EMPOWER
RF SYSTEMS, INC.

Solid State General Communication Power Amplifier

4070 – GCS4F4GTS

1291 – 1299 MHz / 800 Watts Pulse

The GCS4F4GTS (SKU 4070) is suitable L-Band high power pulse and CW applications. This rack mount amplifier utilizes push-pull LDMOS 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 qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state linear design
- Instantaneous broadband
- Built in fast switching circuit.
- Small form factor and lightweight
- Suitable for CW & Pulse applications
- 50 ohm input/output impedance
- High reliability and ruggedness

Shown with Option Package 18

ELECTRICAL SPECIFICATIONS @ $120V_{AC}$, 25°C, 50 Ω System

Characteristics	Rating	Min	Typ	Max	Units
Frequency Response	BW	1291		1299	MHz
Output Power (PEP)	$P_{PULSE-PK}$	800			Watt
Power Output @ 1dB Gain Compression	P_{1dB}	400			Watt
Input Power for Rated P_{SAT-PK}	P_{IN}		0		dBm
Power Gain @ P_{1dB}	G_{1dB}	58			dB
Gain Flatness	ΔG			±1.0	dB
Gain Adjustment Range	VVA	15	20		dB
Input Return Loss	S_{11}			-10	dB
Switching Speed	$T_{ON / OFF}$		1.0	5	uSec
Mute Noise Level	N_{MUTE}			-160	dB/Hz
Noise Figure @ maximum gain	NF		10		dB
Third Order Intercept Point	IP3		+64		dBm
Harmonics @ Rated P_{1dB} = $400W_{PK}$	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Supply Voltage (single phase)	V_{AC}	100		240	Volt
Power Consumption @ $800W_{PK}$	P_D			3000	Watt
Pulse Performance	$T_{RISE (10-90)}$			200	ns
	$T_{FALL(90-10)}$			200	ns
	P_{WIDTH}	2			ms
	Duty cycle	10			%
	PRF	1.0 KHz		1.25 MHz	
Pulse Overshoot				1	dB
Pulse Droop				1	dB

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions H x W x L	19 x 8.75 x 22	Inch	Max
Weight	80	lb.	Max
RF Connectors	Type N Female (front or rear)		
Cooling	Built-in forced air cooling system		
LCD	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 HPIB IEEE-488.2 and Half Duplex RS-232 remote interface.		

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ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	0		+50	°C
Storage 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		

