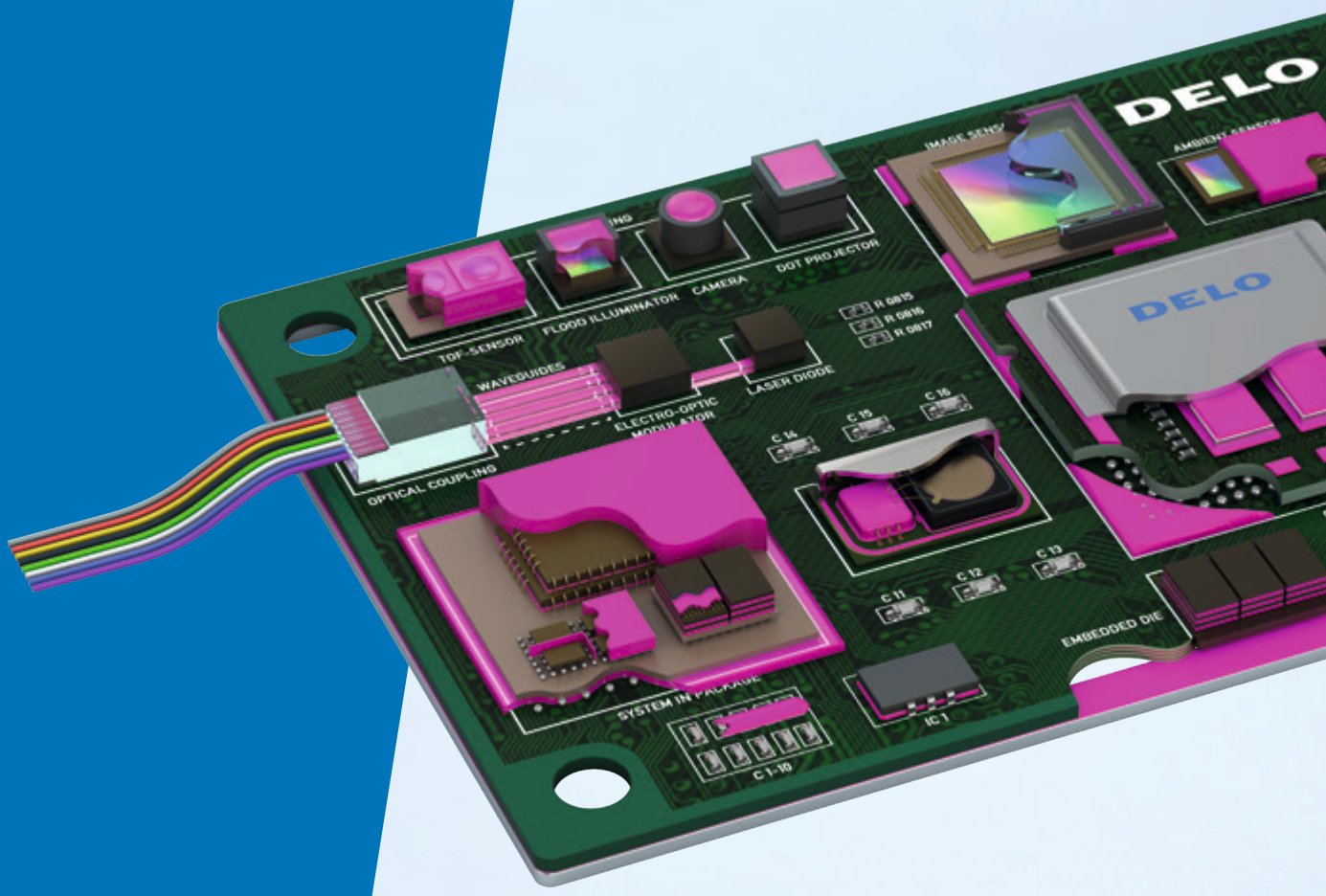
DELO

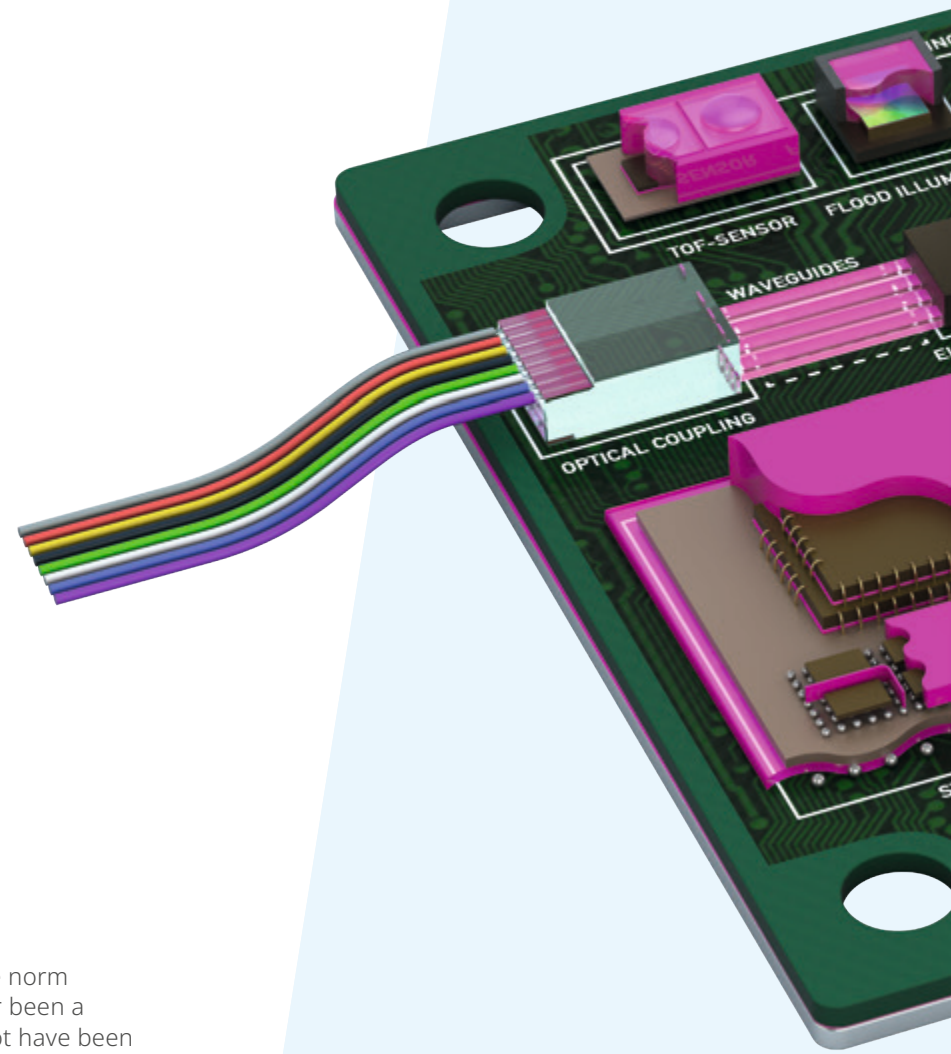
ADHESIVES

for microelectronic packaging



Adhesives for microelectronic packaging

Precise application and fast curing

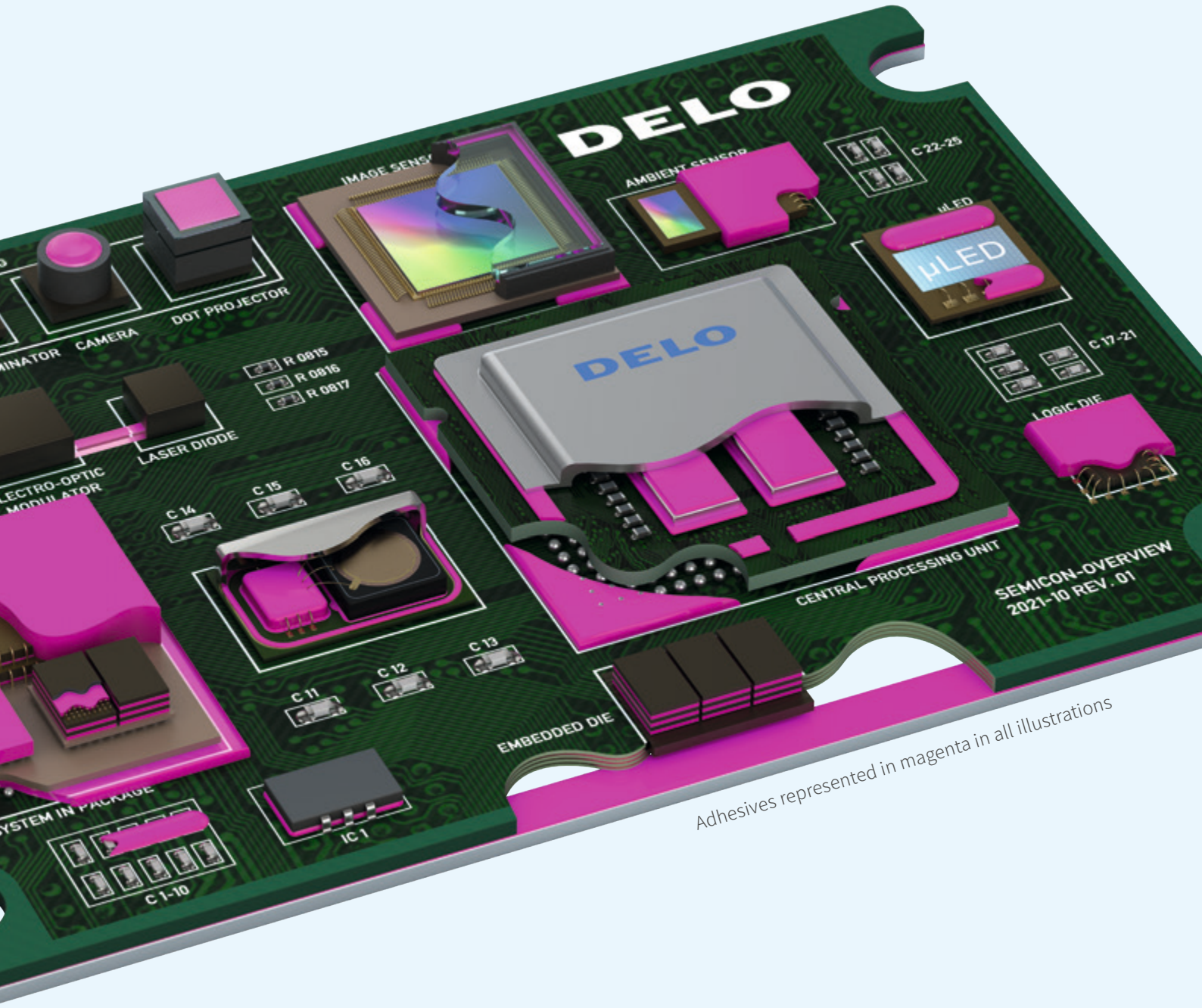


With innovations like 5G and IoT becoming the norm – not to mention the rise of AI – now has never been a smarter time. However, these marvels could not have been achieved without the semiconductors that manage their daily operations and the innovative processes, like wafer-level packaging, behind them.

With this, demand in the semicon industry, as well as industry-specified materials and equipment, is higher now than ever before. Fortunately, DELO Industrial Adhesives specializes in developing tailor-made solutions for semiconductor package assembly, from materials to dispensing and UV curing equipment.

