

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

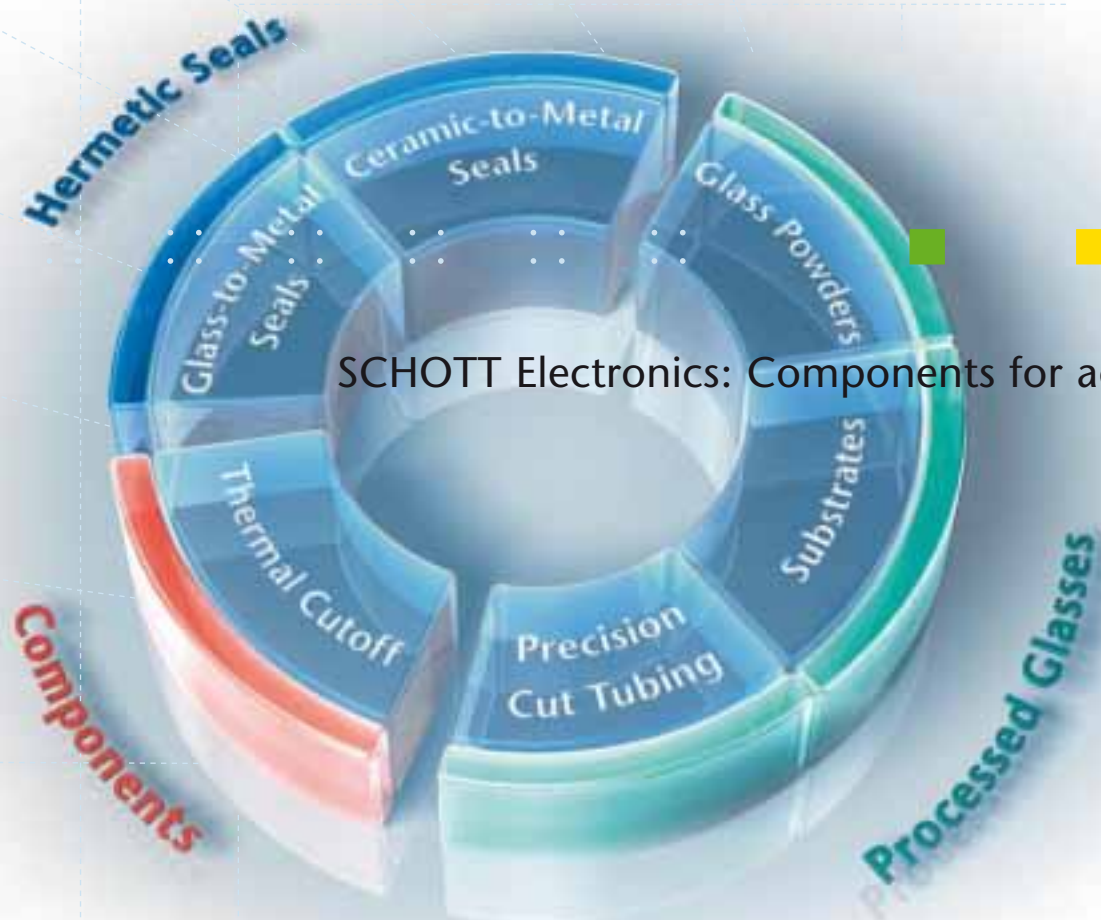


SCHOTT. Glass made of ideas.

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 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

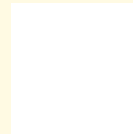
SCHOTT delivers an important base product for the dental sector: dental glass in ultra-fine quality. These glass powders are used in high-quality composites for tooth fillings and dental prosthesis.

