreme high power LEDs double the light output of previous high power LEDs of the same size
- Industry's best lumen density and optical control
- Excellent L90 & L70 lifetimes, even in high stress conditions

XLamp	Package		Footprint	Lumen Range	LPW	Voltage Class	Max. Current	Options	Colour Options
XQ-E	Discrete		1.60 mm	•	•	3V	1.000 A	High Intensity	ROY, BLU, GRN, PCA, RDO, RED, HE PHR
XT-E	Discrete		3.45 mm	• •	• • •	3V	1.500 A		ROY
XP-G3	Discrete		3.45 mm	• • •	• • •	3V	2.000 A		ROY
XP-L2	Discrete		3.45 mm	• • • •	• • •	3V	3.000 A		
XHP35	Discrete		3.45 mm	• • • • •	• •	12V	1.050 A	High Intensity	
XHP50.2	Array		5.00 mm	• • • • • • • •	• •	6V	3.000 A		
						12V	1.500 A		
XHP70.2	Array		7.00 mm	• • • • • • • • • • • • • •	• • •	6V	4.800 A		
						12V	2.400 A		

Buy now.

Cree LEDs Optimized for Horticulture

- Broad portfolio of white and colour LEDs optimized for horticulture lighting
- Industry's highest umol/s, efficiency and reliability across all colour options to enable the replacement of HPS at radically lower power
- Consistent package footprints and drive levels allow easy tuning of spectral content at the luminaire level
- Excellent R90/L90 lifetimes, even in extreme conditions



						
	5.0 mm	3.45 mm			1.6 mm	
	MHB-B	XP-G3	XT-E High Efficacy	XP-E High Efficiency	XQ-E	XQ-A
Key Advantages	High efficiency Simple system design	Industry's highest performance & efficiency LM-80 tested with longest lifetimes Huge ecosystem of PCB & optics			Industry's best PPF density Enables smallest luminaires	
Max Power	6 W	6 W	5 W	3 W	3 W	0.8 W
Colour/CRI	4000 K/70	4000 K/70	4000 K/70		4000 K/70	4000 K/70
	4000 K/90	4000 K/90	4000 K/90			
		450 nm	450 nm		450 nm	450 nm
				660 nm	660 nm	
				730 nm		

XLamp® High Current LED Arrays

- Optimized for best-in-class lumen output, efficacy and reliability at high drive currents
- New innovative metal COB technology that delivers higher reliability than competing metal COBs
- Cree XLamp CMA LED Arrays share same package design and LES sizes as Cree XLamp CXA2 LED Arrays for quick performance upgrade
- Cree XLamp CMT LED Arrays deliver the best performance and metal COB reliability in industry-compatible footprints and LES sizes.



XLamp® CMA High Current LED Arrays

	Light Emitting Surface	Voltage Options	Typ. Power	Max. Power	4000 K, 70 CRI		3000 K, 80 CRI		3000 K, 90 CRI	
					Typ. Flux	Typ. LPW	Typ. Flux	Typ. LPW	Typ. Flux	Typ. LPW
CMA1516	9 mm	36V	16 W	41W	2439 lm	155 (lm/W)	2150 lm	137 (lm/W)	1818 lm	115 (lm/W)
CMA1825	12 mm	36V	24 W	61 W	3823 lm	158 (lm/W)	3370 lm	139 (lm/W)	2849 lm	118 (lm/W)
CMA1840	14 mm	36V	38 W	87 W	6012 lm	158 (lm/W)	5300 lm	139 (lm/W)	4481 lm	117 (lm/W)
CMA2550	19 mm	36V	48 W	122 W	7770 lm	163 (lm/W)	6850 lm	144 (lm/W)	5792 lm	122 (lm/W)
CMA3090	23 mm	48 V, 72 V	82 W	174 W	13295 lm	163 (lm/W)	11720 lm	144 (lm/W)	9909 lm	121 (lm/W)

Buy now.

XLamp® CMT High Current LED Arrays

	Light Emitting Surface	Voltage Options	Typ. Power	Max. Power	4000 K, 70 CRI		3000 K, 80 CRI		3000 K, 90 CRI	
					Typ. Flux	Typ. LPW	Typ. Flux	Typ. LPW	Typ. Flux	Typ. LPW
CMT1407	9.8 mm	36V	7 W	19 W	1117 lm	163 (lm/W)	985 lm	144 (lm/W)	833 lm	122 (lm/W)
CMT1412			12 W	28 W	1917 lm	159 (lm/W)	1690 lm	140 (lm/W)	1429 lm	118 (lm/W)
CMT1420			19 W	49 W	2961 lm	156 (lm/W)	2610 lm	138 (lm/W)	2207 lm	116 (lm/W)
CMT1922	14.5 mm	36V	21 W	57 W	3324 lm	162 (lm/W)	2930 lm	143 (lm/W)	2477 lm	121 (lm/W)
CMT1925			24 W	64 W	3834 lm	160 (lm/W)	3380 lm	141 (lm/W)	2858 lm	119 (lm/W)
CMT1930			28 W	77 W	4447 lm	162 (lm/W)	3920 lm	142 (lm/W)	3310 lm	120 (lm/W)
CMT1945			42 W	94 W	6477 lm	156 (lm/W)	5710 lm	137 (lm/W)	4828 lm	116 (lm/W)
CMT2850	22 mm	36V	47 W	130 W	7997 lm	169 (lm/W)	7050 lm	149 (lm/W)	5961 lm	126 (lm/W)
CMT2870		54 V	71 W	153 W	10720 lm	150 (lm/W)	9450 lm	133 (lm/W)	7990 lm	112 (lm/W)
CMT2890			82 W	181 W	13249 lm	162 (lm/W)	11680 lm	143 (lm/W)	9875 lm	121 (lm/W)

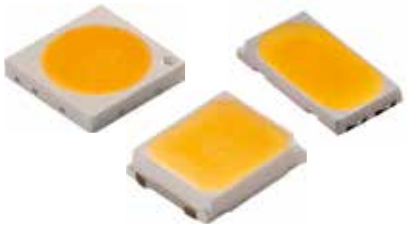
Buy now.

XLamp® High Current LED Arrays

CRI & CCT Options: Standard & Premium

Series		CRI	CCT								
			6500 K	5700 K	5000 K	4000 K	3500 K	3100 K below BBL	3000 K	3000 K below BBL	2700 K
Standard		70	•	•	•	•			•		
		80	•	•	•	•	•		•		•
		90		•	•	•	•		•		•
Premium	Fidelity	98				•	•		•		•
	Specialty	80								•	
		90						•		•	
		98								•	

Cree J Series™ LEDs



- High efficacy and excellent value in reliable packages
- 3-step chromaticity kits aligned with Cree's EasyWhite® bins
- Optimized for low- and mid-density lighting applications
- Industry-compatible footprints

J Series 2835 LEDs

Product	Power	Typical Drive Current (mA)	Typical Forward Voltage	4000 K, 70 CRI		3000 K, 80 CRI		Maximum Drive Current
				Typ. Flux	Typical Efficacy	Typ. Flux	Typical Efficacy	
JE2835 3-V	0.5 W	150 mA	3V	79 lm	176 LPW	70 lm	156 LPW	240 mA
JK2835 6-V	1 W	150 mA	6.2V	153 lm	165 LPW	134 lm	144 LPW	200 mA

J Series 3030 LEDs

Product	Power	Typical Drive Current	Typical Forward Voltage	4000 K, 70 CRI		3000 K, 80 CRI		Maximum Drive Current
				Typ. Flux	Typical Efficacy	Typ. Flux	Typical Efficacy	
JB3030 3-V	0.2 W	65 mA	2.8V	35.5 lm	195 LPW	32 lm	176 LPW	240 mA
JK3030 3-V	1 W	350 mA	3.2V	156 lm	139 LPW	139 lm	124 LPW	400 mA
JK3030 6-V	1 W	150 mA	6V	152 lm	169 LPW	138 lm	153 LPW	200 mA

J Series 5630 LEDs

Product	Power	Typical Drive Current	Typical Forward Voltage	4000 K, 70 CRI		3000 K, 80 CRI		Maximum Drive Current
				Typ. Flux	Typical Efficacy	Typ. Flux	Typical Efficacy	
JB5630 3-V	0.2 W	65 mA	2.8V	36.6 lm	201 LPW	32.3 lm	178 LPW	240 mA

J Series 5050 LEDs

Product	Power	Typical Drive Current	Typical Forward Voltage	4000 K, 70 CRI		3000 K, 80 CRI		Maximum Drive Current
				Typ. Flux	Typical Efficacy	Typ. Flux	Typical Efficacy	
JQ5050 9-V	4 W	400 mA	9.5V	580 lm	153 LPW	520 lm	137 LPW	480 mA

Buy now.

Cree High Brightness LEDs for Signage & Architectural Lighting

Outdoor Full-Colour LED Signs

- Optimized to increase intensity, improve contrast & reduce system cost
- IPX8 rated waterproof family
- Bright enough to replace through-hole LEDs, enabling lighter designs and lower manufacturing costs
- Matte surface for best contrast
- Vertical chip alignment for best picture quality



	LED	Size	Value	Typ. Green Int.
PLCC6 Full-Colour	CLX6E	3.5 × 3.4 × 2.8 mm	Best price/performance	1500 mcd @ 20 mA
	CLX6F	3.5 × 3.4 × 2.8 mm	High brightness	2100 mcd @ 20 mA
	CLY6C	2.8 × 2.8 × 2.5 mm	Low profile/high contrast	1500 mcd @ 20 mA
	CLY6D	2.8 × 2.8 × 2.5 mm	Low profile/high brightness	2250 mcd @ 20 mA
	CLYBB	2.8 × 2.8 × 2.3 mm	Best contrast/black package	1220 mcd @ 20 mA
	CLMXB	2.1 × 1.8 × 1.55 mm	Smallest outdoor black package	570 mcd @ 10 mA

Buy now.

Architectural Lighting

	LED	Size	Value	Typ. Lumen
PLCC8 RGBW	CLQ6A	5.0 × 5.2 × 1.1 mm	First individually addressable RGBW LED in its class	30 lm @ 100 mA
PLCC6 PC Amber	CLX6F	3.5 × 3.4 × 2.8 mm	The first PC Amber LED in its class	23 lm @ 105 mA

Buy now.

Indoor Full-Colour LED Signs

- Optimized for high resolution and maximum contrast
- The proven choice for large indoor signage projects
- Enabling high definition sign resolutions
- Matte surface for best contrast
- Vertical chip alignment for best picture quality

	LED	Size	Value	Typ. Green Int.
PLCC4 Full-Colour	UHD1110	1.0 × 1.0 × 0.6 mm	Industry's best contrast & reliability	100 mcd @ 5 mA
	CLMUC	1.5 × 1.5 × 1.0 mm	Smallest size, highest resolution	170 mcd @ 5 mA
	CLMVC	2.0 × 2.0 × 1.9 mm	Small size, good contrast	225 mcd @ 5 mA
	CLV1L	3.2 × 2.8 × 1.9 mm	Enables semi-outdoor w/cover	1400 mcd @ 20 mA

Buy now.

For automotive, mobile, IoT and illumination companies who require innovative lighting solutions, Lumileds is a global leader employing more than 9,000 team members operating in over 30 countries. Lumileds partners with its customers to push the boundaries of light.



Chip on Board LEDs

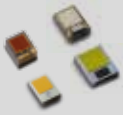
High Performance Array Solutions that Optimize your System Design

Product	Description	Features and Benefits
LUXEON CoB Core Range – High Density 	Double the flux in the same form factor	Double the flux in the same form factor, creating the highest CBCP ("punch") in fixtures Direct compatibility with our existing LUXEON CoB Core Range products with improved phosphors and silicones MCPCB substrate that enables more robust systems and eliminates cracking issues seen in ceramic substrates
LUXEON CoB Core Range 	Uniform, high-efficacy and easy-to-design array	Highest flux densities with industry's smallest LES Available in 80 CRI and 90 CRI–3 SDCM colour definition: Freedom from Binning Up to 4× lower thermal resistance than competition, enabling smaller heatsinks and higher lumens Supported by a comprehensive optical, mechanical and electrical ecosystem

Buy now.

Colour LEDs

A Complete Colour Spectrum for a Variety of Architecture, Entertainment and Horticulture Applications

Product	Description	Features and Benefits
LUXEON 3535L Colour Line 	Colour LEDs that deliver the perfect amount of colour you need. No more. No less.	Same focal length as other LUXEON Colour Lines – optically compatible for simpler design cycles Colour palette +3V white portfolio on the same footprint Unique phosphor converted PC Amber and Lime colours provide unrivaled maximum performance
LUXEON C Colour Line 	Multiple colours, a single focal length	Single focal length allows flawless colour mixing, maximum optical efficiency and removes halos Hot tested, 85 °C, removes guesswork for designers Industry's lowest thermal resistance for greater light output and lower heatsink costs Small symmetrical package enables dense packing
LUXEON CZ Colour Line 	Maximum punch, narrow beam angles in over 20 colors	Industry leading punch across the color gamut Enables fixture designs with narrow beam angles 21 unique whites and colors
LUXEON Rebel Colour Line 	High flux and efficacy on industry's most widely used colour platform	High flux and efficacy on industry's proven LUXEON Rebel platform Distinct 105 lumens LUXEON Rebel PC Amber 1200 mW LUXEON Rebel ES Royal Blue offerings at 700 mA, 85 °C
LUXEON Z Colour Line 	High power colour LEDs in a micro footprint package for ultimate design flexibility	Small 1.3 × 1.7 mm footprint enables designs for space constrained applications 440–670 nm colour selection with White and Violet/UV portfolio available on same footprint Undomed package allows better optical management through collimated light output

Buy now.

High Power LEDs

Leading Efficiency and Design Flexibility

Product	Description	Features and Benefits
LUXEON 5050 	High efficacy and lumens in a multi-die, high power package, enabling low system costs	Small LES (4.6 mm) enables good optic design for great punch Enables highest efficacy system design by driving at low current Cost effective solution for high lm/W industrial/outdoor applications
LUXEON MX 	Unmatched performance in a proven package	2,000 lumens at 130 lm/W enables cost effective > 100 lm/W fixtures Double the flux vs. comparable emitters in 120 lm/W systems More robust package for improved reliability at higher drive currents
LUXEON MZ 	Best combination of brightness, uniformity and luminance, enabling precision light control	Highest lumen density for ideal optical control in a 600–1,000+ lumen package High Central Beam Candle Power (CBCP) for portable and spot applications Tighter beam angles for higher quality retrofit lamps and outdoor applications
LUXEON TX 	Extreme efficacy and best performance	High lumen package and compact source size for design flexibility and reduced LED count Max drive current of 1.5 A Freedom from Binning with 3- and 5-step MacAdam ellipse
LUXEON V 	Unmatched flux density with the lowest thermal resistance enabling never before possible form factors	Over 1700 lumens from a single, compact source Low thermal resistance of 0.8 K/W enables more efficient thermal management – smaller heatsink, more compact fixtures High efficacy at high drive current provides design flexibility and supports high flux density fixtures
LUXEON Z ES 	Extreme flux density in a micro footprint package for precise optical control	Micro footprint enables close packaging No dome design allows precise optical control Freedom from Binning enables colour consistency

Buy now.

Mid Power & Low Power LEDs

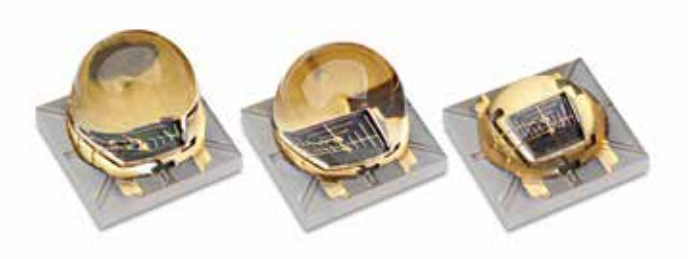
A Broad and Expanding Selection of High Performance, Reliable LEDs

Product	Description	Features and Benefits
LUXEON 2835 Line 	Perfected performance, built on a proven legacy	Maximum drive current of up to 240 mA allows for reduction of LED count 6V and 9V hot-color targeting and 1/9th micro-color binning enables tight color control LUXEON 2835C 3V: 60 lumens at 120 mA (4000 K 80 CRI) LUXEON 2835C 6V: 115 lumens at 120 mA (4000 K 80 CRI) LUXEON 2835E 3V: 29 lumens at 120 mA (4000 K 80 CRI) LUXEON 2835E 6V: 54 lumens at 60 mA (4000 K 80 CRI) LUXEON 2835E 9V: 82 lumens at 60 mA (2700 K 80 CRI)
LUXEON 3014 	Hot-colour targeted industry standard package for uniform light	Industry standard footprint and package offering compatibility with existing designs 1/9th ANSI micro-color binning enables tight colour control Hot-color targeted at 65 degrees C which leads to better color accuracy
LUXEON 3030 2D 	High flux, hot-colour targeted 6V package	Industry standard package enables drop-in replacement for existing 3030 packages 1/9th micro-color binning enables tight colour control Superior luminous flux at max current for reduced LED count
LUXEON 3535L Line 	High flux and efficacy in a 3535 package with a full range of CCTs and CRIs	Maximum drive current of 300 mA delivers superior lumens for reduced LED count 1/7th ANSI color binning delivers tight colour control Supports ENERGY STAR lumen maintenance certification requirements and meets DLC Premium requirements

Buy now.

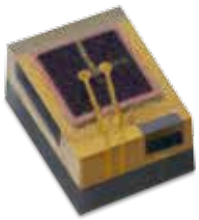
LUXEON IR Domed Line

The LUXEON IR Domed Line is a product line of high power infrared emitters tailored to application needs by offering a variety of products at multiple infrared wavelengths and optical radiation patterns. LUXEON IR Domed Line is designed with innovative LUXEON technology to provide industry-leading performance. Through best-in-class thermal conductivity, LUXEON IR Domed Line has excellent performance at actual operating conditions. The LUXEON IR Domed Line uses an industry standard footprint for ease of integration and upgrading existing system designs.



LUXEON IR Compact Line

The LUXEON IR Compact Line is a product line of high power infrared emitters specifically designed for high efficiency as required in a small spaces. Their compact and well-defined light source geometry allows them to be easily coupled into secondary optics for tight beam control. LUXEON IR Compact Line is designed with innovative LUXEON technology to provide industry-leading performance. Through best-in-class thermal conductivity, LUXEON IR Compact Line has excellent performance at actual operating conditions.



LUXEON IR Family

Product	Peak Wavelength	FWHM Beam Angle	Radiant Flux	Radiant Intensity	Forward Voltage	Thermal Resistance
LUXEON IR Compact Line 	850 nm	150°	1050 mW	250 mW/sr	3.2 V	2.8 °C/W
	940 nm	150°	1150 mW	300 mW/sr	2.9 V	2.8 °C/W
LUXEON IR Domed Line 150 	850 nm	150°	1350 mW	335 mW/sr	3.2 V	2.5 °C/W
	940 nm	150°	1450 mW	350 mW/sr	2.9 V	2.5 °C/W
LUXEON IR Domed Line 90 	850 nm	90°	1350 mW	750 mW/sr	3.2 V	2.5 °C/W
	940 nm	90°	1450 mW	780 mW/sr	2.9 V	2.5 °C/W
LUXEON IR Domed Line 60 	850 nm	60°	1350 mW	1150 mW/sr	3.2 V	2.5 °C/W
	940 nm	60°	1450 mW	1190 mW/sr	2.9 V	2.5 °C/W

Buy now.

LUXEON Stylist Series

Market Segments	Technology	Product Family	Description	Features & Benefits
	CrispWhite Technology	CoB, Matrix Platform	Fashion retail lighting that makes an impact, revealing the whitest whites	Double blue peak enabling the CrispWhite effect All parts > 90 CRI, > 100 lm/W Colour point below BBL matching CDM 3 SDCM colour definition: Freedom from Binning Highest flux densities with the smallest LES
	CrispColour Technology™	CoB, Mid Power, Matrix Platform	Fashion retail lighting that makes an impact, highlighting rich colours and increasing contrast	Typical 92–93 CRI with R9 ~ 95 105 to 110 lm/W Colour point below BBL matching proposed ANSI "Preference-based Specification" targets Gamut area index value of ~ 75 (normal 90 CRI LEDs are around 50 CRI)
	FreshFocus Technology™	CoB, Mid Power, Matrix Platform	Accentuating freshness and overall visual appeal, making food irresistible	LED lighting saves energy, reduces stress on the environment and without IR and UV keeps the products fresh longer. Spectrum engineered products with focused colour points to enable the right lighting for specific merchandise and application Several options available: Produce (fruit and vegetables) Fish Marbled Meat Red Meat Bread & Pastries
	AtmoSphere Technology™	CoB, Matrix Platform	Creating the ideal ambiance for restaurants and other hospitality venues	Warm colour point Available in 80 and 90 CRI for great colour rendering Colour point on BBL matching halogen

Matrix Platform Advanced Technologies

Product		Description	Features and Benefits
Oberon Intelligent Assembly		The industry's only algorithmic LED mixing technology for differentiated solutions.	Unlike contract manufacturers that mix based on flux or Vf 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 Vf strings and board-to-board consistency.
Integrated Drivers		Application specific driver topologies tailored to your needs.	Designed to address the trend of incorporating more electronic components — including the power source — into a fully integrated, driver-on-board LED system. Can also be tailored to unique manufacturing requirements, helping amp up system-level optimization and cost-saving.
Integrated Light Guides		Ultra-thin, non-pixelated lighting for visual comfort with controllable light distributions.	These advanced components soften high intensity LED pixels to create a more uniform light surface. Delivers an unprecedented level of light control and create more visually pleasing light and enhanced ambiance.
Connectivity and Controls		A wide selection of supported wired and wireless protocols, intelligently integrated.	Enables luminaires that can be controlled remotely, using apps or other devices. 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.
Dimming Electronics		Patented circuitry for dim to warm products that pairs perfectly with simple single channel drivers.	Allows LEDs to mimic the warm, yellow dimming pattern that is the hallmark of halogen bulbs by electronically controlling both warm and cool LED strings that pairs seamlessly with simple single channel drivers.

