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.

EMPOWER RF SYSTEMS, INC.

- 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 @ $220V_{AC}$, 25°C, 50Ω System

Characteristics	Rating	Min	Typ	Max	Units
Frequency Response	BW	1.5		32	MHz
Power Output CW	P_{SAT}	500	600		Watt
Power Output @ 1dB Gain Compression	P_{1dB}	400	500		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	56			dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Gain Adjustment Range	FGA	20	25		dB
Small Signal Gain Flatness	ΔG_{SS}			±1.5	dB
Gain Adjustment Range	FGA	25	30		dB
Input Return Loss	S_{11}			-10	dB
Third Order Intercept Point 2-tone @ 49dBm/tone, 3kHz Spacing	IP3		+55		dBm
Harmonics @ P_{OUT} = 400W	2^{ND} / 3^{RD}		-30 / -15		dBc
Noise Figure @ maximum gain	NF		10	15	dB
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	100		240	Volt
Power Consumption @ 500W CW	P_D			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_C	0		+50	°C
Non-operating Temperature	T_{STG}	-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_{OUT} = 400W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

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AVAILABLE OPTIONS

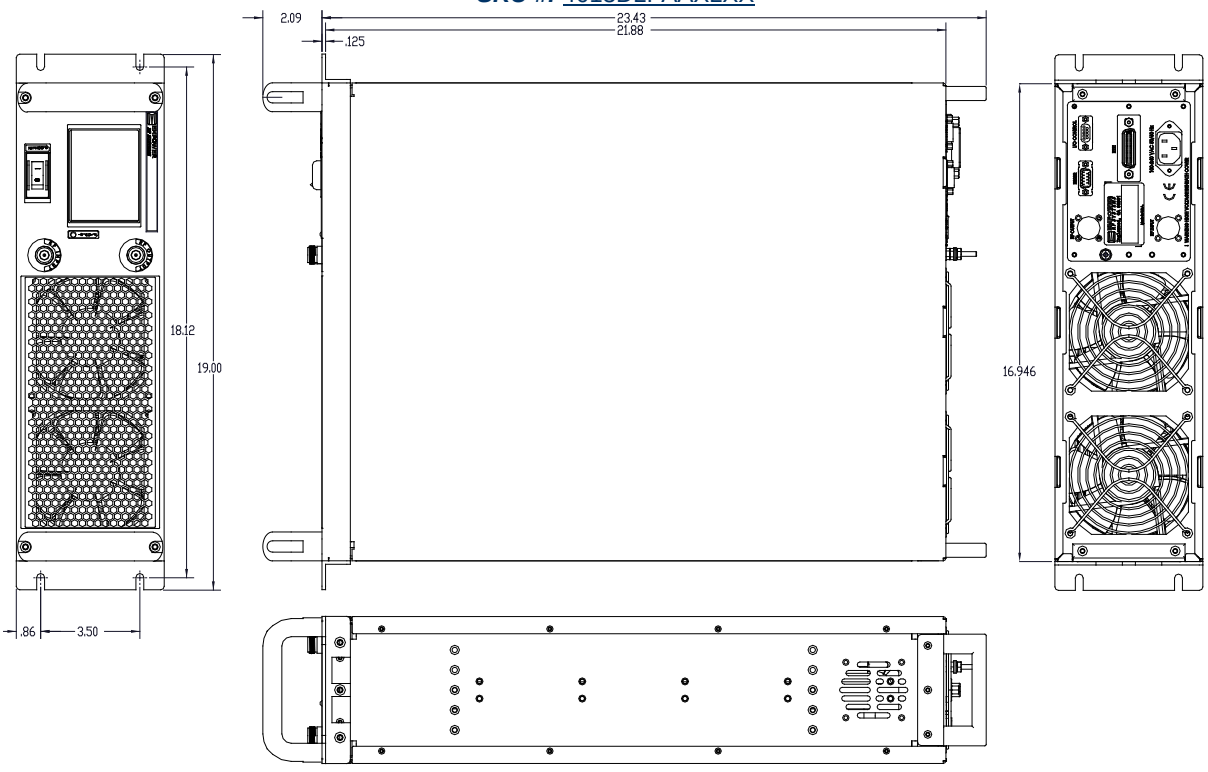
SKU #	Description	LCD Touchscreen
4013DLFAAXLXX	LCD controller, Front RF connectors 100-240VAC, 50/60Hz.	Touchscreen Digital Display, including FWD/REV Power indication (dBm or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB/HPIB IEEE-488.2 and Half 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	Options LCD
1	Forward Test Point	Analog Voltage 0-5V_{DC} relative to Forward Power Level		√
2	Reverse Test Point	Analog Voltage 0-5V_{DC} relative to Reverse Power Level		√
3	5V Test Point	Output +5.0V_{DC} ±0.2V	√	√
4	VVA Test Point	VVA Gain Control +5.6V_{DC} ±0.2V	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)	√	√
6	12V Test Point	Output +12.0V_{DC} ± 0.5V	√	√
7	P/S Test Point	Power Supply Output voltage: +26.0-30.0V_{DC}	√	√
8&9	GND	Ground	√	√

