



SCHOTT
glass made of ideas



Powering & protecting high-performance LiDAR sensors

with proven [packaging technology](#)

Pioneering. Responsibly. Together. These attributes have characterized SCHOTT, manufacturer of special glass, glass-ceramics and other innovative materials, for over 130 years. As #glasslovers and inventor of special glass, we are reliable partners for high-tech industries to enable new market launches and applications. Our goal is to become climate neutral by 2030.

Specialty glass and hermetic packaging play a key role in improving LiDAR technologies. As a world leader in hermetic packaging, SCHOTT Electronic Packaging has been developing, manufacturing and optimizing hermetic packaging components for the reliable, long-term protection of sensitive electronics in a broad variety of applications. Our technology portfolio includes specialized glass and glass-to-metal sealing.

Experts for Hermetic Packaging Solutions

in the automotive and optical communication industries

Leading packaging supplier for automotive electronics

SCHOTT is the world leader in hermetic packaging of high-volume automotive electronics, including airbag ignitor headers, sensor housings, and lithium primary battery seals. With years of comprehensive experience, we can meet the strict standards and delivery requirements of the automotive industry. Our fully automated quality control processes implement a 'zero defects' philosophy.



Innovator of optical communication components

SCHOTT is the quality and innovation leader in laser chip packages for optical communication applications. With more than 75 years of research and applied knowledge in vacuum-tight housings, SCHOTT is a leading force in designing and manufacturing innovative optoelectronic components for optical applications.

Technical Challenges and **SCHOTT** Solutions for LiDAR Sensors



Your Challenges

Complete protection for automotive applications

Sensitive optical LiDAR components, such as MEMS mirrors and high-power lasers, need to be packaged and protected from harmful elements – including moisture, dust particles, and gases. These packages must be reliably hermetic.

Preventing condensation is particularly important for preserving optical precision. It is also important for safety because moisture droplets can potentially distort or magnify a laser beam.

Heat dissipation and precision optics

Hermetic packages need to offer precise optical interfaces and exceptional thermal dissipation to achieve wavelength stability and reduce power consumption.

High performance

A reliably vacuum-sealed hermetic environment is essential for optimal response speed of MEMS mirrors. Moreover, performance can suffer if a high laser temperature is not reduced effectively – higher electrical power is needed to increase optical power.

Competitive market

To adapt LiDAR technology for the mass market, developers require a hermetic packaging partner that can support both prototype and mass production volumes with economies of scale.

Our Solutions

Reliability and safety

Hermetic packages from SCHOTT have been used for decades in a broad range of high-performance, safety-critical applications and are the trusted choice of world-leading automotive and optical module manufacturers.

These packages can be used in all types of LiDAR sensor devices (mechanical, solid-state, flash) to protect laser diodes, photodiodes, and MEMS mirrors from internal condensation and the harsh elements found in the driving environment (vibration, shock, etc.).

High-performance optics and thermal management

SCHOTT offers packages with advanced optical windows, lenses, and coatings. Our precision designs deliver high-performance optical signal transmission. SCHOTT packages also have excellent thermal management thanks to a special heat dissipation design. This is ideal for high-power, long-wavelength lasers.

