

MINIATURIZED MODULES FOR 5G & AUTOMOTIVE SYSTEMS

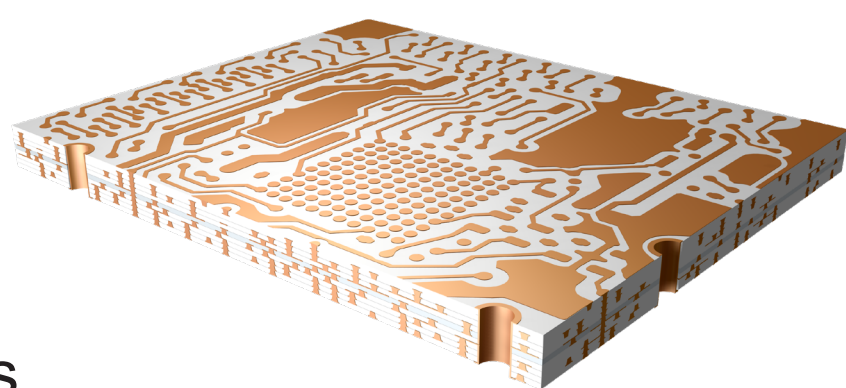
- High-end build-up PCB
- Fine lines and spacing
- Miniaturized PCBs with reduced thickness
- Narrow pitch BGA and CSP fan-out

- Low-inductivity material, Low-inductivity orthotropic material, Low thermal expansion material
- Warpage measurements

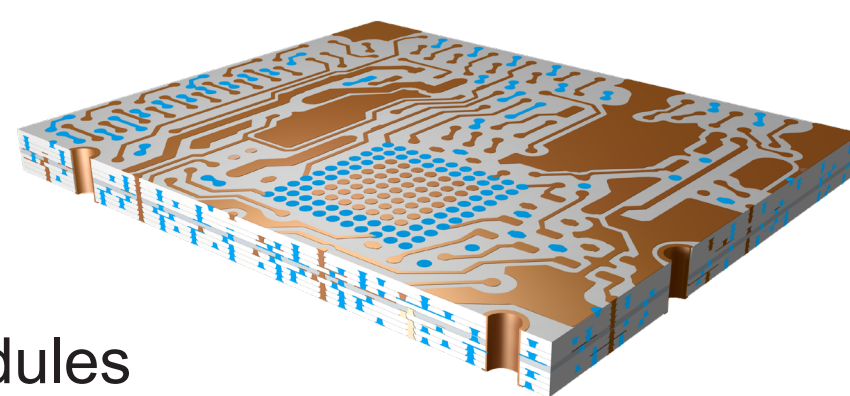
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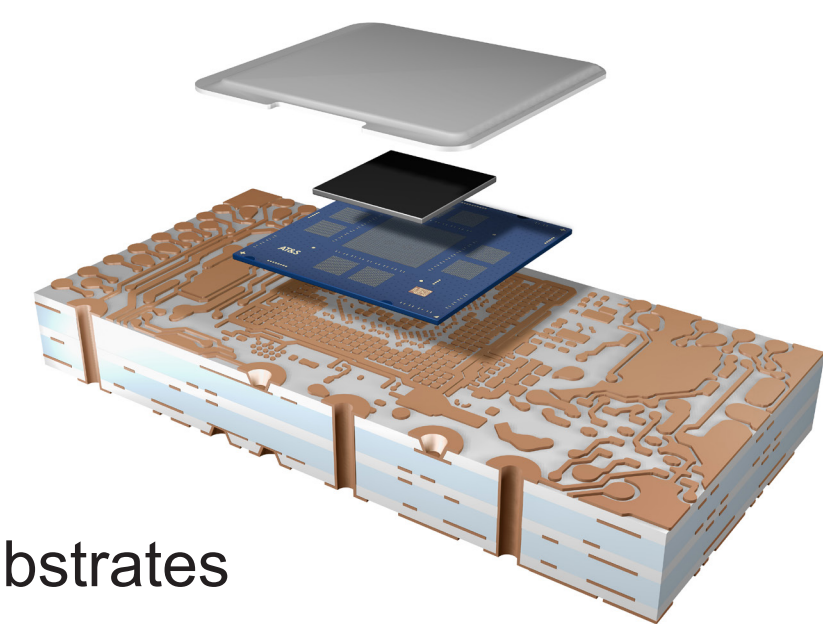
HDI Boards, SiP Modules, IC Substrates



HDI Boards,
40/40 μm



SiP/Modules
25/25 μm



IC Substrates
10/10 μm

Line / Space (μm)

Applications:

- Mobile devices, imaging devices
- Consumer electronics
- ADAS computing
- Storage

Benefits:

- Miniaturization
- High data rates
- Short lines
- Adaptable to different requirements

Applications:

- V2X communication
- Connectivity modules
- Power modules
- Computing modules

Benefits:

- System size reduction
- System cost reduction
- Easy integration (Plug & Play)
- Reduced time to market