- 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

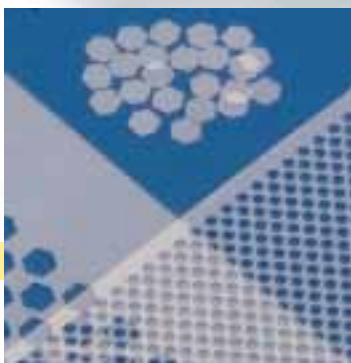
Located in Mainz (Germany), SCHOTT's Glass Research Center is Europe's largest and most modern. Some three hundred scientists and technicians are continuously expanding their fundamental knowledge and expertise in the manufacturing and processing of special glass. Certified, accredited laboratories are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



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



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

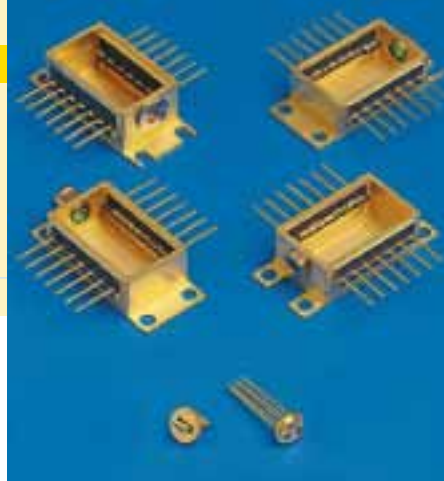


Sensor components



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:

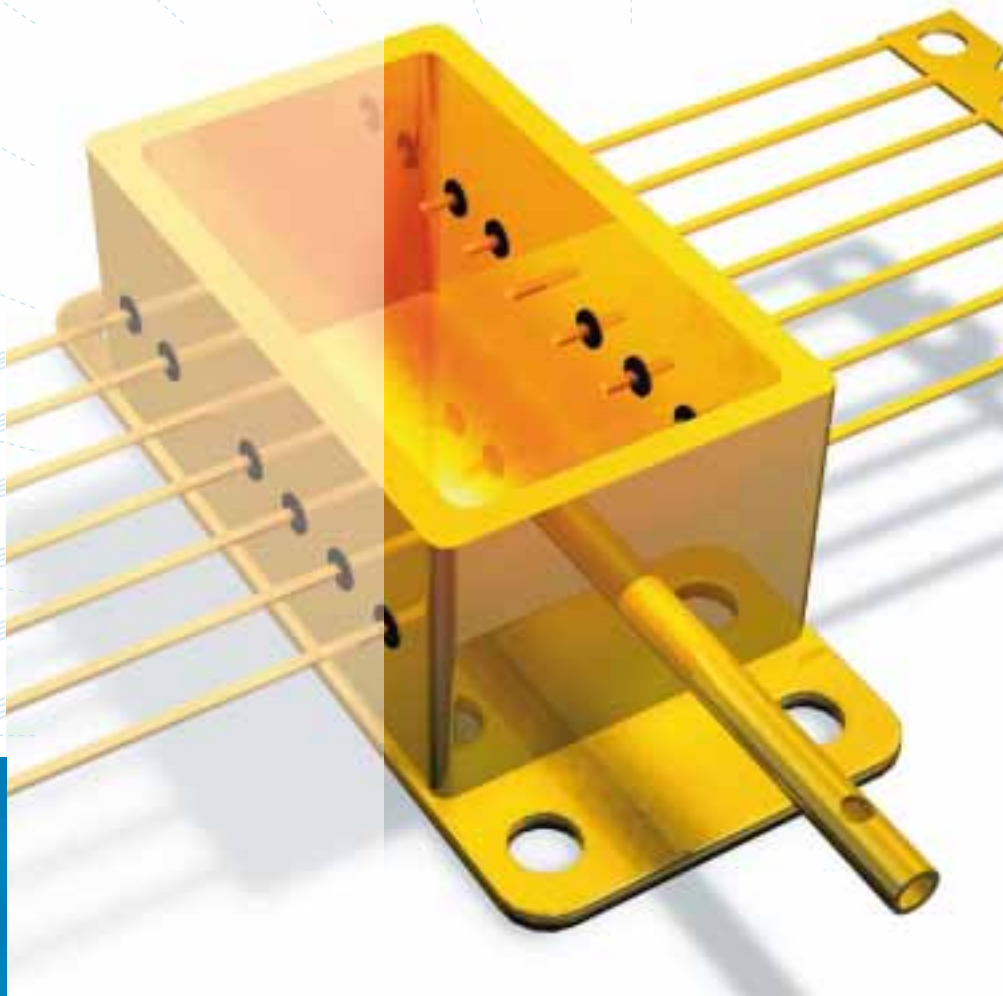
Through systematic design and stringent testing it is now possible to use the transistor outline package for electronic components, which require data rates of up to 10 Gbits/s.

