High Power Amplifier, Solid State, Broadband
20-1000MHz, 51dB Gain, SMA Female Connectors, 80Watts @ 1dB GCP

RAMP-20-1000M-51d-Sf-80W-e7

- Solid-state Class AB linear design
- Instantaneous ultra broadband
- Small form factor and lightweight
- Suitable for all modulation types
- 50 Ohm Input/Output impedance
- High reliability and ruggedness
- Built In Protection circuits and Control interface

ELECTRICAL SPECIFICATIONS @ +28 VDC, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Units
Operating Frequency	BW	20		1000	MHz
Power Output CW	P_{SAT}	100	125		Watt
Power Output @ 1 dB Gain Compression Point	P_{1dB}	80			Watt
Power Gain @ 1 dB Gain Compression Point	G_{1dB}	51			dB
Input Power for Rated Pout	P_{IN}		0		dBm
Small Signal Gain Flatness	ΔG			±1.5	dB
Input Return Loss	S11			-10	dB
Noise Figure	NF		7	10	dB
Third Order Intermodulation 2-tones @ 42dBm/tone, Δ = 100 KHz Harmonics @ 100W output	IMD IP3 2^{nd} 3^{rd}		+38 +56 -20 -20		dBc dBm dBc dBc
Spurious Signals	Spur		<-70	-60	dBc
Operating Voltage	VDD	26	28	30	Volt
Quiescent Current	I_{DQ}		4		Amp
Current Consumption @ rated POUT	I_{DD}		13	16	Amp

ENVIRONMENTAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Units
Operating Case Temperature	Tc	-40		+85	°C
Storage Temperature	Tstg	-40		+95	°C
Relative humidity (non-condensing)	RH	95			%
Altitude	ALT	10,000	30,000		Feet
Shock / Vibration	SH / VI		MIL-STD810F		

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions (excluding heatsink)	6.4 x 6.7 x 1.3	Inch (max)
Weight without HS	4.0	lb. (max)
RF Connectors In/Out	SMA Female	
DC / Interface Connector	7W2 Hybrid D-sub	
Cooling	Requires External Heatsink	

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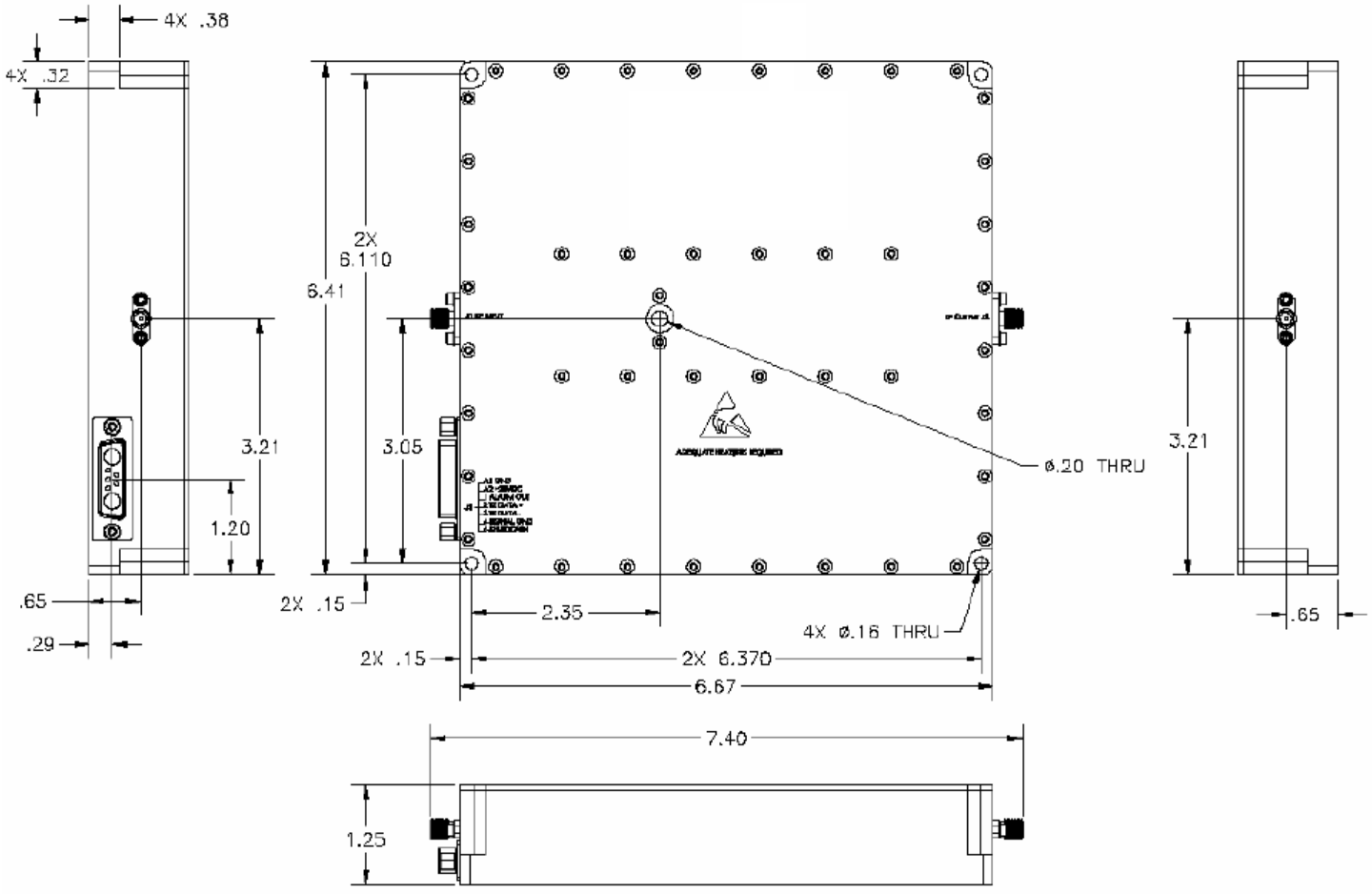
PROTECTIONS

