

DVN REPORT

February 2021

— New Models —
November 2020 - February 2021



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About the authors



Hector Fratty's entire career has been in automotive lighting. From 1995 to 2006, he was Valeo Lighting's chief of R&D. His level of expertise in lighting gained him recognition as one of Valeo's five Master Experts. In 2008, he initiated the launch of his own company, Driving Vision News, which has become the automotive lighting and driver assistance industry's journal of record dedicated to keeping the community informed and communicating about the latest progress and developments.

Driving Vision News DVN is the vehicle lighting and ADAS industry's journal of record, dedicated to keeping the community informed and communicating about the latest progress and developments. DVN's three pillars are

- **Technological watch** on new emerging technologies, with weekly electronic newsletters bringing news, analysis, and crucial information on innovation in lighting, ADAS, and smart car interiors; there are also monthly technical reports with sharp focus on cutting edge technologies, company profiles, regulatory matters, and other relevant content available only from DVN
- **Networking** of high-level decisionmakers, researchers, innovators, practitioners, academics, and regulators to make new business connections with two workshops per year in rotating locations throughout America, Europe, China, Japan, India, and Korea. DVN Workshops gather over 300 participants.
- **Promotion of innovations** from DVN's 150 member companies—we facilitate the promulgation of knowledge of innovation, which in turn paves the way for commercialisation, enabling to build new relationships through DVN Community to forge new business worldwide. The DVN Gold membership roster includes 30 automakers, 30 lighting & ADAS tier-1 suppliers, 15 light source suppliers, 50 tier-2 & -3 suppliers, and a wide variety of universities, research outfits, and consultants. DVN Gold members receive all publications and attendance privileges at all DVN Workshops. Basic members—2,500 and counting—receive Newsletters and can obtain access to other DVN publications and functions.

DVN's Main Takeaways From Recent Auto Launches

1.

Lamps and lighting increasingly amplify style and design; brand signature, and technology differentiation.

Aerodynamic, pedestrian-protection, crashworthiness, and benchmarking all exert homogenising constraints on what a vehicle is shaped like, so the identity, design, and technology content of cars like the Audi e-Tron GT, DS4, and BMW iX are expressed largely through the front and rear lights.



Audi



DS 4



BMW iX



Audi E-Tron GT



DS 4



BMW iX

2.

Rear lamps with full-width light lines are a hot trend.

The Audi e-Tron GT, Mercedes EQA, Nio ET 7, and Nissan Arima are among the increasing number of models with rear light bands spanning the whole width. This brings new possibilities for vehicle design and style, animated light effects, and augments the vehicle's perceived size and presence, while also providing lit area that would otherwise be missing due to another trend:



Audi E-Tron GT



Mercedes EQA



NIO ET7

3.

Rear lamps are growing slimmer and slimmer.

The BMW iX, the DS4, and the Jaguar GT Vision are just a few examples of vehicles with rear lamps in fine-line designs.



BMX iX



DS E-Tense



Jaguar GT Vision

4.

Headlamps are growing slimmer and slimmer, too.

The actual car fashion trend is ultra small headlamps. Stylists force the engineers to find solutions for sufficient light performance.

LED and laser light sources and new optical techniques unlocked by new materials are making it possible for headlamps to be vanishingly thin. Examples include the Acura, BMW iX, DS4 , Genesis GV70, Infiniti QX55, and Nissan Ariya (optic modules just 2 cm high!)



Acura MDX



BMW iX



Nissan Ariya

5.

DRLs, as well, are on a reducing diet.

The Jaguar GT Vision and the Nio ET7 have fine-line DRL designs. And Renault's 5 concept, too, with edge-emitting light guides looped into square shapes to evoke the under-bumper rectangular fog lamps of years past.



Jaguar GT Vision



Nio ET7



Acura MDX

6.

DRLs are increasingly a central anchor point for brand signature.

The Jaguar GT Vision, the Nio ET 7, and the Dacia Bigster concept are far from the only ones, but take a look at these three models and the trend is clear: automakers are piggybacking brand and model identity on the presence-advertising technical function of the daytime running light. It's not just «I'm here», it's «I'm here and I'm an electric BMW» (for example).



Land Rover Discovery



Mini Cooper



Dacia Bigster

7.

Segmented taillights are popular right now.

