

Solid State Broadband High Power Amplifier

4056 – GCS4E4SQR

1200 – 1900 MHz / 400 Watts

The GCS4E4SQR (SKU 4056) is suitable L-Band broadband or band specific high power linear, CW and pulse applications. This amplifier utilizes high power GaN devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The amplifier is housed in two 19" rack mountable cabinets (LRU's) and as a option can be supplied in a rack cabinet. The larger LRU (5U) contains the RF power section while the smaller LRU (3U) contains the main power supply and control circuits. The system operates from a three phase power supply and has built in control, monitoring and protection functions and forced air-cooling system. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



- Solid-state linear design
- Instantaneous broadband
- Modular LRU design
- Suitable for Linear, CW & most modulation types
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built in Control, Monitoring and Protection Circuits

ELECTRICAL SPECIFICATIONS @ 208 VAC, 3Φ, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1200		1900	MHz
Power Output CW	P _{SAT}	400			Watt
Gain @ Rated output power	G _P	56			dB
Input Power for rated output power	P _{IN}		0		dBm
Gain Flatness	ΔG			±2.0	dB
Gain Adjustment Range	VVA	20	25		dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure	NF		10		dB
Intermodulation (Third Order Intercept Point) 2-tone IMD @ 50 dBm/Tone, Δ = 1 MHz	IP ₃	+62			dBm
Harmonics @ 1 dB Gain Compression Point	H	-20			dBc
Spurious Signals	Spur			-50	dBc
Operating Voltage (3 Phase, 60Hz, Line to Line Voltage)	VAC	180	208	264	Volt
AC Power Consumption @ 500 W CW	P _D		2000	3000	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Limit
Dimensions W x H x D w/o enclosure	19" x 14" x 22" (432 x 350 x 560mm)	Typ
Weight	125 lb.	Max
RF Connectors Input / Output	N female / 7/16 DIN Female	
Cooling	Built in forced-air system	

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ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature(MIL-STD-810E, Method 503.3 & Method 500)	Tc	-20		+55	°C
Non-operating Temperature	Tstg	-40		+85	°C
Relative humidity (non-condensing)	RH			95	%
Altitude(MIL-STD-810E, Method 500)	ALT			10,000	Feet
Shock & Vibration (MIL-STD-810E, Method 516.4 & Method 514.4)	SH / VI		Airborne		

Parameter	Max	Unit
RF Noise quieting:		
Output Noise level	-90	dbm/MHz
Quieting mode time on/off	20	µs
Rate	100	KHz
Control	RS422	
Connector type	Front Panel, 15 pin D- type	

PROTECTIONS

Input Overdrive	+10 dBm	Max
Load VSWR programmable response	5:1 @ any angle & magnitude	Nom
Thermal Overload	85°C shutdown	Max

I/O CONNECTOR – Dsub, 15-Pin

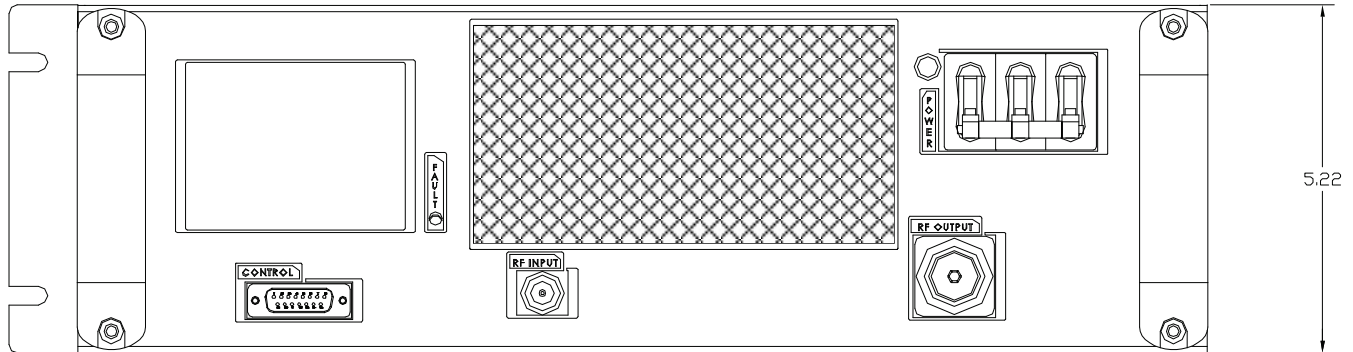
Pin #	Description	Specifications
1	Forward TP	Analog Voltage 0-5 V Test Point relative to Forward Power Output
2	Reverse TP	Analog Voltage 0-5 V Test Point relative to Reverse Power
3	N/C	Spare
4	RF Blanking (+)	RS422 Input On/Off: High = Enable, Low = Disable
5	RF Blanking (-)	RS422 Input On/Off: Low = Enable, High = Disable
6	AC Power ON/OFF(-)	RS485 Input On/Off: Low = Enable, High = Disable
7	AC Power ON/OFF (+)	RS485 Input On/Off: High = Enable, Low = Disable
8	+5 V TP	Measurement Voltage Output 5 V Test Point
9	GND	Ground
10	+12 V TP	Measurement Voltage Output 12 V Test Point
11	RS422 In (+)	RS422 Serial Port Driver In (+) (Amplifier Status & Remote Cntl)
12	RS422 In (-)	RS422 Serial Port Driver In (-) (Amplifier Status & Remote Cntl)
13	RS422 Out (+)	RS422 Serial Port Driver Out (+) (Amplifier Status & Remote Cntl)
14	RS422 Out (-)	RS422 Serial Port Driver Out (-) (Amplifier Status & Remote Cntl)
15	+28V TP	Measurement Voltage Output 28 V Test Point

