GLASS CORE TECHNOLOGY
DESIGN RULES & GUIDELINES

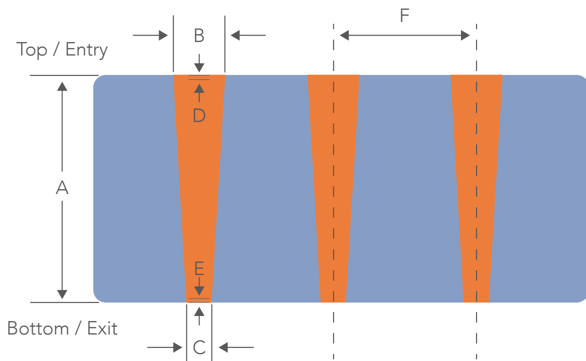
NOTE These dimensions are guidelines designed to help release product to manufacturing as quickly as possible. Full capabilities are not limited to the specifications included in this document. Please contact SME@samtec.com for applications with tighter requirements.

THROUGH-GLASS VIA (TGV) ENABLED GLASS INTERPOSERS

Samtec's Through-Glass Vias (TGVs) enable Glass Core Technology (i.e., glass interposers, smart glass substrates and microstructured glass substrates). TGV-enabled glass substrates permit the integration of glass and metal into a single wafer, while interposers promote more efficient package interconnects and manufacturing cycle times.

The hermetically sealed TGVs are manufactured from both high quality borosilicate glass, fused silica (aka quartz), and sapphire. Through the use of high quality glass wafer material, combined with advanced interconnect technologies (e.g., Redistribution Layer), Samtec's Glass Core Technology enables a one-of-a-kind packaging product.

THROUGH-GLASS VIA CROSS-SECTION VIEW



GLASS CHARACTERISTICS & APPLICATIONS

BOROSILICATE GLASS

- Excellent clarity & rigidity
- High thermal shock resistance
- CTE matched to Silicon
- Applications include:
  - Biomedical
  - 2.5D / 3D Packaging
  - Displays
  - Optoelectronics

FUSED SILICA

- High purity material
- Low dielectric constant & loss factor
- Very low thermal expansion
- Wide operating temp range
- Applications include:
  - Biomedical
  - Microfluidics & Lab-on-a-Chip
  - RF MEMS
  - Optics, Imaging & Photonics

BOROSILICATE GLASS & FUSED SILICA

	DETAIL	UNITS (μm)		
A	Nominal Glass Thickness*	200	300	400
B	Top Via Diameter	40 to 65 ±5		45 to 70 ±5
C	Bottom Via Diameter			
D	Top Via Depth	< 0.4 Maximum		
E	Bottom Via Depth			
F	Via Pitch	2 x B		
	Total Thickness Variation (TTV)	15		20
	Via Positional Accuracy	±25		

STRUCTURE FUSED SILICA (ISLE)

DETAIL	UNITS (μm)
Nominal Glass Thickness*	200 to 500
Top Via Diameter	25 to 70 ±5
Bottom Via Diameter	
Via Pitch	2 x B
Total Thickness Variation (TTV)	20
Via Positional Accuracy	±25
Slot Depth	25 ±5 Minimum

*Custom nominal thicknesses also available.

See reverse for Redistribution Layer (RDL) Technology Design Guidelines.

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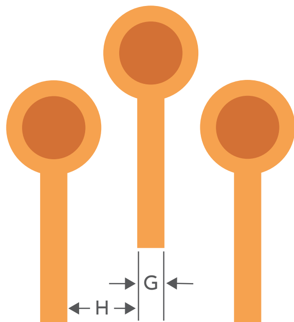
REDISTRIBUTION LAYER (RDL) TECHNOLOGY

Samtec's Redistribution Layer (RDL) technology enables circuit formation on glass substrates for interfacing to TGVs via a unique thin-film approach. This provides for low loss fan-out of chip and package interconnects, and lower costs compared to traditional Silicon-based interposers.

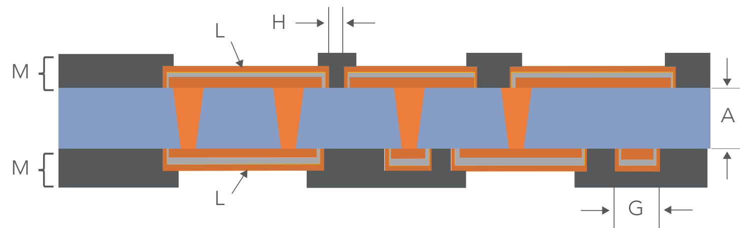
GLASS CORE TECHNOLOGY CAPABILITIES

	SPECIFICATIONS	CURRENT	ROADMAP
	No. of Metal Layers per Side	2	4
A	Glass Core Thickness	300 to 700 µm	100 µm
	Core Via Diameter	40 µm	10 µm
	Core Via Pitch	80 µm	40 µm
G, H	Line / Spacing	15 µm / 15 µm	10 µm / 10 µm
L	Copper Thickness	1-10 µm	
M	Polyimide Thickness 1 & 2	5-10 µm	
	Solder Ball Types	Sn63Pb37, PbSn5, PbSn10, SAC	Cu / Sn Pillars
	Under Bump Metalization (UBM)	ENIG	

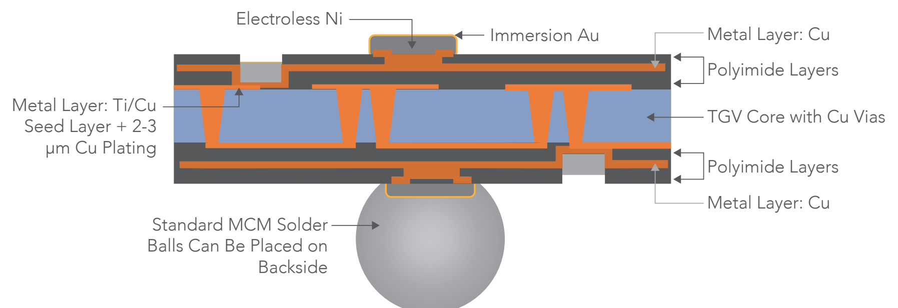
TOP VIEW OF CIRCUIT FOR TOP / BOTTOM RDL



CROSS SECTION - 2 METAL LAYERS (CURRENT CAPABILITY)



CROSS SECTION - 4 METAL LAYERS (FUTURE CAPABILITY)



Visit **samtec.com/microelectronics** to learn more about Samtec's Glass Core Technology and Advanced IC Packaging Capabilities.

Contact **SME@samtec.com** to speak with our specialists about your next generation microelectronics needs.

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