The Infiniti QX55 with its «digital piano-keys» taillights, Audi’s e-tron GT, and the Renault 5 Concept are a few of many examples. Very few vehicles have OLED rear lighting (yet?), but other technologies and techniques are also providing attractive new designs—we like the triangular «fish scales» effect on the DS4. Which technology will transform the rear lamps into rear end communication displays?



Infiniti QX 55



Audi E-Tron GT



Renault 5 Concept

8.

Modularisation is well under way.

We see it heavily in the Kia Sorento, Land Rover Discovery, Mini Cooper, and Nissan Ariya; clearly the industry is finding a sweet-spot, balanced between the cost savings of modular componentry and the exuberance of new lightstyles.



Kia Sorento



Land Rover Discovery



Nissan Ariya

9.

Welcome and farewell displays are proliferating.

Shortly ago these kinds of dancing-light shows were a functional test of the rear lamps. Now it seems that they become a «look what we can do!» fun party trick. Clearly they are helping buyers bond with and appreciate their cars, so these kinds of displays appear to be in it for the long haul, not just a passing fad. But be careful! Authorities of some countries are not happy with this trend.



BMW iX



Buick Envision



BMW Welcome Light Carpet



Audi E-TRON GT

Audi's E-tron GT demonstrates that electric mobility is becoming dynamic and fascinating.

The front and rear lamps are characteristic elements that further enhance the expressive exterior design.

The LED light signatures at the front and rear feature pronounced three-dimensional modelling and emphasise the emotive look of the car. The daytime running lights provide a striking light signature, together with the characteristic blue trim of the optional laser high beam booster.

Porsche's Taycan and Audi's Etron GT share the same electrical platform with 800 V and up to 320 KW charging ability for ultra short charging durations.



A sculptural light strip spans the entire vehicle at the rear, changing dynamically from a line in the centre into ever larger segments toward the outside, which makes the car appear even more powerful.

The DRL builds an X-Frame around the laser which you can perceive as an (electric) lightning too. We actually don't need to mention that fascinating greetings animations in the front and rear come with the lights.



Acura MDX

The new MDX has a new version of Acura's «JewelEye» headlamps with four paired lighting cells per side, each with a low- and high-beam LED.

They give better performance compared to the ones on the previous MDX; the low beams provide 3 per cent longer reach and 35 per cent wider coverage, while the new high beams give 8 per cent more seeing distance and 25 per cent wider coverage.



New «Chicane» taillights are shaped to enhance the vehicle's premium bona fides.

Their 3-dimensional design is defined by an eye-catching light-blade. It's a work of light sculpture offering depth shape, and brilliance while complementing the car's pronounced rear fender forms.



Bugatti Bolide

The Bolide has an ultra-lightweight shell around the iconic 8.0-litre W16 engine with up to 1,850 horsepower. Weighing just 1,240 kg, the Bolide achieves a phenomenal power:weight ratio of 1.49 horsepower per kilogram.

The lighting design of the entire car shows a strong X signature from every angle.



The rear lamps are integrated in the X-shaped surfaces, creating a clean geometrical signature.





Buick Envision

The new Envision strengthens Buick's premium SUV-only lineup with more design, connectivity, and safety features.

All models feature LED headlamps, taillamps, and daytime running light signatures, as well as a welcome/farewell lighting animation activated by using the key fob.



The DRLs have an inverted-checkmark shape while the rear lamps have a two-stripe design with a boomerang shape—reminders of Buick's time as the American badge for Opel vehicles.





BMW iX

A vision is turning into reality, as BMW's Vision iNEXT becomes the iX.

The slimmest headlamp units ever to feature on a series-produced model from BMW provide a freshly minimalist take on BMW's familiar four-eyed face. The white LED daytime running lights, which also light in amber for the turn signal function, have a new design as two-dimensional strips along the upper edge of the headlamp units; they fit neatly into the imposing design of the car.

This gives the front lamps a totally new appearance in daylight.

Blue elements on the side show where the battery is placed (you see this in other electric cars too, but less visible than on the iX). Another new element for BMW are the flush door handles we see on some new premium cars.



The single-piece rear lamps are set neatly into the tailgate, which sweeps a long way into the car's quarter panels.

Like the headlamps, the rear lamps have a slimmer design than on any previous series-produced BMW Group vehicle. All light functions use LED technology. The light fixtures are integrated directly into the three-dimensional lens cover mouldings, creating a strong, bold appearance. The L shape familiar from other BMW models is present here within the single light strip housing both the tail and stop lamps, and also comprising the horizontal turn indicators, which only become visible when active.