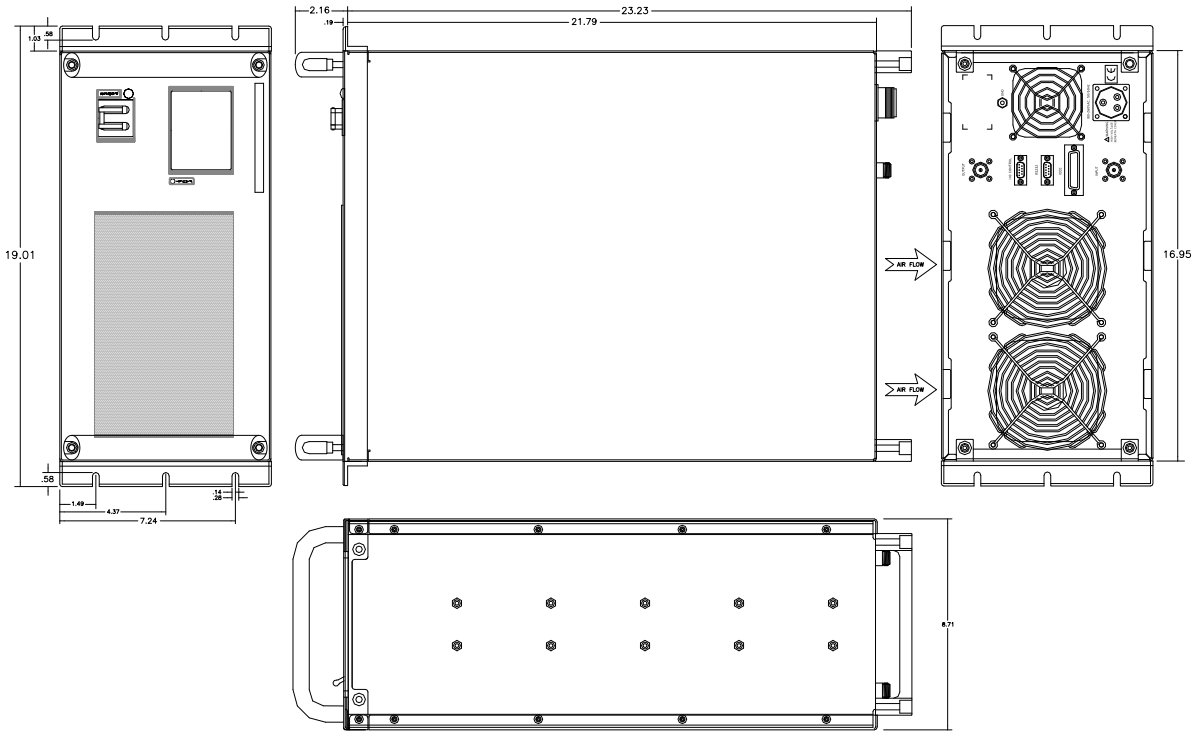
PROTECTIONS

Input Overdrive	+10 dBm	Max
Load VSWR @ P_{OUT} = 800W_{PK}	3:1 all phase and magnitude	-
Thermal Overload	85°C shutdown	Max

I/O INTERFACE CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specifications
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	Test Point: +5.0V_{DC} ±0.2V Test Point
4	N/C	No Connection
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)
6	12V Test Point	Test Point: +12.0V_{DC} ±0.5V
7	P/S Test Point	P/S Output Voltage 26.0V_{DC} – 30.0V_{DC}
8	GND	Ground
9	GND	Ground

OUTLINE DRAWING SHOWN WITH OPTION 18



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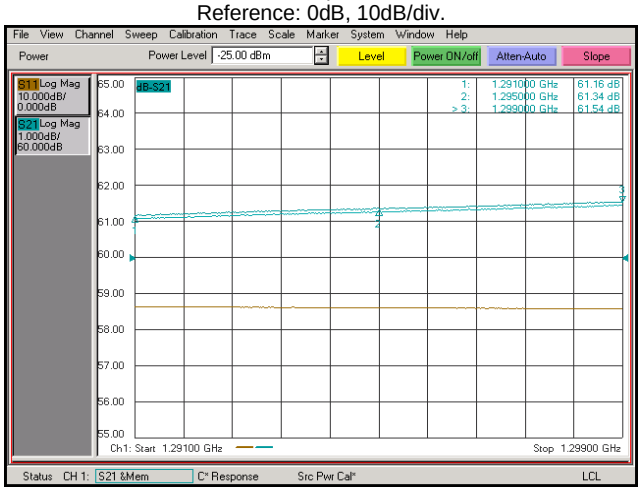
TYPICAL PERFORMANCE PLOTS

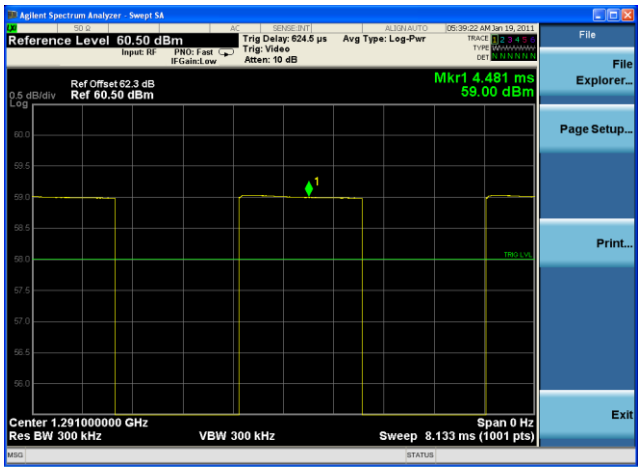
Plot 1 – Small Signal Gain

Top Curve: Small Signal Gain @ P_{IN} = -25dBm
Reference: 60dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



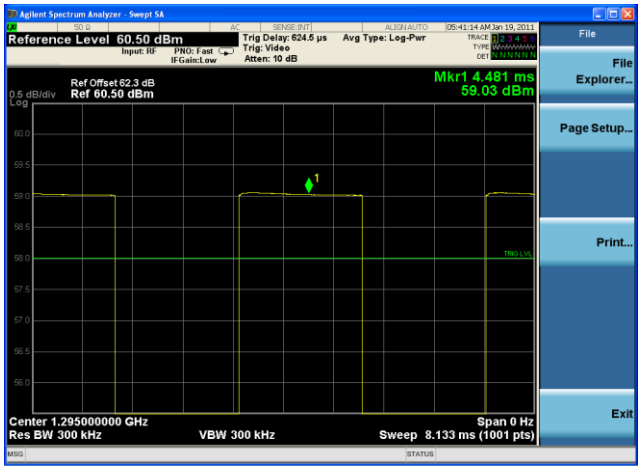
Plot 2

Power Output @ Pulse, P_{IN} = -1.56dBm
CF = 1.291GHz, PW = 2ms, Duty Cycle = 50%
Reference: 60.5dBm, 0.5dB/div



