EMPOWER RF SYSTEMS, INC.

Solid State General Communication Power Amplifier

4054 - GCS1D2GYV

1.5 - 31.5 MHz / 2500 Watts

The GCS1D2GYV (4054) is suitable for HF broadband or band specific high power, CW and pulse Jamming applications. This amplifier utilizes high power MOSFET 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 constructed of two modular drawers, housed in an optional rack cabinet. The main LRU includes the RF power section while the second LRU holds the main power supply and control circuits. The system operates from a three phase power supply and has a built-in control, monitoring and protection functions with forced-air cooling system. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

SKU#: 4054JLRCCDMXQ

- Solid-state class AB design
- Instantaneous broadband
- Modular design
- Suitable for AM, FM, PM modulations (Contact factory for other modulation types)
- 50 ohm input/output impedance
- Built-in control, monitoring and protection functions
- High reliability and ruggedness

ELECTRICAL SPECIFICATIONS @ $208V_{AC}$, 3ϕ, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1.5		31.5	MHz
Power Output CW	P_{SAT}	2500			Watt
Power Output @ 1 dB Gain Compression Point	P_{1dB}	2000			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	64			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Small Signal Gain Flatness / Leveled ALC	ΔG			±2.0 / ±0.5	dB
Gain Adjustment Range	FGA	25	30		dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF		10		dB
Harmonics @ P_{OUT} = 2000W	2^{ND}		-40	-30	dBc
	3^{RD}		-12		
Spurious Signals	Spur			-70	dBc
Operating Voltage (3-Phase, Delta) Line to Line	V_{AC}	180	208	264	Volt
Power Consumption @ P_{OUT} = 2500W CW	P_D			9367	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D – No Enclosure	17 x 14 x 22	Inch
Weight – No Enclosure	150	Pound
RF Connectors Input/Output	Type-N Female / SC-Female	
Cooling	Built-in forced air cooling system	

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T_A	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		

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LIMITS

Input RF drive level without damage	+6 dBm	Max
Load VSWR @ P_{OUT} = 2000W	3:1 @ load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

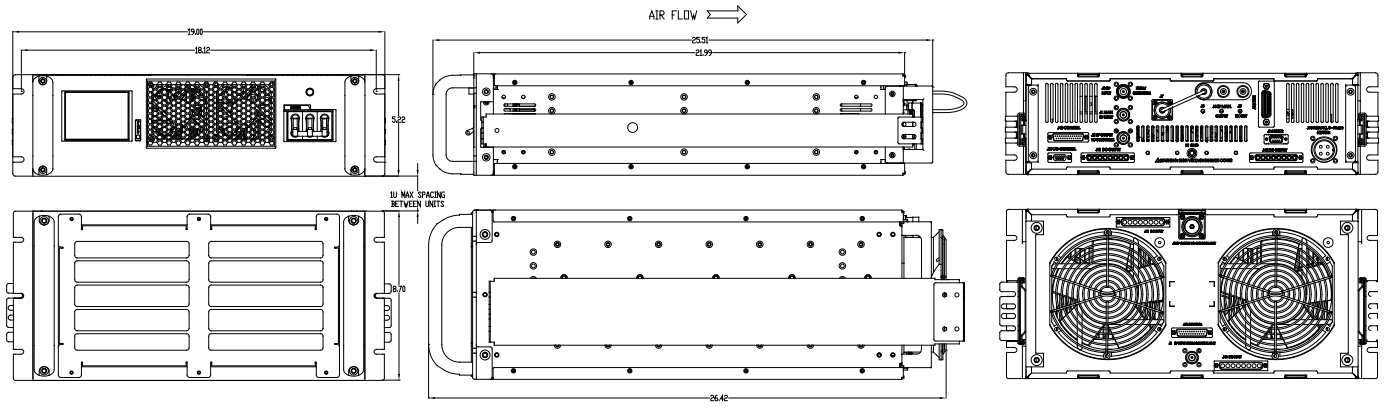
AVAILABLE OPTION

SKU #	Description	LCD Touchscreen
4054JLRCCDMXQ	LCD controller, Rear RF connectors 3-phase, delta, 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. ***Note:*** ***(Output power is lowered by 0.5-0.75dB with this option)***

