

SCHOTT Electronic Packaging

Reliable protection for sensitive electronic components



SCHOTT
glass made of ideas

SCHOTT Electronic Packaging: Reliable high-tech materials and components

<i>Product Groups</i>	<i>Page</i>
Special Glass	4
Automotive	6
Opto-Electronics	8
Large Feedthroughs	9
Quartz Holders	10
Thermal Fuses	12
Technologies	14
Contacts/Insert sheet	15

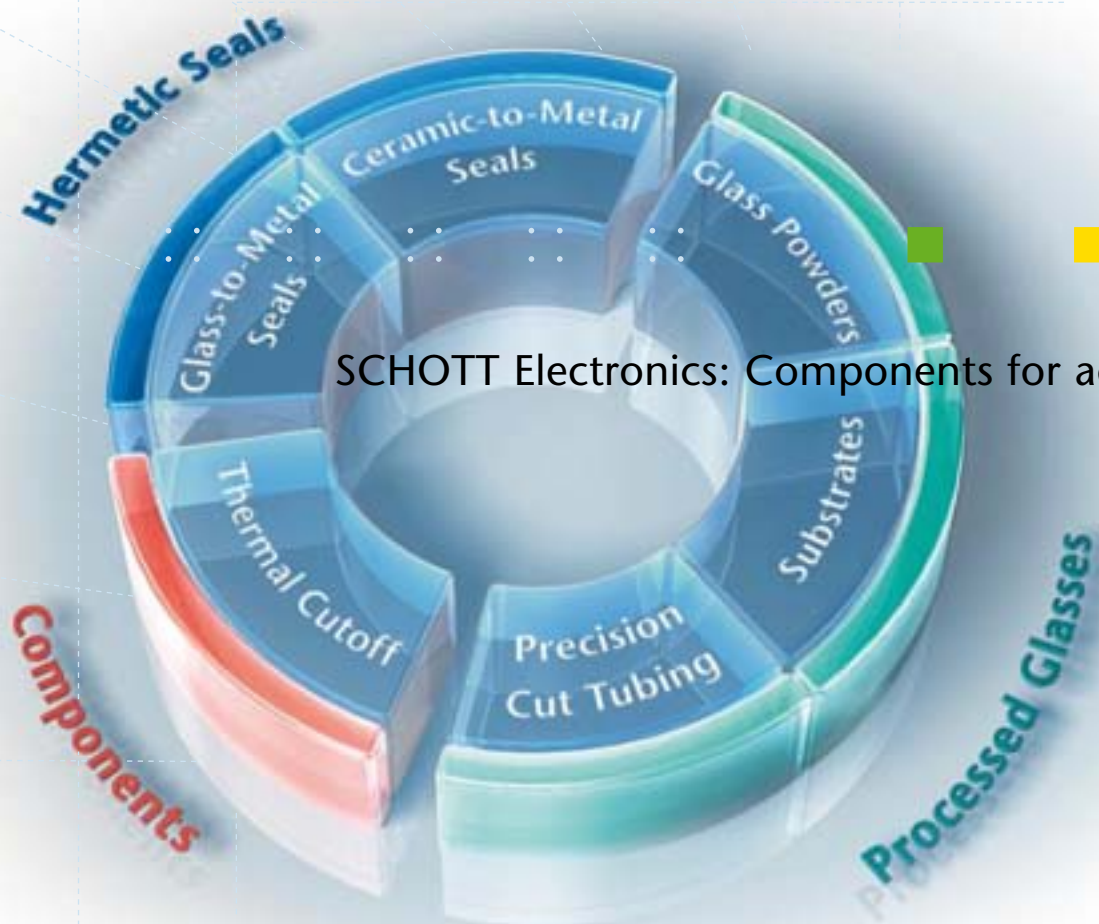


SCHOTT. Glass made of ideas.

As an innovative high-tech group and global player, with production facilities and competence centers in all major markets, we are constantly working on new ideas and creative solutions – to help turn your ideas into reality.

We are continuously striving for excellence and expanding our knowledge base to develop and supply consistently high-quality products. This is how we contribute to your success, around the world – around the clock.