Illumination Product Portfolio

Product	Architectural	Downlights	High Bay & Low Bay	Horticulture	Indoor Area Lighting	Lamps	Outdoor	Specialty Lighting	Spotlights
LUXEON 2835C		•			•	•			
LUXEON 2835E		•			•	•			
LUXEON 2835 with CrispColour Technology™		•			•	•			
LUXEON 2835 with FreshFocus Technology™		•			•	•			
LUXEON 3014		•			•			•	
LUXEON 3014 with FreshFocusTechnology™								•	
LUXEON 3030 2D		•	•			•	•		
LUXEON 3535L Colour Line	•					•		•	
LUXEON 3535L HE			•		•				
LUXEON 3535L HE Plus			•		•				
LUXEON 5050		•	•			•	•		•
LUXEON 3535L with CrispColour Technology™		•			•	•			
LUXEON C Colour Line	•					•		•	
LUXEON CoB Core Range – High Density		•					•		•
LUXEON CoB Core Range	•	•	•			•	•	•	•
LUXEON CoB with CrispColour Technology™		•			•	•			•
LUXEON CoB with CrispWhite Technology		•			•	•			•
LUXEON CoB with FreshFocus Technology™		•			•	•			•
LUXEON CZ Colour Line	•					•		•	
LUXEON UV FC Line								•	
LUXEON UV U Line								•	
LUXEON HR30			•		•		•		
LUXEON MX			•				•		
LUXEON MZ*			•			•	•	•	•
LUXEON Rebel Colour Line	•					•		•	
LUXEON SunPlus 20 Line				•					
LUXEON SunPlus 35 Line				•					
LUXEON SunPlus CoB Line				•					
LUXEON TX*		•	•			•	•		•
LUXEON XF-3014 CV		•			•			•	
LUXEON XF-3535L					•			•	
LUXEON XR-3020	•				•			•	
LUXEON XR-3535L					•				
LUXEON XR-M	•		•				•		
LUXEON XR-TX	•		•				•		
LUXEON Z Colour Line	•					•		•	
LUXEON Z ES*	•	•				•	•		•

* Product also offered in Royal Blue

Different Families – Unique Advantages

OSRAM Opto Semiconductors‘ family concept is our modern response to the rapid development and special demands of the LED market, offering you also a better and faster way of navigation through our product portfolio.

Simply Better Results with our Family Concept
This technology platform approach makes it easy to navigate through our comprehensive portfolio. At the same time it speeds up product development and therefore reduces time to market considerably for the benefit of our customers. The modularity of the family concept with it’s different technologies, performance classes and application offers you maximum demand-based flexibility.

Professional product families

OSCONIQ® Family
High performance LEDs from mid to ultra-high-power designed for high reliability and long lifetime for professional indoor and outdoor applications.
- **OSCONIQ® S:** Compact professional mid-power LEDs that provide flexibility in forward voltage and luminous flux with high performance and long lifetimes
- **OSCONIQ® P:** Professional mid-, high- and ultra-high-power LEDs with long lifetimes and extreme high performance providing leading edge technology for professional indoor and outdoor lighting application.

OSLON® Family
High power LEDs with superior performance. Highly efficient and compact. High quality even in ambient conditions. Preferred LEDs for indoor and outdoor illumination, architecture and street lighting
- **OSLON® SSL:** LED with outstanding efficiency and very long lifetime, optimized for use with lenses and reflectors; very broad color spectrum (RGB and other colors)
- **OSLON® Square:** One of the most popular LEDs in general illumination, key parameters are grouped at high temperatures to get as close as possible to the temperature in the application

SOLERIQ® Family
Ultra-high-power state-of-the-art COB LEDs. Simple installation. Ideal for indoor lighting and spotlight applications.
- **SOLERIQ® S:** The new innovative LEDs that offer flexibility in optics design via smaller LES, high luminous efficacy without compromising the product performance.



Consumer product families

DURIS® Family
Cost performance optimizes LEDs from mid- to ultra-high-power designed for indoor and outdoor applications
- **DURIS® E:** Ideal for lighting applications requiring a homogeneous distributed light source, like fluorescent tube replacements or retrofit bulbs
- **DURIS® S:** Mid- to ultra-high-power compact LEDs that provide flexibility in forward voltage and luminous flux even at high temperature distribution. The product portfolio covers the full range of lumen packages for white and colored LEDs
- **DURIS® L:** The perfect choice for all indoor retrofits with a beam angle of 360° to bring modern LED technology into traditional light bulb design.

Choose Perfection – Easily

		DURIS® E	DURIS® S 5 white and colors	DURIS® L 38	DURIS® S 8/S 10	OSCONIQ® P 2226 white and colors	OSCONIQ® S 1620/S 3030 white	OSCONIQ® P 3737/ P 7070	OSLON® SSL white and colors	OSLON® Square white and colors	SOLERIQ® S
Retrofit	Bulb	●●●	●●●	●●●	●●●	–	–	–	–	–	–
	Directional	–	●●●	–	●●●				●	●	●●●
	Linear	●●●	●	–	–	–	●●●	–	–	–	–
	Smart lights	–	–	–	–	●●●	●	–	●●●	–	–
Home	Spotlight	–	●●●	–	●●●	–	●	–	●	●	●●●
	Pendant	●●●	●●●		●●●	–	–	+	●	●	●
	Strip lighting	●●●	●	–	–	–	–	–	●	–	–
	Smart lights	–	●●●	–	–	●●●	–	–	●●●	–	–
Shop	Spot	–	●	–	●●●	–	●	●	●	●	●●●
	Downlight	●	●●●	–	●●●	–	●	●	–	–	●●●
	Linear/display/freezer/shelf	●●●	●	–	–	●	–	–	–	–	–
Office	Downlight	●	●●●	–	●●●	–	–	–	–	–	●●●
	Linear / area /troffer	●●●	●	–	–	–	●●●	–	–	–	–
Hospitality/ Architainment	Accent lighting	–	●●●	–	●●●	●●●	●●●	–	●●●	●	●●●
	Cove / strip /wall washer	–	●●●	–	–	●	●	●	–	–	–
	Stage lighting	–	●●●	–	–	●	●●●	●	–	●	●●●
Industry	High / low Bay	●	●●●	–	●●●	–	●●●	●●●	–	●●●	●●●
	Linear light	●●●	●	–	–	–	●●●	–	–	–	–
	Emergency light	–	●	–	–	–	●●●	●●●	–	●●●	–
	Portable lights	–	–	–	●●●	–	●●●	●●●	–	●●●	●●●
Outdoor	Road lighting	–	●	–	●●●	–	●●●	●●●	●●●	●●●	●●●
	Tunnel	–	●	–	–	–	●●●	●●●	●●●	●●●	●
	Area lighting	–	●●●	–	●	●	●●●	●●●	●●●	●●●	●
	Residential	–	●●●	–	●●●	–	●●●	●●●	●●●	●●●	●●●
Horticultural	Top lighting	–	–	–	–	●●●	●●●	–	●●●	●●●	–
	Interlighting	–	–	–	–	●●●	●●●	–	●●●	●●●	–

Guide:
●●● Perfect fit
● OK fit
– no fit

Improve Nature

To ensure food supply in the future, choose horticulture LED components from our cutting edge offering a spectrum of infinite possibilities

OSCONIQ® and OSLON® Families: Professional Horticulture Applications

OSCONIQ® and OSLON® families stand for mid and high power LEDs with high performance and long lifetime even in humid environments. With their small footprint very compact clustering of LEDs enables easy and efficient design for professional toplighting, interlighting and multilayer applications. Different ratios between deep blue, hyper red and far red can be achieved simply by varying the number of the respective LED components without any change of the PCB or luminaire design

Professional

Mid Power Components (0.3 W)												High Power Components (1.0 W)												High Power Components (2.0 W)								
																													
OSCONIQ® P 2226												OSLON® SSL												OSLON® Square								
2.2 × 2.6 mm												3.0 × 3.0 mm												3.0 × 3.0 mm								
Deep Blue			Hyper Red			Far Red			White			Deep Blue			Hyper Red			Far Red			White			Deep Blue			Hyper Red			White		
450 nm			660 nm			730 nm			6500 K, CRI			450 nm			660 nm			730 nm			5000 K, CRI			450 nm			660 nm			5000 K, CRI		
mW	µmol/s	µmol/J	mW	µmol/s	µmol/J	mW	µmol/s*	µmol/J*	lm	µmol/s	µmol/J	mW	µmol/s	µmol/J	mW	µmol/s	µmol/J	mW	µmol/s*	µmol/J*	lm	µmol/s	µmol/J	mW	µmol/s	µmol/J	mW	µmol/s	µmol/J	lm	µmol/s	µmol/J
166	0,62	2,15	110	0,60	2,80	66	0,40	2,21	42	0,60	2,06	690	2,61	2,61	425	2,32	3,24	270	1,77	2,41	144	2,04	1,98	1392	5,23	2,57	905	4,96	3,30	314	4,44	2,20
The OSCONIQ® P 2226 is also available in additional colors (Blue, True Green, Yellow, Red) and white (CRI70 CRI80)												The OSLON® SSL is also available in additional colors (Blue, True Green, Yellow, Red) and white (CRI70, CRI80, CRI90 from 2500 to 6500 K)												The OSLON® Square is also available in additional white (CRI70, CRI80, CRI90, CRI95 from 2400 to 6500 K)								

Buy now.





DURIS® S 5: Consumer Horticulture Applications

The DURIS® S 5 purple is offering exciting and efficient opportunities for innovative applications and designs. The purple color achieves state-of-art efficacy and brightness and with the standard footprint of 3.0 × 3.0 mm horticulture retrofit bulbs can be realized easily in cost efficient assembly.

Consumer

Mid Power Components (0.3 W)								
								
DURIS® S 5								
3.0 × 3.0 mm								
PC Purple			PC Lime White			White		
450 & 650 nm			570 nm			4000 K, CRI 70		
mW	µmol/s	µmol/J	lm	µmol/s	µmol/J	lm	µmol/s	µmol/J
360	1,66	1,54	58	0,59	2,01	145	1,91	2,07
The DURIS® S 5 is also available in a broad range of colors (Deep Blue, Blue, True Green, Amber, Red, PC True Green, PC Yellow, PC Amber, PC Red) as well as white (CRI70, CRI80, CRI90 from 2000 to 6500 K)								

Buy now.

Small LES COB C-Series Gen 2

High Efficacy COB LED Package – Well-Suited for use in Spotlight Applications

Features & Benefits

- Chip on Board (COB) solution makes it easy to design in
- Simple assembly reduces manufacturing cost
- Low thermal resistance
- InGaN/GaN MQW LED with long time reliability

Applications

- Spotlight/Downlight
- LED Retrofit Bulbs
- Outdoor Illumination






TC=85 °C	LC010C	LC020C	LC030C	LC040C
LES	6 mm	8.5 mm	11.5 mm	11.5 mm
Typical	35.0V			
	10.5 W (300 mA)	21.0 W (600 mA)	31.5 W (900 mA)	36.8 W (1050 mA)
Max.	13.8 W (380 mA)	34.0 W (920 mA)	51.1 W (1380 mA)	59.5 W (1610 mA)
Size	13.5 × 13.5 mm	19.0 × 19.0 mm		

Buy now.

New line-up of Samsung COB

Launching Samsung Special color COB for Commercial lighting

Special spectrum enhanced vividness for Fashion, Meat, Vegetable

- Fashion light effect: Clean, Elegant, Vivid
- Meat light effect: Fresh (Red), Delicious (Red), Vivid
- Vegetable light effect: Fresh, Delicious, Vivid

General Market lighting

Samsung Special color Lighting



Fashion





Meat





Vegetables

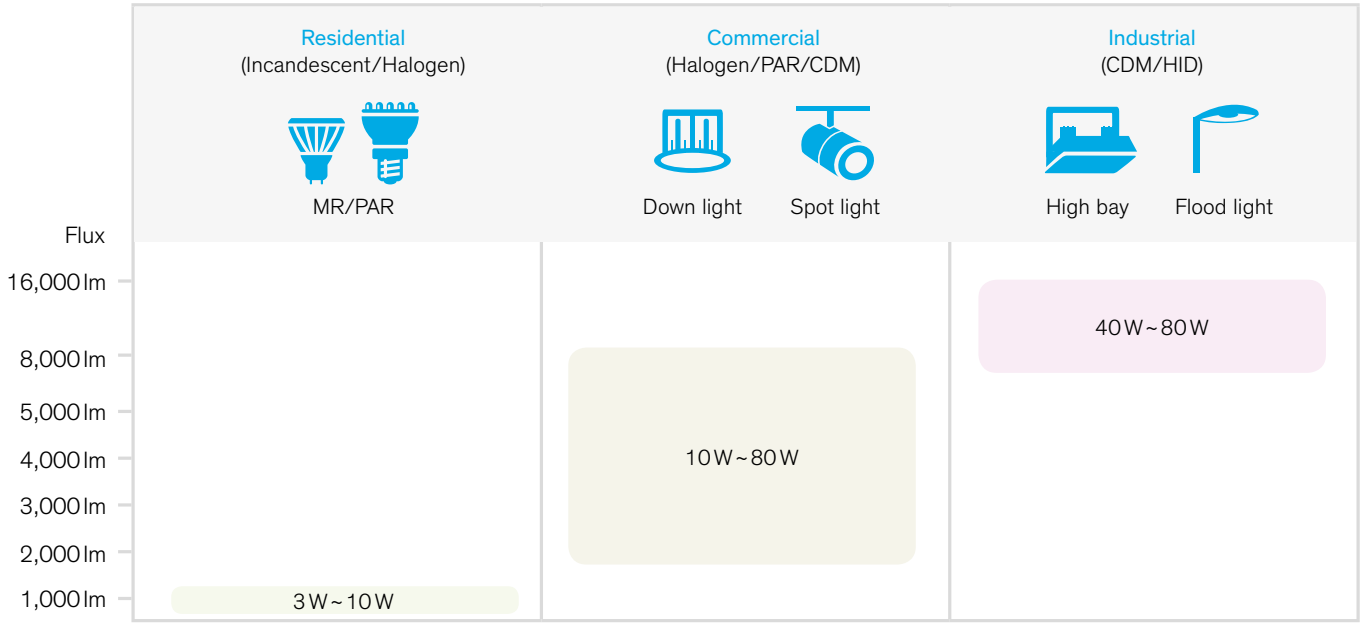


D-Series

Full Line-up for a Wide Range of Applications – Samsung Recommends 'D-series' Solutions for Various Applications

- Industry-leading performance
- Wide range of wattage offerings
- High variety of color rendering index levels
- Premium colors available





Buy now.

D-Series Gen 2

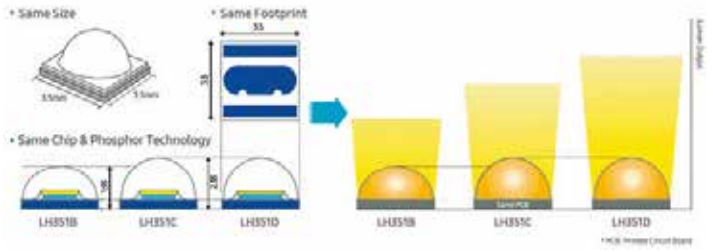
Ti = 85 °C	LC003D Gen2	LC006D Gen2	LC009D Gen2	LC013D Gen2	LC016D Gen2	LC019D Gen2	LC026D Gen2	LC033D Gen2	LC040D Gen2	LC060D Gen2	LC080D Gen2
LES	9.8 mm				14.5 mm				22 mm		
Typical	34.6V								34.6V	52V	
	3.1 W 90 mA	6.2 W 180 mA	9.4 W 270 mA	12.5 W 360 mA	15.6 W 450 mA	18.7 W 540 mA	24.9 W 720 mA	31.1 W 900 mA	37.4 W 1080 mA	56.1 W 1080 mA	84.2 W 1620 mA
Typical performance (CRI80+, 4000K, T_j:85 °C)	507 lm 163 lm/W	1024 lm 164 lm/W	1494 lm 160 lm/W	1950 lm 157 lm/W	2558 lm 164 lm/W	3026 lm 162 lm/W	3950 lm 159 lm/W	4875 lm 157 lm/W	6146 lm 164 lm/W	8995 lm 160 lm/W	13123 lm 156 lm/W
Max.	8.6 W 230 mA	17.2 W 460 mA	25.9 W 690 mA	34.5 W 920 mA	43.1 W 1150 mA	51.8 W 1380 mA	69 W 1840 mA	86.2 W 2300 mA	103.5 W 2760 mA	143.4 W 2760 mA	215 W 4140 mA
Size	13.5 × 13.5 mm				19 × 19 mm				28 × 28 mm		

D-Series Gen 3

Ti = 85 °C	LC003D Gen3	LC006D Gen3	LC009D Gen3	LC013D Gen3	LC016D Gen3	LC019D Gen3	LC026D Gen3	LC033D Gen3	LC040D Gen3	LC060D Gen3	LC080D Gen3
LES	9.8 mm				14.5 mm				22 mm		
Typical	33.8 V								33.8 V	52 V	
	3.0 W 90 mA	6.1 W 180 mA	9.1 W 270 mA	12.2 W 360 mA	15.2 W 450 mA	18.3 W 540 mA	24.3 W 720 mA	30.4 W 900 mA	36.5 W 1080 mA	54.8 W 1080 mA	82.1 W 1620 mA
Typical performance (CRI80+, 4000 K, T_j:85 °C)	524 lm 175 lm/W	1043 lm 171 lm/W	1550 lm 170 lm/W	2036 lm 167 lm/W	2622 lm 172 lm/W	3130 lm 171 lm/W	4112 lm 169 lm/W	5089 lm 167 lm/W	6261 lm 172 lm/W	9253 lm 169 lm/W	13721 lm 167 lm/W
Max.	8.8 W 230 mA	17.5 W 460 mA	26.3 W 690 mA	35.0 W 920 mA	43.8 W 1150 mA	52.6 W 1380 mA	70.1 W 1840 mA	87.6 W 2300 mA	105.1 W 2760 mA	157.7 W 2760 mA	236.5 W 4140 mA
Size	13.5 × 13.5 mm				19 × 19 mm				28 × 28 mm		

Samsung High Power LED LH351-Series

Applications
- Outdoor
- High/Low bay
- Directional
- Stadium & Arena lighting









LH351B

Cost effective solution for Street, High/Low bay and lighting applications

Features
- Operates at a maximum current of up to 1.5 A
- High efficacy outdoor solution
  (Delivering set efficacy over 110 lm/W @700 mA)
- Excellent efficacy: 172 lm/W @350 mA, 85 °C, 5000 K
- Footprint: 3.5 × 3.5 mm



Buy now.

LH351C

High performance for outdoor & directional lighting application

Features
- Operates at a maximum current of up to 2.0 A
- High efficacy outdoor solution
  (Delivering set efficacy over 120 lm/W @700 mA)
- Excellent efficacy : 160 lm/W @700 mA, 85 °C
- Footprint: 3.5 × 3.5 mm



LH351D

System cost effective solution for Street, High/Low bay and Stadium/Arena lighting applications

Features
- Operates at a maximum current of up to 3.0 A
- High efficacy outdoor solution
  (Delivering set efficacy over 120 lm/W @1050 mA)
- Higher TLCI value with CRI90 line-up for broadcase use
  (Stadium/Arena lighting)
- Footprint: 3.5 × 3.5 mm



The Easy Way: PaPIRs Motion Sensors – Connect and Detect!

Panasonic pyroelectric infrared sensors (PaPIRs) guarantee a fast and reliable time-to-market. The sensitivity is significantly improved (approx. 2 times) compared with conventional PIR sensors.

The modular portfolio offers highest design flexibility because of the pin compatibility. As a result, designers can solve various applications without extensive redesigning.





