Intelligent and vibrant lighting: the Audi Q6 e-tron prototype with second-generation digital OLED technology

- **World premiere: The active digital light signature sets headlights and rear lights in motion in an unprecedented way**
- **For the first time, customers can select digital light signatures for the headlights and rear lights via the MMI and the myAudi app**
- **Package with digital light signatures available on demand**

Ingolstadt/Tórshavn, July 26, 2023 – This innovation will permanently change automotive light design and car-to-X communication: With second-generation digital OLED rear lights, the Audi Q6 e-tron is taking light design, range of functions, and road safety to a new level. Audi is gradually developing the technology into intelligent displays that can communicate with other road users by displaying information via the exterior lights – this is the new communication light. The active digital light signature is another world first making its debut in the Audi Q6 e-tron. It makes an entirely new and vibrant impression, pointing the way to the future of Audi lighting technology. For the first time, customers can optionally select digital light signatures for this new evolution of digital daytime running lights in the Matrix LED headlights and the new generation of digital OLED rear lights. In addition, customers may book digital light signatures on demand.

The Q6 e-tron not only marks a new chapter in electromobility at Audi; lighting technology is an important part of Audi's DNA. With the world's first active digital light signature, the Audi Q6 e-tron ushers in a new era characterized by distinctive design and aesthetics unique to Audi.

The second generation of digital OLED technology shapes the look of new Audi models and increases their range of functions many times over. This, in turn, improves road safety, as impressively demonstrated by the communication light in the digital OLED rear lights. The Q6 e-tron also sets new standards in personalization: With a total of eight optional digital light signatures in the redesigned daytime running lights in the Matrix LED headlights and digital OLED rear lights 2.0, customers can design the look of their Q6 e-tron like never before. This is possible via the MMI and, for the first time, via the myAudi app. Customers are also able to buy digital light signatures after purchasing their car.

Signature and movement combined for the first time: the active digital light signature

The headlights and rear lights look alive at first glance – this is how customers should imagine the active digital light signature, a world first from the brand with the four rings. It comes as part of the optional package of digital light signatures. “The Audi Q6 e-tron marks the first time in a production model that we are designing both the shape of the lights and their entire movement. Thanks to a perfect symbiosis between lighting design and the new technology, the new Audi Q6 e-tron lights look more vibrant and intelligent than ever before. We’ve given the light signatures their own personality and the digital world its own aesthetics at the same time”, explains César Muntada, Head of Lighting Design. “With the world’s first active digital light signature, the Q6 e-tron is ushering in a new era of distinctive design and aesthetics unique to Audi.”

A software module in one of the Audi Q6 e-tron's domain computers, jointly developed by Audi and the Group’s software company CARIAD, makes this type of light signature possible. In the case of the second-generation digital OLED rear lights, the six 360-segment OLED panels generate a new image every ten milliseconds using a specially developed algorithm. This algorithm lets the active digital light signature demonstrate the car’s vibrancy and ability to interact personally by making the Q6 e-tron’s “brain activity” visible through constant movement. The active digital light signature at the front is created via the interaction of the algorithm with 12 dimmable segments, while at the rear, all the digital OLED segments are used. The individual light segments interact so that the light signature's overall image does not vary in luminous intensity.

The second generation of digital OLED technology

A brief overview of digital OLED technology 1.0: In 2016, Audi introduced a new lighting technology to the automotive industry in the TT RS. It was the first time organic LEDs (OLEDs for short) were used for rear lights. OLED elements are semiconductor-based surface light sources that generate light with perfect homogeneity and high contrast values. Their brightness is also adjustable. In addition, the shape of OLED lights can be configured freely and divided precisely into switchable segments. Dynamic lighting scenarios in the OLED rear lights also debuted in the Audi TT RS.

In 2020, Audi Q5 customers could select an individual rear light signature for the first time thanks to the digital OLED rear lights. With this accomplishment, Audi became the first automotive manufacturer to modify the rear light signature digitally. The shift was based on OLEDs’ core properties: high contrast, segmentation into switchable zones, high light homogeneity, and the ability to arrange the segments very tightly. Audi remains the only car manufacturer to offer this evolution of technology.

In 2022 this option became standard in the Audi A8 with digital OLED rear lights. The car’s bus system allowed its software to control each rear light panel and each OLED segment individually. In the A8, customers could select from three rear light signatures via the MMI; in the S8, they could choose from four.

“Audi recognized the potential of using OLED technology in rear lights early on and has since continued to systematically advance their development and digitalization as the only car manufacturer to do so. As a result, we can now offer our customers an ever-new range of lighting functions,” explains Stephan Berlitz, Head of Lighting Development, demonstrating a clear strategy behind the use of this technology. “Digital OLEDs are more efficient, lighter, and more homogeneous than traditional lighting systems,” Berlitz continues, offering a glimpse of the future: “Due to their strong contrast, they are gradually turning into exterior displays, making them an important enabler of communication with the car’s surroundings. With the proximity indication function, we have been using light to interact with other road users since 2020. The Audi Q6 e-tron now adds the communication light to improve road safety further.”

