

## Solid State General Communication Power Amplifier

**4062 - GCS1D2GUT**
**1.5 – 30 MHz / 1000 Watt**

The GCS1D2GUT (SKU 4062) is suitable for broadband high power linear applications in the HF 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.



- Solid-state linear design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Suitable for CW, AM and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness
- Transmit / Receive switch
- T/R switch + harmonics filter switch bank

### ELECTRICAL SPECIFICATIONS @ 440V<sub>AC</sub>, 3-phase, 25°C, 50Ω System

Characteristics	Rating	Min	Typ	Max	Units
Operating Frequency	BW	1.5		30	MHz
Power Output CW	P <sub>SAT</sub>	1000		1500	Watt
Power Output @ 1dB Gain Compression	P <sub>1dB</sub>	500	600		Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	60	61		dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>			+3	dBm
Small Signal Gain Flatness per Band	ΔG <sub>SS</sub>			±0.75	dB
Power Flatness, ALC Mode	ΔG <sub>ALC</sub>			±0.5	dB
Input Return Loss	S <sub>11</sub>			-10	dB
Gain Adjustment Range (w/filter bank)	VVA	25	30		dB
Third Order Intercept Point 2-tone @ 50dBm/tone, 100kHz Spacing	IP3		+64		dBm
Harmonics @ P <sub>OUT</sub> = 1000W	H			-50	dBc
Spurious Signals	Spur			-50	dBc
Operating Voltage (3 phase) Line to Line	V <sub>AC</sub>	365	440	528	Volt
Power Consumption @ P <sub>OUT</sub> = 1000W	P <sub>D</sub>		3500	4000	Watt
T/R Switching Time	T <sub>ON</sub> / T <sub>OFF</sub>			1	ms
PA Turn – Time On /Time Off	T <sub>ON/OFF</sub>			30/20	μs
T/R Switch Isolation	TR <sub>ISO</sub>	60			dB
Receive Pass loss	TR <sub>LOSS</sub>		-1		dB
AM distortion (85%) @ P <sub>OUT</sub> = 1000W <sub>PK</sub>	AM <sub>DIST</sub>			10	%
Filter Switching Time	F <sub>SW T</sub>			1	ms
Low Pass Filter, Cut Off Frequency	F <sub>C</sub>	2.3, 3.5, 5.4, 8.3, 12.7, 19.5, 30			MHz

### MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D	19 x 12.25 x 22	Inch
Weight	110 (est.)	lb.
RF Connectors Input / Output / Receive	Type-N, Female	
AC Input Connector	MIL-STD Circular, Male	
I/O Connector	MIL-STD Circular, Female	
Remote Control	Fast filter switch control, T/R control, Noise Quieting	
Remote Control	RJ-45 Ethernet 100MB/s	
Cooling	Built-in forced air cooling system	

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**ENVIRONMENTAL SPECIFICATIONS (Design to Meet)**

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

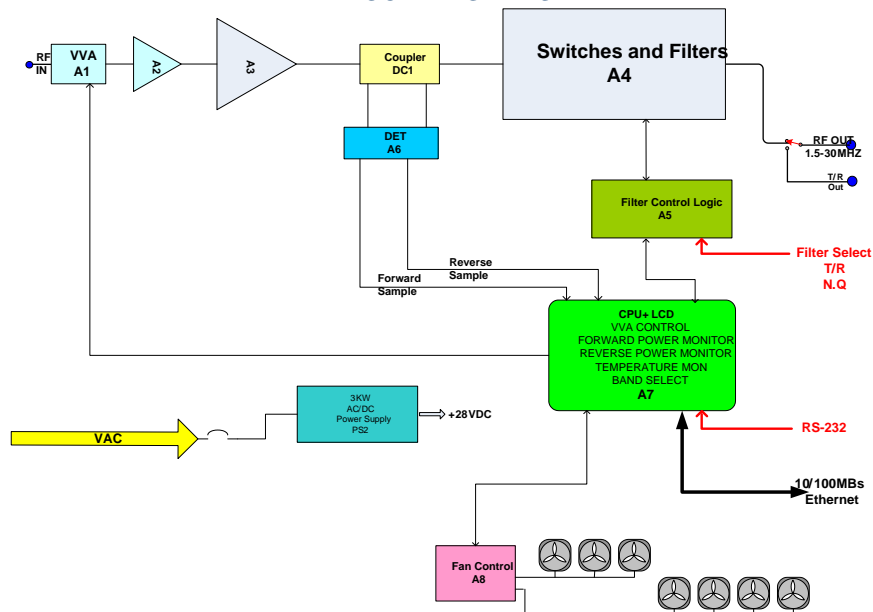
**LIMITS**

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P <sub>OUT</sub> = 1000W	2.5:1 @ any angle & magnitude	-
Thermal Overload	85°C shutdown	Max

