

# MICRODIS

COMPETENCE & RELIABILITY

LIGHTING



## LIGHTING SOLUTIONS

- I HIGH POWER LEDS
- I MID-POWER LEDS
- I HCL LEDS
- I CHIP ON BOARD
- I OLED PANELS
- I UV & IR LEDS
- I LED DRIVERS
- I HEATSINKS, LENSES & CONNECTORS
- I CUSTOMIZED SOLUTIONS

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# EFFICIENT LIGHTING SOLUTIONS

## **MICRODIS ELECTRONICS**

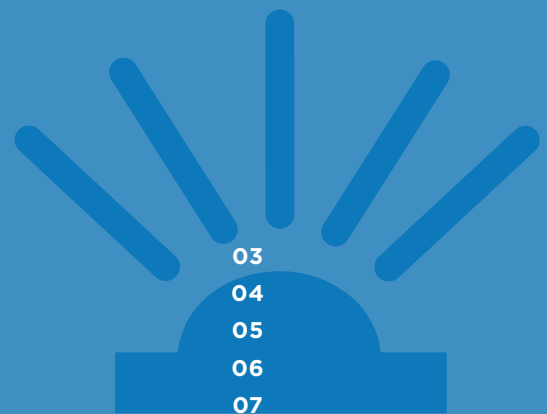
with 30 years of experience in sales of electronic components, Microdis Electronics provides customers with deep knowledge and application support.

Wide portfolio of products, including futuristic OLEDs, LED module design and production, professional advice and more than a decade of experience on the lighting market allows us to support our partners with solutions fitted exactly to their needs.



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# LED LIGHTING

## A MODERN WAY OF FIXTURE DESIGN

LED technology has changed the way we are looking at light and greatly improved not only the efficiency of it, but has also allowed to design fixtures and applications that were out of reach for conventional lighting. The economical and ecological aspects are accelerating the developments. The higher initial costs are balanced in a reasonable time with electricity costs savings. Today it is almost impossible to think about a new investment that is not lit with LED fixtures.

Microdis and our suppliers provide a technical expertise to help customers choose the best solution for their desired application.

We are living in an illuminated world, and the future is getting brighter and brighter.



### Considerations when designing with LEDs

- | Flux required in the application
- | Efficacy of the luminaire (including driver and lens)
- | Luminaire or module spacing and layout
- | Light uniformity
- | Glare minimalization
- | Cooling of LEDs, including ventilation
- | Wiring access
- | Driver size and location
- | Dimming capabilities
- | Cost - less LEDs with higher driving current or higher efficacy

### Future-proofing your design

The LED market is in constant development. Flux and, at the same time, efficacy are moving into levels not imaginable even 10 years ago. The parameters improve with each generation of the products, slower than in the past, but it is a regular growth.

Hence the standard form factors agreed by manufacturers. 5630, 3030, 3528 - the popular mid-power casings, and 3535, 7070 - in the high power region, are the best choice to have the best performance not only now, but also in the future.

## BASIC LED PARAMETERS



FLUX

**Flux** - the total amount of light that comes out of a LED. Expressed in Lumen [lm] or Candela [Cd]. High flux usually comes with high power. If a very small LED - with a small Light Emitting Surface - can provide high flux values, that means it has high light density.



CCT

**Correlated Colour Temperature** - defines the colour appearance of a white LED. It is defined in degrees Kelvin. A white LED may be warm - starting at around 2700K, moving to a natural 4000K CCT, or cold - with CCT of 5000K and above. It does not describe the rendering of the colour.



EFFICACY

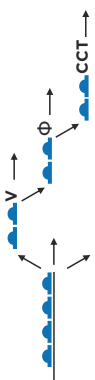
**Efficacy** is one of the key values that describe a light source. It defines how much power is needed to provide the needed flux. Expressed in lm/W - how many Lumen are generated from 1W of power. High efficacy products allow LED lighting fixtures to generate savings on electricity bills - when compared with traditional lighting - and ultimately provide a short ROI (Return Of Investment) time period.



CRI

**Colour Rendering Index** - a parameter that describes the quality of light, with a maximum value of 100 (like the Sun).

Defines if the colours of objects that are lit by the light source are represented correctly. Most of the LEDs on the market provide a CRI of 70+ (allowed for outdoor lighting) or 80+ (indoor lighting). High CRI products (with 90+) are usually used in special applications - museums, medical equipment, but also in retail.



BINNING

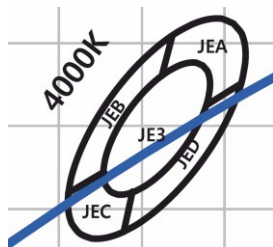
**Binning** is a process that is used specifically for LEDs.

Since many steps in the production rely on chemical interactions (f.e. crystal growth, phosphor mixing) - it is impossible to plan to manufacture high quantities of diodes with exactly the same values of flux, CCT and forward voltage. It is agreed that these can vary in specific ranges - known as **Bins**, and **Binning** is a way of sorting the diodes so that all from a particular bin look the same and have a similar light output.

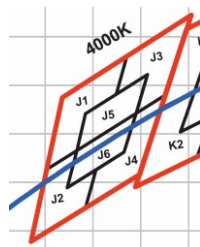
Voltage and flux bins are simply described as values: 2.8 - 2.9 V...26-29 lm etc., with the codename of the bin next to it.

