



Light is smart
Opto components for
home appliances

Light is OSRAM

OSRAM
Opto Semiconductors



OSRAM Opto Semiconductors' light and sensing components for white goods bring home new opportunities to our customers – helping them to deliver new technology, new design and new convenience.

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A whole new dimension to appliance design

LEDs from OSRAM Opto Semiconductors give designers a new palette of color and offer sensing and digital control that delivers convenience and emotional ambiance for a multi-dimensional interactive experience.

Appliances in the kitchen and throughout the home are important applications where the value of LEDs make them the light source of choice for new and contemporary designs. State-of-the-art LEDs from OSRAM Opto Semiconductors bring a whole new dimension of possibilities to appliance lighting and design. While consumers expect only functional lighting in their appliances, our solutions can deliver this functionality while also adding an aesthetically pleasing component to the kitchen environment. Thus designers can create a lighting experience that responds to human interaction with light and sensing functionality that is not possible with conventional incandescent lighting.

Thanks to extremely miniaturized components, high-brightness and the energy efficiency inherent in LED technology, the once unimaginable has become today's reality. Whether you need products for innovative illumination, functional or display design, OSRAM Opto Semiconductors provides the right LED light and sensing solutions in every performance class and every color for every application – and for all your individual demands.



Illumination solutions

Installing white light with perfect color temperature inside and outside? Designing stylish accents with individual colors and color changes? Then our solutions for white goods illumination will serve you perfectly – for refrigerators, washing machines, tumble dryers, dishwashers, ovens, microwave ovens, kitchen hoods and many other home appliances.



Functional solutions

Implementing new innovative functional solutions? Such as touch sensor buttons, intelligent warning lights and status indicators? Our white and colored LEDs for all kinds of home appliances open up a totally new dimension of visibility and usability – in particular when combined with infrared components from OSRAM Opto Semiconductors – and can also be used to enhance the recognition value of brands by using specific colors.

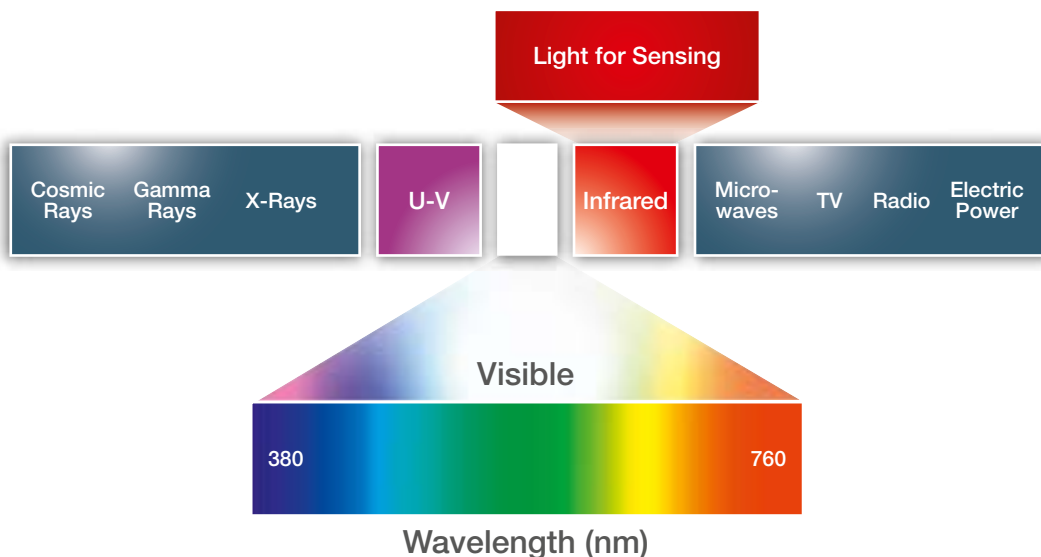


Display solutions

Developing more brilliant, much bigger and perfectly readable displays? Our specific white goods LED solutions will help you to boost the looks and ease of use of all home appliances – with perfect uniform backlighting, in trend-setting white or any other color you choose.

Perfect LED selection for perfect appliance design

There are several key LED characteristics to consider in the appliance design and specification process, including color consistency, lighting color quality, custom color, sensing and control. OSRAM Opto Semiconductors supports you at each and every step of the selection process, providing high-quality customizable and customized products for your specific requirements – all of them fully complying with and most often surpassing the strictest international standards.