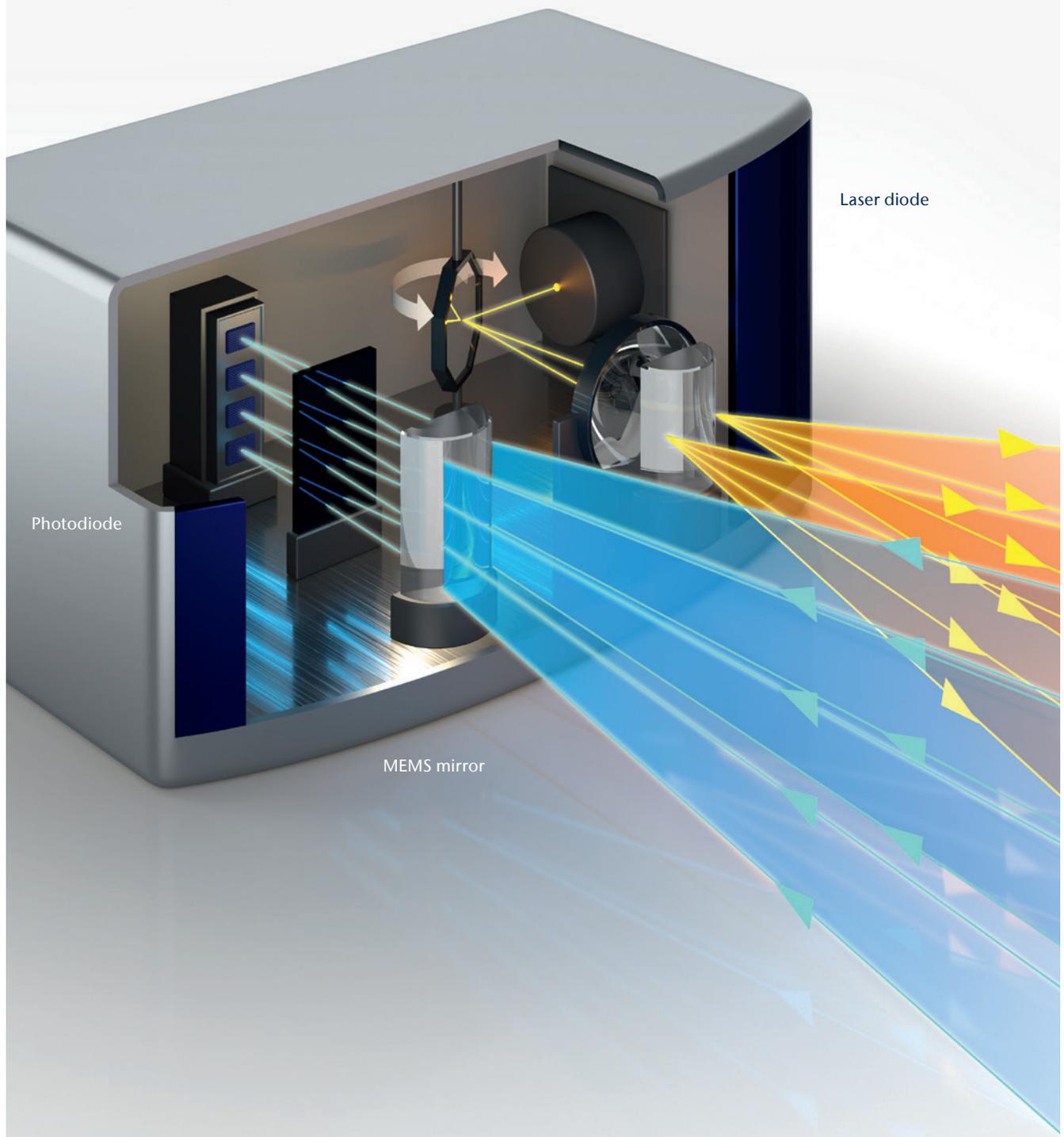
Improved performance

SCHOTT's hermetic packages enable MEMS mirrors to operate in a vacuum environment, enabling an increased scanning field of view and reduced power consumption.

