

CupLids – Fine Leak Hermetic Packages for Optoelectronics

Reto Keller
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MATERION

// BALZERS OPTICS

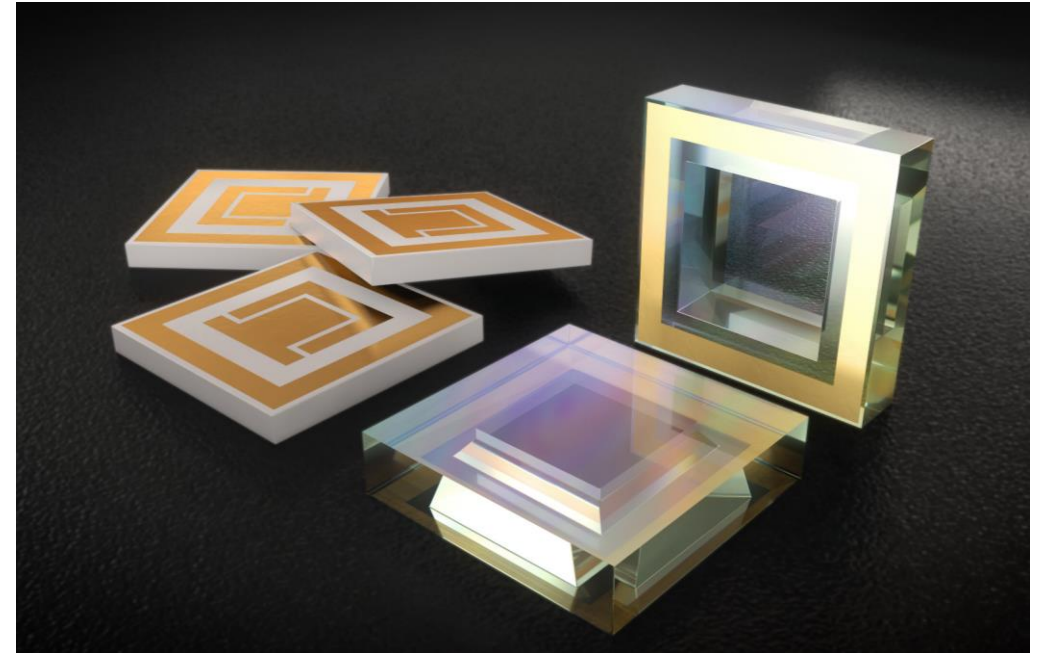
Materion at a Glance

- Materion founded in 1931, Balzers Optics founded in 1946
- A global high-tech solutions provider of performance alloys, precision coatings and advanced materials
- 100+ years of materials knowledge
- ~33 manufacturing plants, >3000 employees, present in 59 countries
- In excess of \$1 billion in sales
- Publicly traded since 1972 – NYSE (MTRN)



CupLids - Hermetic Packages for Optoelectronics

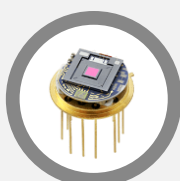
- Surface-mount package for automated chip-scale packaging and PCB assembly of photonic chips
- Fineleak hermetic - solder-bonded cavity window and ceramic submount with filled vias
- Easy die-attach and excellent heat dissipation with planar AlN ceramic submount
- Comprehensive solution portfolio to support a broad range of custom package outlines, cavity shapes and optical coatings