Hermann Ditz
President CEO
SCHOTT Electronics GmbH



SCHOTT Electronics: Components for added safety

SCHOTT AG is a wholly owned subsidiary of the Carl-Zeiss-Foundation and addresses its world-wide markets through strategic business segments which encompass a number of business units. The business unit Electronic Packaging is part of Precision Materials; as such it offers its services through five product divisions.

Landshut, Germany. The headquarters of SCHOTT Electronics GmbH and of SCHOTT Electronic Packaging GmbH, one of the five production facilities around the world that develop, produce, and sell materials and components for electronic applications.

Whether Germany, Singapore, Japan, the US, or the Czech Republic – in addition to standard products, we at SCHOTT provide competent support for our customers and develop innovative and customized solutions.



SCHOTT Electronics GmbH and SCHOTT Electronic Packaging GmbH (Plant I), Landshut, Germany

and protection for microelectronic, electric, and photonic devices.

SCHOTT Electronic Packaging's core competencies are the development and application of demanding electronic housing technologies, as well as the design of special electronic components, all with safety-related functions.

All SCHOTT Electronic Packaging products are of consistently high quality. With more than 65 years of business experience and solid in-depth technological know-how, we offer competent customer service around the world and reliable high-tech products.



Landshut, Plant II, Ger



Singapore



Minakuchi, JP



Lanškroun, CR

Special Glass: Material for all situations

In the beginning there was glass. Ever since SCHOTT was formed, special glass has been our core competence. Ultra-modern machinery, state-of-the-art technologies, the competence of its staff, and the entire know-how of the SCHOTT Group form the basis for the development of new glass products.



The Special Glass Product Division produces a wide range of glass in forms perfectly tailored to meet the requirements of a variety of applications, not just in the area of electronics.

- Glass powders
- Glass powder pastes
- Press-granulates
- Sintered pre-forms
- Precision glass tubing
 - cut lengths
 - with processed ends
- Small glass discs
- Structured glass wafers
- Bioactive glass (VITRYXX®)



Glass powders and granulates

Glass powder product range

Type	Description	Average Particle Size (µm)
K	Standard	3.0 – 30.0
FK	High purity	1.0 – 3.5
SM	Narrow distribution	2.5 – 3.5
UF	Dental powder, also silanated	0.4 – 1.5

For more than 6,000 years, humankind

Application areas

- Passivation of semiconductors (e.g., rectifiers, varistors)
- Encapsulation of components
 - Reed switches
 - Identification systems (e.g. transponders, also implants)
 - Special lamps
 - MEMS wafers

- Windows for opto-electronic components
- Sealing and joining of glass, ceramics and metals etc.
- Composites for dental restoration
- Cosmetics and polymer additives

Dental powder

SCHOTT delivers an important base product for the dental sector: dental glass in ultra-fine quality. These glass powders are used in high-quality composites for tooth fillings and dental prosthesis.

- Particle size less than 1 µm
- Outstanding purity
- Silanated upon request

Please contact us if you require additional product information. Contact information can be found on the "Contacts" insert sheet.



Precision glass tubing

Glass research and product development

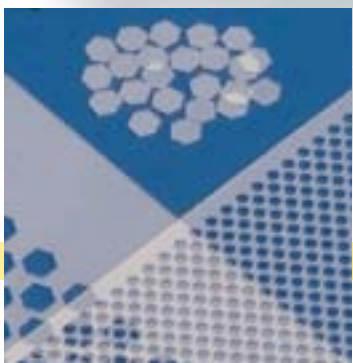
Located in Mainz (Germany), SCHOTT's Glass Research Center is Europe's largest and most modern. Some three hundred scientists and technicians are continuously expanding their fundamental knowledge and expertise in the manufacturing and processing of special glass. Certified, accredited laboratories are setting new benchmarks in metrological and analytical techniques for glass.

Based on this outstanding knowledge pool, application scientists at SCHOTT Electronic Packaging develop custom-made products and solutions for a variety of applications. What can we do for you?



Sintered pre-forms

has been using glass – SCHOTT uses its potential to develop new ideas.