High-volume manufacturing capability

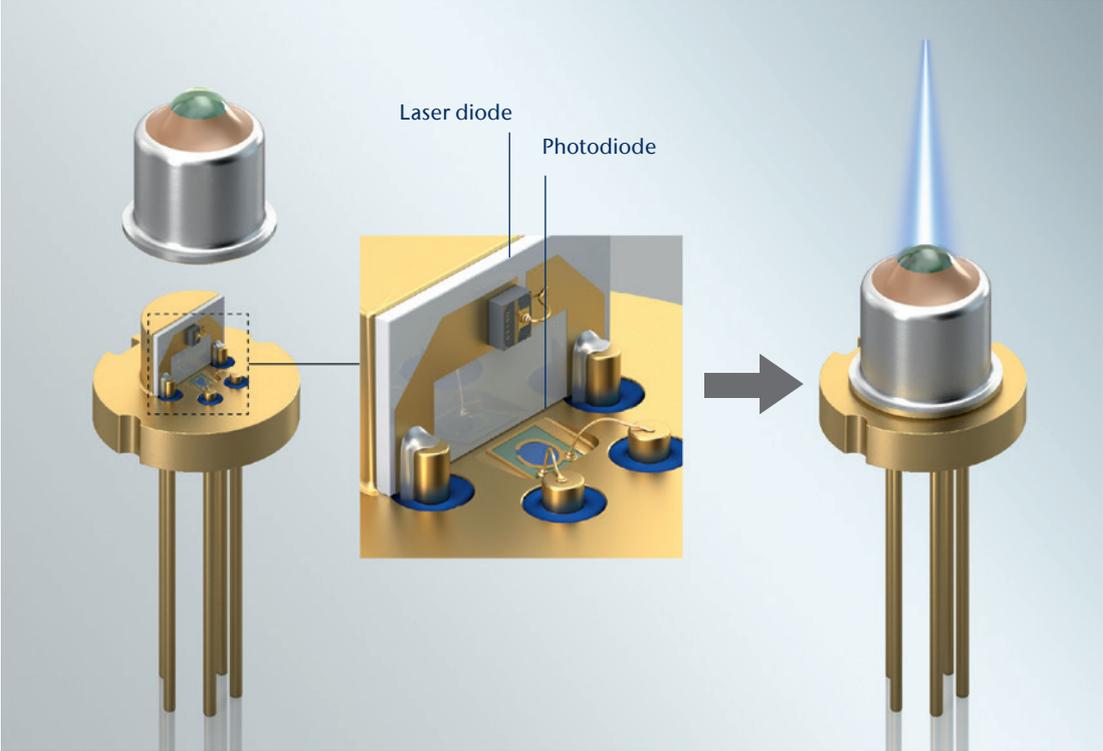
As an electronic packaging expert, SCHOTT takes a collaborative approach when working with customers on LiDAR packaging designs. This includes a special focus on solutions optimized for competitive, high-volume manufacturing.

SCHOTT® Hermetic Packages for LiDAR

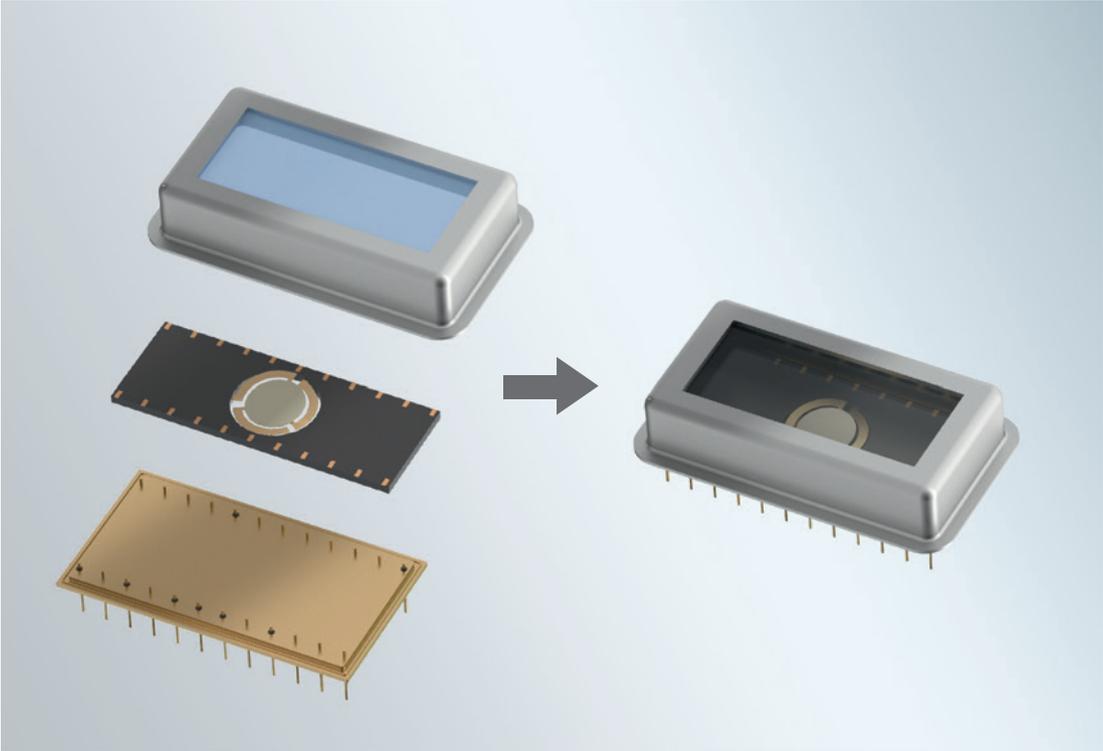


LiDAR sensors for ADAS and autonomous driving

Reliably protect LiDAR sensor components and help to increase their performance



SCHOTT packages for light sources



SCHOTT packages for MEMS mirrors

Product Variants

Various design options for laser diodes, photodiodes, and MEMS mirrors



Advantages



Reliable & safe

- **Shock & vibration resistant:** Reliably protects light sources and scanning MEMS against harsh elements
- **Gas-tight packages** protect against moisture and dust



High optical precision

High-transmission glasses, advanced designs, and many filter and coating options enable excellent optical performance.