BYD D1

BYD have partnered with Chinese ride-hailing giant Didi Chuxiang to develop an all-electric vehicle designed specifically with ride-hailing in mind. The front lights are designed as a full-width stripe, and the rear lamps are integrated in the black tail-gate.





Citroën C3 AirCross

The new front face immediately attracts the gaze, notably with the new headlamp signature. The chrome-trimmed chevrons have been upgraded, extending out towards the LED lights, in the spirit of New C3 and New C4, but with a more muscular approach. The LED lights provide even more clarity and safety, lending motorists a sense of protection.



The 3D-effect rear lights spell out the family connection with the new C3 and the C-Aircross concept car. The sophisticated light units are complemented by Gloss Black inserts in the tailgate featuring the two-tone C3 Aircross badge and Gloss Black chevrons.





Dacia Bigster Concept

The Bigster concept is big and blocky.

The frontal design features a full-width grille housing five lighting elements across its width, tying together placeholder mockups suggesting a new version of Dacia's Y-shaped signature headlamps.



At the rear, there's a pair of large sideways-Y tail light mockups flanking a clean tailgate design that features a large backlit Dacia badge in white, which for sure has to be changed into red for homologation.



CarShow.com





DS 4

The new DS 4 from Citroën's premium DS brand faces the world with eyelike matrix LED headlamps combining matrix and directional lighting.

They are complemented by two-lines-merging-to-one daytime running lights—98 LEDs in total.



Each rear lamp contains a lattice of elegant triangular LED-illuminated scales. Citroën's designers used advanced, highly precise laser engraving technology to design this unique signature.





Genesis GV70

The GV70 is the fifth model and second SUV in the Genesis range.

The front centres around a giant shield-shaped grille between narrow horizontal twin-line headlamps. Each lamp has two projector modules, with linear DRLs accentuating the body-colour divider bar separating the upper lamp from the lower one.



The rear lighting echoes the same design theme, with upper and lower lamps separated by a body-colour divider wrapping around from the quarter panel well into the hatchgate.





Honda Civic Prototype

Honda's newest Civic arrives with a low, wide stature and—in keeping with recent Honda design points—prominent horizontal front lamps.

The headlamps' shovel optics are corralled at the top by inverted-v daytime running light lines.



The inverted-v theme is stated in the rear lamps, as well, with an unusual blackout look to the turn signal and reversing light areas.



Infiniti QX55

Infiniti's signature headlamps' design mimics eyelids above and below ice cube LED optics.

The side marker light and reflector are tidily tucked into the outboard edge as a slim scalene triangle.



The taillights are designed with a «digital piano keys» appearance, as on the recently-shown QX60 Monograph design study.

Their visual depth is enhanced by an intricate inner housing with 45 individual LEDs in each taillight. The piano-key taillights are distinctive from every angle.



Jaguar GT Vision concept

The Gran Turismo Coupé is a teaser of Jaguar's first all-electric sports car created for the globally-renowned Gran Turismo series.

The headlamps are designed as a flush surface integrated within the main bumper, with ultra-thin J-shaped DRLs following the shape of the headlamp lens.



The rear lamps are integrated underneath the spoiler in a black stripe, practically invisible until they're lit.



Jaguar E-PACE

New all-LED headlamps on Jaguar's E-PACE feature double-J daytime running lights, one line above and one below the four prominent ice cube headlight optics.

The LED headlamps are available with pixel technology for increased resolution and brightness. ADB is available (except in the United States, where it's still not allowed).





Kia Sorento

The new Sorento has headlamps visually blended so carefully that they appear to be an integral part of a full-width grille.

On closer examination the three eyelidded optics become apparent. There's a new «tiger eyeline» LED daytime running light arrangement.



Like the Telluride, the new Sorento has vertical tail lamps which wrap around the side of the body. Turn signals are far below, in the bumper below the rear retro-reflectors.





Kia Seltos

We see a harmonized grille and headlamp design featuring full LED lighting. The headlamps are composed in two parts sitting above and underneath a blade.

The DRL is a slim stripe extending almost to the middle of the grille.



A chrome bar houses the reversing lamps and ties the left and right rear lamps together. Depth and motion effects are created by the chicane-style taillight signature.



Land Rover Discovery

The new Discovery faces the world with LED headlamps containing dual horizontal rectangular ice cube optics.

They're underscored by curvilinear daytime running lights. Animated sweeping front and rear turn signals increase visual fascination.



The rear lamps have a trim, simplified new appearance with homogeneously-lit elements.





