

## Avantek Products

# Premium Performance GaAs FET Amplifier Series 6 to 18 GHz

## Technical Data



AWT 186 X XX U Series

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### Features

- Excellent Noise Figure Performance
- Tightly Controlled Small Signal Gain
- Broad Range of Gain Options
- Excellent Gain Performance over Temperature
- Guaranteed P-1 dB and IP3 Performance
- Internal Voltage Regulation
- PHEMT Technology

### Applications

The AWT 186 X XX U premium product series has been designed for application in systems where amplifier noise figure is critical in establishing overall receiver sensitivity. Excellent noise figure and gain variation performance, as well as a wide range of gain options, make these products ideal for broad band military electronic warfare and commercial communications systems. Repeatable unit to unit performance ensures consistent system performance from prototype through production.

### Description

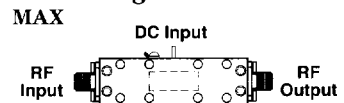
The AWT 186 X XX U premium product series offers the system designer a broad range of high performance non-temperature-compensated amplifiers covering the full 6 to 18 GHz frequency band. HP PHEMT GaAs FET devices and rugged hybrid construction techniques, provide excellent low noise and medium power performance with proven reliability.

This series consists of twenty-two amplifiers with minimum gain options from 17 dB to 42 dB and power outputs up to +20 dBm at 1 dB gain compression. Each unit consists of a cascade of balanced hybrid microcircuits specifically designed to provide an optimal combination of noise figure, small signal gain, and power performance.

### Screening

A standard reliability screening (R-series) is available for these amplifiers. R-screening uses MIL-STD 883, Method 5008 Class B as a guide, which is modified to accommodate the physical

### Pin Configuration



attributes of this product line. Method 5008 was developed for single microcircuits of relatively low complexity, housed in small connectorless packages, and contains some stress levels inappropriate for larger more complex amplifiers. The Reliability Screening Table provides detail on the R-screening test plan.

## Operation

The AWT 186 X XX U series of amplifiers operate from a +12V power supply at a maximum current specified in the Electrical Specifications Table. Internal voltage regulation facilitates operation at voltages other than +12 within the minimum and maximum levels listed in the Maximum Ratings Table. The units are designed to be secured to a thermally conductive mounting surface which will maintain case temperature at 25°C. While the AWT 186 X XX U series of amplifiers specified performance is guaranteed at 25°C, the units are capable of operating over the temperature range of -54°C to +100°C as indicated in the Electrical Specifications Table.

RF input power must be controlled to prevent damage to the input PHEMT devices. See the Electrical Specifications Table for input power restrictions. The PHEMTs are sensitive to electrostatic discharge and should be handled with appropriate ESD processes and procedures.

The aluminum packages are laser welded and tested for hermeticity, which enables operation in environments with high humidity and in the presence of contaminants.

## Maximum Ratings

Parameter	Min	Max	Units
DC Input	11	18	Volts
Reverse Voltage		-25	Volts
Power Supply Ripple			
Power Supply Noise			
CW RF Input Power		20	dBm
Pulsed RF Input Power		+30 (Note 1)	dBm
Operating Temperature	-54	+100	°C
Storage Temperature		150	°C
Humidity		100	%

Notes:

1. 1 µsec pulse width, 1% duty cycle max.

## Reliability Screening

Test	MIL STD 883 Method	Condition
Internal Visual Inspection	(Note 1)	AWS-014355-800
Pre-Seal Bake	—	T <sub>A</sub> = 125°C, 3 hours
Stabilization Bake	1008	Condition B, T <sub>A</sub> = 125°C, 24 hours minimum
Temperature Cycle	1010	Condition B, 10 Cycles, -55°C to +125°C
Constant Acceleration	2001	Condition A, Y axis, 5000 g
Hermetic Seal, Fine	1014	Condition A, 1 x 10 <sup>-6</sup> ATM cc/sec maximum
Hermetic Seal, Gross	1014	Condition C
Burn-in	1015	Condition B, 168 hours, T <sub>A</sub> = 100°C
Final Electrical		T <sub>A</sub> = 25°C, Standard ATP
External Visual	2009	

Notes:

1. Internal visual standard uses Method 2017 Mil-Std 883 as a guide for microwave devices. Actual document used is workmanship Standard AWS-014355-800.

