Cascade **Probe Systems**

Product Line Overview
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.

- Founded in 1993, IPO 2003
- 2017 Revenue $548.4 million
- #1 in Customer Satisfaction for Test Connectivity Systems for 4 Years Consecutively
- #1 Advanced Probe Card Supplier
- 10 BEST Supplier of Chip Making Equipment
- Ship >45 million MEMS probes annually
- Over 10,000 probe systems installed

Our focus on customer partnership, innovation, agility and operational excellence allows us to earn sustainable business every day.

Our heritage is innovation.

Key Facts

Customer Collaboration

Global and local.

Vision & Mission

Our heritage is innovation.

Worldwide expertise, service and support

We have an extensive patent portfolio and are ISO9001:2008 and ISO14000:2004 certified.

With facilities in Dresden/Germany and Beaverton OR/USA, and worldwide sales and support offices we serve customers in all major sectors (Fabless, integrated device manufacturers, foundries, governments, institutes, universities, subcontractors).

Further FormFactor Products

- More than 50 analytical probe models for wafer, package, and board level characterization.
- Our families of RF, mixed-signal and DC probes are designed to meet the challenges of a wide range of probing environments.
- Extensive portfolio of high-performance probe cards for memory, RF, foundry and logic devices that help lower overall production costs, improve yields and enable "more-than-Moore" advanced packaging technologies.

Cascade Probe Systems

Technology leadership

Cascade Probe Systems are an essential part of FormFactor, Inc. We offer a complete line of premium performance analytical probe solutions for on-wafer probing, board test and package test that help increase process performance while reducing cost of ownership. Our probe systems are available with a complete set of accessories such as microscopes, thermal control systems, software and industry-leading probes.

- More than 50 analytical probe models for wafer, package, and board level characterization.
- Our families of RF, mixed-signal and DC probes are designed to meet the challenges of a wide range of probing environments.

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.

- Founded in 1993, IPO 2003
- 2017 Revenue $548.4 million
- #1 in Customer Satisfaction for Test Connectivity Systems for 4 Years Consecutively
- #1 Advanced Probe Card Supplier
- 10 BEST Supplier of Chip Making Equipment
- Ship >45 million MEMS probes annually
- Over 10,000 probe systems installed

Our focus on customer partnership, innovation, agility and operational excellence allows us to earn sustainable business every day.

Our heritage is innovation.

Key Facts

Customer Collaboration

Global and local.

Vision & Mission

Our heritage is innovation.

Worldwide expertise, service and support

We have an extensive patent portfolio and are ISO9001:2008 and ISO14000:2004 certified.

With facilities in Dresden/Germany and Beaverton OR/USA, and worldwide sales and support offices we serve customers in all major sectors (Fabless, integrated device manufacturers, foundries, governments, institutes, universities, subcontractors).

Further FormFactor Products

- More than 50 analytical probe models for wafer, package, and board level characterization.
- Our families of RF, mixed-signal and DC probes are designed to meet the challenges of a wide range of probing environments.
- Extensive portfolio of high-performance probe cards for memory, RF, foundry and logic devices that help lower overall production costs, improve yields and enable "more-than-Moore" advanced packaging technologies.

Cascade Probe Systems

Technology leadership

Cascade Probe Systems are an essential part of FormFactor, Inc. We offer a complete line of premium performance analytical probe solutions for on-wafer probing, board test and package test that help increase process performance while reducing cost of ownership. Our probe systems are available with a complete set of accessories such as microscopes, thermal control systems, software and industry-leading probes.

