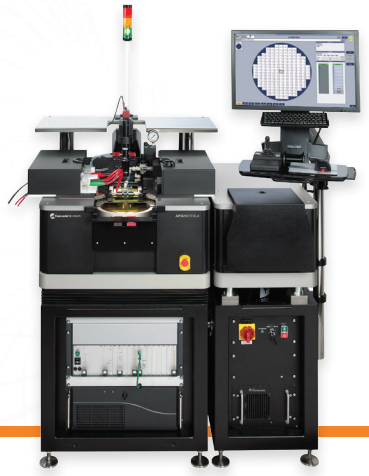
APS/SPS200TESLA

200 mm Fully-automated On-Wafer Probing Solution for High-power Devices



DATA SHEET

The APS/SPS200TESLA is the industry's first fully-automated on-wafer probing solution focused on production performance for high-power semiconductors. The APS/SPS200TESLA improves productivity and yield at final test by enabling production wafer probing of high-power devices, increasing manufacturing margin and reducing your time-to-market. The APS/SPS200TESLA is designed to optimize the transition from device characterization through high-volume manufacturing, thereby optimizing your overall investment.

The APS/SPS200TESLA features a high-power auto-discharging chuck for thin- or Taiko-wafer handling and an anti-arcing solution to enable accurate and high-throughput measurements at high power. The APS/SPS200TESLA ensures precision production test up to 10.5 kV DC / 400 A, while providing a safe and regulatory-certified probing environment.

Using Velox™ probe station control software, the APS200TESLA enables safe and fast wafer loading and easy test automation and measurement system integration, while preventing damage of probe tips and probe cards throughout the entire measurement cycle. The VeloxPro™ test automation software is an open-architecture automation tool for fully-automated wafer probing. Compliant with SEMI E95, the VeloxPro easily enables automated wafer handling, cassette mapping, temperature control, Z-profiling and stepping. The APS200TESLA, powered by Velox and VeloxPro, achieves easy test automation and high test throughput.

FEATURES / BENEFITS

Anti-arcing solution	Shielded system prevents arcing at higher voltages, protecting device and instrumentation from high-voltage discharge Anti-arcing probe card prevents on-wafer arcing at higher voltages by providing compressed atmosphere Anti-arcing solution allows optimal pad layout with smaller distance between pads, maximizing the wafer space Uses clean dry air (CDA), eliminating the need to use any gas or liquid
MicroVac™ chuck	Uniformly distributed vacuum holes provide low contact resistance across the entire wafer, ensuring accurate measurement results Thin-wafer handling capability enables automatic Taiko wafer loading/handling down to 50 µm thickness and conventional wafer loading/handling down to 80 µm thickness 100 µm diameter vacuum holes prevent damage to thin wafer due to probe pin pressure
Safety	Regulatory-certified probing environment to protect operators Chuck auto-discharging capability to protect DUT from unexpected high-voltage discharge Probe-pin touchdown sensor capability to prevent excess overdrive and ease setting probe-to-pad contact height

CascadeMicrotech®

MEASUREMENT PERFORMANCE

Chuck Leakage

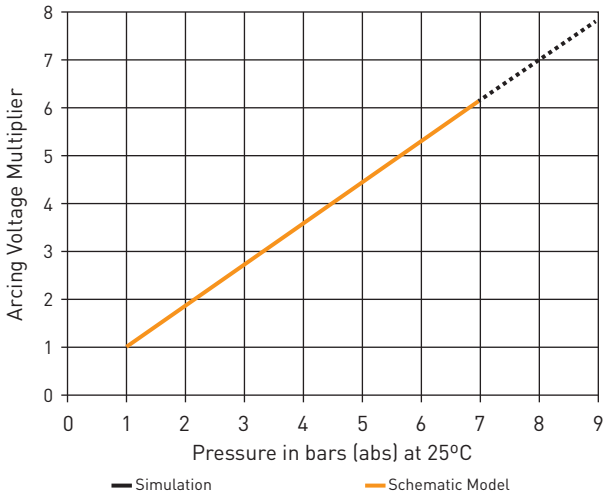
	Tested with SMU*		Tested with HiPot Tester**		
10 V	1000 V	3000 V	3000 V	6000 V	10,000 V
< 10 pA	< 500 pA	< 1.5 nA	< 1 nA	< 1.5 nA	< 3 nA

* SMU testing conducted with Agilent B1505A HVSMU and measured with hold time of 10 sec.
** HiPot testing conducted with Kyoritsu KEW3028 and measured at t = 120 sec.