This diagram illustrates the range of human eye response to visible and infrared wavelengths in respect to other usable electromagnetic wavelengths.

Color consistency and white binning

Color binning selection is one of the most important decisions that a design engineer should factor into the LED lighting application. Smaller color bins yield the tightest color consistency within an application. Designers should pay special attention to the shippable binning limits (i. e. CIE X, Y quadrangle area) of various LED suppliers.

With expensive durable goods such as an appliance, harmonizing between many finished products and within several applications of a product is not a small task. Targeting the smallest binning quadrangle is a critical requirement to maintain lighting color consistency in the finished products.



Food illuminated with different color rendering index (CRI) ratings/values demonstrates the impact of lighting on the contents of a refrigerator.

Lighting color quality

Color coordinated temperature (CCT) and color rendering index (CRI) are two core quality metrics when considering LEDs in the kitchen and appliance environment. LEDs can be produced in CCT ranging from 2,500 K (warm/yellow white) to 12,000 K (cold/blue white). A neutral white light source at 4,200 K is an excellent CCT target for most appliance and general lighting applications.

The CRI is very important for aesthetic appeal, and the only internationally agreed metric for assessing color rendering valuation. Light sources with a high CRI are desirable in color-critical applications. Managing perfectly both CCT and CRI can create varied scenarios, from sterile/clean to soft/warm.

Custom color

Another benefit of LED lighting is the ability to brand appliances with custom colors. The automotive and architectural industries have successfully deployed red, green and blue LED custom colors to help consumers identify a particular brand. They have also successfully incorporated color changing LEDs into vehicles, making it possible for a user to dial in the color they want on any given day.

This same technology can be transferred to appliance design, allowing consumers to customize their kitchens with a simple turn of a dial, changing the color from red to green or mint to bright yellow.

Sensing and control

Appliances are also a prime application for infrared (IR) LED sensing technologies. Utilization of digital IR emitters and detectors with appropriate control logic allows additional sensing control not easily achievable with other analog technologies.

For example, coffee is dispensed only if the sensor detects a cup below the dispenser. Or turbidity sensors in washing machines that help to save water by measuring its cleanliness and replacing it only when necessary. Or induction cookers that recognize and adapt to the size of pots and pans automatically.

IR sensor LEDs with an optical touch switch can optically detect the presence of an object and can be useful for many white good applications





Your PASS to the future

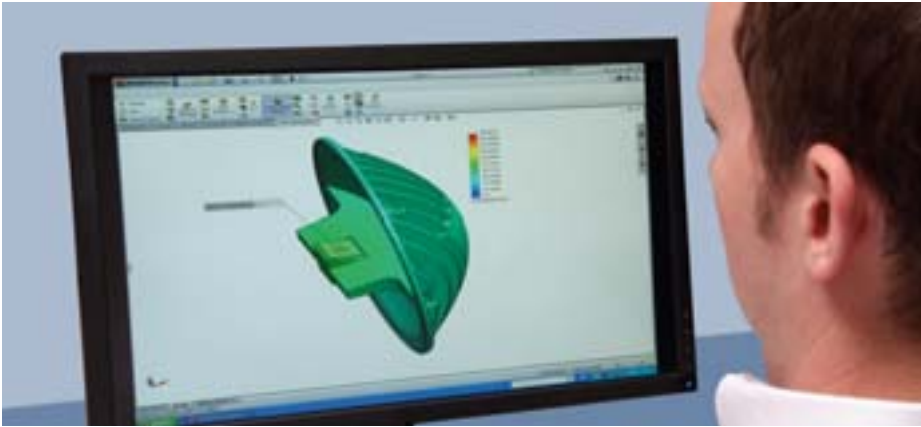
With PASS, you'll get access to OSRAM Opto Semiconductors' application engineering expertise and lab services through a lean, affordable, á la carte program. PASS is an open, collaborative design and testing process that keeps you involved, allowing flexibility along the way.

Make it good, make it fast and make it easy – with PASS you'll access our Premium Application Support Services through a dedicated web page, where you can request services through a dynamic menu featuring simulation, prototype, LED data and system metrology services. Our qualification process determines if your business is a good fit for PASS services. And, if we can't provide everything you need, we'll help you to find the right solution through our LED Light for you program, the premier lighting solutions network of certified industry partners.



