



## 13.56 MHz, 1.5 / 2.5 / 3.5 / 5.0 kW RF Generator

# Synertia® RFG

**Synertia®, Comet's integrated RF Power Delivery Platform, enables the unprecedented power delivery control required by plasma process tools for the next generation of microchips.**

Synertia® is the RF Power System that ensures powerful command and control of plasma conditions at the highest speeds. The system allows the user to manage the complexities of multi-layer next-generation and atomic-scale plasma processes integral to the production of memory and logic microchips.

In Synertia®, the Generator and Matching Network controls interact at ultra-fast speed, creating a powerful synergy. Synertia® RFG is able to react in microseconds to data it receives from the Matching Network. Users fully control the unique performance accelerators of Synertia® RFG, including repeatability, multi-level pulsing and high-speed communication. This responsiveness provides actionable insights and enables more complex plasma applications than have ever been possible before: a new level of deep control.

### Features

- Power accuracy and repeatability
- Multi-level pulsing (four user definable levels)
- Customizable frequency tuning per level
- Versatile arc management
- Digital metrology and intuitive graphical user interface
- Digital system control for advanced manufacturing technologies

### Benefits

- Seamless integration into process systems
- Ultra-fast plasma process control
- Tighter repeatability delivers improved yield
- Fast configurable rise/fall time of pulsing
- Consistent process and wafer level uniformity



## Synertia® RFG 15/13 and 50/13

Electrical specifications	RFG 15/13	RFG 50/13
<b>Frequency</b>	13.56 MHz +/- 10%	
<b>Frequency stability and accuracy</b>	± 50 ppm	
<b>Output power</b>	1.5 W to 1500 W	5 W to 5000 W
<b>RF accuracy into 50 Ω</b>	± 1 % of setpoint or ± 0.3 W whichever is greater	± 1 % of setpoint or ± 1 W whichever is greater
<b>Spurious and harmonics</b>		
Harmonics into 50 Ω	- 40 dBc	
Spurious into 50 Ω	- 50 dBc	
<b>RF pulsing</b>		
Pulse rate	0.05 Hz to 100 kHz	
Pulse rise/fall time	320/240 ns	650/240 ns
Multi-level pulsing	up to 4 individual levels	
<b>Options</b>		
CEX	400 kHz to 110 MHz	
Frequency tuning	within ± 10 % of nominal frequency	
Arc management	various detection and suppression options	
Interfaces	EtherCAT®, RS232, RS485, analog	
<b>Power rating and coolant requirements</b>		
AC input	208 to 240 VAC, 1~, ±10 % tolerant	200 to 480 VAC, 3~, ±10 % tolerant
AC <sub>eff</sub> to RF efficiency	typically 73 %	
Ambient temperature	+5 °C to +35 °C	+5 °C to +40 °C
Cooling system	Forced air	Water-cooled
<b>Mechanical specifications</b>		
Form factor	3U, 19" half-rack	
Dimensions excl. connectors (w x h x d)	216 x 129 x 461 mm 8.5" x 5.08" x 18.15"	216 x 129 x 608 mm 8.5" x 5.08" x 24.0"
Weight	< 14 kg / < 31 lb	< 24 kg / < 53 lb
RF output connector types	default: N-type optional: HN, 7/16	default: 7/16 optional: HN, LC

### Certification

2014 / 35 / EU low voltage directive  
 2014 / 30 / EU EMC directive  
 RoHS 2011/65/EU and 2015/863/EU  
 EN 55011, EN 61000-3-2 (RFG 15/13),  
 EN 61000-3-3, EN 61000-6-2, EN 61010-1,  
 EN 61326-1, SEMI S2, S8, S14, S22, F47,  
 ISTA 1G, ISTA 3A

**Compliance directives and industrial standards**  


### Switzerland (Head Office)

Comet AG  
 Flamatt

### China

Comet Mechanical Equipment  
 (Shanghai) Co. Ltd., Shanghai

### Germany

Comet Yxlon GmbH  
 Aachen

### Japan

Comet Technologies Japan KK  
 Yokohama

### Korea

Comet Technologies  
 Korea Co., Ltd., Suwon-si

### Malaysia

Comet Technologies  
 Malaysia Sdn Bhd, Penang

### Taiwan

Comet Solutions Taiwan Ltd.  
 Hsinchu

### United States

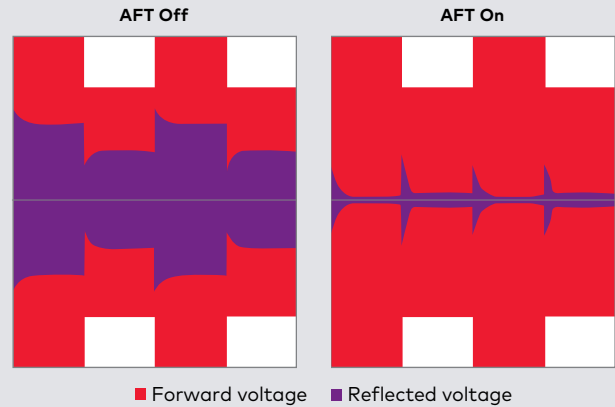
Comet Technologies USA, Inc.  
 San Jose/CA

 [pct.comet.tech](http://pct.comet.tech) |  [pct@comet.tech](mailto:pct@comet.tech)

All measurements were performed into non-reactive load at center frequency and nominal power using maximum AC voltage in laboratory environment unless otherwise stated.

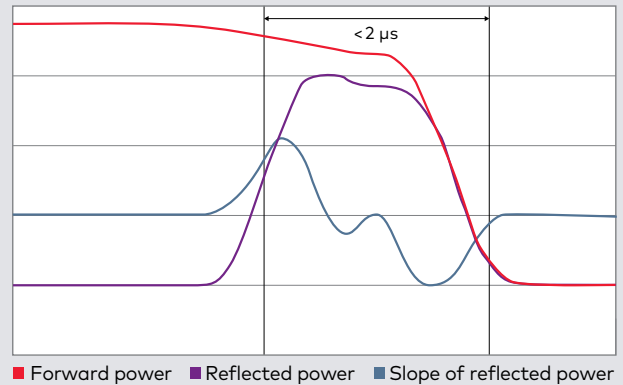
## Auto Frequency Tuning

Rapid reduction of reflected power in multi-level pulsing



## Arc management

Detection/handling within microseconds



## Integrated measurement studio

- Advanced oscilloscope functions for direct access to crucial process parameters
- Event based trigger and data logging functionality

