Advanced Energy®

PARAMOUNT® PLUS PULSED-RF POWER SUPPLIES

PREMIER PULSING TECHNOLOGY FOR EMERGING PLASMA APPLICATIONS



Paramount® Plus
Pulsed-RF Power Supplies

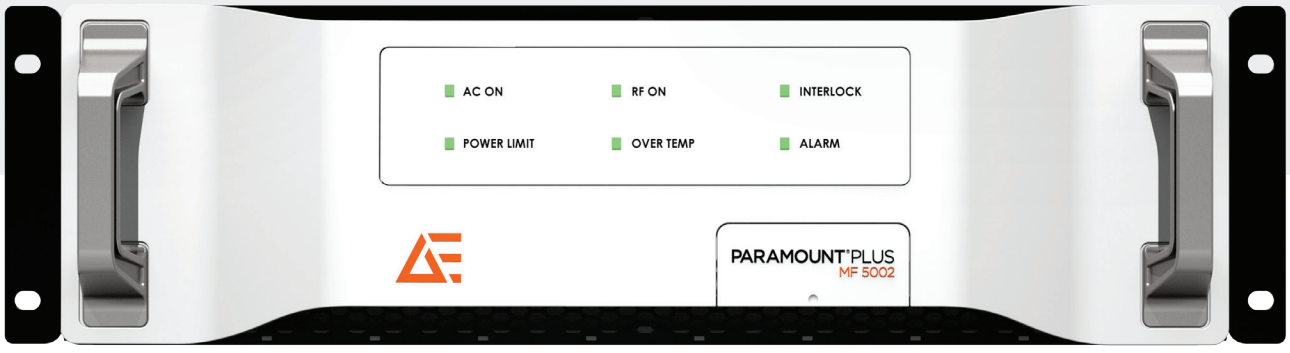
With multi-level pulsing, pulse waveform control, and the broadest feature set available in a pulsed-RF product, the Paramount® Plus platform allows you to push the boundaries of process innovation and delivers the best value in the marketplace. Excellent plasma stability, precise RF regulation, sophisticated pulse manipulation, and advanced data acquisition provide the extreme latitude in plasma control required for next-generation nodes.

BENEFITS

- Precise RF and pulse control
- Enhanced plasma stability and process repeatability
- Fast response to plasma changes
- Flexibility and adaptability for advancing manufacturing technologies

SEMICONDUCTOR APPLICATIONS

- PVD
- PECVD
- Etch



Incomparable Value

With a uniquely broad and powerful feature set, the Paramount® Plus power supply is the industry's most cost-effective solution. Based on the proven Paramount platform, it delivers performance repeatability and reliability you can bank on.

FEATURES

- Full digital control
- Single- and dual-level pulsing
- Pulse synchronization
- Pulse waveform control
- Real-time power and impedance measurement
- Real-time pulse monitoring
- Advanced FastDAQ™ data acquisition system (optional)
- Frequency tuning
- Tightly regulated power output
- Wide operating frequency range (1 to 60 MHz)
- Wide power output range (5 to 15 kW)
- High VSWR capability
- Best-in-class arc management
- Phase synchronization (CEX)
- Superior line sag immunity

BENEFITS

- Precise RF Control
- Enhanced plasma stability
- Flexibility and adaptability for advanced manufacturing technologies

DELIVERED VALUE

- Real-time power control — even with the most abrupt plasma-impedance changes
- Faster plasma transitions
- Shorter process steps
- Reduced process times
- Reduced film stress
- Improved film quality
- Improved process repeatability and chamber matching

Real-time power control — even with the most abrupt plasma-impedance changes.

Powerful Pulse Control for Emerging Applications

Sophisticated multi-level pulsing and pulse waveform control enable the pulse-shape repeatability into dynamic loads required for tomorrow's device geometries.

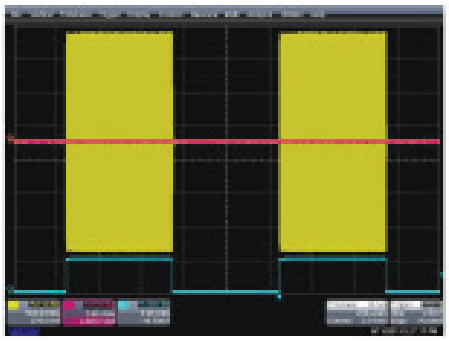
Multi-Level Pulsing

Two Power Set Point Levels Over Full Power Output Range

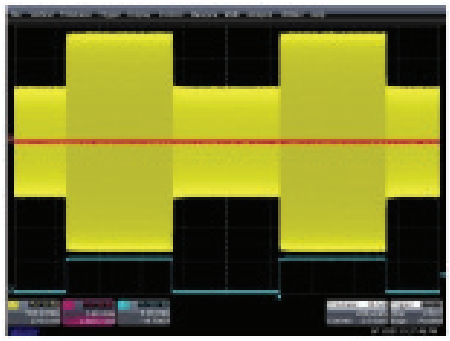
- Plasma operation maintained during pulse low state, reducing impedance swing when pulse goes to high (source)
- Ability to set two separate ion-energy peaks (bias)



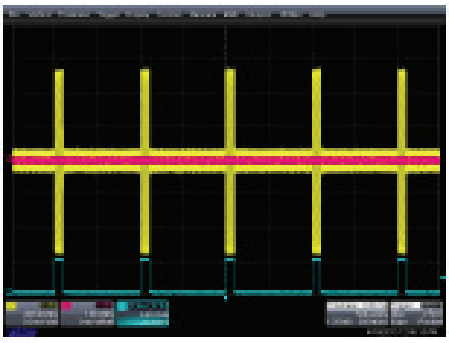
Continuous Wave (CW)