Premium
Application
Support
Services

Solid State
Lighting



Simulation

Simulate your system to study illumination and thermal performance before hardware is realized.

- Simulate your optical system
- Model your illumination environment
- Simulate your thermal system
- Optics and thermal design support

Prototype

Choose from a list of standard printed circuit boards (PCBs), specify a custom PCB or work with engineering to realize an entire system mockup for proof of concept.

- Standard PCBs
- Custom PCBs
- System mockups

LED data

LED characterization and lifetime estimation based on your specified parts and drive current.

- LED measurements
- Lumen maintenance estimation
- LM-80/TM-21 reports

System metrology

Get photometric and thermal measurements for your solution.

- Integrating sphere measurement
- Goniophotometer measurement
- Thermal spot & area measurement
- System luminance



Bright and reliable: modern illumination solutions

OSLON® Square

As a compact high power LED the OSLON® Square is the perfect choice for spot illumination.

Features:

- Perfect for spot illumination
- Compact high power LED
- Excellent current elasticity: can be driven from 200 mA up to 1,5 A
- Very good thermal performance in terms of lifetime and efficiency
- Efficient light extraction

DURIS® E3

DURIS® E3 combines high efficacy and a wide beam angle in a compact format.

Features:

- PLCC 3014 package, binned @20 mA
- Compact lumen package for perfect uniform illumination
- Very cost effective PLCC package
- All CCTs available
- Small package dimensions for good second-board reliability

DURIS® E5

With its broad color temperature spectrum, high efficiency and natural color rendering, DURIS® E5 is well suited to the residential sector and a wide range of home illumination tasks.

Features:

- Compact light source in 5630 package
- Medium lumen package for uniform illumination
- All CCTs available
- 3–5 Step MacAdam fine binning





OSLON® Square (2nd gen)

GW CSSRM.CC

Available colors/typical CCT	2700 K	3000 K	3500 K	4000 K
CRI	min. 90	min. 90	min. 90	min. 90
Typical brightness (luminous flux) (@700 mA)	183 lm	193 lm	202 lm	211 lm
ESD	8 kV	8 kV	8 kV	8 kV
Beam/viewing angle	120°	120°	120°	120°



DURIS® E3

LCW JNSH.EC

LUW JNSH.EC

Available colors/typical CCT	2700 K	3000 K	3500 K	4000 K	5000 K	5700 K	6500 K
CRI	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85
Typical brightness (luminous flux) (@20 mA)	7.0 lm	7.0 lm	7.0 lm	7.6 lm	7.6 lm	7.6 lm	7.6 lm
ESD	sensitive	sensitive	sensitive	sensitive	sensitive	sensitive	sensitive
Beam/viewing angle	110°	110°	110°	110°	110°	110°	110°



DURIS® E5

GW JDSRS.EC

Available colors/typical CCT	2700 K	3000 K	3500 K	4000 K	5000 K	5700 K	6500 K
CRI	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85	typ. 85
Typical brightness (luminous flux) (@120 mA)	47 lm	50 lm	51 lm	53 lm	54 lm	53 lm	53 lm
ESD	5 kV	5 kV	5 kV	5 kV	5 kV	5 kV	5 kV
Beam/viewing angle	120°	120°	120°	120°	120°	120°	120°

TOPLED®

Having set the standards on the PLCC market with its housing, TOPLED® covers the whole low brightness range up to 3 cd.

Features:

- Well established PLCC-2 package
- Complete color portfolio available
- Different brightness levels available for all colors

TOPLED® E3014

TOPLED® E3014 fits for all applications. With its low profile it's perfect for applications with small space.

Features:

- Cost effective compact PLCC 3014 package
- ESD stability up to 2 kV
- Small package dimensions for good second-board reliability



TOPLED®	LW TVSG.CB	LB TTSD	LT TTSD	LY T67F	LR T67F
Available colors/typical CCT	5600 K	469 nm	525 nm	590 nm	625 nm
CRI	typ. 80	—	—	—	—
Typical brightness (at typical current I _F)	2200 mcd (20 mA)	280 mcd (20 mA)	635 mcd (10 mA)	710 mcd (20 mA)	710 mcd (20 mA)
ESD	8 kV	2 kV	2 kV	2 kV	2 kV
Beam/viewing angle	120°	120°	120°	120°	120°



TOPLED® E3014	KW DCLMS1.PC		
Available colors/typical CCT	4500 K	5000 K	8000 K
CRI	min. 70	min. 70	min. 70
Typical brightness (luminous flux) (@20 mA)	7.8 lm	7.8 lm	7.8 lm
ESD	2 kV	2 kV	2 kV
Beam/viewing angle	110°	110°	110°

Advanced Power TOPLED®

Advanced Power TOPLED® is a bright mid power LED covering the whole color range for all kind of illumination and backlighting.

