

PARAMOUNT HP 10013

Digitally controlled high impulse RF power delivery systems for higher power applications



Building upon Advanced Energy's signature Paramount® RF generator platform, the Paramount HP 10013 offers full digital control and dynamic plasma response for higher power applications. With high pulse energy with low average power, achieve accurate and repeatable pulse power.

As semiconductor processes evolve, high aspect ratio devices require high plasma density and ion energy while maintaining low average process power. The Paramount HP 10013 enables high instantaneous peak power while minimizing average process power dissipation.

BENEFITS

- Enhanced plasma stability and process repeatability
- Precise RF control
- Fast response to plasma changes
- Flexibility and adaptability to meet specific application needs

FEATURES

- Full digital control
- Pulsing and pulse synchronization
- Frequency tuning
- Real-time power and impedance measurement
- Tightly regulated output power
- Arc management
- Phase synchronization (CEX)

TYPICAL APPLICATIONS

- Conductor etch
- Dielectric etch
- PECVD
- Sputtering

PARAMOUNT HP 10013

Accuracy

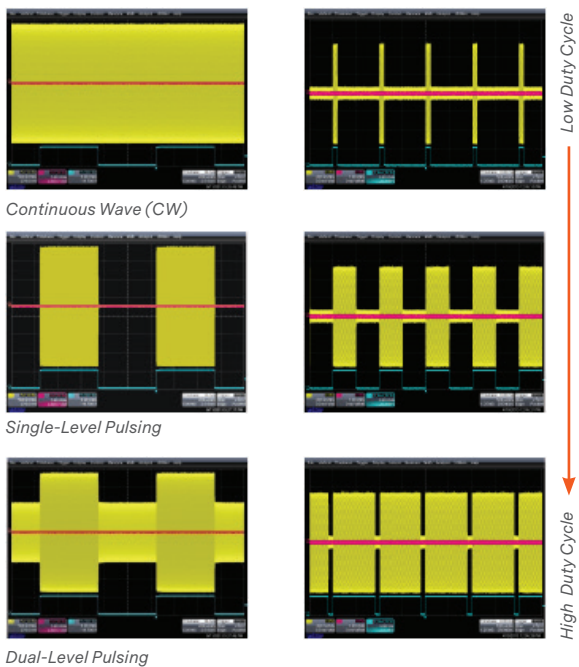
The Paramount HP 10013 uses a digital architecture that allows for extremely precise process measurement and control and provides the adaptability needed to keep pace with increasing manufacturing demands. Advanced functions are easily integrated.

Wide Power and Frequency Coverage

With power setpoints from 100 to 10,000 W and a variable frequency from 12.882 to 14,238 MHz, the Paramount HP 10013 enables efficient new process development while reducing with integration issues and "new-product" learning curves.

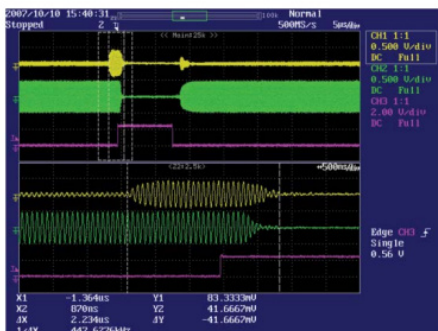
Pulsing

Reduced charge buildup, arcing, and feature distortion during etching. The Paramount HP 10013 offers single and dual Level pulsing with frequency ranges from 2 Hz and 20 kHz.



Arc Management

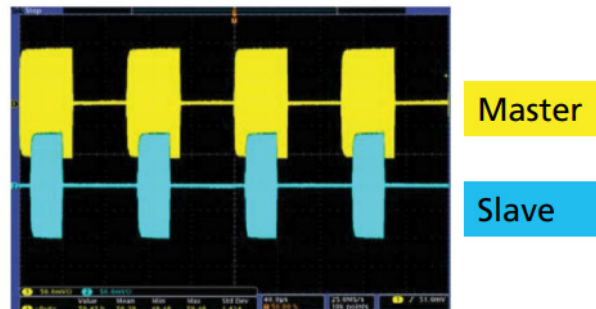
Reduced particle contamination, feature distortion, and equipment damage



Sudden change in reflected power indicating an arc; Rapid output power shutdown. All arc management parameters are user-selectable.