- More than 50 analytical probe models for wafer, package, and board level characterization.
- Our families of RF, mixed-signal and DC probes are designed to meet the challenges of a wide range of probing environments.
Worldwide Application Support and Customer Service

Global presence:
- Over 10,000 probe systems
- Six strategically located global service centers
- Over 50 certified field service engineers
- Continued training/certification

Application support:
- World-wide Customer Application and Product Solutions team
- Dedicated experts for state-of-the-art solutions
- Over 20 certified field application engineers
- Over 20 application experts at our partners

Variety of service offerings:
- Full performance guarantee
- Calibration/maintenance only options
- Labor or parts only options
- Customized agreements to meet customer needs
- Volume and multi-year discounts

User and service training:
- System- or application-specific user training
- Maintenance/calibration service certification training
- Complete system service certification
- Annual service certification renewals
- Available at FormFactor locations or customers site

- Service center
- Certified field support
Applications

8

- MeasureOne - Integrated Test and Measurement Solutions
- Device Characterization and Modeling
- 19/41/64 / 1T4
- Silicon Photonics
- Wafer-level Reliability
- High Power Test
- Opto / µLED
- Failure Analysis
- MEMS Test
- Customized Solutions

Technologies

18

- Contact Intelligence™ Technology
- MicroChamber® and MicroChamber® PureLine™
- VueTrack™

Systems

22

- 150 mm Systems
- 200 mm Systems
- 300 mm Systems
- Board Test Systems
- High Power Systems
- Vacuum, Cryogenic and Pressure Probe Systems

Software

54

- Velox Probe Station Control Software
- WinCal XE

Accessories

58

- Engineering Probes
- Calibration Substrates
- Probe Cards
- Positioners
- Chucks
- Thermal Systems
- Microscopes
- Vibration Isolation Tables
- Lights and EMI-shielding solutions

Programs

62

- Educational Savings Program
- Trade-In / Buy Back
- Certified Used Equipment
- Product Safety and Ergonomy
MeasureOne™ - Powerful, Integrated Test and Measurement Solutions

Guaranteed configuration, integration and support

MeasureOne is a unique commitment between FormFactor and a select group of partners to deliver optimized solutions to address customers’ applications. FormFactor and its MeasureOne partners work together to configure and install solutions with validated performance and post-installation service and support.

Our solutions help reduce costs, time, and ultimately get your products to market – faster.

/ Powerful, integrated test and measurement solutions with best-of-breed partners
/ Eliminates the time and risk involved in sourcing incompatible products from multiple vendors
/ Provides confidence in measurement by applying combined know-how and expertise
/ Partners share a commitment to customer success and seek to understand and solve future customer challenges
/ Single point of contact to coordinate the optimal customer solution, managing all aspects of configuration, installation, service and performance

1/f Device Characterization
/ Cascade 200 mm or 300 mm semi-automatic probe system, Velox™ Software
/ DCP Probes, ACP Probes, Infinity Probes®, or 1ZProbes
/ DPP precision DC positioners or RPP precision RF positioners
/ Keysight Technologies E4727A Advanced Low-Frequency Analyzer (ALFNA), B1500A, WaferPro Express software

Circuit Characterization
/ Cascade 200 mm or 300 mm semi-automatic probe system
/ WinCal XE calibration software
/ Infinity Probes and ISS calibration standards
/ Keysight Technologies PNA or PNA-X, B1500A, WaferPro Express, IC-CAP software, DC Power Analyzer

Cryogenic / Magnetic Probing
/ Cascade cryogenic probe stations supporting device substrates up to 200 mm in diameter with manual, semi-automatic and fully-automatic operation for DC and RF measurements into the terahertz range.
/ Lake Shore Cryotronics cryogenic probe stations for characterization of small material samples and devices (typically less than 100 mm) down to 2 Kelvin and with magnetic field strengths up to 2.5 Tesla

Terahertz Probing
/ mmW and sub-mmW on-wafer Ground-Signal-Ground probes
/ Solutions for electrical measurement of devices using rectangular waveguides from 50 GHz up to 11 THz
/ Validated on 150 mm, 200 mm and 300 mm probe stations
Application Expertise

"Investigate sensitive device measurements."

"Make the most of your RF expertise and take the shortest path to highest accuracy."

"Providing solutions in wafer-level photonics probing."

"Accelerate reliability assessments and process qualifications."