Input Power Overdrive	P_{od}	+10dBm	Max
Load VSWR @ rated P1dB Gain Compression Point	Ψ	∞ @ all load phase & amplitude	Nom
Thermal Overload	T_{OD}	Graceful Degradation	

INTERFACE CONNECTOR – 7W2 Hybrid D-Sub

Pin #	Description	Specifications
1	Summary Alarm Out	TTL Low = Fault
2	RS422 TX_DATA+	Differential RS422 transmit output
3	RS422 TX_DATA-	Differential RS422 transmit output
4	Signal Gnd	Ground
5	Shutdown	PA ON - TTL "Low" (1.0 µSec typical) PA OFF - TTL "High"
A1	GND	Ground



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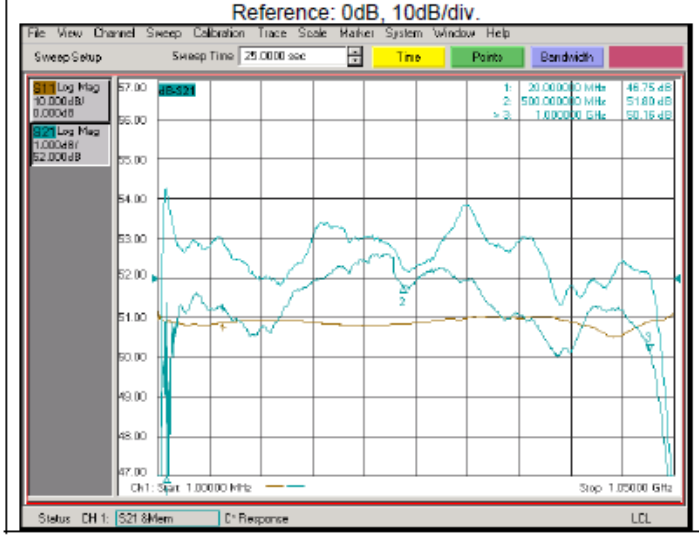
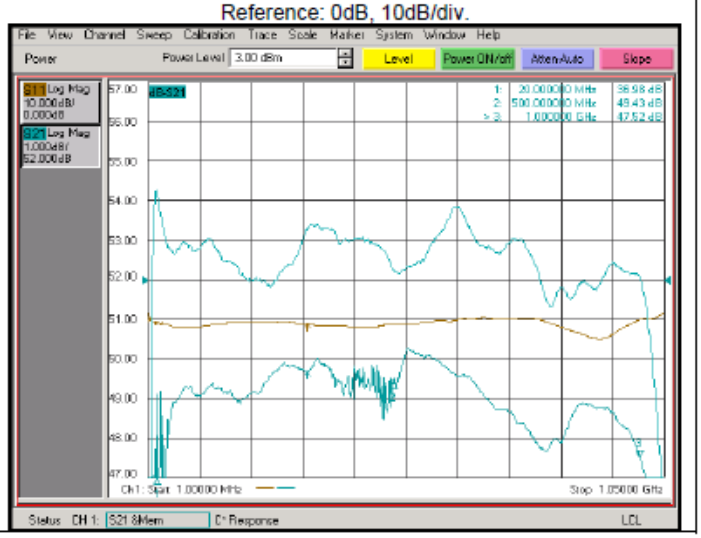
TYPICAL PERFORMANCE PLOTS

Plots 1 - Small Signal and P_{2dB} Gain
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{2dB}, P_{IN} = 0dBm **(Note 2)**
Reference: 52dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 - Small Signal and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Bottom Curve: P_{SAT} @ P_{IN} = 3dBm **(Note 2)**
Reference: 52dB, 1dB/div.
Middle Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Notes: Cable Loss/Source Correction included in P_{IN} Measurement: 0.0dB @ 1000MHz.