Pulse Synchronization

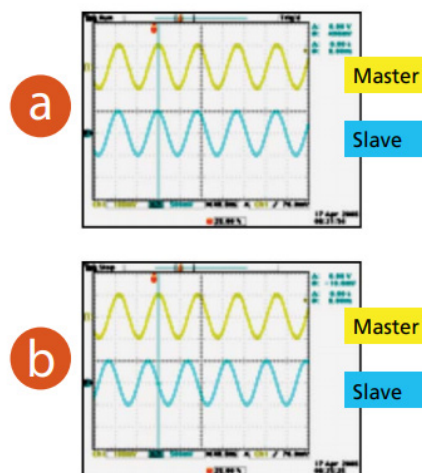
Synchronized pulses for multiple Paramount units.



Synchronized pulsing with timing offset and different pulse-on times

Phase Synchronization (CEX)

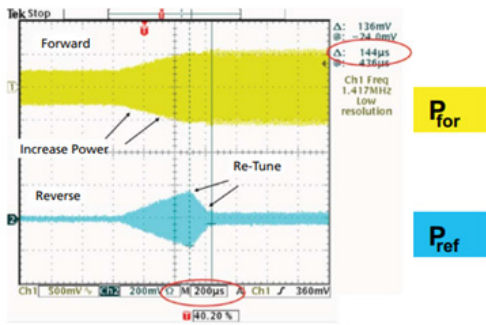
Synchronized output waveforms of connected Paramount units



(a) 0° phase offset; (b) 90° offset. Phase offset is user-adjustable, 0 to 359°

Frequency Tuning

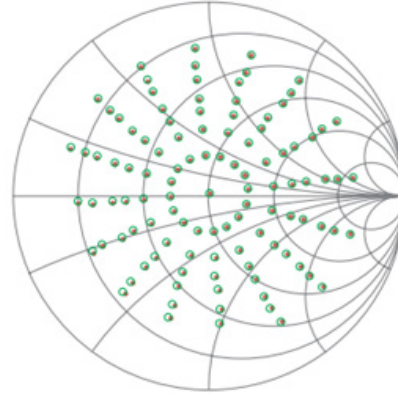
Fast tuning and repeatable power delivery during short process steps.



Above, reflected power is minimized ~150 μsec after plasma power setpoint change

Advanced Power and Impedance Measurement

Paramount HP 10013 measures plasma characteristics in real time and detects changes with extreme sensitivity. This enables high-accuracy power output and repeatable performance.



Paramount Power and Impedance Measurement Rivals the Accuracy of a Network Analyzer

TECHNICAL DATA

General Specifications		
Power Output	Delivered power limit	10,000 W
	1.1:1 VSWR	10,000 W (delivered)
	1.2:1 VSWR	10,000 W (delivered)
	2:1 VSWR	6667 W (delivered)
	3:1 VSWR	5000 W (delivered)
	Reflected power limit	2000 W (user-selectable)
Frequency	Fixed	13.56 MHz
	Variable	12.882 to 14.238 variable
Power Accuracy	Into 50 ohms (<1.2:1 VSWR)	±1% of setpoint or ±1 W, whichever is greater
	Into all loads up to 1.2:1 VSWR	±1.5% of setpoint or ±1 W, whichever is greater
	Into all loads up to 3:1 VSWR	±2% of setpoint or ±1 W, whichever is greater
Pulsing Frequency	Single level pulsing	2 Hz to 20 kHz
	Dual level pulsing	2 Hz to 20 kHz
Dimensions (H x W x D)	134 x 443 x 708 mm (5.25 x 17.43 x 27.85 in)	
Features	Available interfaces	RS-232, Ethernet, EtherCAT
	Feature set	CEX, AMS, FastDAQ, Pulse Sync, HALO



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ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE

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