Features:

- High quality mid-power package
- Optimized lens for perfect light emission for illumination and backlighting
- Improved thermal management due to leadframe shape
- Perfect for backlighting mid to large-scale panel backlighting
- Long lifetime even with high driving conditions

SYNIOS® E4014

SYNIOS® E4014 combines a high flexibility with a wide beam angle.

Features:

- ESD stability up to 8 kV
- Well established PLCC-2 package
- Small footprint and low profile
- Temperatures from 3,000 K to 6,500 K



Advanced Power TOPLED®	LCW G6CP	LW G6CP	LB G6SP	LT G6SP	LY G6SP	LR G6SP
Available colors/typical CCT	3000K/4000K	5600K	470 nm	528 nm	590 nm	623 nm
CRI	80	80	—	—	—	—
Typical brightness	24.1 lm	30.1 lm	7.8 lm	10.1 cd	5.1 cd	5.1 cd
Available colors/typical						
ESD	2 kV	2 kV	2 kV	2 kV	2 kV	2 kV
Beam/viewing angle	120°	120°	120°	120°	120°	120°



SYNIOS® E4014	KW DPLS32.EC		
Available colors/typical CCT	3000 K	4500 K	6500 K
CRI	min. 80	min. 80	min. 80
Typical brightness (luminous flux) (@20 mA)	41 lm	41 lm	41 lm
ESD	8 kV	8 kV	8 kV
Beam/viewing angle	120°	120°	120°

Intelligent and robust: multifaceted functional solutions



CHIPLED® 0402

CHIPLED® 0402 is the smallest package we offer in the market.

Features:

- Extremely efficient light source with the smallest dimensions available on the market
- RGB solutions at the minimum space

CHIPLED® 0603

CHIPLED® 0603 is a well established package for white goods applications, perfect for 7-segment displays and backlighting of small panels.

Features:

- Well established 0603 package for white goods applications
- Perfect fitting for 7-segment displays and illumination of switches and buttons
- Good price/performance ratio
- ESD-stable CHIPLED® 0603 with integrated ESD-diode available



CHIPLED® 0402	LW QH8G	LB QH9G	LT QH9G	LY QH9F	LR QH9F
Available colors/typical CCT	5600 K	466 nm	525 nm	590 nm	625 nm
Typical brightness (at typical current I _F)	160 mcd (5 mA)	56 mcd (5 mA)	125 mcd (5 mA)	80 mcd (5 mA)	80 mcd (20 mA)
ESD	sensitive	2 kV	sensitive	sensitive	sensitive
Beam/viewing angle (hor./ver.)	120°/145°	155°/170°	155°/170°	120°/130°	120°/130°



CHIPLED® 0603	LW Q38E	LB Q39E	LT Q39E	LY Q396	LS Q976
Available colors/typical CCT	8200 K	470 nm	530 nm	589 nm	633 nm
CRI	typ. 80	—	—	—	—
Typical brightness (at typical current I _F)	160 mcd (5 mA)	41 mcd (5 mA)	100 mcd (5 mA)	71 mcd (10 mA)	71 mcd (20 mA)
ESD	8 kV	8 kV	8 kV	1 kV	2 kV
Beam/viewing angle (hor./ver.)	150°/130°	170°/130°	170°/130°	150°/120°	160°



PointLED®

PointLED® is a perfect combination of advanced package and chip technologies. It is the smallest LED with an integrated reflector and is suitable for both surface mount technology (SMT) and zero-height mounting.

Features:

- Only round package available on the market
- Flexibility of mounting: integration into pcb-board or top mount possible
- Ideal for very thin designs

Mini TOPLED®

Mini TOPLED® is a high brightness small power package for applications with small spaces, well established on the market.