CCT binning however is a representation of the colour on a chromacity diagram. Currently there are two main methods used - ANSI binning - rectangular shapes split into a number of subbins, and ellipse binning - using MacAdam ellipses.

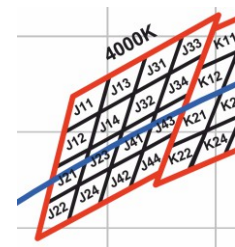
Three most common types are presented below - based on LG Innotek datasheets for 4000K.



Ellipse binning



ANSI binning with central bins

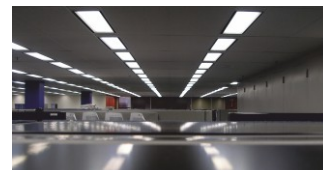


ANSI binning with 16 sub-bins

# MID POWER LEDS

**Mid power LEDs** are the usual choice for home and office lighting where a high density of light is not required - because of the luminaire size, and efficacy together with light uniformity are crucial. An additional argument for the usage is cost - plastic cases are more economical than ceramic - like in the more powerful products.

The most popular form factors are 2835 and 3030 in various power options, with 5630 being the still used legacy size.



## COST EFFICIENT MID POWER 3528



	Flux @ 65mA 4000K	Efficacy @ 65mA 4000K	Binning	Note
<b>B106</b>	<b>38.2 lm</b>	<b>200 lm/W</b>	<b>3-5 step MacAdam</b>	<b>Highest efficacy</b>
<b>B105</b>	<b>36.2 lm</b>	<b>190 lm/W</b>	<b>3-5 step MacAdam</b>	<b>Best price ratio</b>
<b>B102</b>	<b>33.0 lm</b>	<b>180 lm/W</b>	<b>ANSI with central</b>	<b>Economical</b>
<b>B100</b>	<b>31.0 lm</b>	<b>163 lm/W</b>	<b>3-5 step MacAdam</b>	<b>Low cost 0.5W</b>
<b>B100</b>	<b>25.0 lm</b>	<b>135 lm/W</b>	<b>ANSI with central</b>	<b>Low cost 0.2W</b>

Various power options available for design flexibility, the best efficacy or the lowest cost does not always have to be the only choice. CCT range from 2700K to 6500K. CRI 80 & 90 versions available in selected products.

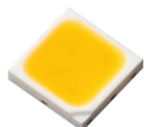
## HIGH PERFORMANCE MID POWER 5630



	Flux @ 65mA 4000K	Efficacy @ 65mA 4000K	Binning	Note
<b>5630 G7</b>	<b>38.4 lm</b>	<b>212 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Highest efficacy</b>
<b>5630 G6</b>	<b>36.3 lm</b>	<b>202 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Best price ratio</b>
<b>5630 G5</b>	<b>34.9 lm</b>	<b>195 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Stable CCT</b>

The legacy package with stable CCT production. Used in linear lighting, where the rectangular shape is a benefit. CCT range from 2700K to 6500K. CRI 80 & 90 versions available in selected products.

## HIGH FLUX MID POWER 3030



	Flux @ 150mA 4000K	Efficacy @ 150mA 4000K	Binning	Note
<b>3030 G4</b>	<b>140.7 lm</b>	<b>151 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Highest flux</b>
<b>3030 G3</b>	<b>137.0 lm</b>	<b>147 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Economical</b>
	Flux @ 65mA 4000K	Efficacy @ 65mA 4000K	Binning	Note
<b>S36W</b>	<b>36.4 lm</b>	<b>203 lm/W</b>	<b>ANSI with ellipse 3 step</b>	<b>Highest flux, flip chip</b>
<b>S36U</b>	<b>33.6 lm</b>	<b>181 lm/W</b>	<b>ANSI with 9/16 subbins</b>	<b>Economical</b>

The 3030 is a package that was developed to be an alternative for power LEDs. A 1W chip in a plastic casing equals low cost where such power is enough. The 3030 comes in two possibilities: a high flux version - reaching approx. 140lm from one LED, or a high efficacy version - with up to even 220lm/W from a flip-chip. CCT range from 2700K to 6500K. CRI 80, 90 and CRI 70 (for outdoor) versions available in selected products.

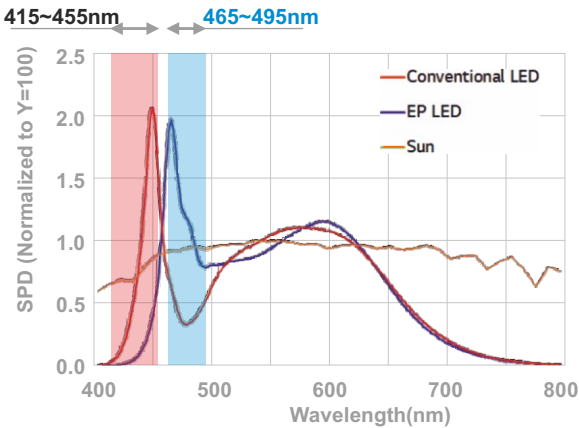
Microdis Electronics offers the full portfolio of LG Innotek and Brightek of mid-power LEDs. That includes the most popular parts shown above, but also white and **coloured (Red, Green, Blue)** LEDs in 3020 and 3030 form factor, also with high forward voltages.