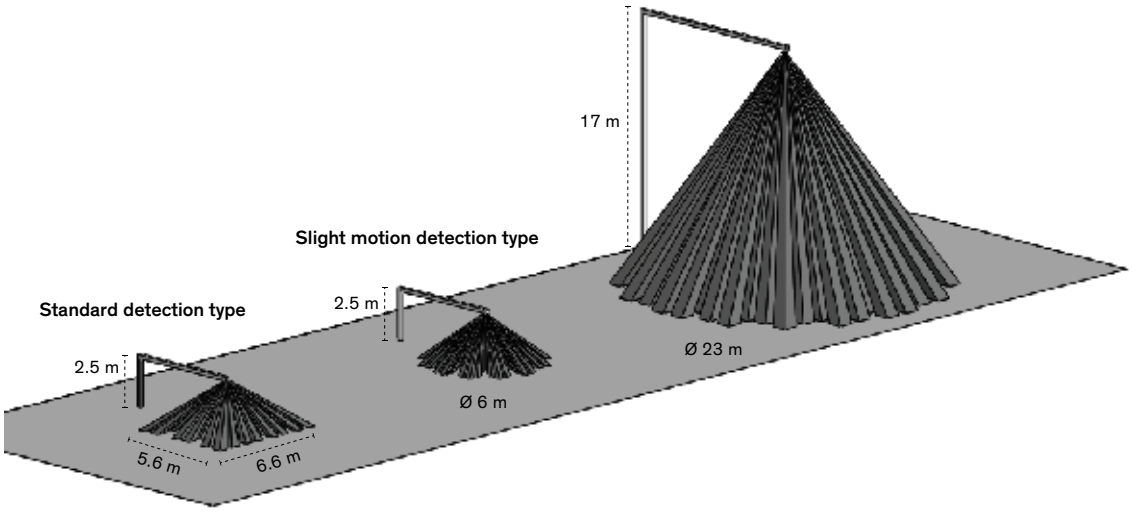


Features
- Small and extremely sensitive
- With built-in amplifier and comparator
- Detection distances up to 17 m
- 3 lens colours
- Extremely reliable
- Pin compatibility

Applications
- Lighting control solutions for offices, warehouses, retails, and public buildings
- Street lighting
- Smart luminaires and bulbs
- Battery-operated motion sensors

Portfolio Highlights
- **Standard type:** Sensor with a flat lens surface and small lens diameter (Ø 9.5 mm), optimal for fancy product designs and unobtrusive integration.
- **Slight motion detection type:** Optimal for offices, meeting or education rooms
- **High density long distance detection type:** The world's smallest high-bay sensor with a lens diameter of 19.3 mm! Ideal for street lights and high-bay luminaires used in warehouses, for example.

High density long distance detection type



EKMB Series for Battery-Operated Devices
EKMC Series for Battery-Free Devices

Product name				Standard and slight motion	Slight motion	Standard	Horizontally wide	Wall installation	Long distance	High density long distance detection	Lensless
Appearance											
Standby current consumption	Output type	Sensitivity	Part numbers								
1 µA	Digital (open collector)	Standard sensitivity type		EKMB119311o	EKMB119111o	EKMB110111o	EKMB110511o	EKMB110411o	EKMB110311o	EKMB110611o	EKMB1100100
2 µA				EKMB129311o	EKMB129111o	EKMB120111o	EKMB120511o	EKMB120411o	EKMB120311o	EKMB120611o	EKMB1200100
6 µA				EKMB139311oK	EKMB139111oK	EKMB130111oK	EKMB130511oK	EKMB130411oK	EKMB-130311oK	EKMB-130611oK	EKMB1300100K
170 µA	Digital (open collector)	Standard sensitivity type		EKMC169311o	EKMC169111o	EKMC160111o	EKMC160511o	EKMC160411o	EKMC160311o	EKMC160611o	EKMC1600100
		High sensitivity type		EKMC469311oK	EKMC469111oK	EKMC460111oK	EKMC460511oK	EKMC460411oK	EKMC460311oK	EKMC460611oK	EKMC4600100K
		Low sensitivity type		EKMC769311oK	EKMC769111oK	EKMC760111oK	EKMC760511oK	EKMC760411oK	EKMC760311oK	EKMC760611oK	EKMC7600100K
	Analog (op amp)	Adjustable		EKMC269311oK	EKMC269111oK	EKMC260111oK	EKMC260511oK	EKMC260411oK	EKMC260311oK	EKMC260511oK	EKMC2600100K
White				o = 1							NA
Black				o = 2							NA
Pearl white				o = 3							
Typical detection distance	Standard sensitivity type			2.2–3.1 m	2.5–4 m	3–5 m	5 m	3–12 m	7–12 m	12–14.5 m	NA
	High sensitivity type			3–4.3 m	3.5–5.6 m	4.2–7 m	7 m	4–17 m	10–17 m	17–20.5 m	NA
	Low sensitivity type			1.5–2.1 m	1.7–2.8 m	2.1–3.5 m	3.5 m	2–8.5 m	5–8.5 m	8.5–10.2 m	NA
	Analog (adjustable)			3–4.3 m	3.5–5.6 m	4.2–7 m	7 m	4–17 m	10–17 m	17–20.5 m	NA
Maximum field of view (horizontal x vertical)				90° x 90°	104.4° x 104.4°	106° x 97°	150° x 35°	112° x 55.6°	108° x 99°	69° x 69°	NA
Detection zones				84	112	64	104	68	92	128	4

EKMB Buy now.

EKMC Buy now.



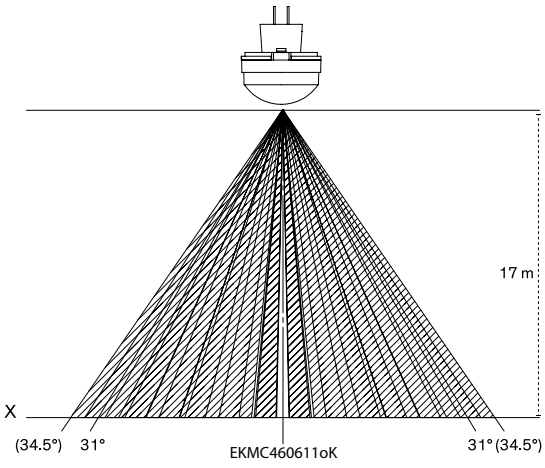
High Density Long Distance Detection Type

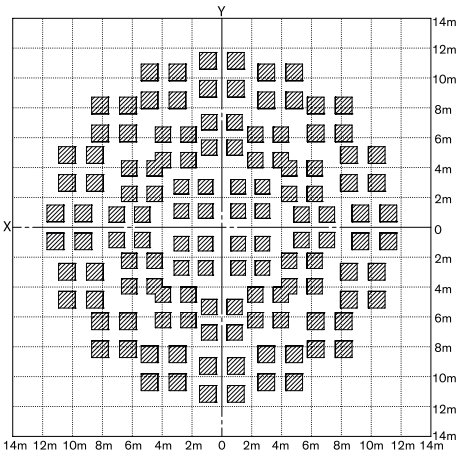
- World's smallest!
- Extremely high switching zone density!
- Available in white, black and pearl white!

Request samples! Request specification!

ORDERABLE PART NUMBERS

- EKMC160611o
- EKMC460611oK
- EKMC260611oK





X-Y Cross Section (17 m)

From your first moment of insight to distribution and reverse logistics, we have the state-of-the-art technology and support you need. Our deep line card features SSL technologies and components from leading lighting manufacturers.



Power Supplies for Lighting

When used in an LED lighting application, the term power supply refers to a complete pre-packaged assembly including driver, integrated transformer, and all the associated electronic components and circuitry required to convert and manage power. There are two basic types of power supplies, depending on the input voltage.

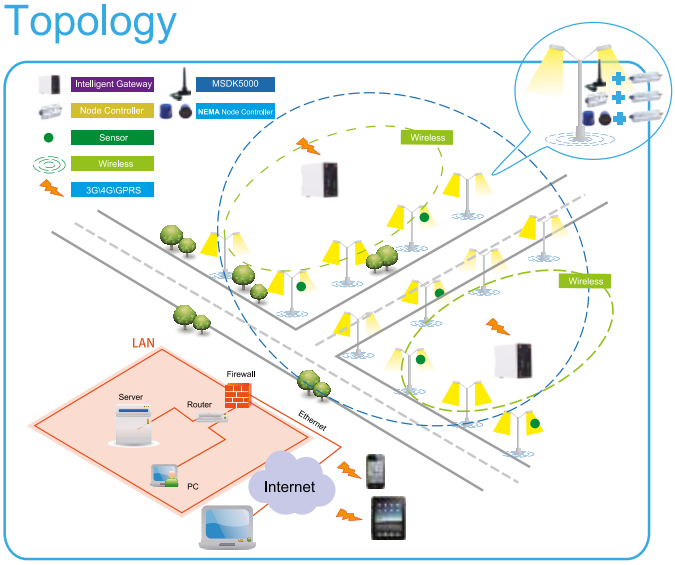
- AC to DC Converter
- DC to DC Converter

Moons' is the professional supplier of LED lighting intelligent control and driver solutions. Moons' LED lighting solutions are widely used in outdoor lighting, as well as industrial & commercial lighting. Our products include intelligent driver, IP67 high power driver, intelligent lighting control system etc.

Intelligent Lighting Control System

Moons' Wireless lighting system is suitable for the Smart City solution. The system consists of intelligent gateway, node controller, control and monitoring system software, lighting protocol and various sensors. The system can be implemented citywide to allow users complete control of their luminaries, and provide a platform through which data can be transferred from street level to end users via mobile apps and machine-to-machine connectivity.

Topology



S Series Intelligent LED Drivers

Features

- Full range (100 to 0.1 %) smooth dimming; flicker free
- Linear/logarithmic curve or gamma-corrected curve; 16 bit resolution
- Rapid response dimming
- Support 0 ~ 10 V, DALI (type 6 or type 8), DMX (RDM), PUSH dimming
- Input: 90–305 VAC
- Output power: 30 W/50 W/80 W/96 W, Channel 1/2; 50 W 100 W, Channel 2/4
- Output voltage range: 8–55 VDC, Current settable from 150 ~ 2800 mA
- Applications: stage, architecture, agriculture lighting

Functions

- Set the Max Output Current:
  With the help of our Smartkey II or NFC programming tool, you can set the MAX output current of the driver, each step is 1 mA. Please refer to specification of Smartkey.
- Temperature Detection:
  In order to protect the LED, the temperature of LED is detected by a NTC (customer provided). When the temperature exceeds the point which can be set by Smartkey II or NFC programming tool, the output current can be decreased automatically, but not less than 25 %.
- Online Update (for DALI & DMX versions):
  Use Smartkey II to connect PC and the driver to update the firmware. Please refer to the specification of Smartkey II.

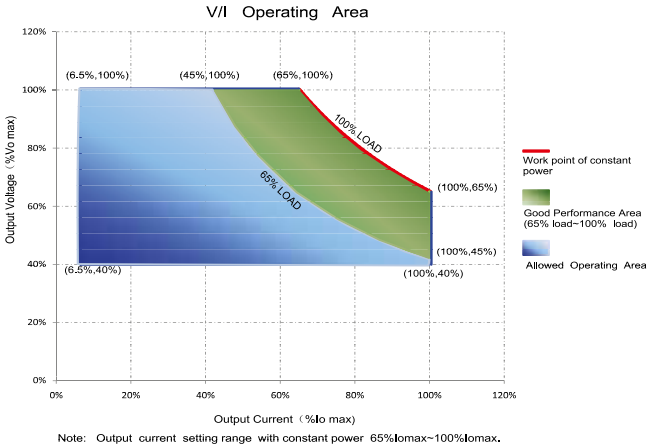


NEW: Wireless Node Controller (MSDK61xx)

- Interface: ANSI C136.41, supports dual channel dimming
- Input: 90~277 VAC, 50/60 Hz
- Surge: EN61000-4-5 (10 KV)
- Dimming: 0–10 V*2 or DALI (up to 32 slaves)
- Output: 5 Arms, 100 Apeak
- RF: 2.4 GHz-IEEE802.15.4 compatible, up to 1000 m (clear line of sight)
- Power meter: power, KWH, voltage and current, complies with ANSIC12.1 ±2% accuracy
- IP53 (self), IP65 (after installation)
- Size: Dia=84 mm, H=76.8 mm
- Complies with FCC PART 15
- Complies with UL773
- GPS: accuracy ±10 m (optional)
- Photocontrol: complies with ANSI C136.10 (optional)



Constant Power LED Drivers



ME_CP Series and MU_CP Series
Common Features

- Optional dimming mode: constant current, 0–10 V, PWM, Smart Midnight ClockDIM, Fixed ClockDIM
- Easy to adjust the output current or dimming mode through MSSL200. Please refer to the specification of MSSL200
- Permits optimum inventory management
- Reduce part numbers
- Quick response to end customers' requirements



ME_CP Series
Features

- Input voltage: 176–305 VAC (Europe market)
- Output power: 75 W/100 W/150 W/200 W/250 W series
- Protection level: class I and class II (optional)
- Certificate: ENEC, CE, CCC
- Surge level: L-N:10KV; L/N-PE:10KV



MU_CP Series
Features

- Input voltage: 90–305 VAC (Global market)
- Output power: 75 W/100 W/150 W/240 W/320 W series
- Certificate: UL, CUL, CE

Scan for more information

MOONS´Official Website

Products Searching Center

Buy now.

OPTOTRONIC Intelligent Ultraflat

OTi DALI 35/220...240/400 D LT2 UF L and OTi DALI 75/220...240/700 D LT2 UF L

Product Benefits

- Ultra-flat housing (11 mm height) for innovative luminaire designs and applications
- LEDset interface for direct Ultraflat sensor connection (LS/PD LT2 LI UF sensor)
- Fully programmable via software (DALI Interface, NFC)
- Lifetime: up to 100,000 h (temperature at Tc = 65 °C, max. 10 % failure rate)
- High-quality dimming of 1...100 % by amplitude dimming
- High quality of light thanks to < 1 % output ripple current
- Very high efficiency and reliability
- Safety requirement due to overload, overtemperature, Hot Plug protection

Areas of Application

- Linear lighting for office, education, industry, storage areas and retail
- Installation in emergency lighting systems according to IEC 61347-2–13, appendix J
- Suitable for luminaires of protection class I



ORDERABLE PART NUMBER

- 4052899957022

Buy now.

LINEARlight FLEX Tunable White

Product Benefits

- Simple mounting and connection
- Toolless connection with the optional CONNECTsystem
- Easy mounting on many smooth surfaces thanks to self-adhesive tape at the back
- High luminous flux
- Extraordinary design and high quality materials
- Pre-soldered wires (TWW versions)

Areas of Application

- Cove lighting
- Shop lighting
- Offices



ORDERABLE PART NUMBER

- 4052899953260

OPTOTRONIC Outdoor

OT 20/170…240/1A0 1DIMLT2 G1 CE

Product Benefits

- Wireless luminaire programming: easy and in no time at all
- High surge protection: up to 10 kV for class I or II luminaires
- Green City: Optimal energy savings even if the existing infrastructure remains in place
- Reduced number of luminaire types: With the new Smartphone app Tuner4TRONIC Field (available from Q1/2018), cities and luminaire manufacturers can use the same type with various operating parameters

Areas of Application

- City and street lighting
- Industrial applications
- Suitable for outdoor applications in luminaires with IP > 65
- Suitable for use in outdoor luminaires of protection class I and II



ORDERABLE PART NUMBER

- 4052899517400

OPTOTRONIC Outdoor

OT 40/120…277/1A0 4DIMLT2 E

Product Benefits

- 4DIM functionality in one device (StepDIM, AstroDIM, MainsDIM, DALI)
- Very high efficiency
- High surge protection: up to 10 kV (1 pulse)/8 kV, in protection class I or II
- Low luminous efficacy tolerance through low output current tolerance of ± 3 %
- Great flexibility due to wide operating temperature range of -40…55 °C or 60 °C
- Protection through double isolation between mains input and LED output

Areas of Application

- Street and urban lighting
- Industry
- Suitable for outdoor applications in luminaires with IP > 54
- Suitable for use in outdoor luminaires of protection class I and II



ORDERABLE PART NUMBER

- 4052899925182

Buy now.

Our solid-state lighting (SSL) capabilities can be the difference between night and day for your business. We provide state-of-the-art technology to support you from the first moment of insight to distribution and reverse logistics.

LED Drivers Electronics

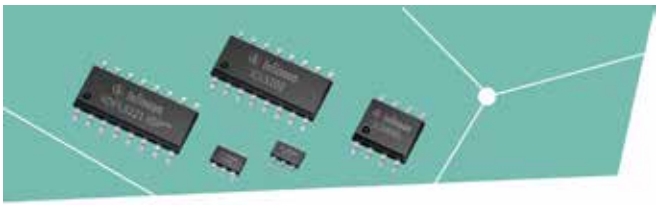
Once the number and the arrangement of the LEDs are selected, Arrow can offer all possible combinations of products and reference designs in order to provide the right voltage and the right current for your light. These drivers take as an input an AC or a DC current and deliver the DC current at the right voltage level.

LED Driver ICs from Infineon

Efficiencies Up to 98 %, Dimming Level Down to 1 %, Supported by User-friendly Design Tools

Luminaire and specialty lighting makers often have to adapt their lighting control solution to specific project needs. Each lighting installation is unique and needs to consider design and smart lighting control aspects. Meeting the comprehensive requirements of large projects can be a difficult challenge to master. At Infineon we have a full range of AC/DC, DC/DC and linear LED control solutions addressing all kinds of general lighting applications from a simple strip light to high power LED driver.

Highly efficient switch mode LED drivers increase system efficiency up to 98 %, offer analog or PWM dimming interfaces. And they also come with smart thermal protection, to ensure for safety reasons you're never left in the dark. Leveraging the Infineon Designer Online Simulation Tool, we can help you quickly build innovative LED lighting solutions exactly meeting your customers' requirements. Get your samples below and test for yourself.



Linear Control Solutions

Product Name	Group	Topology	V_s (min.)	V_s (max.)	I_{out} (typ.)	I_{out} (max.)	Dimming	Package	P_{tot} (max.)
Low-power LED Driver ICs (5–65 mA) Low-power LED Driver ICs (5–65 mA)									
BCR430U	LED Controller	Linear	6V	42V	5 mA	100 mA	Digital	SOT23-6	600 mW
BCR401U	LED Driver for low-power LEDs	Linear	1.4V	40V	10.0 mA	65 mA	Digital	SC74	750 mW
BCR401W	LED Driver for low-power LEDs	Linear	1.2V	18V	10.0 mA	60 mA	Digital	SOT343	500 mW
BCR402U	LED Driver for low-power LEDs	Linear	1.4V	40V	20.0 mA	65 mA	Digital	SC74	750 mW
BCR402W	LED Driver for low-power LEDs	Linear	2V	18V	20.0 mA	60 mA	Digital	SOT343	500 mW
BCR405U	LED Driver for low-power LEDs	Linear	V 1.4	40V	50.0 mA	65 mA	Digital	SC74	750 mW
Medium- and high-power LED Driver ICs (65–500 mA)									
BCR320U	LED Driver for low-power LEDs	Linear	1.4V	24V	250 mA	300 mA	Digital	SC74	1,000 mW
BCR321U	LED Driver for low-power LEDs	Linear	1.4V	24V	250 mA	300 mA	Digital input PIN	SC74	1,000 mW
BCR420U	LED Driver for low-power LEDs	Linear	4V	40V	150 mA	200 mA	Digital	SC74	1,000 mW
BCR421U	LED Driver for low-power LEDs	Linear	1.4V	40V	150 mA	200 mA	Digital input PIN	SC74	1,000 mW
BCR450	LED Controller	Linear	8.0V	27V	70 mA	Ext. switch	Digital	SC74	1,000 mW

Buy now.

DC/DC Switch Mode LED Driver ICs

Product Name	V_s (min.)	V_s (max.)	I_{out} (typ.)	I_{out} (max.)	Package	Dimming	Topology	f_{sw}	Features
ILD1150	4.75V	45V	ext. switch	ext. switch	PG-SSOP-14	Digital	DC-DC Boost, Buck, Sepic, Buck-Boost, Flyback	Adjustable 100–500 kHz	Multi topology controller, constant current or constant voltage mode, overvoltage, overcurrent protection
ILD1151	4.5V	45V	ext. switch	ext. switch	PG-SSOP-14	Analog/ digital	DC-DC Boost, Buck, Sepic, Buck-Boost, Flyback	Adjustable 100–500 kHz	Multi topology controller, constant current or constant voltage mode, overvoltage, overcurrent, short on GND protection
ILD4001	4.5V	42V	10.0 mA	3,000 mA*	DSO-8-27	Analog/ digital	Hysteric buck	< 500 kHz	Thermal protection, *with external switch
ILD4035	4.5V	40V	350 mA	400 mA	SC74	Analog/ digital	Hysteric buck	< 500 kHz	Smart thermal protection, overvoltage, overcurrent protection
ILD4071	5V	40V	100–700 mA	700 mA	PG-DSO-8	Analog/ digital	DC-DC Buck	Adjustable 50–300kHz	Buck converter, constant current mode
ILD6070	4.5V	60V	700 mA	700 mA	DSO-8-27	Analog/ digital	Hysteric buck	< 1,000 kHz	Integrated switch rated up to 700 mA, PWM or analog dimming, adjustable overtemperature protection, over-current protection
ILD6150	4.5V	60V	1,500 mA	1,500 mA	DSO-8-27	Analog/ digital	Hysteric buck	< 1,000 kHz	Integrated switch rated up to 1,500 mA, PWM or analog dimming, adjustable overtemperature protection, over-current protection

Buy now.

Dimming Interface ICs

Product	CDM10V	CDM10V-2	CDM10V-3	CDM10V-4	CDM10VD	CDM10VD-2	CDM10VD-3	CDM10VD-4
I_{out}	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA	1 mA	1 mA
Min. duty cycle	1/2/5/10 %	n.a.	1 %	n.a.	5 %	10 %	5 %	10 %
PWM output frequency	0.2/0.5/1.0/2.0 kHz	1 kHz	1 kHz	2 kHz	1 kHz	1 kHz	1 kHz	1 kHz
Dimmer/Resistor bias current	50/100/200/500 µA	200 µA	200 µA	100 µA	120 µA	120 µA	120 µA	120 µA
Dim-to-off	Disabled/Enabled	Enabled	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled

Buy now.

Less Energy – More Light at Reduced System Cost

LED Driver and Professional Luminaires with off-line LED Driver ICs
The digital IC family XDP™ LED is the first all-in one package solution that integrates a digital power controller with key peripherals and simplifies your innovations.

