SCHOTT
glass made of ideas

Augmented Reality Packaging Solution SCHOTT® LightView

Miniaturizing and enhancing light engine systems

What are the Technical Challenges for Augmented Reality?

Colour & Resolution

Achieving a broad colour gamut and high resolution is essential for realistic image projection.

Brightness & Power Effiency

High brightness is required to provide contrast in outdoor use cases. Coupling of light to waveguides at high efficiency is also essential. These factors have direct impacts on battery consumption.

Form factor

To proliferate the use case of consumer AR, form factor is highly important. Existing packaging solutions are bulky, which can result in undesirable end device form factor.

SCHOTT Solution

Innovation in Glass-to-Metal Seal technology to enable and drive the adoption of laser base light engines

Glass-to-metal sealing technology has been utilized to manufacture hermetic housings and feedthroughs for a broad variety of applications. Leveraging on more than 75 years experience, SCHOTT has developed a series of glass-to-metal sealed package solutions to address the technical challenges that the Augmented Reality community is currently facing. The innovative SCHOTT® LightView Packages (RGB lasers and MEMS mirror packages) aim to miniaturize and enhance opto-electronic performance for Augmented Reality light engine systems.

Miniaturized and Integrated Form Factor

The innovative side emitting cap and SMD base reduce the footprint of the entire light engine module.

A miniaturized and integrated solution enables the laser-based light engine to meet the size requirements for the end device.

Superior Opto-Electronic Performance

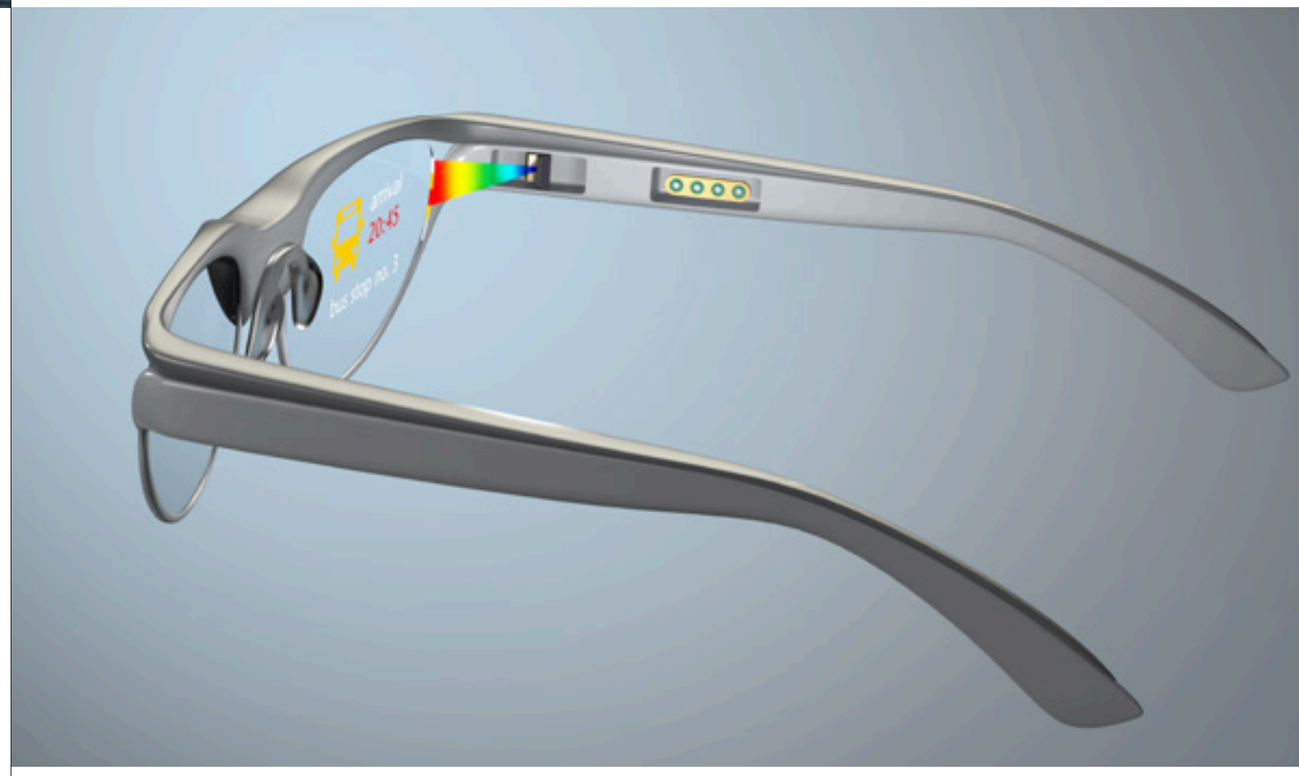
As a leading specialty glass company, SCHOTT optical glasses, lenses, and windows are developed and processed to an extremely high quality standard for light engine systems.

Customized glass window sizes or even angled windows are possible. Special coatings, such as AR coatings can be applied to achieve even higher transmission. The flat base with flushed pins can be soldered in a typical SMD style.

