



Light is security
Opto components for
infrared illumination

Light is **OSRAM**

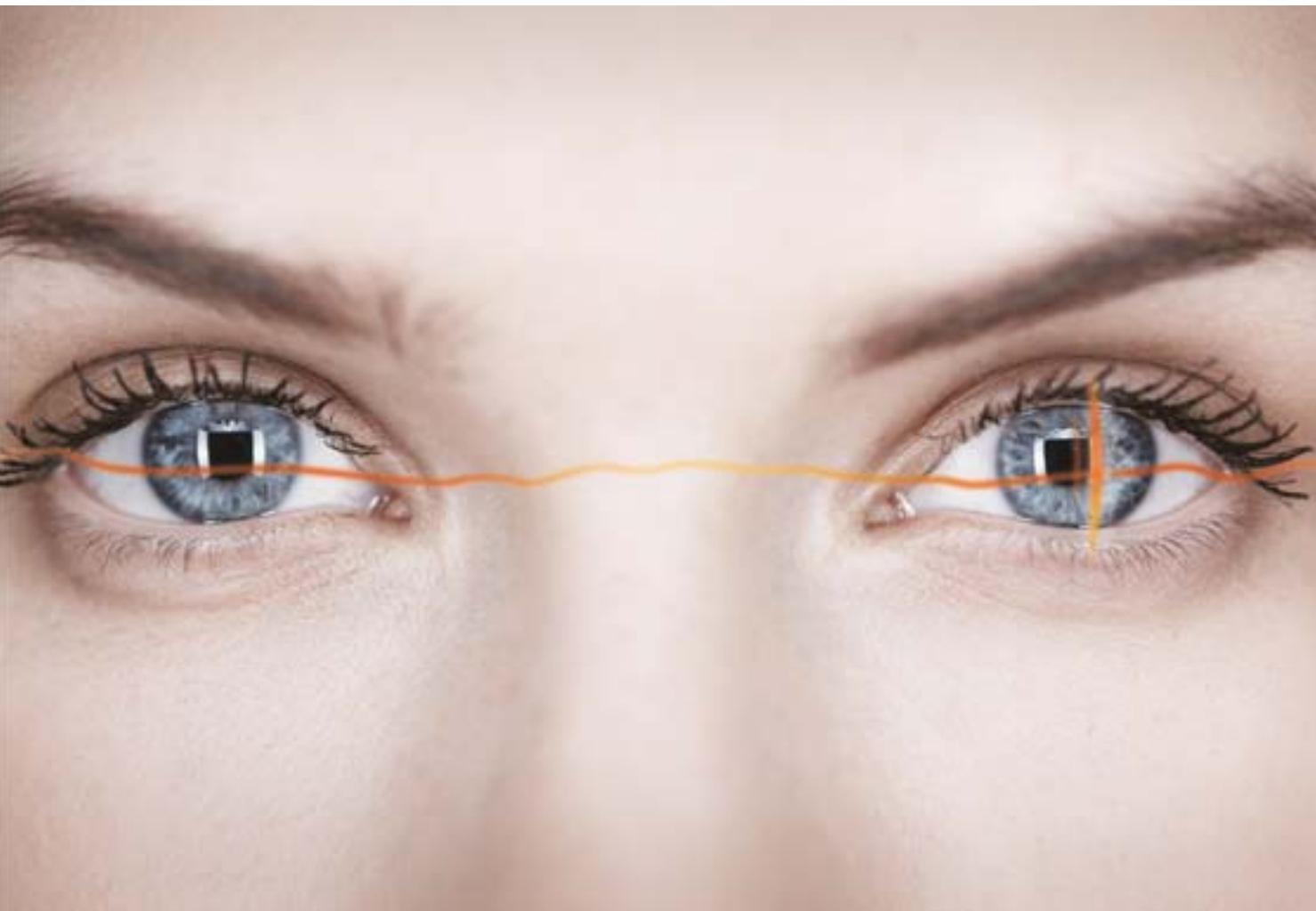
OSRAM
Opto Semiconductors



Combining great performance and small dimensions, OSRAM Opto Semiconductors' state-of-the-art infrared illumination components secure new opportunities for our customers.

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Realizing new visions with invisible light

Designers and manufacturers of “invisible” IR based applications clearly benefit from OSRAM Opto Semiconductors’ high quality infrared components, allowing high system efficiency along with low total system costs.

