

MesoSPHERE™ Plasma System

Features and Benefits

- Modular design allows capacity increase on a per plasma chamber basis
- EFEM integration supports from 1 to 4 plasma chambers
- Pocket chuck design ensures accurate substrate placement and centering, maximizing process repeatability
- Configurable for wafer, wafer-on-frame, and round/square substrates up to 480mm
- Plasma confinement technology isolates plasma distribution directly above the wafer, minimizing undesired secondary reactions



Superior Plasma Technology for Wafer and Panel Packaging

Whether it is fan-in, fan-out, wafer-level or panel-level, the MesoSPHERE™ system is ideal for very high-throughput processing of wafers or substrates up to 480mm. It includes field-proven plasma chambers along with an innovative handling system that can transfer round or square substrates and frame or bonded carriers.

Built upon the patented F3 symmetrical chamber design, all areas of the substrate are treated equally, ensuring excellent within wafer and wafer-to-wafer uniformity. When equipped with a plasma confinement ring, etch rates can increase up to 25 percent and non-uniformity reduced by up to 50 percent.

The universal architecture of the MesoSPHERE system accommodates a wide range of substrate sizes, simplifying the transition from wafer-level to panel-level advanced packaging. Its small chamber geometry requires minimum hardware change to transition from one substrate size to another. In some cases, it is possible to support two or more substrate sizes with a single configuration.

High-Throughput Processing

The MesoSPHERE system's integrated handling system provides rapid material transfer for a wide range of wafer, carrier and panel sizes. Processing can be done on standard, warped, bonded, or thin wafers/panels (with and without frames), in most types of cassettes.

Production-ready end-effectors support vacuum, backside or edge-grip transfer. End effectors connect to a dual-arm, 3-axis transversal robot for efficient substrate handling.

The proprietary chamber design and control architecture enables short plasma cycle times with very low overhead, ensuring that throughput for your application is maximized and cost of ownership is minimized.

Plasma Treatment

- Remove organic and inorganic contamination
- Passivate metallic surfaces to minimize oxidation
- Remove adhesive residue after debonding
- Sputter metal and metallic oxides
- Improve spun-on film adhesion
- Clean metallic bond pads

Plasma Etching

- Descum wafer of residual photoresist / BCB
- Pattern dielectric layers for redistribution
- Strip photoresist
- Enhance adhesion of wafer applied materials
- Remove excess wafer applied mold or epoxy
- Enhance adhesion of gold solder bumps
- Destress wafer to reduce breakage
- Clean Aluminum bond pads



Specifications: MesoSPHERE™ Plasma System

Enclosure Dimensions	W x D x H – Footprint: Single Chamber w/ EFEM Dual Chamber w/ EFEM Quad Chamber w/ EFEM	1480W x 2700D x 2190H mm (58W x 106D x 86H in) 1480W x 2700D x 2190H mm (58W x 106D x 86H in) 2695W x 2700D x 2190H mm (106W x 106D x 86H in)	
	Net Weight: Process Module EFEM	725 kg (1600 lbs) 860 kg (1900 lbs)	
	Effective Footprint – Clearances	Left/Right – 775 mm (30 in.), Front – 153 mm (6 in.), Back – 380 mm (15 in.)	
Chamber	Maximum Volume Chuck Configurations	11.7 liters (715 in ³) Round or square wafer/substrate up to 480mm	
Electrodes	Variable Electrode Configurations Working Area	Power-Ground, Ground-Power, Power-Power 480 x 480 x 50 mm (19 x 19 x 2.0 in.) (L x W x H)	
	RF Power	Standard Wattage Frequency	1000 W 13.56 MHz
Gas Control	Available Flow Volumes Maximum Number of MFCs	10, 25, 50, 100, 250 or 500 sccm 4	
	Control & Interface	Software Control Remote Interface	EPC with PC-Based Touch Screen Interface SMEMA, SECS/GEM
Vacuum Pump	Standard Dry Pump Optional Purged Dry Pump N2 Purged Pump Flow	22 cfm 22 cfm 2 slm	
	Facilities	Power Supply Process Gas Fitting Size & Type Process Gas Purity Process Gas Pressure Purge Gas Fitting Size & Type Purge Gas Purity Purge Gas Pressure Pneumatic Valves Fitting Size & Type Pneumatic Gas Purity Pneumatic Gas Pressure Exhaust	220 VAC, 20A, 50/60 Hz, 1-Phase, 12 AWG, 3-Wire 6.35 mm (0.25 in.) OD Swagelok Tube Lab or Electronic Grade 0.69 bar (10 psig) min. to 1.03 bar (15 psig) max., regulated 6.35 mm (0.25 in.) OD Swagelok Tube Lab or Electronic Grade N2/CDA 2 bar (30 psig) min. to 6.9 bar (100 psig) max., regulated 6.35 mm (0.25 in.) OD Swagelok Tube CDA, Oil Free, Dewpoint ≤7°C (45°F), Particulate Size <5 µm 5.5 bar (80 psig) min. to 6.89 bar (100 psig) max., regulated 25.4 mm (1 in.) OD pipe flange
		Compliance	SEMI International
Ancillary Equipment		Gas Generators Facilities	Nitrogen, Hydrogen (Requires Additional Non-Optional Hardware) Chiller

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