TO 56 PLUS® Passes Stringent RGA Tests and Can Serve 25 GB/s and Beyond

Ready to serve the increased requirements of higher bandwidths for future data communication networks

In a series of tests conducted in 2008, SCHOTT researchers confirmed that its glass-to-metal sealed TO 56 PLUS® packages were fully capable of handling 25 GB/s data streams given certain design guidelines were followed.

SCHOTT TO PLUS® packages are extremely low-loss and are well-suited for high-frequency applications because of the company’s signature glass-to-metal sealing technology. Polymer non-hermetic seals contain organic materials which have a tendency to degrade and outgas over time. Glass- (GTMS) and ceramic-to-metal seals (SCHOTT CerTMS®), on the other hand, contain no organic contents and hence do not emit gases over its lifetime – this means a longer lifetime and a higher level of chemical stability.

As data exchanges are expanding to meet increasing commercial and consumer bandwidth needs, the chips used in these applications are expected to be even more sensitive and susceptible to degradation due to exposure to harmful gases and environment. Even leaks of traceable amounts of hydrogen, and water vapor can compromise the functions of the sensitive opto-electronic components. Humidity, in particular, can cause semiconductor elements to degrade, leading to the failure of the entire unit.
The stability and capacity of these TOs (otherwise known as feedthroughs) are hence even more important. The TO PLUS® line passes the RGA and other reliability tests without issues.

The ability to build new capabilities into a proven technology & platform like TO PLUS® offers important cost savings, because a new technology need not be developed and taken through the standard industrial shake-down period before being deployed. In fact, by linking more 25 GB/s units, it may even be possible to advance to 100 GB/s capabilities with current technology, sparing systems developers the need to design larger, custom-built packages.

SCHOTT’s US Acquisition Brings Local Production and New Product Offerings to Customers

SCHOTT Elecpac, LLC | Latest US manufacturing facility enhances the company’s global footprint and adds connectors to its product range.

April 2009 | SCHOTT North America, Inc. (SCHOTT) has acquired ELECPAC of Cary, Il., a division of Wilbrecht Electronics, Inc. (St. Paul, Minn.). Effective with this acquisition, the division has been renamed SCHOTT Elecpac, LLC and will become a wholly owned subsidiary of SCHOTT North America, Inc.

SCHOTT Elecpac produces glass-to-metal hermetic feedthroughs, headers, and connectors used in defense, aerospace, and medical applications. Ron Campbell, who has 30 years of experience in the electronic packaging industry, will become President and General Manager of SCHOTT Elecpac, LLC. Both companies have built a long heritage in their areas of expertise, especially in glass-to-metal sealing technology. The inclusion of Elecpac complements SCHOTT’s existing manufacturing capabilities while adding glass-to-metal seal connectors for special applications.

“Elecpac represents a tremendous opportunity for SCHOTT to expand its global manufacturing footprint in the electronic packaging space,” Andreas Becker, Chairman of the Board of SCHOTT Elecpac, LLC. “U.S.-based manufacturing will allow us to better serve the domestic market.”

Hermann Ditz, President of SCHOTT’s Electronic Packaging business worldwide, agrees. “With the acquisition of ELECPAC, SCHOTT is now able to provide our customers a complete local portfolio of R&D, technical customer support, production, sales and marketing.”
SAW Torque Sensors for Automotive Applications Help to Improve Fuel Efficiency

May 2009 | SCHOTT has developed a unique new hermetic sensor housing for Transense’s SAW technology, assisting tomorrow’s automobiles to go greener.

Automotive manufacturers have been waiting for these for some time: torque sensors that allow for exact metering of driving power, shifting operations, and steering movements that increase driving comfort and reduce fuel consumption, as a result. However, to date, no sensor has ever been able to meet the demands with respect to performing exact measurements and remaining hermetic over its operating life – typically at least a quarter of a million kilometres. In working together with the British sensor technology company Transense Technologies plc, SCHOTT Electronic Packaging has now developed a completely new three-part housing for a SAW sensor that meets all these demands. Serial manufacturing of the new housing will commence soon.

Automatic transmissions are becoming progressively smoother. But despite the duplex clutch, passengers still feel a noticeable jolt while shifting gears and reaccelerating. New transmissions attempt to reduce this by using a clever electronic control system, however erratic changes in torque can still occur during shifting especially as the vehicle and transmission ages so that the original calibration becomes less and less accurate. The reason is that there have never been any production viable sensors that have been able to directly measure the torque inside the drivetrain. Attempts made by various manufactures to produce torque sensors from two housing parts have failed because in order to perform exact measurements, this housing must be both elastic, as well as completely hermetic.

Now, Transense’s and SCHOTT’s solution provides a unique housing that combines a metal with high elastic limit for transmitting the torque to the sensor with an annealed metal suitable for hermetic glass-fritted electrical feedthroughs.