Key Benefits of a Digital Switched Mode Power Supply
- Technical enhancement and cost saving go hand-in-hand
- Firmware gives flexibility over fixed analog design
- Cost saving and faster time to market increase competitiveness

Customer Advantage
- More flexibility, quick design and simplified logistics handling
- Shorten development cycles down by 70 %
- Offer room for customer innovation and own IP
- Advanced energy efficiency and reduced system cost BOM

Portfolio AC-DC LED Driver ICs

Product Name	Topology	Package	Comments
IRS2982S	Flyback/ buck-boost	SOIC 8N	A versatile SMPS control IC designed to drive switching converters for LED drivers and power supplies
XDPL8105	High PF Flyback, single stage	DSO-8	XDP™ LED CC digital flyback controller with analog dimming interface and extended dimming range for configurable LED driver
XDPL8218	High PF Flyback, single stage	DSO-8	HPF Flyback CV with wide output power range
XDPL8220	PFC and Flyback, dual stage	DSO-16	XDP™ LED digital and configurable flyback controller with CC/CV/LP output
XDPL8221	PFC and Flyback, dual stage	DSO-16	XDP™ LED digital and configurable flyback controller with CC/CV/LP output and UART control (1% dimming)
ICL5101	PFC + LLC	DSO-16	High-voltage resonant controller with PFC and extended dimming range for LED driver
ICL5102	PFC + LLC/LCC	DSO-16	High-performance PFC + resonant controller for LCC and LCC with extended dimming range

Microcontrollers for LED Lighting

- The XMC1100 series is not only designed for easy entry into the XMC™ world, but is also cost- and size-optimized for use as a pure communication IC in LED lighting applications
- The XMC1200 line features dedicated peripherals for LED lighting designs
- The XMC1300 series addresses real-time control requirements in many fields, such as digital power conversion applications
- The XMC1400 is the highest performance series within the XMC1000 family. Adding bigger packages makes it best suitable for advanced, multichannel lighting control (e.g. RGBW intelligent lighting control) and DC/DC power conversion

Key Features & Benefits of the XMC1000 Family
- Low-cost 32-bit MCU with a programmable memory of up to 200 KB flash
- Connectivity (UART, SPI, I²C, I²S) to external motion or light sensors and a DALI or DMX lighting bus (for example)
- Free DAVE™ App with DALI stack
- Specific easy-to-use peripherals for flicker-free LED-dimming, automated calibration to various drivers and smooth colour mixing
- Fast ADC (< 0.5 µs) and peripheral interconnects for precise real-time control loops

DAVE™ is a complete free development environment for XMC™ microcontrollers. It features a complete SW development tool-chain and DAVE™ Apps for reducing SW complexity and time-to-market.

Product	System			Timers			Signal processing		Communication	Application specific		
	Co-processor	Flash memory (KB)	RAM (KB)	CCU4 (4 ch, 16-bit)	CCU8 (8 ch, 16-bit)	POSIF (hall & encoder I/F)	ADC (12-bit)	AnaComp	USIC (2 ch, UART, SPI, I²C, I²S), CAN	LED brightness & colour control	LED display control	Touch control
XMC1100	–	8–64	16	1	–	–	1×	–	1× USIC	–	–	–
XMC1200	–	12–200	16	1	–	–	2×	up to 3	1× USIC	9 ch	64 segment	16 buttons
XMC1300	MATH (CORDIC/DIV)	8–200	16	1	1	1	2×	3×	1× USIC	9 ch	–	–
XMC1400	MATH (CORDIC/DIV)	32–200	16	2	2	2	2×	4×	2× USIC, CAN	9 ch	–	–

Buy now.

LITIX™ – Automotive LED Driver

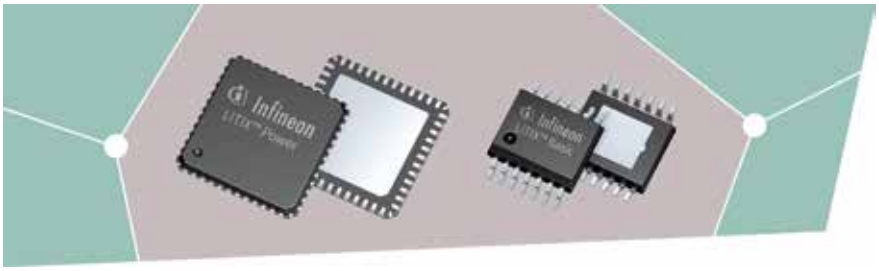
The LITIX™ – Infineon® Auto LED Drivers are enablers of protected and high-performing lighting applications in the automotive industry. In particular, the constant current regulation secures the stable brightness of the LED over the whole automotive temperature and voltage range. Both the driver and LED are protected against overstress e.g. caused by voltage spikes or overtemperature. All kinds of load conditions are detected by its diagnostic features, such as open-load or shorted LED. All features are required to drive LEDs in harsh automotive environment conditions.

Applications

The Infineon automotive-optimized LED drivers address interior and exterior, low to high-power automotive LED applications such as: high and low beam, fog, DRL, position, tail, stop, CHMSL, RCL, reverse, turn indicator, dome, ambient lighting, status lamps etc.

Features

- Constant output current, therefore constant brightness and extended LED lifetime
- Wide input voltage range
- Low drop voltage
- Open-load detection
- Overtemperature protection
- Short-circuit proof
- Reverse polarity proof
- Wide temperature range
- Very small SMD packages
- Automotive qualified



LITIX™ – Infineon® Auto LED Driver Consists of 4 Sub-families

LITIX™ Basic
- Flexible linear current source family with scalable feature set

LITIX™ Linear
- BCR400 series is the most cost effective solution to drive low-power LED
- Linear current sources for low, medium and low-cost high-power applications

LITIX™ Power
- DC-DC converter and controller for medium and high-power applications

LITIX™ Power Flex
- Multipology DC-DC controller for highest flexibility/power applications

LITIX™ Basic – Flexible Linear Current Source Family with Scalable Feature Set

Product Name	1 IN 1 OUT	1 IN 3 OUT	3 IN 3 OUT	Output current (typ) mA per channel	PWMI	N–1	OL and SC detection	OL and SC with double fault detection	DEN	Matrix	Package
TLD1120EL	•			180							SSOP-14 EP
TLD1310EL		•		60							SSOP-14 EP
TLD2310EL			•	60							SSOP-14 EP
TLD1312EL		•		60	•						SSOP-14 EP
TLD1311EL		•		60		•					SSOP-14 EP
TLD1121EL	•			180			•				SSOP-14 EP
TLD2311EL			•	60			•				SSOP-14 EP
TLD1313EL		•		60				•			SSOP-14 EP
TLD1124EL	•			180			•		•		SSOP-14 EP
TLD1314EL		•		60			•		•		SSOP-14 EP
TLD2314EL			•	60			•		•		SSOP-14 EP
TLD1125EL	•			180	•		•				SSOP-14 EP
TLD1315EL		•		60	•	•	•				SSOP-14 EP
TLD1326EL		•		60	•	•				•	SSOP-14 EP
TLD2326EL			•	60			•			•	SSOP-14 EP

PWMI = Internal PWM dimming engine
N - 1 = Complete device deactivation during open-load
OL = Open-load diagnosis
SC = Short-circuit diagnosis
DEN = Diagnosis Enable input
Matrix = Feedback to DC-DC to optimize efficiency

Buy now.

LITIX™ Linear – Linear Current Sources for Low to Medium Power Applications

Product Name	Output current (max) [mA]	Adjustable	Driver for external transistor	Open-load detection	PWM/enable input	Adjustable high/low current switch	Package
TLD1211SJ	85	•	•		•		DSO-8
TLE4241GM	60	•		•	•	•	DSO-8
TLE4242EJ	250	•		•	•		DSO-8 EP
TLE4242G	450	•		•	•		TO263-7-1 (TO220-7 (SMD))

Buy now.

LITIX™ Power – DC-DC Converter and Controller for Medium and High-Power Applications

Product Name	Topology	Power stage	Current (max)	V_{IN} range	V_{OUT} (max)	LED current dimming		Package
						Digital (PWM)	Analog	
TLD5045EJ	Buck converter	Internal	0.70 A	5.00 … 40.00 V	40 V	Yes	Yes	DSO-8 EP
TLD5095EL	Multitopology controller IC buck, boost, buck-boost, SEPIC, flyback	External	Dependent on external MOSFET	4.75 … 45.00 V	45 V	Yes	No	SSOP-14 EP
TLD5097EL	Multitopology controller IC buck, boost, buck-boost, SEPIC, flyback	External	Dependent on external MOSFET	4.50 … 45.00 V	60 V	Yes[1)]	Yes	SSOP-14 EP
TLD5098EL	Multitopology controller IC buck, boost, buck-boost, SEPIC, flyback	External	Dependent on external MOSFET	4.50 … 45.00 V	60 V	Yes	Yes	SSOP-14 EP
TLD5190QV	Synchronous H-bridge	External	Dependent on external MOSFET	5.00 … 40.00 V	55 V	Yes	Yes	VQFN-48

1) No dedicated Gate driver. Digital dimming done via main switch

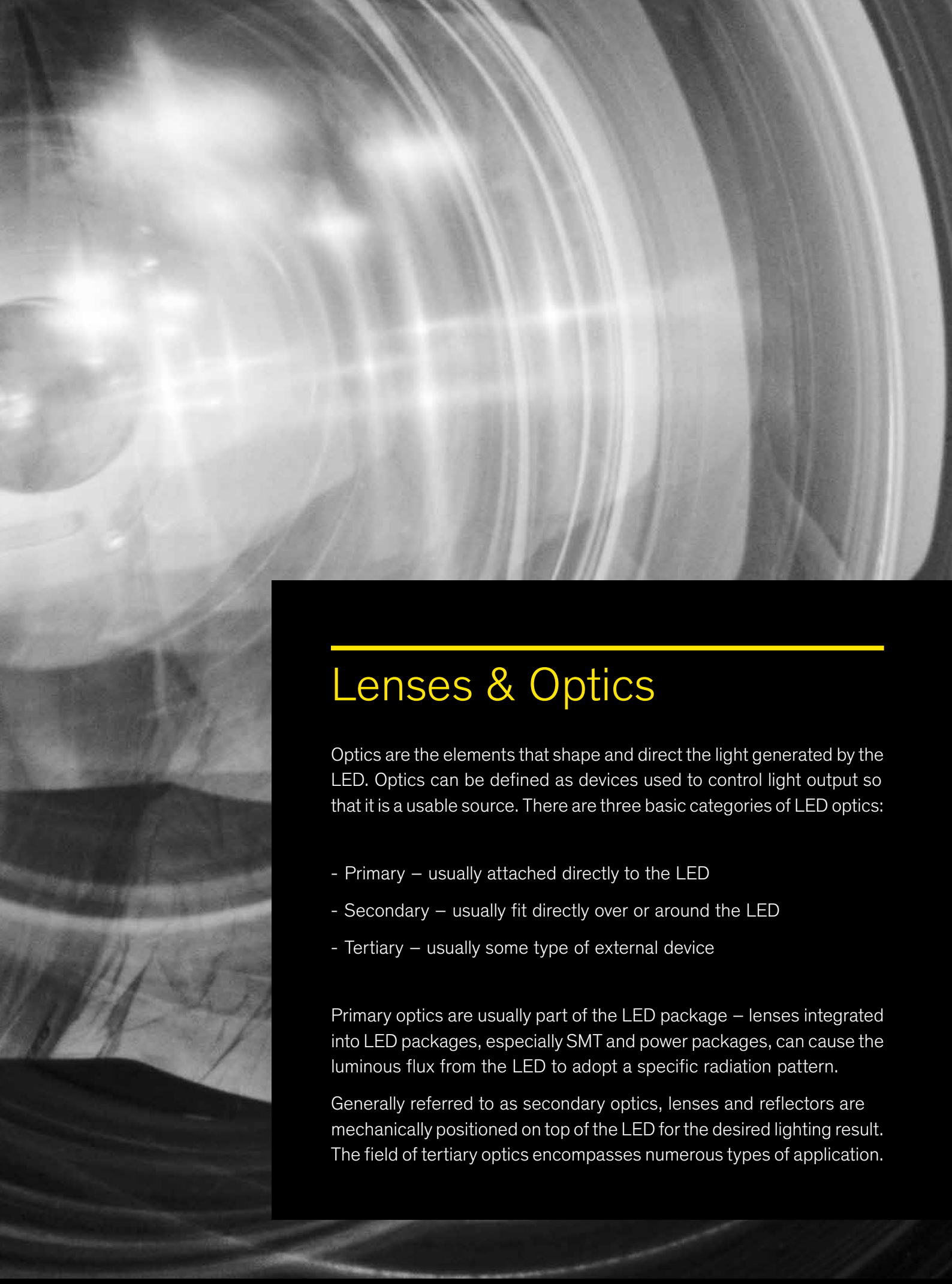
Buy now.

LITIX™ Power Flex – Synchronous DC-DC Controller for High-current, High-Power and Cost Optimized Applications

Product Name	Topology	Power stage	Current (max) [A]	V_{IN} range	V_{OUT} (max)	Package
TLD5541-1QV	Synchronous H-bridge w/SPI	External	Depending on external MOSFET	4.50 … 40.00 V	55 V	VQFN-48
TLD5541-2Q	Synchronous dual channel multitopology w/SPI	External	Dependent on external MOSFET	4.50 … 40.00 V	55 V	VQFN-48
TLD5501-2Q	Synchronous dual channel buck w/SPI	External	Dependent on external MOSFET	4.50 … 40.00 V	50 V	VQFN-48

Buy now.

From the backlit tablet in a child's hands, to the interior lights in the family car all the way through to the lights showing the way across a bridge – examples of our lighting applications are everywhere, every day.



Lenses & Optics

Optics are the elements that shape and direct the light generated by the LED. Optics can be defined as devices used to control light output so that it is a usable source. There are three basic categories of LED optics:

- Primary – usually attached directly to the LED
- Secondary – usually fit directly over or around the LED
- Tertiary – usually some type of external device

Primary optics are usually part of the LED package – lenses integrated into LED packages, especially SMT and power packages, can cause the luminous flux from the LED to adopt a specific radiation pattern.

Generally referred to as secondary optics, lenses and reflectors are mechanically positioned on top of the LED for the desired lighting result. The field of tertiary optics encompasses numerous types of application.

Carclo Optics boasts unrivalled expertise in LED optical design, development and manufacture. Their in-house dedicated team provides innovative specialist design solutions, whilst dedicated global manufacturing sites ensure they have a local presence on a global scale. Carclo Optics have design, development and stock holding capabilities in the UK, Czech, USA, China and India. Custom design projects are an important area of the business.

10 mm TIR Optics
These are small form factor TIR optics that have been designed to support the latest small LED packages. All 10 mm optics are available as singles or clusters. They are also available as a single optic IP rated design solution to allow you to utilise the optic, sealing the LED to the board.

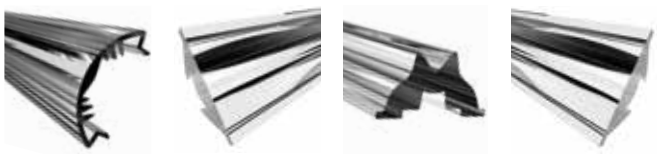
20 mm TIR Optics
These are the most common size of TIR optic as they produce a range of beam angles from relatively tight to wide. There are also two reflectors within our 20 mm range that take the beam even wider – therefore, you can design your fixture around this family of optics and select what beam is required as you build.

26.5 mm TIR Optics
These TIR optics are used to get narrow beams with smaller LED's or allow you to use the larger source LED's and even multi chip LED's. As with the other TIR ranges, we have a number of beams to allow you to use the same size optics for a number of beam angles.

30 mm Optics
Designed for the larger multi chip LED's, they give a smooth beam output mixing the light and adding diffusion to the beam. There are a number of beams to allow you to use the same size optics for a number of beam angles.

60 mm Optics
The 60 mm optics are catadioptrics, which is a combination of TIR and reflector that enables us to compress the optic to be as thin as possible whilst getting a very narrow beam.

Strip Optics
The Strip Optics are continuous moulded optics (extrusion) that utilise the TIR optics for strip fixtures. Suitable for a number of lighting applications such as retail, warehouse, architectural and signage.



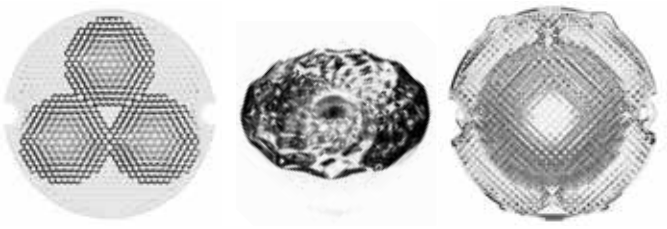
Hubble Optics
These are freeform optics designed to give a number of different beam options. Ideal for the European and USA street lighting standards, but also suitable for a number of lighting applications where a specialist beam pattern is required.

Mini Hubble Optics
The Mini Hubble range of free form optics are available in single and array configurations. The range conforms to numerous standards including US Type I – V and European ME.



33Up Array Optics
With 32 part numbers available in Double Asymmetric, 30, 60 & 90 degree beam angles, the 33Up Arrays provide a modern solution for the most demanding of situations. A choice of PMMA or PC adds to the flexibility of this range.

Custom Optics
If you have a project you feel may need a custom solution, why not get in touch with our specialists? With extensive experience in tailor made solutions, Carclo Optics can provide exactly the answer you've been looking for.



Silicone
Silicone optics are an excellent choice for high output and high temperature LEDs. The Carclo Optics Silicone S1 range are ideal for COB LEDs from 6 to 23 mm LES. Compatible with Philips Fortimo, BJB, Molex and TE connector bases, the Silicone S1 range is available in Ultra Narrow, Narrow, Medium and Wide beam angles.

Optic Select

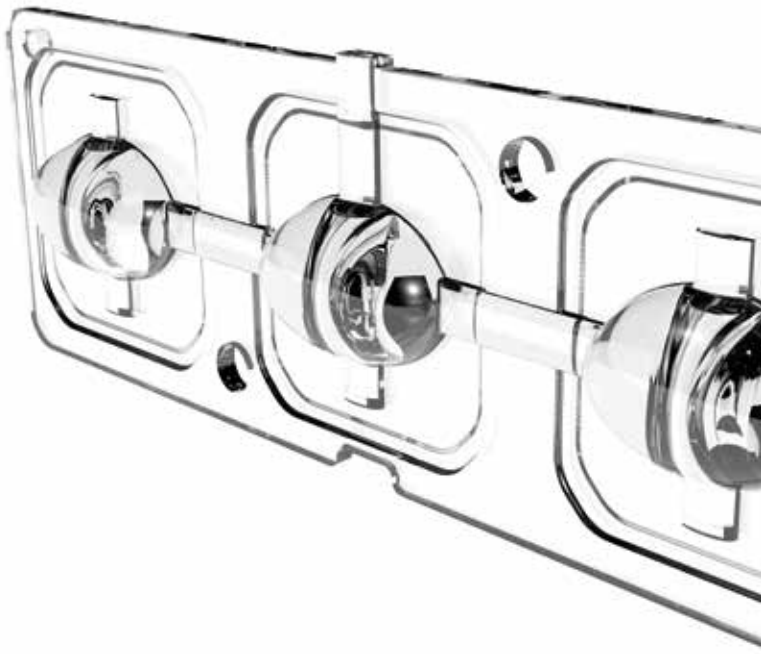
Optic Select™ is Carclo Optics' searchable database that brings the ability to search for the perfect optic or reflector online. All standard optics, reflectors and suitable holders are listed – with new solutions added weekly.

Buy now.

Mini Hubble Optics

Optic Select

- A cost effective solution
- Works with a wide range of LEDs
- An industry recognised footprint
- EN1838 (Emergency Lighting) compliant
- Single & 1×3, 2×2, 2×3 arrays
- Lightweight design

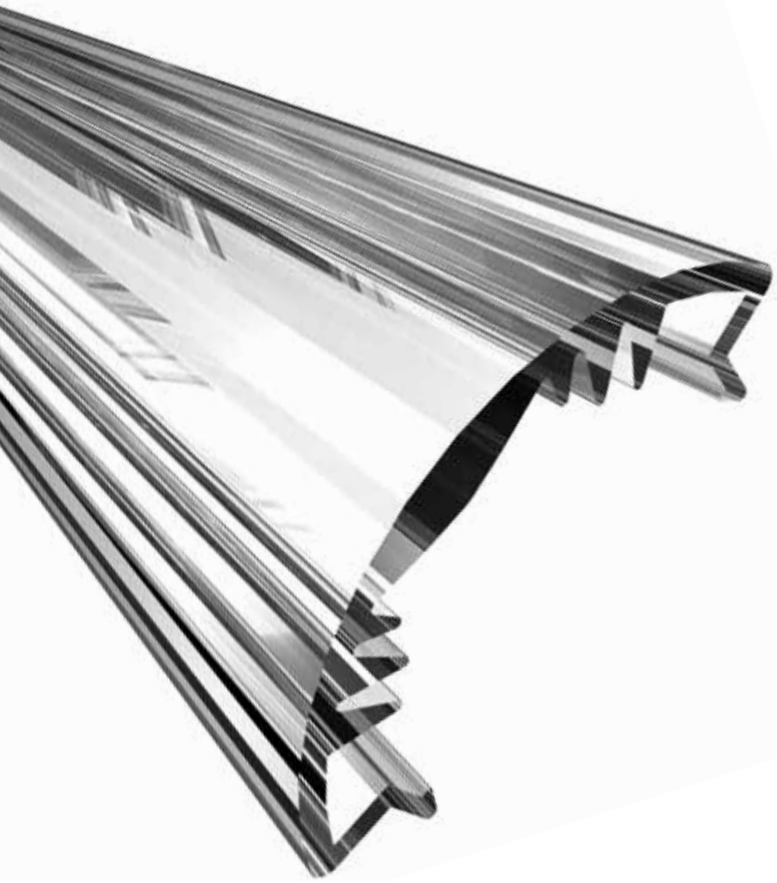


33Up Array Optics

- Designed for retail and general lighting
- Works with a wide range of LEDs
- Compatible with industry standard PCBs
- Custom PCB manufacturing flexability: long boards, interconnecting boards etc
- Allows onboard wire connectors and edge board to board connectors
- The placement of multiple optics end to end allows for thermal expansion
- Complete PCB coverage creates the illusion of a continuous optic
- Board to board production tolerances
- Available in 30°, 60°, 90° & double asymmetric beam patterns
- Custom light output can be designed and engineered into the same tooling frame
- Manufactured in high grade PMMA or PC
- Lightweight design
- Ideal T8/T5 replacement

Buy now.