# FUNCTIONAL LIGHTING

## HUMAN CENTRIC LIGHTING (HCL)

### THE EYE PLEASING CONCEPT



The Eye Pleasing LED concept is quite easy, but at the same time revolutionary. White light spectrum always has had harmful UV radiation, if it's the Sun, conventional LEDs or other light sources. LEDs however have had a high peak in the range of 415-455 nm wavelength which could cause unwanted effects to a human who was working with LED light for longer periods of time - actively affecting the circadian rhythm or accelerating AMD (Age-Related Macular Degradation). With the EP LED concept - the power peak is shifted to the beneficial area: 465-495 nm. The optical energy from this spectrum range is positively working on the human body by activating Biorhythm Melanopsin response. A practical result is also glare reduction - because the pupil minimizes and does not change size rapidly. Eye Pleasing LEDs carry more beneficial optical energy than the Sun.

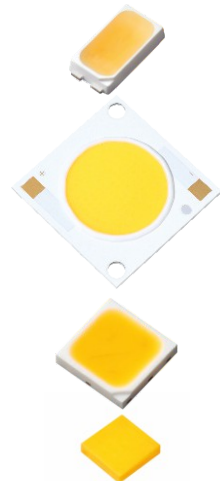
Making the light work for your health.



### EYE PLEASING LINE-UP

The Eye Pleasing concept is available in products suited for most applications. A COB for retail and home spot lights, 5630 and 3030 for office linear and troffer lights, and a CSP for luminaires with high flux density.

	Flux @ 4000K	Efficacy @ 4000K
<b>5630 EP</b>	<b>33.9lm @ 65mA</b>	<b>189 lm/W</b>
<b>30W EP COB</b>	<b>4600lm @ 900mA</b>	<b>146 lm/W</b>
<b>3030 EP</b>	<b>31.5lm @ 65mA</b>	<b>176 lm/W</b>
<b>1414 EP CSP</b>	<b>133.3lm @ 350mA</b>	<b>129 lm/W</b>
<b>1818 EP CSP</b>	<b>162.0lm @ 350mA</b>	<b>171 lm/W</b>
<b>2323 EP CSP</b>	<b>182.0lm @ 350mA</b>	<b>190 lm/W</b>



Note
<b>Highest efficacy</b>
<b>High flux spot light</b>
<b>Lens suitable</b>
<b>Mid power CSP</b>
<b>High power CSP</b>
<b>Large chip CSP</b>

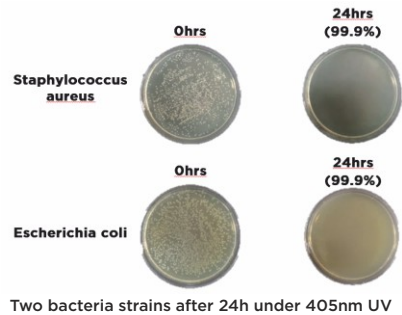
### VISIBLE HYGIENE CONCEPT

By combining a visible light spectrum and a weak UV it is possible to build a safe and effective disinfecting luminaire that can be used in public areas - places where bacterial infections are common, yet the people do not spend too much time there. Examples of such places are elevators, public bathrooms, swimming pools and hospital corridors, but also kitchens and private bathrooms. Using UV with 405 nm wavelength, with power even below the power of the sun in this spectral range, causes successful inactivation for a wide range of organisms, like the Staphylococcus aureus or the Escherichia coli bacteria, killing more than 99% in a 24h period.

Making the light work for your health.

**White LED** + **405nm UV LED**

<b>5152 UV</b>	<b>Flux @ 350mA</b> <b>450 mW</b>	<b>Wavelength</b> <b>400-410 nm</b>
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### Applications



# HIGH POWER LEDs

**High power LEDs** are currently mainly used for applications where high flux is needed from a small area - high light density, and where beam control is very important. These include streetlighting, industrial low and high bays, flood lights and miniaturized light sources - like personal flashlights.

The most popular industry standard is a 3535 form factor, with lenses available for virtually any use case. Working with high power parts comes with a cost - the overall efficacy is lower than in mid power LEDs, and it is extremely important to provide proper heat management, as the temperatures may easily reach levels that affect lifetime and colour shifts. Passive heatsinks with guaranteed air movement are a bare minimum, and in specific cases active cooling may be needed.

## Applications



Area Light



Flashlight



Street Light



Tunnel

## HIGH PERFORMANCE 3535

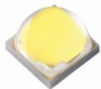


	Flux @ 350mA 4000K	Efficacy @ 350mA 4000K	Binning	Note
<b>3535 F</b>	<b>173 lm</b>	<b>177 lm/W</b>	<b>ANSI with 4/16 subbins</b>	<b>Flip chip</b>
<b>3535 G10</b>	<b>167 lm</b>	<b>172 lm/W</b>	<b>ANSI with 4/16 subbins</b>	<b>Best value</b>
<b>3535 G6</b>	<b>160 lm</b>	<b>163 lm/W</b>	<b>ANSI with 4/16 subbins</b>	<b>Cost effective</b>

Hot lumen values (@T<sub>j</sub>=85°C), CRI 70

The industry standard package used widely around the world, with possible currents up to 1500mA or 2000mA. CCT range from 2700K to 6500K. CRI 80, 90 and CRI 70 (for outdoor) versions available in selected products.