OSRAM Opto Semiconductors also delivers a complete portfolio of innovative infrared LED and laser components in every performance class. Our products combine the competence of nearly 40 years of expertise in the semiconductor industry with 100 years of experience in lighting technology from OSRAM GmbH. All opto semiconductor processes are concentrated under one roof – from chip development, packages and phosphors to finalized components. Thanks to our extremely reliable products and the energy efficiency inherent in infrared LED technology, the once unimaginable has become today’s reality.

Many different applications

There are countless applications for infrared illumination that are already implemented today, and many more to come that will be realizable in the future.

- Driver monitoring and occupancy detection
- Automatic number plate recognition (ANPR) and intersection pre-emption
- Adaptive Cruise Control (ACC)
- Night vision
- Pre-crash sensing and pedestrian protection
- Fingerprint or face recognition
- Door control (intruder sensor)
- IR audio and video communication
- Gesture recognition (HMI)
- Interactive board

And last but not least: Closed Circuit Television (CCTV), probably the most prevalent and most versatile applications just now.



The same challenges

Seeming quite different at first sight, all these IR illumination applications have to meet exactly the same requirements:

- High light intensity and flexible angle of illumination
- Uniform illumination
- Long-distance coverage
- Wavelength requirements: good camera sensitivity vs. covert observation (non-visible to the human eye)
- Low heat generation and power consumption
- Long-term stability

Whether surveillance, machine vision or traffic control, biometrics or games, whether for automotive, office, home, interior or exterior use, OSRAM Opto Semiconductors offers the perfect solution for the most diversified and most innovative IR illumination applications – ready to use or customized for your special needs.

Covert light for clear images – infrared illumination for camera systems

Whether wide-range surveillance of parking lots, industrial sites or airports, video cameras in banks or number plate recognition at the gate of a company's car park – Closed Circuit Television (CCTV) keeps a close watch. Many solutions benefit from adding infrared light. Camera sensors register this radiation which is hardly noticeable to the human eye, producing high-quality images.

Systems with a long range

To cover ranges of 100 meters and more especially for outdoor applications, the illumination unit must supply an optical output of several watts. So far the infrared spotlights have been based on a large number of radial through-hole components. Radial IREDS come in a broad variety of emission angles which facilitate narrow, far-reaching light cones. However, these devices reach their limits when high power is required because they are restricted to low currents in continuous operation for thermal reasons.

Special high-power DC (direct current) or CW (continuous wave) packages allow higher currents because they dissipate considerably more thermal losses. Thus the number of IREDS per spotlight is reduced. These products, such as the infrared OSRAM OSTAR®, reduce the board space significantly. Generally, IREDS in DRAGON®, DRAGON® Dome, OSLON® or OSRAM OSTAR® packages are recommended for long-range infrared spotlights.

For narrow light cones or for zoom systems which have to match the emission angle with the focal distance of the camera, DRAGON® or OSLON® products are particularly well suited. For them a broad range of lenses is available with emission angles as low as 5° full width at half maximum.





Systems in buildings

For the surveillance of interior areas such as banks or museums, either IREDs with different emission angles are used, or the emission optics above the diodes are varied. In speed dome cameras a motor swivels the camera through 360° to cover larger areas. In this case very high optical power is required because each image segment must be adequately illuminated at very short exposure times. So far, the light sources in dome cameras have been mainly based on radial IREDs, but now manufacturers are increasingly favoring powerful diodes such as DRAGON® or OSOLON® devices. These compact emitters are particularly attractive for small and efficient systems.

Automatic number plate recognition at gates calls for a special type of camera surveillance. In this case, the license plate of a moving car must be captured in optimum image quality to enable the image recognition software to read the characters correctly. To reduce the interfering effects of ambient light, the systems only use infrared light and have a filter in front of the camera sensor. For cameras mounted at gateposts, DRAGON®, OSOLON® or Power TOPLED® devices are the ideal compact illumination solution.



Powerful IREDs facilitate compact illumination units for video and CCTV systems on an infrared basis. They substantially reduce the cost for packages, optics, reflectors and production. OSRAM Opto Semiconductors holds a leading position in the field of infrared LED illumination and supports manufacturers with ongoing power enhancement and comprehensive application know-how.