/ Device Characterization and Modeling

/ RF / mmW / THz

/ Silicon Photonics

/ Wafer-level Reliability
Application Expertise

"Energize your power measurements."
/ High Power Test

"Highly-accurate high-throughput functional testing of optoelectronics."
/ Opto / µLED

"Fast and accurate solutions for identifying the cause of a failure."
/ Failure Analysis

"Modern and innovative solutions for the special requirements in MEMS testing."
/ MEMS Test
Customized Probe Solutions

We are your partner for challenging applications. Our comprehensive technical and application know-how over all probe system platforms and our expertise for customized products is based on an extensive experience over many years.

We offer a special demo support in-house or at the customer, as well as after sales support for complicated setups.

Complicated Configurations

- New applications (magnetic, mixed signal, WLR)
- Total solution incl. customized software

Advanced Setups

- High number of positioners
- Chuck top plates
- Simultaneous setup of two microscopes
- Upgrades

Small Modifications

- Probe holders
- Cables
- Microscope adapters

“We are your partner for challenging applications.”
Contact Intelligence™ Technology

Contact Intelligence is a unique technology which guarantees to make and hold wafer contact with constant high quality. A powerful combination of innovative system design and state of the art image processing provides an operator-independent solution to achieve highly-reliable measurement data at any time. Even over a wide temperature range this technology ensures stable contact on small pad designs. With less operator interaction it reduces test cycle times and provides faster time to data, regardless of which application you are addressing. Contact Intelligence supports autonomous measurement assistants for dedicated applications.

Autonomous DC
/ Unattended testing on small pads over time and at multiple temperatures
/ System adapts to temperature variance and provides automated drift correction
/ Automated temperature ramp with optimized soak times
/ VueTrack™ closed-loop positioning capability minimizes the need of manual re-adjustment

Autonomous RF
/ Autonomous hands-free calibrations and RF measurements over temperature
/ Optional motorized positioner package compensates thermal drift for individual pads
/ Intelligent automatic probe placement enabling truly accurate and repeatable calibrations

Autonomous Silicon Photonics
/ Validated nanometer positioning technology
/ Integrated displacement sensors regulate distance between wafer and fiber(s)
/ Unique peak detection algorithms guarantee fast and repeatable measurement data
/ Specially developed automated calibration techniques

MicroChamber®, AttoGuard® and PureLine™ technologies guarantee an advanced shielding of the measurement environment.

MicroChamber for dark, dry and enhanced EMI-shielding enclosure
/ EMI shielding for low noise measurements
/ Environmentally sealed for moisture-free, low-temperature measurements
/ Low volume for the fastest purge
/ Light tight to eliminate the need for a dark box

PureLine technology for premium signal path fidelity
/ Enhanced EMI shielding
/ Lowest spectral noise floor and system AC noise
/ Ideal for low level and 1/f measurements

AttoGuard for enhanced IV and CV testing
/ Extends instrument guard to completely surround wafer
/ Makes the station invisible to the instrument
/ Extremely low capacitance and leakage characteristics
/ Fast settling times

Increased productivity and faster time to data
/ Compensates drift that results from test temperature changes by automatically adjusting chuck XYZ for probe-to-pad alignment
/ Single-site and multi-site capability
/ Ensures constant contact quality when probing on smallest pads
/ Increases productivity by eliminating idle time waiting for operator intervention
/ Faster time to market due to higher efficiency of test equipment

VueTrack™ Technology

VueTrack™ technology enables automatic probe-to-pad alignment when testing over multiple temperatures

/ Unattended testing on small pads over time and at multiple temperatures
/ System adapts to temperature variance and provides automated drift correction
/ Automated temperature ramp with optimized soak times
/ VueTrack™ closed-loop positioning capability minimizes the need of manual re-adjustment

/ Autonomous hands-free calibrations and RF measurements over temperature
/ Optional motorized positioner package compensates thermal drift for individual pads
/ Intelligent automatic probe placement enabling truly accurate and repeatable calibrations

/ Validated nanometer positioning technology
/ Integrated displacement sensors regulate distance between wafer and fiber(s)
/ Unique peak detection algorithms guarantee fast and repeatable measurement data
/ Specially developed automated calibration techniques