I/O CONNECTOR – D-sub 9-pin, Female

Pin #	Description	Specifications
1	Forward TP	Analog Voltage 0-4V_{DC} Test Point relative to Forward Power Level
2	Reverse TP	Analog Voltage 0-4V_{DC} Test Point relative to Reverse Power Level
3	5V TP	Test Point: 5.0V_{DC}, ±0.5V
4	N/C	No Connection
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-low*)
6	P/S1 TP	Test Point: 26.0-30.0V_{DC}
7	P/S2 TP	Test Point: 26.0-30.0V_{DC}
8	Disable RX	Disable RX: TTL Logic Low (0V)
9	GND	Ground

SYSTEM OUTLINE Shown
SKU#: 4054JLRCCDMXQ



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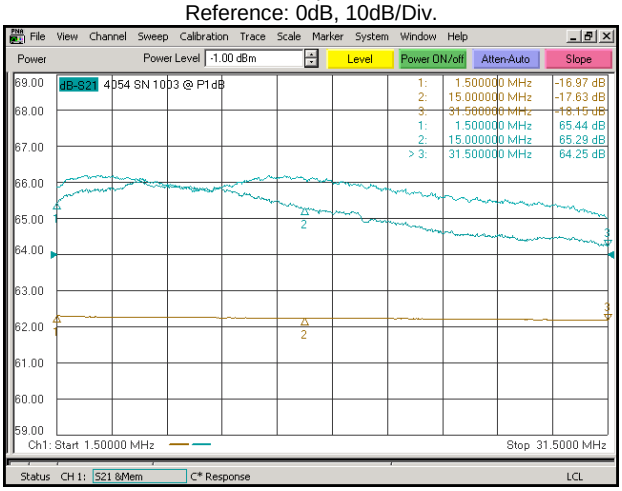
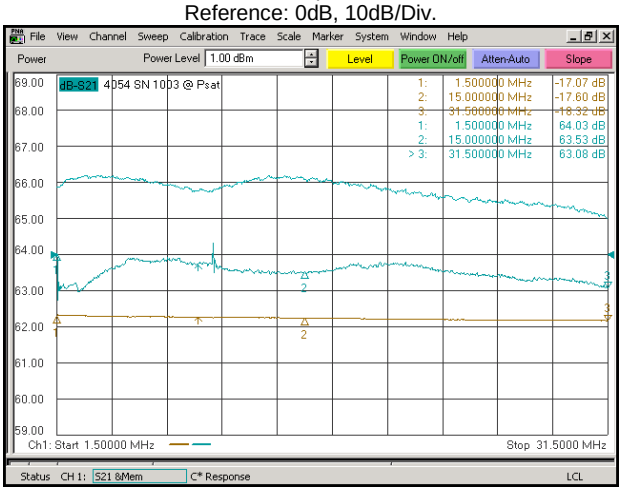
TYPICAL PERFORMANCE PLOTS

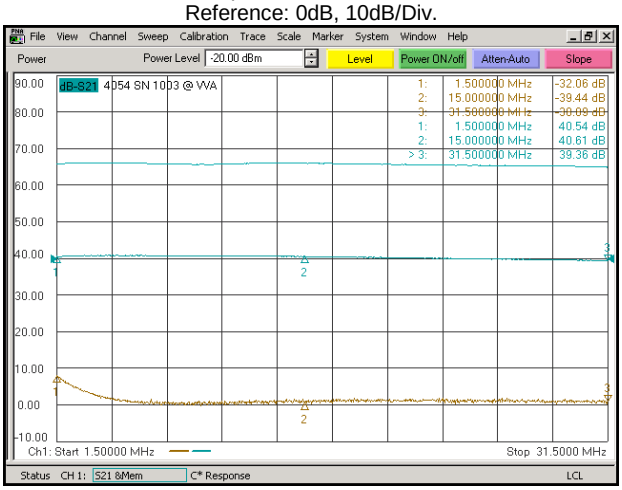
Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -1.0dBm
Reference: 64dB, 1dB/Div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/Div.



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: 64dB, 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 @ 1250W & 250W
Top Curve: ALC @ 1250W, P_{IN} = 0dBm
Bottom Curve: ALC @ 250W, P_{IN} = 0dBm
Reference: 58dB, 1dB/Div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/Div.