## HIGH FLUX 3535

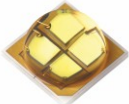


	Flux @ 4000K	Efficacy @ 4000K	Binning	Note
<b>3535 G4L</b>	<b>1019 lm @ 3000 mA</b> <b>165 lm @ 350 mA</b>	<b>109 lm/W</b> <b>179 lm/W</b>	<b>ANSI with 4/16 subbins</b>	<b>Competitive pricing</b>

Hot lumen values (@T<sub>j</sub>=85°C), CRI 70

High current (up to 3000mA) and high flux 3535 package. CCT range from 2700K to 6500K. CRI 80, 90 and CRI 70 (for outdoor) versions available in selected products.

## MULTICHIP 7070



	Flux @ 4000K	Efficacy @ 4000K	Binning	Note
<b>7070 30W</b>	<b>3025 lm @ 2000mA</b>	<b>125 lm/W</b>	<b>ANSI with 4/16 subbins</b>	<b>Ultra high flux</b>
<b>7070 15W</b>	<b>1795 lm @ 1250mA</b>	<b>115 lm/W</b>	<b>ANSI with 4/16 subbins</b>	

Hot lumen values (@T<sub>j</sub>=85°C), CRI 70

A high power, multichip package. The chips are connected in series, resulting in a forward voltage of appx. 12V. CCT range from 2700K to 6500K. CRI 80, 90 and CRI 70 (for outdoor) versions available in selected products.

## HIGH POWER CHIP SCALE PACKAGE



	Flux @ 4000K	Efficacy @ 4000K	Binning	Note
<b>1818 CSP</b>	<b>162.0lm @ 350mA</b>	<b>171 lm/W</b>	<b>ANSI with ellipse central</b>	<b>High power CSP</b>
<b>2323 CSP</b>	<b>182.0lm @ 350mA</b>	<b>190 lm/W</b>	<b>ANSI with ellipse central</b>	<b>Large chip CSP</b>

Hot lumen values (@T<sub>j</sub>=85°C), CRI 70

The package of the future - reduced to the only necessary components - the chip and phosphor. CCT range from 2700K to 6500K. CRI 80, 90 and CRI 70 (for outdoor) versions available in selected products.

# FUNCTIONAL LIGHTING

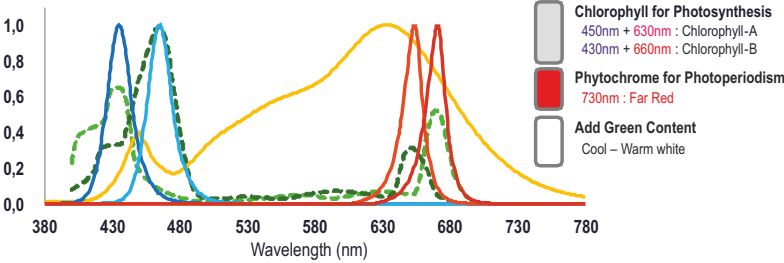
## HORTICULTURE



Plants, as everything, can be grown traditionally and can be grown effectively. For many years greenhouses have been using specialized light to increase their annual capacities - by artificially extending the daylight periods. Not until recently the cost of LED solutions was too high against the traditional HPS & MH tubes. Yet the energy saving diodes are gaining more and more traction, because the energy required by a industrial greenhouse is huge, and in many cases a power station supplying it cannot provide any more.

LED lights may be the only way to extend a greenhouse area, and are a sure way to lower the electricity bills. It is not the only advantage however - a specialized horticulture fixture is using more than one type of LED - it can change its light output and spectrum by simply using a programmable driving system, providing to the plants what is exactly needed at that time.

Depending on the spectrum of the light it can be used for faster growing, or bigger green yield. Photoperiod is the time that the plants are illuminated, and they recognize this illumination - hence the need for this wavelength - far red. The rest, deep red and royal blue, stimulate photosynthesis - the process of storing energy by the plants, and using that energy to increase in size. The visible white spectrum is adding green content to the organism.



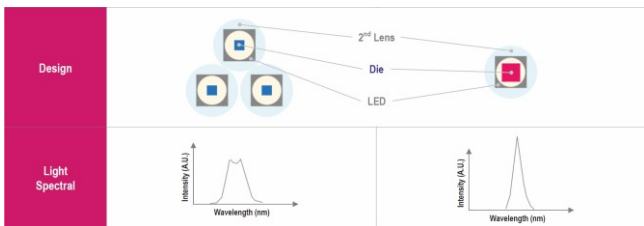
### HORTICULTURE SOLUTIONS - 3535 colour



