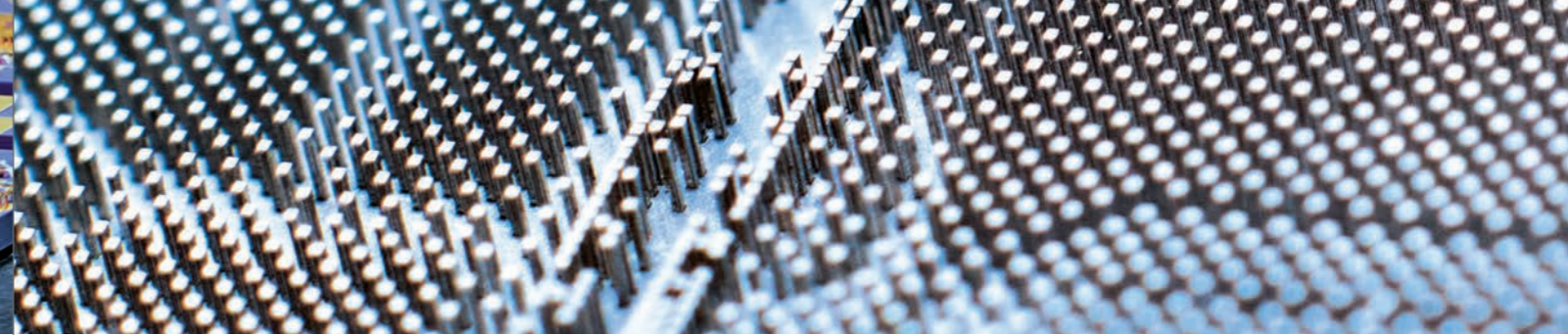
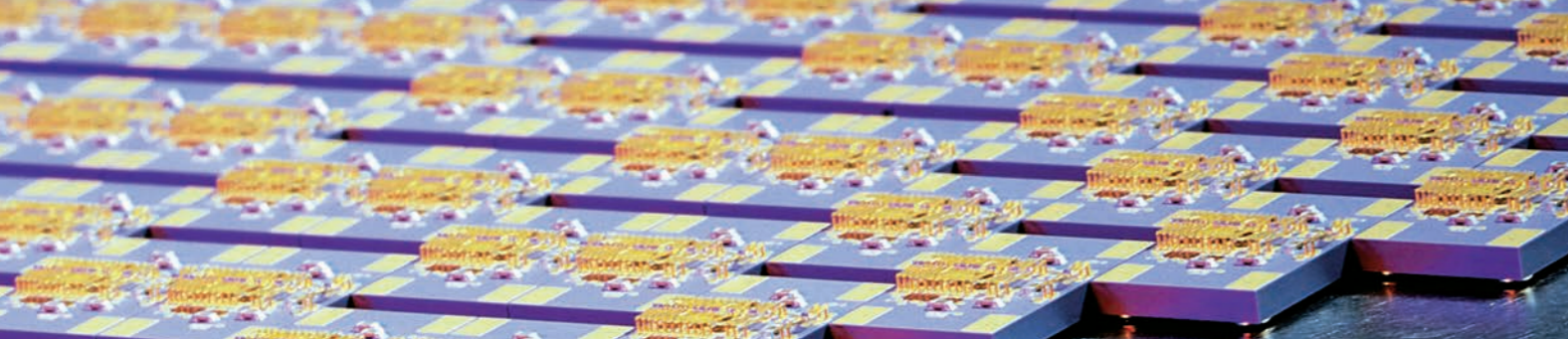


## Advanced Wafer Probe Cards

High-performance probe cards for memory, RF, foundry and logic devices



## FormFactor, Inc. - Company Profile

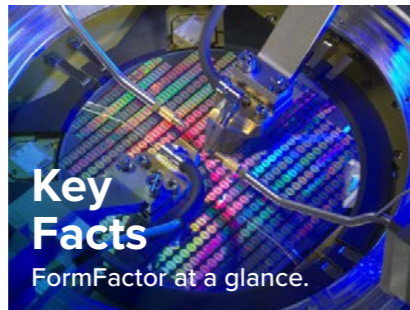
FormFactor, Inc. (NASDAQ:FORM) is a leading provider of essential test and measurement technologies along the full IC life cycle – from characterization, modeling, reliability, and design de-bug, to qualification and production test.