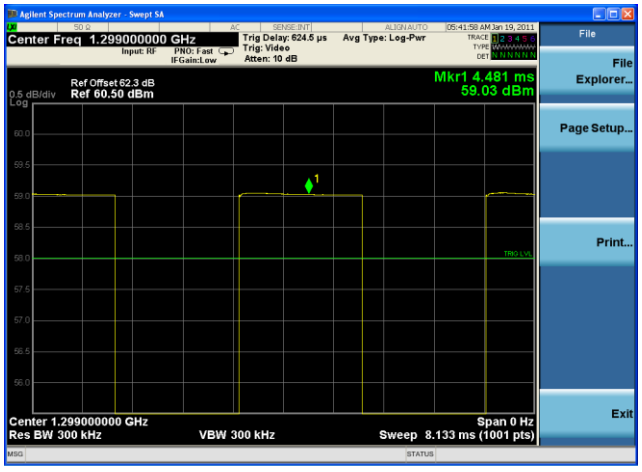
Plot 3

Power Output @ Pulse, P_{IN} = -1.56dBm
CF = 1.295GHz, PW = 2ms, Duty Cycle = 50%
Reference: 60.5dBm, 0.5dB/div



Plot 4

Power Output @ Pulse, P_{IN} = -1.56dBm
CF = 1.299GHz, PW = 2ms, Duty Cycle = 50%
Reference: 60.5dBm, 0.5dB/div



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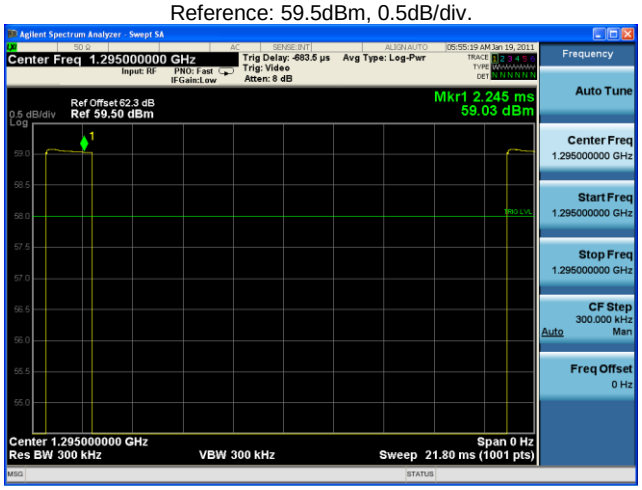
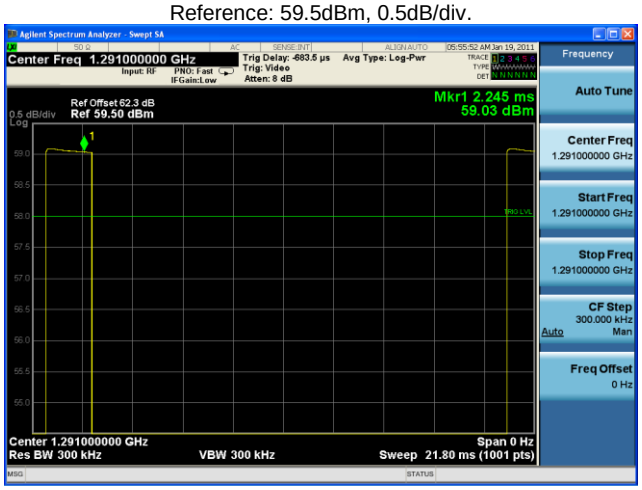
Plot 5

Power Output @ Pulse, P_{IN} = -1.9dBm
CF = 1.295GHz, PW = 2ms, Duty Cycle = 10%
Reference: 59.5dBm, 0.5dB/div.



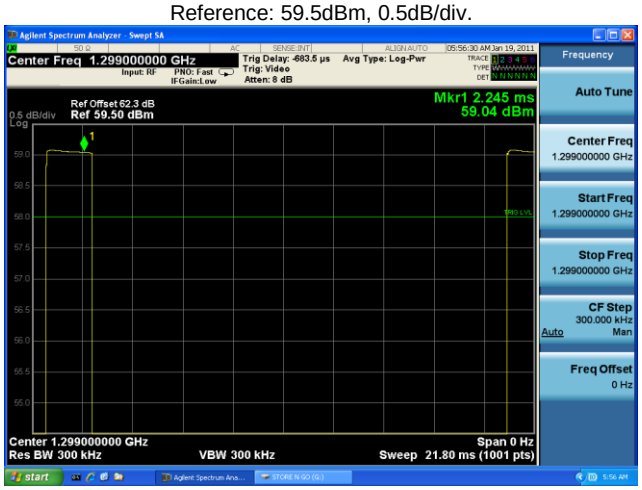
Plot 6

Power Output @ Pulse, P_{IN} = -1.66dBm
CF = 1.291GHz, PW = 2ms, Duty Cycle = 10%
Reference: 59.5dBm, 0.5dB/div.