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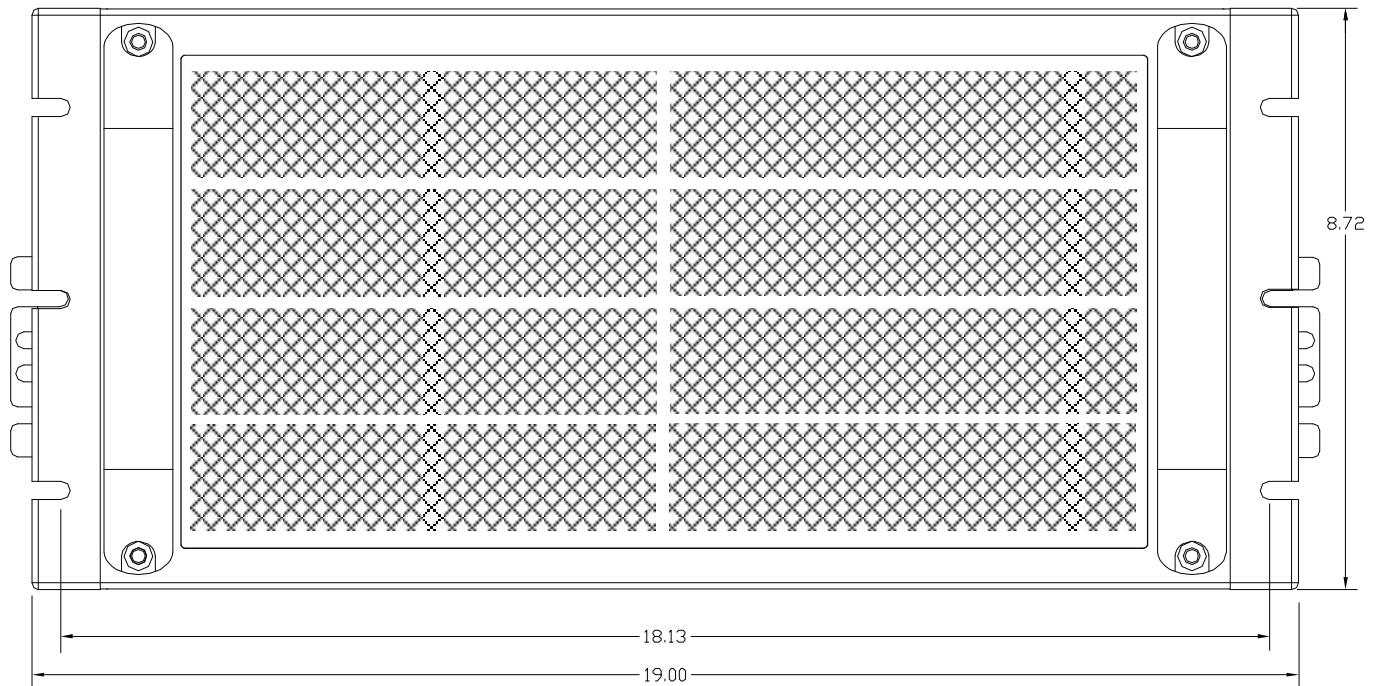
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SYSTEM OUTLINE DRAWING - FRONT VIEW