Glass discs and structured wafers



SCHOTT Glass Research Center, Mainz

Automotive: Automotive electronics in safe hands

The Automotive Product Division develops and produces efficient, electric glass-to-metal feedthroughs as well as housing components for automotive electronic applications. The reasons for their success: long product lifespans, high quality, and superior performance.

The Landshut (Germany) and the Minakuchi (Japan) facilities are the Technology Development Centers for the Automotive Product Division, while SCHOTT's production facilities in the Czech Republic and Singapore, employing the very latest technology, focus on the production of components for airbags and other safety-related devices. Four production facilities enable the company to react quickly and flexibly to increased automotive customer demand.

Using innovative solutions made of glass and metal, SCHOTT



Application areas

- Automotive electronics
 - Airbag igniters and sensors, seat belt pretensioners
 - Sensor technology
 - Engine control system
 - Voltage regulators
 - Anti-theft devices
- Sensors
 - Pressure, gas, and flow sensors
 - Pressure gauge converters
- Standard feedthroughs
 - Lithium, primary, and secondary batteries
 - Pyrotechnology
 - Relays, diodes, rectifiers, and capacitors
- Compressor seals
 - Air-conditioners
 - Refrigerators
 - Freezers



Automotive feedthroughs



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makes it safer for you to drive from point A to point B.

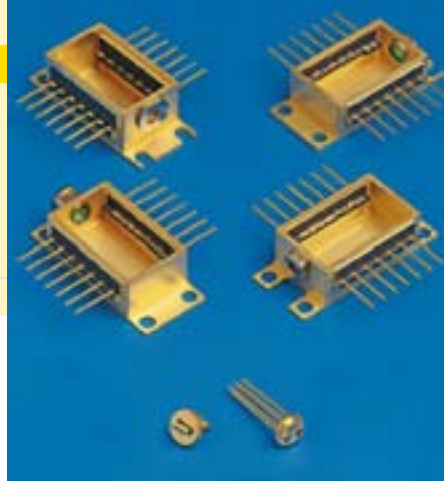


Sensor components



Standard feedthroughs

Opto-Electronics: Multifunctional components



*Ceramic-to-metal and
TO PLUS® packages*

When you require reliability and durability, hermetic glass-to-metal seals are indispensable. The Opto-Electronics Product Division develops and manufactures both: standard components, such as hermetically sealed glass- and ceramic-to-metal transistor headers, hybrid packages and caps, as well as products designed to meet the needs of individual customers. This is made possible by a highly skilled sales and engineering team.

High-speed data transfer

SCHOTT TO PLUS® High frequency TOs:

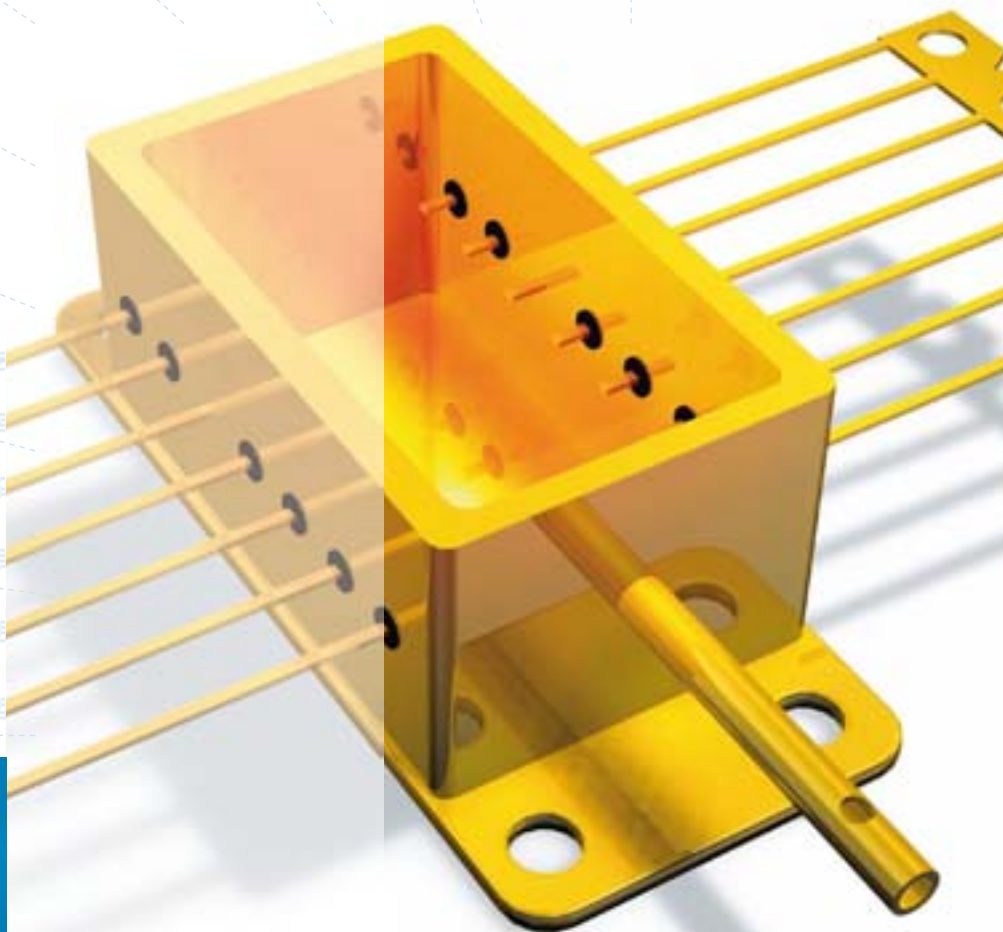
Through systematic design and stringent testing it is now possible to use the transistor outline package for electronic components, which require data rates of up to 10 Gbits/s.