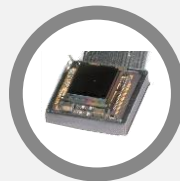
Supported Photonic Chips



Photon Detector



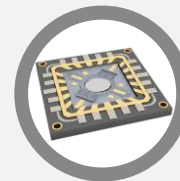
Infrared Detector



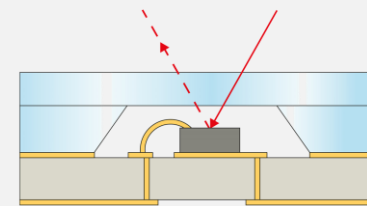
μ -Bolometer



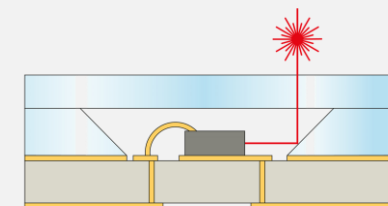
LED & Laser Diode



MEMS



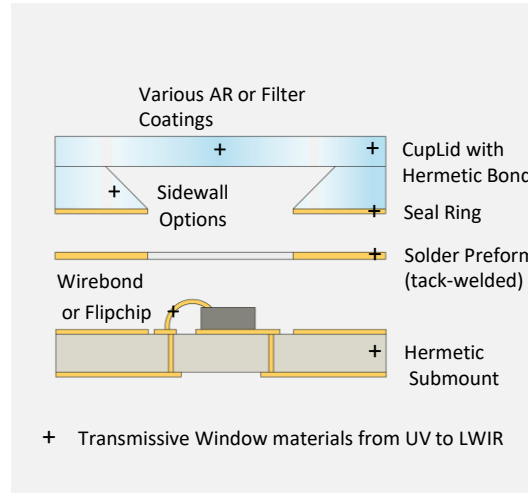
Detector CupLid



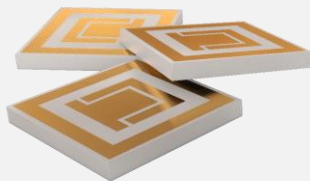
Reflector CupLid

The CupLid Advantage

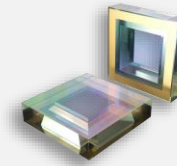
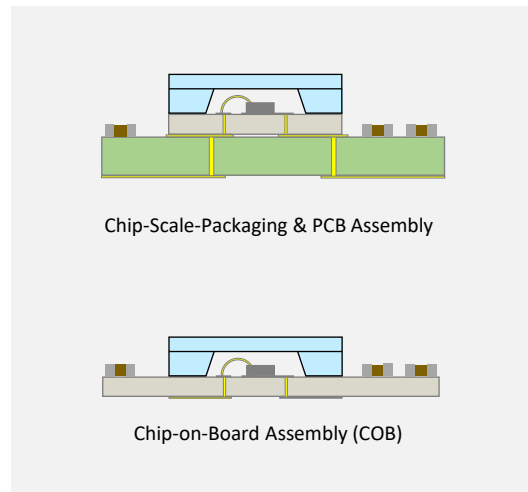
- **space-saving and surface-mount**
- **die-attach and wirebond on a flat hermetic submount**
- **cool chips with excellent heat dissipation of AlN**
- **ready to use with tack-welded solder preforms**



Offer for Prototyping



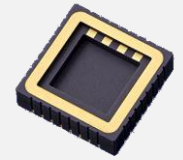
- + ceramic submounts with hermetic vias
- + custom designs for wirebond or flipchip
- + AlN or Al₂O₃, single chips or in panels
- + CupLid Sample Kit – Reference Design