The cooperation between Transense Technologies and SCHOTT Electronic Packaging has been ongoing since 2002. When SCHOTT and Transense decided to develop a three-part housing, joint work began in 2004 on a torque sensor that now is ready for mass production. Transense is already negotiating with automobile manufacturers and Tier 1 and 2 suppliers and is confident that vehicles can be equipped with up to ten torque sensors. These would enable smoother fuel-saving automatic gear changes, improved engine output monitoring, better traction control by torque vectoring and smarter electrical power assisted steering.

For more information on hermetic housings, please refer to this product datasheet from SCHOTT

For more information on Transense SAW Torque Sensor, please refer to http://www.transense.co.uk
The demand for natural gas is on the rise – and with it the need for appropriate means of transportation. But, because pipelines are expensive, often cross through crisis regions and put suppliers in a position to cut off the supply rather easily, the manufacturing and consuming countries are increasingly relying on ships to transport the raw material inside four or five huge tanks, after it has been liquefied by reducing its temperature. Around 270 such tankers are currently sailing on the world’s oceans, another more than 130 have already been ordered and should be launched by the year 2011. 45 of these are for Qatar alone, the world’s largest producer of liquefied gas.

In order for it to be shipped, the gas is liquefied by cooling it down to minus 165 degrees Celsius and then pumped into the tanks on board the ship. This means that 600 times as much gas can be stored in comparison with normal temperature. While it is being pumped, liquefied gas is subjected to high pressure of up to 150 bar. The chassis and internal electric motors of the pumps that are a permanent component of the tank’s cladding are immersed in liquefied gas. For this reason, they must be sealed perfectly, particularly where the electrical connections from the deck of the ship lead into the pump.

Compression sealing technology

Here, SCHOTT relies on a technique called compression seal. “This calls for both the glass isolator and the copper conductor to be placed inside a stainless steel housing and then be heated up so that all of the elements melt together,” explains Dr. Oliver Fritz, Technical Manager for Large-scale Feedthroughs at SCHOTT Electronic Packaging in Landshut, Germany.

“As the assembly cools down, the glass solidifies and the stainless steel housing contracts to a greater degree than the glass. Due to the differences in the coefficients of thermal expansion of the materials used, the glass isolators are subjected to compression and a hermetic joint is created,” he adds. Later, when the cold liquefied gas flows through the pump, the stainless steel contained in the housing of the feedthrough continues to contract, exerts even more pressure on the glass and, thus, helps ensure that it remains sealed.
The pressure barrier in the glass version that SCHOTT relies on does not contain any organic ingredients that age rapidly in response to the severe temperature cycling and, thus, lose their hermeticity. In comparison with hermetic pressure barriers that feature a ceramic-metal bond, glass feedthroughs are less likely to experience breakage.

Secure insulations: tested under high pressure

Because feeding electrical conductors through to the submerged pump represents a rather sensitive area, SCHOTT adheres to the highest possible safety standards during manufacturing. “We are capable of supplying all types of products together with certification in accordance with the European ATEX standard and the international IEC standard for electrical safety,” Ulrich Dirr, Sales Manager for Large-scale Feedthroughs at SCHOTT Electronic Packaging, notes. “Before it is shipped, each and every liquefied gas feedthrough is subjected to one and a half times the maximum required design pressure and then tested for density using helium mass spectrometers. Testing for electric strength and insulation guarantee reliable performance at voltages of up to 6,600 volts and flows of 600 amperes,” he adds.

Thanks to the technology of compression glass-to-metal sealing that SCHOTT has succeeded in perfecting by optimizing material combinations and manufacturing processes for these extreme applications, the company has captured the leading position in this market.

SCHOTT started manufacturing the first glass-to-metal feedthroughs for liquefied gas applications 25 years ago. These products are still doing their jobs today without requiring any maintenance or causing any problems.

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SCHOTT Introduces Hermetic Packages to Improve Performance of Aircraft Proximity Sensors

Glass-to-metal technology provides several advantages over conventional packaging systems.

October 2008 | Properly functioning proximity sensors are critical for flight safety and reliable operation of the aircraft. Dependable, long-lasting hermetic packages from SCHOTT are designed to protect a variety of sensors, especially proximity sensors from condensation, corrosion and other common in-flight stressors. They are manufactured specifically for the most vulnerable sensors – including those placed in outside doors and landing gear – that are consistently exposed to extreme conditions.

“One of the major challenges facing the industry today is sensor failure, which can result in departure delays and an increase in maintenance,” says Matthias Rindt, Sales Manager responsible for SCHOTT Electronic Packaging’s avionics products. “SCHOTT’s hermetic packages provide a much more effective solution as the technology has a long track record for ruggedness.”

Sensors are used to monitor various aspects of an aircraft and detect critical items, such as whether doors are properly closed or landing gear is not operating properly. Protecting these sensors is critically important to the safe operation of the aircraft.

SCHOTT’s glass-to-metal design shields aircraft sensors from a broad range of in-flight variables. The packages are water-, humidity- and gas-tight, and constructed of nonflammable materials that do not produce hazardous fumes. Likewise, the materials are chemical-resistant and can be used in locations where contact with solvents or petroleum is likely, such as fuel tanks.