Options:

1	**RF Power display**
2	**Ethernet Output**

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ACCEPTANCE TEST DATA

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

Parameter	Specifications						Test results (MHz)			
	Symbol	Min	Typ	Max	Units	Notes	20	500	1000	P/F
Operating Frequency – Plot 3dB BW	BW	20		1000	MHz	Plot 1,2	x	x	x	P
Output Power CW @ 3dB G.C.P.	P_{SAT}	120			Watt	Plot 2 **Note 2, 3**	x	x	x	P
Output Power @ 1dB G.C.P.	P_{1dB}	**80**			Watt	Plot 1 **Note 2, 3**	x	x	x	P
Power Gain @ 1dB G.C.P.	G_{1dB}	50			dB	Plot 1	x	x	x	P
Input Power for rated P_{OUT}	P_{IN}		0		dBm	Record	-0.2	-2.6	2.5	P
Small Signal Gain Flatness (P_{IN} = -20dBm)	ΔG			±2.0	dB	Plot 1, 2	x	x	x	P
Gain Adjustment Range	FGA		25		dB	Plot 3	x	x	x	P
Gain @ Shutdown Condition, P_{IN} = 0dBm	G_{MUTE}			-	dB	Record	-35	-40	-36	P
ALC Flatness @ 10W & 50W (Optional)	ΔALC			±1.0	dB	Plot 4	x	x	x	P
Sample port @ 47dBm (ALC, Optional)	G_{SP}		-		dB	N/A	x	x	x	-
Input Return Loss	S11			-10	dB	Plot 1-4	x	x	x	P
Inter-modulation (Third Order Intercept Point) 2-tone IMD @ 40dBm/Tone, Δ = 100KHz	IMD		-34		dBc	Record	-38	-40.5	-28	P
	IP3		+57		dBm	Calculate	+59	+60.3	+68.8	
Harmonics @ rated P_{1dB}	2^{nd}			-20	dBc	Record	-35.1	-38.6	-73.9	P
	3^{rd}			-20			-23.0	-48.4	-83.9	
Spurious Signals	Spur			-60	dBc	Record	<-70	<-70	<-70	P
Switching Time, 1KHz TTL, P_{IN} = 0dBm	T_{ON}			50	µSec	Record	x	3.5	x	P
	T_{OFF}			50			x	0.9	x	
Operating Voltage – Test @ $120V_{AC}$	V_{AC}	100		240	Volt	Verify	x	√	x	P
AC Current @ Standby	I_{DQ}			4.0	Amp	Record	x	3.7	x	P
AC Current Consumption, $120V_{AC}$ P_{OUT} = 120Watts	I_{AC}			15.0	Amp	Record	12.9	10.3	11.4	P
	P_D			1800	Watt	Calculate	1548	1236	1368	P
Input Overdrive - Test for 5Sec.	P_{OD}			+10	dBm	Record P_{OUT}	51.3	52.0	51.1	P
Load VSWR – Test for 5Sec. @ rated P_{1dB}	Open		6.0		Amp	Record I_{AC} **Note** 1	9.8	10.1	9.8	P
Load VSWR - Test for 5Sec. @ rated P_{1dB}	Short		6.0		Amp	Record I_{AC} **Note** 1	10.7	9.9	9.9	P
Thermal Overload	T_{OD}			85	°C	Record	x	73	X	P

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INTERFACE

LCD Controller Settings (Opt 062)	Firmware	NTE	Max ALC	VVA		Fwd./Rev.	Watt/dB	GPIB	RS-422	Monitors
	Version	dBm	dBm	Min	Max	-	-	-	-	-
Verify / Record	3.3	52	51.8	29.8	54.8	N/A	N/A	N/A	√	√

I/O Connector D-Sub Connector, 9-Pin

I/O Connector	1 - Fwd	2 - Rev	3 - V_{DC} (TP) 5 $V_{DC} \pm$ 0.2 V_{DC}	4 – VVA (TP) 5.6$V_{DC} \pm$ 0.2	5 - Ex SD TTL $_{High}$	6 - V_{DC} (TP) 12 $V_{DC} \pm$ 0.5V_{DC}	7 - V_{DC} (TP) 13$V_{DC} \pm$ 1V_{DC}	8 & 9 - GND
Verify/Record @ P_{1dB}	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes: **1. Verify No change in performance after test.**
2. Source correction included in P_{IN} measurement: 0.0dB @ 1000MHz.
3. Output Directional Coupler will reduce Power Capability by 0.5-0.75dB.