Features:

- Improved corrosion stability
- ESD stable
- Available in all colors and two kinds of white



PointLED®	LW P4SG	LB P4SG	LT P4SG	LY P47F	LS P47F
Available colors/typical CCT	5600 K	470 nm	528 nm	590 nm	633 nm
Typical brightness (at typical current I _F)	1120 mcd (20 mA)	355 mcd (20 mA)	1400 mcd (10 mA)	1120 mcd (30 mA)	805 mcd (30 mA)
ESD	2 kV	2 kV	2 kV	2 kV	2 kV
Beam/viewing angle (hor./ver.)	120°	120°	120°	120°	120°



Mini TOPLED®	LCW MVSG.EC	LW MVSG	LD MVSG	LT MTSG	LY M67F	LS M67F
Available colors/typical CCT	4000K	5600 K	460 nm	529 nm	590 nm	633 nm
CRI	typ. 82	typ. 82	—	—	—	—
Typical brightness (@ 20 mA)	1500 mcd	1500 mcd	3.55 mW/sr	900 mcd	710 mcd	505 mcd
ESD	8 kV	8 kV	8 kV	8 kV	2 kV	2 kV
Beam/viewing angle (hor./ver.)	120°	120°	120°	120°	120°	120°



Consistent and clear: innovative display solutions

TOPLED® E3014

By adapting the successful TOPLED® packaging technology to the special needs of backlighting applications, OSRAM Opto Semiconductors has created a brilliant LED that will enhance screens and displays of all sizes by covering the color space according to the sRGB standard.

Features:

- PLCC 3014 package, binned @20 mA
- Small lumen package for perfect uniform illumination
- Small package dimensions for good second-board reliability

Micro SIDELED®

Micro SIDELED® is the smallest SMT module (surface mounted technology) so far with side beam characteristics and integrated ESD protection.

Features:

- Sidelooker optimized for switches and small display backlighting
- Latest technology inside
- Wide color portfolio available

SIDELED®

Offering sidelooker housing for all applications in need of that specialty, SIDELED® is the perfect supplement to TOPLED® and Mini TOPLED®. Together, these three different packages cover all brightness values.

Features:

- Sidelooker optimized for mid-size panel backlighting
- Optimized supplement to the TOPLED® and Mini TOPLED® family
- Wide color portfolio available



TOPLED® E3014	LUW JLSH
Available colors/typical CCT	10000 K
Typical brightness (luminous flux) (@20 mA)	7.2 lm
ESD	2 kV
Beam/viewing angle	110°



Micro SIDELED®	LW Y1SG	LB Y8SG	LT Y8SG	LY Y8SF	LR Y8SF
Available colors/typical CCT	8200 K	470 nm	529 nm	590 nm	625 nm
Typical brightness (@20 mA)	1500 mcd	400 mcd	710 mcd	630 mcd	450 mcd
ESD	2 kV	sensitive	sensitive	2 kV	2 kV
Beam/viewing angle	120°	120°	120°	120°	120°



SIDELED®	LW A6SG	LB A6SG	LT A6SG
Available colors/typical CCT	5600K	470 nm	528 nm
Typical brightness (at typical current I _r)	1260 mcd (20 mA)	400 mcd (20 mA)	1600 mcd (30 mA)
ESD	2 kV	2 kV	2 kV
Beam/viewing angle	120°	120°	120°

Choose perfection – easily



Illumination



Functional



Display

✓ recommendation

	OSLON® Square	DURIS® E3	DURIS® E5	TOPLED®	TOPLED® E3014	Advanced Power TOPLED®	SYNIOS® E4014	CHIPLED® 0402	CHIPLED® 0603	PointLED®	Mini TOPLED®	TOPLED® E3014	Micro SIDELED®	SIDELED®
Illumination	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Functional		✓		✓	✓			✓	✓	✓	✓			
Displays					✓	✓		✓				✓	✓	✓
Page	10	10	10	12	12	13	13	14	14	15	15	16	16	17

Optical switching/interfaces

Sensors

Emitters	IR TOPLED® SFH 4243/4253	✓		
	IR Mini TOPLED® SFH 4247	✓		
	IR SIDELED® SFH 4256	✓	✓	
	MIDLED® (Top- or Sidelooking) SFH 465x	✓	✓	✓
	MINI MIDLED® SFH 4451	✓	✓	✓
SIDELOOKER IRL 81A				
Detectors	IR TOPLED® SFH 320	✓		
	IR SIDELED® SFH 325	✓	✓	
	MIDLED® (Top- or Sidelooking) SFH 360x	✓	✓	
	SIDELOOKER LPT 80A		✓	
	Smart DIL Photodiode SFH 2400	✓		
2 in1 Sensor SFH 7770 E6				
Application		Induction stove	Turbidity sensor	Gesture switch
		IR interface	Object sensing	
		Rotary switch	Optical switch	

