

Technical Specifications of High Precision Silicon Photonics Probe Station with Optical/Electrical probes for Vertical grating coupling and Horizontal edge coupling for O-O, O-E, & E-O Device Measurements.

A. MECHANICAL PERFORMANCE SPECIFICATION OF PROBE SYSTEM		
<u>Chuck X-Y Stage</u>		
It should have independent X and Y axis control.		
1	X-Y travel range	200 mm x 200 mm
2	X-Y travel resolution	0.2 μm
3	X-Y repeatability	1.5 μm or less
4	X-Y accuracy	2 μm or less
<u>Chuck Z & Theta Stage</u>		
5	Z travel range	35 mm or more
6	Z travel resolution	1 μm
7	Z repeatability	1 μm or less
8	Theta travel range	±7.5°
9	Theta resolution	0.5 μm or less
10	Theta repeatability	1.5 μm or less
B. WAFER & AUXILIARY CHUCK		
1	Type	Non thermal Coax High Isolation
2	Material	Nickel plated
3	Diameter	200 mm or more
4	Vacuum zones for holding wafer	four with vacuum holes surface
5	DUT sizes supported	SEMI-M1 compliant wafers 50 mm (2 in.) through 200 mm (8 in.)
6	Vacuum Diameters	10, 70, 141, 180mm
7	Vacuum Actuation	Both software & manual control to activate each vacuum zone
8	Auxiliary Chuck	Aux chuck, integrated with wafer chuck assembly. Aux chuck can be used for Auto Cleaning of probe tips or placing of Calibration Substrate for RF Cal
9	Aux Chuck Surface Flatness	8μm or less
10	Aux Chuck Vacuum Control	Independent Vacuum Switch control, separate from main chuck control.
C. PLATEN SYSTEM & PLATEN LIFT		
The platen top should be large enough to accommodate Optical & Electrical Probing accessories		
1	Material	Steel
2	Thermal Isolation	Integrated laminar-flow air-cooling for temperature expansion during thermal testing
3	Max No. of Hexapod & RF Positioners	up to 2 Hexapod & 2 RF Positioners
4	Positioners mounting	Bolt down for both Hexapod & RF Positioners.
5	Platen lift range	5mm
6	Platen separation repeatability	3μm or less
7	Platen Lift Control	Ergonomic handle with 90 degree stroke. Optional Micrometer Control for fine adjustment of probe card contact
D. MICROSCOPE STAGE & IMAGING SYSTEM		

1	Microscope System Mount	High stability bridge & transport (programmable)
2	X-Y travel range	50 x 50 mm
3	X-Y resolution	1 μ m
4	X-Y repeatability	2 μ m or less
5	X-Y accuracy	5 μ m or less
6	Z travel range	125 mm or less
7	Z resolution	0.4 μ m
8	Z repeatability	2 μ m or less
	<u>Digital Microscope System</u>	
9	Objective Lens	$\geq 10x$
10	Working Distance	≥ 30 mm
11	Optical Resolution	1 μ m or less at Maximum magnification
12	Field Of View (H x V)(Max)	2.62 x 1.97 mm
13	Field Of View (H x V)(Min)	0.26 x 0.2 mm
14	Focus Block	Focus block for coarse and fine focus adjustment.
	Microscope Video Camera	
15	Type	High magnification digital microscope with intelligent lens to avoid collision with optical & electrical probe
16	Microscope Internal Optical Paths	2
17	Internal Microscope z drive resolution	0.2 μ m or better
18	Zoom range	0.5 - 5.0
19	Video frame rates (1024 x 768)	45.5 fps or better
E. LOCAL ENVIRONMENTAL CHAMBER		
	The probe station should have integrated local shielded environment chamber around the chuck	
a)	Electrical	
1	EMI shielding	≥ 20 dB(typical) for 0.5 - 20GHz
2	Spectral noise floor	≤ -150 dB $V_{rms}/rtHz$ (≤ 1 MHz) Non thermal
3	System AC noise	≤ 15 mVp-p (≤ 1 GHz) Non thermal
b)	Light Shielding	
1	Type	Complete dark enclosure around chuck
2	Wafer access	Front access door with extended Y axis stage for auto wafer loading
3	Probe compatibility	Should allow access for up to 2 optical probes with 2 RF probes.
4	Light attenuation	≥ 120 dB
F. HEXAPOD POSITIONER & ACCESSORIES		
1	Hexapod Positioners for Optical Test	2
2	Travel range in X, Y, Z	± 17 mm, ± 16 mm & ± 6.5 mm
3	Theta range in X, Y, Z	± 10 , ± 10 & ± 21 degree
4	Repeatability X, Y, Z	± 0.15 μ m, ± 0.15 μ m & ± 0.06 μ m
5	Z Displacement Sensor	High temp (125 degC) Cap Sensor for finding accurate fiber height for optical measurement
6	Photonic Integration Sigma Kit	Should provide all necessary accessories for easy setup, calibration &