OUTLINE DRAWING SHOWN

SKU #: 4013DLFAAXLXX



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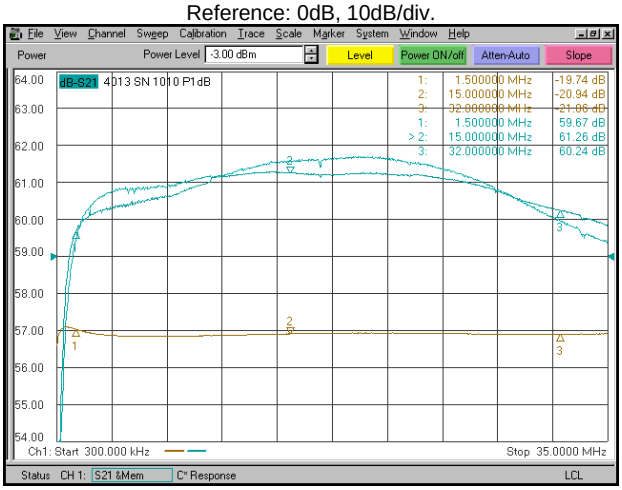
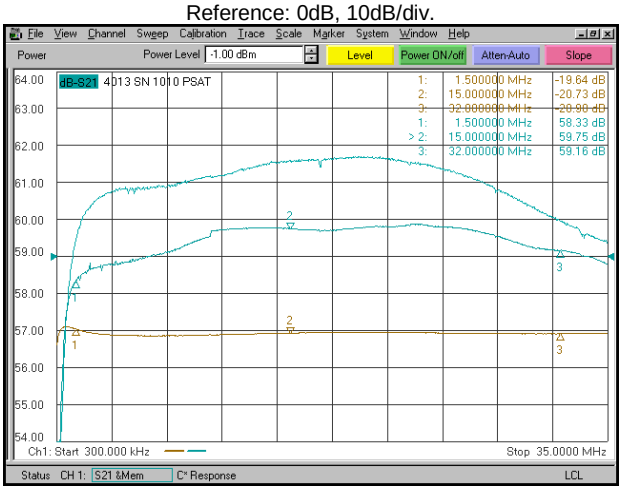
TYPICAL PERFORMANCE PLOTS

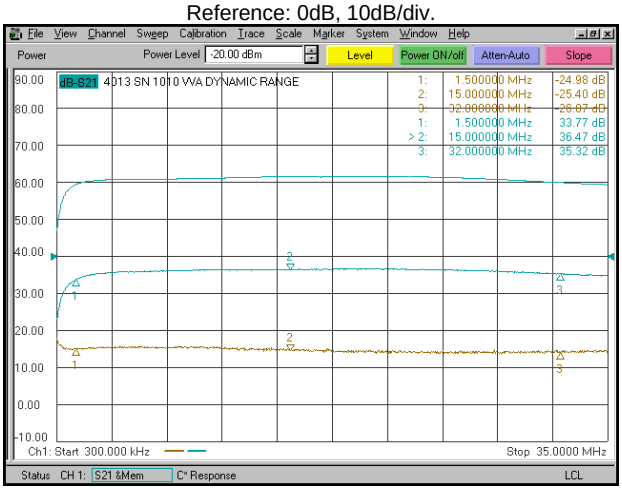
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -3.0dBm
Reference: 59dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = -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_{IN} = -20dBm
Middle Curve: Minimum Gain @ P_{IN} = -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_{IN} = 0dBm
Bottom Curve: ALC @ 50W, P_{IN} = 0dBm
Reference: 51dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.