High power infrared emitters with 850 and 940 nm

IR Power TOPLED® is the ideal replacement for standard through-hole devices such as 5 mm radials. The small SMT packages are available with spectral emission at 850 nm for high camera sensitivity and 940 nm for reduced reddish glow for security and interior applications (semi covert). There are options with and without lenses for beam angles of $\pm 15^\circ$, $\pm 25^\circ$ and $\pm 60^\circ$ so Power TOPLED® is especially suited for short and mid range infrared illumination. Standard reflow solder processes can be used for device assembly.



**IR Power TOPLED®:
SFH 4240/4250/4250S**

- 940 nm (SFH 4240) and 850 nm (SFH 4250/4250S) wavelength
- Radiant intensity up to 22 mW/sr at 100 mA (typ.)
- Operating temperature range: -40° to $+100^\circ\text{C}$
- Suitable for all CMOS/CCD camera systems

**IR Power TOPLED® with lens:
SFH 4248/4249/4258/4259/4258S/4259S**

- 940 nm (SFH 4248/4249) and 850 nm (SFH 4258/4259/4258S/4259S) wavelength
- Radiant intensity up to 110 mW/sr at 100 mA (typ.)
- $\pm 15^\circ$ and $\pm 25^\circ$ options available
- Operating temperature range: -40° to $+100^\circ\text{C}$
- Suitable for all CMOS/CCD camera systems



IR Power TOPLED®



	SFH 4240	SFH 4248	SFH 4249
Centroid wavelength λ (nm)	940	940	940
Total radiant flux (mW) @0.1 A	55	65	65
Radiant intensity (mW/sr) @0.1 A	15	100	55
Forward voltage (V) @0.1 A	1.5	1.5	1.5
Viewing angle (°)	± 60	± 15	± 25

IR Power TOPLED®



	SFH 4250	SFH 4258	SFH 4259
Centroid wavelength λ (nm)	850	850	850
Total radiant flux (mW) @0.1 A	60	70	70
Radiant intensity (mW/sr) @0.1 A	15	110	55
Forward voltage (V) @0.1 A	1.5	1.5	1.5
Viewing angle (°)	± 60	± 15	± 25

**IR Power TOPLED®
with Nanostack®**



	SFH 4250S	SFH 4258S	SFH 4259S
Centroid wavelength λ (nm)	850	850	850
Total radiant flux (mW) @0.07 A	70	80	80
Radiant intensity (mW/sr) @0.07 A	22	100	60
Forward voltage (V) @0.07 A	3.0	3.0	3.0
Viewing angle (°)	± 60	± 15	± 25

High power infrared emitters with 850 nm and 940 nm

IR Platinum DRAGON® high performance infrared emitters are available with 850 nm for high camera sensitivity. The Nanostack® DRAGON® devices offer very high total optical flux (SFH 4235 typically 950 mW) and very low thermal resistance for operation at elevation ambient temperature and high current DC operation. The SMT packages provide a very stable solder interface between the chip and the package particularly for pulse operation, as well as holes for precise adjustments of external optics to precisely define the beam angle for dedicated applications. IR Platinum DRAGON® IREDs are qualified according to automotive standards. Especially for DC operation the IR Golden DRAGON® is optimized in terms of high total optical flux. The SFH 4232A offers with 650 mW the highest optical power at a voltage of just 1.65 V.

IR Platinum DRAGON®:

SFH 4235

- Centroid wavelength 850 nm
- Radiant intensity 320 mW/sr at 1 A (typ.)
- Active chip area 1 × 1 mm²
- Low thermal resistance < 9 K/W
- Very high total radiant flux at 1 A DC
- Pulse currents up to 5 A possible
- Operating temperature range: -40 ° to +125 °C
- Suitable for all CMOS/CCD camera systems
- Perfect solution also for gesture recognition (HMI) gaming applications

IR Golden DRAGON®:

SFH 4232A

- Radiant intensity of 205 mW/sr
- Active chip area 1 × 1 mm²
- Centroid wavelength 850 nm
- Low thermal resistance < 10 K/W
- Very high total radiant flux at 1 A DC
- Pulse currents up to 2 A possible
- Operating temperature range: - 40 ° to +100 °C
- Perfect solution for all CMOS/CCD camera systems

IR Platinum DRAGON®

IR Golden DRAGON®



	SFH 4235	SFH 4232A
Centroid wavelength lambda (nm)	850	850
Total radiant flux (mW) @1 A	950	650
Radiant intensity (mW/sr) @1 A	320	205
Forward voltage (V) @1 A	3.0	1.65
Viewing angle (°)	± 60	± 60

New high power infrared emitter with narrow beam angle of $\pm 12^\circ$

IR DRAGON® Dome is a new high efficiency infrared emitter with narrow 12° half angle for long distance illumination and 850 nm wavelength for high camera sensitivity. The SMT package with deep reflector and integrated lens has the same footprint as IR DRAGON® and provides a very stable solder interface between chip and package.