Option	Number	Description
LCD	062	Front panel touch screen LCD controller including FWD/REV Power indication true, Gain Adjustment, ALC Fast/Slow & On/Off, Standby mode, Fault indication (T/R, High Temp, High VSWR, Power Supply)

**I/O CONTROL – J20**

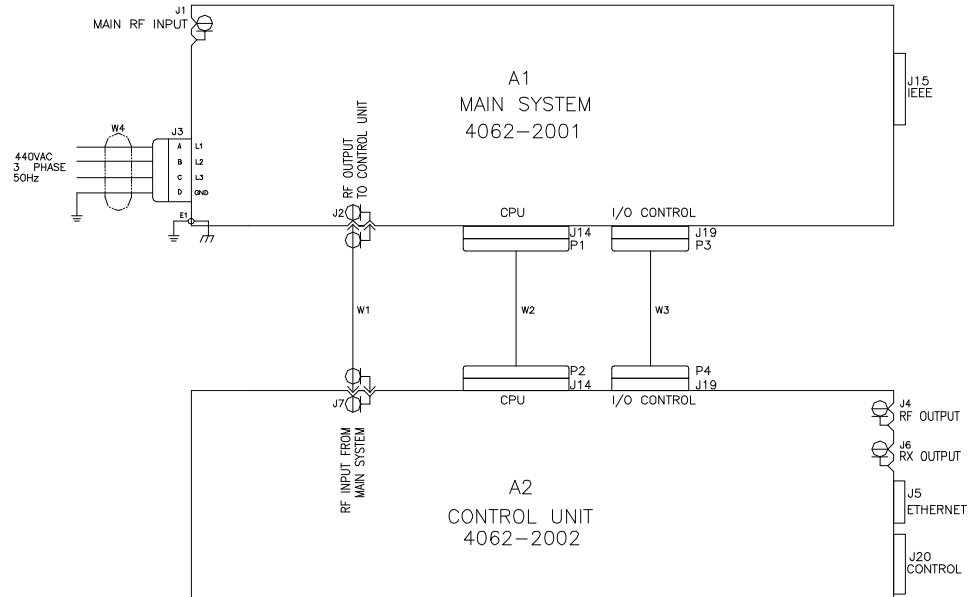
Pin #	Description	Specifications
A	D0	Data Bit LSB
B	D1	Data Bit
C	D2	Data Bit MSB
D	N.Q +	Amplifier Enable: Differential RS-422 Low (0 V) Amplifier Disable: Differential RS-422 High (5 V)
E	N.Q -	Amplifier Enable: Differential RS-422 Low (0 V) Amplifier Disable: Differential RS-422 High (5 V)
F	TX	T/R Control TTL (0-+5 V)
G	N/C	Spare
H	N/C	Spare
I	N/C	Spare
J	N/C	Spare

