



GLASS CORE TECHNOLOGY

Robust, Ultra-High Performance Solutions for Next Generation Connectivity

A New Era of Connectivity

As data rates escalate, so do the challenges of advanced packaging design. The need for interconnect solutions that can support massive bandwidths, densities and miniaturization requirements is driving innovation in all areas of the electronics industry. Substrate materials are one key area of opportunity in the quest to meet these challenges.

The Future of Interconnect Technology

Glass is quickly becoming recognized as a viable and vital resource in the evolution of high-performance connectivity.

Used as an alternative to traditional silicon, ceramic and organic substrates, glass offers many mechanical and electrical advantages, including

Desired Properties	Glass	Silicon	Organic
TTV: < 5 μm	✓	✓	✗
Warp: < 2 $\mu\text{m}/20\text{ mm}$	✓	✓	✗
Insulation Resistance: High	✓	✗	✓
Optical I/O Transparency	✓	✗	✓
Surface Roughness: < 5 nm	✓	✓	✗
CTE: 3.2 ppm/°C	✓	✓	✗
Hermetic Vias: Mil-Spec	✓	✗	✗

superior signal integrity, high structural integrity, environmental ruggedness, hermeticity & low electrical loss.

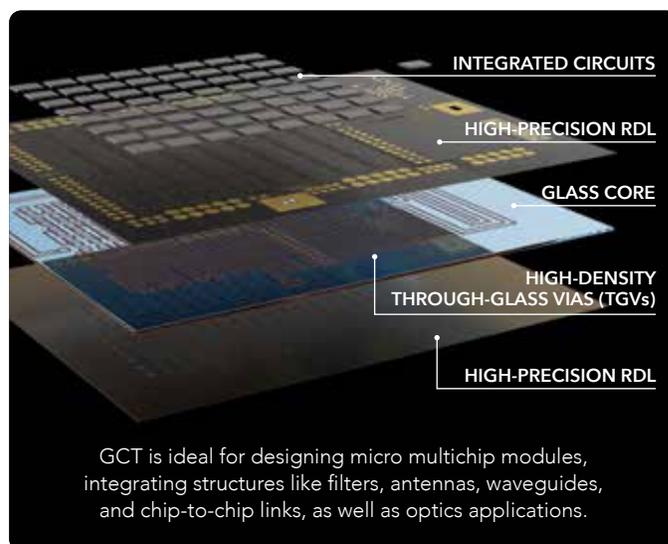
Additionally, the electrical properties of glass that allow for cleaner signal transmission also make it virtually invisible to the system. This allows glass to act as an extension of the IC when integrated with embedded passive components such as RF structures, enabling further miniaturization opportunities.

Glass Core Innovation & Expertise

Samtec was an early adopter of the potential of glass as a high-performance alternative to traditional substrates.

Anchored by our patented, proprietary **Hybrid Through-Glass Via Metalization (TGV)** and **Redistribution Layer Circuitry (RDL)** processes, Samtec's GCT operation is mature and robust, offering high volume production in our world-class, in-house facility.

Samtec's proprietary GCT process leverages the performance benefits of glass to enable performance optimized, ultra-miniaturized substrates for next generation designs.



INDUSTRIES & APPLICATIONS

Glass Core Technology enables ultra-high performance connectivity in applications requiring superior signal integrity, high-speed data transfer, reliability in harsh environments, and ultra-compact/high-density footprints.



MIL/AERO



MEDICAL/BIOMED



TELECOM/DATA CENTER



RF/MEMS



AUTOMOTIVE

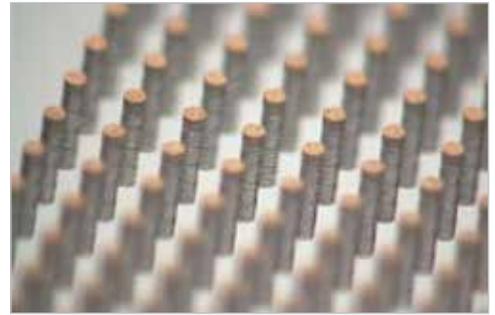
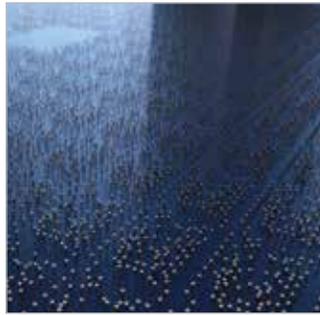
GLASS CORE INNOVATION

Patented Proprietary Hybrid TGV Metalization • Redistribution Layer Circuitry on Glass

Samtec's Glass Core Technology is a proprietary process that leverages the performance benefits of glass by creating small diameter, fine pitch Through-Glass Vias (TGV) that are conductive, fully filled and hermetically sealed.

TGVs are then linked via Samtec's thin film Redistribution Layer (RDL) process to create custom circuits on a glass substrate.

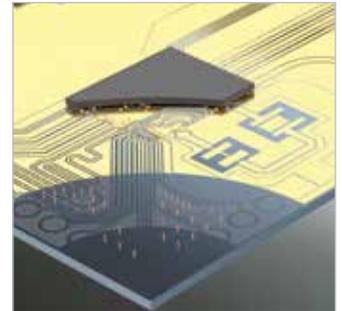
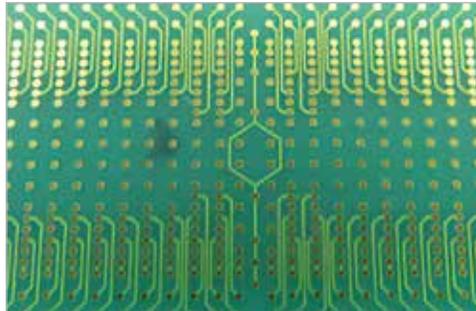
This provides for low loss chip and package interconnects, and lower cost compared to traditional silicon-based interposers.



High-Density Through-Glass Vias (TGVs)

Hybrid Via Benefits:

- Straight-walled, fully filled & planar
- Variety of diameter options
- Thermal stability to 350 °C
- Hermetic sealing with near zero surface topography
- Compatible with Borosilicate, Fused Silica, Synthetic Quartz



High-Precision Redistribution Layers (RDL)

GLASS CORE EXPERTISE

World-Class In-House Fabrication • High-Volume Production • Established, Robust Processes

Samtec offers years of industry experience in GCT product development and manufacturing, along with turn-key solutions, including design, build, reliability testing, scale-up and support. Our on-site facility houses the most advanced equipment available today.

- Wafer Line, comprised of:
 - Lithography
 - Film deposition
 - Etching (laser drill etch, wet etch)
 - Custom wafer layout drilling
 - Chemical mechanical polishing (CMP)
- Extensive automated metrology to support all unit processes
- Precision tools and instruments for laser drill, metrology, CMP
- 5,000 sq. ft. clean room with the potential to run 24/7
- ITAR and ISO certified



For additional information, visit samtec.com/GCT, or to discuss your specific application, please contact GlassCore@samtec.com.



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