IR DRAGON® Dome: SFH 4783

- Narrow viewing angle ($\pm 12^\circ$)
- Low thermal resistance (max. 11 K/W)
- Centroid wwn also for surveillance cameras and machine vision systems

IR DRAGON® Dome



	SFH 4783
Centroid wavelength lambda (nm)	850
Total radiant flux (mW) @1 A	430
Radiant intensity (mW/sr) @1 A	2300
Forward voltage (V) @1 A	1.65
Viewing angle (°)	± 12



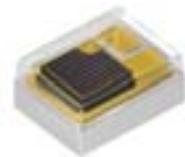
Mid-power infrared emitters with an emission angle of $\pm 65^\circ$

Despite its very small package, the IR OSOLON® Compact offers impressive output. The infrared light emitting diode has an emission angle of $\pm 65^\circ$ and does not need internal optics or reflectors. Its light can however be successfully injected into narrow-angle external optics. The infrared OSOLON® Compact SFH 4710 has been designed especially for industrial applications. As a mid-power LED with a typical output of 270 milliwatts (mW) from an operating current of 500 milliamps (mA), it is a welcome addition to the product portfolio of OSRAM Opto Semiconductors, occupying the output range between Power TOPLED® and OSOLON® Black.

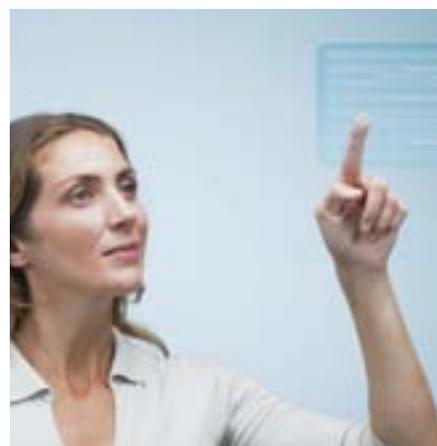
IR OSOLON® Compact

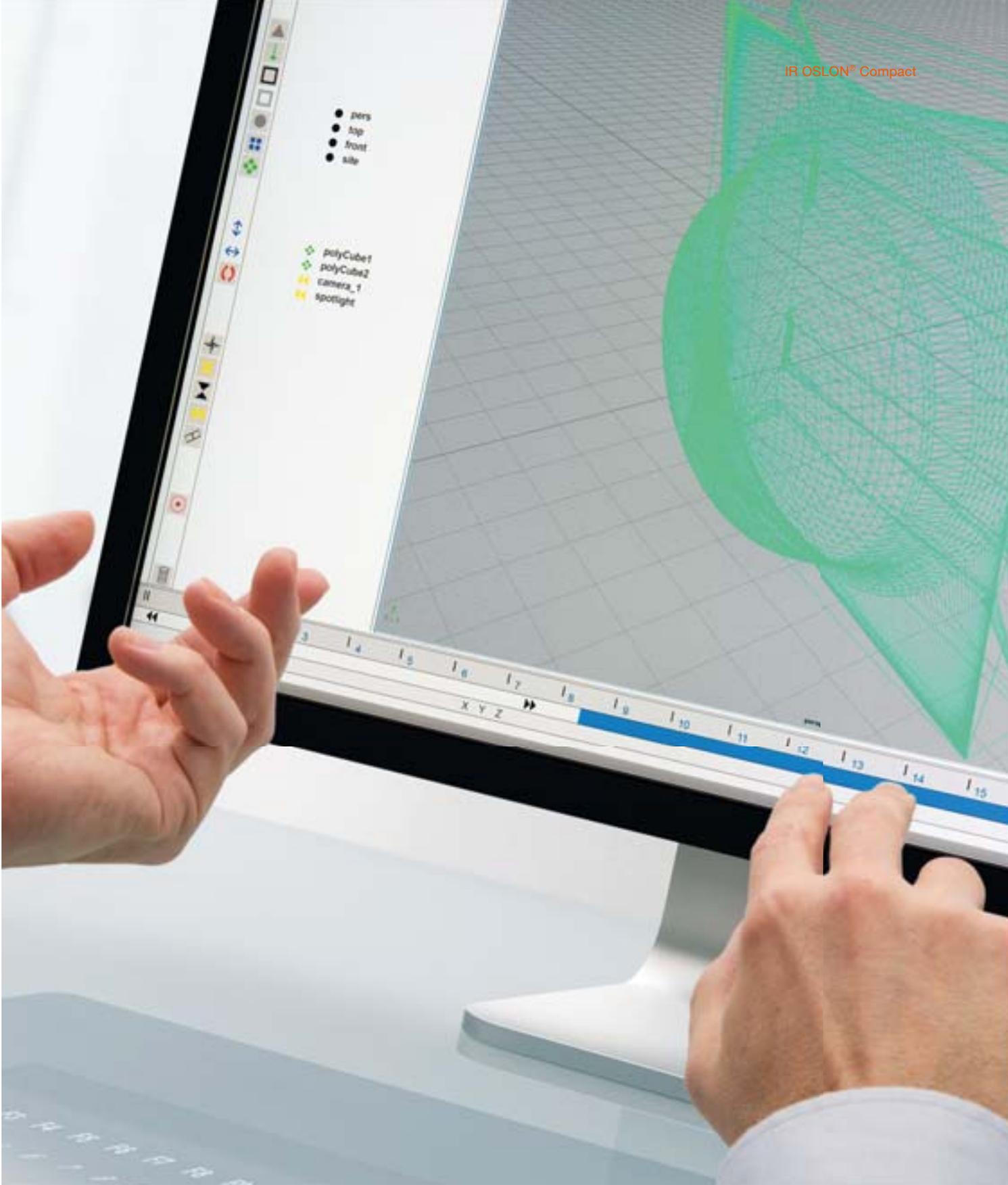
- Centroid wavelength 850 nm
- High radiant flux of 270 mW at 500 mA
- Radiant intensity of 63 mW/sr at 500 mA
- Half angle: $\pm 65^\circ$