/ EMI shielding for low noise measurements
/ Environmentally sealed for moisture-free, low-temperature measurements
/ Low volume for the fastest purge
/ Light tight to eliminate the need for a dark box

/ Enhanced EMI shielding
/ Lowest spectral noise floor and system AC noise
/ Ideal for low level and 1/f measurements

/ Extends instrument guard to completely surround wafer
/ Makes the station invisible to the instrument
/ Extremely low capacitance and leakage characteristics
/ Fast settling times
Highlights

- Manual, open probe system for wafers and substrates up to 150 mm
- Flexible and stable design allows to configure and individualize the system to match application requirements
- Pre-configured application-specific packages guarantee highly-precise measurement results

MPS150 / EPS150

“The Cascade MPS150 is an easy-to-use probe solution for highly-accurate measurement results in the shortest time, with maximum confidence.”
200 mm Systems Overview

“Cascade 200 mm wafer probing systems have the precision and versatility needed for advanced semiconductor processes and aggressively scaled devices.”

<table>
<thead>
<tr>
<th>SUMMIT200</th>
<th>Summit 12000</th>
<th>Summit 11000</th>
<th>BlueRay</th>
<th>PM83200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended use</td>
<td>IV/CV</td>
<td>IV/CV</td>
<td>IV/CV</td>
<td>RF/mmW/THz</td>
</tr>
<tr>
<td>New product</td>
<td>Failure analysis</td>
<td>Failure analysis</td>
<td>Failure analysis</td>
<td>Failure analysis</td>
</tr>
<tr>
<td>High-volume engineering</td>
<td>Wafer level reliability</td>
<td>Wafer level reliability</td>
<td>High-volume engineering</td>
<td>Wafer level reliability</td>
</tr>
<tr>
<td>fabrication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| EMI shielding | Standard / open | Standard / open | Standard / open | Open | Open |

|------------|---------------------------------|---------------------------------|---------------------------------|--------|--------|

<table>
<thead>
<tr>
<th>Thermal range</th>
<th>-60 → +300° C</th>
<th>-60 → +300° C</th>
<th>-60° C → +300° C</th>
<th>Ambient → 60° C</th>
<th>Ambient → +300° C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unattended testing at multiple temperatures</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Backside emission support (DSP)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
**SUMMIT200**

**Highlights**

- Automatic wafer loading option
- Unattended thermal testing
- Thin wafer handling capability
- Advanced shielding with Microchamber and AttoGuard/PureLine
- Modular system - scalable in the field
- Designed for 24/7 operation

“The new SUMMIT200 advanced probing system enables up to 5x faster time to accurate data.”

<table>
<thead>
<tr>
<th>Feature</th>
<th>SUMMIT200-AP</th>
<th>SUMMIT200-M</th>
<th>SUMMIT200-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimized for</td>
<td>LF, Low noise, CV, Niche production, High volume engineering</td>
<td>LF, Low noise, CV, Niche production, High volume engineering</td>
<td>LF, Low noise, CV, Niche production, High volume engineering</td>
</tr>
<tr>
<td>Unattended testing at multiple temperatures</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EMI shielding</td>
<td>≥50 dB to 20 GHz (typical)</td>
<td>≥ 30 dB 6-20 GHz (typical)</td>
<td>Open</td>
</tr>
<tr>
<td>Light attenuation</td>
<td>≥100 dB</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Spectral noise floor</td>
<td>≤-170 dBVrms/rtHz (≤1 MHz)</td>
<td>≤-150 dBVrms/rtHz (≤1 MHz)</td>
<td>Open</td>
</tr>
<tr>
<td>System AC noise</td>
<td>≤5 mVp-p (≤1 GHz)</td>
<td>≤15 mVp-p (≤1 GHz)</td>
<td>Open</td>
</tr>
<tr>
<td>Automation</td>
<td>scalable wafer probing from single wafer to high volume engineering, semi-automatic and fully-automatic</td>
<td>scalable wafer probing from single wafer to high volume engineering, semi-automatic and fully-automatic</td>
<td>scalable wafer probing from single wafer to high volume engineering, semi-automatic and fully-automatic</td>
</tr>
<tr>
<td>Thermal range</td>
<td>-60°C ... +300°C</td>
<td>Ambient ... +300°C</td>
<td>Ambient ... +300°C</td>
</tr>
<tr>
<td>Wafer loading</td>
<td>unique roll-out chuck</td>
<td>optional auto-loader</td>
<td>Open</td>
</tr>
</tbody>
</table>

