MacDermid Alpha
ELECTRONICS SOLUTIONS

Datacom and Telecom

High-Reliability Material Solutions

SEMICONDUCTOR MICROELECTRONICS AND SENSORS

macdermidalpha.com
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Evolving Demands in Telecom and Datacom

MacDermid Alpha Electronics Solutions delivers innovative, high-performance materials for next-generation *telecom* and data center communications, *datacom*. The rapid growth of AI, data centers and the implementation of next-generation communications infrastructure requires solutions that offer high-performance and high-reliability. Networks are under constant pressure to deliver faster data rates, higher bandwidth, and improved power efficiency.

Proven solutions are needed for:

- Data center optical communications
- Metro and long-haultelecom
- Space and subsea, high-reliability communication systems

Delivering high-performance materials that:

- Bond with reliability
- Protect with precision
- Manage heat effectively

With expertise spanning both semiconductor-level packaging and board-level integration, MacDermid Alpha is not just a materials supplier—we are a strategic partner in building the reliable, high-performance networks of the connected world.

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Our advanced materials portfolio provides essential solutions for **bonding, protecting,** and **managing thermal performance** of critical components, sub-assemblies and modules, including:

- Optical Transceivers and Sub-Assemblies
- Co-Packaged Optics (CPO) Development
- Telecom Optical Networking Equipment
  - Wavelength Management
  - Transmission Components
  - Hermetically Sealed Modules

Bonding

- Die attach adhesive
- Conductive adhesive
- Film adhesive (thermal and electrical)
- Lid seal (thermoset) and thermoplastics

Protecting

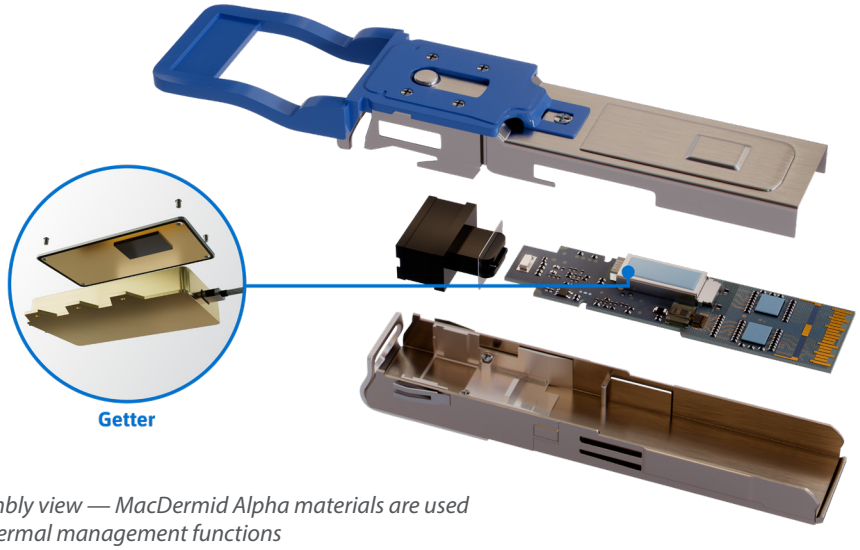
- Getters (moisture, hydrogen and dust)
- UV and structural adhesives for optics
- Underfill and edgefill
- Conformal coatings

Thermal

- Gap filling pad
- Liquid gap filler
- Thermal gel and paste

STAYSTIK® Thermoplastic Adhesives

Optical transceivers are high-density photonic sub-assemblies at the heart of datacom and telecom infrastructure — from data center interconnects to coherent longhaul systems. MacDermid Alpha provides bonding, protecting, and thermal management materials used throughout the transceiver assembly — from die attach to lid seal to getter protection.



Optical transceiver exploded assembly view — MacDermid Alpha materials are used across bonding, protection, and thermal management functions

Bonding: Die Attach & Optical Alignment

Every laser, photodetector, lens, and optical sub-component must be precisely bonded for alignment stability and mechanical integrity.