	Flux/P <sub>o</sub> @ 350mA	Max. Current [mA]	Wavelength
<b>Deep Red 1W</b>	<b>453 mW</b>	<b>800</b>	<b>640 - 660 nm</b>
<b>Far Red 1W</b>	<b>295 mW</b>	<b>800</b>	<b>720 - 740 nm</b>
<b>Royal Blue 1W</b>	<b>570 mW</b>	<b>1000</b>	<b>450 nm</b>
<b>Red 1W</b>	<b>89 lm</b>	<b>800</b>	<b>630 nm</b>
<b>Green 1W</b>	<b>109 lm</b>	<b>800</b>	<b>515 - 535 nm</b>
	Flux/P <sub>o</sub> @ 1050mA		
<b>Deep Red 6W</b>	<b>977 mW</b>	<b>2000</b>	<b>640 - 660 nm</b>
<b>Far Red 6W</b>	<b>TBD - new product</b>	<b>2000</b>	<b>720 - 740 nm</b>
<b>Royal Blue 6W</b>	<b>1220 mW</b>	<b>2000</b>	<b>450 nm</b>
<b>Red 6W</b>	<b>190 lm</b>	<b>2000</b>	<b>630 nm</b>
<b>Green 6W</b>	<b>381 lm</b>	<b>2000</b>	<b>515 - 535 nm</b>



LG Innotek's horticulture portfolio consists of two series, a lower power 1-3 W series - the A31X, and the higher power (up to 6 W) E333 for bigger plant factories - where the fixture is mounted higher. The E333 series is enabling a side lighting design possibility due to more focused light spectral. The industry standard 3535 package allows use of lenses from popular manufacturers.



In horticulture it is a standard that the equipment has to work in harsh conditions. Humidity and gas emitted from the fertilizer and anti-bug sprays can be very harmful to a LED.

LG Innotek uses Au (gold) plating in its products - to guarantee a longer lifetime than standard Ag (silver) used by the competitors. With almost no flux drop against 20% of other products.

# SPECIAL APPLICATIONS

## UV & IR LEDS

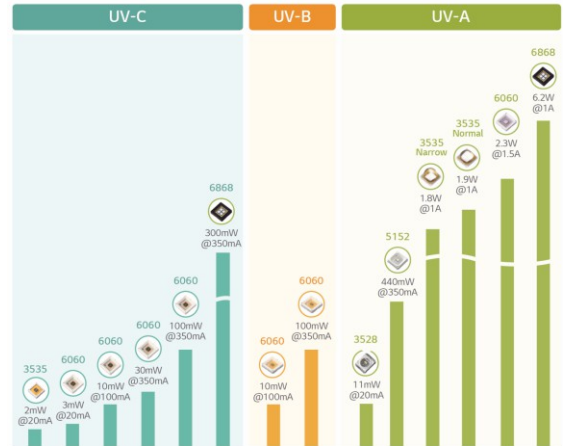
### UV LEDS

The development of LED technology enables its use in many applications that were unreachable before. The fast growth of LED UV lighting is mainly driven by the need to find environmentally friendly methods of producing UV light - the current market is dominated by mercury lamps.

The spectrum of UV can be broken down to 3 general areas: UV-A, UV-B and UV-C. Each of which is used in very specific applications.

The UV-A is currently the most commonly used range (~315-420nm), found in counterfeit detectors, simple curing, sensing and disinfection - the last applications are also taking advantage of the UV-B (~280-315nm). The final area - the UV-C (200-280nm) can be used in air purification systems - not only simple disinfection.

**Applications - consumer and industrial:  
detection, curing & disinfection**



UV money detector



Curing



Swimming pool



Elevator



Bathroom



Kitchen



Hospital

### ULTRAVIOLET SOLUTIONS



	Optical power [mW]	Beam angles [°]	Wavelengths [nm]
<b>3528 UV-A</b>	<b>11</b>	<b>130</b>	<b>385</b>
<b>3535 UV-A</b>	<b>960 - 2640</b>	<b>130, 75, 55</b>	<b>365, 385, 395, 405, 415</b>
<b>5152 UV-A</b>	<b>340 - 790</b>	<b>120</b>	<b>365, 385, 395, 405</b>
<b>6060 UV-A</b>	<b>2060 - 2990</b>	<b>120</b>	<b>365, 385, 395, 405</b>
<b>6868 UV-A</b>	<b>5300 - 8560</b>	<b>120</b>	<b>365, 385, 395, 405</b>
<b>6060 UV-B</b>	<b>10, 100</b>	<b>126, 120</b>	<b>305</b>
<b>3535 UV-C</b>	<b>2</b>	<b>126</b>	<b>278</b>
<b>6060 UV-C</b>	<b>3 - 100</b>	<b>126, 120</b>	<b>278</b>
<b>6868 UV-C</b>	<b>200, 300</b>	<b>120</b>	<b>278</b>



### IR LEDS

On the other side of the spectrum is the infrared area. Used commonly for remote controls, sensors, machine vision, detectors and of course night vision. High power products may be used for defrosting.

Brighteks' infrared LED portfolio consists of various form factor and power versions. Starting from THT (3 mm & 5 mm), SMD low power chips (0602, 0805, 1206) through the standard mid power casings (3020, 3030, 3528) and ending with ceramic high power 3535, also with black surface or with rectangular 16:9 light pattern.



### INTERESTING PRODUCT - VCSEL

**Vertical Cavity Surface Emitting Laser**

Narrow angle and straight directivity, applicable to long distances. Very efficient optoelectronic transformation. High power allows to penetrate even thick fog and enhance monitor lighting even in bad weather.