**Optimized for**

- 1/f Low noise
- CV
- Niche production
- High volume engineering

**Contact Intelligence Technology**

- ✓ ✓ ✓

- Unattended testing at multiple temperatures
- EMI shielding ≥30 dB 3-20 GHz (typical) ≥ 20 dB 0.5-20 GHz (typical) Open
- Light attenuation ≥100 dB Open
- Spectral noise floor ≤-170 dBVrms/rtHz (≤1 MHz) ≤-150 dBVrms/rtHz (≤1 MHz) Open
- System AC noise ≤5 mVp-p (≤1 GHz) ≤15 mVp-p (≤1 GHz) Open
- Automation scalable wafer probing from single wafer to high volume engineering, semi-automatic and fully-automatic
- Thermal range -60°C ... +300°C Ambient ... +300°C
- Wafer loading unique roll-out chuck, optional auto-loader
Summit 11000

**Highlights**

- Manual advanced shielding solution
- Stable and repeatable measurements over a wide thermal range
- Small- and large-area multi-site probe cards

“The Cascade Summit 11000 allows you to access the full range of your test instruments.”

<table>
<thead>
<tr>
<th></th>
<th>Summit 11000-AP</th>
<th>Summit 11000-M</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Optimized for</strong></td>
<td>freq. Low noise</td>
<td>freq. WA/0.1/0.01</td>
</tr>
<tr>
<td><strong>EMI shielding</strong></td>
<td>&gt;50 dB (1-20 GHz typical)</td>
<td>&gt;70 dB (0.1-20 GHz typical)</td>
</tr>
<tr>
<td><strong>Light attenuation</strong></td>
<td>&gt;0 dB</td>
<td>&gt;0 dB</td>
</tr>
<tr>
<td><strong>Spectral noise floor</strong></td>
<td>c 170 dB(mV/m) / c 100 (1 MHz)</td>
<td>c 190 dB(mV/m) / c 50 (1 MHz)</td>
</tr>
<tr>
<td><strong>System AC noise</strong></td>
<td>c 45 µV(p-p) (1 GHz)</td>
<td>c 45 µV(p-p) (1 GHz)</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>Manual</td>
<td>Manual</td>
</tr>
<tr>
<td><strong>Thermal range</strong></td>
<td>-60°C – +300°C</td>
<td></td>
</tr>
<tr>
<td><strong>Wafer loading</strong></td>
<td>Unique roll-out chuck</td>
<td></td>
</tr>
</tbody>
</table>

Cascade Probe Systems / 200 mm Systems
BlueRay

“The Cascade PA200 BlueRay enables high-throughput functional testing of optoelectronic, MEMS and RF devices.”

Highlights

- Up to 8 dies/sec
- Die-to-die stepping time of under 100 ms
- Highest Z-axis resolution of any production prober
- Double-side option
The Cascade PM8 is designed to provide a highly stable, ergonomic and flexible probing platform for precise analytical probing.

- Submicron precision and stability
- Supports multiple applications and accessories
- Wide-range coarse movement
- Micrometer-level fine movement