- **ALPHA® HiTech®** - UV and low-temp curable adhesives for optical module assembly
- **ATROX®** - Die attach paste with high thermal & electrical conductivity
- **POLYSOLDER® SE3001** - Thermoset conductive die attach adhesive
- **STAYSTIK®** - Thermoplastic adhesive bonding film with conductive filler options

Protection: Getters and Sealing

Hermetically sealed packages require tight atmosphere control. Getters prevent moisture and hydrogen ingress that degrades laser performance.

- **STAYDRY® HiCap 2000/3000** - High-capacity moisture getter
- **STAYDRY® H2-3000** - Hydrogen and moisture getter film
- **STAYDRY® GA2000-2** - Particle and moisture getter paste
- **Lid Seal: Thermoset & thermoplastic** lid seal adhesives for hermetic closure

Thermal Management: Heat Dissipation

High-speed transceivers generate significant heat. Thermal interface materials between components and heatsinks maintain safe operating temperatures.

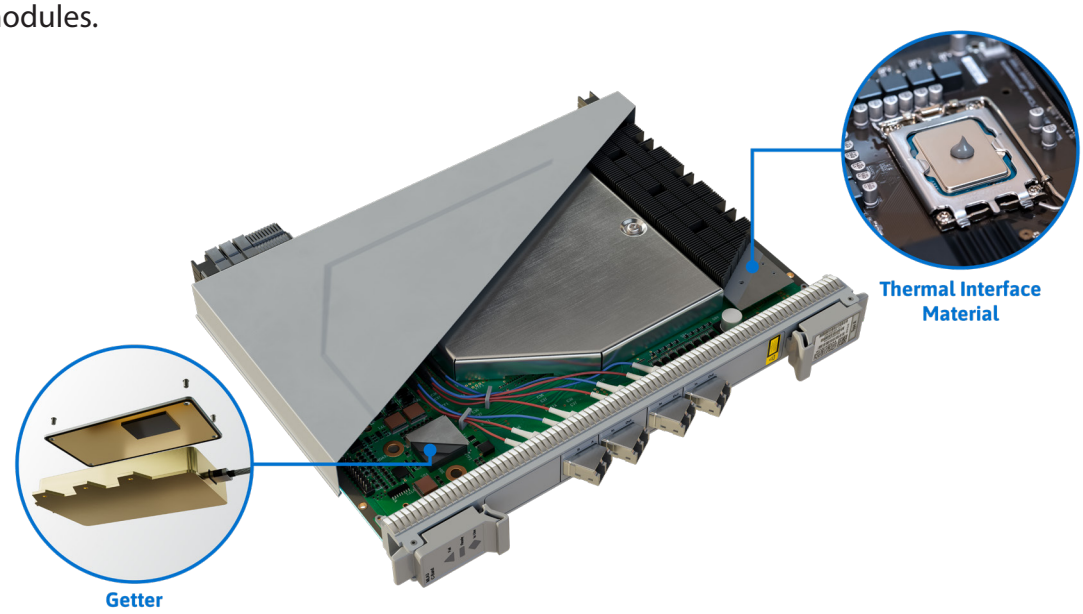
- **Electrolube® PCG 300/400** - Pre-cured dispensable thermal gel
- **Electrolube® HTSP/HTCP** - Thermal paste (silicone & silicone-free)
- **Electrolube® GFP 600/850** - Compressible gap filling pads
- **Electrolube® LGF 200/400** - Two-part cure-in-place liquid gap filler

Why it matters:

Data center bandwidth demand is doubling every 2–3 years. Transceivers running at 400G, 800G and beyond require materials that perform reliably at higher temperatures, tighter tolerances, and increasingly compact form factors — exactly where MacDermid Alpha excels.

Wavelength Selective Switches (WSS)

Wavelength Selective Switches (WSS) are hermetically sealed optical modules used in ROADM and wavelength management systems across telecom networks. MacDermid Alpha provides critical getter and thermal interface materials that protect optical components and maintain performance inside these demanding modules.