		verification of System before optical measurement. Self Developed Controller software interface for control of optical positioning
7	Photonic Calibration Kit	In Situ Calibration to ensure all 9 axes of each Optical Position are calibrated to achieve accurate & repeatable results.
8	Power Measurement	Enable In Situ power measurement at the measurement plane for single fiber or fiber array
9	Probe Inspection	Upward looking probe inspection for single fiber, fiber array, DC or Rf probe
10	Die Holder	Customizable die holder for maximum die size 25 x 25mm or for true horizontal edge coupling testing
G. <u>RE POSITIONERS & ACCESSORIES</u>		
1	RF Probe Positioners	2
2	Micropositioner for RF measurements	One set of two RF probe arms in North-South configuration.
3	Micropositioner XYZ travel range	12 mm or better
4	Micropositioner Feature Resolution	1 μm or better
5	Micropositioner mounting:	Bolt-down on platen
	RF Positioner Footprint	130 mm x 150 mm
6	RF Positioner frequency support:	DC to 67GHz
7	Probe Arm	Universal RF and microwave probe mount. Accurate RF probe planarity control by micrometer screw.
H. <u>RF PROBE & RF CABLES</u>		
1	50GHz RF Probe suitable S-parameters, O-E or E-O frequency	Infinity probe with angle connectors type
2	Frequency range	DC to 50 GHz
3	RF probe tip Configuration	GSG Probes
4	RF Probe pitch	150 μm
5	RF probe temperature range	-65 $^{\circ}\text{C}$ or less to 125 $^{\circ}\text{C}$ or more
6	RF Probe Pad Size (Minimum)	25 x 35 μm
7	RF probe Insertion loss @ 40 GHz	0.7 dB (typical)
8	RF Probe Return Loss @ 40-50 GHz	17 dB
9	RF Probe Contact resistance	< 0.05 Ω on Al, < 0.02 Ω on Au
10	Cables:	2 pieces of male/female flexible cables with length \geq 1200 mm for angle style probe body with suitable connectors
11	Typical Raw Insertion Loss	6.5 dB or better @ 50GHz (can be calibrated)
12	Calibration substrate	Self-developed On-Wafer RF Calibration Substrate or Impedance Standard Substrate for probe pitch 100– 250 μm , DC - 67GHz, Short, Open, 50 Ω Load, Through standards
13	Contact substrate	Substrate with Aluminum for RF planarity check

14	RF Calibration Software	Self - developed Calibration software to support SOLT, multi-line TRL, eLRRM, Hybrid LRRM-SOLR for multiport, 16-Term SVD, LRRM and LRM+
I. <u>DC Probes</u>		
1	Probe tip material	Tungsten
2	Number of pins	16
2	Probe pitch	150 μ m
3	Cable from probe	RG-178 COAX
4	Cable length	> 3 ft
5	Connector from the cable	BNC
J. <u>VIBRATION ISOLATION TABLE</u>		
1	Vibration Isolation Table design	Active Anti Vibration isolation table with Hexapod support
2	Vibration Isolation Methodology	Adjustable air damping system, Automatic Load Balancing
3	Load Capacity	\geq 300 kg
4	Monitor Stand	Vibration isolation table to include monitor stand
K. <u>OTHER ACCESSORIES</u>		
1	Probe Station Controller	System comes with a computer with automation software tools such as AutoAlign, WaferAlign, AutoXYZ correction on wafer map for accurate die stepping movement, together with Silicon Photonic & Controller Tools.
2	Vacuum pump	Vendor should provide suitable oil less vacuum pump with the system
3	Compressor	Vendor should provide suitable air compressor for complete functioning of the table
L. <u>OTHERS:</u>		
1	Protect Investment	Probe Station can be converted to other applications when measurement requirements grow, such as IV or RF testing.
2	Warranty	Standard warranty for 1 year from the date of installation. The vendor is also expected to provide the cost for an extended comprehensive warranty until 5 years as an optional item.
3	Standard Configurations requirement	NO CUSTOM-BUILT SYSTEMS WILL BE ENTERTAINED.
4	Install base	Parent company should be an established company with a good number of installations (at least 10) and after sales support in India as well.

Note: It is mandatory for the bidders to provide the compliance statement in tabular column format along with catalogue page number (comply/not comply) for the Above points with document proof as required. Failing which bidders will be technically disqualified