Discuss your project and your requirements with our experts:

semicon@DELO.de

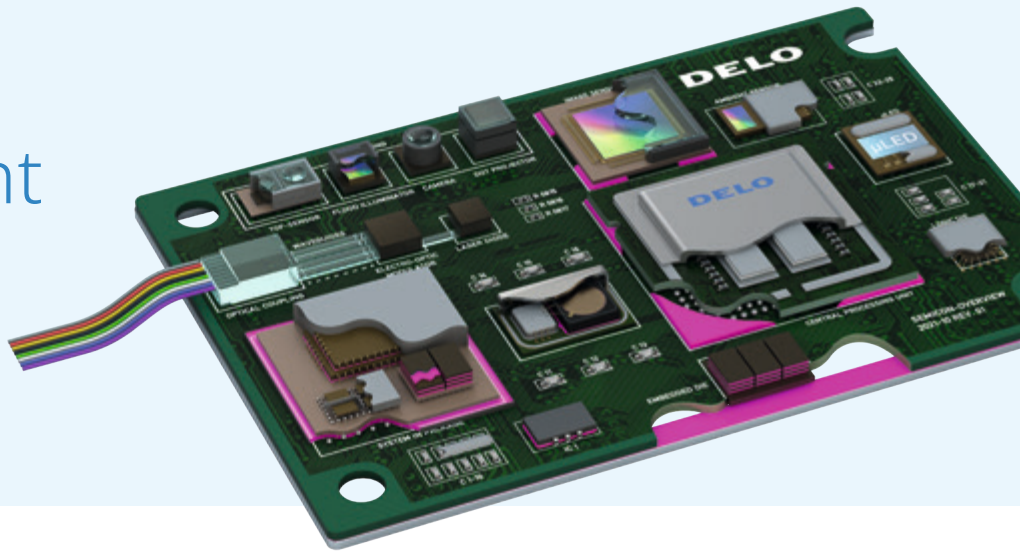


Adhesives represented in magenta in all illustrations

Your benefits at a glance:

- Short cycle times
- Maximum precision
- Optimized products for various applications

Die attach & reinforcement



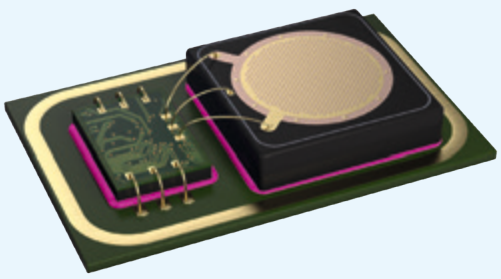
Even though die attach materials have been in use for years, new challenges are constantly arising. Dies are becoming thinner and larger, requiring adapted properties such as lower Young's modulus or the use of alternative curing processes. Afterwards, these packages are used in many larger-scale applications such as cars. This is just one of the many reasons they must meet the strict requirements of the AEC-Q100 or JEDEC MSL standards.

In addition to soldering, housed semiconductors (such as BGAs) also require materials that reduce stresses and protect the solder joints. In addition to the common capillary underfills, DELO's portfolio also includes solutions such as edge bonds or corner fills, which not only reduce process times, but also allow the use of pure UV curing, reducing carbon emissions.

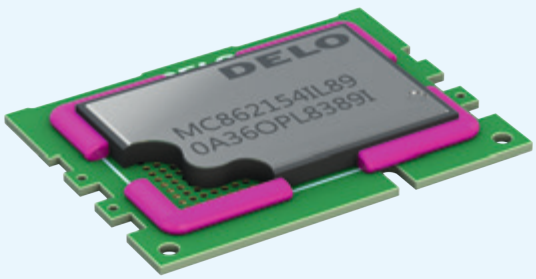
Die attach materials	Special feature	Application example
DELO MONOPOX DA2258	Low temperature curing	Fingerprint modules
DELO MONOPOX DA255	High bonding strength	Automotive pressure sensor
DELO DUALBOND BS3770	Low stress	MEMS microphone