Excellent heat dissipation

TEC (thermoelectric cooler) and copper header designs provide cooling for high-power lasers while keeping the wavelength constant and reducing power consumption.



Certified Automotive supplier

SCHOTT offers high-quality products, from prototypes to small batches and mass production. Our products meet strict automotive industry standards (IATF).



Various designs

Flexible and customizable: SCHOTT offers one-stop service with various options for product size, shape (round, rectangular, asymmetrical), I/O technology, coating materials, and more. No matter how complex, we can provide the LiDAR components our customers require.



Expert R&D Partner

Our dedicated technical experts can provide comprehensive support to customers across all product development stages. SCHOTT has decades of expertise in both the automotive and optical communication industries.

Technical Details

Typical technical features

Vacuum tightness	<p>High hermeticity</p> <ul style="list-style-type: none"> • Our hermetic packaging technology enables tailored and controlled internal pressure environments (typically $<1 \times 10^{-8}$ mBar*I/s) • Hermeticity enables the required internal pressure to be maintained for an extremely long time
	<p>Corrosion resistance</p> <ul style="list-style-type: none"> • Salt spray test: 35°C, 0.5 to 3.0% salt concentration, 24 hours • Humidity test: 85°C, 85% RH, 1000 hours
	<p>Thermal stability</p> <ul style="list-style-type: none"> • Thermal shock: -65°C to 150°C, 15 cycles • Soldering compatibility: 260°C for 5 minutes
Reliability	<p>Mechanical stability</p> <ul style="list-style-type: none"> • Leads twisting and bending with load (56 g for pin diameter 0.25 – 0.29 mm, 85 g for pin diameter 0.3 – 0.5 mm) • Tensile test (10 N for pin diameter 0.20 to 0.29 mm, 23 N for pin diameter 0.30 to 0.50 mm)
	<p>Plating stability</p> <ul style="list-style-type: none"> • Bake test: 425°C for 15 minutes (no plating discoloration, blistering) • Solderability of leads: wet homogenously with stains/bare spots < 5% • Mandrel test: leads to be coiled at 1 mm diameter, 2 to 6 coils with no plating blistering and peeling
Thermal conductivity	<ul style="list-style-type: none"> • High thermal material (CuW, OFHC) choice available: copper thermal conductivity = 385 W/m-k • TEC (thermoelectric cooler) design available
Optical features	<p>Windows, lenses, and coatings for improved optical transmission and reduced reflection</p> <ul style="list-style-type: none"> • High-transmission glass in 905 to 1550 nm range • Glass filters/coatings • Angled window caps available
Emission direction	<p>Enabling both vertical and horizontal directions</p> <ul style="list-style-type: none"> • Vertical emission for VCSEL, such as with TO packages • Horizontal emission for edge emitting laser diodes
Insulation resistance	<ul style="list-style-type: none"> • Feedthrough insulation $> 1 \times 10^{10}$ ohm at 50% RH, 100 V
THT and SMD technology	<ul style="list-style-type: none"> • THT: Through Hole Technology – particularly reliable for environments with mechanical vibration / shock • SMD: Surface Mount Technology – particularly reliable for packages with lower mass
Sealing methods	<p>Various standard methods available for package sealing:</p> <ul style="list-style-type: none"> • Projection welding – fast, economical, low heat dissipation to the chip • Seam sealing – rectangular package, seal in array form • Eutectic soldering such as AuSn $\leq 350^\circ\text{C}$ • Laser welding – high precision

Note: Functionality and reliability results may vary depending on design factors, such as plating thickness.

SCHOTT



schott.com

SCHOTT AG, Christoph-Dorner-Strasse 29, 84028 Landshut, Germany
ep.info@schott.com, kristina.gruber@schott.com