## Electrical Specifications

Guaranteed Specifications @ 25°C Case Temperature, Max Operating Temperature of 100°C

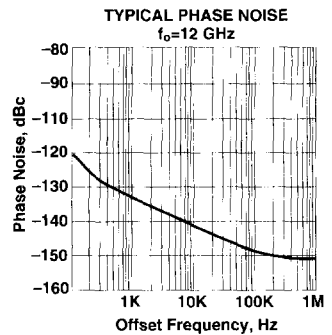
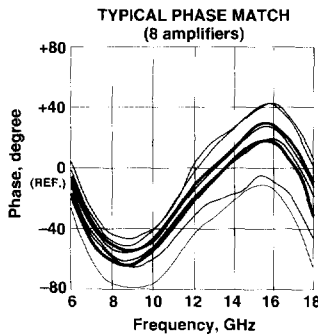
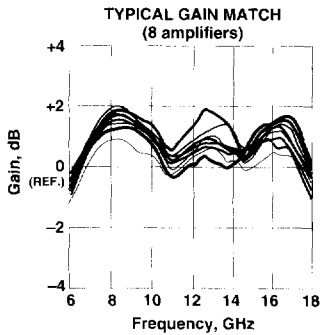
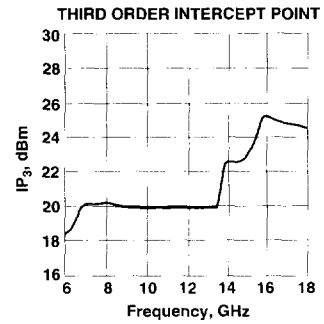
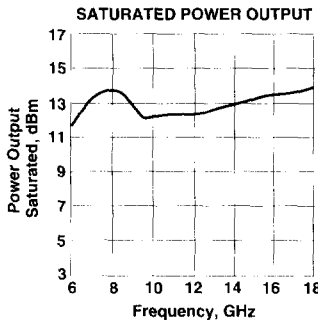
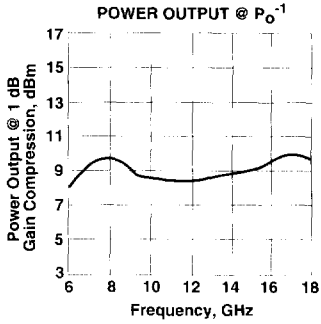
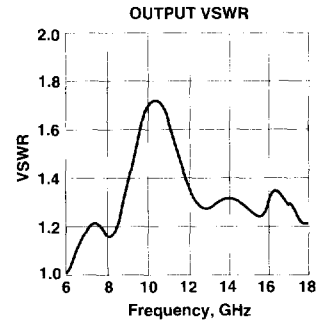
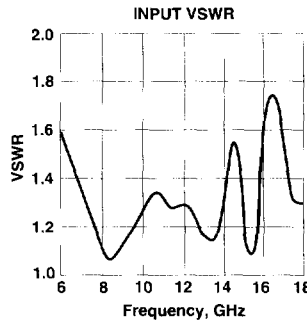
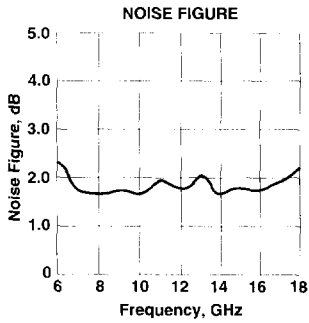
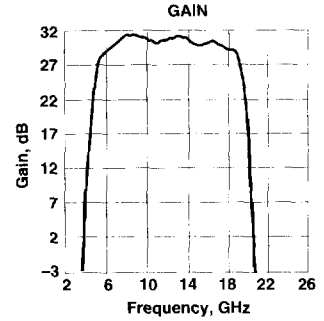
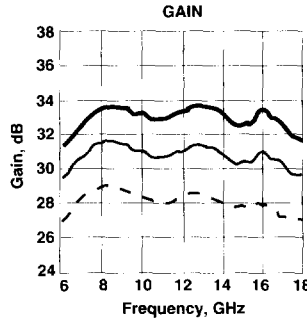
Model	Gain (dB)	Gain (dB)	Gain Variation (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Third Order Intercept Point (dBm)	PSAT (dBm)	VSWR (50 ohms)		Voltage (VDC)	Input Power Current @ +12 V <sup>1</sup>	Case Style
	Min.	Max.	Max. (P-P)	Max.	Minimum	Minimum	Min.	In	Out		Max. (mA)	
<b>Low Noise Amplifiers</b>												
AWT 186 N 23 U 17	17.0	20.0	2.0	2.3	7.0	15.0	9.0	1.8	1.8	+12	85	MAX2L
AWT 186 N 23 U 20	20.0	23.0	2.0	2.3	4.5	12.5	6.5	1.8	1.8	+12	130	MAX4L
AWT 186 N 23 U 23	23.0	26.0	2.0	2.3	7.0	15.0	9.0	1.8	1.8	+12	135	MAX4L
AWT 186 N 23 U 25	25.0	28.0	2.0	2.3	10.5	18.5	12.5	1.8	1.8	+12	145	MAX4L
AWT 186 N 23 U 28	28.0	32.0	3.0	2.3	6.5	14.5	8.5	1.8	1.8	+12	170	MAX4L
AWT 186 N 23 U 32	32.0	36.0	3.0	2.3	10.0	18.0	12.0	1.8	1.8	+12	185	MAX4L