Reinforcement solutions		
DELO MONOPOX EG2545	Fast partial solder joint reinforcement	Corner fill
DELO KATIOBOND EG6688	Fast light-curing package reinforcement	Edge bond
DELO MONOPOX EG2566	Warpage reduction on CPU & GPU units	Stiffener attach
DELO MONOPOX EG2596	Fixing SMT components	Solder support

BS = **B**-**S**tage, **DA** = **D**ie **A**ttach, **EG** = **E**lectronic **G**rade

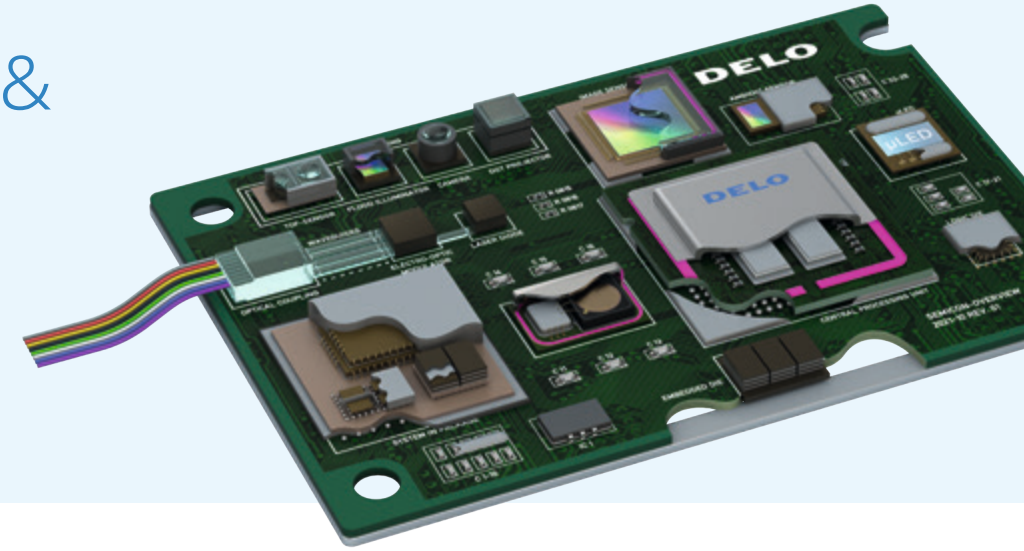


MEMS microphone die attach



Chip edge bond

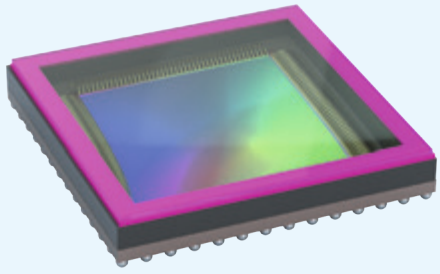
Cap bonding & lid attach



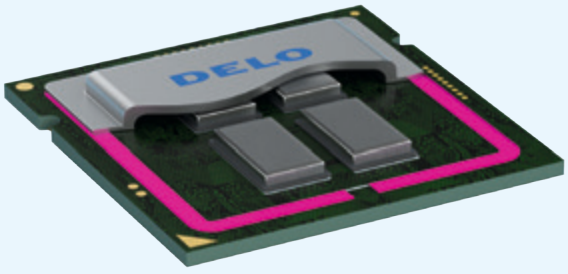
Different package types require a cap or lid to be placed in order to protect the semiconductors underneath against radiation or influences such as humidity and dust. In CPUs and GPUs, the lid is also placed to distribute generated heat. The adhesive, being exposed to great stresses, must reliably hold the lid in place. Another challenge is bonding lids that capture air beneath them, since the adhesive can be stretched and compressed by changing pressure. DELO has developed suitable solutions to overcome these challenges, establishing them on the market.