- Low thermal resistance of < 20 K/W

IR OSOLON® Compact



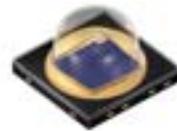
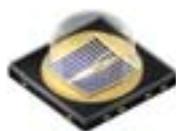
	SFH 4710
Centroid wavelength λ (nm)	850
Total radiant flux (mW) @0.5 A	270
Radiant intensity (mW/sr) @0.5 A	63
Forward voltage (V) @0.5 A	1.6
Viewing angle ($^\circ$)	± 65







IR OSOLON® Black Series



	SFH 4715A	SFH 4715S	SFH 4716A	SFH 4716S
Centroid wavelength λ (nm)	850	850	850	850
Total radiant flux (mW) @1 A	800	1030	760	1030
Radiant intensity (mW/sr) @1 A	430	440	170	225
Forward voltage (V) @1 A	1.65	2.9	1.65	2.9
Viewing angle (°)	± 45	± 45	± 75	± 75

High power infrared emitters with 850 nm and 940 nm

IR OSOLON® Black Series are very cost-effective high-performance infrared emitters with 850 nm for high camera sensitivity and 940 nm for reduced reddish glow for security and interior applications (semi covert). The devices combine very high total optical flux of typically 1,030 and 990 mW at 850 nm and 940 nm and very small packages with a footprint of only $3.85 \times 3.85 \text{ mm}^2$ for very dense packing. Further benefits include very high total radiant flux at 1 ADC, low thermal resistance for operation at elevation ambient temperature and high current DC operation and an integrated lens for a beam angle of $\pm 45^\circ$. IR OSOLON® Black Series IREDs are qualified according to automotive standards.