### Vision & Mission

Our heritage is innovation.

- / We constantly strive to help our customers solve the advanced test challenges of the broader semiconductor industry.
- / Our focus on customer partnership, innovation, agility and operational excellence allows us to earn sustainable business every day.



### Key Facts

FormFactor at a glance.

- / Founded in 1993, IPO 2003
- / #1 Advanced Probe Card Supplier
- / #1 Engineering Probe Systems Supplier
- / Named as a BEST Supplier in customer satisfaction surveys, year-after-year
- / Ship >50 million MEMS probes annually
- / Over 10,000 probe systems installed
- / 2021 Revenue of \$770 million (USD)



### Customer Collaboration

Global and local.

- / Enable customer success through technology, partnerships, "First Time Right" product quality, global customer support
- / 2,300 employees, with >500 directly supporting customers
- / 23 service and repair centers
- / 13 sales offices
- / 10 design centers

## Apollo™ Vertical Probe Cards for Bump/Cu Pillar Probing

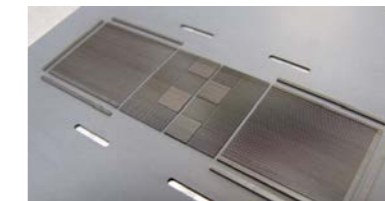
High Current Capacity for Artificial Intelligence, Applications Processors and Server Chips

- / Pitch scalability to 40 μm.
- / Variety of metallurgies and geometries.

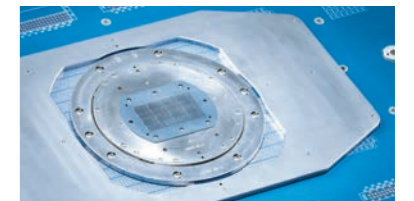
- / Best-in-class contact stability and lifetime.
- / Membrane, MLO, MLC space transformation options.

### Customer Applications

- / High pin-count and multi-site: >64K probes
- / Ideal for AI, AP and server chip testing: >1.8A CCC/probe
- / V93K and Ultraflex+ Direct-Dock for KGD performance
- / Low-force probing for Cu pillar and bumps



60K+ Apollo fine pitch probe head



Direct-Dock solution

## Kepler™ Vertical MEMS Probe Cards for AI/Cu Pads Probing

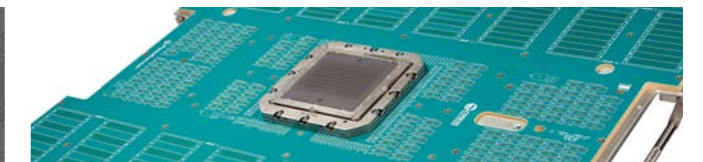
Low Impact Probe Optimized for Automotive Applications

- / High parallelism, increased touchdown efficiency, and lower cost of test.
- / Excellent mechanical stability for high temperature probing (-40 to 150°C) at 60 μm pitch and above.

- / Low-force 2D Vertical MEMS springs ensure small, consistent scrub marks with minimal pad damage.
- / Probe design and product architecture ensures superior and stable contact resistance.



FormFactor low-force 2D MEMS MF spring family for 60 μm pitch pads applications.



