AGC ELECTRONICS AMERICA

AGC EN-A1 Alkali-Free Boro-Aluminosilicate Glass Wafers

Alkali-free Boro-Aluminosilicate Glass Wafers for Interposer for WLP and MEMS Bonding

AGC's new EN-A1 interposer glass has excellent engineering properties that permit the electrical engineers with never-before-seen flexibility for designing the next-generation entertainment, communications and display products.

EN-A1 is the premier interposer substrate for applications requiring high via counts. EN-A1 being a glass, will impart excellent chemical resistance, and a low CTE substrate that provides a stable foundation for your next design.

In addition, AGC's EN-A1 has proprietary refractive properties to allow for a low taper when laser drilled, providing for precise pitch control, hole size which facilitates higher via counts.

The Importance of a CTE Match

When an interposer is bonded to an active die with millions of transistors the size of vias, the demands placed upon that interposer substrate are extreme. And as dies continue to shrink and the number of electrical and thermal vias increase, the demands placed upon the interposer substrate are extreme.

Because of the increased via count, there is now a strong need for closely matched CTE of the die to the interposer substrate in order to reduce stress when wafer bumping the die to the interposer. If the CTE of the interposer and die are not closely matched, thermal excursions due to the high operating temperature of the die will cause expansion and contraction of the die/interposer interface resulting in excessive stress and early device failure.

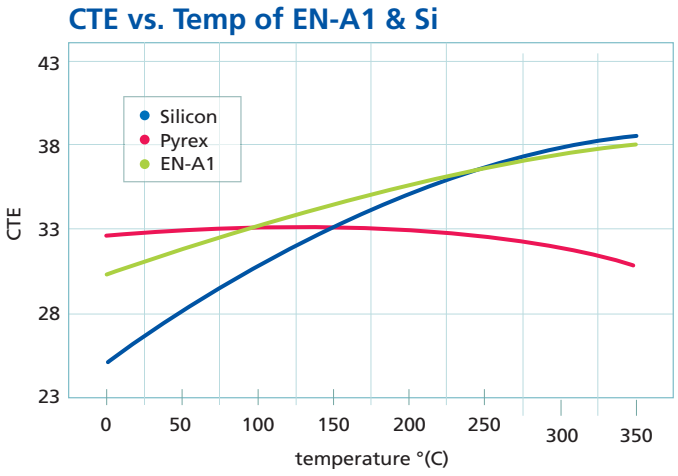
EN-A1 is the ideal match to the die across a wide temperature range making EN-A1 wafers a preferred packaging solution for next-generation dies.

Metallization

EN-A1 has a highly polished surface and can readily accept either thin-film or thick-film metallization directly on the glass without the need for an adhesion layer. The advanced polish on EN-A1 provides the ideal surface for high speed applications where parasitic skin effects can become problematic. Copper and Silver thick-film have been tested on EN-A1 with excellent results. Surface roughness of 10 Å or less is typical.

The next generation of devices with many hundreds of thousands of I/O vias require a high level of precision to locate the conductive vias and allow bonding to the vias. The stability of EN-A1 allows for precise alignment and facilitates automatic assembly.

Thermal Expansion Properties



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EN-A1 and AQ Wafer Properties

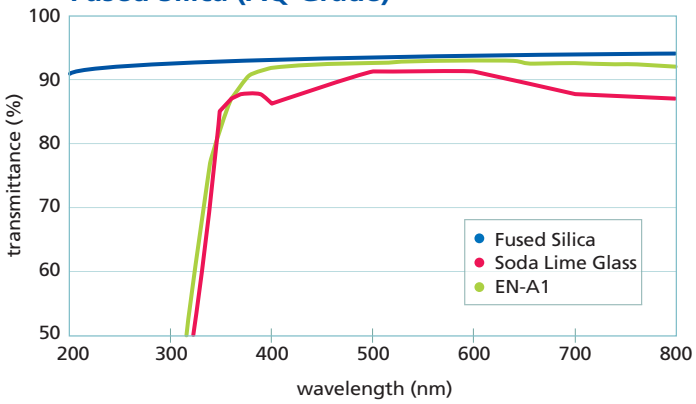
			EN-A1	AQ (fused silica)
Thermal Properties	Thermal Expansion (CTE)	10 - 7	38	6
	Softening Point	°C	950	1600
	Transformation Point	°C	720	1200
Optical Properties	Transmittance		Good transmittance > 400nm	Excellent transmittance >170nm
	Refractive Index		1.52	1.46
Chemical Properties	Acid Resistance (HF 5% 25°C 20min)	mg/cm^2	3.1	0.16
Mechanical Properties	Density	g/cm^3	2.51	2.20
	Young's Modulus	GPa	77	74
	Knoop micro hardness	GPa	---	6.4
Electrical Properties	Bulk resistive	log (Ω • cm)	13.6	12.5
	Dielectric constant	at 0.001GHz RT	5.5	3.9
		at 10 GHz RT	5.5	3.9
	Dissipation factor	at 0.001GHz RT	0.002	0.00001
		at 10 GHz RT	0.006	0.0002

EN-A1 Specifications

Size	ø 150mm ± 0.25mm ø 200mm ± 0.25mm ø 300mm ± 0.25mm		
Thickness	ø 150mm ø 200mm ø 300mm	0.3mm 0.5mm 0.7mm	Tolerance: ± 0.04mm
Surface Roughness (Ra)	20 Å		
Flatness	5 µm		
TTV	ø 150mm ø 200mm ø 300mm	< 5 µm*	

*high standard = 0.5µm

Transmittance of EN-A1, Soda Lime Glass & Fused Silica (AQ Grade)



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