CupLid



TO Can

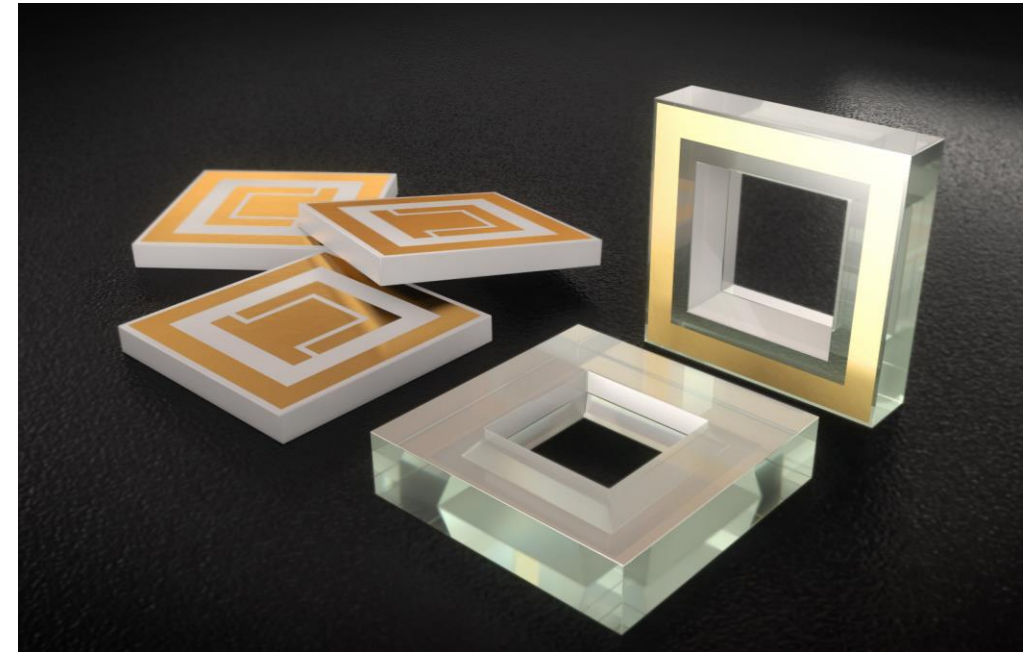


Ceramic

	CupLid	TO Can	Ceramic
Technology	Surface-mount	Through-hole	Surface-mount
Hermetic Seal	Solder Seal	Seam Seal	Seam Seal Solder Seal
Heat dissipation	Excellent (AlN) Good (Al ₂ O ₃)	Fair (Kovar, glass, leads)	Excellent (AlN) Good (Al ₂ O ₃)
Package outlines	Scalable to custom sizes	large & bulky standard sizes	MOQ applies for custom sizes
Ease-of-Use	Simple die attach on flat submount	Manual assembly	
Availability	••	•••	•
Package Costs	\$\$	\$	\$\$
Total-Cost-of-Ownership	\$\$	\$\$\$	\$\$

CupLids – Non-hermetic Option

- CupLid optical packages are also available in a non-hermetic version for bonding with epoxies onto ceramic substrates or printed circuit boards
- CupLids encapsulate the bare die & bond wires and protects the sensitive semiconductor from mechanical damage, dust and other contaminants
- Non-hermetic CupLids assembled with fast curing epoxies or subsequential batch curing are ideally suited for automated assembly



Supported Photonic Chips



Any Bare Die Attach

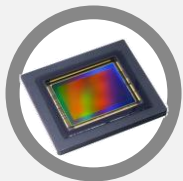


Image Sensors

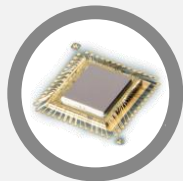
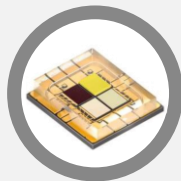
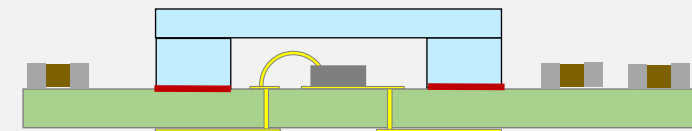


