Technical brief

Pragmatic Semiconductor

Flexible HDI: unlock ultra-compact design in consumer electronics

As consumer tech evolves, systems are doing more in less space. The challenge? Packing in complexity without expanding the footprint.

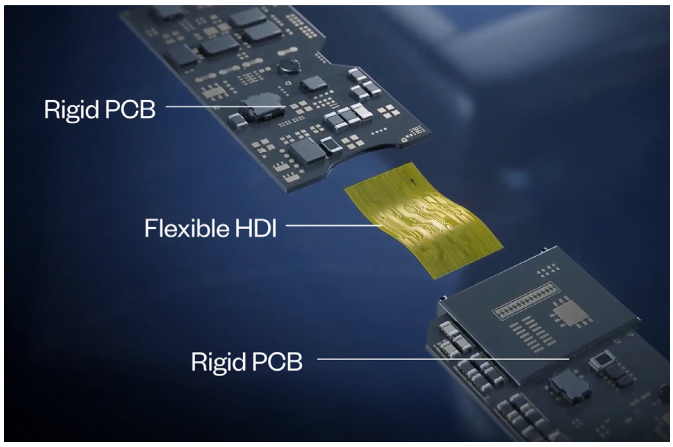
FlexICs are ultra-thin, physically flexible chips. They deliver ground-breaking circuit density for space-constrained applications with high system integration demand, where size, weight, and flexibility matter.

Optimise your designs, streamline system integration or tackle assembly complexity in your next-gen consumer tech like wearables, hearables and smart camera technology.

Introducing HDI on FlexICs

FlexICs deliver high routing density with unmatched flexibility. Their multi-layer interconnects provide compact, high-speed signal routing in space-constrained applications – so you can shrink your device without compromising on signal integrity or performance.

With the routing density of integrated circuit substrates and the pliability of flexible printed circuit boards (flex PCBs), they deliver high-density circuitry in untapped spaces – in a cost-effective, ultra-compact form.

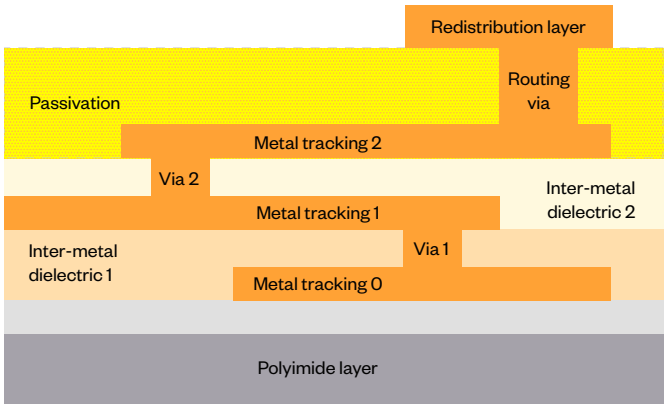


Technology overview

Built on a flexible polyimide substrate, the technology offers three levels of metal tracking, separated by inter-metal dielectric layers and connected by 1.5 µm microvias – giving exceptional mechanical flexibility and thermal stability.

Each metal layer allows a minimum 1 µm line width and minimum 1 µm trace spacing, enabling high routing density for fine-pitch designs. The redistribution layer (RDL) provide routing flexibility for final high-density I/O placement or bumping, with pad sizes down to 50 µm.

The total stack height is just 37 microns, enabling integration into ultra-compact designs such as foldable devices, wearab and tightly packed modules.



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Technical specification

Base material	Polyimide
Thickness	<37 µm
Radius of curvature	<2 mm
Routing layers	Four, including redistribution layer
Via size/pitch	1.5/4 µm
Stacked vias	No
Through via	No
Minimum line/space	1/1 µm
Cross-trace routing	Yes
Minimum pad size/pitch	50/100 µm
Pad finish	Aluminium/electroless nickel immersion gold (ENIG)
Voltages	Up to 5 V
Typical current	100 mA
Current density	0.1 mA/µm width

The FlexIC Foundry provides rapid fabrication on 300 mm wafers, delivered on a glass carrier or diced on frame. We provide everything you need for design success, from a comprehensive Process Design Kit and engineering services to a growing ecosystem of design partners.

To request our Process Design Kit and learn more about our Foundry services, contact our experts:

sales@pragmaticsemi.com

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