EMPOWER RF SYSTEMS, INC.

Solid State General Communication Power Amplifier

4009 - GCS1D2GUT

1.5 – 32 MHz / 1000 Watts

The GCS1D2GUT (SKU 4009) is suitable for broadband high power linear applications in the RF frequency range. This rack mount amplifier utilizes push-pull MOSFET power 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.

Shown with Option Package 18

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

ELECTRICAL SPECIFICATIONS @ $220V_{AC}$, 25°C, 50 Ω System

Characteristics	Rating	Min	Typ	Max	Units
Frequency Response	BW	1.5		32	MHz
Output Power CW	P_{SAT}	1000			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	700			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	60			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG			±1.5	dB
Gain Adjustment Range	FGA	25	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF		7	10	dB
Third Order Intercept Point 2-Tone @ 50dBm/Tone, 100kHz Spacing	IMD		-28		dBc
Harmonics @ P_{OUT} = 700W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Supply Voltage (single phase)	V_{AC}	180		260	Volt
Power Consumption	P_D			3500	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D	19 x 8.75 x 22	Inch
Weight	80	lb.
RF Connectors Input/Output	Type-N, Female	
Cooling	Built-in forced air system	

ENVIRONMENTAL SPECIFICATIONS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating 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} = 700W	5:1 @ any angle & magnitude	-
Thermal Overload	85°C shutdown	Max

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SELECTED AVAILABLE OPTIONS (Refer to table for systems options @ www.empowerrf.com)

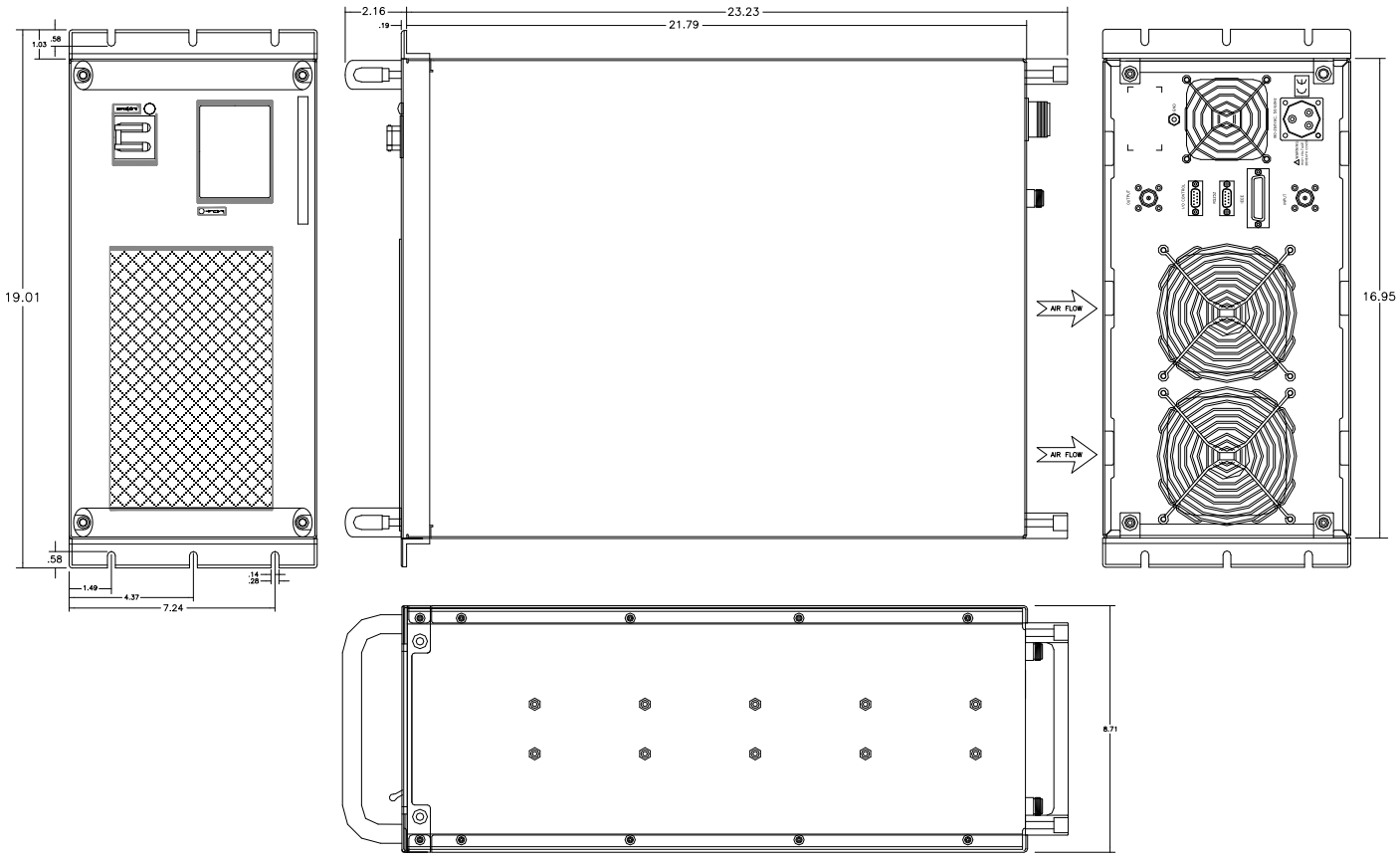
Option	Number	Description	Price
FGA	**061**	Front panel manual gain adjustment 10 turns	Standard
LCD	**062**	Touchscreen Digital Display, including Fwd/Rev Power indication (dB or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel IEEE/GPIB-488.2 and Half Duplex RS-232 or Full Duplex RS-422 Remote Interface	Call
FCN	**051**	Front Panel Type-N, Female	N/C
RCN	**052**	Rear Panel Type-N, Female	N/C
TRS	**068**	High Power PIN T/R Switch (F<100uSec, M<10mSec or S<50mSec)	Call

