

## Solid State Broadband High Power Amplifier

**2038 – BBS4A5AEL**
**1000 – 2000 MHz / 25 Watts**

The BBS4A5AEL (2038) is suitable for broadband and band specific L-Band high power linear applications. This amplifier utilizes linear GaAsFET 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 housing, and qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.



SKU#: 2038CLRAAXXX

- Solid-state class A linear design
- Instantaneous ultra broadband
- Small and lightweight
- Standard front panel manual gain adjust
- Suitable for CW, AM and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness

### ELECTRICAL SPECIFICATIONS @ 120V<sub>AC</sub>, 25°C, 50 $\Omega$ system

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1000		2000	MHz
Power Output CW	P <sub>SAT</sub>	25	30		Watt
Power Output @ 1dB Gain Compression	P <sub>1dB</sub>	20			Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	44			dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>		0	3	dBm
Small Signal Gain Flatness	$\Delta G$			$\pm 1.5$	dB
Gain Adjustment Range	FGA	20	25		dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure	NF			10	dB
Third Order Intercept Point 2-Tone @ 33dBm/Tone, 100kHz Spacing	IP3		+53		dBm
Harmonics @ P <sub>OUT</sub> = 20W	2 <sup>ND</sup> / 3 <sup>RD</sup>		-30 / -20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V <sub>AC</sub>	100		240	Volt
Power Consumption @ P <sub>OUT</sub> = 25W	P <sub>D</sub>			200	Watt

### MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions	19 x 3.5 x 18	Inch
Weight	30	lb.
RF Connectors Input/Output	Type-N, Female	
Cooling	Built-in internal forced air cooling system	

### ENVIRONMENTAL CHARACTERISTICS (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
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		

### LIMITS

Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P <sub>OUT</sub> = 20W	$\infty$ @ any angle & amplitude for duration of 1 minute 3:1 @ any angle & amplitude continuous	-
Thermal Overload	80°C shutdown	Max

## Solid State Broadband High Power Amplifier

2038 – BBS4A5AEL

1000 – 2000 MHz / 25 Watts

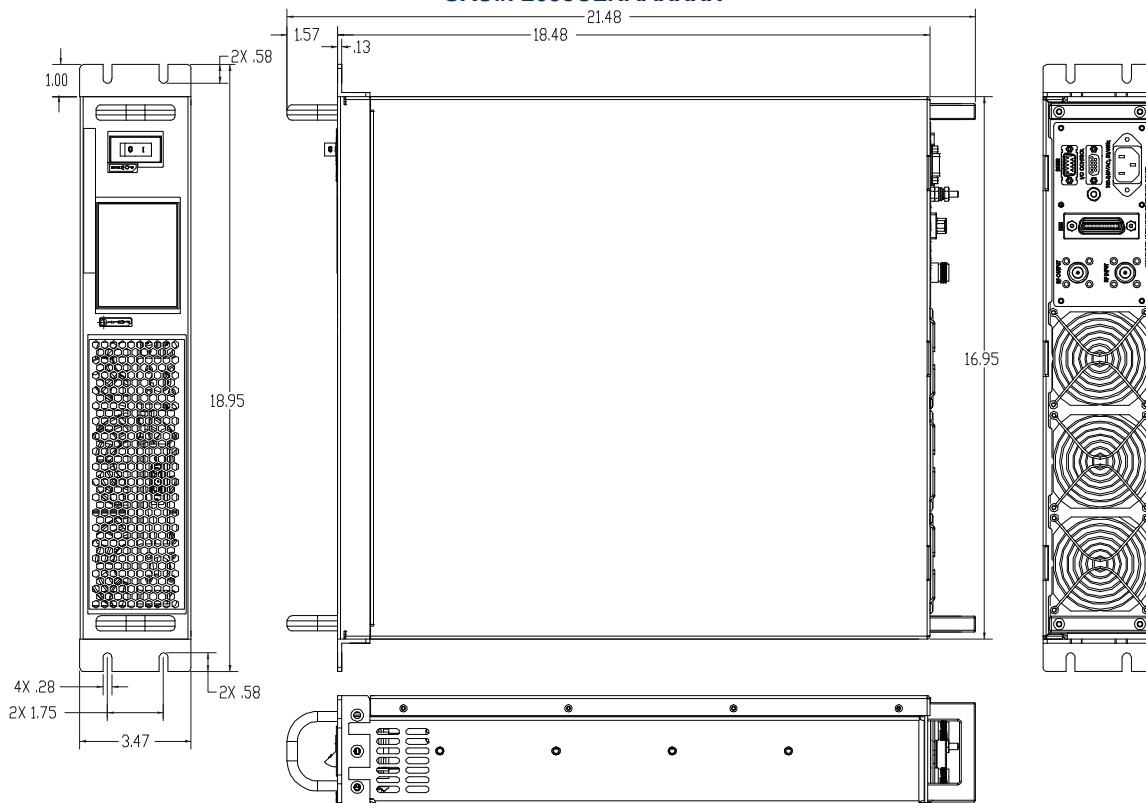
### AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2038CLRAAXXX	LCD controller, Rear RF connectors 100-240VAC, 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. <i>Note: (Output power is lowered by 0.5-0.75dB with this option)</i>
2038CFFAAXXX	FGA (Front Gain Adjust) Front RF Connectors, 100-240VAC, 50/60Hz	
2038CFRAAXXX	FGA (Front Gain Adjust) Rear RF Connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	

### I/O CONNECTOR – D-sub 9-pin, Female

Pin #	Description	Specification	Option	
			FGA	LCD
1	Forward Test Point	Analog voltage 0-5V <sub>DC</sub> relative to forward power level		√
2	Reverse Test Point	Analog voltage 0-5V <sub>DC</sub> relative to reverse power level		√
3	5V Test Point	Test point: 5.0V <sub>DC</sub> ±0.2	√	√
4	VVA Test Point	Test point: 5.6V <sub>DC</sub> ±0.5V <sub>DC</sub>	√	
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (Internally Pulled-low)	√	√
6	12V Test Point	Test point: 12.0V <sub>DC</sub> ±0.5V	√	√
7	P/S Test Point	Test point: 12.0-15.0V <sub>DC</sub>	√	√
8&9	GND	Ground	√	√

### SYSTEM OUTLINE SHOWN SKU#: 2038CLRAAXXX



# Solid State Broadband High Power Amplifier

2038 – BBS4A5AEL

1000 – 2000 MHz / 25 Watts

## TYPICAL PERFORMANCE PLOTS

**Plots 1 – Small Signal Gain and  $P_{1dB}$  Gain**  
 Middle Curve: Small Signal Gain @  $P_{IN} = -20dBm$   
 Top Curve: Power Gain @  $P_{1dB}$ ,  $P_{IN} = -2dBm$   
 Reference: 44dB, 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:  $P_{SAT}$  @  $P_{IN} = -1dBm$   
 Reference: 44dB, 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: 30dB, 10dB/Div.  
 Bottom Curve: Input Return Loss @ Minimum Gain  
 Reference: 0dB, 10dB/Div.



**Plot 4 – ALC Flatness**  
 Top Curve: ALC @ 41dBm,  $P_{IN} = 0dBm$   
 Bottom Curve: ALC @ 34dBm,  $P_{IN} = 0dBm$   
 Reference: 38dB, 1dB/Div.  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.