NEW – High Bay Strip Optic

- High uniformity
- Simple clip-in mounting
- Designed to work up to 12 m high
- Compatible with a wide range of LEDs

The new High Bay Strip Optic is suitable for a wide variety of applications including:
- Retail Lighting
- Warehouse Lighting
- Architectural Lighting
- Signage Lighting

Buy now.

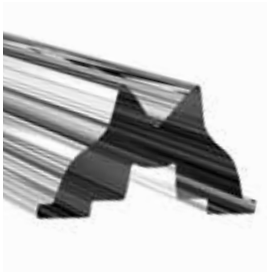
High Bay



11 mm Linear



Side Emitter Strip



28 mm Linear Strip

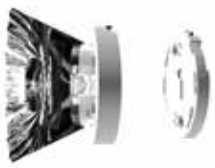


Optic Select

Optic Select™ is Carclo Optics' searchable database that brings the ability to search for the perfect optic or reflector online. All standard optics, reflectors and suitable holders are listed – with new solutions added weekly.



Ultra Narrow



Narrow



Medium



Wide

NEW – Silicone S1 Range

The latest product line from Carclo Optics is the Silicone S1 range. Suitable for chip on board LEDs from 6 mm LES to 23 mm LES. Compatible with Philips Fortimo, BJB, Molex and TE Connector bases. Starting with S1, the silicone optics family will expand to include additional ranges over the coming months.

Buy now.



GAGGIONE is constantly improving and expanding its standard optics product range. Targeting high end applications were the beam consistency and quality are requested, GAGGIONE applies patented technology to match most demanding requirements.

LLC66x7

A Whole Family of 67 mm Silicone Collimators

As an addition to the already existing LLC66N7 (10°), LLC66M7 (25°) and LLC66W7 (32°), two new references are now available:
LLC66L7: Large version with a 40° FWHM
LLC66V7: Very large version with 55° FWHM

LLC66x7 collimators technology has been selected as finalist for the 2018 Sapphire Awards and provide Tunable White color temperature mixing capability with advanced color homogeneity properties.


66L7

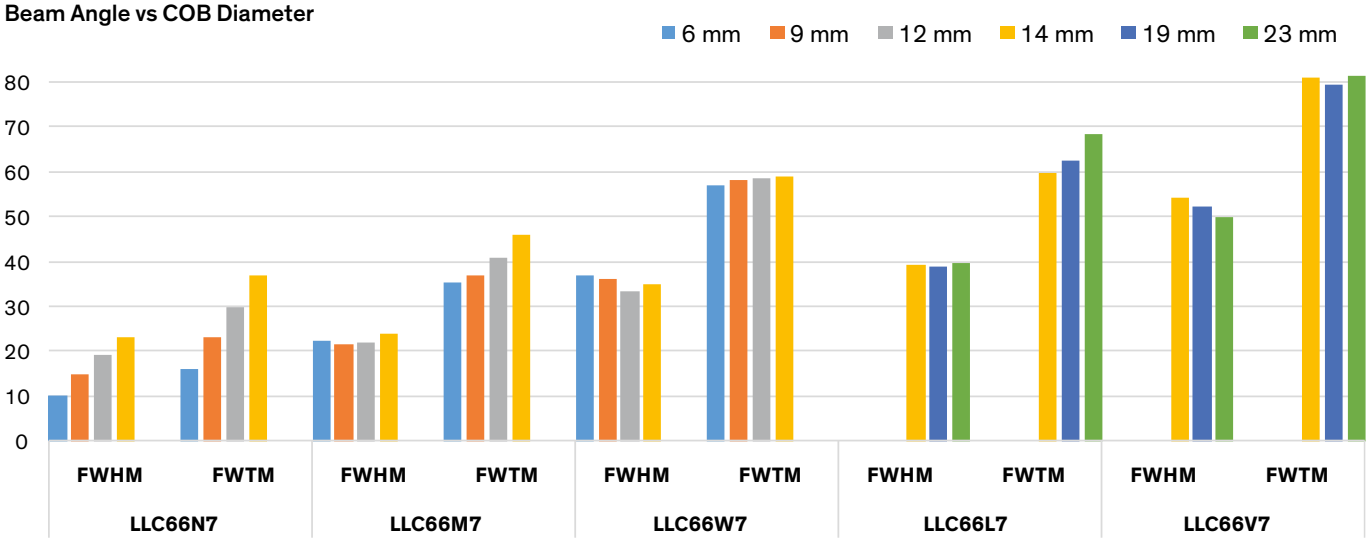

66M7


66N7


66V7


66W7

Beam Angle vs COB Diameter

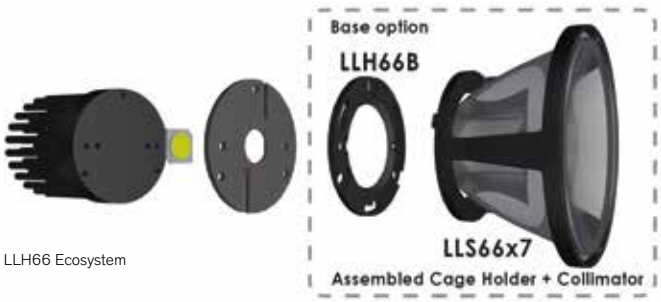


LLH66 Ecosystem

A Fast Time to Market Solution for LLC66x7 Range

LLH66 Ecosystem is an integration platform for 67 mm silicone collimators adapted to various COB holders manufacturers.
It consists of pre-assembled collimators/holders sets and COB holders dedicated bases.





LLH66 Ecosystem

LLC66Z7 67 Zoom Collimators

A Unique Single Optical Part Zoom Solution

LLC66Z7 achieves a 10° to 30° FWHM within 67 mm diameter form factor. It is available with its dedicated mechanical integration Ecosystem allowing easy product development with all-in-one various zoom movement mechanical options.



LLC66Z7



LLS66Z



LLH66BZ bases



LLC66 Zoom ecosystem





LLC66Z7 Assembled ecosystem

LLC79x7 45 mm Silicone Collimators range

A Smaller Form Factor for Silicone Collimator's Beam Quality

LLC79x7 ranges reproduces the LLC66x7 patented technology beam homogeneity and quality in a smaller 45 mm form factor. Three references available and an upcoming zoom version!

LLC79x7 range comes with a dedicated cage holder solution, compatible with all of the LLH66 Ecosystem bases.



79M



79N



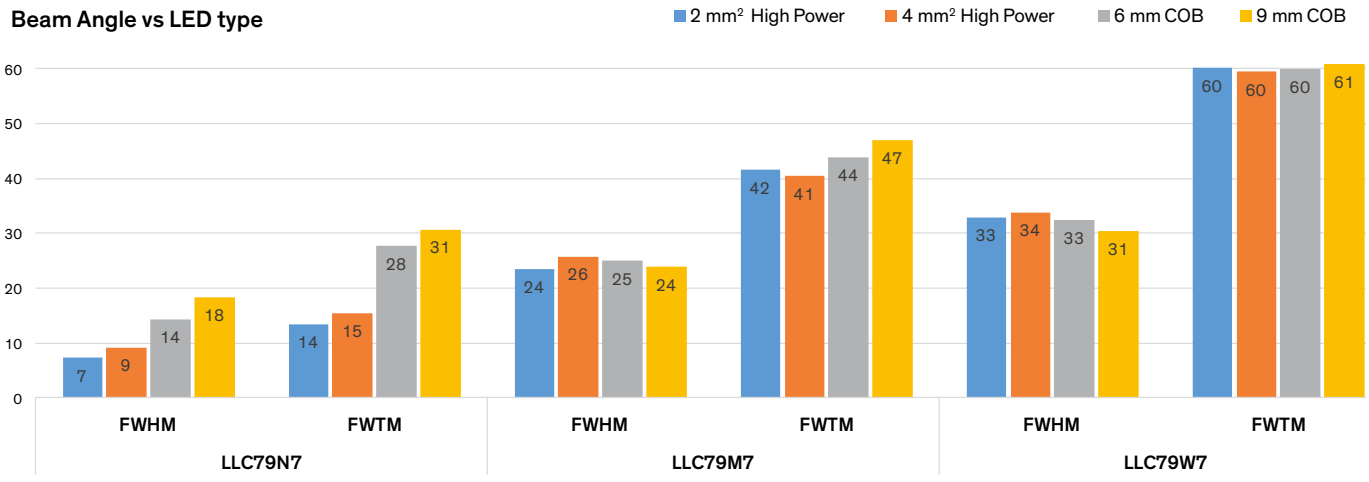
79W



LLC79N black holder



LLC79N clear holder



ORDERABLE PART NUMBERS

- LLC66N7
- LLC66M7
- LLC66W7
- LLC66L7
- LLC66V7
- LLH66
- LLC66Z7
- LLC79x7

Buy now.

DARE NOT TO GLARE.



DAISY | LINNEA-GC | FLORENTINA-BW

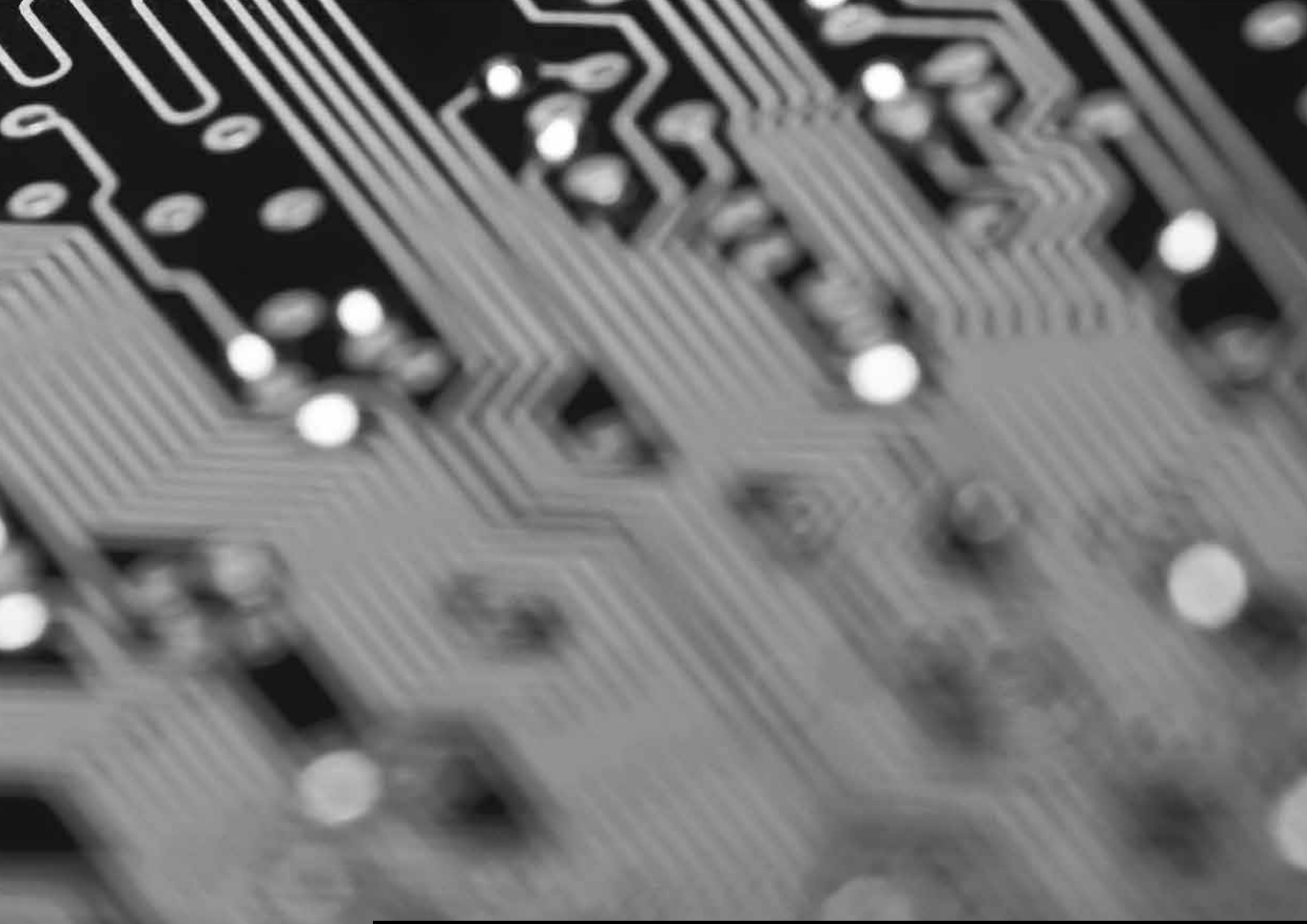
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www.ledil.com

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PEMCO

Connecting and protecting a Lighting system for both indoor and outdoor applications.

LED holders, wire to board and board to board connectors, connecting to the power source as well as circuit protection for modern day lighting designs.

Removing the heat from electronic systems presents a great challenge for the industry. A well-organized thermal management offers various cooling options, including heat sinks, fans, heatpipes and thermal accessories.

3M is fundamentally a science-based company. We produce thousands of imaginative products, and we're a leader in scores of markets – from health care and highway safety to office products and abrasives and adhesives. Our success begins with our ability to apply our technologies – often in combination – to an endless array of real-world customer needs. Of course, all of this is made possible by the people of 3M and their singular commitment to make life easier and better for people around the world. We leverage these competencies to create innovative solutions for our customers and to also provide investors with attractive long-term returns.

Seeing the Light

As LED lighting proliferates, lighting designers and manufacturers are faced with new connectivity challenges. Unlike traditional lighting sources, LED fixtures are powered by semiconductors mounted on a printed circuit board (PCB), requiring board-to-wire connections. Plus, LED lighting is often packaged in rigid or flexible strips, which are mounted on walls, ceilings, or cabinets. A lighting design may require power to branch, with multiple LED strips sharing the same power source. Your basic bulky wire nut, requiring considerable wire preparation and labour, won't suffice for installing many LED lighting designs.

Link Connectors and Mini-Clamp Connectors from 3M were originally designed for factory automation applications. The connectors, featuring 3M insulation displacement contact (IDC) technology, are currently deployed in factories around the world, providing reliable, long-lasting, easy-to-install connections in electronic manufacturing machinery and sensor systems. They are also used in conveying systems, building automation, and communication networks.

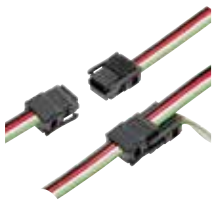
However, 3M Link and Mini-Clamp Connectors are also well suited for the assembly and installation of LED products for general lighting applications, such as residential, office, and hospital environments. The Link Connector family includes two- and four-position wiremount and boardmount products that can be used for wire-to-board and wire-to-wire applications. Link Connectors can be used for applications with current requirements up to 5 amps per conductor. The smaller Mini-Clamp Connectors are available in three-, four-, six-, and eight-position configurations and can be used for applications up to 3 amps per conductor.



Mini Clamp Family



Link Connector 2-position



Link Connector 4-position

Clamp Connectors

3M's Mini-Clamp- and Power Clamp Connectors are designed to provide connection reliability and cost performance. They are suitable for many discrete wiring applications including LED lighting, signage and medical. These products use 3M's insulation displacement connector (IDC) technology to deliver a safe and reliable electrical connection. The connectors do not require any special tooling or pre-treatment of cables and can be terminated using a standard pair of pliers.



Clamp Connector 4-position

Key Features Include

- Semitransparent cover
- Colour-coded covers
- Wire alignment & retention built into the cover
- Easy, labour-saving and reliable IDC termination
- Easy field termination with no special wire preparation – no stripping, tinning or special tooling
- Design accepts multiple wire diameters 0.8 to 2.0 mm (.031 to .079")/conductor sizes (20–26 AWG/0.14 to 0.5 mm^2)
- Integrated wire retention cover design to retain the wires while terminating to the IDC
- Mating latches provide a reliable interconnection in demanding applications

Link Connectors Simplify Plug-in Connections & Bus Structure

Mini Clamp Connector 4-position



3M's Link Connectors are developed to meet the requirements of reliable interface applications and to enable T-tab terminations as well as mid-cable terminations. The hermaphroditic design of these wire mount products reduces the number of components required for interconnections, while the proven IDC termination process enables easy field termination and reduces labour cost relative to traditional interconnect alternatives. The link connectors are suitable for 18 AWG and 20 conductor sizes AWG of discrete wires or flat ribbon cables.

Key Features Include

- Colour-coded covers
- Wire alignment & retention built into the cover
- Suitable flat cables with four conductors as well as various board mount connectors
- Mating latches provide a reliable interconnection in demanding applications

Mini Clamp Connectors

3M Part Number (Plug Connectors)	3M Part Number (Socket Connectors)	Outside Diameter Range of Wire	Wire Gauge [AWG/mm²"]	Colour
37103-A165-00E MB	37303-A165-00E MB	1.2–1.6 mm [.063–.079"]	20–24/0.25–0.50	Blue
37104-A165-00E MB	37304-A165-00E MB			
37103-A206-00E MB	37303-A206-00E MB	1.6–2.0 mm [.047–.063"]		Grey
37104-A206-00E MB	37304-A206-00E MB			
37103-A124-00E MB	37303-A124-00E MB	1.0–1.2 mm [.039–.047"]		Green
37104-A124-00E MB	37304-A124-00E MB			
37103-B163-00E MB	37303-B163-00E MB	1.2–1.6 mm [.047–.063"]	24–26/0.14–0.25	Orange
37104-B163-00E MB	37304-B163-00E MB			
37103-B101-00E MB	37303-B101-00E MB	0.8–1.0 mm [.031–.039"]		Red
37104-B101-00E MB	37304-B101-00E MB			
37103-B122-00E MB	37303-B122-00E MB	1.0–1.2 mm [.039–.047"]		Yellow
37104-B122-00E MB	37304-B122-00E MB			

Link Connectors

Part Number	Description	Pin Count	Applicable Wire Size	Colour Body/Cover
38104-0018-000 FL	3M-LINK HERM POS BLACK/BLACK, 2,54 FLAT	4	AWG 18	Black/Black
38104-E018-E00 FL	3M-LINK HERM POS BLACK/ORANGE, DISCRETE	4	AWG 18	Black/Orange
38104-F018-F00 FL	3M-LINK HERM POS BLACK/YELLOW, DISCRETE	4	AWG 18	Black/Yellow

Buy now.

3M offers a wide variety of specialty products for thermal management which address the critical issues of today's lighting designs – the need to dissipate the sizable amounts of heat being generated by LED devices

Specialty Products for Thermal Management

Junction temperature effects the flux (lumen/volt) output as well as the useful life of LED devices, making thermal management a crucial part of modern lighting system design. The 3M thermal interface materials include a broad range of high adhesion thin tapes and pads which offer efficient thermal transfer. These materials are used for a wide variety of applications that require a high performance thermal management solution.

Thermally Conductive Transfer Tapes

3M's 8805, 8810, 8815 and 8820 series of thermally conductive transfer tapes exhibit a high mechanical strength, improved surface wet out and strong shock performance for applications requiring thin bonding with good thermal transfer. These tapes can be applied quickly and easily using die-cut shapes, offering high temperature adhesion with good dielectric strength. Applications range from bonding heatsinks, heat spreaders and other cooling devises to IC packages, power transistors and other heat generating components like LEDs.

Key Features Include
- Strong thermal conductivity
- Strong electrical insulation
- Good & reliable adhesion performance
- Low thermal impedance

Applications
- LED module bonding
- General heatsink bonding



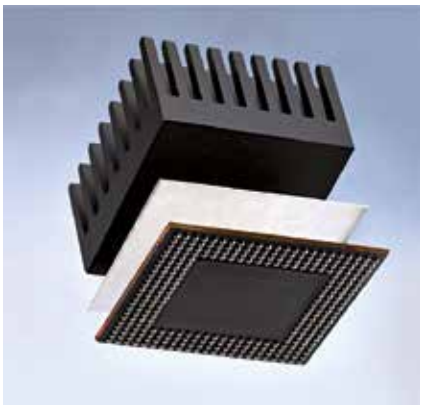
Thermally Conductive Transfer Tapes

Thermally Conductive Interface Used with Heatsink

3M's hyper-soft, thermally conductive interface pads are derived from either silicon or acrylic polymer filled with ceramic particles. They are flame retardant and used to augment the heat dissipation effect of conventional heat sinks and other passive devices. The pads are best used for applications requiring gap filling and superior thermal performance without bonding.