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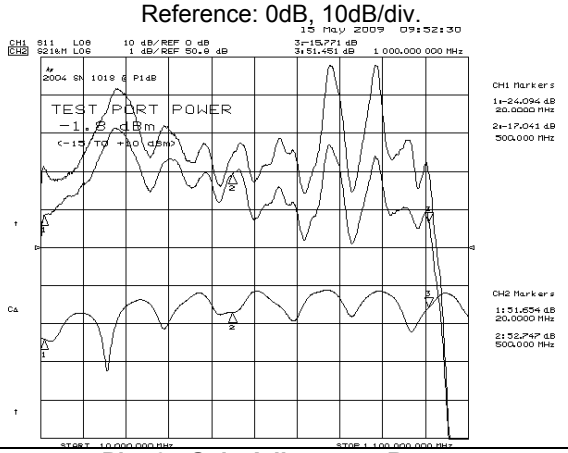
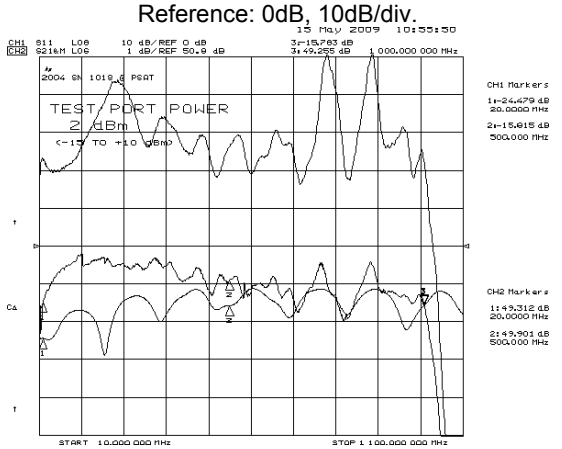
Performance Plots

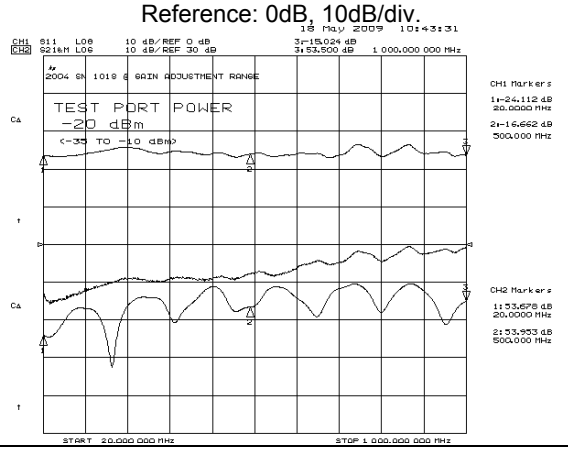
Plots 1 - Small Signal and P_{1dB} Gain
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -1.8dBm **(Note 2, 3)**
Reference: 50.8dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



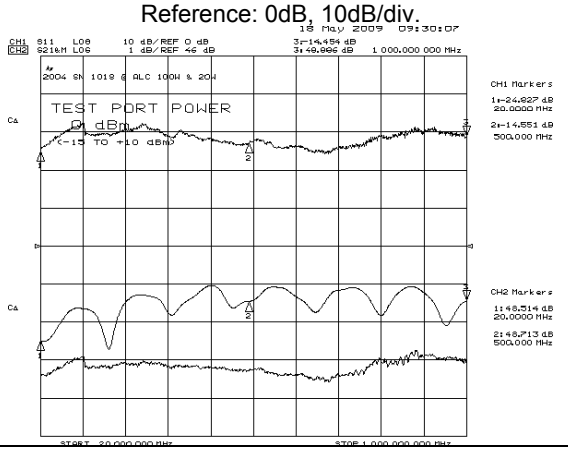
Plot 2 - Small Signal and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: P_{SAT} @ P_{IN} = 2.0dBm **(Note 2, 3)**
Reference: 50.8dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 - Gain Adjustment Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Middle Curve: VVA @ Minimum Gain
Reference: 30dB, 10dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 4 - ALC Flatness @ 10W & 50W
Top Curve: ALC @ 50W, P_{IN} = 0dBm
Middle Curve: ALC @ 10W, P_{IN} = 0dBm
Reference: 46dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



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