You can count on SCHOTT's custom-made opto-electronic

Products

Window and lens caps:

- Biconvex and plano-convex lenses
- Aspherical lenses
- Silicon lenses
- Ultra-flat windows and sapphire windows
- Optical glass and sapphire spheres
- Solder glass and direct seals
- Additional optical filters (BG and RG filters) and coatings (high UV, AR, HR, beam splitters, etc.)
- Integrated lenses, miniature lenses and windows, window covers for MEMS



SCHOTT CerTMS®:

CerTMS® use the internationally recognized multi-layer ceramic competence of NEC/SCHOTT Components Corporation to meet today's complex connection demands. The ceramic technology allows for flexible arrangement of the circuit tracks in HTCC and LTCC, and has excellent high frequency characteristics. Packages with CerTMS® technology can support data rates of up to 40 Gbits/s.

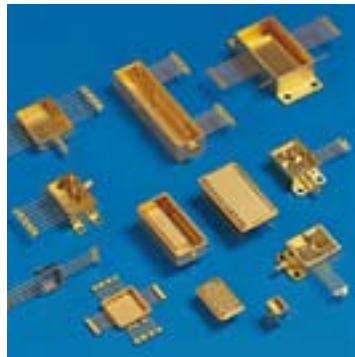


solutions – every time!

Product forms

Hybrid packages:

Platform, flatpack, solid side wall, fiber-optic, machined, and MiniDIL



Hybrid packages

Headers:

TO 46, TO 39, TO 8, TO 18, TO 56, TO 3, TO 66, copper heatsink TOs and DIPs TO (= Transistor Outline)

Application areas

- Telecommunications
- Opto-electronics
- Data processing
- Semiconductor industry
- Medical
- Industrial
- Avionics
- Laser applications
- Sensors



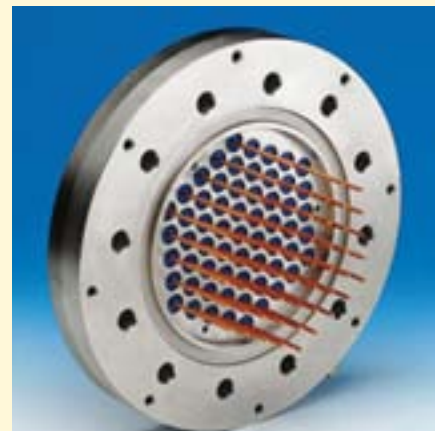
Opto caps and headers

Large-scale feedthroughs

SCHOTT's large-size, hermetic cable penetrations in pressure glass technique represent a new, worldwide standard in the safety of power-, control-, and instrumentline feedthroughs. Whether in chemical plants or pressure vessel construction, in power plants or special shipbuilding, SCHOTT delivers the most reliable, service-free containment penetrators – particularly when highly critical media are involved. The hermetic containment and all electrical functions are safely maintained even during serious accidents with pressure surges, increasing temperatures, temperature cycles, and possible power surges, as well as radiation loads.

