

## Solid State General Communication Power Amplifier

**4013-GCS1D2GRR**
**1.5 – 32 MHz / 500 Watts**

The GCS1D2GRR (SKU 4013) is suitable for RF broadband high power linear applications. This rack mount amplifier utilizes high power push-pull MOSFET devices that provide high gain, wide dynamic range, low distortions and good linearity. Exceptional performance, long term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, built in high quality power supply, EMI/RFI filters, machined housings and all qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



SKU#: 4013DLFAAXLXX

- Solid-state linear design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Standard front panel manual gain adjust
- Suitable for CW, FM, AM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness

### ELECTRICAL SPECIFICATIONS @ 220V<sub>AC</sub>, 25°C, 50Ω System

Characteristics	Rating	Min	Typ	Max	Units
Frequency Response	BW	1.5		32	MHz
Power Output CW	P <sub>SAT</sub>	500	600		Watt
Power Output @ 1dB Gain Compression	P <sub>1dB</sub>	400	500		Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	56			dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>		0	3	dBm
Gain Adjustment Range	FGA	20	25		dB
Small Signal Gain Flatness	ΔG <sub>SS</sub>			±1.5	dB
Gain Adjustment Range	FGA	25	30		dB
Input Return Loss	S <sub>11</sub>			-10	dB
Third Order Intercept Point					
2-tone @ 49dBm/tone, 3kHz Spacing	IP3		+55		dBm
Harmonics @ P <sub>OUT</sub> = 400W	2 <sup>ND</sup> / 3 <sup>RD</sup>		-30 / -15		dBc
Noise Figure @ maximum gain	NF		10	15	dB
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V <sub>AC</sub>	100		240	Volt
Power Consumption @ 500W CW	P <sub>D</sub>			2000	Watt

### MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D	19 x 5.25 x 22	Inch
Weight	50	lb.
RF Connectors	Type-N, Female	
Cooling	Built-in forced air cooling system	

### ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T <sub>c</sub>	0		+50	°C
Non-operating Temperature	T <sub>STG</sub>	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration / Shock					
MIL-STD-810F - Method 514.5/516.5 – Proc I	VI / SH		Airborne		

### LIMITS

Input RF drive level without damage	+6 dBm	Max
Load VSWR @ P <sub>OUT</sub> = 400W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

# Solid State General Communication Power Amplifier

<b>4013-GCS1D2GRR</b>	<b>1.5 – 32 MHz / 500 Watts</b>
-----------------------	---------------------------------

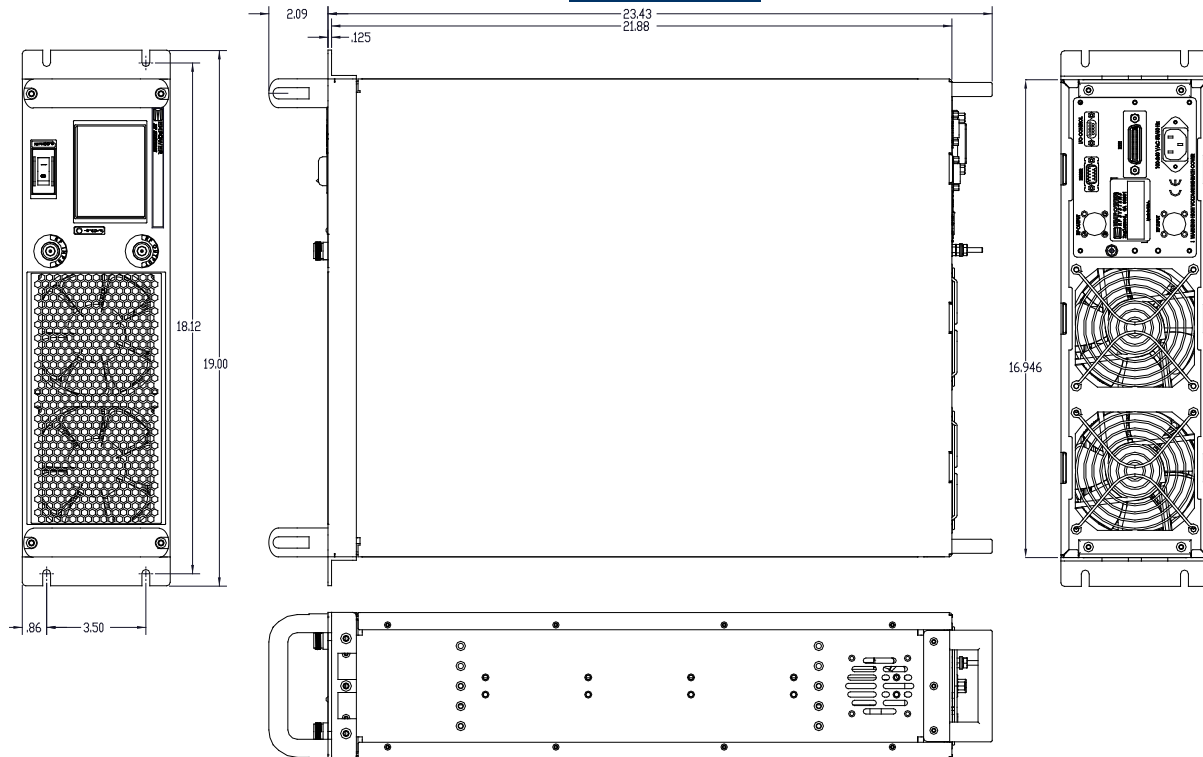
### AVAILABLE OPTIONS

SKU #	Description	LCD Touchscreen
4013DLFAAXLXX	LCD controller, Front RF connectors 100-240VAC, 50/60Hz.	Touchscreen Digital Display, including FWD/REV Power indication (dBm or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB/HPIB IEEE-488.2 and Half Duplex RS232.
4013DLRAAXLXX	LCD controller, Rear RF connectors 100-240VAC, 50/60Hz.	
4013DFRAAXLXX	Front Gain Adjust, Rear RF connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

