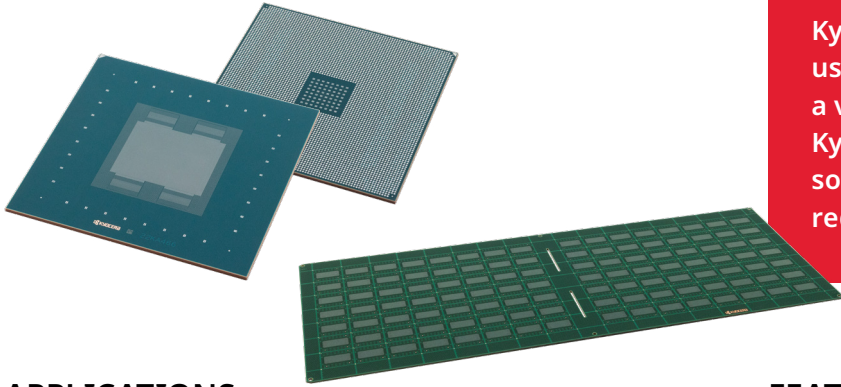


## PACKAGE SUBSTRATE SOLUTIONS FCBGA TECHNOLOGY



Kyocera provides package substrates by using organic products that are ideal for a variety of applications. Kyocera FCBGA organic substrate solutions meet increasing customer requirements.

### APPLICATIONS

- ▶ Processing unit packages e.g.:
  - ▶ CPU for servers
  - ▶ ASIC for networks
  - ▶ SoC for automobiles

### FEATURES

- ▶ Large body and high layer count (90 mm SQ, 10L/side build-up)
- ▶ Fine pattern L/S=9 μm/12 μm
- ▶ Impedance control characteristic

### KYOCERA TECHNOLOGY ROADMAP (CONVENTIONAL FCBGA SUBSTRATES)

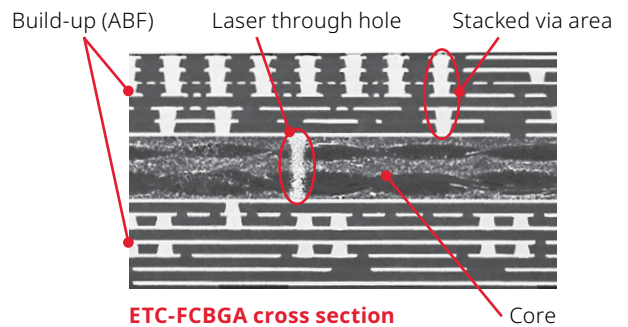
Item		Plant	2023	2024	2025	2026	2027
Maximum build-up layer count	Volume	Ayabe	9/x/9	10/x/10			
		Sendai	10/x/10				
	Sample	Ayabe	10/x/10			12/x/12	
		Sendai	-		14/x/14		
Maximum body size	Volume	Ayabe	90 x 90 mm	90 x 90 mm	115 x 115 mm	120 x 120 mm	
		Sendai		110 x 110 mm			
	Sample	Ayabe	100 x 100 mm	115 x 115 mm	120 x 120 mm		
		Sendai	110 x 110 mm	120 x 120 mm	130 x 130 mm		
Bump pitch / SRO	Volume	Ayabe	130/70 μm	130/60 μm	110/55 μm		
		Sendai		130/70 μm			
	Sample	Ayabe	130/60 μm	110/55 μm			
		Sendai	110/55 μm			90/50 μm	
Build-up line space (GZ/GL material) Flip chip area (max. length 3 mm)	Volume	Ayabe	9/12 μm		8/8 μm		
		Sendai	12/12 μm			10/12 μm	
	Sample	Ayabe	9/12 μm	8/8 μm			6/6 μm
		Sendai	9/11 μm			6/7 μm	

## ENHANCED THIN CORE (ETC) FCBGA TECHNOLOGY

### ADVANTAGES

- ▶ **Electrical performance improvement** due to reduced core thickness and Cu filled vias
- ▶ **Higher integration thanks to advanced design rules**
  - Smaller drill/hole size due to thin core  
→ higher amount of holes possible
  - Fine pattern on core
- ▶ **Less layer count** (and/or smaller body size)
  - Design to cost
  - Improved manufacturing lead time

Kyocera's "ETC-FCBGA" uses low CTE thin core technology with laser through holes to provide increased performance.



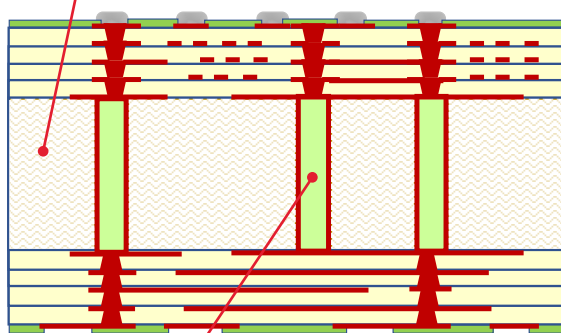
### ELECTRICAL PERFORMANCE

<p>▶ Thin core → Self inductance improvement → DC resistance improvement</p>	<p>▶ Cu filled through hole → DC resistance improvement</p>	<p>▶ Fine pitch through holes → Mutual inductance improvement</p>
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### ADVANCED DESIGN RULES

#### Conventional FCBGA

Typical core thickness: 400 - 1,600 μm

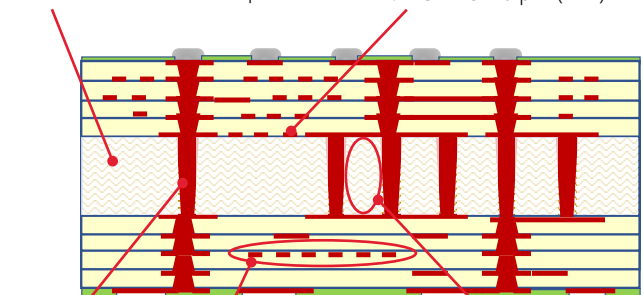


Cu plated through hole, resin filled

#### ETC-FCBGA

Thin core thickness: 150/200/250 μm

Fine pattern (SAP/MSAP on core)  
min. L/S = 20/25 μm (MP)  
min. L/S = 15/20 μm (NPI)



Cu filled through hole    Signal line on back side    Tight through hole pitch @200 μm core = 110/70/160 μm