	Optical power [mW]	Beam angle [°]	Wavelength [nm]
<b>3535BS VCSEL</b>	<b>700</b>	<b>15</b>	<b>850</b>



**BRIGHTEK**  
BRIGHTEK (EUROPE) LIMITED





# CHIP ON BOARD (COB)



The Chip On Board concept has introduced LED lighting to an array of applications and paved the way to a modern design for many fixture manufacturers. No required soldering - thanks to standardized sizes and the availability of plastic holders and availability of dedicated power supplies - even in shapes fitted for high bays.

After the required heat management and beam angle calculations - all it takes to finish a product is a heatsink from Fischer Elektronik, a holder, an optional lens and mechanical assembly.



## SELECTED COB MODELS

	Size (LES) [mm]	Typical current [mA]	Flux [lm]	Voltage [V]	Max. current [mA]
<b>6W L-COB G2</b>	<b>13.5x13.5(Ø9.8)</b>	<b>180</b>	<b>979</b>	<b>31.0-37.0</b>	<b>360</b>
<b>15W L-COB G2</b>	<b>19.0x19.0(Ø14.5)</b>	<b>450</b>	<b>2448</b>	<b>31.0-37.0</b>	<b>900</b>
<b>25W L-COB G2</b>	<b>19.0x19.0(Ø14.5)</b>	<b>720</b>	<b>3917</b>	<b>31.0-37.0</b>	<b>1440</b>
<b>34W L-COB G2</b>	<b>28.0x28.0(Ø22.0)</b>	<b>990</b>	<b>5386</b>	<b>31.0-37.0</b>	<b>1980</b>
<b>55W L-COB G2</b>	<b>28.0x28.0(Ø22.0)</b>	<b>1620</b>	<b>7315</b>	<b>31.0-37.0</b>	<b>3240</b>
<b>40W F-COB</b>	<b>28.0x28.0(Ø22.0)</b>	<b>1080</b>	<b>5308</b>	<b>32.4-37.4</b>	<b>2400</b>
<b>83W F-COB</b>	<b>28.0x28.0(Ø22.0)</b>	<b>1620</b>	<b>12444</b>	<b>49.7-54.7</b>	<b>3200</b>
<b>115W F-COB</b>	<b>38.0x38.0(Ø32.5)</b>	<b>2250</b>	<b>18148</b>	<b>49.7-54.7</b>	<b>4000</b>
<b>170W F-COB</b>	<b>38.0x38.0(Ø32.5)</b>	<b>1620</b>	<b>23575</b>	<b>94.2-111.2</b>	<b>4000</b>

COBs are available in Lateral Chip (L-COB) and Flip Chip (F-COB) versions. Lateral are provided with CCT 2700K-6500K and CRI 80 or 90, while Flip Chips with CCT 2700K-5000K and only one CRI version - 80. Above values are for CRI 80.



**EXTREMELY THIN AND LIGHTWEIGHT**  
only 0.51 mm



**EXCELLENT COLOUR RENDERING**  
CRI>93



**TRULY FLEXIBLE**  
30mm [R]

## OLED PANELS

OLED is a thin, lightweight, and sometimes flexible surface light source. However the significance of this technology goes beyond its unique form factor. OLEDs provide a natural and pleasant light with low glare, no UV, and very little heat emission. Being a uniform surface light source by nature, OLEDs also reduces the hard edged shadows which can be a source of eye fatigue. In fact, several test results also show that actively reading under OLED light may actually cause lesser eye strain than our general surroundings. On top of all this, high level of colour fidelity comes as a bonus.

### Eye Comfort

OLED light helps protect your eye health by providing a soft and pleasant illumination with low blue light emission.

### Flexible & Paper-Thin

The flexibility, thinness, and lightweight of OLED light open up new design horizons for architects and designers.

## SELECTED OLED MODELS

	Size [mm]	Typical current [mA]	Flux [lm]	Voltage [V]	CCT [K]	Type
<b>LL081FR1-53P1</b>	<b>200X50</b>	<b>175</b>	<b>75</b>	<b>8.4</b>	<b>3000</b>	<b>Flexible</b>
<b>LL159FR1-53P1</b>	<b>400X50</b>	<b>350</b>	<b>150</b>	<b>8.7</b>	<b>3000</b>	<b>Flexible</b>
<b>LL167FS1-53P1</b>	<b>300X300</b>	<b>1720</b>	<b>750</b>	<b>8.8</b>	<b>3000</b>	<b>Flexible</b>
<b>LL056RS1-73P1</b>	<b>100X100</b>	<b>125</b>	<b>75</b>	<b>8.4</b>	<b>3000</b>	<b>Rigid</b>
<b>LL039RC1-54P1</b>	<b>Ø100</b>	<b>185</b>	<b>60</b>	<b>6.3</b>	<b>4000</b>	<b>Rigid</b>
<b>LL124RR1-54P1</b>	<b>300X100</b>	<b>700</b>	<b>230</b>	<b>6.4</b>	<b>4000</b>	<b>Rigid</b>

The OLED panels are available only in 3000K or 4000K - depending on the model. Efficacies up to 72lm/W are possible. LT70 of the products is up to 40000 hours.