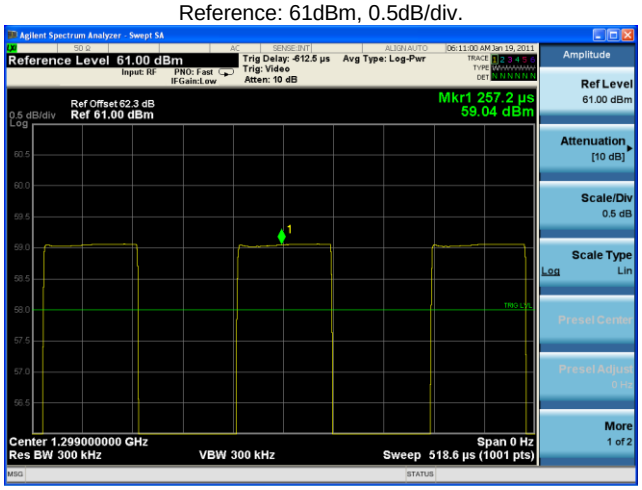
Plot 7

Power Output @ Pulse, P_{IN} = -2.0dBm
CF = 1.299GHz, PW = 2ms, Duty Cycle = 10%
Reference: 59.5dBm, 0.5dB/div.



Plot 8

Power Output @ Pulse, P_{IN} = -1.76dBm
CF = 1.299GHz, PW = 100us, Duty Cycle = 50%
Reference: 61dBm, 0.5dB/div.



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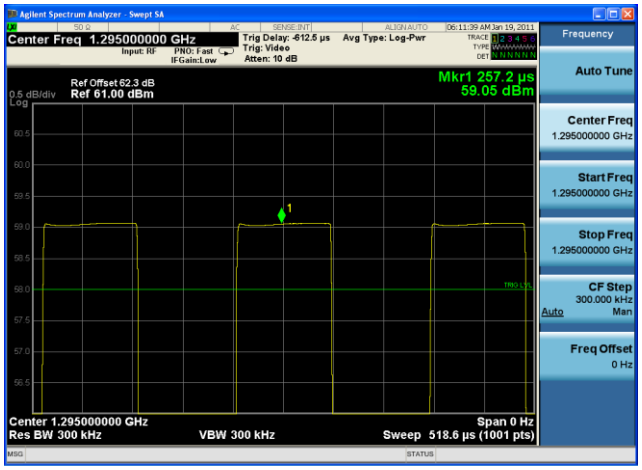
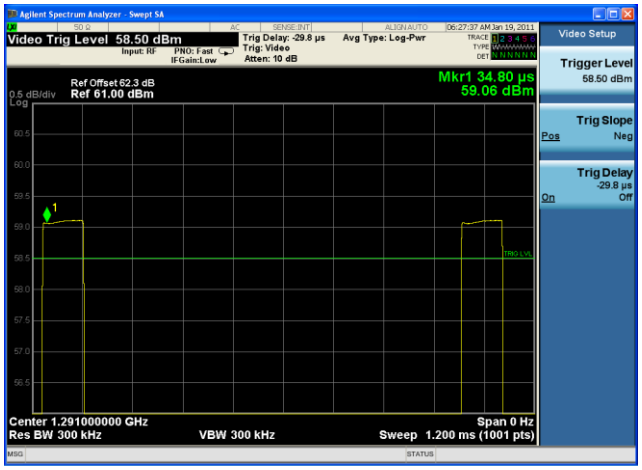
Plot 9
Power Output @ Pulse, P_{IN} = -1.5dBm
CF = 1.295GHz, PW = 100us, Duty Cycle = 50%
Reference: 61dBm, 0.5dB/div.



Plot 10
Power Output @ Pulse, P_{IN} = -1.52dBm
CF = 1.291GHz, PW = 100us, Duty Cycle = 10%
Reference: 61dBm, 0.5dB/div.



Plot 11 – Noise Figure
Top Curve: Noise Figure
Reference: 15dB, 1dB/div.
Bottom Curve: Small Signal Gain
Reference: 58dB, 1dB/div.