The products can withstand pressures of up to 4,500 bars and are tested with temperature shocks within a range of -65°C to +150°C for 15 cycles. Due to the high rate of metal parts that are used for the packaging, the packages provide EMC/EMI shielding.

Glass-to-metal sealed packages and feedthroughs from SCHOTT Electronic Packaging are already commonly used in avionics, e.g. for relays or DC/DC converters. SCHOTT’s hermetic seal technology meets stringent military specifications.
March 2009 | SCHOTT is the world’s leading manufacturer of special glass powders for dental fillings made of composite materials.

At the two key industry events in Europe and the USA, the Special Glass Division of SCHOTT Electronic Packaging presented the world’s first “NanoFine” dental glass powder that consists of particles that are only 180 nanometers in size. For dentists and patients alike, finer filler materials mean longer lasting fillings and a more attractive appearance. Product developers also benefit from the extended material properties. Bright white teeth are an attractive sign of one’s health. Nevertheless, caries rank among the world’s most frequent and widespread infectious diseases. Painful holes can result when bacteria cause the dental enamel to become porous. To save the tooth, the dentist has to remove the damaged areas and fill them with a replacement material.

In the past, mainly metallic alloys, such as gold or amalgam, were used as fillings. However, these have disadvantages: they conduct electricity, heat and cold to the sensitive nerve of the tooth. Many patients disapprove of using amalgam, a substance that contains mercury, for health reasons. Besides, these dark metallic fillings are often considered to be unattractive. Fillings made from composites offer clear advantages

Dental composites, on the other hand, are optically similar to natural tooth material. Their recipe for success lies in their main components: a polymer resin that is initially liquid but hardens when exposed to UV light, and the less familiar but important filler material glass. “Glass powder is a key component of modern dental composites,” explains Dr. Jörn Besinger, head of development at SCHOTT in Landshut, Germany. “Hardly anyone knows that a dental filling contains up to 80 percent glass powder. This gives the filling excellent mechanical properties. It can handle sustained pressure and is easy to polish,” he adds.

NanoFine glass particles for perfect dental fillings

In addition to the use of an extremely pure specialized glass, the size of the particles is critical to the quality of the composites. Here, experts say the smaller, the better. SCHOTT supplies its ultrapure dental glasses in 5 to 0.4 micrometer (µm) grain sizes. For this reason, leading dental composite manufacturers mainly use “SCHOTT UltraFine”, currently the finest quality level on the market, for their products. Now, the international technology group has succeeded in improving the grain size from “UltraFine” to “NanoFine” by further developing its patented multi-stage grinding process. The resulting particles are an average of 180 nanometers (nm) in size, with a tolerance of only 30 nm and a very narrow grain size distribution.

Glass powder from SCHOTT: The glass powder’s fine grain size gives the final dental filling the hardness it needs to be able to withstand pressure.
New Hermetic Packaging and Sealing Technology Handbook available

March 2009 | SCHOTT Electronic Packaging (EP) has launched a new edition of the “Hermetic Packaging and Sealing Technology” handbook. The updated version continues to provide a good insight into the company’s signature glass-to-metal sealing (GTMS) technology and now includes an overview and technical details of EP’s other hermetic packaging technologies in the portfolio.

The following chapters are the new additions included in the updated handbook:

- Latest developments in Glass-to-Metal Sealing technology
- Ceramics-To-Metal Sealing (SCHOTT CerTMS®)
- Passivation Glass Powders
- Glass Tubes
- Application examples

The technology handbook is intended to provide readers of both technical and non-technical backgrounds – product developers, quality managers, purchasing managers, electrical and electronic engineers, etc. – with information on hermetic glass-to-metal, ceramics-to-metal and glass encapsulation technologies in a reader-friendly fashion. Each technology chapter includes a description of the most important features and benefits as well as application examples of how the respective packaging is currently used. If you would like more insights or clarifications regarding the information presented in the handbook, or if we have provoked some new thoughts that you would like to discuss with us about, do contact us directly at any of our competence centers near you.

SCHOTT’s Electrical Penetration Assemblies for Nuclear Power Plants: Maintenance-free Performance – New Product Information

April 2009 | With the nuclear renaissance in motion, nuclear power capacity worldwide has been increasing steadily with over 40 new reactors under construction in 12 countries. New reactor designs have also been created. In addition to the 60 years of minimum qualified lifetime, the new reactor designs offer new safety standards while increasing efficacy with higher temperatures and higher pressure limits.

Electrical Penetration Assemblies are safety critical components that provide the pass-through for power, control and instrumentation cables into the sealed off reactor vessel. The new reactor designs require special electrical penetration assemblies, designed to perform and remain hermetic at higher temperature and pressure limits.

Since the early 1960s, SCHOTT has been consistently supplying superior glass-to-metal sealed (GTMS) large-scale feedthroughs used in Electrical Penetration Assemblies (EPAs) for nuclear power plants. The reliability and durability of SCHOTT’s signature GTMS technology has been proven more than 5000 times in over 50 nuclear power plants world-wide as these EPAs have remained to be maintenance-free throughout the last 5 decades.