### I/O INTERFACE CONNECTOR – D-sub 9-pin, Female

Pin #	Description	Specifications	Options	
			FGA	LCD
1	Forward Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to Forward Power Level		√
2	Reverse Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to Reverse Power Level		√
3	5V Test Point	Output +5.0V <sub>DC</sub> ±0.2V	√	√
4	VVA Test Point	VVA Gain Control +5.6V <sub>DC</sub> ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) <i>(Internally Pulled-Low)</i>	√	√
6	12V Test Point	Output +12.0V <sub>DC</sub> ± 0.5V	√	√
7	P/S Test Point	Power Supply Output voltage: +26.0-30.0V <sub>DC</sub>	√	√
8&9	GND	Ground	√	√

### OUTLINE DRAWING SHOWN SKU #: 4013DLFAAXLXX



# Solid State General Communication Power Amplifier

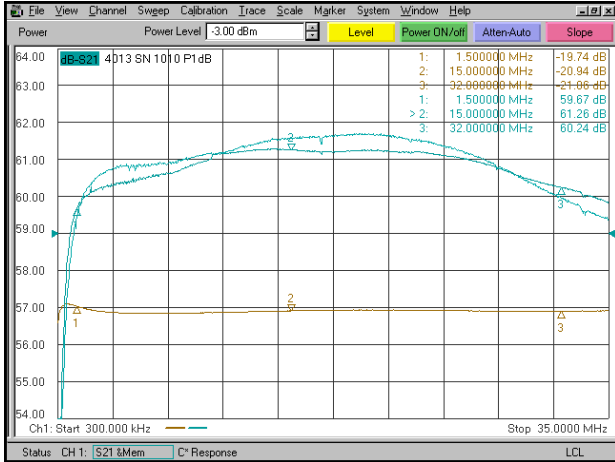
4013-GCS1D2GRR

1.5 – 32 MHz / 500 Watts

## TYPICAL PERFORMANCE PLOTS

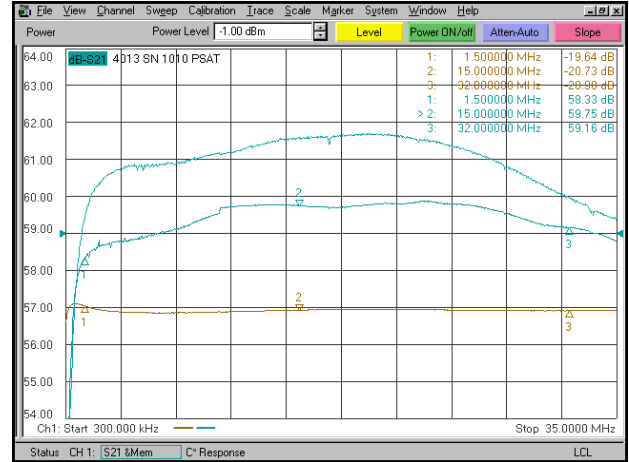
**Plot 1 – Small Signal Gain and P<sub>1dB</sub>**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>1dB</sub>, P<sub>IN</sub> = -3.0dBm  
 Reference: 59dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



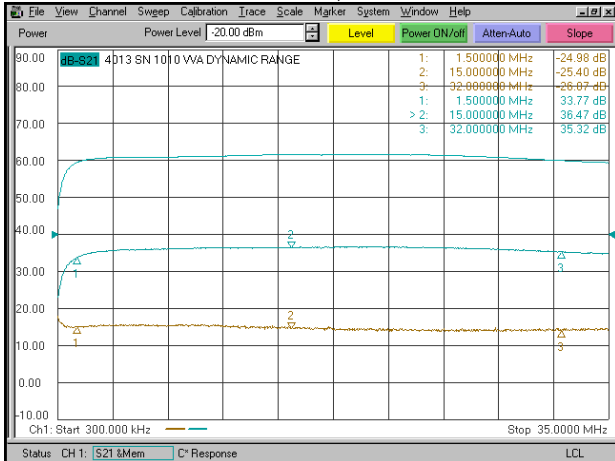
**Plot 2 – Small Signal Gain and P<sub>SAT</sub>**

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>SAT</sub>, P<sub>IN</sub> = -1.0dBm  
 Reference: 59dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



**Plot 3 – Gain Adjustment Range**

Top Curve: Maximum Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Minimum Gain @ P<sub>IN</sub> = -20dBm  
 Reference: 40dB, 10dB/div.  
 Bottom Curve: Input Return Loss @ Minimum Gain  
 Reference: 0dB, 10dB/div.



**Plot 4 – ALC Flatness @ 250W & 50W**

Top Curve: ALC @ 250W, P<sub>IN</sub> = 0dBm  
 Bottom Curve: ALC @ 50W, P<sub>IN</sub> = 0dBm  
 Reference: 51dB, 1dB/div.  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.