Cap bonding & lid attach materials	Special feature	Application example
DELO DUALBOND BS3770	Low-stress lid attach	Glass on housing (image sensors)
DELO MONOPOX EG3773	CPU lid attach	Bonding of heat spreader lids
DELO DUALBOND LT2208	Low-temperature lid attach	Bonding of temperature-sensitive packages
DELO MONOPOX DA255	LCP cap attach	ToF or proximity sensors
DELO MONOPOX EG2598	Metal cap attach	Bonding of small metal caps

BS = **B**-**S**tage, **DA** = **D**ie **A**ttach, **EG** = **E**lectronic **G**rade, **LT** = **L**ow **T**emperature

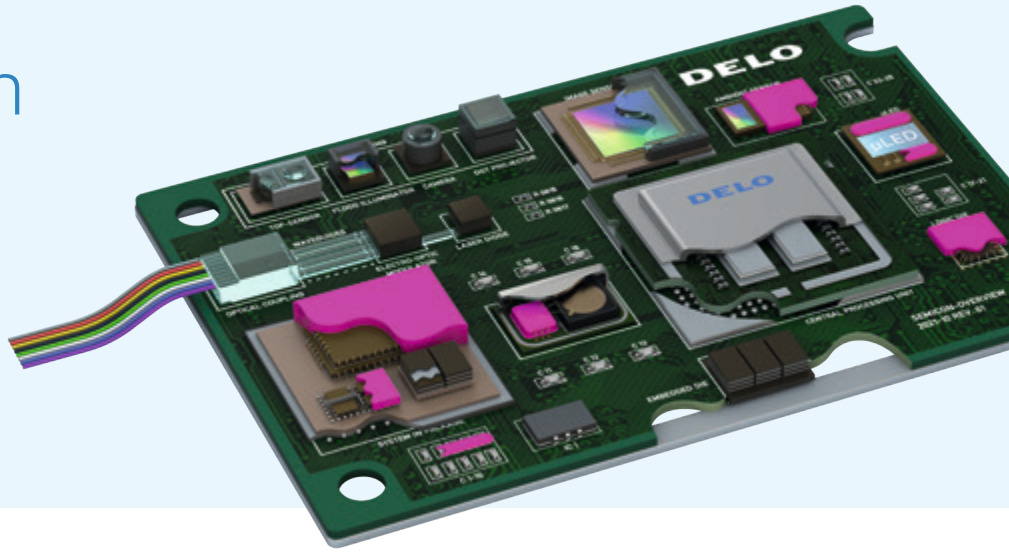


CMOS sensor – lid attach



CPU / GPU lid seal

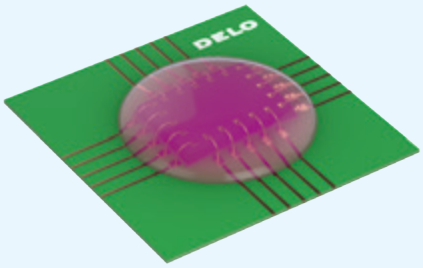
Encapsulation



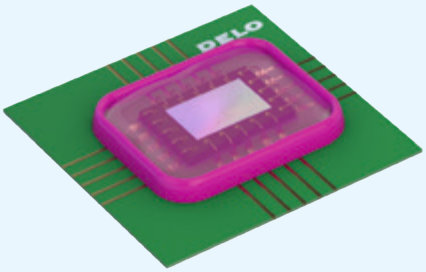
Encapsulation adhesives are often used to protect bare dies against environmental influences. Depending on the application and its requirements, dies can sometimes include wires. In other instances, only the wires are encapsulated. Typical applications in this case include glob tops and dam & fill. To ensure a long service life for the final package, mechanical properties and curing methods must suit the application. Here, curing temperature, the coefficient of thermal expansion, filler size, and other factors play a very important role. In addition, the use of a dual-curing adhesive can help achieve the lowest possible carbon footprint or high aspect ratios.