The second-generation digital OLED rear lights in detail
With the next generation of digital OLEDs in the rear lights that now follow in the Audi Q6 e-tron, Audi is significantly expanding the range of functions and design freedom while, above all, improving road safety. For the first time, the digital OLED rear lights can specifically communicate with the immediate environment (car-to-X communication). The number of segments per digital OLED panel has increased from six to 60 compared to the first generation. Six OLED panels with 360 segments in total are used in the Q6 e-tron's rear lights. The new E^3 electronic architecture makes it possible to control this significantly increased number of segments using a software module on one of the domain computers. The steady increase in the number of segments per digital OLED panel will, in the future, make it possible to develop the rear of the car into a display that further improves car-to-X communication and road safety.

The innovative digital OLED technology creates the conditions for a completely new rear light design, ensuring a one-of-a-kind homogeneity and very high contrast. There are other advantages: Surface light sources do not require additional reflectors, light guides, or optics, making them very efficient. Together, these properties allow Audi’s engineers and designers to break down the design boundaries between two- and three-dimensionality. In other words, the brand with the four rings is creating three-dimensional shapes on two-dimensional surfaces. In addition to an integrated, expressive LED light strip at the rear, 3D glass successfully separates the rear light signature from the other lighting functions.

Audi is also innovating the front of the car. The next generation of digital daytime running lights and the light modules are now visually separate, creating greater design clarity. The designers have designed the individual LEDs – 70 in total – in this new evolution of digital daytime running lights as transparent 3D objects. The front section of the digital daytime running lights features a precise prismatic structure, while a metalized 3D trim surrounds them to draw the focus to the car’s digital eyes.

Improved safety thanks to intelligent headlights and rear lights
Audi has also taken the car's safety features to a new level. Proximity indication, a feature familiar to other Audi models, is expanded in the new Q6 e-tron to include a communication light. Integrated with the digital OLED rear lights, it warns other road users forsighted of accidents and breakdowns by displaying a specific static rear light signature with integrated warning symbols and the regular rear light graphic in critical road situations. The assistance system thus aids Audi drivers forsighted and all other road users. As with the advanced traffic information system in the A8, which warns road users of accidents or hazards via the digitalized headlights, the communication light uses data from the swarm. In addition, second-generation digital OLED rear lights activate the communication light with warning symbols for emergency assist, RECAS (rear-end collision alert signal), hazard warning lights, emergency calls (eCall), roadside assistance calls (bCall), and emergency brake lights.

The communication light also adds an extra dimension to the exit warning function. Previously, it only informed the occupants when exiting the car, for example, if another car or a bicycle was approaching. But now, a specially adapted light signature in the rear light graphic warn cyclists or drivers approaching from behind. In this way, the Audi Q6 e-tron extends its safety concept to other road users, increasing road safety for everyone.

Finally, the communication light also uses a specific light signature at the front and rear to indicate the car's park assist status when it is in automated parking mode. This makes it clear to road users in the immediate vicinity that the car is safe to approach.

A new level of freedom: digital light signatures available via the MMI and the myAudi app

With up to eight digital light signatures for the headlights and rear lights, drivers can enjoy a new level of freedom in personalizing their Q6 e-tron. Customers can select a signature in one of two ways, via the myAudi app or in the car via the MMI. Six additional signatures with a coming home/leaving home lighting scenario and the corresponding digital light signature are available through additional optional packages.

Via the myAudi app, customers can activate their personal light signatures from outside the car and experience the dynamic lighting scenario and the coming home/leaving home function right on their car. It's the same with the communication light in the second-generation digital OLED rear lights and proximity indication. On request, the Matrix LED headlights can provide a live demonstration of the sign glare suppression and object masking features.

For an even greater degree of personalization for the Q6 e-tron, customers can book the package of digital light signatures for the LED headlights plus/Matrix LED headlights and digital OLED rear lights after purchasing their car using on-demand functions. Customers can purchase the features permanently or for a specific period. This flexibility lets Audi customers design their Q6 e-tron with up to eight digital light signatures (only in conjunction with digital OLED rear lights and LED headlights plus/Matrix LED headlights) to suit personal preferences. Finally, they can also purchase high-beam assist and the Matrix package on demand.

Product and Technology Communications
Stefan Grillneder
Spokesperson Q6 e-tron,
PPE (Premium Platform Electric)
Tel.: +49 841 89 41449
Mobile: +49 152 57716813
E-mail: stefan.grillneder@audi.de
www.audi-mediacenter.com

Product and Technology Communications
Stefanie Melander
Spokesperson Lighting Technology
Tel.: +49 841 89 38053
Mobile: +49 160 93980732
E-mail: stefanie.melander@audi.de
www.audi-mediacenter.com

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