Cascade

# Double-sided VCSEL Probe System with Thermally Controlled Probe Unit

## Overview

FormFactor, Inc., a leader in electrical test and measurement, has developed a high precision double-sided and thermally controlled probe system mainly for the VCSEL market.

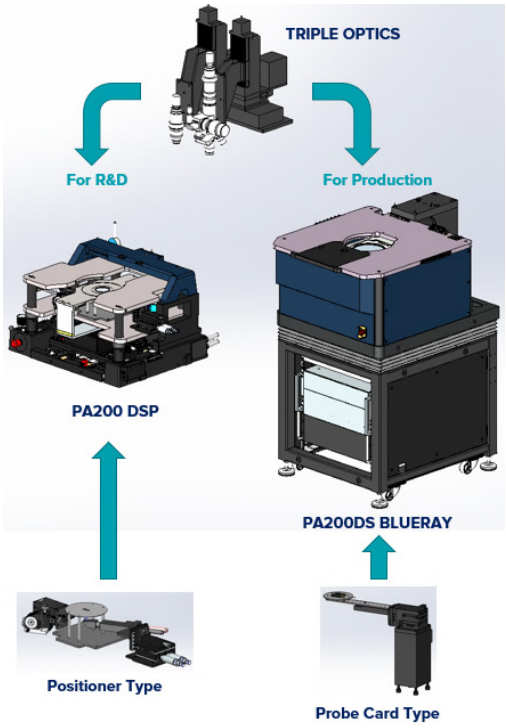
Triple optics, including LIV (light intensity, current and voltage), near field and far field, can be mounted on top of the prober while probing is done from the bottom side of the wafer. The double-sided chuck design allows free access to both sides of the wafer. The wafer itself can be fixed by vacuum or mechanically clamped to allow testing up to the substrate edge.

The patented design of the thermally controlled probe unit (FireProbe) enables the test for both high and low temperature with very stable and accurate conditions. Both probe card and probe positioner types can be chosen for this new technology. Our extensive portfolio of high-performance probes suits most requirements.

There are choices of probe systems: a semi-automated double-sided probe system (PA200DSP) for R&D usage and a semi/fully automated double-sided probe system (PA200DS BlueRay) for production. PA200DSP has more flexibility of customization since there is greater access.

## Features / Benefits

| | |
|---|---|
| **Flexibility** | • Prober options (PA200 DSP for R&D and PA200DS BlueRay for production)<br>• Options of probe positioners and probe cards with different probe types<br>• Large number of accessories available |
| **Optics** | • Triple optics (LIV, NFP and FFP) can be mounted on top side of the prober<br>• Different configurations of optics are available |
| **Double-side probing** | • Customized double-sided chuck design for up to 6-inch wafers<br>• Variety of wafer carriers, glass chucks, mechanical edge clamping solutions |
| **Thermal control** | • Patented design of probe system enables test temperatures from 10°C to 85°C<br>• Accuracy of temperature within ±1°C |



## Mechanical Performance

| PA200DS BlueRay | |
|---|---|
| **X-Y Movement** | |
| Travel | 205 mm x 205 mm |
| Resolution | 0.5 µm |
| Repeatability | ± 2 µm |
| **Z Movement** | |
| Travel / Resolution | 15 mm / 0.25 µm |
| Repeatability | ± 1.0 µm |
| **Theta Movement** | |
| Travel / Resolution | ± 6.0° / 0.0001° |

| PA200DSP | |
|---|---|
| **X-Y Movement** | |
| Travel | 200 mm x 200 mm |
| Resolution | 0.5 µm |
| Repeatability / Accuracy | ± 1.0 µm / ± 2.5 µm |
| **Z Movement** | |
| Travel / Resolution | 9 mm / 0.25 µm |
| Repeatability | ± 1.0 µm |
| **Theta Movement** | |
| Travel / Resolution | ± 6.0° / 0.0001° |

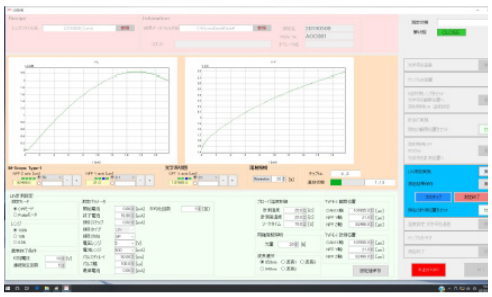
## Optics

| LIV | |
|---|---|
| Spectral Response Range | 340 nm to 1100 nm |
| CW | 1A |
| Pulse | 5A (500 n sec to 5 m sec) |

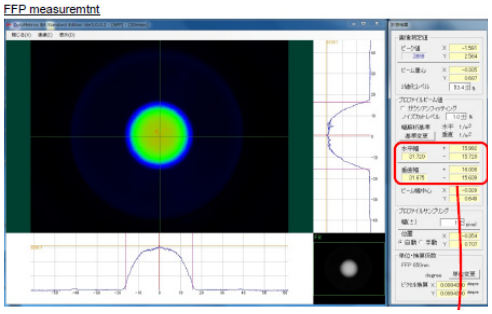
| NFP (M-Scope Type S) | Objective Lens | Measurement Area | Pixel Resolution |
|---|---|---|---|
| High resolution digital CCD detector | 50x<br>100x | 0.13x0.1 mm<br>0.06x0.05 m | 0.093 µm<br>0.043 µm |
| InGaAs high sensitivity NIR detector | 50x<br>100x | 0.128x0.1024 mm<br>0.064x0.0512 m | 0.4 µm<br>0.2 µm |
| Light irradiation/detection area (size) | Objective lens 10x: equal to the core diameter of 50 µm in case of fiber core is 50 µm<br>Objective lens 20x: 1/2 size of the core diameter of 25 µm in case of fiber core is 50 µm | | |

| FFP (M-Scope Type F) | Measurement Angle Range | Wavelength Range | Pixel Resolution |
|---|---|---|---|
| High resolution digital CCD detector | Approx. ±40° / N.A. 0.65 | 400 nm to 1100 nm | Approx. 0.09° |
| InGaAs high sensitivity NIR detector | Approx. ±39.5° / N.A. 0.65 | 950 nm to 1700 nm | Approx. 0.4° |
| Working Distance | Approx. 6 mm ±0.8 mm | | |

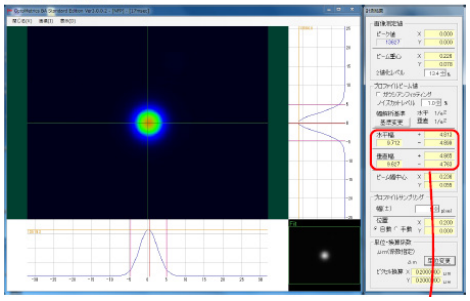
LIV measurement



FFP measuremtnt



NFP measurement



## Probe Card / Positioner

| | |
|---|---|
| Probe Card | Vertical probes for bump and cantilever probes for pad applications |
| Positioner | Motorized and manual positioners available with different probe types |
| Temperature | 10°C to 85°C with accuracy of ±1°C |

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