Technical brief

Flexible integrated passive devices

Maximise circuit density; reduce size and complexity

Consumer electronics design is constrained by limited space. Traditional passive components consume valuable printed circuit board (PCB) real estate, driving up costs and restricting further miniaturisation.

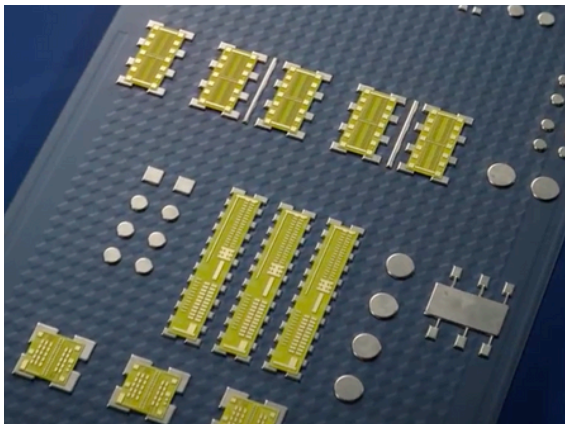
Enter FlexICs – ultra-thin, physically flexible chips that deliver ground-breaking circuit density to allow the creation of bespoke, ultra-compact integrated passive devices (IPD).

Introducing IPD on FlexIC

FlexICs consolidate multiple passive devices on a single chip, so designers can deliver more functionality in a smaller footprint, optimising layout and reducing the bill of materials along with PCB area.

- Increase circuit density
- Reduce assembly costs
- Achieve ultra-thin, flexible form factors
- Improve device matching
- Customise to suit your application

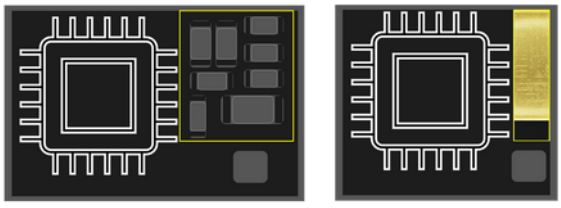
Typical applications include pull up/down or current-limiting resistors, coupling/decoupling capacitors, loading capacitors for oscillators, and RF matching/tuning networks.



Technology overview

Pragmatic's FlexIC Platform uses an industry-standard Process Design Kit to enable efficient design of analog and digital integrated passive devices that meet your design requirements.

Built on a flexible polyimide substrate, the technology offers customisable high-value resistors, thin-film metal resistors, and metal-insulator-metal capacitors. Four metal layers provide efficient routing and interconnects between devices and a redistribution layer.



FlexICs consolidate multiple passive devices on a single chip, for more functionality in a smaller footprint

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Technical specification

Base material	Polyimide
Thickness	<37 µm
Radius of curvature	<5 mm
Operating temperature	-20 °C to 85 °C
Thin-film metal resistor	
Sheet resistance	0.45 Ω/µm^2
Temperature coefficient	+0.43 %/°C
High-value resistor	
Sheet resistance	200 kΩ/µm^2
Temperature coefficient	-0.8 %/°C
Metal-insulator-metal capacitor	
Unit capacitance	4.5 fF/µm^2
Voltage coefficient (f=100MHz) (-3V to +3V)	0.30%
Leakage at 1.8 V	1x10$^{(-16)}$ A/µm^2
Temperature coefficient	2.49%
Routing layers	Four
Minimum line/spacing	1/1 µm
Via size/pitch	1.5/4 µm
Minimum pad size/pitch	50/100 µm
Pad finish	Aluminium/electroless nickel immersion gold (ENIG)

Broader specifications are subject to application requirements.

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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