FICT

TFC*1 Embedded Substrate "GigaModule-EC"

New proposal for high performance and energy-saving semiconductor

Note*1: Thin Film Capacitor

GigaModule-EC, a best suitable substrate for next high-performance & energy-saving semiconductor

To make high performance and energy-saving semiconductor devices work stably, power management becomes very important. A decoupling capacitor with large capacity and low power impedance, at ultra-high frequency, is strongly needed for the power stabilization. "GigaModule-EC" enables TFC embedded semiconductor substrates with low inductance and effective use of space for wiring patterns and device mounting.

Effective improvements at high frequency

- TFC is aimed to be embedded just under the die in a semiconductor packaging substrate, enabling low V/G impedance at high frequency by connecting via VIAs.

Electric capacitance is designed as needed

- The electric capacity can be set as designed with TFC area, formed with the etching process.
- 2 types of TFC materials are available :
  Normal Capacity type : 1.0μF/cm²
  Large Capacity type : 2.0μF/cm²

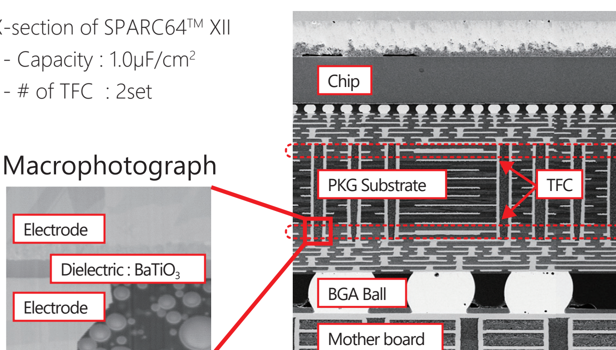
Effective use of device mounting spaces

- Embedded TFC enables the reduction of surface mount chip capacitors. Also, its narrow pitch Via connection expands its wiring capacity.

Practical use of TFC

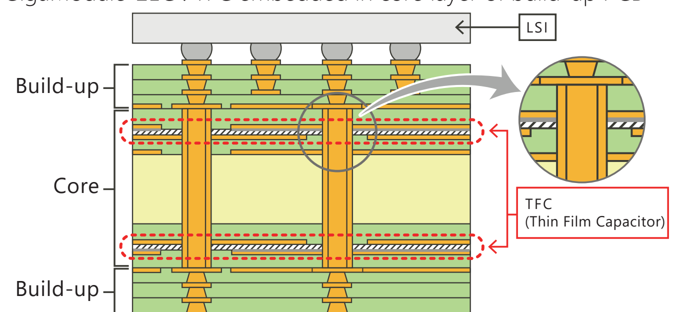
Fujitsu Limited
SPARC64 processor
SPARC64™ XII
- Max Freq. : 4.25GHz
- # of CPU core : 12 cores
- I/O band width : 64GB/s

X-section of SPARC64™ XII
- Capacity : 1.0μF/cm²
- # of TFC : 2set

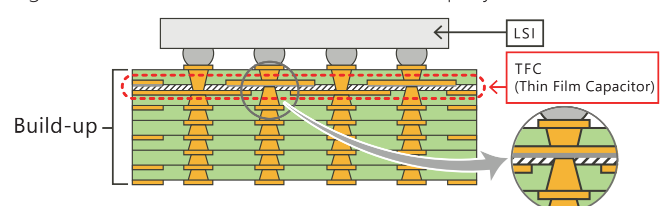


Advantage : Structural type selection

GigaModule-2EC : TFC embedded in core layer of build-up PCB



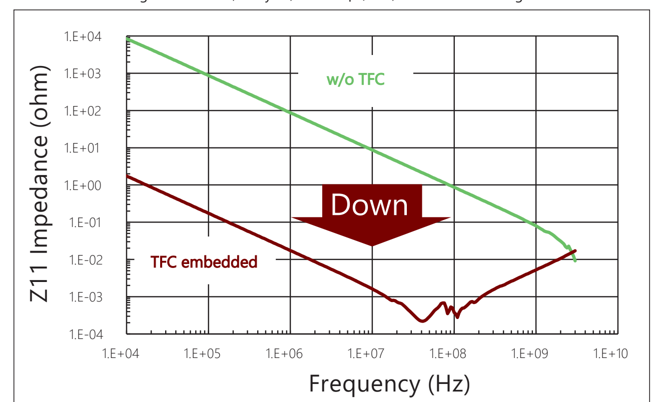
GigaModule-4EC : TFC embedded in build-up layer of coreless PCB



Advantage : Electrical characteristics

Embedded TFC makes V/G impedance reduce effectively

Condition : GigaModule-4EC, 8 Layers, TFC=2.0μF/cm², Simulator : FTCP Signal Adviser-PI



Contact
FICT LIMITED
1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588, Japan (Company Mail No./Hon-1014) Tel: +81-44-754-2260