# DESIGN SUPPORT

## LED MODULES AND CUSTOMIZED SOLUTIONS

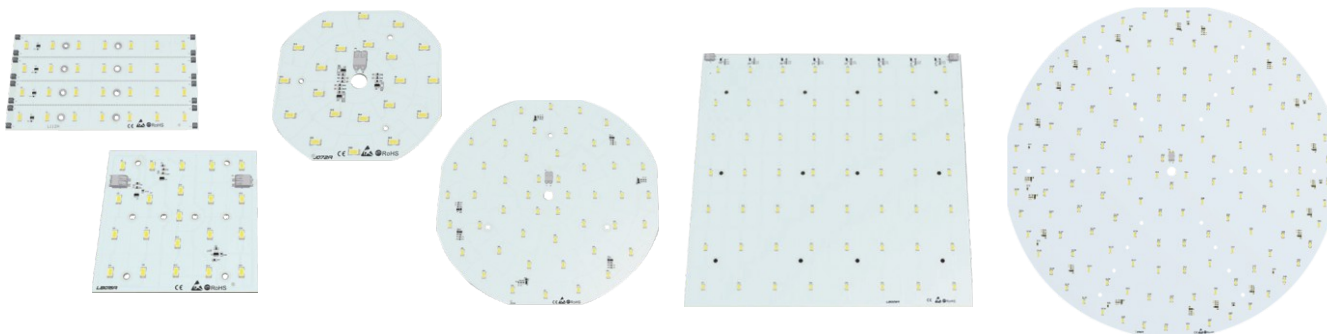
A wide selection of off-the-shelf LED modules, based on most popular diodes - including 2835, providing high efficiency and CV or CC power supply options. The modules are available in 2700-6500K colours and standard shapes - square, round and linear. Sizes reach up to 44cm in diameter (round) and 30cm edge length (square). The efficacy can reach more than 190lm/W (when LEDs are driven with 60mA).

Other available options:

- | Dynamic White modules - with LEDs with two CCT (3000K and 5600K) for smooth colour adjustment
- | 230V modules - for easy plug in
- | RGB and RGBW modules - for colour effects
- | Power LED modules - with 1-5W LEDs for more flux
- | CSP based modules

Microdis Electronics also provides custom designed LED lighting solutions. The idea is all the customer has to have. Our team of engineers will put that idea into a real product.

Our offer includes LED strips, custom designed LED lamps, waterproof LED lighting for bathtubs or showers, including a capacitive touchpanel, and many others.



## OTHER OPTOELECTRONIC COMPONENTS

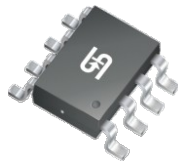
Microdis Electronics together with its partners, may supply a wide portfolio of optoelectronic components that are not presented in the current folder. Products that are suitable for almost any application, not only direct lighting.

The offer includes:

- | THT lamps
- | Superflux LEDs
- | Light bars
- | Black body and black surface LEDs in many sizes
- | Chip LEDs
- | Low power 3528, also with lenses
- | Reverse mount LEDs
- | High power, high voltage LEDs (5050), also in colour versions
- | RGB LEDs equipped with IC - for simple, digital colour control
- | High power RGB diodes
- | Low power and mid power LEDs in less popular sizes (f.e. 3020, 3014)
- | Dot matrix
- | SMD & THT digit displays
- | LCD/OLED character & graphic displays
- | TFT LCD from 1.5" up to 10.1", also with touch
- | Photocouplers, photointerrupters, photo DMOS relays
- | Phototransistors, photodiodes
- | Photo-voltaic MOSFET Drivers
- | OLED switches
- ... and more



## LED DRIVERS



Taiwan Semiconductors Lighting IC portfolio enables module designers to provide driving solutions on-board of their products. Flyback, Buck, Boost or Linear topologies make the circuits fitting to all applications. Superb parameters - High PFC and low THD, competitive BOM, dimming capabilities - the customers can make their choice and build a solution that meets all of their expectations.

Currents up to 700 mA, and powers up to 25W - or depending on external N-MOS - and 230V solutions.

SOP-8, SOP-14, SOT-26 or TO-252 packages.

Taiwan Semiconductor offers also a wide selection of Planar or Super-Junction MOSFET transistors for power management.

## HEATSINKS



LEDs, with their high performance and long life, are growing exponentially in popularity. This tendency is even enhanced by the increasing efficiency and falling prices. However, to make the best possible use of all the benefits offered by LEDs, efficient thermal management is indispensable.

To meet this requirement, Fischer Elektronik has developed a special product range: heatsinks for LED applications. In addition to a number of star-type heatsinks with different diameters and contours, it comprises, among other things, pin heatsinks, miniature cooling aggregates and case elements for accommodating LED line modules. Modified heatsink variants and versions specially adapted to customized LED applications are manufactured according to customers' specifications using advanced CNC machining centres or through extrusion. The LEDs are fastened using double-sided, thermally conductive adhesive, screw fastening or solderable surface coatings.

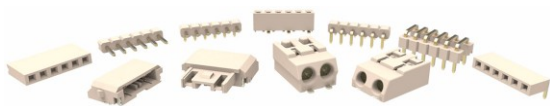
## LENSES



Wide portfolio of lenses suitable for mid or high power LEDs and COBs. Single, as well as multilenses, are available, fitting most applications: streetlights, office and linear luminaires, industrial and architectural lighting, also IR and UV dedicated products.