Performance profile

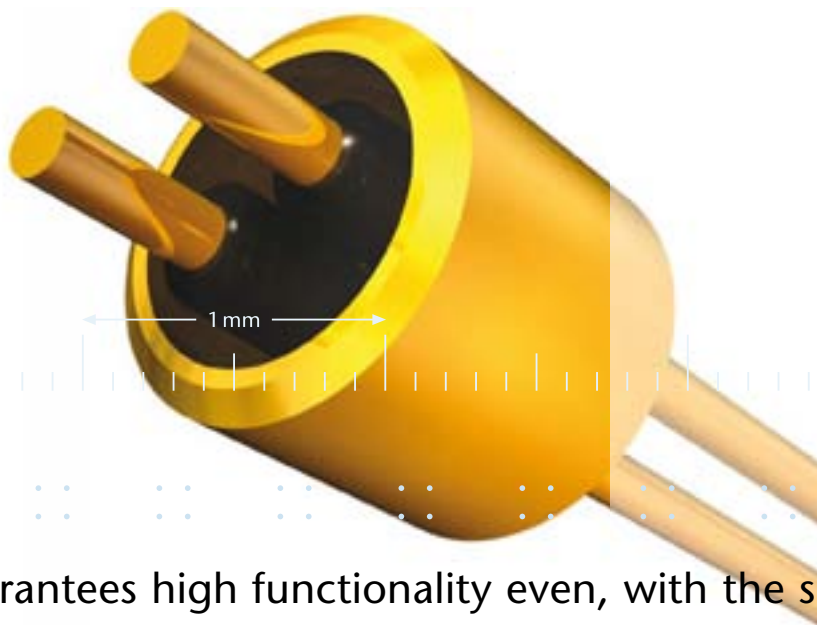
- Operation range: –200 °C up to +240 °C
- Pressure resistance: up to 1,000 bar
- Gas tightness: $< 1 \times 10^{-6}$ mbar 1 s^{-1} Helium
- Corrosion resistance: plating or use of stainless steel
- Non-aging due to glass and metal sealing
- Rated current: up to 1,200 A per pin
- Rated voltage: up to 13 kV AC
- Short-circuit load: up to 120 kA peak
- Shock-load tested: up to 190 g in mated condition, 2000 g at the penetration
- Vibration tested: up to 5 g at 5–100 Hz and more
- Qualified lifetime per assembly: up to 60 years, unlimited at pure penetration



Large-scale feedthroughs

Quartz Holders: For seals that stay tight

Quartz resonators, monolithic filters and oscillators are electronic components that place great demands on hermetic seals. The safest choice: cylindrical frequency-control components from NEC/SCHOTT and oval components from our Singapore plant. Our specialists have in-depth experience with these types of sealing technologies – in the form of matched seal and compression seals made of glass and metal.



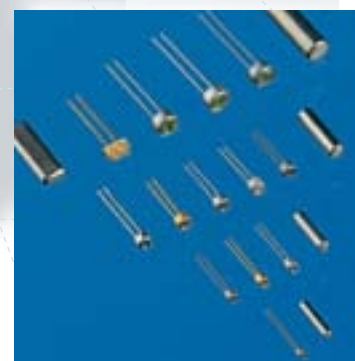
SCHOTT guarantees high functionality even, with the smallest

Diameter	Base
1.2	Solder-plated HP
1.5	Solder-plated HP
	Solder-plated
	Gold-plated
2.0	Solder-plated HP
	Solder-plated
	Gold-plated
	Solder-plated, lead-free
	Bright tin-plated
3.0	Solder-plated HP
	Flattened lead
	Silver-plated Y-lead
	Solder-plated
Other quartz	Gold-plated Y-lead

HP = High melting point

The cylindrical glass-to-metal seals (GTMS) from NEC/SCHOTT are used with tuning-fork oscillators and high-frequency quartz crystals. Extremely precise assembly techniques enable GTMS to be created with diameters between 1.2 and 3.0 mm (after cap installation).