IR OSOLON® Black Series:

SFH 4715A /4716A /4715S /4716S /4725S /4726S

- 850 nm (SFH 4715A /4716A /4715S /4716S) and 940 nm (SFH 4725S /4726S) wavelength
- Radiant intensity of up to 440 mW/sr at 1 A (typ.)
- Emitting angle $\pm 45^\circ$ and $\pm 75^\circ$
- Active chip area $1 \times 1 \text{ mm}^2$
- Low thermal resistance $< 11 \text{ K/W}$
- Pulse currents up to 5 A possible
- Operating temperature range: -40° to $+125^\circ \text{C}$
- Suitable for all CMOS/CCD camera systems

The smallest IR-LED in the 1-watt class:

IR OSOLON® SFH 4715S

The record-breaking high-performance IR OSOLON® SFH 4715S LED typically provides 1,030 mW optical power at an operating current of 1 A, offers a typical thermal resistance of only 6.5 K/W and features an integrated lens with an emission angle of $\pm 45^\circ$. Due to this adapted outcoupling lens the IR OSOLON® SFH 4715S delivers 15 percent more output power than components without a lens. For short distance applications a wider beam angle is often desired. For those requirements SFH 4716S with a beam angle of $\pm 75^\circ$ offers a good solution. The small package allows compact arrangements with very high power density. 3D cameras in particular benefit from the improved power since the IR-LED can be modulated up to very high operating currents of 5 A in the range of 10 MHz.

IR OSOLON® Black Series



	SFH 4725S	SFH 4726S
Centroid wavelength λ (nm)	940	940
Total radiant flux (mW) @1 A	990	990
Radiant intensity (mW/sr) @1 A	425	215
Forward voltage (V) @1 A	2.75	2.75
Viewing angle ($^\circ$)	± 45	± 75

Ultra high power infrared emitters with 850 nm

IR OSRAM OSTAR® SFH 4750 is a densely packed multi-chip device for a very high total optical flux of up to 3.5 W at 1 A. With spectral emission at 850 nm for high camera sensitivity and very low thermal resistance for operation at elevation ambient temperature and high current DC operation, these ultra high power IR emitters are especially suitable for all CMOS/CCD camera systems. All devices are plug and play solutions after mounting on a proper heat sink.



IR OSRAM OSTAR® Lighting: SFH 4750

- Powerful LED array in a hexagonal package at 850 nm
- Viewing angle: +/-70°
- High optical flux of 3.5 W
- Pulse currents up to 5 A possible
- Very low thermal resistance of 3 K/W
- Operating temperature range: -40° to +100 °C

IR OSRAM OSTAR®



	SFH 4750
Centroid wavelength lambda (nm)	850
Total radiant flux (mW) @1 A	3500
Radiant intensity (mW/sr) @1 A	1000
Forward voltage (V) @1 A	9.5
Viewing angle (°)	± 70



Choose perfection – easily

✓ recommendation

	5mm radials SFH 4550/5/6/7, SFH 4545/6/7	IR Power TOPLED® SFH 4240/50/50S	IR Power TOPLED® with lens SFH 4248/9, SFH 4258/8S/9/9S	IR Platinum DRAGON®/Golden DRAGON® SFH 4235/SFH 4232A	IR DRAGON® Dome SFH 4783	IR OSOLON® Black Series SFH 4715A/4715S/4716A/4716S/4725S/4726S	IR OSOLON® Compact SFH 4710	IR OSRAM OSTAR® Lighting SFH 4750	Pulsed Laser Diodes SPL PL/LL
Surveillance									
Automatic number plate recognition (ANPR)	✓		✓	✓	✓	✓	✓	✓	
CCTV	✓		✓	✓	✓	✓	✓	✓	
Industrial – machine vision									
Machine vision/quality control	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCTV	✓	✓	✓	✓	✓	✓	✓	✓	
Industrial – traffic control									
Intersection pre-emption	✓			✓	✓	✓	✓	✓	
Biometrics									
Vein/fingerprint recognition	✓	✓	✓			✓	✓		
Iris/face recognition	✓	✓	✓			✓	✓		
Automotive – interior									
Driver monitoring	✓		✓						
Occupancy detection	✓		✓						
Automotive – exterior									
ACC									✓
Side vision	✓			✓		✓			
Pre-crash sensing/pedestrian protection				✓		✓			✓
Night vision				✓		✓			
Home interior									
3D remote control	✓	✓	✓						
IR audio/video communication	✓	✓	✓						
Home exterior									
CCTV, video communication/door control (intruder sensor)	✓	✓	✓				✓		
Games									
Gesture recognition (HMI)		✓	✓	✓		✓	✓		✓
Office									
IR audio/video communication		✓	✓			✓	✓		
CCTV	✓	✓	✓	✓	✓	✓	✓	✓	
Non-glare presentation			✓	✓		✓	✓	✓	✓
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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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