#### **USHIO's Product Portfolio for Semiconductors**

USHIO INC. has been delivering UV lamps for photolithography, VUV lamps for surface modification, and halogen lamps for thermal processes to the global semiconductor industry since its foundation.

Based on research in and development of its core technologies including new light source and optical technologies, USHIO has expanded to provide a wide range of semiconductor fabrication equipment, subsystems and components, such as projection, contact and proximity lithography tools, and WLP steppers. USHIO has been supporting a variety of innovations in semiconductors with its lighting-edge technologies.

#### **USHIO's Stepper Series for Advanced Packaging Solutions**

In recent years, USHIO has developed stepper systems specializing in advanced packaging applications used for manufacturing of mobile devices such as smartphones and tablet PCs. Based on the field-proven UX series platform, with its installed base of more than 1,200 units, the UX-5 stepper series for high-definition PCBs and the UX7-3Di stepper series for 300-mm wafers have already been well-accepted by leading manufacturers throughout the world.



UX-5 Stepper Series for High-definition PCBs Debuted in 1999



UX7-3Di Stepper Series for 2.5D/3D Packaging Solutions Debuted in 2012

# New Stepper System Model "UX7-3Di LIS 350" Dedicated to Manufacturing of Large-field Interposers for 2.5D/3D Packaging Applications Unveiled at SEMICON Japan 2012

At SEMICON Japan 2012, USHIO unveils the new stepper system "UX7-3Di LIS 350 dedicated to the manufacturing of large-field interposers for 2.5D/3D packaging applications. This system allows processing of silicon wafers of up to 300 mm in diameter as well as 405 x 350 mm substrates, including non-silicon substrates, to provide unlimited flexibility in designing interposers. Thus, the UX7-3Di LIS 350 achieves incomparably high throughput of large interposers and a significant reduction of manufacturing cost.



UX7-3Di LIS 350: Large-Field Interposer Stepper Lithography System for 300-mm Wafers and 405 x 350 mm Substrates

## UX7-3Di LIS 350 Large-field Interposer Stepper System is Capable of Processing 300-mm Wafers as well as 405 x 350 mm Substrates

### Achieving Significant Reduction of the Cost for Manufacturing Large-field Interposers for 2.5D/3D Packaging Applications

As a world-premier photolithography tool provider for 2.5D and 3D packaging solutions, the USHIO GROUP leverages the industry's most advanced development capabilities to meet the increasingly sophisticated and divergent product requirements of the global semiconductor industry.

Based on the large-field stepper system "UX7-3Di LFS 300" for 2.5D/3D packaging released this fall, this new UX7-3Di-LIS 350 is able to process 405 mm x 350 mm interposer substrates as well as 300-mm silicon wafers. It also allows processing of interposers made of materials other than silicon, including glass, which has currently become popular, and organic materials.

Furthermore, by mounting a large-diameter projection lens that allows projection of a large field of 78 mm x 66 mm, the UX-3Di LIS 350 can achieve incomparable throughput of 120 wafers per hour for 300-mm wafers or 90 substrates per hour for 405 mm x 350 mm substrates. As a result, the UX-3Di LIS 350 offers significant flexibility in designing interposers for a variety of 2.5D devices expected to be in high demand for smartphones and tablet ICs, while allowing the manufacturing of large interposers as well as a significant reduction of manufacturing cost.

### UX7-3Di LFS 200/300 Features

- Achieves a large-field interposer of up to 78 mm x 66 mm
- Can process interposer substrates made of a variety of materials other than Si, including glass and organic material
- Can process large substrates of up to 300-mm wafers or 405 x 350 mm substrates
- High overlay accuracy of < 500 nm</li>
- Innovative alignment with IR that transmits Si to allow back-side alignment required for TSV (Through-Silicon-Via) applications indispensable to 2.5D interposers
- High throughput of 120 wafers per hour for 300-mm wafers or 90 substrates per hour for 405 x 350 mm substrates, approx. 2 times the throughput of conventional stepper systems

Resolution:	Up to 2.0 µm L/S
Wavelength:	365 nm
Overlay Accuracy:	Front 500 nm, Back 500 nm
Throughput:	300-mm wafers: 120 wph
	405 x 350 mm substrates (panels): 90 pph
Lens Field Size:	78 x 66 mm
Substrate Size:	Up to 300-mm wafers or 405 x 350 mm substrates
Wafer Transfer Method:	Wafers: Automated transfer
	Substrates and others: Manual transfer

### UX7-3Di LFS 200/300 Specifications

Performance Comparison between a	Conventional Steppe	r and the UX7-3Di LIS 350
----------------------------------	---------------------	---------------------------

	Conventional Stepper	UX7-3Di LIS 350
Field Size(mm)	2X of Scanner	6X of Scanner (78 x 66 mm)
35mm Large Die Interposer Capability	NA	Yes
Throughput (wph)	110	120 (300-mm wafer) 90 (405 x 350 mm substrates )
Throughput of Large Die Interposer	60% of nominal	80 through 90% of nominal
Overlay Accuracy (nm)	300	500
Resolution (µm)	1.5 to 2.5	2.0
	UV Light Mask Lens Workpiece (Wafer)	UV Light Mask Lens CWorkpiece (Wafer) The large exposure field enables a shorter process time for each wafer.

### **USHIO's Precision Projection Lens**

The UX7-3Di LIS 350 series is mounted with USHIO's precision projection lens series of up to 300 mm in diameter allowing one-shot exposure of a large field of 78 x 66 mm.