Auto-discharging Time (Typical)

10 kV discharged to 1 V	< 3 ms

Anti-arcing High-pressure Probe Card Performance (Typical)



MECHANICAL PERFORMANCE

	X-Y Stage	Z Stage	Theta Stage
Travel	205 mm x 205 mm	15 mm	± 6°
Resolution	0.5 µm	0.25 µm	0.00001°
Repeatability	± 2 µm	± 1 µm	< 2 µm**
Accuracy (Precision Mode)*	± 5 µm	± 2 µm	NA
Max. acceleration	596 mm/sec^2	596 mm/sec^2	NA
Max. velocity	49 mm/sec	18 mm/sec	NA

* (MAX ERR –MIN ERR) / 2 as measured at 60 locations.
** Measured at edge of 200 mm chuck with standard moves.

SYSTEM COMPONENTS FOR HIGH-POWER APPLICATIONS

Safety system	Integrated, easy-to-use safety enclosure with duplicated interlock functionality to ensure operator safety, and device protection
Instrument connectivity	Dedicated instrument-to-station connection interface such as Agilent, ipTEST and others (available upon request)
Anti-arcing probe card integration	Built-in probe card air control with interlock. Insulated, high-force probe card holder, and arc shielding system Support for 10.5 kV probe cards
Contact sensor	Probe-to-pad contact detection under pressure
Voltage discharge	Automatically discharge chuck between measurements in milliseconds
Wafer alignment	On-axis probe-to-pad, and off-axis theta alignment optics
Probe card holder	4.5 inch probe card holder

MICROVAC CHUCK

Max voltage and current*	10.5 kV DC / 400 A-pulsed**
Chuck size	200 mm (Taiko and conventional wafer) or 150 mm (Taiko wafer)
Material finish	Gold-plated
Flatness	< 15 µm
Supported wafer thickness	≥ 50 µm for Taiko wafer or other wafer types
Supported wafer diameter	Shards or wafers from 3 inch through 8 inch
Vacuum hole diameter	Approximately 100 µm
Number of vacuum holes	Approximately 500 holes across 200 mm chuck
AUX chucks	Two auxiliary locations for use with ISS, contact or cleaning substrate

* Contact Cascade Microtech for application-specific testing conditions and specifications.

** Current duty cycle < 1% with max pulse width < 1 ms.

WAFER-HANDLING ROBOT

Supported cassettes	One SEMI E1 cassette ("H" bar design)
Supported wafers	Conventional wafer: 3 inch to 8 inch Taiko wafer: 6 inch to 8 inch
Wafer handling	Conventional wafer (3 inch to 8 inch): Vacuum-end effector at wafer bottom side Taiko wafer (6 inch to 8 inch): Optional vacuum-end effector
Cassette indexing	Single beam laser reflection scanner
Pre-aligner	Optical sensing, compatible with notch / flats
Wafer ID reader	Optional top or bottom wafer ID reader
Conventional wafer exchange time	~ 58 sec (end of test to start of test)

MACHINE TABLE

Anti-vibration damping	Self-leveling air dampers or passive polymer dampers

The APS200TESLA is equipped with Velox probe station control software and VeloxPro user interface for test automation.

Velox Probe Station Control Software

Velox software provides all features and benefits required for semi-automated operation of the probe system, such as:

- WaferMap with Z-profiling, sub-die stepping, binning and other useful features
- Configurable user interface and programmable buttons
- Intuitive GUI for efficient system utilization by novice and expert users
- Software joystick for precise, sub-micron positioning
- Easy integration with instruments, testers and measurement software for fast data collection

VeloxPro User Interface for Test Automation

The APS200TESLA also includes VeloxPro user interface for test automation and automated wafer handling, featuring:

- Compliance to SEMI E95
- Cassette mapping and map visualization capabilities, with statistics and status view
- Test sequence customization
- Ability to load new wafers into the cassette while test is running on the chuck
- Screens for the setup of new recipes, parameters and pattern recognition
- Capability to accommodate multiple types of wafers in one cassette

Tester Interface

The APS200TESLA uses commands through GPIB/TCPIP as master or slave. The GPIB/TCPIP interface provides the ability to:

- Request an inventory of all wafers available in the cassettes
- Define a wafer map
- Define a job (out of wafers and recipe)
- Initiate re-alignment
- Receive notifications when the wafer is aligned and ready to test

Communication Ports

Type	Qty	Location	Notes
LAN	1	Rear system controller	For factory integration
USB 2.0	2	Front of system controller	For USB drives, security keys and USB instrument control
RS232	1	Rear system controller	For instrument control
GPIB IEEE 488.2	1	Rear system controller	For instrument control (optional)

