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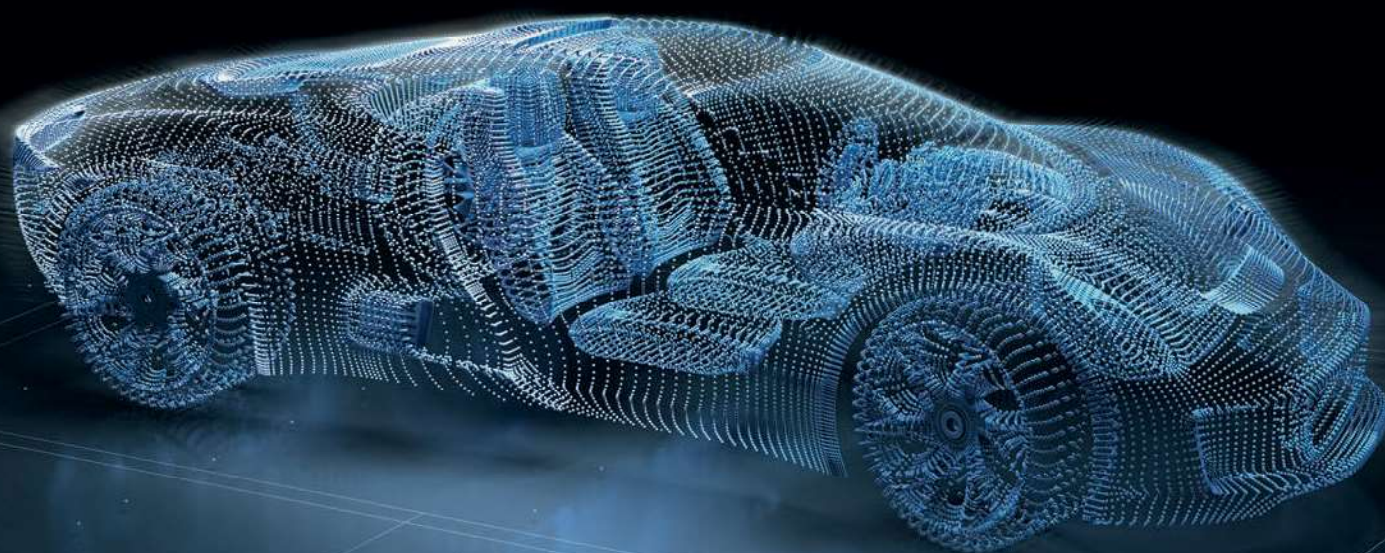
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Automotive Audio Bus (A²B) and Ethernet –

Analog Devices discusses the two buses that could meet most of the future needs in vehicles



SPECIAL REPORT: Automotive Electronics

Sustainable E/E architecture

EVs and their batteries

also in this issue T&M supplement

Determining the probability of intercept

EMC challenges in power electronics

Accredited high-frequency calibration

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Q&A with...

Rogier Reinders

Global Marketing Director, Electronics and Advanced Assembly, Dow Consumer Solutions



...who discusses the importance of modern silicone materials in electronics design

Q
A

Are advanced silicones important to electronics applications?

As a class of materials, silicones offer significant, proven benefits, including hydro-thermal stability and resistance to most chemicals, viscosities and mechanical strengths that minimise stresses on electronic components, good protection against shock and vibration, long pot life and non-toxicity, and more.

Building on these desirable properties, advanced silicone adhesives, sealants, optical bonding materials, conformal coatings and encapsulants deliver specialised performance, tailored to the needs of today's electronic devices. For example, they can offer thermal conductivity or electromagnetic interference (EMI) shielding that have become critical to a growing number of smaller electronic components. Optically-clear silicone materials for bonding automotive and consumer displays can provide high transmittance, low haze, minimal yellowing and superior reliability.

Q
A

Silicone materials are found in many applications; but, what specific electronics market segments offer the greatest growth potential?

We see strong demand for advanced silicone solutions in communications, transportation and consumer electronics.

In communications, 5G wireless networks with higher power densities, the Internet of Things (IoT) and Big Data used in analytics are exponentially increasing the amount and rate of data transfers. For reliability, components in these systems need protection from EMI that can disrupt circuits, and from damaging heat generated by high-speed, high-volume operations. Silicone-based conductive materials that offer electrical conductivity or EMI shielding help enable the next generation of data communications.

In transportation, the introduction of electric vehicles and the proliferation of automotive driver-assistance sensors require solutions to meet safety and reliability requirements

whilst achieving efficient throughput in mass production. Thanks to their versatility and performance-enhancing capabilities, silicones can be found in virtually every area of automotive system assemblies, from powertrains and engine sealants to electronic control modules, novel lighting systems and safety features. For example, silicone materials for EMI shielding can play a key role in ensuring reliable performance over the product lifetime of critical applications like radar, cameras and electronic control units (ECUs).

And in the highly competitive and fast-paced consumer electronics sector, products like smartphones and foldable tablets require rapid, efficient assembly. They also need solutions for ease of rework, reduced energy usage and management of high temperatures and radiation generated by smaller components and increased functionality, all met by advanced silicone materials.

Q
A

When it comes to materials, what challenges currently face electronic component designers?

Several technology trends are prompting designers to move beyond standard silicone materials. First, as devices become thinner and smaller, miniaturisation and tighter packaging of sensitive components are increasing the need for improved thermal management. Thermally-conductive silicones work with heat sinks to improve heat dissipation. They are available in many forms, including uncured greases, curable thick-layer applicable gap fillers, thermally-conductive adhesives, gels and encapsulants.

Another challenge that silicones can address is reliability. As electronics – particularly consumer devices – become more expensive to buy and repair, dependable performance and longer life are especially important to brand reputation and customer satisfaction. This reliability mandate also applies to advanced driver assistance systems (ADAS) in vehicles, where consumers pay a premium for such safety features.

Another concern is production speed. When a highly-anticipated new device comes on the market, customer demand can surge

overnight. Manufacturers need fast throughput to capitalise on this demand without delays. Silicones can shorten production times through accelerated and low-temperature curing, primerless bonding and not using oven curing.

Q
A

Do silicone materials meet sustainability requirements in electronics designs?

Silicones can play a critical role in increasing the sustainability of components and helping manufacturers comply with environmental regulations. They also help support mainstream adoption of electric and autonomous vehicles, which reduce or avoid fossil fuel consumption and carbon emissions. In addition, silicones, including UV-cure grades, are frequently solventless, making them the material of choice where emerging regulations impose complex and costly special handling and processing requirements.

Q
A

Electronics manufacturers always look for ways to reduce costs. How do silicones contribute to cost control?

There are several ways high-performance silicones can help reduce manufacturing costs, whether by replacing more expensive materials, increasing productivity, eliminating secondary operations or reducing overheads:

- Replacing pre-cured materials that are often more expensive;
- Avoiding the need for pre-treating, thanks to primerless adhesion to a wide range of substrates, including glass, plastics and metals;
- Delivering high flow rates for efficient filling, dispensing and self-leveling;
- Rapid curing with or without added heat to shorten cycle times and reduce energy use for curing;
- Reducing weight and operational costs by eliminating mechanical fasteners;
- Offering opportunities to reduce waste and scrap rate of electronic devices, and address warranty issues, thanks to the stability of silicone materials. **EW**