Special silicone materials allow production of elastic optical systems with high transmittance and no yellowing in time.

## CONNECTORS



White Lite is aimed at LED strip applications perfectly aligning centre lines of horizontal mating printed circuit boards. Available in both SMT or through hole with 2-6 contacts as a two piece or as a through hole single piece solution with an innovative U-shaped connector design.

U-shaped connectors are an economical option and allow connections where access from above the PCB is the only option. U-Shaped connectors can be either soldered direct to the PCB or plugged into vertical PCB sockets.

LCP insulators are natural coloured to reduce light absorption not only providing better aesthetics but also a resistance to high process temperatures.

Engineered to be the perfect choice for LED strip light applications.

### WIRE TRAP CONNECTORS 2.40 & 4.00MM PITCH

BL300 2.40mm pitch, height of 3.60mm (max) with a footprint of 7.90mm x 7.60mm in three circuits. Cables with stranded conductors in 22 & 24 AWG.

BJ302 4.00mm pitch, height of 4.50mm (max) with a footprint of 11.8mm x 11.45mm in three circuits. Solid conductors in 18 to 24 AWG and stranded conductors in 20 to 22 AWG.

### WHITE LITE BOARD TO BOARD 4.00MM PITCH - PLANAR MATING

BJ300 & 301 are two position surface mount board to board connectors perfect for LED strip light applications. Mated connector height is 2.6mm, with a total mated footprint of 8.80mm (width) x 11.00mm (depth).

### WHITE LITE BOARD TO BOARD 2.54MM PITCH - PLANAR MATING

The BG300-306 range are LED light strip connectors both surface mount and through hole. Post and box style connectors offer mating combinations of header and socket. One piece U-Shaped connectors BG304 & 305 may be hard soldered to your PCB or mated to BG306 single row sockets.

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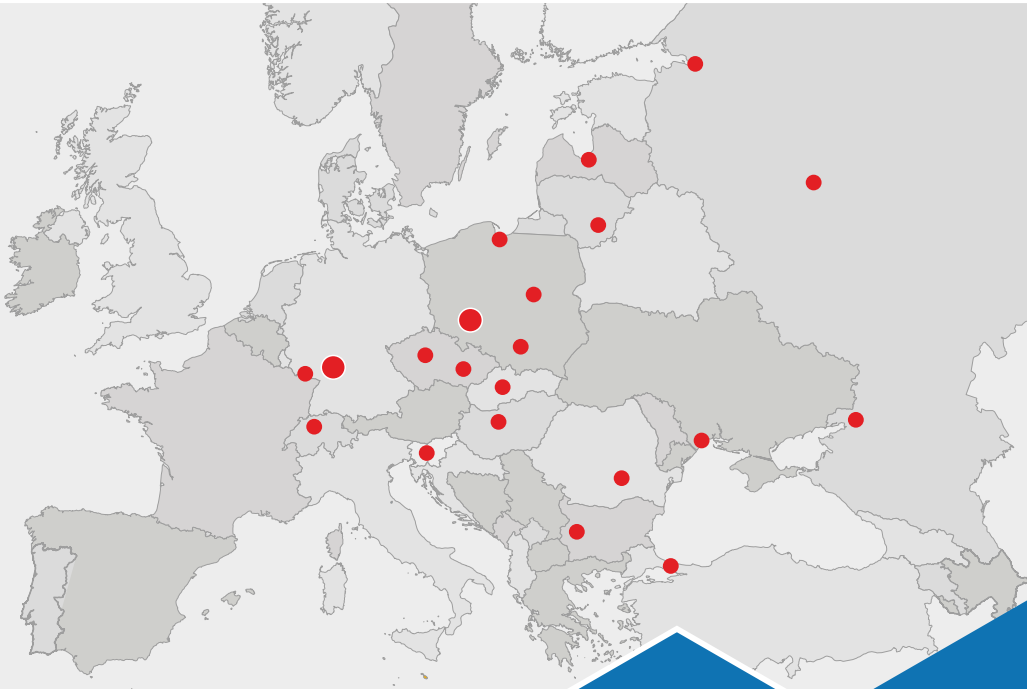
\*Electromechanical Competence Center for France

Currently the Microdis Group employs over 100 people, with a large number of electronic engineers, mostly involved in sales and application support.

As a company with an extensive experience in the distribution of electronic components, and a purchasing center in Germany for many years, we are able to offer almost any product from a wide variety of electronic components. We offer also the production of cable harnesses and programming of crystal oscillators for a customised frequency.

Cooperation with a catalogue distributor provides fast deliveries (2 days) of a wide range of catalogue products.

We have certificates of quality management DIN EN ISO 9001:2015 for the distribution of electronic components.



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**AEGID**  
**ASROCK INDUSTRIAL**  
**BRIGHTTEK**  
**CAMDENBOSS**  
**EPSON**

**FISCHER CONNECTORS**  
**FISCHER ELEKTRONIK**  
**GERSYS**  
**GLOBAL CONNECTOR TECHNOLOGY**  
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