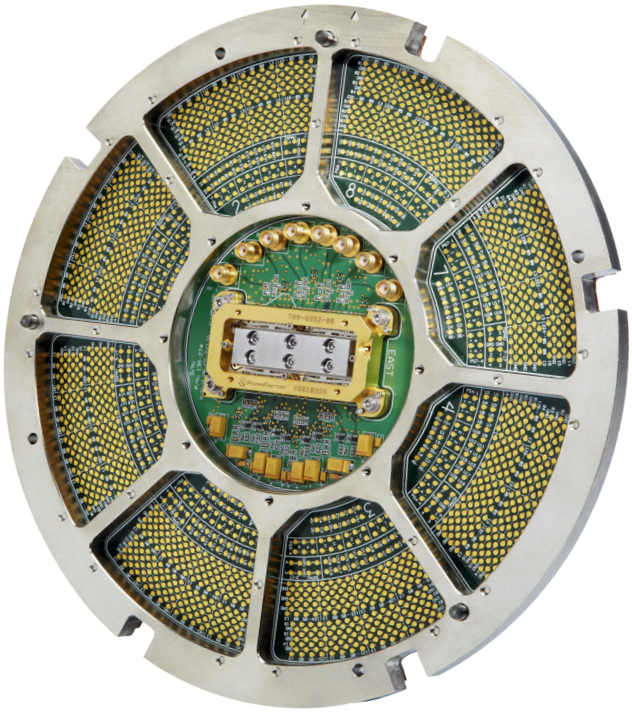
RF Pyramid Probe Series

High-performance RF Probe Card

Overview

FormFactor's high-performance RF Pyramid Probe cards provide state-of-the-art signal integrity for wireless RF and microwave production wafer test. FormFactor is able to maintain impedance control all the way from the probe card connector to the IC. RF Pyramid Probe cards are also able to place bypass capacitors extremely close to the IC, providing resonance- free power supplies. In addition, the RF Pyramid Probe card delivers minimal pad damage and extremely long life, dramatically reducing the cost of ownership versus other RF production probe card offerings. FormFactor's innovative Pyramid Plus™ manufacturing process ensures a substantially lower cost of ownership, while delivering superior RF signal integrity in a single solution.



Features / Benefits

Superior signal performance	• High-bandwidth RF transmission lines and guarded DC traces to probe tips guarantee performance and ensure low signal loss, with options for high isolation when requested • Custom designed ground and power planes, with bypass capacitors, provide resonance-free stable power supplies directly to the DUTs • Consistent low contact resistance and low-inductance probe tips ensure accurate and repeatable high-speed digital and analog measurements on all types of probed material
Mechanical robustness	• MicroScrub® technology provides consistent low contact resistance and inductance on a variety of pad materials and flip-chip bumps • High-density photolithographically-placed contact probe tips are stable over lifetime of product • Low maintenance and permanent probe tip placement improve test cell uptime, reducing the cost of ownership compared to other probing technologies
Versatile and cost-effective	• Lower maintenance overhead with less cleaning and no need for probe tip alignment
Advanced membrane technology	• FormFactor's industry-leading Pyramid Plus manufacturing process delivers higher performance, plus unique features that lower your cost of test

Mechanical Specifications

	RFC, MSI, LSI, and VLSR	P800-S	P2000
Minimum pitch, peripheral	50 µm	67 µm	67 µm
Staggered pitch, peripheral	36 µm / 72 µm	44 µm / 88 µm	44 µm / 88 µm
Minimum pitch, array	180 µm (layout dependent)	180 µm (layout dependent)	130 µm (layout dependent)
Tip Alignment	+/- 10 µm	+/- 10 µm	+/- 10 µm
Probe tip material	Rhodium	Rhodium	Rhodium
Temperature range	-50°C to 125°C	-50°C to 125°C	Room temperature
Pad and bump materials	Al, Cu, Au, all types of solder balls	All types of solder balls	All types of solder balls
Probe Force (150 um OT)	10 gf/tip	20 gf/tip	20 gf/tip
Edge sense	Optional	Not available	Not available
First-to-Last	< 50 µm in periphery <100 µm on array		
Tip Co-Planarity	N/A	< 15 µm	< 15 µm

Electrical Specifications

Leakage	1.4 nA/V
Contact resistance	0.1 to 0.2 Ω (Al pads), 0.005 to 0.010 Ω (Au pads), 0.3 to 0.5 Ω (solder balls)
Maximum current / tip	1 A (Au pads), 200 mA (Al pads, Cu pads and solder balls)
Maximum power 50 Ω microstrip	+33 dBm CW, +36 dBm pulsed
Max. power 50 Ω Co-Planar Waveguide (CPW)	+33 dBm CW, +39 dBm pulsed
Power Supply Max Current	10 A*
Residual Inductance	<0.05 nH
Signal line impedance	50 Ω nominal, 2 Ω to 120 Ω ±20% options available
Ground inductance (typical)	0.04 nH
Return loss (S11) to coax	>10 dB @ specified bandwidth up to 81 GHz
Input reflection	±80 mrho @ 50 Ω
Optimized signal (custom layout)	±1.5 ps (3 ps window)

Typical Isolation Measurements

Filter and switch	2 GHz	50 dB to 70 dB
High pin count	10 GHz	50 dB
High Speed Digital	40 GHz	40 dB

Component on Membrane

Package type	SMT
Sizes	01005, 0201, 0402, 0603, 0805

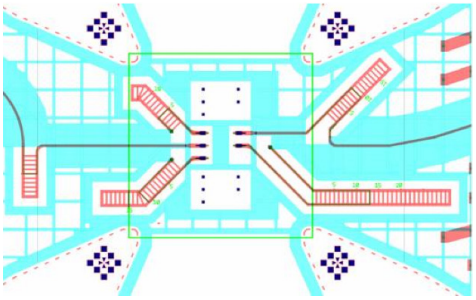
Pyramid Probe Core Options

Previous frame core		RFC	MSI	LSI	VLSR	P800-S	P2000
I/O capacity		108	408	520	804	804	2112
XY area (mm)		4.1 x 4.1	9.6 x 9.6	24 x 24	38 x 11	38.4 x 12.5	50 x 9.4
Components on core		32	40	100	120	120	250
Depth* from tester side, mm (in.)	Shallow		6.096 (0.240)	6.096 (0.240)	6.096 (0.240)		
	Standard	4.521 (0.178)	6.985 (0.275)	8.712 (0.280)	8.712 (0.280)	8.712 (0.280)	
	Extra	5.334 (0.210)	8.712 (0.343)	8.712 (0.343)	8.712 (0.343)	8.712 (0.343)	
	Deep	6.223 (0.245)	10.287 (0.405)	10.287 (0.405)	10.287 (0.405)	10.287 (0.405)	
	440		11.176 (0.440)		11.176 (0.440)	11.176 (0.440)	11.176 (0.440)

Depth variation is ± 0.30 mm (± 0.012”) from one design to another, and repeatable to ±0.10 mm (± 0.004”) within the same design.

Emulating Wire Bond

Some circuits require proper inductive loading
Effects cannot be calibrated out easily
Embed inductance on all interface pins into probe card
Do not calibrate past lead inductance structures



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