In addition to conventional holders, lead-free clock quartz holders can now be mass produced. Tin/copper coatings are environmentally friendly, hermetic and easily mountable.



Cylindrical clock quartz holders



Oval quartz holders



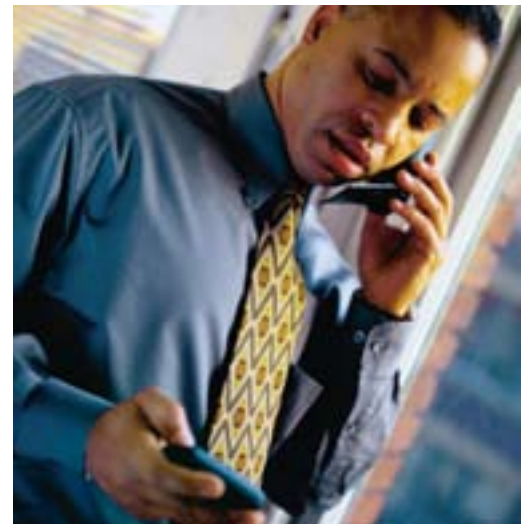
Products

- HC 49/U
- HC 49/U-S
- HC 52
- UM
- DIPs/standard sizes, nickel-plated, gold-plated and/or tin-plated
- SAW filters/resonators

of quartz holders – for watches, computers or cell phones.

Application areas

- Cell phones
- Computers
- Quartz watches
- Digital cameras



Miniature packages

Hermetic, thin-metal packages are suitable for surface-mountable designs.



Thin-metal packages

Please contact us if you require additional product information. Contact information can be found on the "Contacts" insert sheet.

Thermal Fuses:

Technical protection against overheating

Using the SEFUSE® trademark, the Thermal Fuses Product Division makes thermal cut-off products designed to protect electrical equipment and appliances from catching fire. Thermal fuses operate by cutting power to electrical devices when ambient temperatures increase to abnormal levels.

An experienced research and development team works closely with our customers to create innovative solutions for the electronics market. One of our latest products: The SH type.

SEFUSE® products meet a number of industrial safety standards and are also available in the form of cadmium- and lead-free products.

Product characteristics

- Compact, durable, and reliable due to resin-sealed construction
- One-shot, irreversible operation
- Very sensitive to abnormal temperature increases
- High accuracy
- Robust and stable in operation



Type SF-Metal

Whether it is a coffee machine, transformer or an air-conditioning system –



Type SM-Ceramic

Products

Type SM

The SM type uses a fusible alloy.

- Cut-off temperature: From 76°C to 187°C
- Nominal current: 0.5 A, 1 A, or 2 A
- SM/A series: 2 A
- SM/B series: 1 A
- SM/G series: 0.5 A