Superior Design and Volume Production Capability

SCHOTT is the world leader in hermetic packaging of high volume electronics, including ignitor headers, transistor out-line packages, quartz, and many others.

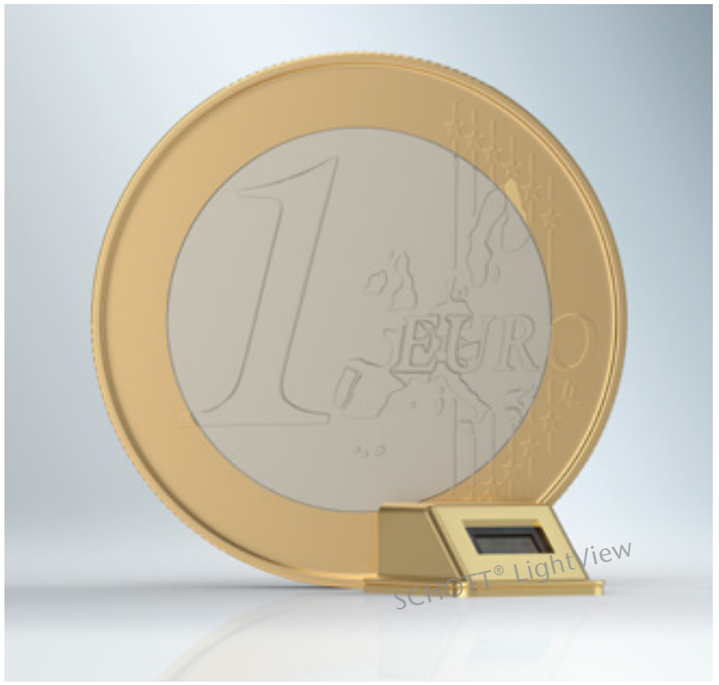
With vast experience in glass to metal sealing, SCHOTT is able to design innovative yet cost effective and scalable solutions.



SCHOTT® LightView RGB Laser Packages

SCHOTT® LightView RGB Laser Package enables the adoption of laser-based light engine technologies for Augmented Reality/HUD applications. Hermetic encapsulation protects the sensitive RGB laser chips to enable high brightness and image resolution.

- **Three times form factor reduction compared to individual TO cans**
- Hermetic encapsulation supports reliability of RGB laser chips
- Cost efficient, localized joining of metal base and cap
- Excellent optical properties thanks to in-house SCHOTT optical glass

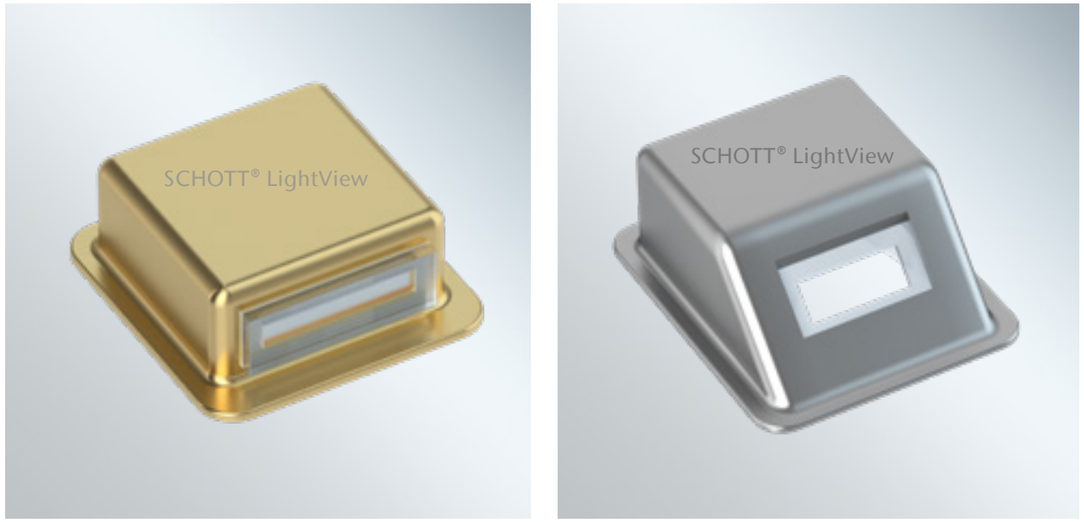


SCHOTT® LightView
RGB Laser Base

Stamped metal with glass-sealed pins

- Customized designs available (size / pin numbers)
- Gold plating for wire bonding
- Pedestal for light output
- Feedthrough can have controlled impedance in coaxial lines
- Excellent thermal properties of metal substrate (thermal conductivity >40W/mK)
- Superior thermal conductivity (400W/mk) such as copper can be added as for high power application
- True hermetic design (Hermeticity < 10^{-8} mbar l/s)
- Non-aging due to use of inorganic materials
- Surface mount design (SMD)

SCHOTT® LightView
RGB Laser Cap



Deep drawn cap with sealed optical window

- Customized designs available (size/material)
- High window transmission
- 45 degree window design to reflect light partially to MPD for intensity feedback controlg
- AR coating add-on possible
- Low overall cap height (<2mm possible) for slim packages
- True hermetic design (Hermeticity < 10^{-8} mbar l/s)
- Non-aging due to use of inorganic materials