**BLOCK DIAGRAMS**


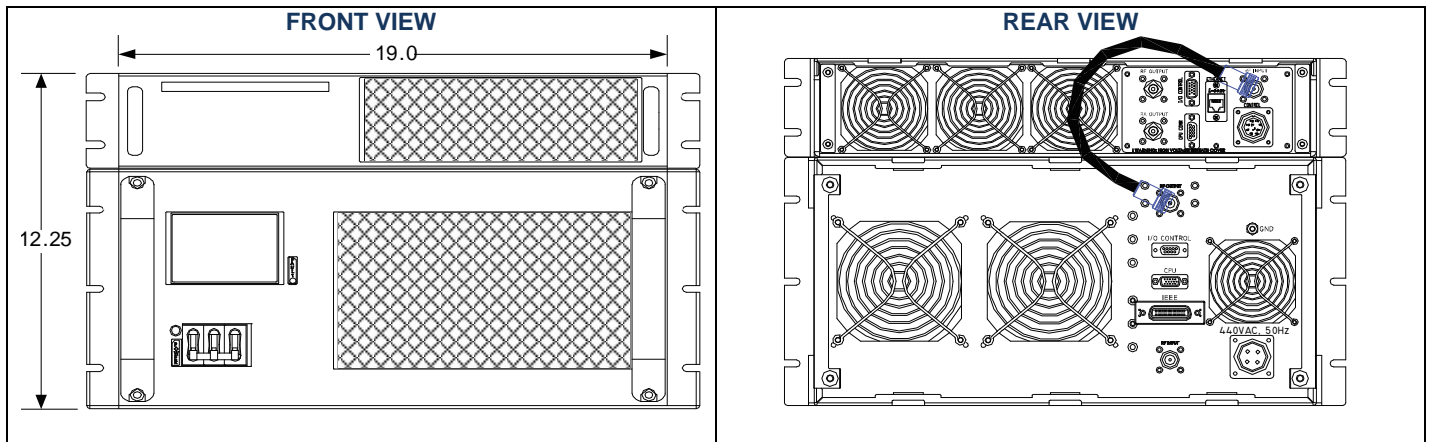
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**OUTLINE DRAWING**



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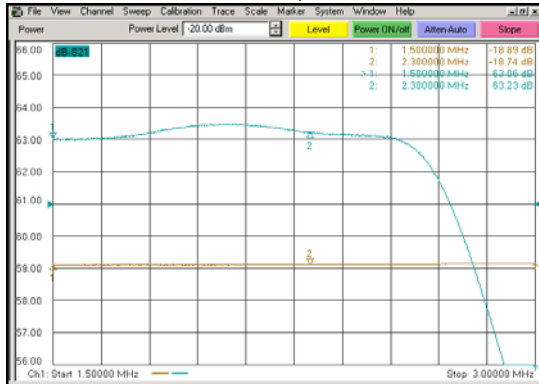
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## TYPICAL PERFORMANCE PLOTS

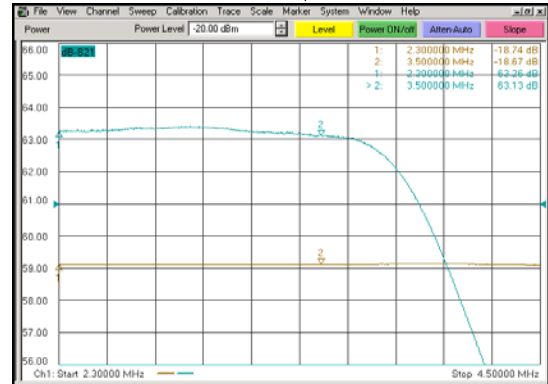
**Plot 1 – Band A Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 61dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



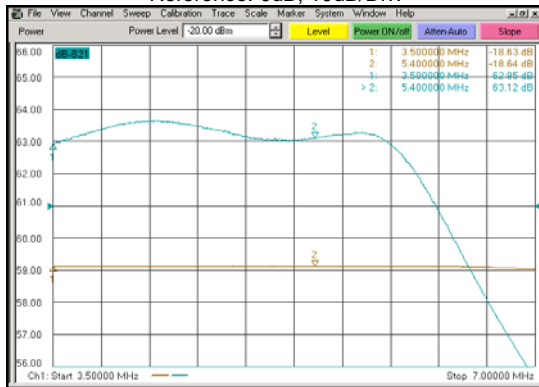
**Plot 2 – Band B Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 61dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



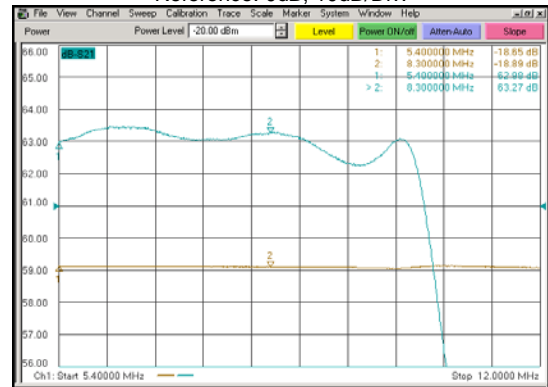
**Plot 3 – Band C Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 61dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