Getter: Moisture and Hydrogen Control

Hermetically sealed WSS modules require tight control of internal atmosphere. Getters absorb moisture, hydrogen, and particulates that cause corrosion, optical degradation, and electrical failures.

- **STAYDRY® HiCap 2000/3000** - High-capacity moisture getter paste and film
- **STAYDRY® H2-3000** - Hydrogen and moisture getter, flexible film
- **STAYDRY® GA2000-2** - Particle and moisture getter paste, MEMS & optical

Thermal Interface Material: Heat Management

WSS modules generate heat from MEMS actuators and active optical components. Thermal interface materials transfer heat from critical components to the module housing.

- **Electrolube® PCG 300/400** - Pre-cured dispensable thermal gel
- **Electrolube® GFP 600/850** - Compressible gap filling pads
- **Electrolube® LGF 200/400** - Two-part cure-inplace liquid gap filler

Bonding: Die Attach & Optical Assembly

Optical components within WSS require precise, high-reliability adhesive bonding. UV-curable and conductive adhesives are used at critical join points throughout the module.

- **ALPHA® HiTech®** - UV & low-temp curable adhesives for optical modules
- **ATROX®** - Die attach paste, high thermal & electrical conductivity
- **POLYSOLDER® SE3001** - Conductive die attach adhesive

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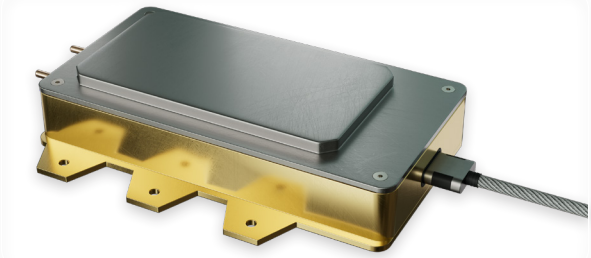
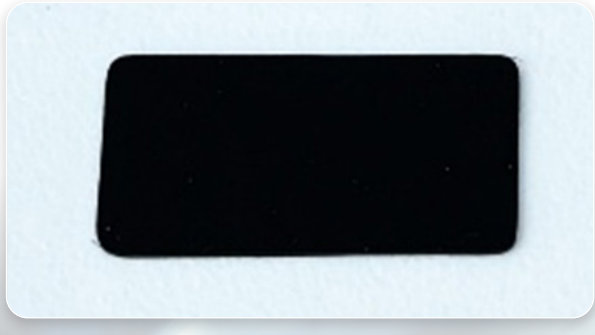
STAYDRY® Getters for Optical Communications

High-reliability moisture, hydrogen and particle getters ensure that a controlled environment is maintained. They absorb contaminants such as moisture and hydrogen, which can lead to corrosion, electrical failures, and degradation of optical components over time. Getters are ideal for high reliability applications such as space, subsea, and hermetically sealed modules used in the telecom industry and radio frequency (RF) communications.

Product	Description	Applications
STAYDRY HiCap 2000	High-capacity moisture getter paste	Moisture control for optical components and modules for wavelength management
STAYDRY HiCap 3000 PSA	High-capacity moisture getter film	
STAYDRY Z20	Moisture getter dispersed in a flexible film	
STAYDRY H2-3000	Hydrogen and moisture getter in a flexible film	Hydrogen removal in high-reliability, hermetically sealed environments
STAYDRY H2-3000PSA		
STAYDRY GA2000-2	Particle and moisture getter available in a paste	Dust control for MEMS and optical components