AWT 186 N 23 U 36	36.0	40.0	3.0	2.3	12.0	20.0	14.0	1.8	1.8	+12	210	MAX4L
AWT 186 N 23 U 40	40.0	45.0	4.0	2.3	13.0	21.0	15.0	1.8	1.8	+12	360	MAX6L
<b>Low Noise Medium Power Amplifiers</b>												
AWT 186 N 27 U 23	23.0	26.0	2.0	2.7	14.5	22.5	16.5	1.8	1.8	+12	265	MAX4L
AWT 186 N 27 U 25	25.0	28.0	2.0	2.7	17.0	25.0	19.0	1.8	1.8	+12	265	MAX4L
AWT 186 N 27 U 28	28.0	32.0	3.0	2.7	15.0	23.0	17.0	1.8	1.8	+12	305	MAX4L
AWT 186 N 27 U 31	31.0	35.0	3.0	2.7	17.0	25.0	19.0	1.8	1.8	+12	305	MAX4L
AWT 186 N 27 U 34	34.0	38.0	3.0	2.7	18.0	26.0	20.0	1.8	1.8	+12	305	MAX4L
AWT 186 N 27 U 37	37.0	42.0	4.0	2.7	16.0	24.0	18.0	1.8	1.8	+12	345	MAX4L
AWT 186 N 27 U 42	42.0	47.0	4.0	2.7	18.0	26.0	20.0	1.8	1.8	+12	345	MAX6L
<b>100 mW Amplifiers</b>												
AWT 186 P 20 U 22	22.0	25.0	2.0	4.5	20.0	28.0	22.0	1.8	1.8	+12	430	MAX4L
AWT 186 P 20 U 25	25.0	28.0	2.0	4.5	20.0	28.0	22.0	1.8	1.8	+12	430	MAX4L
AWT 186 P 20 U 27	27.0	30.0	2.0	4.5	20.0	28.0	22.0	1.8	1.8	+12	590	MAX6L
AWT 186 P 20 U 29	29.0	33.0	3.0	4.5	20.0	28.0	22.0	1.8	1.8	+12	590	MAX4L
AWT 186 P 20 U 32	32.0	36.0	3.0	4.5	20.0	28.0	22.0	1.8	1.8	+12	590	MAX4L
AWT 186 P 20 U 35	35.0	39.0	3.0	4.0	20.0	28.0	22.0	1.8	1.8	+12	490	MAX4L
AWT 186 P 20 U 39	39.0	44.0	4.0	4.0	20.0	28.0	22.0	1.8	1.8	+12	650	MAX6L