Photo Detectors

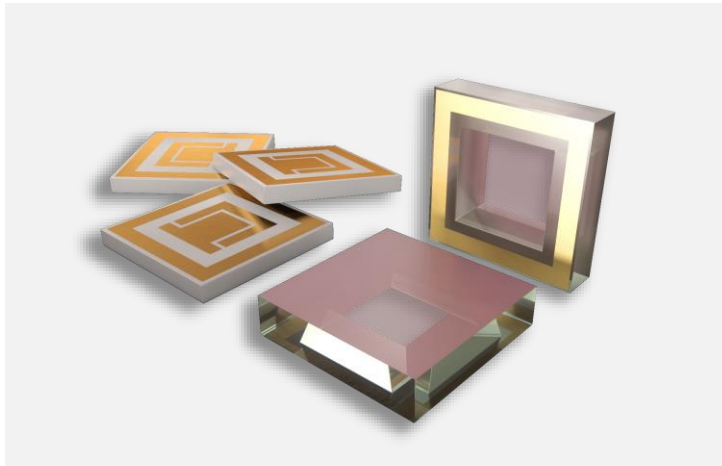


LEDs



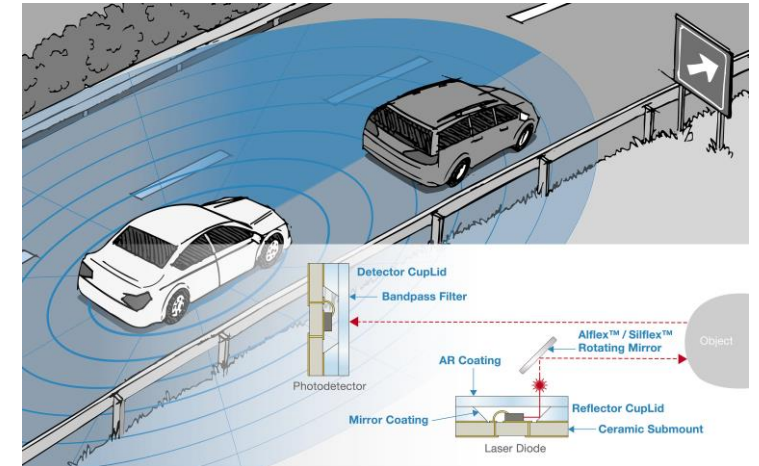
CupLid on PCB (epoxy-bond e.g. on FR4)

CupLid Applications



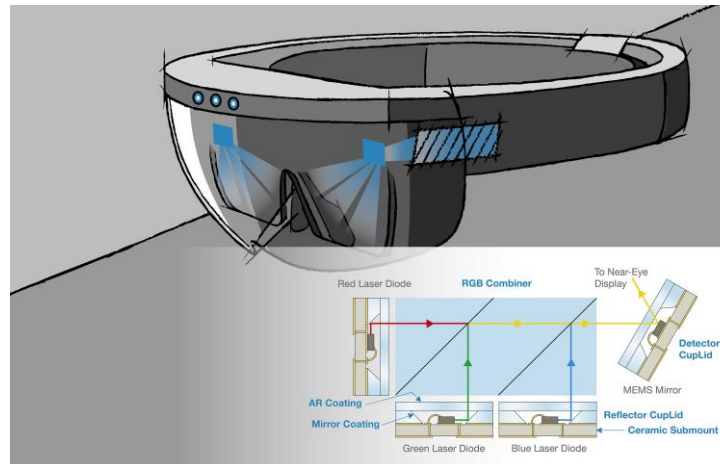
Automotive applications

- CupLid with near-IR bandpass filter for photon detectors in LiDAR
- CupLids with anti-reflective coatings for laser diodes in headlights
- CupLids with anti-reflective coatings for laser diodes and MEMS scanning mirrors in LiDAR



Application examples across the Spectrum

- Fused Silica windows for UV Disinfection
- Near-IR Bandpass for LiDAR & 3D Sensing
- Mid-IR Bandpass for Gas Sensing
- LWIR Window for Motion Detection & Thermal Sensing
- Metallized sidewalls as broadband reflectors