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



Opto caps

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!

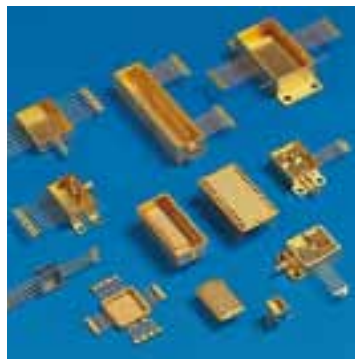
Product forms

Hybrid packages:

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

Headers:

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



Hybrid packages

Application areas

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



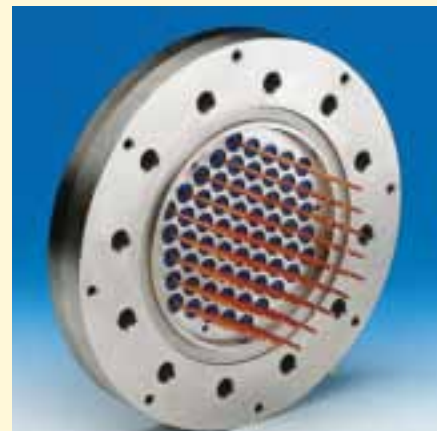
Opto caps and headers

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

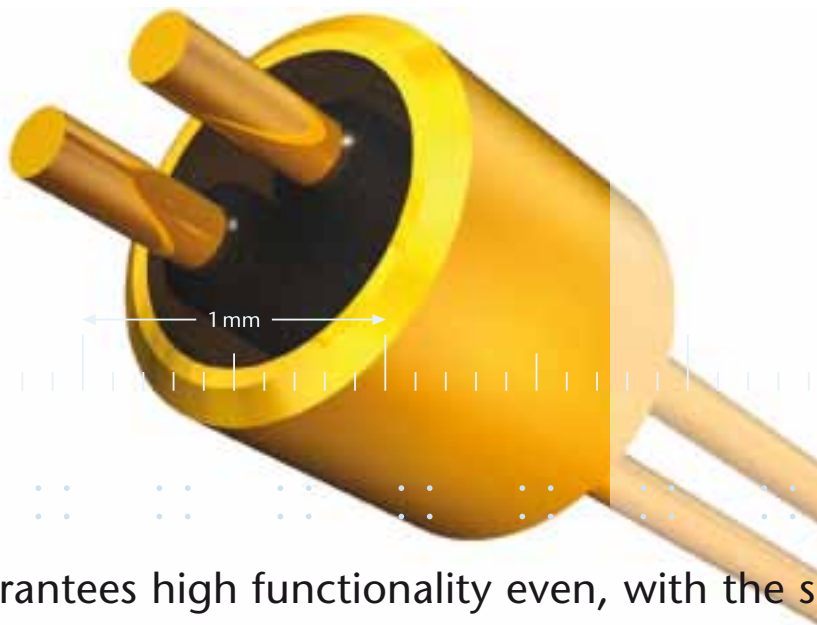
- Operation range: –200 °C up to +240 °C
- Pressure resistance: up to 1,000 bar
- Gas tightness: $< 1 \times 10^{-6}$ mbar 1 s^{-1} Helium
- Corrosion resistance: plating or use of stainless steel
- Non-aging due to glass and metal sealing
- Rated current: up to 1,200 A per pin
- Rated voltage: up to 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
3.0	Bright tin-plated
	Solder-plated HP Flattened lead
	Silver-plated Y-lead
Other quartz	Solder-plated
	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.