**Highlights**

**PM8 / EPS200**

<table>
<thead>
<tr>
<th>Optimized for</th>
<th>PM8</th>
<th>EPS200RF</th>
<th>EPS200MMAW</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHS/V</td>
<td>RF up to 87 GHz</td>
<td>RF up to 87 GHz</td>
<td>RF up to THz Laser pull</td>
</tr>
<tr>
<td>Thermal range</td>
<td>Up to 200°C</td>
<td>Up to 200°C</td>
<td>—</td>
</tr>
<tr>
<td>Chuck</td>
<td>Glass, brass, RF (depending on requirements)</td>
<td>RF with ceramic AUX chuck, vacuum controlled</td>
<td>—</td>
</tr>
<tr>
<td>Positioner plate</td>
<td>Stainless steel, leaf deposition/fatigue resistant</td>
<td>Stainless steel, leaf deposition/fatigue resistant</td>
<td>Stainless steel, engraved guides on mmW platen</td>
</tr>
<tr>
<td>Postioner</td>
<td>Manual, motorized (depending on requirements)</td>
<td>Two RF positioners with 50 TPI included</td>
<td>Dedicated, depending on measurement equipment and frequency range</td>
</tr>
<tr>
<td>Microscope</td>
<td>Depending on requirements</td>
<td>Camera-ready stereo zoom microscope with 150x magnification</td>
<td>Slim-body high-resolution zoom microscope with eyepieces, camera-ready</td>
</tr>
</tbody>
</table>

cascade probe systems / 200 mm systems
300 mm Systems Overview

“The Cascade 300 mm systems product line sets the industry benchmark for on-wafer test, delivering the precision and versatility needed to address a wide range of advanced, complex testing requirements.”

<table>
<thead>
<tr>
<th>CM300xi-P</th>
<th>CM300xi-S</th>
<th>CM300-O</th>
<th>PM300PS</th>
<th>PM300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended use</td>
<td>Intended use</td>
<td>Intended use</td>
<td>Intended use</td>
<td>Intended use</td>
</tr>
<tr>
<td>IV/CV</td>
<td>RF/mmW</td>
<td>Failure analysis</td>
<td>Failure analysis</td>
<td>Failure analysis</td>
</tr>
<tr>
<td>Failure analysis</td>
<td>Failure analysis</td>
<td>Wafer level reliability</td>
<td>Wafer level reliability</td>
<td>Wafer level reliability</td>
</tr>
<tr>
<td>Silicon photonics</td>
<td>Silicon photonics</td>
<td>Niche production</td>
<td>High-volume engineering</td>
<td>Niche production</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMI shielding</th>
<th>Automation</th>
<th>Thermal range</th>
<th>Material handling unit</th>
<th>Dual automatic system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced EMI shielding</td>
<td>Semi-automatic</td>
<td>-60 … +300°C</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>EMI shielding</td>
<td>Fully-automatic</td>
<td>-60 … +300°C</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Open</td>
<td>Semi-automatic</td>
<td>Ambient … +300°C</td>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>EMI shielding</td>
<td>Fully-automatic</td>
<td>-60 … -850°C</td>
<td>Option</td>
<td>Option</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material handling unit</th>
<th>Dual automatic system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>Option</td>
<td>Option</td>
</tr>
<tr>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
### CM300xi / CM300

**Highlights**

- Unattended testing on small pads over time and at multiple temperatures
- Highest flexibility to support a wide range of applications
- Best-in-class measurement performance
- Advanced EMI-shielded, light-tight and moisture-free test environment

“The Cascade CM300xi delivers best-in-class measurement performance at a high level of automation in the lab.”

---

<table>
<thead>
<tr>
<th>CM300xi-F</th>
<th>CM300xi-S</th>
<th>CM300xi-O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimized for</td>
<td>FACQ, AFM work, failure analysis, Wafer level reliability, silicon photonics, No signal production, High volume engineering</td>
<td></td>
</tr>
<tr>
<td>Contact Intelligence Technology</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Unattended testing at multiple temperatures</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EMI shielding</td>
<td>&gt;30 dB (typical) at 1 kHz to 1 MHz</td>
<td>&gt;20 dB (typical) at 1 kHz to 1 MHz</td>
</tr>
<tr>
<td>Light attenuation</td>
<td>&gt;100 dB</td>
<td>Open</td>
</tr>
<tr>
<td>Spectral noise floor</td>
<td>≤170 dBV rms/rtHz (≤ 1 MHz)</td>
<td>≤150 dBV rms/rtHz (≤ 1 MHz)</td>
</tr>
<tr>
<td>System AC noise</td>
<td>≤5 mVp-p (≤1 GHz)</td>
<td>≤20 mVp-p (≤1 GHz)</td>
</tr>
<tr>
<td>Automation</td>
<td>Scalable wafer probing from single wafer to high volume engineering: semi-automatic, fully automatic, dual fully-automatic systems</td>
<td></td>
</tr>
<tr>
<td>Thermal range</td>
<td>-65 to +300° C</td>
<td>Ambient to +300° C</td>
</tr>
<tr>
<td>Wafer loading</td>
<td>Unique wafer chuck</td>
<td>Optional auto-loading</td>
</tr>
</tbody>
</table>
**Highlights**