Note: Units contain internal voltage regulator and normally operate with input voltage of +12 to +15 Vdc. Currents listed are for small signal gain at 25°C. When driven into Psat and cold temperature, the maximum current may increase by 25%.

# AWT186N23U28 Typical Performance Over Temperature

(@ +12 VDC unless otherwise noted)

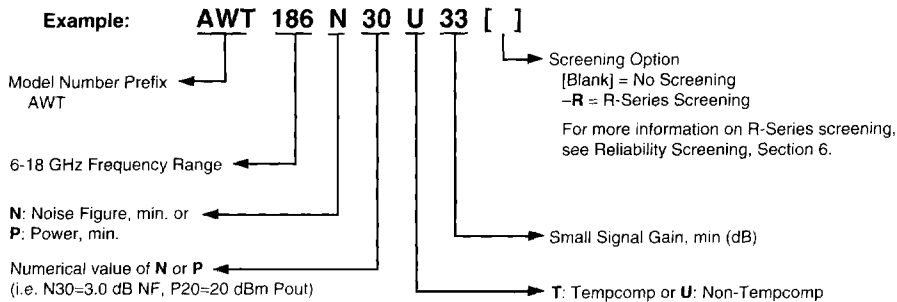
Key: +25°C ———  
 +100°C - - - -  
 -54°C ———



## Ordering Information

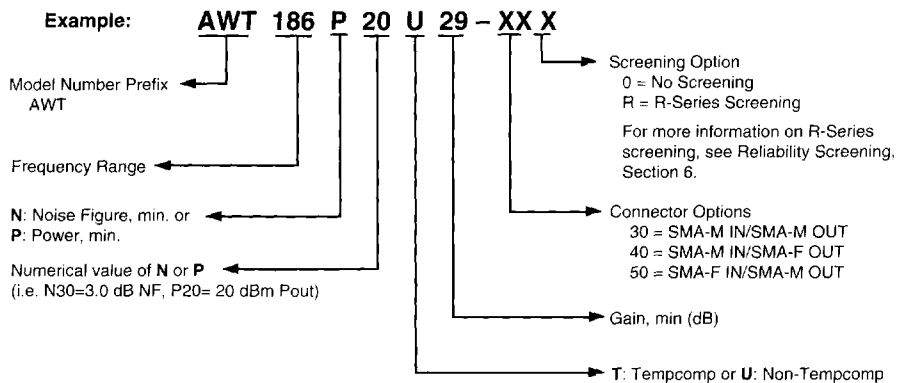
The AWT 186 X XX U series of amplifiers may be ordered with four connector options, with or without R-series screening. The Product Options part numbering scheme shown below is provided to facilitate ordering the correct amplifier.

### Product Options with SMA-F IN/SMA-F OUT Connectors ONLY



This example would order a 6–18 GHz amplifier with a noise figure of 3.0 dB max, no temp comp, a small signal gain of 33 dB minimum, and NO "R" Series Screening.

### Product Options with Male-Female SMA Connectors



This example with a -40R suffix would order a 6–18 GHz amplifier with a Pout of 20 dBm minimum, no temp comp, a small signal gain of 29 dB minimum, a SMA-male input connector and SMA-female output connector, and "R" Series Screening.