Key Features Include
- Thin for lower thermal impedance:
  0.20 & 0.25 mm thick products available
  Softness & conformability even to non-flat surfaces
- Good dimensional stability to improve converting process & ease to make complex die cut patterns
- Good thermal conductivity
- Strong electrical insulation properties
- High pressure relaxation capability
- Surface tack allows pre-assembly

Applications
- LED board TIM
- IC packaging heat conduction



Thermally Conductive Interface Used with Heatsink



Connectors from Molex

Molex is committed to delivering innovative solutions for the lighting industry that enhance design flexibility and reduce costs. Molex's product range offers both standard interconnect systems and user interface solutions, as well as custom solutions ranging from tailored wire and cable assemblies to fully assembled LED modules.

Pico-Lock Connector System



Series: 504050 | 504051 | 504052
1.50 mm pitch wire-to-board system offering the only combination of low profile, high current capacity and durable locks in the industry. Ideal for LED backlighting applications where tight-pitch spacing is critical.

- 1.50 mm pitch (3.0 A) SMT wire-to-board system with a maximum mated height of 2.00 mm
- 1.50 mm pitch version available in 4–12 circuits

Buy now.

Mizu-P25 Miniature Waterproof Connectors



Series: 50038 | 50039 | 050147 | 050148 | 052116 | 052117 | 052213 | 052266
Miniature wire-to-wire connectors that provide the smallest size and highest level of dustproof and waterproof protection of any similar system in the market today.

- IP67-rated system ensures complete waterproof and dustproof protection
- System includes two sub-families: the low-voltage system rated up to 125 volts (4.0 A) and the high-voltage system rated up to 250 volts (3.0 A)
- Available in 2, 3 and 4 circuits

Premo-Flex Hot Bar Soldering Cable Jumpers

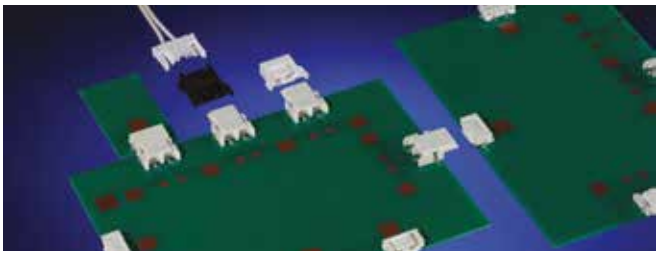


Series: Custom product – contact Molex
Delivering permanent direct-to-PCB connections in high vibration environments and superior signal integrity, Premo-Flex Hot Bar Soldering Cable Jumpers are available in a variety of pitches, circuit sizes and terminations. The flat cable design offers flexibility to be folded and bent for applications with space restrictions. Complementary to this series are the Premo-Flex Round Flat Cable (RFC) Jumpers. The RFC jumpers deliver superior signal integrity and high resistance to vibration and bending. Ideal for rugged applications with space limitations.

Flexi-Mate Connector System

Series: 503469 | 503471 | 503473| 503474 | 503485
Designed to meet the backlighting needs of LED TVs and room lighting applications, Molex's Flexi-Mate family of connectors is the first of its kind on the market to provide a full range of both board-to-board and wire-to-board solutions.

- 3.70 mm pitch system with a 3.00 mm stacking height



Buy now

Pico-EZmate and Pico-EZmate Slim Wire-to-Board Connector Systems

Series: 202654 | 202655 | 202656
Low-profile connectors support automated assembly processes and are ideal for tight-spaced applications.

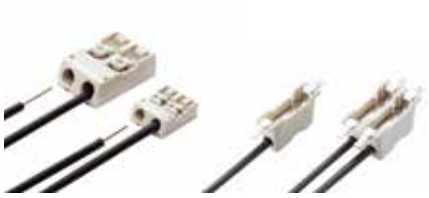
- The Pico-EZmate 1.20 mm connector system meets this need with mated-heights of 1.55 and 1.65 mm.
- The Pico-EZmate Slim connector system introduces an even lower mated-height of 1.20 mm and provides customers the needed speed in their pick and place operations, as well has higher circuit size variants that pass multiple test cycles.



Buy now.

Molex is a registered trademark of Molex, LLC in the United States of America and may be registered in other countries; all other trademarks listed herein belong to their respective owners.

Lite-Trap SMT Wire-to-Board Connector System, Push-Button Type



Standard, Mini and Bottom- and Vertical-Entry Types
Series: 104188 | 104238 | 104266 |202394
Ideal for thin LED lighting-module applications, these wire-to-board connectors offer easy wire removability and profile heights as low as 2.65 mm with top-, bottom- and vertical-entry styles for reduced shadowing.
- Lower wire insertion force than similar types.
- User-friendly latch that is easy for operators to engage and disengage, even without tooling.

Buy now.

EdgeMate Wire-to-Edge-Card Power Connector



Series: 172159 | 172160 | 172879
Available in glow-wire-compatible versions, EdgeMate power connectors eliminate the need for mating headers, offering significant cost savings in appliance, industrial and lighting applications.
- Mates directly to the PCB edge-card without a mating header
- Glow-wire-compatible versions (meeting IEC 60355-1 safety standards)
- Positive-lock design (applicable to non glow-wire-compatible versions only)
- Polarized housing
- Bifurcated (dual contact-point) terminals
- Polarized crimp terminal
- Connectors without locking features (option)

Buy now.

Self-Contained Power Connector (SCPC)



Series: 19045 | 19401 | 19402 | 19403 | 19421 | 19424 | 19425 | 19426
A simple two-piece system used to splice and tap solid and stranded non-metallic sheathed cable, quickly and easily.
The SCPC system supports two and three conductors and ground circuits for AC power applications. The SCPC product line features insulation displacement contacts providing wire termination without the need to pre-strip the wires and is UL/CSA certified as a junction box. The Splice connectors splice two cable segments together and replace butt connectors, wire nuts, and junction boxes used in traditional splice applications. Tap connectors operate similarly, used to support taps of existing cable segments, creating new branch circuits.

Multi-Drop Sealed Connector System

Series: Custom Product – Contact Molex
The Multi-Drop Sealed Connector and Cable system features rugged IP-66 and -67 interface seals using field termination cable-pierce technology to offer a simple, free-form, pluggable connector string for internal and external data/signal and power applications.



TermiMate One-Circuit Terminal-Style Connector System

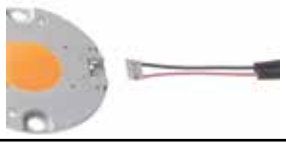
Series: 505071 | 505072 | 505073 | 63827 063824 | 063903 | 57814
A sleek, simple terminal-only system without a housing that provides high current, space savings and reduced shadow interference for LED lighting applications.
- Ultra-low-profile terminal-only system that prevents shadowing
- Wire-to-board and board-to-board options using the same terminal for design flexibility and component/assembly cost savings.



Buy now.

Molex is a registered trademark of Molex, LLC in the United States of America and may be registered in other countries; all other trademarks listed herein belong to their respective owners.

LED Holders

	LED Array Holders for Bridgelux and Similar COB Arrays Series: 180150	Ideal for OEM light-fixture manufacturers, this LED array holder simplifies the LED installation process for Bridgelux energy-efficient ES Arrays
	LED Array Holders for Citizen and Similar COB Arrays Series: 180416 180414	Simplify the LED installation process for Citizen energy-efficient CL-L330 and CL-L340 Arrays and reduce installation time with compression contacts that eliminate hand soldering
	LED Array Holders for Cree and Similar COB Arrays Series: 180555 | 180560 180810	Ideal for OEM light-fixture manufacturers, this holder simplifies the LED installation process for Cree energy-efficient XLamp arrays
	LED Array Holders for Sharp Zenigata‡ and Similar COB Arrays Series 180330 | 180390	Simplify the installation process for small-fixture applications for OEMs using Sharp Mega and Mini Zenigata arrays to reduce installation time with compression contacts that eliminate hand soldering
	LED Array Holders, Dual-Ended Wire Trap Series: 180150 | 80330	Designed for any fixture that requires array holders for COB chip sets measuring 15.85 by 15.85 mm, 22.00 by 22.00 mm and 23.85 by 23.85 mm
	LED Array Holders for Samsung Electronics and Similar LED COB Arrays Series: 104228 | 104229	Easy wire removability using a simple push-button method without the extra costs, process steps and inventory control needed with an extraction tool
	SlimRay Pre-Wired LED COB Array Holders for Lumileds LUXEON* and Similar COB Arrays Series: 180555	Simplifying the LED installation process by eliminating the need for labor-intensive hand soldering, lowprofile SlimRay Pre-Wired LED Array Holders are ideal for Lumileds LUXEON* and similar next-generation COB arrays
	Pico-EZmate Harness for Bridgelux Vero and Similar LED COB Arrays Series: 068801	An extreme low-profile design for simple and reliable solderless connections to LED Arrays

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Phoenix Contact created a generation of small connectors that help lighting manufacturers to simplify the wiring of LED modules. The PTSM series connectors are easy to integrate into existing SMT processes and feature fast, reliable connection technology. The product family uses push-in leg-spring technology and allows connection of solid and stranded conductors.

Small Plug-in Connectors for Flexible LED PCBs

The new plug-in connectors from the PTF series enable you to quickly and easily connect LED PCBs with the smallest external dimensions for 8 and 10 mm LED strips.

Compact Plug-in Connectors for Solid and Flexible LED PCBs

The new PTF series of direct connectors can be used to connect your flexible LED printed-circuit boards quickly and conveniently. Their small size allows you to connect printed-circuit boards in narrow linear profiles as well.



Main Features

- Currents up to 10 A per connector
- Voltages up to 24 V
- 2- and 4-pos. supply version for 8 and 10 mm wide LED strips
- According to IEC 60838-2-2

Your Advantages

- Easy connection of the printed-circuit board saves time
- The small size lets you make the connection even in applications where space is limited
- The tight fit and high current carrying capacity create a safe connection
- Two and four-position variants for various LED applications

		Butt Connector for Flexible PCBs	Supply Element for Flexible PCBs	Supply Element for Flexible PCBs
LED Strip Width	No. of Positions:	4-pos.	4-pos.	2-pos.
8 mm	Designation:	PTF 0.3/4-BB-8-H	PTF 0.3/4-WB-8-H	PTF 0.3/2-WB-8 H
	Order No.:	1707559	1707561	1707558
10 mm	Designation:	PTF 0.3/4-BB-10-H	PTF 0.3/4-WB-10-H	PTF 0.3/2-WB-10-H
	Order No.:	1707563	1707565	1707562

PTCM Connectors with Crimp Connections

The new plug connectors pf the PTCM series make it possible to have crimp connections in the PTSM product family. Many solutions can be created like wire-to-wire and wire-to-board connections. The new plug connectors are compatible to all headers and plugs of the PTSM series.



Advantages

- Cost-effective connection of crimped conductors in large quantities
- Plug-compatible PCB connectors with crimp or Push-in technology for flexible conductor connection
- Tools for manual and automatic crimping available as an option
- Taped products for efficiently automated crimping of high quantities

Main Features

- Conductor cross sections: 0.14–0.75 mm²
- Currents up to 6 A
- Voltages up to 160 V
- Pitch: 2.5 mm
- 2-pos. to 8-pos.

Number of positions	Plug housing with latches	Crimp terminals for stranded wire for different cross sections	Inverted plug housing	Crimp terminals for stranded wire for different cross sections
2	1015464	1013778 (0.14–0.5 mm²)	1015242	1013988 (0.14–0.5 mm²)
4	1015462		1015244	
6	1015460	1013777 (0.34–0.75 mm²)	1015246	1013987 (0.34–0.75 mm²)
8	1015458		1015248	

White PCB SMT Header and Connector for LED Applications



Benefit from the advantages of the only 5 mm high PTSM series connector optimized for LED applications. It lets you to get more components and functions onto the confined space available on a printed-circuit board and save time connecting the board with the push-in connection.

Main Features
- Current up to 6 A
- Voltages up to 320 V
- Conductor cross sections up to 0.5 mm²
- Design height: 5 mm
- Pitch: 2.5 mm
- 2- to 8-pos.

Your Advantages
- Complete product range for wire-to-board and board-to-board connections
- Horizontal and vertical versions are available
- For the SMT process, products are delivered in tape-on-reel packaging
- High performance with a compact design
- Fast push-in connection

Vertical SMT-header

No. of Pos.	Order No.
2-pos.	1839198
4-pos.	1839211
8-pos.	1839321

Through-board SMT-header

No. of Pos.	Order No.
2-pos.	1830126
4-pos.	1830142
8-pos.	1830168

Horizontal SMT-header

No. of Pos.	Order No.
2-pos.	1814919
4-pos.	1814935
8-pos.	1814977

Inverted PCB Connector for Compact Applications



With the new inverted PCB connectors from the PTSM series wire-to-wire connections are now possible as well as wire-to-board connections. The small design and high current carrying capacity make the connection system an ideal connection solution for the power supply.

Main Features
- Current up to 6 A
- Voltages up to 320 V
- Conductor cross sections 0.14 … 0.5 mm²
- 2- to 8-pos.
- Pitch: 2.5 mm
- High-quality PA material in white

Your Advantages
- Easy connection of the conductors' thanks to fast push-in spring connection
- High current carrying capacity of 6 A with very compact dimensions
- Defined contact force ensures that contact remains stable over the long term
- Wire-to-wire and wire-to-board connections possible

Inverted Plug

No. of Pos.	Order No.
2-pos.	1709450
4-pos.	1709452
8-pos.	1709456

Miniature PCB Connectors with Positive Latches on the Side



The new PTSM 0,5/… PL PCB connector with positive latches on the side enables stable latching with the counterpart. In combination with the new inverted PCB connectors, particularly compact solutions can be created for wire-to-wire connections.

Main Features
- Current up to 6 A
- Voltage up to 320 V
- Conductor cross sections 0.14 … 0.5 mm²
- 2- to 8-pos.
- Pitch: 2.5 mm
- High-quality PA material in white

Your Advantages
- Easy connection of the conductors
- thanks to fast push-in spring connection
- High current carrying capacity of 6 A
- with very compact dimensions
- Defined contact force ensures that contact remains stable over the long term
- Convenient operation of the positive
- latches on the side

Plug with Side Latches

No. of Pos.	Order No.
2-pos.	1709457
4-pos.	1709460
8-pos.	1709465

Plug without Side Latches

No. of Pos.	Order No.
2-pos.	1704853
4-pos.	1704857
8-pos.	1704861

Pulse Larsen Antenna Systems

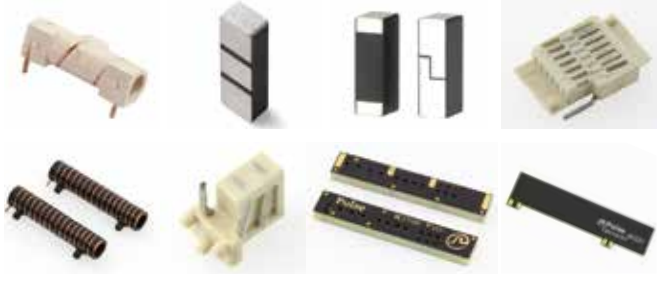
Broadest Portfolio of High Performing Catalog and Customized Solutions for the Lighting Industry.



PulseLarsen is the global leader in antenna systems for the lighting industry. The company designs and manufactures antenna products in one of its three factories (USA and China). Strong of a broad portfolio of embedded, internal or external solutions, PulseLarsen has the product that will enhance the wireless connectivity that your system requires. PulseLarsen antennas are EVERYWHERE: inside the light bulb, on the monitoring station controlling the whole part of a city or a highway, on top of the light street pole, in the remote control of your smart home automation system, inside the shopping mall light frame to track customers, managing light beam directions, colors and dimming to guide visitors, in the motion sensor detection box to swicth the right lighting at the right time, in the energy meter to manage your electricity bill, and also in the nearby mesh network to provide intelligent control systems so that data can be analyzed and processed accurately. Independently of the wireless standard utilized to provide intelligent lighting and control (WiFi, Zigbee, Sigfox, LoRa, ISM, 3G, 4G, Bluetooth), PulseLarsen offers reliable solutions to ensure security, custom ambiance and energy savings by controlling the lighting. PulseLarsen selection tool guides and catalogs help customers to select the proper product.

Embedded Solutions

PulseLarsen has a broad variety of embedded antennas covering all frequency spectrum (from 13.56 MHz to 6 GHz). These antennas are made form ceramic, composite substrates or molded helix and are directly surface mounted on the PCB of the customer product. These solutions are light weighted, compact and single or multiband products. Typical parts are W3XX.



Internal Solutions

Internal solutions are cable assembly type of antennas composed of single band or multi-band antenna solutions with one or more cables. They have various shapes and dimensions and are easily mounted inside the product using adhesive, location pins or snap-in features and connect to the radio by means of a connector (e.g: u.fl, w.fl, SMA...). Typical parts are SPDA family: W5XX, W1XX.



External Solutions

External Antennas can be a stick or a blade type that mounts on the product, or a variety of cable assembly combinations reliably meeting IP65 or IP67 standards for outdoor usage (direct mount, magnet mount, screw mount, with or without GPS etc...) including stealth blades antennas that can be easily hidden in the product. PulseLArsen has omnidirectional and directional antennas that can meet all the requirements for the base station antennas, mesh network station, metallic cabinets, street light poles and other wall mount applications. Typical products are the GPSMB, GPSCP, SLPT, RO, YAGI, FB, BS, LPT, WA, GPSDM, DISC W4165, RAZ, ARM, PAN, JAG family of products.



ORDERABLE PART NUMBERS

- W3796
- W3331
- W3525
- W3554

Buy now.

TE Connectivity (TE) is a global company which designs and manufactures over 500,000 products that connect and protect the flow of power and data. Its extensive catalogue includes innovative solid-state lighting interconnects for the LED Lighting market.

TE is at the forefront in the development of next generation lighting solutions that accelerate lighting manufacturers' transition from traditional light sources to new LED lighting fixtures.

Lumawise Drive LED Holder Type Z50

Lumawise Drive LED holder type Z50 is ideal for use in track and spot lighting. It integrates the holder and DC/DC driver into a single package allowing designers to develop compact, more aesthetically pleasing lighting products.

Until recently, most LED drivers have been housed in separate boxes, often larger than the lamp itself, mounted to the side of the luminaire and remote to the light source. This configuration required wiring between the light source and driver, creating design and manufacturing complexity for the designer. TE's new holder reduces that complexity and allows more flexibility for lighting design, providing a more cost-effective and visually attractive solution.

- 48 VDC input
- Four current outputs; 350 mA/500 mA/700 mA/1050 mA
- 0–10 V dimming option

Development kits are available allowing luminaire designers to purchase a single unit to perform desktop testing, product evaluation and luminaire prototyping.



ORDERABLE PART NUMBERS

- 2213699-1
- 2213699-2
- 2213699-3
- 2213699-4
- 1-2213699-1
- 1-2213699-2
- 1-2213699-3
- 1-2213699-4
- 2-2213699-1
- 2-2213699-2
- 2-2213699-3
- 2-2213699-4
- 3-2213699-1
- 3-2213699-2
- 3-2213699-3
- 3-2213699-4

Buy now

AmbiMate Sensor Module: MS4 Series

The AmbiMate sensor module provides an application specific set of sensors on a ready to attach PCB assembly for easy integration into a host product. Design resources are freed and time to market accelerated by integrating the MS4 series pre-engineered, four core sensor solution for motion, light, temperature, humidity into your next product.

Other MS4 series sensor modules include VOC (Volatile Organic Compound), eCO^2 and sound detection. Add the capability to monitor air quality through the capture of VOC concentrations. Select an MS4 series P/N with a microphone to augment motion detection or to listen for sound events.

- Temperature: 5 to +50 °C, ±0.3 °C accuracy
- Relative Humidity: 5 to 95 % RH, 2 % accuracy
- Motion: Interrupt driven, response < 0.5 seconds
- Ambient Light Level: 1 sec acquisition rate
- Microphone: Analog audio and interrupt driven option, response < 0.5 seconds
- VOC: 0–1187 ppb
- CO^2: 400–8192 ppm, an equivalent CO^2 measurement based on total VOC concentrations



ORDERABLE PART NUMBERS

- 2316851-1
- 2316851-2
- 2316852-1
- 2316852-2
- 2314277-1
- 2314277-2
- 2314291-1
- 2314291-2
- 1-2314277-1
- 1-2314277-2
- 1-2314291-1
- 1-2314291-2

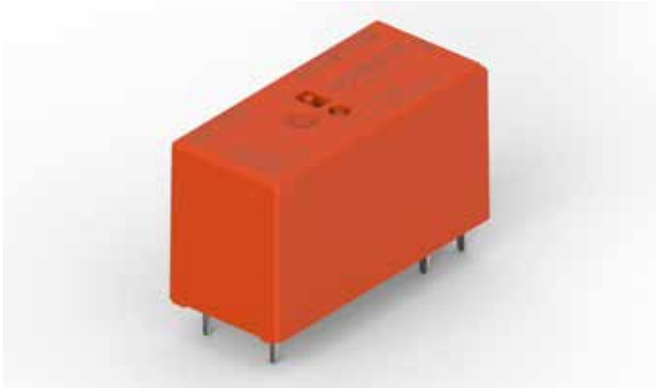
Relays in Lighting

RTX
- Reduce cost and save space with one relay for capacitive and for inductive loads
- Minimizes use of zero cross drives
- Standard 16 Amps global footprint

RT-iPOWER
- Enable switching without energizing the coil through manual operator option
- Minimizes use of zero cross drives
- Standard 16 Amps global footprints

RT INRUSH
- Monostable and bistable versions available
- Standard 16 Amps global footprint

Applications
- Occupancy sensor
- Intelligence lighting control by bus systems
- Movement detectors
- Remote light controls
- Intelligent wall sockets
- Light sensors
- Street lighting
- Emergency lighting
- LED Lighting control



ORDERABLE PART NUMBERS

RTX
- 1937650-5
- 1937650-6
- 1937650-8
- 1937650-9

RT-iPOWER
- 1-1415898-9
- 2-1415898-3
- 2-1415898-5
- 1415898
- 1415898-2
- 1415898-5

RT INRUSH
- 2-1393240-7
- 2-1393240-8
- 3-1393240-3
- 3-1393240-5
- 7-1393239-3
- 7-1393239-5

Lumawise Endurance S

TE Connectivity's (TE) LUMAWISE Endurance S connector set was designed specifically for LED light sources and drivers in outdoor luminaires. Comprised of an IPX6 rated receptacle assembly, sealing cap and two bases sized in 40 and 80 mm diameters, when used in conjunction with sensor ready certified drivers, the receptacle assembly accepts a twist-to-lock pluggable sensor module, provides DC power to the module and enables a DALI 2.0 or derivative two-wire bus for communication and data transfer.