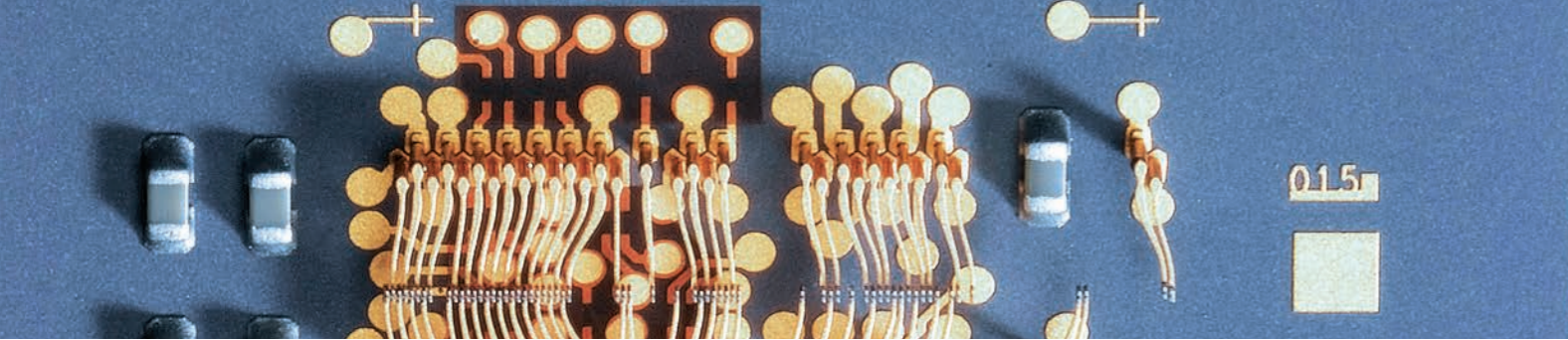
High pin count, multi-site Kepler probe card (shown for V93K Direct-Dock).

### MF60R Probe Options for Pad Probing

- / Supports fine pitch, multi-site pad probing down to 60 μm
- / Low-force spring ideal for automotive, and other high temperature applications
- / Designed for both peripheral and core pad layouts applications



Multi-site MF60R probe head



## FormFactor Full Wafer Contact Card Solutions

Matrix Probe Card Family for DRAM: Targeting 1-2 Touchdowns with 256-3200 Sites

- / Lowest full wafer contact planarity for optimum scrub performance and contact resistance.
- / HFTAP (High Frequency Test at Speed) for KGD (Known Good Die) applications and advanced memory characterization up to 3.2 GHz.

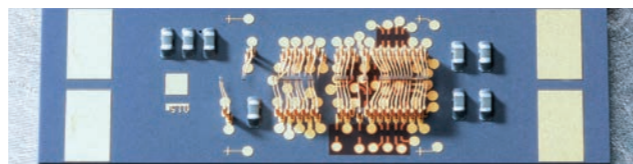
- / Advanced tester resource extension (ATRE) capability: Maximize parallelism with high performance and reliability on existing ATE to minimize CAPEX investment.
- / Industry-leading electrical performance.

### Customer Applications

- / DRAM Sort and BI – over 150K springs (Smart Matrix)
- / Best suited for High Bandwidth Memory (HBM) stack wafer sort
- / NAND and NOR Flash (TouchMatrix) SoC embedded Memory (TrueScale Matrix)
- / Wide temperature probing, from -40°C to 175°C
- / 3D MEMS Spring technology with superior CCC performance



SmartMatrix™ enables parallel testing of >3000 DRAM DUTs on 300 mm wafers

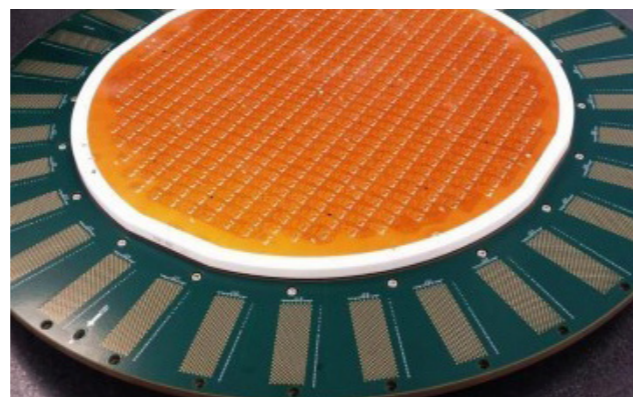


FormFactor's unique "DUTLet" architecture enables superior scrub margin performance, zero soak, wide temperature range, and high speed testing

### Genus Probe Card for NAND Flash Probing

- / NAND and NOR Flash (Genus) Sort and wafer level BI – over 35K springs.
- / Monolithic space transformer technology for better signal performance and multi-chuck applications.