Mercedes EQA

The EQA is Mercedes' entry-level EQ EV. For familial tie-in there's a continuous light strip at front and rear. A horizontal fibre optic strip connects the daytime running lights of the full-LED headlamps (projector low beam, shovel-reflector high beam).

The inside of the compact headlamp is finished to a high level of quality, detail and precision. Blue colour highlights within the headlamp reinforce the signature Mercedes EQ appearance.



The LED rear lamps merge seamlessly into the stretch-tapered LED light strip, enhancing the impression of width.





Mitsubishi Eclipse Cross

The front end adopts an evolved version of Mitsubishi's signature Dynamic Shield design concept, expressing strength and security. A new front bumper guard and refreshed light layout completes the front design with a bold, dynamic look.



The vertical rear lamps are shaped like boomerang with two modules under the signature.





Mini Cooper

Twenty years after the rebirth of the Mini marque, this new model still retains classic round headlamps.

The inner housing is now black rather than chrome, and a circular light band takes on the function of the daytime running lights and indicators.



The wheel arch has new contours, the side repeaters now finally adopt LED technology, and the rear fog light is now integrated into the rear apron as a narrow LED unit. Taillights are the latest iteration of Mini's Union Jack (British flag) design.



NIO ET 7

Nio's new sedan features smart lighting interaction as a main theme all around the car. The dual-element LED headlamps harmonise with the double-dash daytime running lights and the heartbeat tail-light anchored on a full-width red line. With multiple animated-light scenarios, it is a conversation with the future.





Nissan Ariya

The new Ariya electric coupé crossover puts Nissan's redesigned brand logo prominently at the centre of the aerodynamic shield, glittering with the light of 20 LEDs. Thin LED headlamps, constructed with four 20-millimetre projectors per side, are hidden in a black band atop the grille.

The daytime running lights are broad upturned boomerang shapes connecting the underside of each headlamp to the adjacent grille edge and bolstered by sequential turn signals.



The rear lamps are integrated with a full-width wraparound band engineered to give a blackout effect when parked, and a consistent red illumination when in use.