Benefits
- Standardized interface defined in Zhaga Book 18
- Compact size allowing greater flexibility in luminaire design
- Improved sealing to achieve IPx5 or IPx6 with no mounting screws
- Scalable solution allows use of Ø 40 mm photocell and a Ø 80 mm central management system with the same connection interface
- Flexible mounting position, upwards, downwards and sideways facing
- Integrated single gasket that seals to both luminaire and module that minimizes assembly time



ORDERABLE PART NUMBERS
- 2213858-1
- 2213837-1
- 2213831-1
- 2213795-1

Buy now.

SlimSeal Connectors – Miniature Series

TE Connectivity's (TE) SlimSeal Connector Miniature Series is a sealed wire to wire and wire to board connection able to withstand the harshest of environments making it suitable for outdoor lighting and other high humidity applications. The SlimSeal Connector Miniature Series features a press-to-release spring latch ensuring that your connector mating is secure. The wire to wire connector comes in three different colors making wire identification and proper assembly easy. A wire to board offering expands the possibilities for use.

Key Benefits
- 2 and 3 position
- Compact space saving design
- Positive latching prevents inadvertent un-mating of connectors
- Pre-assembled seals reduce assembly time



ORDERABLE PART NUMBERS
- 1-2834074-2
- 1-2834074-3
- 1-2834075-2
- 1-2834075-3
- 2-2834074-2
- 2-2834074-3
- 2-2834075-2
- 2-2834075-3
- 3-2834074-2
- 3-2834074-3
- 3-2834075-2
- 3-2834075-3
- 1-2834067-3
- 1-2834068-3

Buy now

Push Grip Wire Connectors

For electrical installations, TE Connectivity is dedicated to developing products that are easy and fast to install and make repairs go smoother. Our Push grip wire connectors address these criterias through tool-less, poke-in termination. These splice products are color coded for easy identification and the compact size makes them a perfect choice for applications where space constraints are present. These connectors provide a visual termination of 22–12 AWG solid and stranded wires.

Our Push grip wire connectors are insulated splice connectors for electrical installations. These tool-less, poke-in wire splice connectors are suitable for 22–12 AWG solid and stranded wires and are easy to install for lighting and other wiring system applications.



ORDERABLE PART NUMBERS
- 2299518-1
- 2299514-1
- 2299515-1
- 2299516-1
- 2299517-1

Buy now

CoolSplice Connectors (Large Wire)

TE Connectivity (TE)'s CoolSplice connectors offer a sealed and standard connector system for splicing 12 to 18 AWG stranded or solid wires. All CoolSplice connectors allow for push button termination using a common pair of pliers saving the installation time and eliminating the need to pre-strip wires with insulation displacement technology (IDC). The sealed products offer an IP68 sealing level and the transparent body allows users to visually confirm the termination. Available in 1 position and multiple positions can be achieved by stacking individual parts together

Benefits
- Save installation time and eliminate the need to pre-strip wires with insulation displacement technology (IDC)
- Enable a waterproof solution with an IP rated splice
- Easy factory or field installation using independent left and right side push button termination
- Flexibility in multi-pair termination design with stacking feature

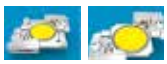


Applications
- Outdoor Lighting
  - Roadway Street and Area
  - Signs and Building Façade
  - Architectural
  - Bridge and Tunnel
- Indoor Lighting Fixtures
- Wiring Harness Field Repairs

ORDERABLE PART NUMBERS
- 2213600-1
- 2213600-2
- 2213600-3
- 2213600-7
- 2213600-8

Buy now

LUMAWISE LED Holder Selection Sheet

Chip-On-Board LEDs				TE LED Holder Solutions				
				Circular Holder			Scalable LED Holder	
LED Brand	LED Type	Light Emitting Surface (Ø)	LED Board size	 Z50 Low Profile (Zhaga Inspired)[1]		 Z32 Mini CoB Holder[3]		
				Z50 Zhaga Profile Holder[2]		Z35 Mini CoB Holder[4]	One Piece Solution[5]	Two Piece Solution[6]
CITIZEN	CLL02X/CLU02X	9.8 mm	13.5 × 13.5 mm			2213678-6[4]	6-2154874-1[5]	2-2154857-1[6]
	CLU700, CLU025, CLU027	6.0 mm	13.5 × 13.5 mm			2213678-5[4] 2213678-6[4]	6-2154874-1[5]	2-2154857-1[6]
	CLL03X/CLU03X	14.5 mm	19 × 19 mm	2213254-1[1]	2213254-2[2]		6-2154874-2[5]	2-2154857-1[6]
	CLU720	11 mm	19 × 19 mm	2213254-1[1]	2213254-2[2]		6-2154874-2[5]	2-2154857-1[6]
	CLL04X/CLU04X	22 mm	28 × 28 mm	2213480-1[1]			6-2154874-3[5]	2-2154857-2[6]
	CLU730	13 mm	28 × 28 mm	2213480-1[1]				
	CLL05X/CLU05X	32.8 mm	38 × 38 mm				6-2154874-4[5]	2-2154857-2[6]
	L330	15 mm	28 × 19 mm					2-2154857-3[6]
	L340	20 mm	28.5 × 28.5 mm					2-2154857-3[6]
CREE	CXA 13XX	6 mm	13.5 × 13.5 mm					2-2154857-2[6]
	CXA 15XX	9 mm	15.85 × 15.85 mm				5-2154874-2[5]	2-2154857-3[6]
	CXA 18XX	12 mm	17.85 × 17.85 mm					2-2154857-1[6]
	CXB 1830	12 mm	17.85 × 17.85 mm	2213401-1[1]	2213401-2[2]			2-2154857-1[6]
	CXA 2011	16.2 mm	22 × 22 mm				5-2154874-1[5]	1-2154857-3[6]
	CXA 25XX/CXB 25XX	19 mm	23.85 × 23.85 mm	2213407-1[1]	2213407-2[2]		5-2154874-3[5]	2-2154857-2[6]
	CXA 30XX/CXB 30XX	23 mm	27.35 × 27.35 mm	2213480-2[1]				2-2154857-2[6]
	CXA 35XX	30 mm	34.85 × 34.85 mm					2-2154857-2[6]
EVER-LIGHT	EAHP1215 series	9 mm; 10.5 mm	12 × 15 mm			2213118-1[3] 2213678-3[4] 2213678-4[4]		2-2154857-2[6]
	EAHP2024 series	16.2 mm	20 × 24 mm	2213130-1[1]	2213130-2[2]			2-2154857-2[6]
	Xuan1313	9.8 mm	13 × 13 mm				6-2154874-1[5]	2-2154857-1[6]
	EAHP1919Wxx	14.5 mm	19 × 19 mm	2213254-1[1]	2213254-2[2]		6-2154874-2[5]	2-2154857-1[6]
NICHIA	S-series	Multiple LES	12 × 15 mm			2213118-1[3] 2213678-3[4] 2213678-4[4]		2-2154857-1[6]
	L-seires	Multiple LES	16 × 19 mm	2213382-1[1]	2213382-2[2]			2-2154857-1[6]
	J-series	Multiple LES	19 × 24 mm	2213580-1[1]	2213580-2[2]			2-2154857-1[6]
OSRAM	Soleriq 9 series	9.8 mm	13.5 × 13.5 mm			2213678-5[4] 2213678-6[4]	6-2154874-1[5]	2-2154857-1[6]
	Soleriq 13 series	13.5 mm	18 × 18 mm	2213401-1[1]	2213401-2[2]			2-2154857-2[6]
	Soleriq 13 Gen 2	13.9 mm	19 × 19 mm	2213254-1[1]	2213254-2[2]		6-2154874-2[5]	2-2154857-2[6]
	Soleriq 19 series	19 mm	24 × 24 mm	2213407-1[1]	2213407-2[2]		5-2154874-3[5]	2-2154857-3[6]
SHARP	Petit Zenigata	5.7 mm	8 × 12 mm					2-2154857-1[6]
	Mini Zenigata	10 mm	12 × 15 mm			2213118-1[3] 2213678-3[4] 2213678-4[4]		2-2154857-1[6]
	Mega Zenigata	17.2 mm	20 × 24 mm	2213130-1[1]	2213130-2[2]			2-2154857-3[6]

Other Accessories		
	OPTIC Reflector LUXEON S/Type LS spot optic	1-2154430-1
	Optic attachment ring for LEDIL: ANGELA series F13662 ANGELINA F13402ANGELINAW	2213194-1*
	Optic attachment ring for Khatod	2213349-1**

* Fits to Z50 Zhaga Profile Holder
** Fits to Z50 Low and Zhaga Profile Holder

CoolSplice, LUMAWISE, NECTOR, TE Connectivity, TE connectivity (logo) are trademarks.

Interactive version
LED holders overview

Buy now.



Wireless & Connectivity

Arrow has extensive product offerings from leading suppliers in all aspects of IoT systems including sensors, low power microcontrollers, wireless connectivity, networking protocols gateways, operating systems, security, big data platform management, and Cloud solutions including device management, data analytics and visualization.

Smart Light Management from ams

Single-Chip Solutions Enabling IoT Connectivity and Precise Control of Smart Lights and Replacement Lamps

Multi-Spectral Sensing Solutions

ams' AS726× family of multi-spectral sensors have opened the door to an entirely new set of spectral sensing solutions. Available technology includes tri-stimulus color matching, 6-channel visible, 6-channel near-IR and 18-channel vis + NIR, all at price points that enable spectral sensing that brings the lab to the sample. Whether it is color matching and calibration, identification or authentication, ams' AS726× family delivers the answer.



Features
- 6- to 18-channel configurations ranging from 410 to 940 nm
- Calibrated-for-life normalized channel responses
- I^2C and UART interface options
- Low power consumption < 5 mA

Applications
- Paint or fabric color matching
- Fluid and material color detection and calibration
- Ambient light and color analysis
- Authentication and spectral signature detection
- Display management

Smart Lighting Manager

The AS7221 and AS7225 smart lighting manager and director make tunable-white simpler for luminaire manufacturers with the world's first chip-scale integrated lighting "system-on-a-chip" solution. The addition of closed loop optical sensing delivers the added benefit of optimizing overall system architecture by enabling tunable-white solutions from a single channel driver, while loosening LED binning requirements and eliminating light-by-light calibration.



The AS7221 Manager is a fully integrated luminaire control system, compatible with standard 0–10 V inputs, 0–10 V and PWM outputs, and enabled for IoT connectivity and network control through standard clients such as BLE, ZigBee or WiFi, through a complete Smart Lighting Command Set.

The AS7225 Director is a host-based approach, designed to seamlessly deliver CCT tuning "directives" to any in-luminaire application processor to bring closed loop precision to an existing connected or smart light.

Features
- Smart XYZ tri-stimulus chromatic sensing delivering closed loop CCT/daylighting directives
- Simple register-based commands to control and configure key light-tuning supervisory functions
- Calibrated nano-optic silicon interference filters

Buy now.

Cypress' BLE Mesh Solution



Introducing Cypress' BLE Mesh: SIG Qualified, Available on WICED® Platform

Cypress' WICED Studio 6.1 supports BLE Mesh with full implementation, is compliant with Bluetooth 5.0, and has been successfully qualified by Bluetooth SIG. WICED Studio is Cypress' industry-leading development environment for the IoT, supporting both Bluetooth and Wi-Fi development as well as providing code examples and an application framework to abstract complexity. Customers have already verified the robustness of Cypress' WICED BLE Mesh support with the world's first LED lighting products that are Bluetooth Mesh qualified – SYLVANIA SMART+ Bluetooth lighting products from LEDVANCE.

BLE mesh is perfectly suited to meet the needs of the Lighting/ Controls industry and exceeds existing solutions in terms of user experience, latency, reliability and scalability.

BLE mesh is architecturally and structurally built to support the most demanding commercial and industrial deployments. Additionally BLE mesh specifically defines a low-power node element to operate on a coin-cell battery for years.

WICED Sample Mesh Applications

On/Off bulb	Dimmable bulb	Color temperature bulb	Color HSL bulb
Light Controller	On/Off switch	Dimmer	Power plug
Occupancy sensor	Motion Sensor	Temperature sensor	Ambient light sensor

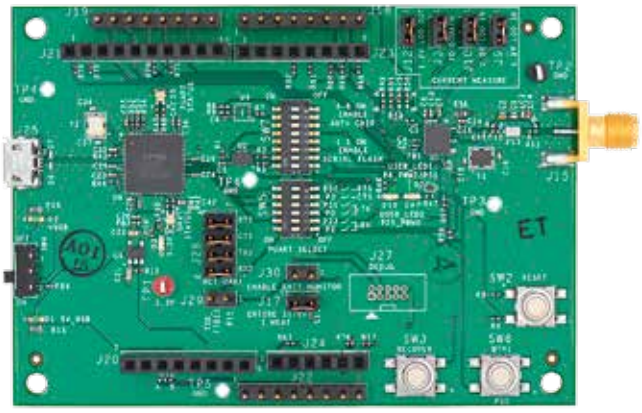
Create BLE Mesh Enabled IoT Solutions with Cypress' Bluetooth Chipsets: CYW20719 & CYW20706

Get started today with one of Cypress' WICED Bluetooth Kits supporting BLE Mesh:



WICED BT/BLE 5.0 CYW20719 EVK (CYW920719Q40EVB-01)

Buy now.



WICED Dual-Mode BT 4.2 CYW20706 EVK (CYW920706WCDEVAL)

Buy now

Get support with your next IoT project on the Cypress Developer Community: **community.cypress.com**

Intelligent Lighting and Control

Intelligent Lighting and Control solutions from Microchip can meet the technical needs of lighting engineers with a large array of 8-, 16-, 32-bit PIC® and AVR® microcontrollers, analog, wireless, and human interface products. With advanced peripheral integration and support for LED lighting technologies. A scalable Microchip solution provides significant flexibility versus that of pure analog or ASIC implementation. Designing with Microchip based lighting solutions enables innovation that expands lighting product capabilities and provides product differentiation



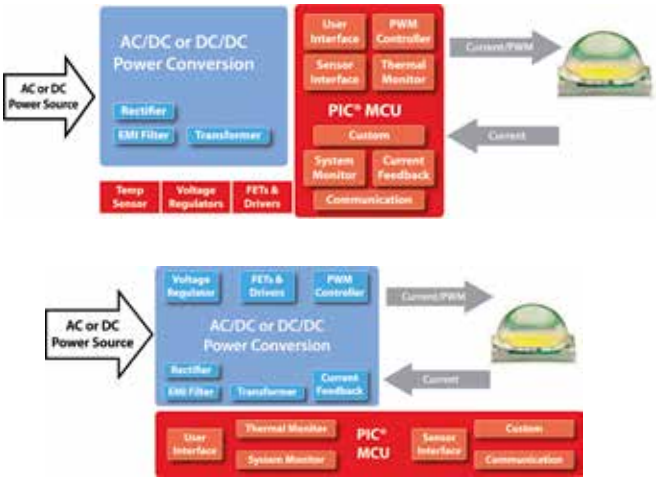
Intelligence
- Communication and networking
- Lumen and color control
- Environmental sensing
- Thermal management
- Predictive failure and maintenance
- Daylight harvesting
- User interface and control

Flexible Power
- Flexible power topology support
- High efficiency power conversion
- Failsafe monitoring
- Energy monitoring and control
- Energy harvesting (e.g. solar)
- Battery management and charging

Scalable Design
- Scalable performance
  - 8-, 16-, 32-bit PIC & AVR MCUs
  - Analog products
  - Wireless ICs and modules
  - Human interface products
- Customizable solutions
- Ease of use
  - Easy-to-use development tools
  - Reference designs and collateral
  - Lighting design partner specialists

Efficient Power Conversion

Microchip based solutions can support any LED drive methodology as well as add additional capabilities beyond that of traditional lighting solutions. The flexibility of these solutions allows for simplified attachment to existing designs or the development of full Switch Mode Power Supply (SMPS) based intelligent solutions.



SMPS with PIC MCU & Microchip Analog
- Increased MCU integration
- Fully customisable
- Increased efficiency
- Power factor correction (PFC)
- Flexible topologies
- Simplified modifications via firmware updates
- Closed loop control feedback
- High performance PWM and current control variation
- Intelligent control capabilitie

PIC MCU Attach to Basic Power Supply
- Simplified design-in
- Customisable features
- Simplified modifications via firmware updates
- Intelligent control capabilities

Intelligent Control Capabilities

In addition to efficient power conversion and LED control, a Microchip based lighting solution provides opportunities to further enhance your lighting application through product differentiation and increased user experience.

- Custom User Interface & Control
- Communication & Networking
- Environmental Sensing
  - Motion, External, Light Source, etc
- Day light Harvesting & Auto-Dimming
- Thermal Management
  - Active & Passive
- Smooth dimming control
- Colour mixing
- Closed loop lighting control
- Colour & lumen compensation
- System health monitoring
- Remote fault detection
- Energy monitoring & control
- Energy harvesting
  - Solar, radio, etc
- Battery management & charging
- Fully customisable options

Every day more and more devices get connected to the internet. On top of computers and smart phones, now your lighting is connected and accessible over the internet. As a result, the engineers who designed these devices need ways to easily implement secure communication in their designs. Microchip offers both software and hardware solutions that allow secure wired and wireless communication.

Wireless Connectivity

Intelligent lighting solutions are a key part of smart homes and buildings. The capability to connect and control all light sources in a home or space offers many advantages, including energy savings, custom atmospheres and increased security. Microchip has the solutions, know-how and partnerships to help you successfully add cloud connectivity to your lighting product.

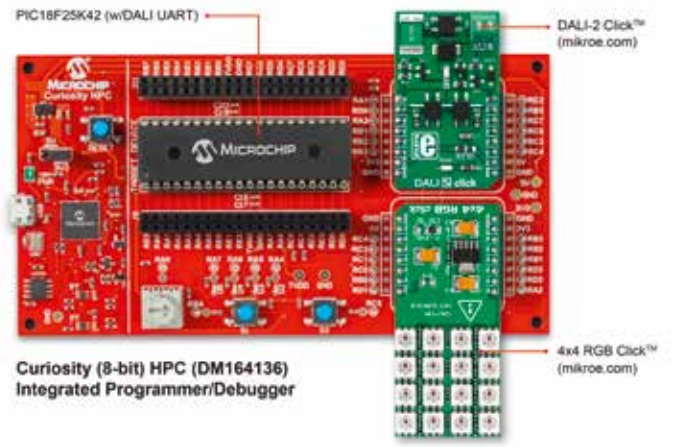


Digitally Addressable Lighting Interface

New DALI-2 Standard (IEC62386)

- Introduces Multimaster messages
- Color Control and Light Temperature extensions
- Introduces support for Input Devices/Sensors
- Additional Addressing space for input devices
- Introduces new 24-bit format

New PIC® & AVR® DALI-2 Ready Library!
FREE Download contact Lighting@microchip.com

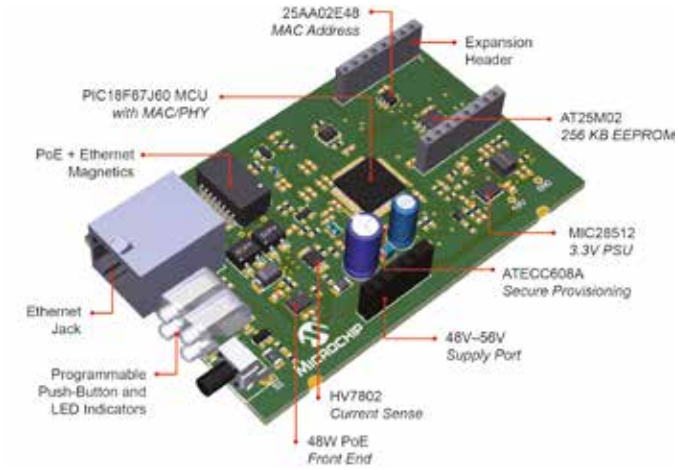


IoT with PoE Development Platform

Along with CoAP, Microchip is developing the next generation development hardware that takes advantage of PoE for single line communications and power. This will ultimately simplify design, reduce form factors, and ease in the installation of the “things”.

Universal IoT Platform

- Single Ethernet Cable
  - Communications
  - Power over Ethernet (PoE)
  - PoE 15W, PoE+ 30W, UPoE 60W
- Expansion Header
  - LED Driver
  - Gesture controller
  - mikroBUS™ Click Boards
  - Custom expansion





World-class Embedded Security Solutions Ensures Trust for Every System Design

Trust is what security is really all about today. Microchip security products make “trust” easy to embed in any system. Flexibility, advanced features, innovative cost effective architectures, and ultra-secure hardware defense mechanisms make Microchip hardware-based security devices and ideal way to add trust, by design.