- Excellent measurement accuracy
- Fast navigation and high-precision probe positioning
- Modular upgrade path
- Fast transition between wafer and packaged device test

“The Cascade PM300 analytical probe system enables highly-precise manual semiconductor failure analysis and in-process testing.”

---

<table>
<thead>
<tr>
<th></th>
<th>PM300PS</th>
<th>PM300</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Optimized for</strong></td>
<td>IV/CV Failure analysis</td>
<td>IV/CV Failure analysis</td>
</tr>
<tr>
<td><strong>EMS shielding</strong></td>
<td>Ultra-shielding</td>
<td>Open</td>
</tr>
<tr>
<td><strong>Light attenuation</strong></td>
<td>&gt;60 dB</td>
<td>Open</td>
</tr>
<tr>
<td><strong>Automation</strong></td>
<td>Manual</td>
<td>Manual</td>
</tr>
<tr>
<td><strong>Thermal range</strong></td>
<td>-60 to +300°C</td>
<td>Ambient - +300°C</td>
</tr>
<tr>
<td><strong>Operation workflow</strong></td>
<td>Fine-glide chuck stage which offers both wide range coarse movement and precise fine movement</td>
<td></td>
</tr>
</tbody>
</table>
Dedicated Systems Overview

“FormFactor provides comprehensive measurement solutions for most challenging test requirements.”

<table>
<thead>
<tr>
<th>Feature</th>
<th>Board Test Systems</th>
<th>High Power Systems</th>
<th>Vacuum / Cryogenic Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimized for</td>
<td>Precision electrical measurements of IC packages and circuit boards</td>
<td>On-wafer device characterization and production test</td>
<td>MEMS devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Superconductor devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IR imaging devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Optoelectronic test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Compound semiconductor devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cutting edge technologies</td>
</tr>
<tr>
<td>Shielding</td>
<td>Open</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>Semi-automatic</td>
<td>Semi-automatic</td>
<td>Semi-automatic</td>
</tr>
<tr>
<td></td>
<td>Fully-automatic</td>
<td>Fully-automatic</td>
<td></td>
</tr>
<tr>
<td>Thermal range</td>
<td>Ambient</td>
<td>-65º C – +100º C</td>
<td>&lt; 7 K – &lt; 400º C</td>
</tr>
</tbody>
</table>
Board Test Systems

Highlights

- Fully customized system to match the needed measurement requirements
- Probing horizontal and vertical PCB's
- Ergonomic and straightforward design
- Solid station frame and a rigid microscope bridge

“Complete board test solutions for signal integrity probing on IC packages and circuit boards.”
### Highlights

- Low electrical and thermal contact resistance across the entire wafer
- Prevents thin wafers from curling and breaking
- Certified safety solutions to protect device, operator and probing equipment
- High-current probes up to 600 A

“On-wafer power device characterization systems from FormFactor reduce time-to-market for new power devices and keep up with production.”

---

### Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>TESLA200</th>
<th>T200</th>
<th>ESPERTELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wafer size</td>
<td>200 mm</td>
<td>200 mm</td>
<td>150 mm</td>
</tr>
<tr>
<td>Contact Intelligence Technology</td>
<td>✓</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Thermal range</td>
<td>-55° C … +300° C / 400° C</td>
<td>-55° C … +300° C</td>
<td>Ambient … +300° C</td>
</tr>
<tr>
<td>Thin wafer support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Maximum voltage triax/coax</td>
<td>3 kV / 10 kV</td>
<td>3 kV / 10 kV</td>
<td>3 kV / 10 kV</td>
</tr>
<tr>
<td>Maximum current</td>
<td>600 A (pulsed), 200 A (DC)</td>
<td>200 A (pulsed), 10 A (DC)</td>
<td>40 A (pulsed), 3 A (DC)</td>
</tr>
</tbody>
</table>
“Cascade vacuum and cryogenic probe systems enable precise on-wafer measurements in extreme environments.”