Encapsulants	Special feature	Application example
DELO DUALBOND GE7065	Light-fixable glob-top	Densely packed automotive devices
DELO MONOPOX GE6585	Low CTE dam	Highly-resistant encapsulation of components (e. g. in automotive or aerospace)
DELO MONOPOX GE6525	Low CTE fill	
DELO MONOPOX GE4825	Flexible black coating	MEMS microphone ASIC die
DELO MONOPOX EG3773	Low-stress encapsulant	Passive component encapsulation

EG = **E**lectronic **G**rade, **GE** = **G**eneral **E**ncapsulant

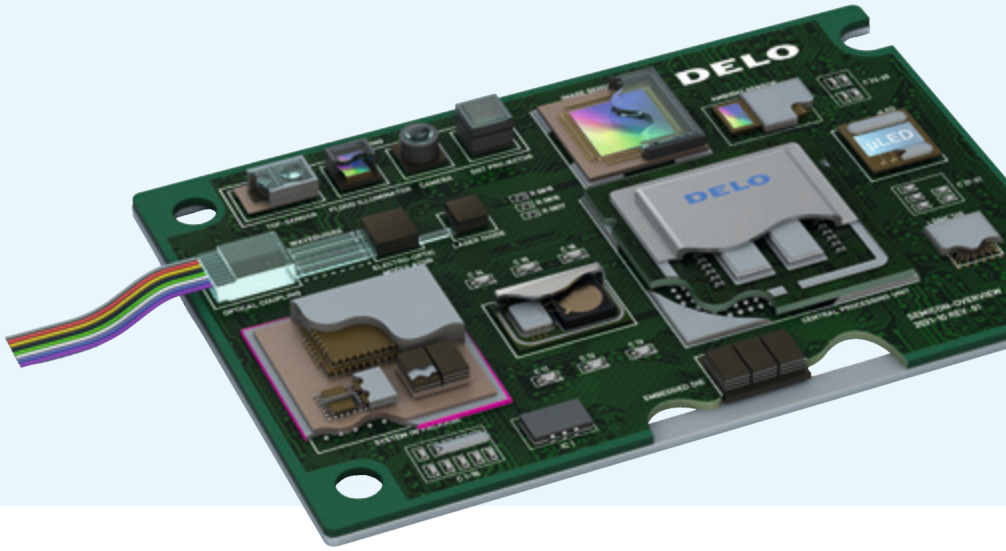


Glob top



Dam & fill

Functional materials

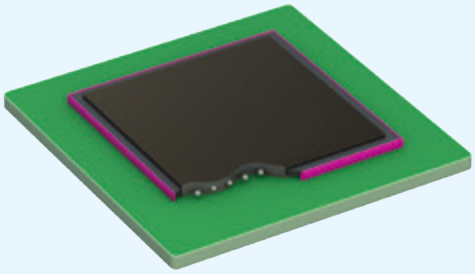


Advanced package types need specific adhesive solutions. Fortunately, one of DELO's defining attributes as a Premium Partner is that we provide tailored solutions based on individual needs.

Some examples of specially developed products include thermally and electrically conductive materials, required for die attach or cavity filling to distribute heat generated by bare semiconductors or to electrically contact dies. Recently added to our portfolio are specially designed micro dam materials that allow for widths of less than 100 µm with an aspect ratio of up to 5, breaking existing design rules regarding package density. DELO also offers solutions for EMI shielding and low Dk / Df, which are crucial for 5G and other applications to increase package performance.

Functional materials	Special feature	Application example
DELO DUALBOND IC343	Electrically conductive	Die attach for grounding
DELO MONOPOX TC6513	Thermally conductive	Thermally conductive fill for automotive sensors
DELO MONOPOX AC6523	Anisotropic conductive	Anisotropic conductive adhesive for multibump application
DELO DUALBOND EG4797	Micro dam	Underfill flow stop

AC = **A**nisotropic **C**onductive, **EG** = **E**lectronic **G**rade, **IC** = **I**sotropic **C**onductive, **TC** = **T**hermally **C**onductive



Micro dam flow stop

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