Be informed – completely

Looking for more information and data on our products for LEDs in general lighting or LEDs in general? All you need to know about our state-of-the-art products, modern LED technology and the latest LED trends can be found on our website along with other related links.

catalog.osram-os.com

Our complete product catalog with all available products

www.osram-os.com/solid-state-lighting

Products and solutions for general lighting/solid state lighting

ledlight.osram-os.com

The leading source of LED information, resources, tools, technology & LED lighting solutions for the solid state lighting and general illumination sectors

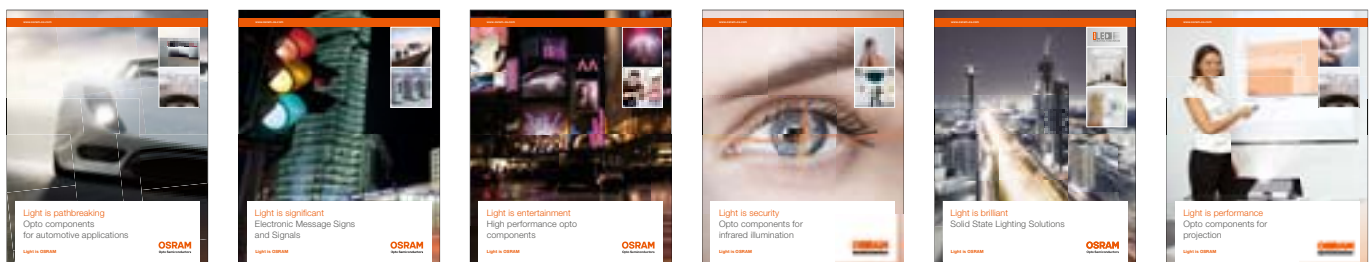
www.ledlightforyou.com

The network for LED lighting technology – powered by OSRAM



Application brochures available from OSRAM Opto Semiconductors

Our innovative products open up a wide variety of applications. Just contact us for assistance with your specific design (for contact information see last page) or order our application brochures: www.osram-os.com/downloads.



Bringing your visions to life

OSRAM Opto Semiconductors is one of the world's leading manufacturers of optoelectronic semiconductors and is considered an authority on innovative light technologies. With numerous patented technologies, a deep understanding of customer needs, close customer relations and highly committed employees, we take an active part in shaping the future of light.

Leader in technology

Because for decades we have been investing in technology and quality, steadily expanding our competencies, OSRAM Opto Semiconductors today sets the highest international standards in the fields of illumination, visualization and sensor technology. Our products range from high-performance light-emitting diodes (LEDs) and infrared diodes (IREDs) to detectors.



Your partner of choice

OSRAM Opto Semiconductors' close cooperation with our customers and partners generates new ideas for products and light solutions. Not least, these joint efforts have also resulted in an application-specific portfolio for a variety of applications: our semiconductors are used, for instance, in light solutions for automotive, white goods, entertainment and infotainment, projection and general lighting as well as numerous infrared and laser solutions.



Driver for innovation

Continuous commitment to research and development have established a solid foundation at OSRAM Opto Semiconductors for product development and manufacturing at a consistently high level. We have, for example, turned out pioneering technologies for almost 40 years and hold thousands of patents. Milestones reached in setting numerous standards in LED light technologies include the development of the first surface-mountable LED (TOPLED®), the first LED with white light and the OSRAM OSTAR® product platform with its versatile package design.



Competent light solutions around the globe

By engineering and manufacturing highly complex semiconductor chips and consistently developing new products for new applications, OSRAM Opto Semiconductors is able to satisfy the needs and requirements of customers around the world. With our headquarters in Regensburg (Germany), Sunnyvale (USA) for North America and Hong Kong for Asia, production sites in Regensburg, Penang (Malaysia) and soon in Wuxi (China), some of the most modern LED chip manufacturing facilities in the world, and a global network of sales and marketing centers, we and you are in an excellent position to meet the challenges of today and tomorrow.



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