

Avantek Products

General Purpose GaAs FET Amplifier Series 6 to 18 GHz

Technical Data



AFT 186 X XX U Series

Features

- **Low Cost**
- **Excellent Noise Figure and Medium Power Performance**
- **Hermetically Sealed Low Profile Case**
- **Internal Voltage Regulation**
- **PHEMT Technology**

Applications

The AFT 186 X XX U product series has been designed for those applications where moderate noise figure and power output performance are acceptable. This product series provides a low cost solution for new system development or price sensitive commercial applications.

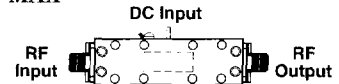
Description

The AFT 186 X XX U product series offers the system designer a low cost, high value family of amplifiers covering the full 6 to 18 GHz frequency band. HP PHEMT GaAs FET devices and rugged hybrid construction techniques result in reliable amplifier performance. This series of amplifiers is offered for cost sensitive applications where premium performance is not required. This product series is offered without temperature compensation and selected gain levels. Performance is guaranteed at 25°C.

This series consists of thirteen amplifiers with minimum gain options from 18 dB to 48 dB and power outputs up to +18 dBm at 1 dBm 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.

Pin Configuration

MAX



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 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 AFT 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 +12V 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 AFT 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 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 _A = 125°C, 3 hours
Stabilization Bake	1008	Condition B, T _A = 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 ⁻⁶ ATM cc/sec maximum
Hermetic Seal, Gross	1014	Condition C
Burn-in	1015	Condition B, 168 hours, T _A = 100°C
Final Electrical		T _A = 25°C, Standard ATP
External Visual	2009	

Notes:

1. Internal visual standard uses Method 2017 Mil-Std 883 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

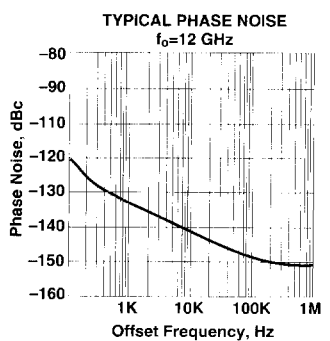
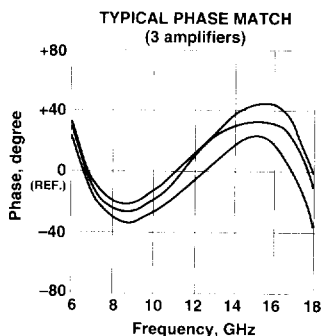
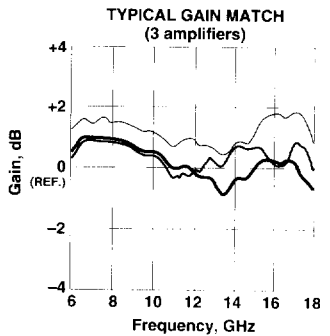
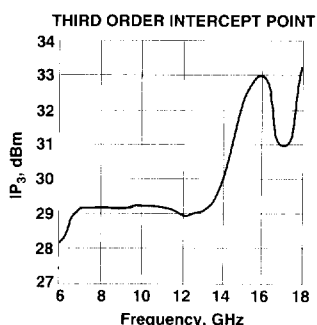
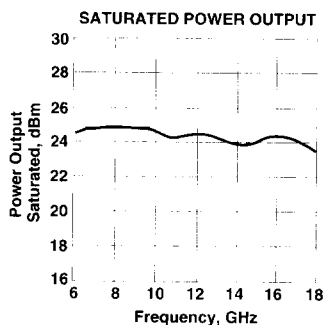
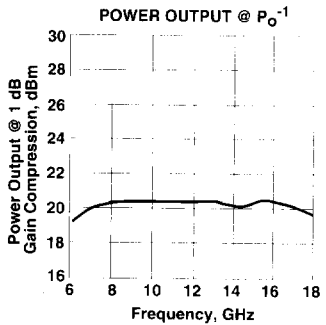
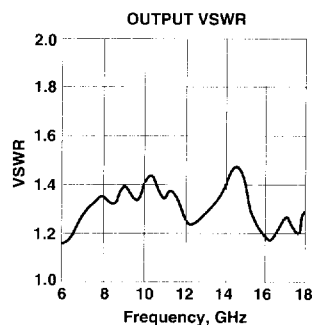
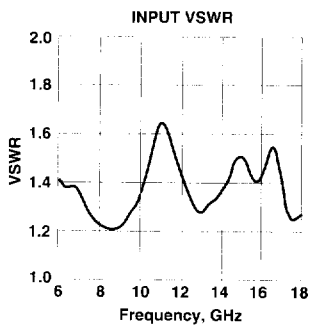
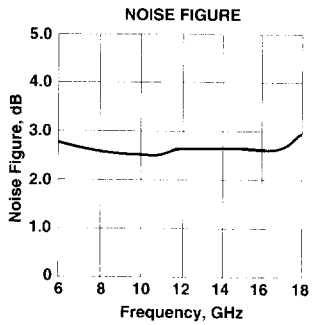
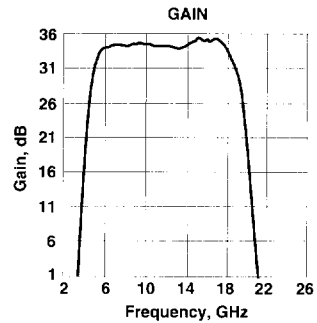
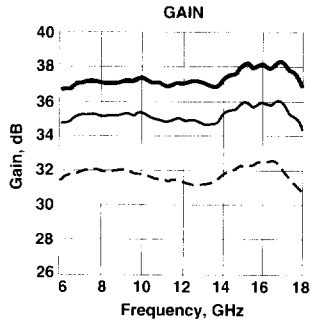
Model	Gain (dB)	Gain (dB)	Gain Variation (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	PSAT (dBm)	VSWR (50 ohms)		Voltage (VDC)	Input Power Current @ +12 V ¹	Case Style
	Min.	Max.	Max. (P-P)	Max.	Minimum	Min.	In	Out		Max. (mA)	
Low Noise Amplifiers											
AFT 186 N 40 U 18	18.0	22.0	3.0	4.0	10.0	12.0	2.0	2.0	+12	140	MAX2L
AFT 186 N 40 U 23	23.0	28.0	3.0	4.0	10.0	12.0	2.0	2.0	+12	205	MAX4L
AFT 186 N 40 U 28	28.0	33.0	4.0	4.0	10.0	12.0	2.0	2.0	+12	205	MAX4L
AFT 186 N 40 U 33	33.0	39.0	4.0	4.0	10.0	12.0	2.0	2.0	+12	265	MAX4L
AFT 186 N 40 U 38	38.0	44.0	5.0	4.0	10.0	12.0	2.0	2.0	+12	265	MAX4L
AFT 186 N 40 U 43	43.0	51.0	5.0	4.0	10.0	12.0	2.0	2.0	+12	330	MAX6L
AFT 186 N 40 U 48	48.0	56.0	5.0	4.0	10.0	12.0	2.0	2.0	+12	330	MAX6L
Low Noise Medium Power Amplifiers											
AFT 186 N 50 U 21	21.0	27.0	3.0	5.0	18.0	20.0	2.0	2.0	+12	430	MAX4L
AFT 186 N 50 U 24	24.0	30.0	3.0	5.0	18.0	20.0	2.0	2.0	+12	410	MAX4L
AFT 186 N 50 U 30	30.0	37.0	4.0	5.0	18.0	20.0	2.0	2.0	+12	395	MAX4L
AFT 186 N 50 U 35	35.0	42.0	4.0	5.0	18.0	20.0	2.0	2.0	+12	390	MAX4L
AFT 186 N 50 U 40	40.0	48.0	5.0	5.0	18.0	20.0	2.0	2.0	+12	470	MAX6L
AFT 186 N 50 U 45	45.0	52.0	5.0	5.0	18.0	20.0	2.0	2.0	+12	470	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%.