- / Wide temperature probing, -33°C to 125°C.
- / 2D MEMS Spring technology with superior scrub performance.



Genus Flash Probe Card



## Pyramid Probe® for High-Performance RF Applications

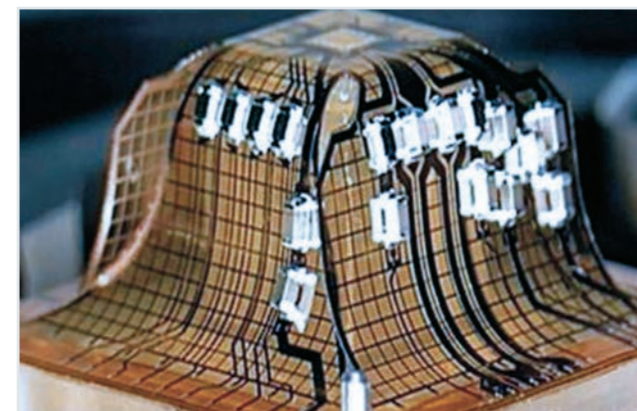
Leading Supplier for 5G Mobile Devices with Performance up to 81 GHz

- / High-bandwidth RF microstrip transmission lines to probe tips guarantee performance and ensure low signal loss.

- / Consistent low contact resistance and low-inductance probe tips ensure accurate and repeatable RF measurements.

- / Patented ground and power planes, provide resonance-free stable power supplies directly to the DUTs.

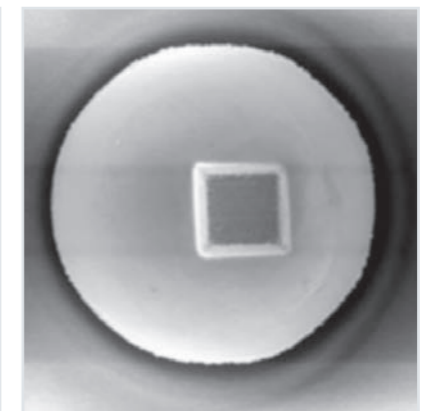
- / Permanent probe tip placement improves test cell uptime reducing the cost of ownership compared to other probing technologies.