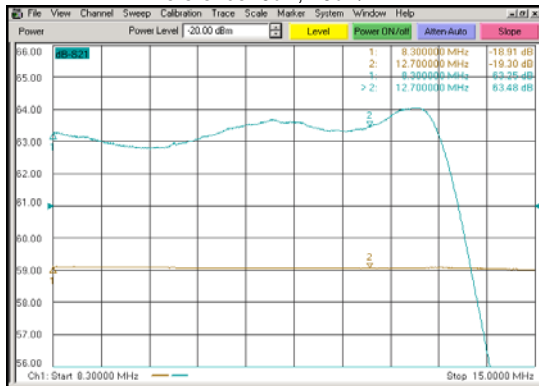
**Plot 4 – Band D Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 61dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



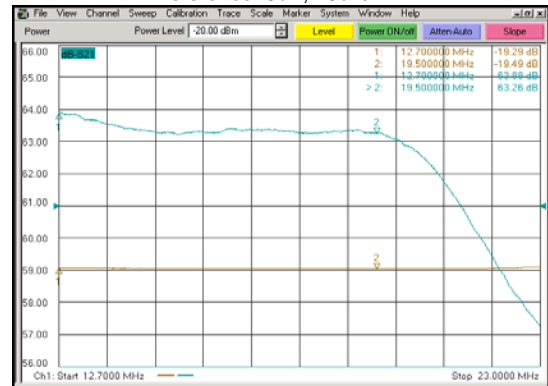
**Plot 5 – Band E Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 62dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



**Plot 6 – Band F Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 62dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



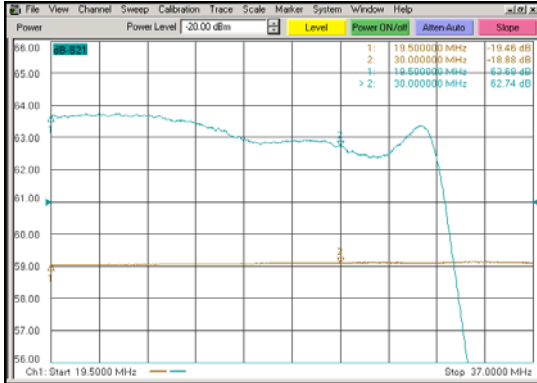
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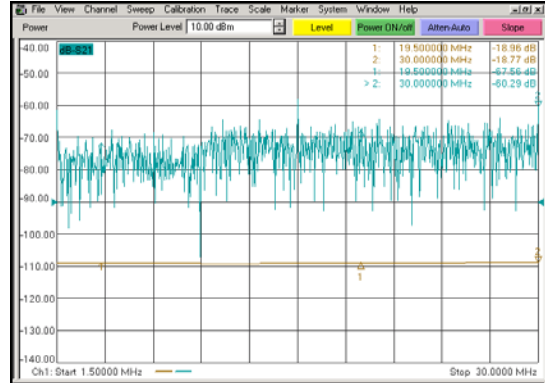
**Plot 7 – Band G Small Signal Gain 3dB BW**

Top Curve: Small Signal Gain @  $P_{IN} = -20\text{dBm}$   
 Reference: 61dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



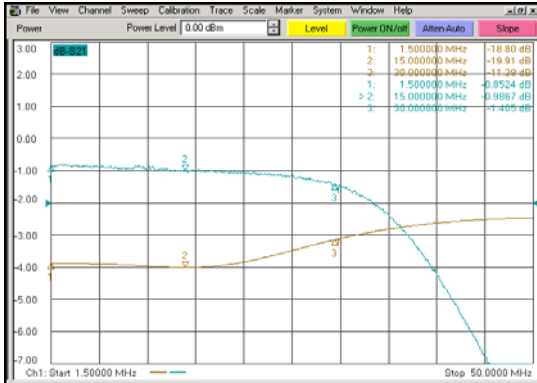
**Plot 8 – T/R Isolation**

Top Curve: Isolation @  $P_{IN} = 0\text{dBm}$   
 Reference: -90dB, 10dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



**Plot 9 – T/R Insertion Loss**

Top Curve: Insertion Loss @  $P_{IN} = 0\text{dBm}$   
 Reference: -2dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



BLANK