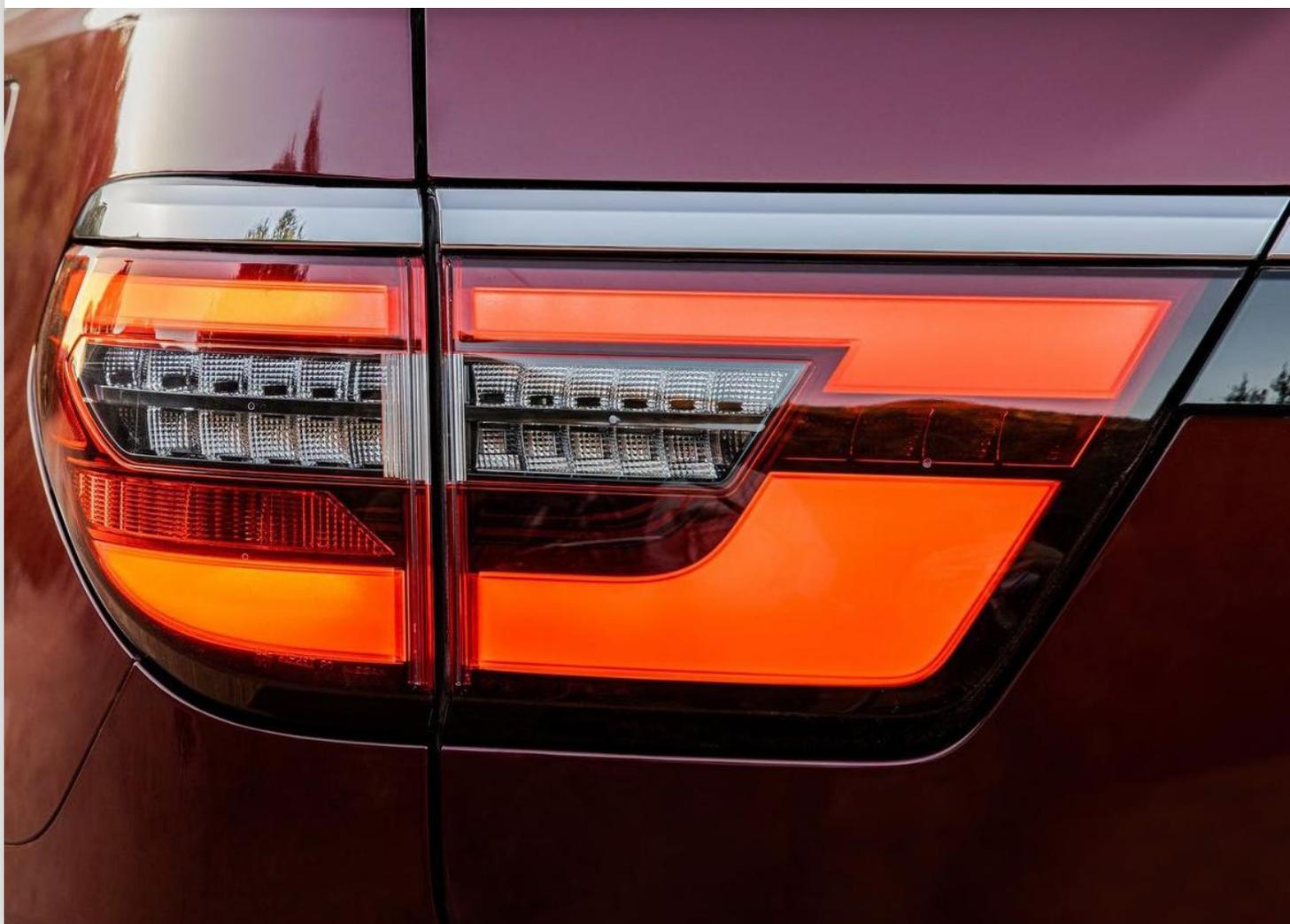


Nissan Armada

The big Armada SUV has been redesigned extensively, and features an all-new all-LED lighting package. More than 50 LEDs in each headlamp help create wide, bright beam coverage.



The rear lamps—over 70 LEDs in each one—feature a bold, blocky red bracket appearance overlidded by an elegant chrome band.





Nissan Kicks

The Kicks compact crossover has new shrewd-eyed headlamps with a high-tech, modern-premium appearance—an effect enhanced on the SR trim level's super-thin LED multi-reflector design.

The SR version also includes standard LED fog lights.



The rear lamps continue Nissan's signature taillight shape, but with a new, neatly integrated version. Turn signal and reversing lamp functions are done with incandescent bulbs; stop/tail and rear sidemarker functions are LED.





Renault 5 Concept

Gilles Vidal's design team were inspired by the iconic model from Renault's past, the R5. The new 5 prototype recalls that car without rehashing it. Depth-effect LED headlamp mockups are tied together by a dot-line bar drawing the eye to the illuminated Renault logo in the centre.

The DRLs are envisioned as rounded-corner squares in the bumper fascia, with intriguing side-visible illuminated 5 callouts.



The vertical taillights evoke those on 5s of years gone by, but now they're implemented as stack-of-stripes LED units with a dual-stripe full-width tie bar. and a neat incorporation of the numeral 5 in the middle of the renault logo.

The 3rd stop light is a full-width red line across the trailing edge of the roof.





Renault Kiger

The Kiger compact SUV is designed and intended for India first, before eventually venturing out elsewhere from there.

Prominent triple-square lamps with shovel optics are set into blacked-out pads in the front fascia; above are hook-shaped DRLs and an array of chrome nuggets in the grille flanking a big chrome Renault logo.



Double-C LED taillights bracket the rear of the car. The tail lamp units, with their glossy black inserts, are resolutely modern and distinctive within the segment. Turn signal and reversing lamp functions appear to be bulb-type, but might be «LED bulbs» such as Osram's XLS family.



Subaru BRZ

The new BRZ takes this model in a different design direction than before.

The headlamps, with their arc-wedge shape, feature a round beam projector in an oblong surround, outboard of a concentric-ringed LED turn signal; both these elements are corralled by a fish hook DRL.



The hook-shaped theme is repeated at the rear by the thick red elements of the tail light. As before, the reversing lamps and the rear fog lamp form a white-red-white trio in the middle of the rear fascia, below the licence plate.



