

A lighthouse with a red and white striped body stands on a rocky shore. The sky is a dramatic mix of orange, red, and blue, suggesting a sunset or sunrise. The lighthouse has a red band at the top and a red door at the bottom. A cutaway section at the top reveals internal components, including a LiDAR sensor emitting a blue laser beam. Two other laser beams, one yellow and one blue, cross the sky from the right side of the image.

SCHOTT
glass made of ideas

Hermetic Packages

Powering and protecting
high-performance LiDAR
sensors

SCHOTT is a leading international technology group in the areas of specialty glass and glass-ceramics. With more than 130 years of outstanding development, materials and technology expertise we offer a broad portfolio of high-quality products and intelligent solutions that contribute to our customers' success.

Specialty glass and hermetic packaging play a key role in improving LiDAR technologies. SCHOTT Electronic Packaging have 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, glass-to-metal, and ceramic-to-metal sealing.



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 automotive industry standards and delivery requirements. Our fully automated quality control implements the '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 in optical applications.

SCHOTT® Hermetic Packages for LiDAR

Customized packages with superior reliability from the most experienced high-volume supplier for the optoelectronics and automotive industries.

Your Challenges

Protection from harmful substances

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

Condensation prevention is particularly important as it can negatively impact optical precision. This even mitigates a safety risk: moisture particles could potentially cause distortion or magnification of a laser beam.

Heat dissipation & Precision optics

A reliably vacuum-sealed hermetic environment is essential for optimal response speed. At the same time, hermetic packages need to offer precise optical interfaces and exceptional thermal dissipation properties to achieve stable laser wavelengths for superior performance.

Competitive market

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

Our Solutions

Reliability & 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.

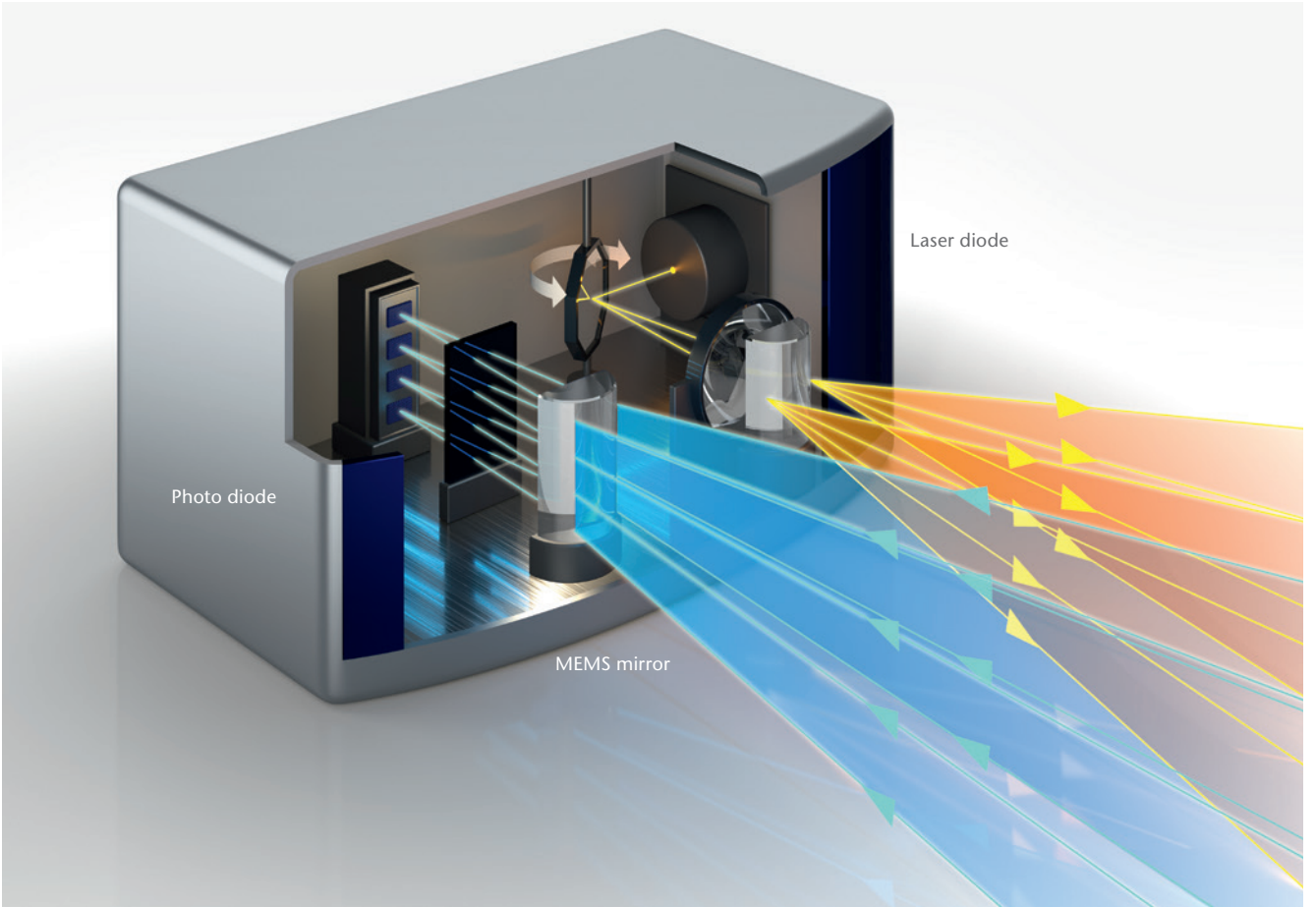
These packages can be used in all types of LiDAR sensor devices (mechanical, solid-state, flash) to protect laser diodes, photo diodes and MEMS mirrors against internal condensation and harsh external elements of the driving environment (vibration, shock etc.).