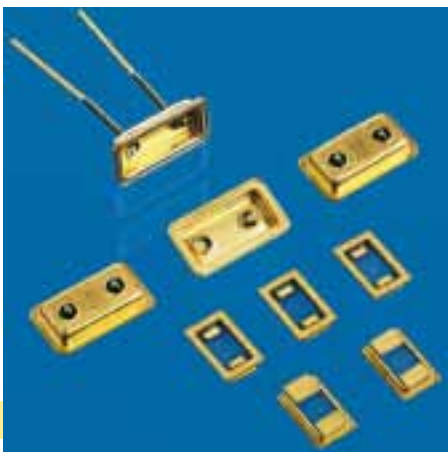
Application areas

- 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.

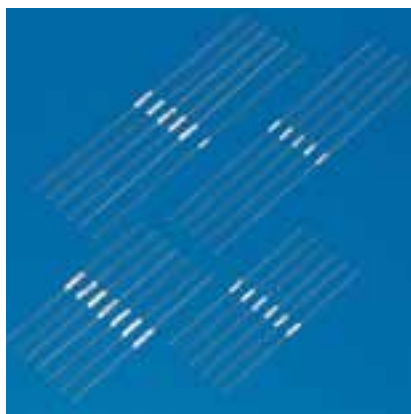
Product characteristics

- 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

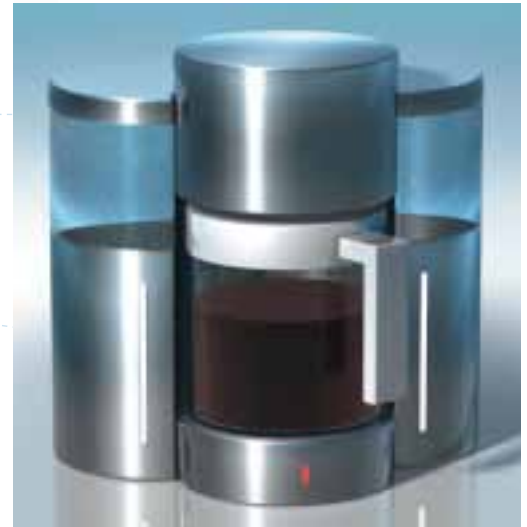
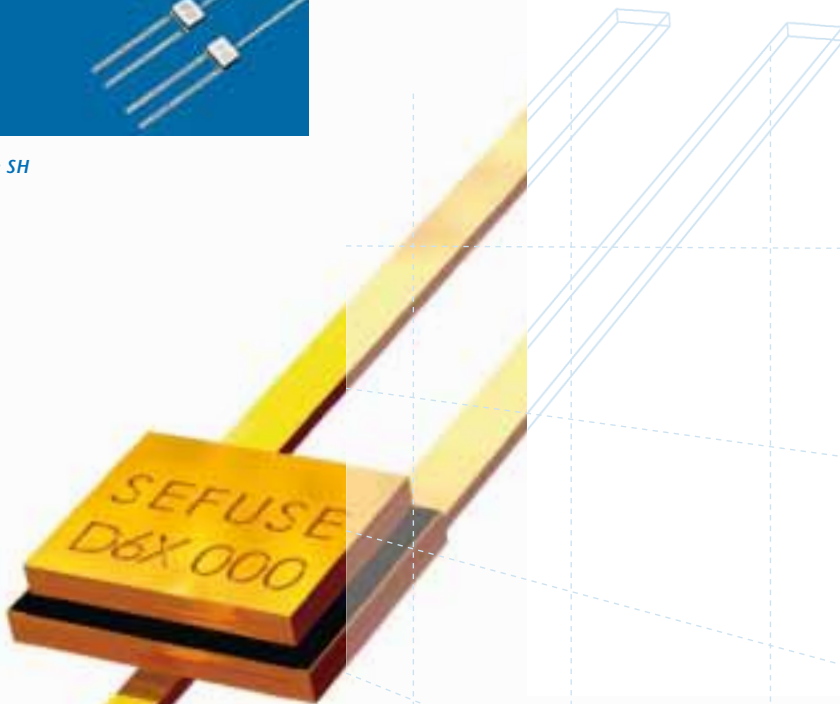
Type SF

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

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

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.

SCHOTT products are monitored continuously

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.