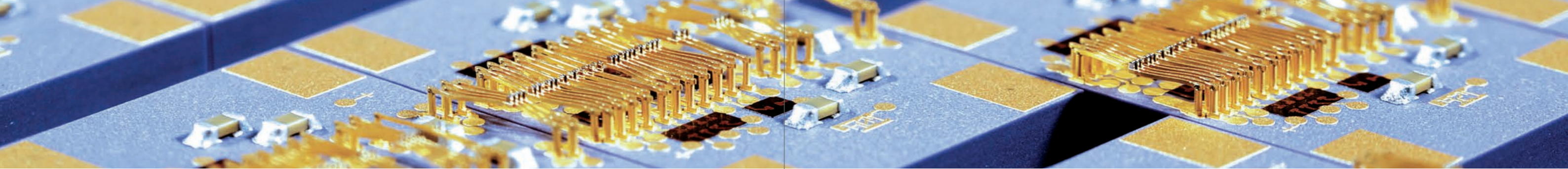
Pyramid probe head wafer-side view



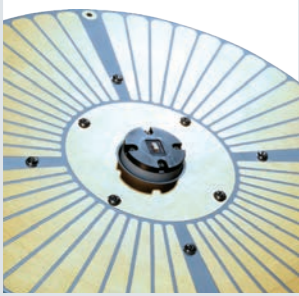
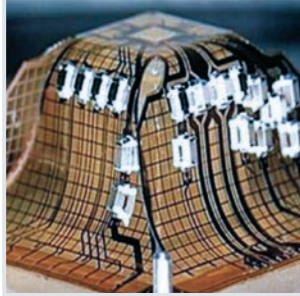
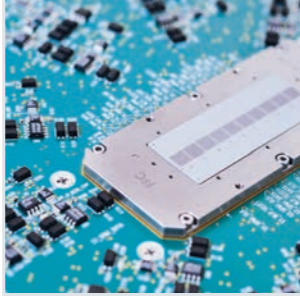
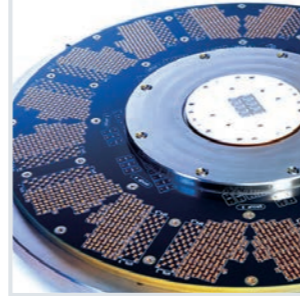
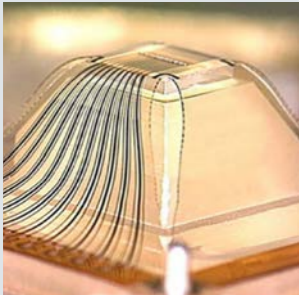
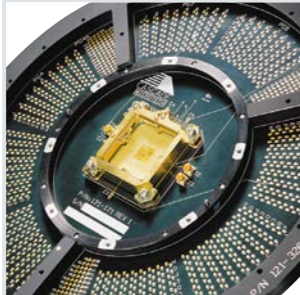
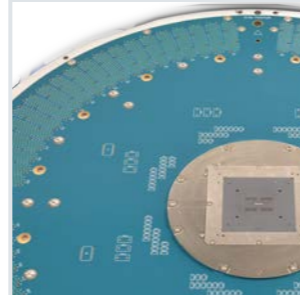
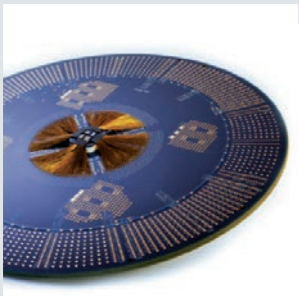
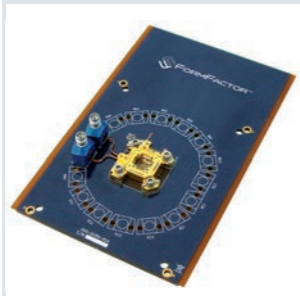
Pyramid probe tips



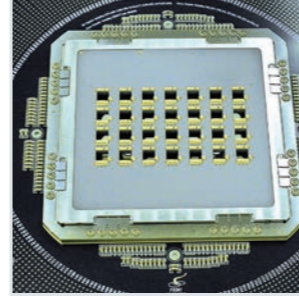
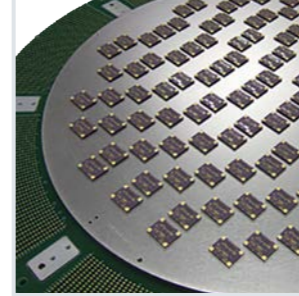
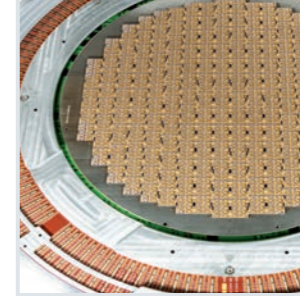
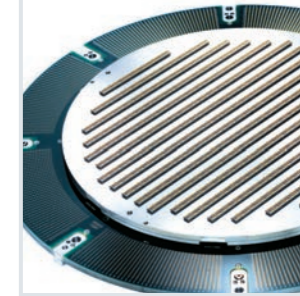
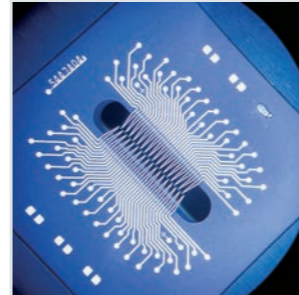
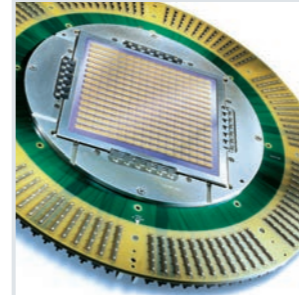
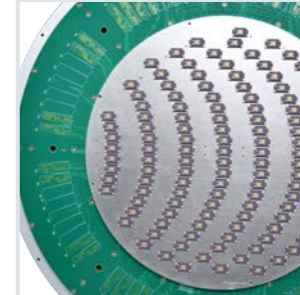
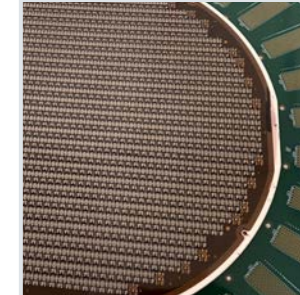
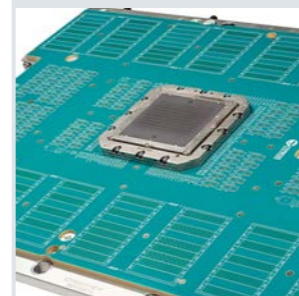
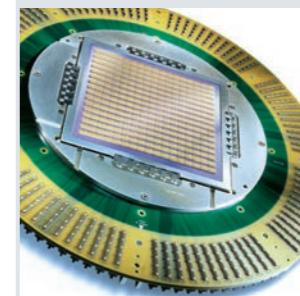
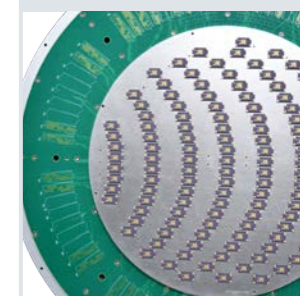
Probe mark on 70 μm solder ball