Applications:

- Data centers, microservers, 5G base stations
- Server & cloud computing, 3D sensing module
- High performance computers
- Notebook and 2-in-1-devices

Benefits:

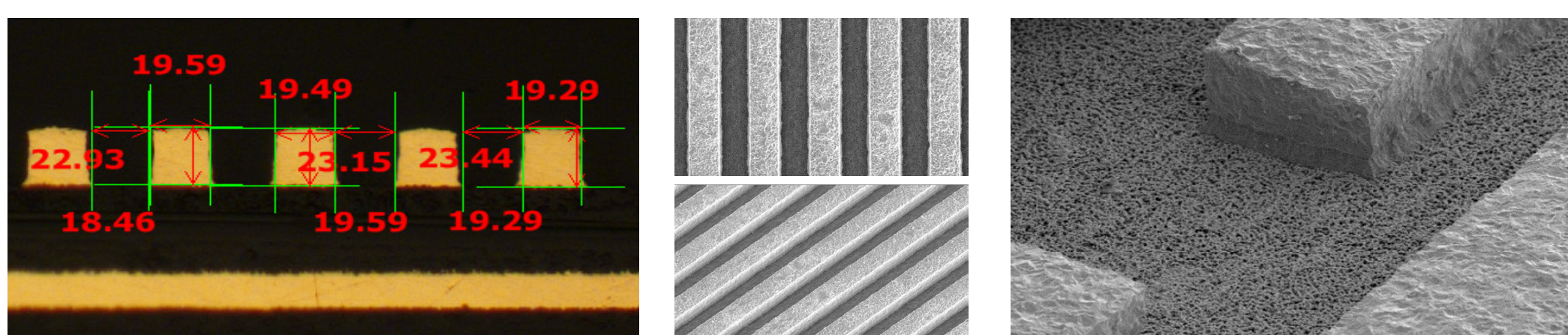
- High performance and reliability
- Flexible structure
- Can be adapted for many applications

HDI/mSAP/SAP capability

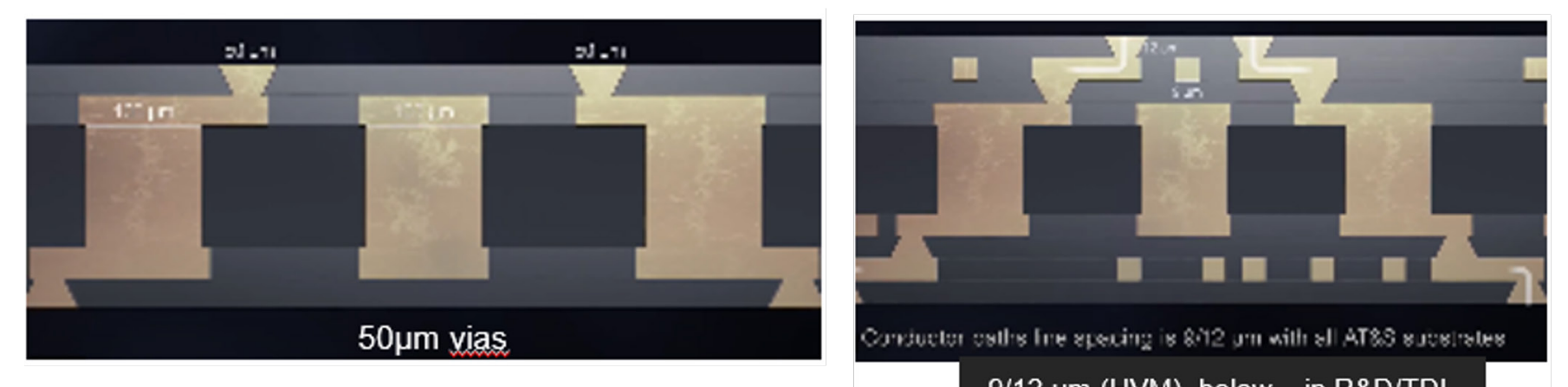
Technology	Subtractive	mSAP	IC Substrate
Status	Mass production available	Mass production available	Mass production available
Laser pad size	110 μm	90 μm	77 μm
Line width / spacing	@Cu=15 μm	25/25 μm (MP) 20/20 μm (Sample)	9/12 μm
	@Cu=30 μm	40/60 μm	-
Line geometry			
Min. copper thickness	10 μm	12 μm	15 μm
Min. dielectric thickness	20 μm	20 μm	25 μm
Min. soldermask thickness	10 μm		18 μm
Low Dk / Df material	Dk=3.4 / Df=0.004		Dk=3.36 / Df=0.0051 at 20GHz
Technology combination	Coreless, Laser trench, 2.5DC, 2.5DR, ECP		-

Cross section

Cross section (mSAP on outer layer)



Cross section (L/S 9/12 μm SAP)



Conductor pitch line spacing is 6/12 μm with all AT&S substrates
9/12 μm (HVM), below – in R&D/TDI