26 Car makers

Aston Martin, UK
 Audi, Germany
 Bentley, UK
 BMW, Germany
 Daimler, Germany
 FCA, USA
 Ferrari, Italy
 Ford, Germany
 Geely, Germany
 GM, USA
 Honda, Japan, USA
 Hyundai Motor, Korea, Eur.
 Jaguar-Land Rover, UK
 Mitsubishi Motors, JP
 Nio, China
 Nissan, Japan, Europe, USA
 Opel, Germany
 Porsche, Germany
 PSA, France
 Renault, France
 Shanghai-VW, China
 Seat, Spain
 Skoda, Czech Republic
 Toyota, Japan, Europe, USA
 Volkswagen, Germany
 Volvo Cars, Sweden

23 DVN-Interior

Faurecia, France
 Coindu, Portugal
 Everlight, Taiwan
 Ford, USA
 Grupo Antolin, Spain, Ger.
 Inova, Germany
 Honda, Japan,
 Marelli, Japan
 Melexis, Germany
 Mitsubishi Motors, Japan
 NBHX Trim, Germany
 NIO, China
 Novem, Germany
 Osram, Germany
 Preh, Germany
 Recticel, Germany
 Renault, France
 SMR Automotive, Australia
 Sensata, UK, France
 Texas Instruments, USA
 Valeo, France, Spain, China
 Weidplass, Germany

32 Set makers and Tier 1s

DH Lighting, Korea
 Elba, Romania
 Farba, Turkey
 Feka, Turkey,
 FlexNgate, USA
 Grakon, USA,
 Grote, USA
 Hascovision, China
 Hella, Germany
 Ichikoh, Japan
 J.W. Speaker, USA
 Koito, Japan, Europe, USA
 Lightworks, Germany
 Lumax, India
 Magna, USA, Austria, Italy
 Marelli, AL Germany, USA
 Mind Opto, China
 Myotek Industries, USA
 Mobis, Korea
 NAL, USA
 Neolite ZKW, India
 Nordic Lights, Finland
 Odelo, Germany
 Phoenix lamps, India
 Plastic Omnium, France
 SL Corporation, Korea
 Stanley, Japan
 Valeo, France, Spain, China
 Varroc, Germany, Czech R.
 Xingyu, China
 ZKW, Austria
 Zodiac, France

15 Light Source Suppliers

Anrui Opto, China
 Brightek, Taiwan
 Cree, USA
 Diodes Dynamics, USA
 Dominant Opto Tech., Malaysia
 Everlight Electr., Taiwan, Germ.
 Excellence Opto., USA, Taiwan
 LG Innotek, South Korea
 Lumileds, Netherlands
 Nichia, Japan
 Osram, Germany
 Samsung LED, Korea
 Seoul Semiconductor, Korea
 Soraa Laser Diode, USA
 Tungsram, Hungary

54 Lighting Suppliers

3M, USA
 Altran, Spain
 AML Systems, France
 Ansys, France
 Aspöck Systems, Germany
 ASYST Technologies, USA
 Auer-Lighting, Germany
 Bicomoptics, China
 Bühler Alzenau, Germany
 Covestro, US, China, Europe
 Dajac, USA
 DBM Reflex, Canada
 DesignLED, UK
 Docter Optics, Germany
 EcoGlass, Czech Republic
 Elmos, Germany
 GXC Coatings, Germany
 Holophane, France
 IMS, Netherland
 Infineon, Germany
 Jenoptik, Germany
 Inova Semiconductors, Germany
 Instrument Systems, Germany
 Keboda, China
 Less, Switzerland
 Liteon Technology, Taiwan
 LMT, Germany, China
 Luminus, USA
 Lumitex, USA
 Mektex, Germany
 Maxell Frontier, Japan
 MD Molding, Portugal
 Mentor Graphics, Europe, USA
 Mitsubishi Electric, Germany, Jap.
 Nalux, Japan
 NXP, UK
 ON Semiconductor, Europe, Asia, US
 Optoflux, Germany
 Panasonic, Japan
 Proper Group, USA
 Red Spot, USA
 Sabic, USA
 Sapphire, USA
 Sea Link International, USA
 SMR Automotive, Australia
 SUSS Micro Optics, Switzerland
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 TechnoTeam, Germany
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 TQ Technology, Taiwan
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20 Univ., labs, Consultants

Andaltec, Spain
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 Institut d'Optique, Fr.
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 LAB, France
 Light Sight Safety, Belgium
 Nuremberg university, Ge
 Pacific Insight, USA
 Parma university, Italy
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VISION Congress Vehicle Lighting in USA
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DVN Rochester workshop
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Lighting in developing countries

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Lighting in Developing Countries
Models Launched in October 2020-February 2021
latest evolutionary development in ADB technology
Exterior decorative and ambient lighting
Shanghai auto show
Shanghai DVN Workshop
Lighting in Taiwan