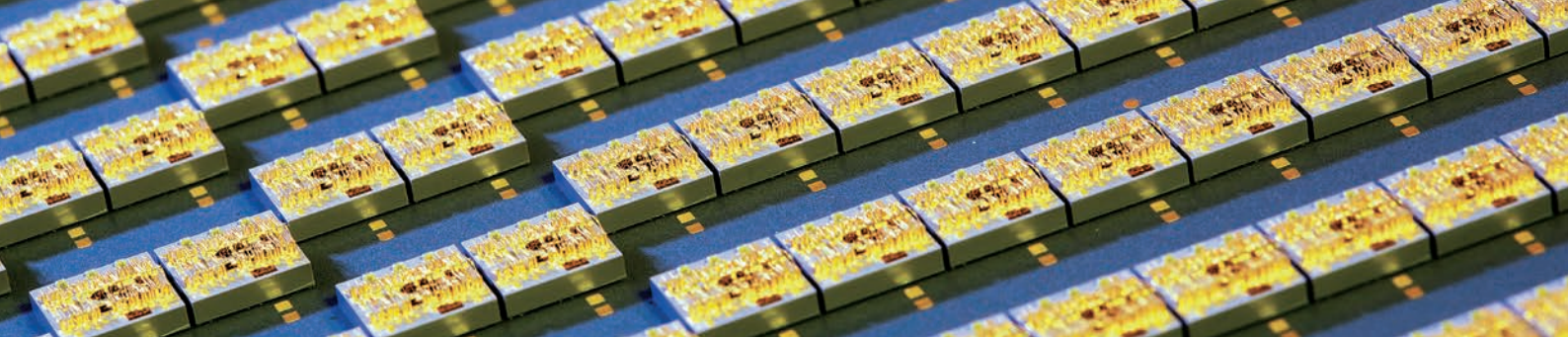


The world's most comprehensive portfolio of wafer probe cards with an extensive library of advanced probe contact technologies.

Parametric	RF	SOC WLCSP	SOC Grid Array
 Takumi™	 Pyramid	 QiLin	 Apollo
 Pyramid	 Pyramid-RF		 Altius for HBM
 Cantilever	 Pyramid-MW		

FormFactor's industry leading MEMS factories enable wafer test capability across SoC, Foundry, DRAM and Flash markets.

SOC Optical IC	SOC Wire Bond	DRAM	Flash
 Hikari for Image Sensor	 TrueScale Matrix	 SmartMatrix	 TouchMatrix
 Akari for LED	 PH	 HFTAP	 Genus
	 Kepler	 PH	 HFTAP



## Locations



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