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

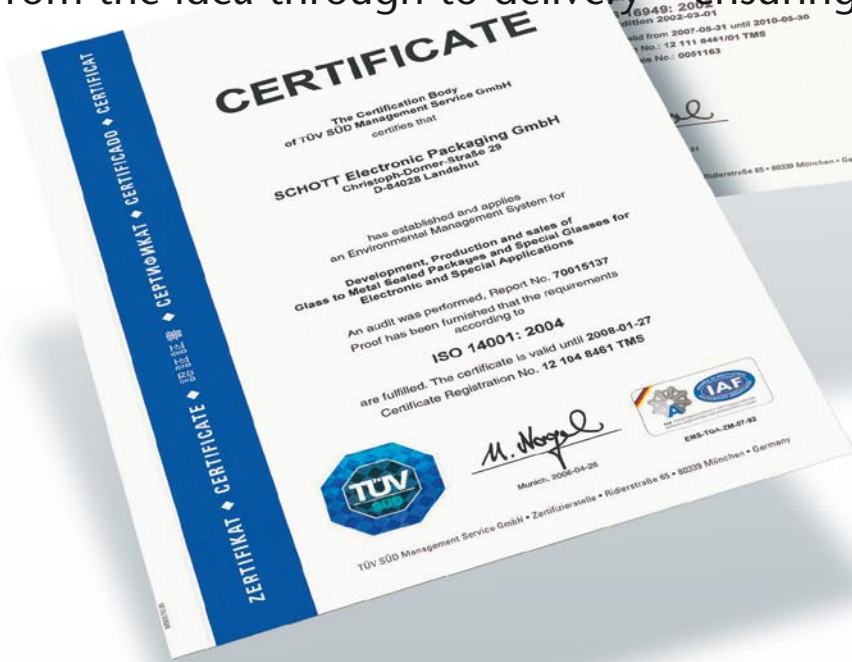


Quality management system

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.



Business card (contact partner)

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.

www.schott.com/epackaging

US customers: www.us.schott.com/epackaging

SCHOTT Electronics GmbH
Christoph-Dorner-Strasse 29
84028 Landshut
Germany
Phone +49 (0)871/826-0
Fax +49 (0)871/826-200

SCHOTT Electronic Packaging
Div. of SCHOTT North America, Inc.
122 Charlton Street
Southbridge, MA 01550
USA
Phone +1 508 765-3370
Fax +1 508 765-3377

SCHOTT
glass made of ideas

Contacts/Competence Centers

We are close to you:

In our competence centers we speak your language when it comes to the solution of your technical or economic questions.

You can also contact a product division directly using our hotline service.

Special Glass

Hotline +49 (0)871/826-702
Fax +49 (0)871/826-55702
sandra.blomer@schott.com

Automotive

Hotline +49 (0)871/826-254
Fax +49 (0)871/826-411
sigrid.biewald@schott.com

Opto-Electronics

Hotline +49 (0)871/826-329
Fax +49 (0)3641/28889090
tanja.wituschek@schott.com

Frequency Control

Cylindrical Types
Hotline +81 (0)748636603
Fax +81 (0)748632371
takahiro.ono@schott.com

HC/UM-Types

Hotline +65 (0)64248600
Fax +65 (0)65534787
david.lim@schott.com

Thermal Fuses

Hotline +81 (0)748636629
Fax +81 (0)748636627
yasuo.tsukada@schott.com

USA

SCHOTT Electronic Packaging
A Division of SCHOTT North America, Inc.
122 Carlton Street
Southbridge, MA 01550
USA
Phone +1 508 765-3370
Fax +1 508 765-3377
epackaging@us.schott.com www.us.schott.com/epackaging

SCHOTT Electronic Packaging
A Division of SCHOTT North America, Inc.
Sales Office West
23832 Rockfield Boulevard, Suite 170
Lake Forest, CA 92630
USA
Phone +1 949 460-2066
Fax +1 949 460-2069
kurtis.kanne@us.schott.com
www.us.schott.com/epackaging

Germany

SCHOTT Electronic Packaging GmbH
Christoph-Dorner-Strasse 29
84028 Landshut
Germany
Phone +49 (0)871/826-0
Fax +49 (0)871/826-200
ep.info@schott.com
www.schott.com/epackaging