AFT186N50U30 Typical Performance Over Temperature

(@ +12 VDC unless otherwise noted)

Key: +25°C —
 +100°C - - -
 -54°C —

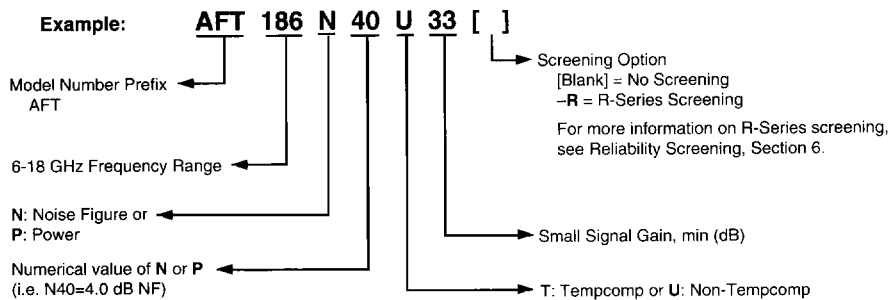


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Ordering Information

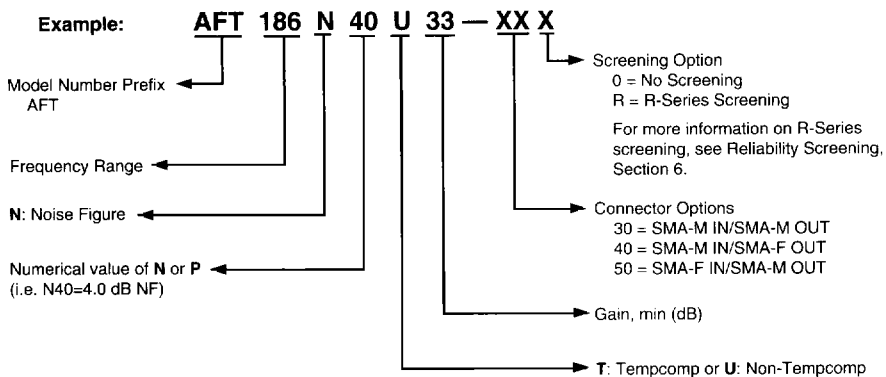
The AFT 186 X XX U series of amplifiers may be ordered with four connector options, with or without R-series screening. The Product Options part numbering scheme shown below is provided to facilitate ordering the correct amplifier.

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 4.0 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 noise figure of 4.0 dB maximum, no temp comp, a small signal gain of 33 dB minimum, a SMA-male input connector and SMA-female output connector, and "R" Series Screening.