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The Preferred Wireless Solution for Smart Lighting Providers

Four out of the top 5 connected lighting and controls companies rely on the Silicon Labs Wireless Gecko platform to bring their products to life. Regardless of the wireless protocol needs, Silicon Labs multiprotocol, multiband SoCs and modules have you covered and provide a common platform for Bluetooth, 802.15.4 Mesh (Zigbee/Thread), and proprietary Sub-GHz solutions.



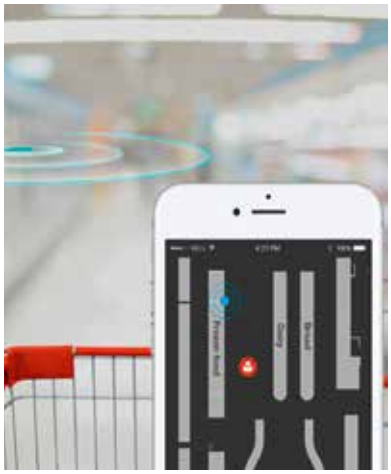
Extend Product Functionality

Designing lighting products today requires a flexible approach to meet building and lighting control system requirements. Products must also support secure OTA (over-the-air updates), temperatures as high as 125 °C, and simplified commissioning or setup. Silicon Labs' unique Wireless Gecko connectivity hardware and software makes it possible for manufacturers to address these challenges, join existing ecosystems such as Apple HomeKit, and build differentiated lighting products for multiple scenarios.



Home and Building Automation

- Provide direct phone and cloud-based control
- Support local device-to-device communication
- Interoperate with existing standards-based home/building automation and security systems



Beaconing

- Add Bluetooth beacons to connected lights
- Improve beacon density and management
- Deliver value-added location services



Asset Tracking

- Enable asset tracking with connected lights through beacons
- Eliminate manual scanning
- Determine location in real-time

Mix and Match the Right Technology for the Right Application

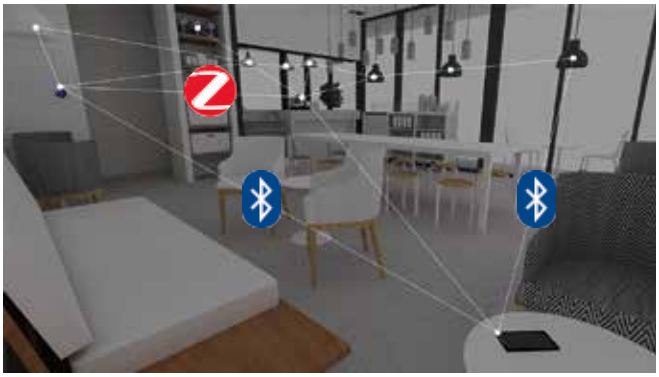
Every connectivity standard has its set of benefits. When you build a network on a multiprotocol platform, the network will have the benefits of both protocol stacks, increasing the functionality of the network. With the option to select any of the below wireless technologies, companies can target the needs and specific system advantages in the most cost-effective manner and quickly adapt to changing market needs.

	Bluetooth LE	Bluetooth Mesh	Zigbee	Thread	Proprietary
Applications	Audio Streaming, Device Data Transfer, Beaconing	Lighting, Home Automation	Lighting, Home Automation, Building Automation, Metering	Lighting, Home Automation, Building Automation	Industrial
Ecosystems	Apple HomeKit	N/A	Amazon, Comcast, Deutsche Telekom, IKEA, Lowes Iris, Philips Hue, Samsung SmartThings, Wink	Nest Weave	N/A
Cloud Connectivity	via Smartphone (temporary)	via Smartphone (temporary) Gateway	Gateway	Border Router Gateway	Gateway
Area Coverage	Low to Medium	Medium to Large	Medium to Large	Medium to Large	Medium to Large
Application Layer(s)	GATT	Mesh Model	Zigbee 3.0, HA, ZLL, SE	Flexible App Layer (e.g. Zigbee dotdot, OCF, Weave)	Proprietary
IPv6 Support	No	No	No	Yes	No
Self-Healing Network	No	Yes	Yes	Yes	No
Routing	Point-2-Point or Star	Managed flooding	Full routing	Full routing	Point-2-Point, Star, Extended Star
Frequency	2.4 GHz	2.4 GHz	2.4 GHz	2.4 GHz	Sub-GHz or 2.4 GHz
Silicon Labs Solution	Blue Gecko SoC and Modules	Blue Gecko SoC and Modules	Mighty Gecko SoC and Modules	Mighty Gecko SoC and Modules	Flex Gecko SoC and Modules

Multiprotocol and Multiband Operation on a Single Wireless SoC

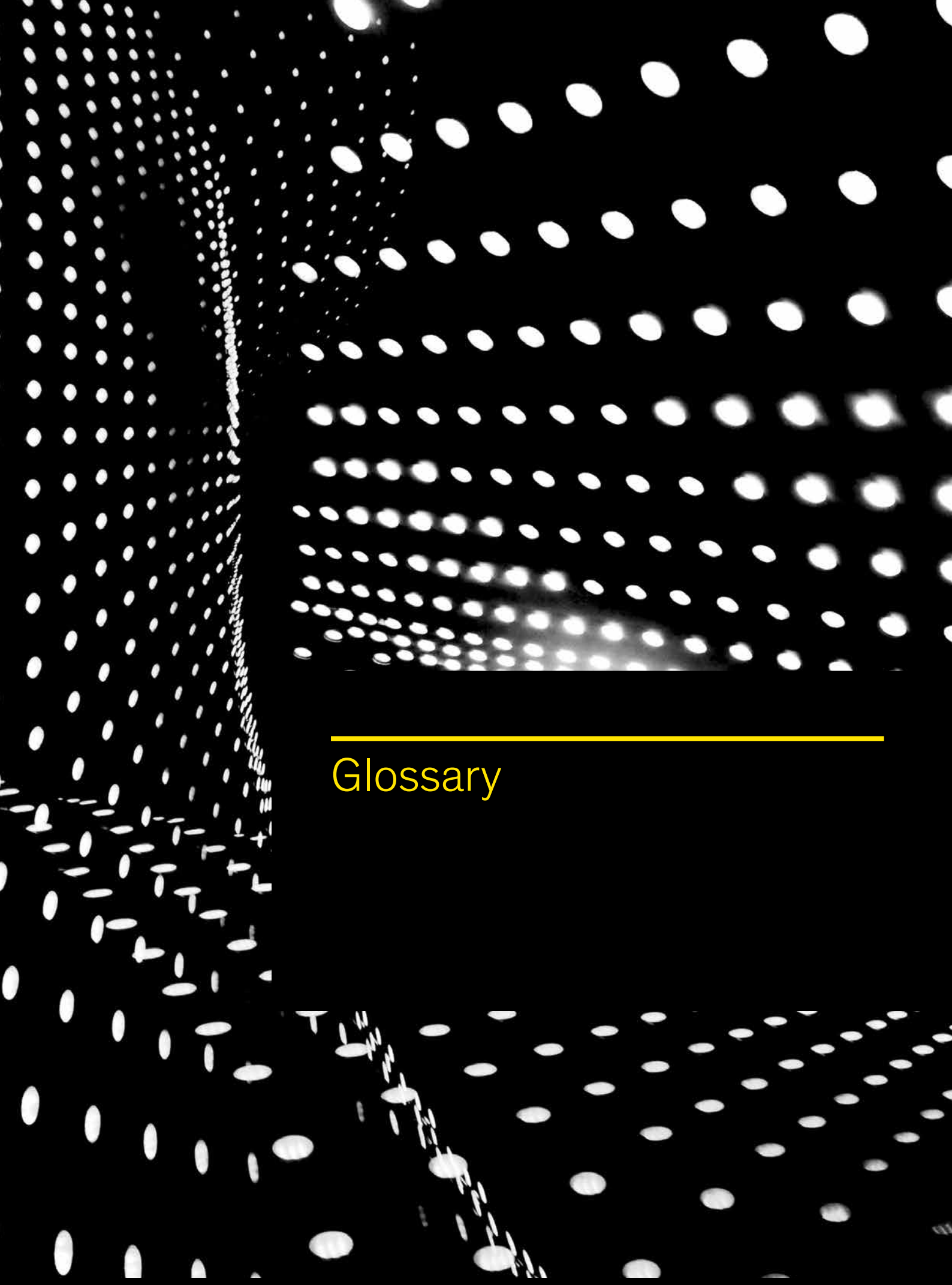
A multiprotocol approach opens up new use cases, especially when combining Bluetooth with other wireless protocols. Some of the benefits that Bluetooth and Zigbee provide when used separately can be combined and give lighting manufacturers an edge in the evolving smart lighting market.

- Simplified device setup, operation, and maintenance with local smartphone control
- Deploy scalable indoor location-based service infrastructure in homes and buildings
- Improves over-the-air update performance with Bluetooth LE
- 40 % reduced Bill-of-Material cost for the wireless sub-system



Find your wireless technology and multiprotocol device on **silabs.com/wireless**

Seeing into the future isn’t easy, especially without the right light. At Arrow Lighting, we are a beacon for innovating illumination – Experts in the new way of lighting the world.



Glossary

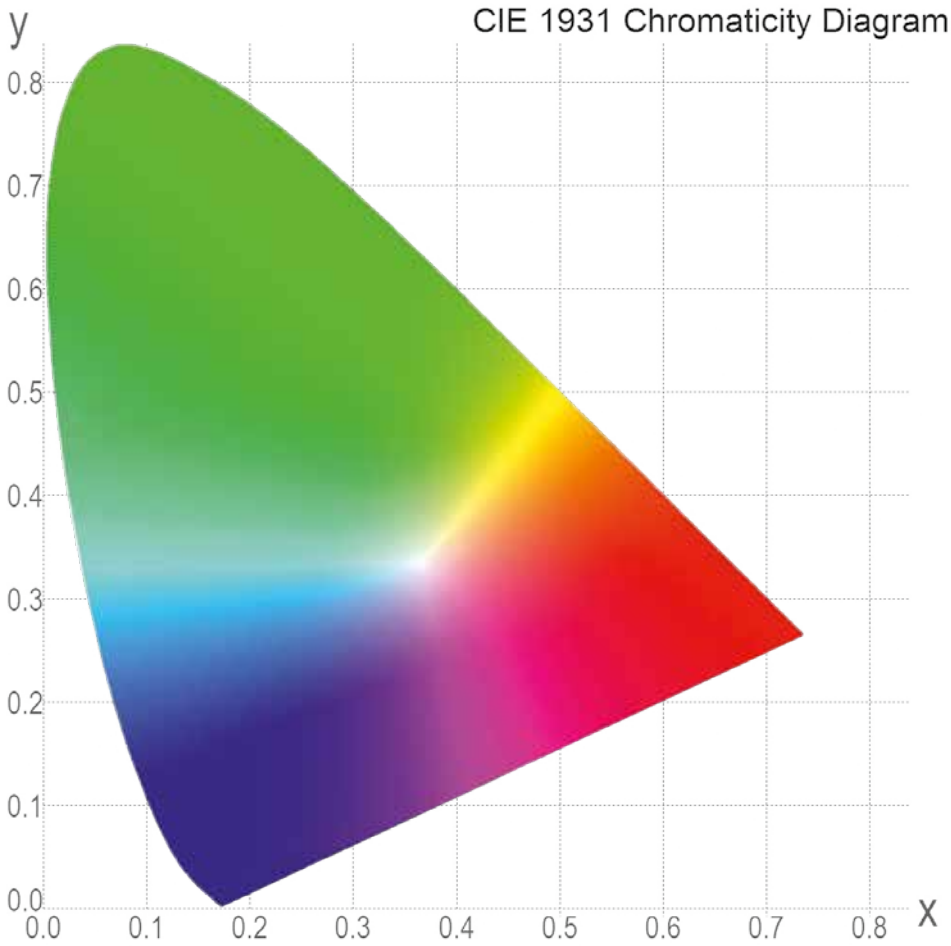
Colour Measurement

Lighting Sources
With several leading LED manufacturers in our portfolio, we offer one of the broadest selections of electronics devices for lighting applications in the industry. This spans LEDs, LED arrays, LED modules, lenses, LED driver ICs, power supplies, heatsinks, circuit protection devices and connectors. For every possible light specification there is a suitable LED solution based on high power, high brightness, array or LED module obtaining the desired colour and luminous flux is also simple thanks to our LED binning services.

CIE Chromaticity Diagram
To measure colour, the 'Commission Internationale de l'Eclairage' (CIE) created the 1931 Chromaticity Diagram. The curve that forms the periphery, or edges, of the diagram, is called the spectral locus. The spectral locus corresponds to the spectral colours in the visible light spectrum and contains wavelength values.

LEDs and Saturated Colours
Monochromatic light, consisting of only one wavelength, is fully saturated. Single LEDs are essentially monochromatic and, therefore, produce saturated light. However, when multiple LEDs of different colours are combined the result is unsaturated light.

Diagram Features
The two-dimensional chart represents colour as seen by the human eye in full daylight. Chromaticity is displayed by x and y coordinates, with spectral colours along the outside of the horseshoe shape curve (spectral locus). The colours located in other areas are not spectral, such as the bottom straight line that represents purples.
The interior depicts unsaturated colours, a mixture of a spectral colour and a greyscale colour.



White Chromaticity Bins

Colour Sensitivity
Our eyes can detect subtle changes in colour, down to ~10 nm for red and 2 to 3 nm for green. For white light LEDs, this sensitivity may or may not be an issue depending on the application. For example, matching the chromaticity of white light in a flashlight is not as critical as a string of a dozen HB-LED modules on an office wall. When LEDs are not properly matched, they produce a rainbow of different shades of white light. To minimise this potential problem, vendors provide binning charts and Arrow can offer bin selection services.

Binning Explained
- Binning is the process of sorting and grouping LEDs to allow:
  Design engineers to systematically specify an LED
- Manufacturers to order LEDs that function consistently
- Customers to reorder LEDs that match the original

Binning diagrams employ geometric regions on the CIE 1931 chomaticity diagram arranged along the BBL to specify chromaticity coordinate variation.

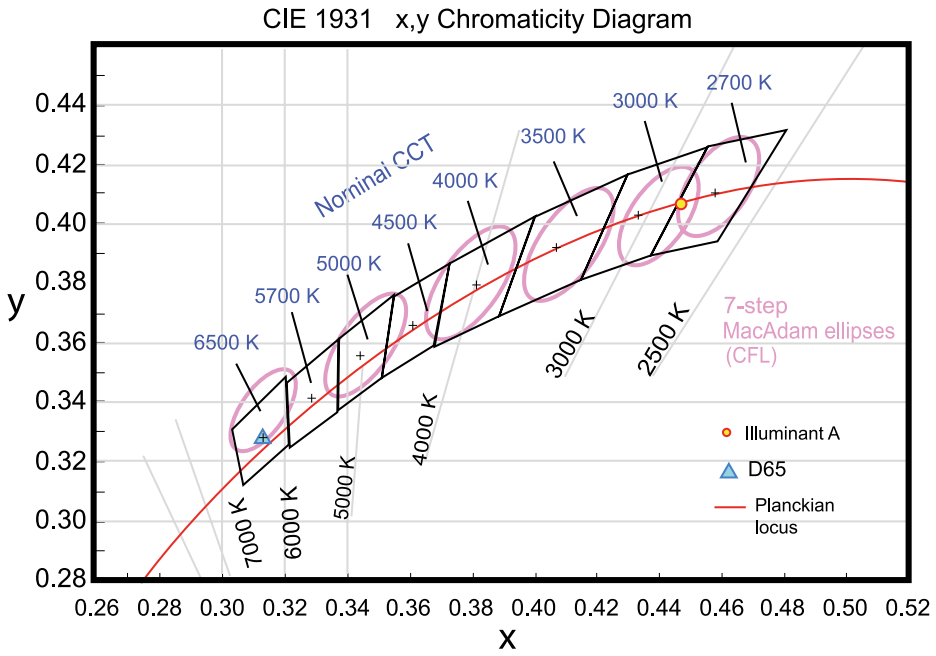
The BBL below is the line on which the colour temperatures for white light from sources with a CRI of 100 will lie. The lines labelled 5000 K through 10000 K are the lines of CCT. Each of the regions, such as WA, WB, and WC, represent two kinds of colour variation. One is the CCT variation (for example, 5000 K to 5700 K in WH and WJ). The other variation is called tint, indicating how far the chromaticity coordinates are from the BBL.

The top of region WG, for instance, would have a slightly more greenish tint than the bottom. The bottom of WP would have a slightly more purplish tint than the top.

WD, in between WG and WP, would have a smaller range of tint. Nevertheless, WG, WD, and WP are all in the same CCT range. Chromaticities that lie directly on the BBL do not have a tint.

Supplier and Customer View of Binning
Chromaticity bins are set up as a function of an LED supplier's production yield.

Customers can use them to specify and record parts. Rectangle WE contains the chromaticity coordinates CCy = 0.33, CCx = 0.30. It also contains CCy = 0.32 and CCx = 0.29, and many others that intersect within it. For a given application, the light that any LED emits whose chromaticity falls within the region WE, will be considered a match for the light from any other LED whose chromaticity coordinates also fall within region WE.



LED Terminology

Correlated Colour Temperature (CCT)
Correlated colour temperature (CCT) is a value that relates to the nearest colour temperature of light on the Planckian Locus that visually matches the light of a particular LED light source. For example, a 100 W incandescent lamp has a colour temperature of 2700 °K, meaning that a black body radiator at 2700 °K produces the same chromaticity as the 100 W incandescent lamp. The light emitted from the incandescent lamp contains a wide range of frequencies; therefore, it has a continuous colour spectrum. However, LED white light contains a limited range of frequencies, and therefore, it produces spikes in the colour spectrum and its chromaticity may not lie exactly on the Planckian Locus. This requires LED manufacturers to calculate a correlated colour temperature (CCT) for all their LED products.

Warm, Neutral, and Cool White
Colour temperature can also be associated with white light. White light is called warm, neutral, or cool, depending on its colour temperature range. This terminology, however, can be confusing since it is counter-intuitive. The reason being, the higher the colour temperature, the cooler the light, and the lower the colour temperature, the warmer the light. Cool means the white light appears more bluish and warm means the white light appears more reddish.

The white light emitted from high-brightness LEDs (HB-LEDs) is designated as cool, neutral, and warm as follows:

- Warm: 2700–3700 °K
- Neutral: 3700–5000 °K
- Cool: 5000–10000 °K

CRI (Colour Rendering Index)
Colour rendering relates to the way objects appear under a given light source. The measure is called the colour rendering index, or CRI. A low CRI indicates that objects may appear unnatural under the source, while a light with a high CRI rating will allow an object's colours to appear more natural. Lights with CRIs of 80 or higher are generally considered to have a high CRI. For lights with a "warm" colour temperature the reference point is an incandescent light. For lights with a cool colour temperature the reference is sunlight.

Efficacy
The term effective refers to getting the desired result whereas the term efficient refers to the use of minimum resources to get the same desired result. The term efficacy refers to the capacity of some process or entity to produce both an efficient and effective result. Within the technology of lighting, the parameter used to measure the efficacy of a light source is called lumens per watt (LPW).

Lumen
Luminous flux is a quantitative expression of the brilliance of a source of visible light, which is electromagnetic energy within the wavelength range of approximately 390 nanometres (nm) to 770 nm. The standard unit of luminous flux is the lumen (lm).

LED
A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current passes through it. The output from an LED can range from red (at a wavelength of approximately 700 nanometers) to blue-violet (about 400 nanometers). Some LEDs emit infrared (IR) energy (830 nanometers or longer); such a device is known as an infrared-emitting diode (IRED)

LED Types
LEDs come in a huge variety and are available in different performance classes, various brightness levels, and package sizes, in the complete colour range (including all shades of white), and in red, green, and blue.

LED products offer total solutions for illumination and lighting applications. Key products include high brightness and high power LEDs, mid power LED's, PLCC surface-mount LEDs, and display backlighting module solutions. LEDs and display modules address a wide range of markets, including electronic signs and signals, automotive, solid-state lighting, and LCD display backlighting.

High brightness (HB) LEDs are specifically designed with small packages for space-limited applications such as display illumination. HB-LEDs offer long operating life and low power consumption and are well suited for many consumer and commercial lighting applications that have traditionally used conventional incandescent or other technologies.

LED Driver
An LED driver is a device that manages power and controls the current flow for an LED lighting product. LED lighting doesn't normally require high voltage, and depending on the application, could even use batteries or solar power. In the HB-LED lighting market, the term driver is usually applied to a device that can accept an input voltage and produce the required voltage. An important factor that affects the choice of a particular driver is the way in which multiple LEDs are actually wired together.

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Are You Five Years Out?

Most people live in the present. The world of now. But a handful of us work in a unique world that doesn't quite exist yet—the world of Five Years Out.

Five Years Out is the tangible future. And the people who live and work there know that new technologies, new materials, new ideas and new electronics will make life not only different, but better. Not just cheaper, but smarter. Not just easier, but more inspired.

Five Years Out is an exciting place to be. So exciting that, once you've been there, it's hard to get excited about the present. Because we know what's coming is going to be so much better.

Five Years Out is a community of builders, designers, engineers and imaginers who navigate the path between possibility and practicality. Creating the future of everything from cars to coffeemakers.

Are you one of them? Then you're probably working with us.

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Five Years Out

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