High performance optics and thermal management

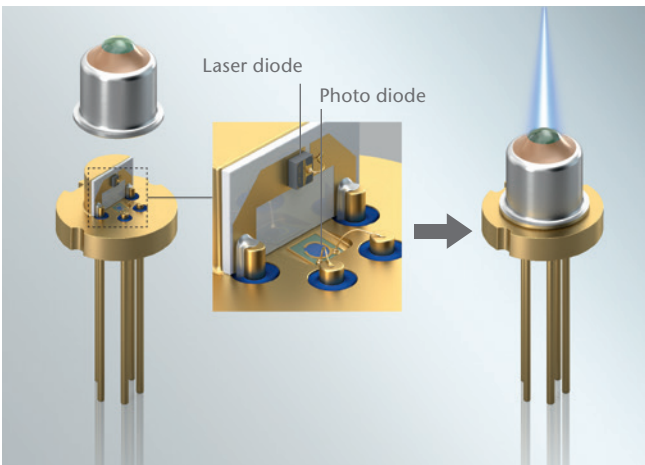
SCHOTT offers packages with advanced optical windows, lenses, and coatings. Our precision designs deliver high-performance optical signal transmission. SCHOTT packages also have excellent thermal management thanks to a special heat dissipation design – ideal for high-power, long wavelength lasers.

High volume manufacturing capability

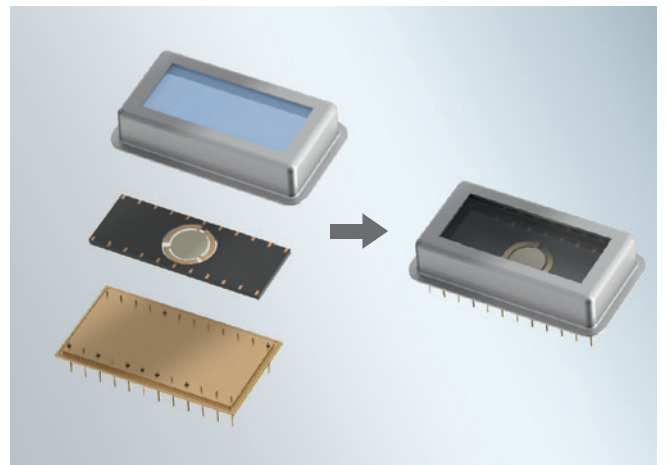
As an electronic packaging expert, SCHOTT takes a collaborative approach when working with customers on LiDAR packaging designs. This includes a special focus on solutions optimized for competitive, high-volume manufacturing.