Available Options Packages: 15, 16, 17, 18

I/O CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specifications	OPTIONS FGA	OPTIONS LCD
1	Forward Test Point	Analog Voltage 0-5V relative to Forward Power Level		√
2	Reverse Test Point	Analog Voltage 0-5V 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 Voltage: +12.0V_{DC} ±0.5V	√	√
7	P/S Test Point	P/S Output Voltage: +28.0V_{DC} ±2.0V	√	√
8	GND	Ground	√	√
9	GND	Ground	√	√

OUTLINE DRAWING SHOWN WITH OPTION PACKAGE 18



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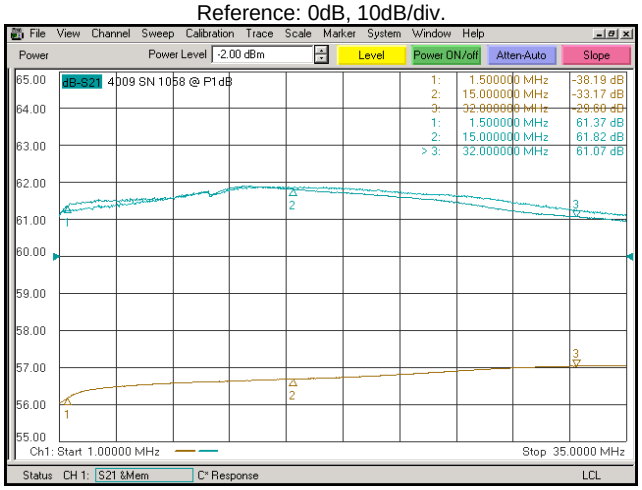
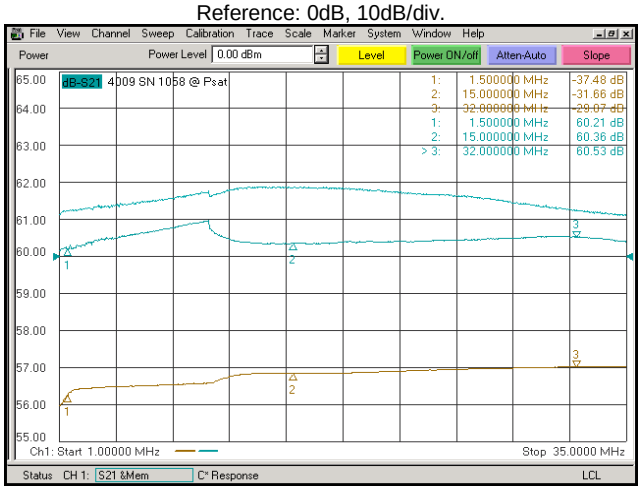
TYPICAL PERFORMANCE PLOTS

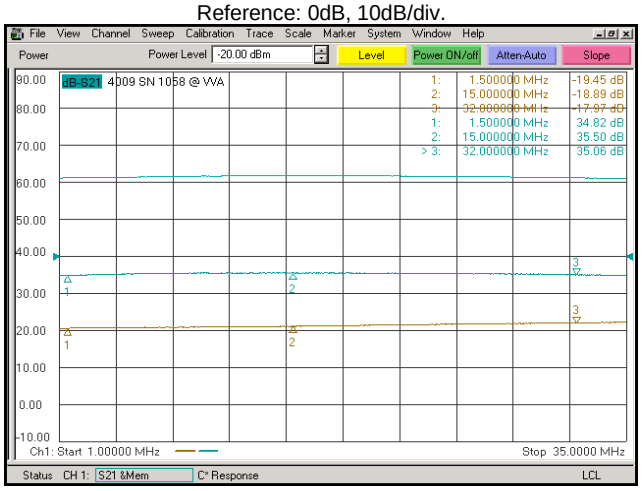
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -2.0dBm
Reference: 60dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 0.0dBm
Reference: 60dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Bottom Curve: VVA @ Minimum Gain
Reference: 40dB, 10dB/div.
Middle Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.



Plot 4 – ALC Flatness @ 57dBm & 50dBm
Top Curve: ALC @ 57dBm, P_{IN} = 0dBm
Bottom Curve: ALC @ 50dBm, P_{IN} = 0dBm
Reference: 54dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.