Resistance welded

Localized
Resistance Welding

Direct bonding with two dissimilar metals without need for additional bonding material

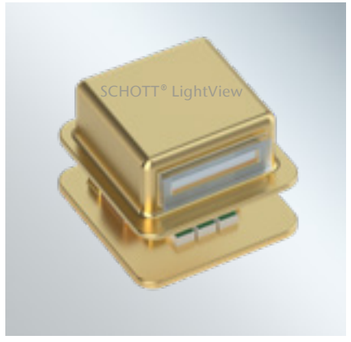
Process can be done at room temperature (Soldering puts thermal stress on semiconductor materials)

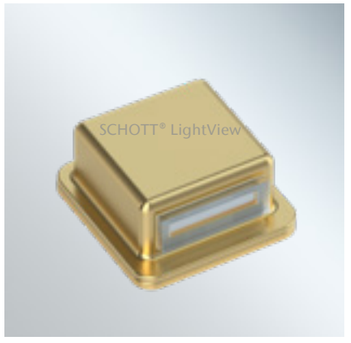
Easy control of atmosphere within packaged module

High production efficiency

Cost efficient process

Well established technology, used in TO packages for over 50 years



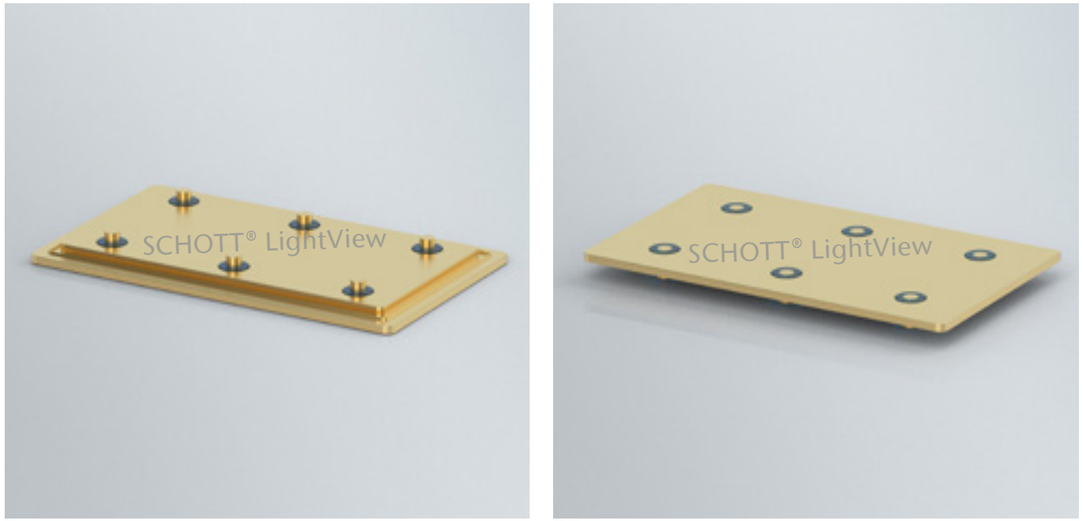


SCHOTT® LightView MEMS Mirror Packages

SCHOTT® LightView MEMS package offers hermetic vacuum packages for MEMS mirrors

- Wider scanning angle, lower power consumption in vacuum environment
- Reduction of back reflection through angled window concept (lesser ghost images)
- Moisture and dust protection
- Readily available technology for scalable production

SCHOTT® LightView
MEMS Base



Stamped metal with glass-sealed pins

- Customized designs available (size/pin numbers)
- Gold plating to enable wire bonding
- Feedthrough can have controlled impedance in coaxial lines
- True hermetic design (Hermeticity < 10^{-8} mbar l/s)
- Non-aging due to use of inorganic materials
- Surface mount design

SCHOTT® LightView
Angled Window Cap

Deep drawn cap with sealed optical window

- Customized designs available (size/material / geometry)
- High window transmission
- AR coating add-on possible
- True hermetic design (Hermeticity < 10^{-8} mbar l/s)
- Non-aging due to use of inorganic materials

Resistance welded

Localized
Resistance Welding

Direct bonding with two dissimilar metals without need for additional bonding material

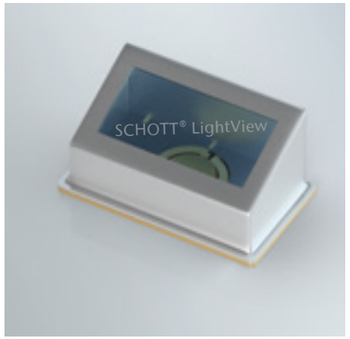
Process can be done at room temperature (Soldering puts thermal stress on semi conductor materials)

Easy control of atmosphere within packaged module

High production efficiency

Cost efficient process

Well established technology, used in TO packages for over 50 years



Why SCHOTT?

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.

schott.com

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00000 ENGLISH 12/2021 ali/xxx Printed in Germany