Accessory Interface Ports

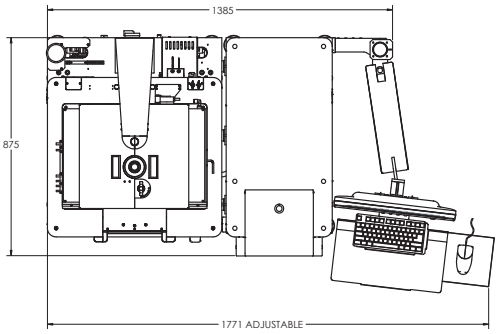
EDGE SENSE	1	Connection panel at rear of platen	Probe card contact sense in addition to audible probe-to-pad contact detection under pressure

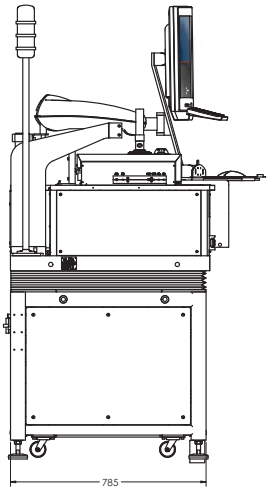
PHYSICAL DIMENSIONS

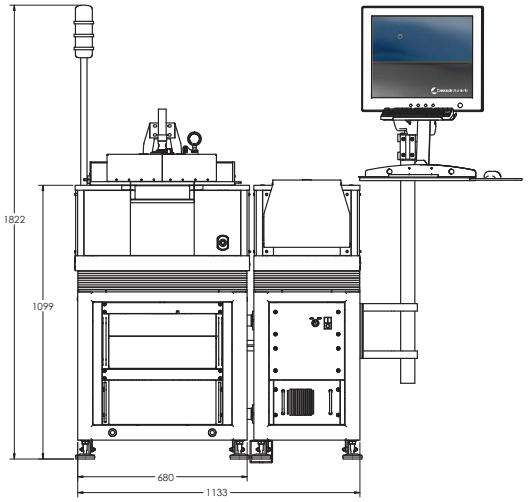
Station Platform with Robot Handler

Station dimensions*	Minimum: 1385 mm (W) x 875 mm (D) x 1822 mm (H) Station only (without loader): 932 mm (W) x 785 mm (D) x 1822 mm (H)
Weight	Station: 475 kg, Loader: 250 kg

*See drawings for detailed dimensions.







FACILITY REQUIREMENTS*

Vacuum	Less than 20 kPa absolute Flow rate 0.5 SCFM 8 mm hose (5/16-inch)
Compressed air for vibration-isolation table and probe card	Filtered, dry and oil-free Minimum 0.65 MPa (6.5 bar) minimum to 0.8 MPa (8 bar) bar maximum Flow rate 140 liters/min (5 SCFM) 8 mm hose (5/16-inch)
Power	200-240 VAC nominal, 50/60 Hz, 500 VA

*See the Station Facility Guide for more details.

AVAILABLE MODELS

Part Number	Description
APS200TESLA-010	Fully-automated 200 mm on-wafer probe system for high-power devices, with a vibration isolation table and loader
APS200TESLA-020	Fully-automated 200 mm on-wafer probe system for high-power devices, with a prober table and loader
SPS200TESLA-010	Semi-automated 200 mm on-wafer probe system for high-power devices, with a vibration isolation table
SPS200TESLA-020	Semi-automated 200 mm on-wafer probe system for high-power devices, with a prober table

AVAILABLE CHUCK OPTIONS

Part Number	Description
158-870	MicroVac chuck, coaxial, Au, 200 mm (8"), Taiko wafer ready*
158-871	MicroVac chuck, coaxial, Au, 150 mm (6"), Taiko wafer ready*
158-050	MicroVac chuck, coaxial, Au, 200 mm (8")

*Taiko wafer ready chuck designed to Disco Corp maximum grind diameter and tolerance specifications.

AVAILABLE INTERFACE KIT*

Part Number	Description
158-532	Agilent B1505A with module selector interface assembly
158-520	ipTEST tester interface assembly
162-800	Agilent B1505A with UHCE or UHVE interface assembly

*Additional interfaces are available upon request.

STATION ACCESSORIES

Part Number	Description
158-850	Bottom-side reader
158-922	Top-side reader
158-600	30U accessory rack
136687	Rear shelf
155-496	Optem Zoom 70 microscope
158-860	Auto-loader upgrade

REGULATORY COMPLIANCE

Certification	CE and CB

WARRANTY

Warranty*	Fifteen months from date of delivery or twelve months from date of installation
Service contracts	Single and multi-year programs available to suit your needs

*See Cascade Microtech's Terms and Conditions of Sale for more details.

APS/SPS200TESLA-DS-0715

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