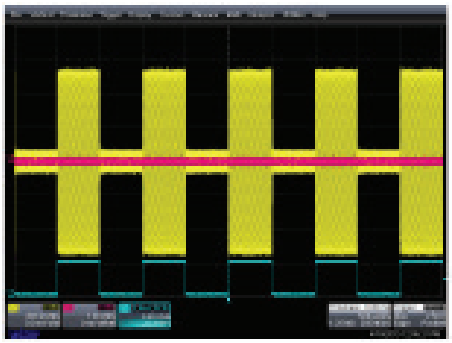


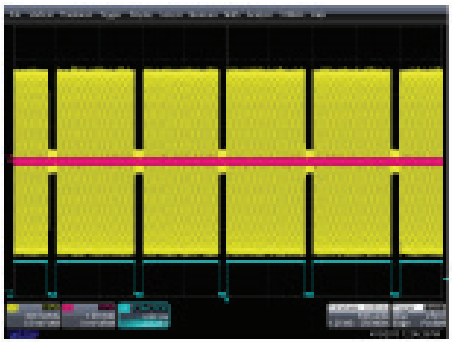
Single-Level Pulsing



Dual-Level Pulsing







Low Duty Cycle → High Duty Cycle

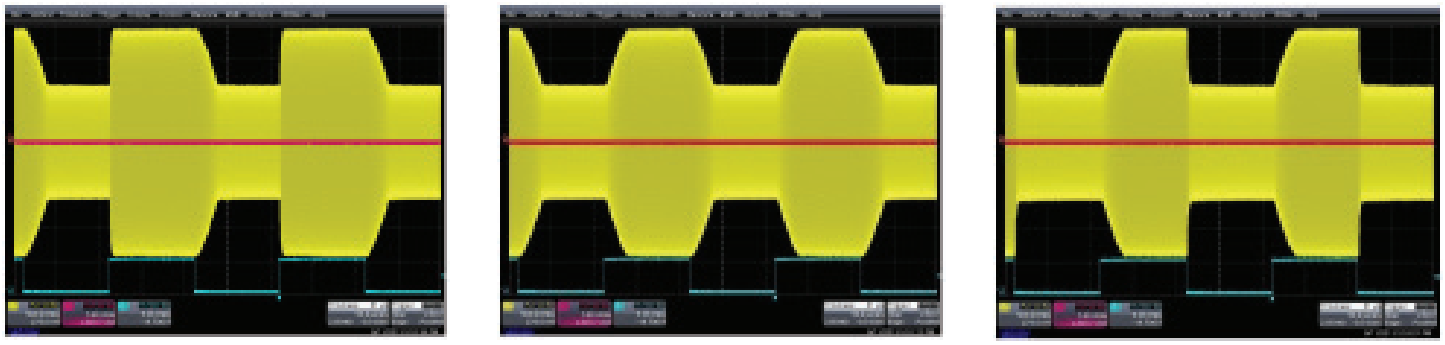
Pulse Waveform Control

Precise, Repeatable Pulsing

- Flat forward-power pulse waveform
- Clean rise time
- Limited over-shoot

Independent Control of Pulse Rise and Fall Times from ~1 to 25 µsec

- Impact of sudden plasma impedance change minimized by reducing reflected power “spike” at pulse level change



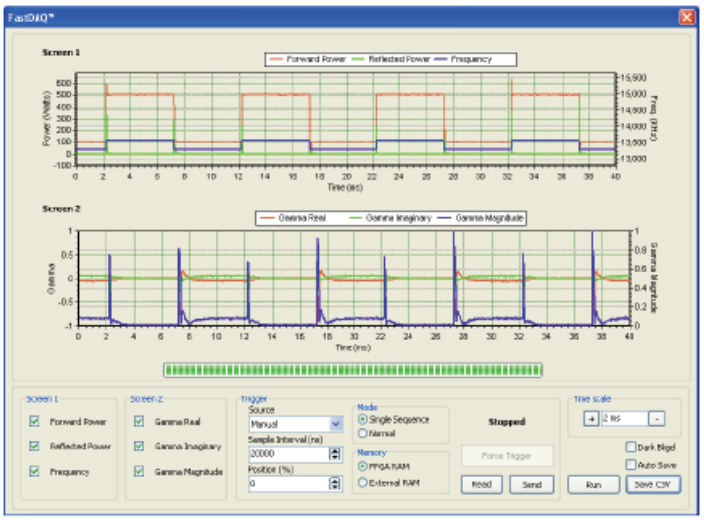
Pulse Waveform Control

Exceptional Process Insight

Real-time pulse monitoring and available FastDAQ™ data acquisition provide unique access to crucial parameters for advanced process development and system troubleshooting.

FastDAQ™ Data Acquisition

- Reduced need for directional coupler and oscilloscope
- Monitoring via PC or .csv file download with Virtual Front Panel (VFP) interface





Paramount® Plus	
General Specifications [1]	
RF Output Power	5 to 15 kW
Frequencies	1 to 60 MHz
Power Accuracy into 50 Ω	± 1 W or ± 1% of set point, whichever is greater
Auto Frequency Tuning	Available
Pulsing Frequency Range	5 Hz to 10 kHz
Available Serial Interfaces	RS-232, Ethernet, DeviceNet®, EtherCAT®, AE Navigator® II match control

[1] Electrical specifications vary by model number. Please contact an AE representative for more information.

Paramount® Plus and Navigator® II Optimized RF Power-Delivery System

Optimized to perform seamlessly with Paramount Plus power supplies, Navigator® II matching networks enable precise plasma process control, with tuning-while-pulsing over a wide pulse frequency and duty cycle range.

