Stepper designed for energy-efficient, environmentally conscious devices

Canon U.S.A. recently launched sales of the new FPA-3030i5+ i-line stepper. The FPA-3030i5+ is designed to provide a long-term manufacturing solution for manufacturers of energy-efficient, environmentally conscious devices[*1] including Light-Emitting Diodes (LEDs), MicroElectroMechanical Systems (MEMS)[*2] and power semiconductors[*3].

As awareness of clean energy and energy conservation continues to increase, demand has simultaneously increased for new environmentally conscious technologies including wind and solar power, high-efficiency vehicles and low-power facilities. As a result, manufacturers of these devices have unique process requirements that have been incorporated into the FPA-3030i5+ semiconductor stepper design that, along with optional equipment available to be purchased separately, will help facilitate these process requirements.

The FPA-3030i5+ represents a new product platform, designed specifically to provide a flexible solution for a variety of users, including power semiconductor, LED and MEMS manufacturers.

Canon FPA-3030 platform provides performance and productivity improvements

The FPA-3030 platform represents an upgrade to earlier Canon “FPA-3000 platform” steppers. The FPA-3030i5+ features an overhauled software structure and

electrical control system that allow application of optional advanced hardware (e.g., projection lens, wafer stage, and alignment system) that is not compatible with traditional FPA-3000 platform steppers.

The FPA-3030i5+ is capable of providing imaging resolution below 0.35mm[*4], while maintaining overlay accuracy of less than or equal to 40nm[*5] and throughput equal to or in excess of 104 wafers per hour[*6]. Canon developed the FPA-3030i5+ system to meet and exceed the imaging, overlay and productivity requirements of those environmentally conscious devices and MEMS manufacturers.

Canon FPA-3030 platform supports optional equipment designed for special substrate materials required for energy reducing devices and MEMS manufactures

The FPA-3030 platform allows the use of optional equipment designed for the processing of silicon (Si), sapphire (Al_2O3), silicon carbide (SiC) and a wide variety of wafer materials used in environmentally conscious device manufacturing. Optional equipment for the FPA-3030i5+ includes warped-wafer handling systems to allow processing of distorted substrates, and advanced image processing systems for clear substrates.

With the purchase of the optional Multi-Size Wafer Kit, the FPA-3030i5+ stepper can also be configured to process multiple wafer sizes, and can be equipped with other optional equipment to help improve productivity and efficiency.

Canon FPA-3030i5+ stepper feature summary

1. FPA-3030i5+ imaging system provides 0.35mm resolution with a flexible optical system and lens

· FPA-3030i5+ lens and optical system specifications equal FPA-3000 platform specifications.

· Variable Lens NA (0.45-0.63) and illumination Sigma (σ, 0.3-0.7 @ NA0.63) allows control of resolution and depth of focus.

· The FPA-3030i5+ optical system supports Off-Axis Illumination and provides imaging resolution requested by manufacturers of energy efficient devices.

2. FPA-3030i5+ platform enhancements help provide alignment accuracy and reliability

· FPA-3030i5+ is equipped with field-proven stage drive and damper control systems to provide high stability and reliability.

· Wafer stage position is controlled by Laser Interferometer System and wafer alignment scope.

· FPA-3030i5+ is capable of overlay accuracy less than or equal to 40nm to

support production of highly efficient devices.

3. FPA-3030i5+ platform supports optional equipment designed to process special environmentally conscious device substrates

· With the purchase of the optional special-substrate handling system, the FPA-3030i5+ supports special substrates widely used in manufacturing of environmentally conscious devices, including silicon (Si), sapphire (Al_2O_3) and gallium arsenide (GaAs).

· With the purchase of the optional warped wafer handling system the FPA-3030i5+ supports processing of wafers warped and distorted by earlier process steps.

· FPA-3030i5+ supports overlay correction for random wafer distortion effects.

· With the purchase of the optional Multi-Size Wafer Kits, the FPA-3030i5+ can process multiple wafer sizes (75mm & 100mm; 100mm & 150mm; 150mm & 200mm) without additional configuration change.

4. FPA-3030i5+ platform electrical control system and software are modernized to help support future semiconductor manufacturing

· FPA-3030i5+ adopts systems developed for the “FPA-5500 platform” steppers. FPA-5500 steppers are widely accepted as a leading exposure system for high-volume memory devices[*7], image sensors[*8] and advanced packaging applications.

· The new FPA-3030i5+ e-Console software structure allows compatibility and migration of process and exposure conditions from earlier FPA-3000 platform systems

Market trends for semiconductor lithography equipment

Demand for low-power consumption systems and vehicles, social infrastructure improvements such as wind, solar and smart grid products have increased as society becomes more aware of the importance of conserving energy and reducing environmental impacts. Semiconductor lithography equipment supporting environmentally conscious devices must provide process flexibility to meet the wide range of requirements from manufacturers of environmentally conscious devices.

Main Features of the Canon FPA-3030i5+ Stepper

[2] With purchase of optional 5 inch reticle handling kit

[22] With purchase of optional 3” and 4” conversion kits and/or multi-wafer kits

[222] 8-inch (200 mm) wafers, 60 shots per wafer

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