Czech Republic

SCHOTT Electronic Packaging Lanškroun s.r.o.
Dvůrákova 997
56301 Lanškroun
Czech Republic
Phone +420 (0)465 350-113
Fax +420 (0)465 350-114
radim.dvorak@schott.com
www.schott.com/epackaging

United Kingdom

SCHOTT Electronic Packaging
Rose Cottage Norwich Road
Denton Harleston, Norfolk UK
IP20 0BB
United Kingdom
Phone +44 (0)1986-788788
Fax +44 (0)1986-788551
malcolm.bardsley@schott.com
www.schott.com/epackaging

Japan

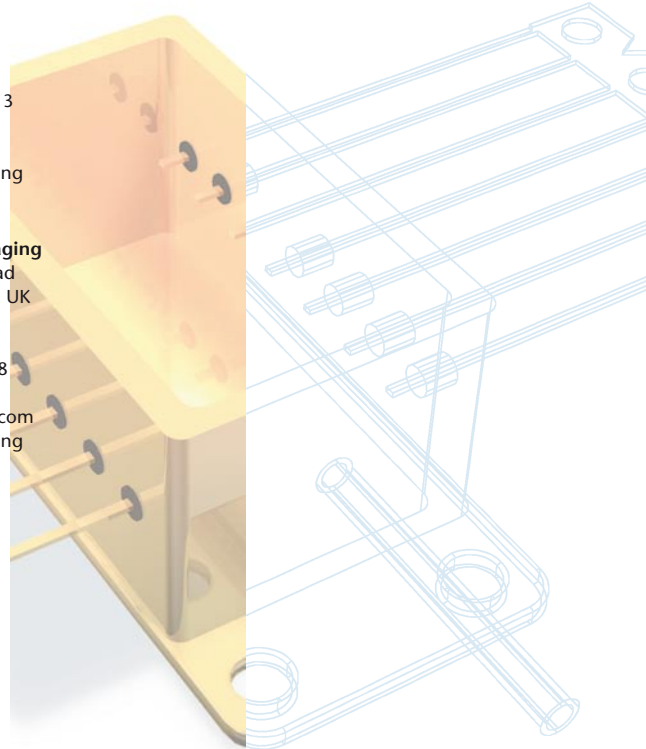
NEC SCHOTT Components Corporation
3-1, Nichiden, Minakuchi-cho
Koka-shi
Shiga 528-0034
Japan
Phone +81 (0)74 863-6600
Fax +81 (0)74 863-5134
masako.takashiba@schott.com
www.nec-schott.co.jp/english

Singapore

SCHOTT Electronic Packaging Asia Pte. Ltd.
Blk 209 Woodlands Avenue 9
#01-57/58 Woodlands Spectrum II
Singapore 738959
Phone +65 (0)6424 8600
Fax +65 (0)6553-4787
selpa.singapore@schott.com
www.schott.com/epackaging

France

SCHOTT France SAS
Sales Office
8, rue Fournier
92110 Clichy
France
Phone +33 (0)14087-3974
Fax +33 (0)14087-3988
eric.lateltin@schott.com
www.schott.com/epackaging



Contacts/General Sales Office

Australia

SCHOTT Australia Pty. Ltd.
Unit 1, 9 Rodborough Rd,
Frenchs Forest 2086 NSW
Sydney
Phone +61(0)284261600
Fax +61(0)284261666
ravi.shetty@schott.com
www.schott.com/australia

BeNeLux

SCHOTT Benelux B.V.
Marconistraat 36
P.O. Box 6000
NL-4004 JM Tiel
Phone +31 (0)344 670-911
Fax +31 (0)344 621-802
info.benelux@schott.com
www.schott.com/benelux

Brazil

SCHOTT Brasil Ltda.
International Sales Division
Av. Francisco Nakasato, 1801
CEP 13295-000 Itupeva – SP
Brazil
Phone +55 (0)11 4591-0260
Fax +55 (0)11 4591-0285
thiago.vilela@schott.com
www.schott.com/epackaging