LiDAR sensors for ADAS and autonomous driving



SCHOTT packages for light sources

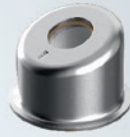


SCHOTT packages for MEMS mirror

Various design options for Laser diodes, photo diodes and MEMS packages

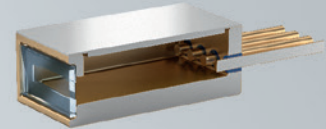


Ultra high-precision ball lens cap

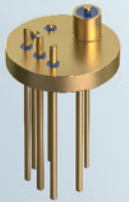


Angled window cap

Optical window



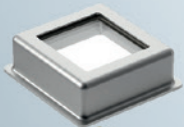
Horizontal emission package



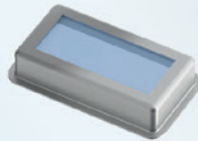
TO can with TEC design



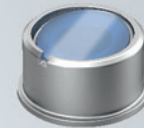
Copper TO package for thermal conductivity



Window lid



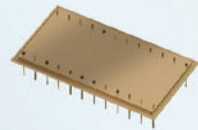
Optical lid with AR/NIR coating



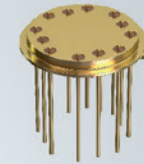
Angled window cap



SMD – surface mount package



High I/O rectangular package



High I/O packages with through-hole technology

Advantages



Reliable & Safe

- Shock & Vibration Resistant: Reliable protection of light sources and scanning MEMS against harsh elements.
- Gas-tight packages protect against moisture and dust



High Optical Precision

High-transmission glass and advanced designs enable excellent optical performance



Excellent Heat Dissipation

TEC (thermoelectric cooler) and copper header designs cool high-power lasers and control constant wavelength



Certified Automotive Supplier

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



Customizable Designs

Flexible and customizable: SCHOTT offers one-stop service with various options of product size, shape (round, rectangular, asymmetrical), I/O technology, glass, coating materials, and more. We can fulfill the complex requirements of LiDAR components for our customers.



Expert R&D Partner

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

Technical Features	
Vacuum Tightness	<ul style="list-style-type: none"> • High hermeticity • Our hermetic packaging technology allows the implementation of tailored and controlled internal pressure environments. Hermeticity enables the required internal pressure to be maintained over an extremely long time period
Reliability	<ul style="list-style-type: none"> • Thermal Cycle: -65 to 150 °C, 15 cycles • Thermal shock (air) 250 °C for 1 minute • Leads twisting and bending with load (56 g for pin diameter Ø 0.25 ~ 0.29 mm, 85 g for pin diameter Ø 0.3 ~ 0.5 mm) • Tensile test (10N for pin dia 0.20 - 0.29 mm, 23N for pin dia 0.30 - 0.50 mm)
Corrosion Resistance	<ul style="list-style-type: none"> • Humidity test: 85 °C, 85 % RH, 240 hours • Salt spray test: 35 °C, 0.5 - 3.0 % salt concentration, 24 hours
Plating Stability	<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, 2-6 coils with no plating blistering and peeling
Insulation Resistance	<ul style="list-style-type: none"> • Feedthrough insulation >1x10¹⁰ ohm at 50 % RH, 100 V
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 • Ceramic multilayer substrates available
Sealing Methods	<p>Various standard methods are available for package welding / 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 = < 350 °C • Laser welding – high precision
I/O	<p>Two technologies enabling low or high I/O count:</p> <ul style="list-style-type: none"> • THT: Through Hole Technology – Reliable for environments with mechanical vibration/shock • SMD: Surface Mount Technology – High density, fast processing, and thin form factor
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
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, 1550 nm • Glass filters / coatings • Angled window caps

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

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