**Cascade Probe Systems / Dedicated Systems**

- **Unique wafer-level probing down to 7 K**
- **Test of devices (e.g., MEMS) in a high vacuum (<1 × 10⁻⁵ mbar)**
- **Manual and semi-automatic versions up to 200 mm**
- **Probing is as simple as on standard wafer-level probe systems**
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>8 - 17</td>
</tr>
<tr>
<td>Technologies</td>
<td>18 - 21</td>
</tr>
<tr>
<td>Systems</td>
<td>22 - 53</td>
</tr>
<tr>
<td>Software</td>
<td>54 - 57</td>
</tr>
<tr>
<td>Accessories</td>
<td>58 - 61</td>
</tr>
<tr>
<td>Programs</td>
<td>62 - 65</td>
</tr>
</tbody>
</table>
“The Velox probe station control software is the universal standard for probe operations, both semi-automatic and fully-automatic.”

“Comprehensive and intuitive on-wafer RF measurement calibration software.”
Full Range of Accessories

- Probes
- Calibration Substrates
- Probe Cards
- Positioners
- Probe Mounts
- Microscopes
- Chucks
- Thermal Systems
- Light- and EMI-shielding solutions
- Vibration Isolation Solutions
Educational Savings Program

Make the most of your research budget

With our Educational Savings Program you can benefit from exclusive savings on 150 mm wafer probe systems.

Program Benefits*

/ Free shipping
/ Two-year factory warranty
/ Four years of FreeWinCal XE™ Calibration Software updates
/ 10% discount on upgrades

*For terms and conditions please contact your local sales representative or visit us at https://www.formfactor.com/product/probe-systems/150-mm-systems/mps150/

SourceOne - Protect Your Test Investment

Our SourceOne program brings quality and industry-leading performance to the secondary equipment market. Whether you choose to purchase a reconditioned probe system or trade in your old equipment (or simply let us buy it back) – We will support you every step of the way, from order to installation.

Trade-In / Buy Back

/ Receive cash or credit for your returned probe station
/ Credit is good toward any Cascade probe system or service
/ Simplified logistics for easy shipping and handling
/ Competitive market rates

Pre-owned Equipment

/ Purchasing from OEM removes the risk from used equipment acquisition
/ Support from order configuration through setup reduces time to first measurement
/ Complete factory refurbishment ensures like-new performance
/ Standard one-year factory warranty on probe stations is an extra assurance of quality

Trade-In / Buy Back Pre-owned Equipment

/ Receive cash or credit for your returned probe station
/ Credit is good toward any Cascade probe system or service
/ Simplified logistics for easy shipping and handling
/ Competitive market rates

Simplified logistics for easy shipping and handling
/ Competitive market rates

Competitive market rates

Competitive market rates
Product Safety and Ergonomy

Cascade probe systems and systems-related services conform to the highest international standards and regulatory requirements.

- **Quality ✓**
  - / ISO 9001 : 2015
  - / SEMI S2, cNRTL US, CE, UL
  - Compliance with safety, health and environmental requirements to prevent or reduce the risk of injury
  - Continual improvement of products and processes

- **Safety ✓**
  - / SEMI S8
  - Straightforward design
  - Easy and ergonomic operation

- **Ergonomics ✓**
  - / ISO 14001 : 2015, RoHS
  - Prevention of pollution
  - Reduced consumption of natural resources
  - Minimization of waste
  - No use of hazardous materials

- **Environment ✓**
  - / SEMI S8
  - Products and services meet all customer and regulatory requirements
  - Continual improvement of products and processes

Certifications in collaboration with TÜV SÜD and TÜV Rheinland.