China

**SCHOTT (Shanghai)
Precision Materials & Equipment
International Trading Co. Ltd.**
Unit 2308, 23rd Floor, CrossTower
318 Fuzhou Road
Shanghai
Postal Code 20 00 01
China
Phone +86 (0)21 6391-3311
Fax +86 (0)21 6391-3300
info@schott.com.cn
www.schott.com.cn

SCHOTT Glas China Ltd.
Unit 3703-5, 37th Floor
9 Wing Hong Street
Cheung Sha Wan
Kowloon Hong Kong
China
Phone +852 3106-3868
Fax +852 2576-2929
jina.li@schott.com
www.schott.com/china

Hungary

SCHOTT Glas Export GmbH
Representative Office
Tündérlaki mélyút 4
1016 Budapest
Hungary
Phone +36 (06)1 466-5471
Fax +36 (06)1 466-5935
schotthu@schott.com
www.schott.com/hungary/hungarian/

India

SCHOTT Glass India Pvt. Ltd.
DYNASTY "A Wing"
303/304, 3rd Floor
Opp. Sangam Theatre
Andheri-Kurla Road
Andheri (E)
Mumbai-400059
India
Phone +91-22-40947000/+91-22-28266100
Fax +91-22-40947001/+91-22-28266097
pti-bombay@schott.com
www.schott.com/epackaging

Indonesia

PT. SCHOTT Igar Glass
Jl. Meranti 3, Blok L8-06B
Delta Silicon Ind. Park
Lippo Cikarang-Bekasi 17550
Indonesia
Phone +62 (0)2128640088
Fax +62 (0)2128640055
schott.igar@schott.com
www.schott.com/igar

Italy

SCHOTT Italgias s. r. l.
Via Assarotti 5/6
16122 Genova
Italy
Phone +39 (0)10/84241
Fax +39 (0)10/8398806
info.italglas@schott.com
www.schott.com/epackaging

Korea

SCHOTT Korea Co., Ltd.
12th Floor, ILSONG Bldg.
157-37 Samsung-Dong, Kangnam-Ku
Seoul
Korea
Phone +82 2 3456-0300
Fax +82 2 3456-0301
seung-in.han@schott.com
www.schott.com/epackaging

Mexico

SCHOTT Mexicana, S.A. de C.V.
Chicle No. 162
Col. Granjas México
Delegación Iztacalco
08400 México, D.F.
Phone +52 (55) 5803 1233
Fax +52 (55) 5649 9801
ventas.mexico@schott.com
www.schott.com/epackaging

Poland

SCHOTT Poland Sp.z o.o.
ul. Migdalowa 4/70
02-796 Warszawa, Poland
Phone +48 (0)22645-1206
Fax +48 (0)22645-1209
info.poland@schott.com
www.schott.com/pl

Russia

SCHOTT Glas Export GmbH
Representative Office
Denissowsky Pereulok 26
105005 Moscow
Russia
Phone +7 495 93351-53
Fax +7 495 93351-57
schott@co.ru
www.schott-export.com

Taiwan

SCHOTT Taiwan Ltd.
8F-3, No.126, Sec. 4,
Nanking E. Road,
Taipei 105
Taiwan
Phone +886-2-2570-9626
Fax +886-2-2570-9628
stephen.pan@schott.com
www.schott.com/taiwan/chinese/

Thailand

SCHOTT Singapore Pte. Ltd.
Thailand Branch Office
253 Oriflame Asoke Tower
22nd Floor, Sukhumvit 21 Road
North Klongtoey, Wattana
Bangkok 10110
Thailand
Phone +66 (0)2 261-8445/7
Fax +66 (0)2 261-8448
sales.thailand@schott.com
www.schott.com/epackaging

Turkey

SCHOTT Türkiye
Irtibat Bürosu
Cemal Sahir Sokak No.: 26-28, Kat 2
34387 Mecidiyeköy
Istanbul
Turkey
Phone +90 (0)212 356 87 80
Fax +90 (0)212 356 87 85
mustafa.kologlu@schott.com
www.schott.com/epackaging