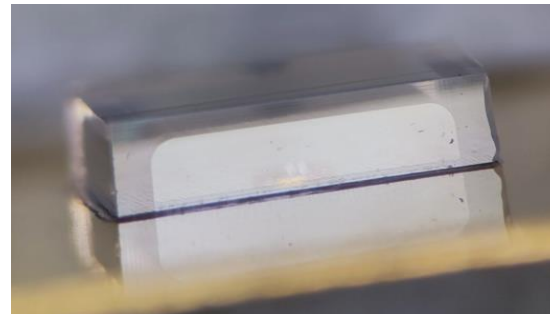
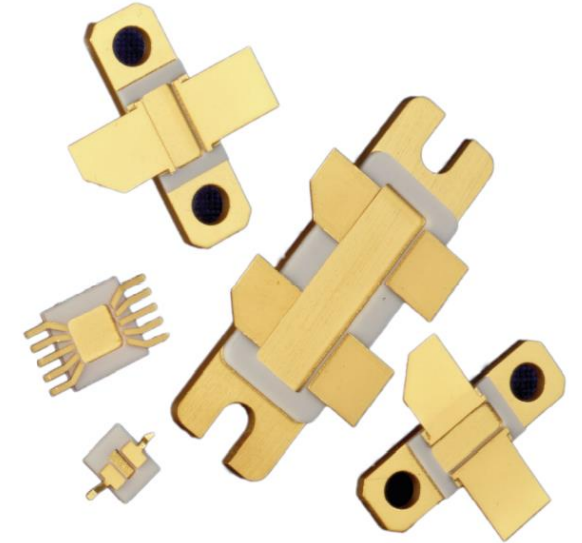
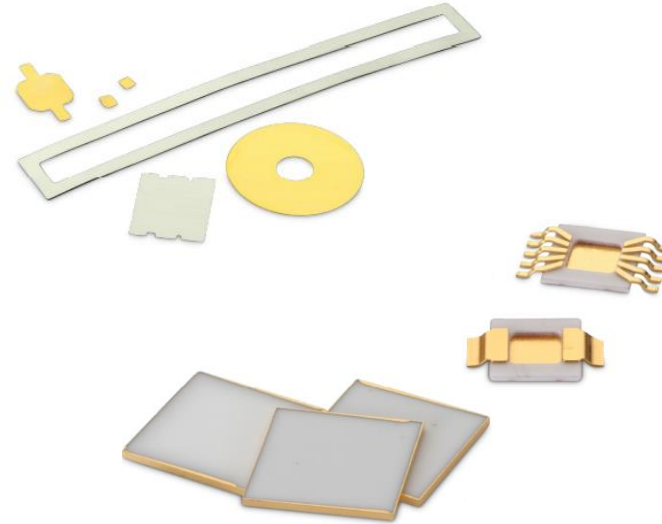
Augmented Reality Smart Glasses

- CupLid with anti-reflective coating for laser diodes and MEMS scanning mirrors
- CupLids with anti-reflective coatings for 3D Sensing VCSELs and edge emitting laser diodes

Hermetic Packaging – Application Support

Why work with Materion?

- We are your one-stop-shop for optical packaging providing optically coated and metallized lids, solder alloys and package materials
- 100+ years in combined packaging know how and experience
- Engineering support in material selection and process development for fine-leak hermetic packages
- Our capabilities include: reflow soldering under nitrogen & vacuum, shearforce testing, leak testing



CupLid Solution Portfolio & Summary

Solution Portfolio

	UV	Visible	NIR	SWIR	MWIR	LWIR
Optical Coating	Antireflective	Short-/Long Wavepass	Bandpass / Notchfilter	Beamsplitter	Mirrors	Black Coatings
Window Material	Fused Silica, Glass			Silicon		
Window Type						
Seal Ring	Gelot™, Cr, Ni, Pt, Au					
Solder Attachment	Solder Preforms from AuSn, SnSb			Various solder alloys on request		
Hermetic Package for Target Application	UV Disinfection Lithography Wafer Inspection	LBS Displays Image Sensors LED Lighting	LiDAR 3D Imaging NIR Detectors Optical Transceivers	LiDAR 3D Imaging SWIR Detectors Optical Transceivers	IR Detectors Gas Sensor IR Imagers IR Emitters	Motion detector μ-Bolometer

Summary

- CupLids are available for order now!
 - Sample Kits and Reference CupLid Designs for fast prototyping
 - Tailored packages for customer's product development
- CupLids offer a space-saving and easy-to-automate surface-mount alternative to TO-style packages with their known disadvantages
- A combination of established manufacturing processes allows us to offer tailored CupLid solutions for a wide range of applications
- We are continuously expanding our portfolio – let us know your requirements!
- For application support please contact us: reto.keller@opticsbalzers.com

Materion enables what's next™

To learn more about Materion and our capabilities, please feel free to contact me:



Reto Keller

Business Development Manager

reto.keller@opticsbalzers.com

+423 388 92 38