1U MAX.
SPACING
BETWEEN
UNITS

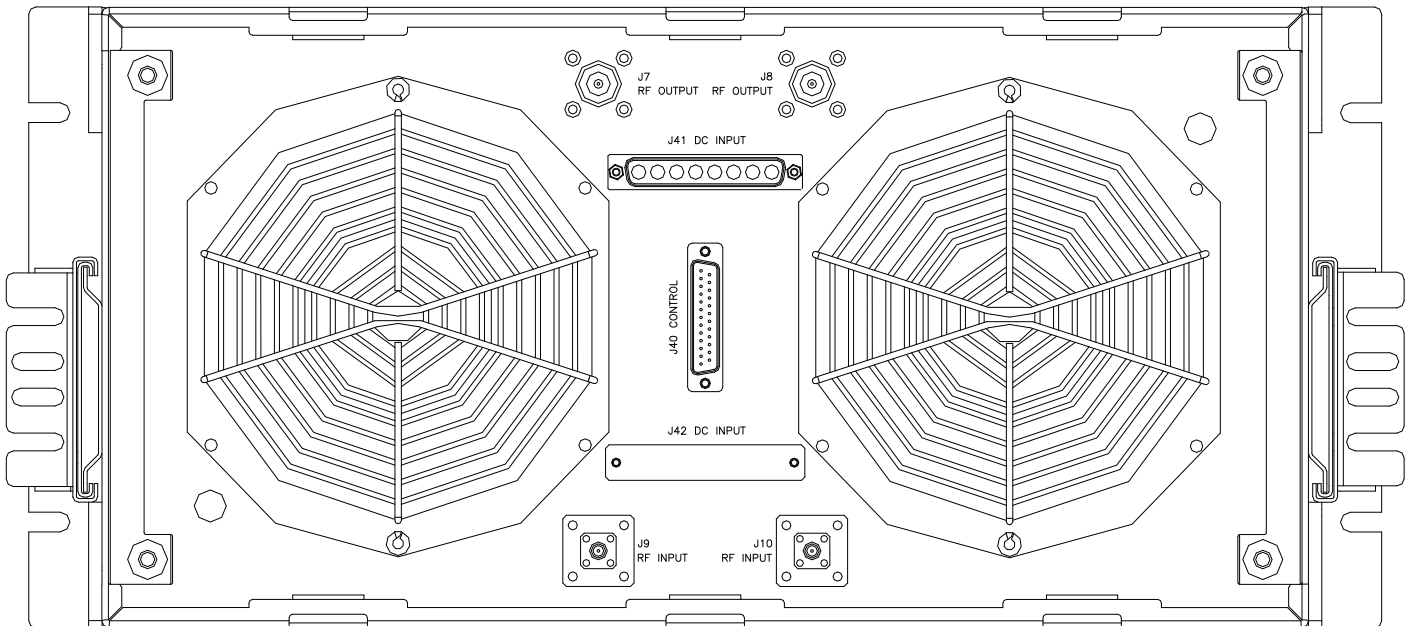
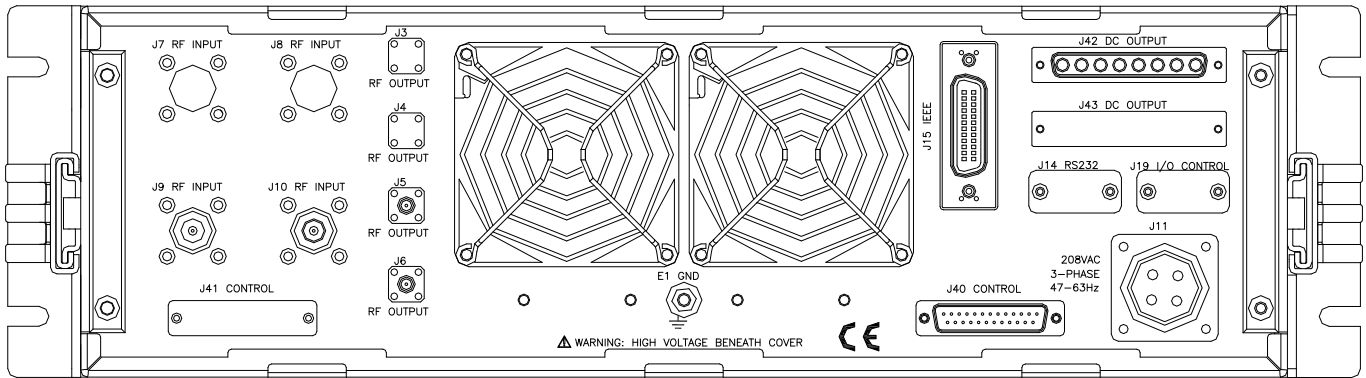