Hermetically sealed module



Preform film of a STAYDRY Z20 moisture getter

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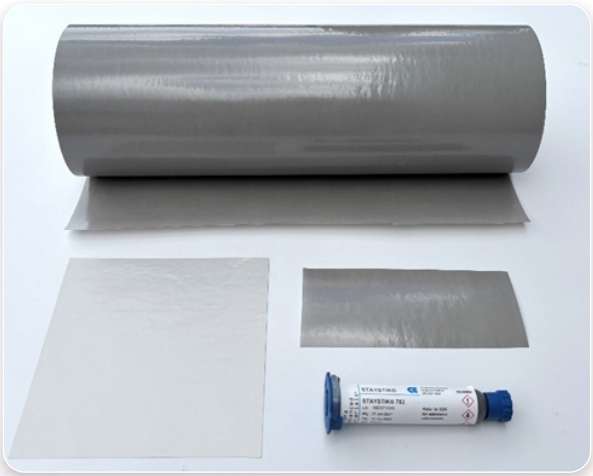
Bonding

- **STAYSTIK®** thermoplastic adhesive bonding film with optional conductive fillers
- **POLYSOLDER®** SE3001 conductive adhesive for fast, low temperature curing applications
- **ATROX®** die attach paste with high electrical and thermal conductivity

Product	Description	Applications
STAYSTIK 472, 482	Non-conductive, thermoplastic adhesive	Bonding film
STAYSTIK 571, 581	Conductive adhesive	Conductive bonding film
POLYSOLDER SE3001	Thermoset, conductive die attach adhesive	Printed or dispensed conductive adhesive
ATROX	Hydrogen and moisture getter in a flexible film	Die attach with high thermal conductivity



STAYSTIK® Conductive Bonding Film and Paste

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Protecting

- **STAYCHIP®** adhesive with electrical insulation for bonding and sealing
- **ALPHA® HiTech®** UV and low-temperature curable adhesives for assembly of optical modules
- **ALPHA® HiTech®** underfills for reliable protection of chip packages on PCBs

Product	Description	Applications
STAYCHIP F614-3A	Electrically-insulating thermoset adhesive	Bonding and sealing
HiTech AD13-9692B	Single component, low-temp curing epoxy adhesive	Low-temperature curable adhesive
HiTech UP44-5566T	UV-curing system, suitable for rapid curing and bonding	UV adhesive
HiTech CU11-3127	Single-component, low-viscosity, capillary underfill	Underfill
HiTech CU21-3240	Single-component, capillary underfill	Underfill
HiTech CU31-2031	Single-component, low-viscosity, room temp flow properties	Underfill

STAYCHIP® Adhesives

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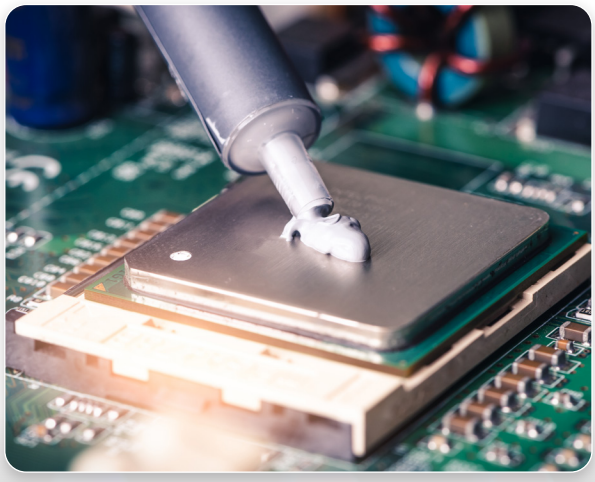
Thermal Management

Electrolube® thermal solutions enhance device performance and extend operational life.

- **Thermal Gels**
- **Thermal Pastes**
- **Gap Filling Pads**
- **Liquid Gap Fillers**

Product	Description	Applications
Electrolube PCG 300/400	One-part, pre-cured paste suitable for dispensing	Thermal gel
Electrolube HTSP/HTCP	One-part, uncured paste silicone and silicone free	Thermal paste
Electrolube GFP 600/850	Compressible pads in custom size and shape	Gap filling pad
Electrolube LGF 200/400	Two-part, cure-in-place suitable for dispensing	Liquid gap filler



Electrolube® Thermal Paste

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Power Your Path

WITH MACDERMID ALPHA ELECTRONICS SOLUTIONS

CONNECT WITH OUR EXPERTS

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