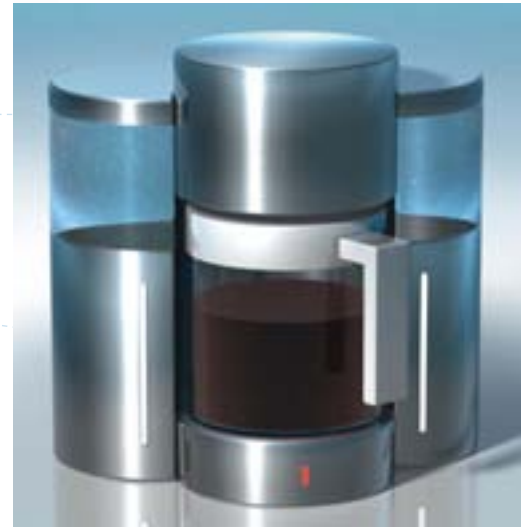
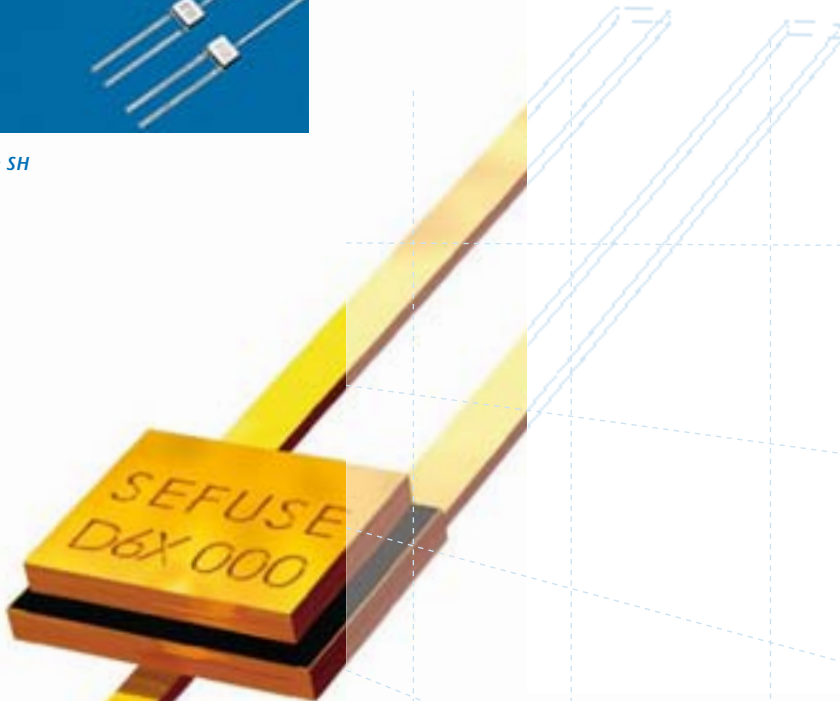
Type SF

The SF type uses an organic, thermo-sensitive material that has a specific melting point.

- Cut-off temperature: From 73°C to 240°C
- Nominal current: 6 A, 10 A, or 15 A
- SF/E series: 10 A or 15 A
- SF/Y series: 15 A
- SF/K series: 6 A



Type SH



NEC/SCHOTT thermal fuses can protect your electrical devices.

Type SH

In addition to fusible alloy, the SH type also has an electrical resistor inside. When the load becomes unsustainable or the level of heat unusually high, the circuit is interrupted.

Application areas

- Home appliances such as coffeemakers, irons, toasters, grills, and refrigerators
- Heating and cooling equipment including humidifiers and fans
- Personal hygiene equipment such as hairdryers, hair curlers and electric shavers
- Office equipment such as PCs, copiers, laser printers and fax machines
- Electric transformers, converters, chargers and motors

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A wide range of innovative technologies



SCHOTT products are monitored every step of the way, from the idea right through to delivery, resulting in the highest level of quality.



Surface treatment and plating

In order to enhance their functionality, glass-to-metal as well as ceramic-to-metal seals undergo special surface treatments in our most advanced plating lines. These include electroless nickel, electrolytic nickel, Ni-/Au-plating, selective and full gold-plating, silver and other plating processes.

SCHOTT offers plating services also to third companies. State-of-the-art plant engineering, process-integrated analysis, and exemplary environmental management ensure that even the strictest customer requirements are met in the electronics sector.

Metal processing

Not just glass!
SCHOTT manufactures in-house a variety of precision eyelets and metal components for different hermetic seals.



Materials management

Global procurement: In order to obtain the materials required for high-quality products, SCHOTT has set up a purchasing network that spans the entire globe.

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Quality management system

SCHOTT uses a wide range of cutting-edge technologies and modern machinery to ensure a smooth operation for high-quality products – as expected by our customers. Quality levels are permanently monitored and the results are captured and analyzed in a computer-aided quality (CAQ) system.

from the idea through to delivery – ensuring top quality.

Quality System Certification

The QM department as a Service Center continuously organizes and audits the quality system to meet changing requirements.

Our quality management system is in accordance with DIN/ISO 9001 and has been certified since 1992. Products for the automotive industry are developed and manufactured using the system requirements of TS 16949 (corresponds to QS 9000/VDA 6.1).

Constant commitment to the environment is demonstrated by SCHOTT in holding ISO 14001 certification.

Business card (contact partner)

www.us.schott.com/epackaging

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