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SYSTEM OUTLINE DRAWING - REAR VIEW



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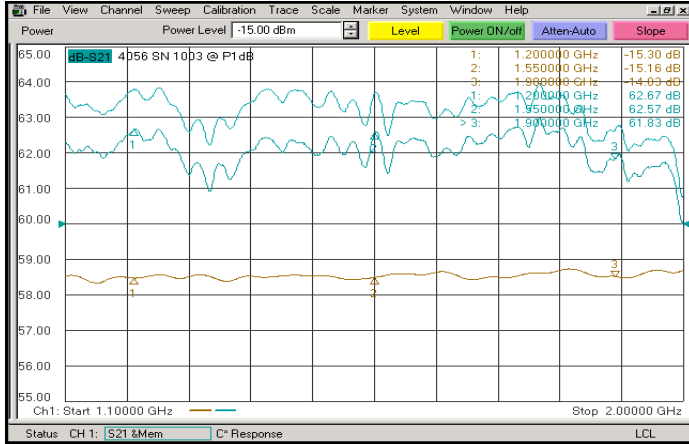
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TYPICAL PERFORMANCE PLOTS

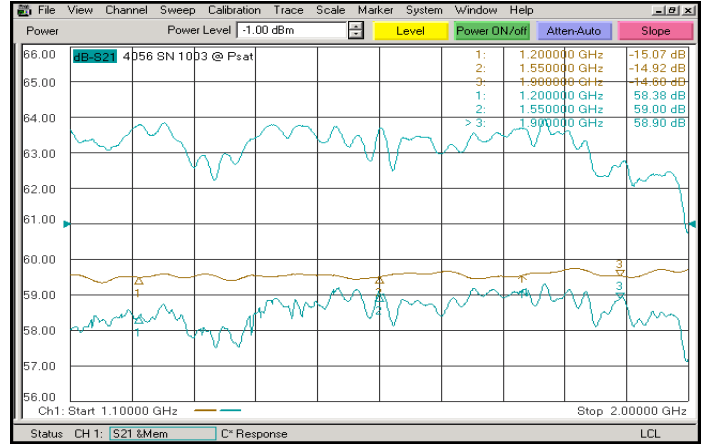
Plots 1 - Small Signal and P_{1dB} Gain

Top Curve: Small Signal Gain @ $P_{IN} = -20dBm$
 Middle Curve: Power Gain @ P_{1dB} , $P_{IN} = -15dBm$ (Note 2, 3)
 Reference: 60dB, 1dB/Div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/Div.



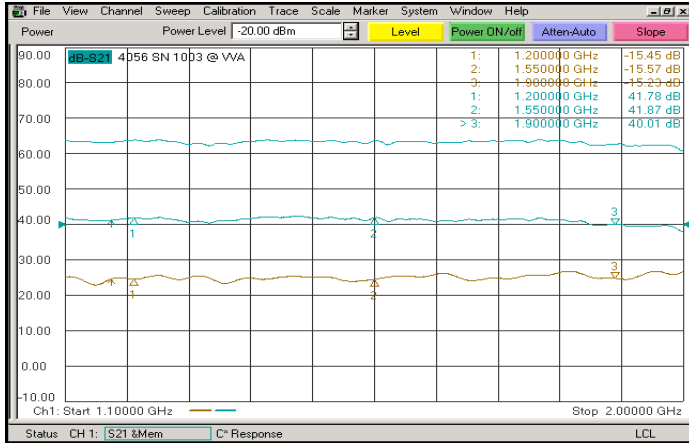
Plot 2 - Small Signal and Power Gain

Top Curve: Small Signal Gain @ $P_{IN} = -20dBm$
 Bottom Curve: Power Gain, $P_{IN} = -1.0dBm$ (Note 2, 3)
 Reference: 61dB, 1dB/div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 - Gain Adjust Dynamic Range

Top Curve: Maximum Gain @ $P_{IN} = -20dBm$
 Middle Curve: VVA @ Minimum Gain
 Reference: 40dB, 10dB/Div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/Div.



Plot 4 - ALC Flatness @ 200W & 40W

Top Curve: ALC @ 200W, $P_{IN} = 0dBm$
 Bottom Curve: ALC @ 40W, $P_{IN} = 0dBm$
 Reference: 50dB, 1dB/Div.
 Middle Curve: Input Return Loss
 Reference: 0dB, 10dB/Div.

