Standard Amplifier Capability

MicroWave Technology, Inc. has been a leading manufacturer of high performance amplifiers since it was founded in 1982. MwT's principal strengths are derived from an in-house quarter micron Gallium Arsenide device fabrication technology, innovative circuit design and advanced packaging techniques. Led by a core group of GaAs material/device technologists and Microwave design engineers, MwT is a vertically integrated company with both wideband and narrowband standard and custom-special amplifiers. With its long history of successful participation on numerous military programs for U.S. and International customers, MwT has earned a reputation as a supplier of reliable and state-of-the-art amplifiers.

Most manufacturing is performed within clean room facilities (areas up to class 100), located in a modern 30,000 square foot facility in Fremont, Ca (California's Silicon Valley), which are regulated for humidity, temperature, and particle count. Process technologies include Epi growth of the active layers on GaAs devices, thin-film circuit fabrication, hybrid assembly and test, laser welding and environmental screening. MwT maintains Quality and Inspection systems which are approved to MIL-I-45208 and MIL-Q-9858 and is ISO9001 certified.

This catalog gives a limited sampling of the wide variety of MwT Amplifier Products. These are divided into several categories for convenient reference. All of these amplifiers utilize MwT's line of standard hybrid gain, temperature compensation, and voltage regulator modules. All amplifiers are manufactured to MwT's stringent workmanship standards, laser welded for hermeticity and screened to assure reliability. Full screening to MIL-STD-833 is available. Most of the units are delivered with internal voltage regulators which include reverse bias protection.

Standard Amplifiers for Defense and Aerospace

The first major family is a Wideband Amplifier series covering 0.5–20GHz in octave and muliti-octivae bands. These are ideal for many EW and test applications. Temperature compensation option is available for all types of MwT amplifiers. Another standard product option is a limiting Amplifier series in which MwT's expertise in deigning for suppression of simultaneous signals is exploited for use in systems for military high-threat-density environments.

The second major family is principal focus in telecommunication and narrow-band military applications. MwT has a unique capability in the fabrication of low noise, medium power, and low intermediation distortion GaAs FETs. This allows MwT to produce extremely good LNA and efficient high intercept amplifiers.

Wide-Band GaAs FET and PHEMT Amplifiers

- Multi-octave Bandwidth
- Power levels to +30dBm
- Low Noise figures
- Excellent Temperature Stability (with Temperature Compensation Options)
- Simultaneous Signal Suppression (with Limiting Amplifier Options)
- Rugged Hermetic Package
- Removable SMA connectors

The AW wideband amplifier family is the best known of Mwt's product offering. Based on standard gain modules, these units incorporate voltage regulators which also provide reverse bias protection allowing safe operation over a 12–15 Volt range. The specifications in the attached tables are guaranteed at 25 degree C. However all units will operate over -54 to 95 degree C with some performance variation. Input and Output VSWR is 2:1 maximum. Amplifiers typically can survive with input power of 23dBm CW and 1uSec of pulse of +30dBm peak at 0.1% duty cycle. Models ending with "N" can survive +13dBm CW and +23dBm pulsed. Typical IP3 is 10dB above P_{1dB}.

Temperature Compensated Options

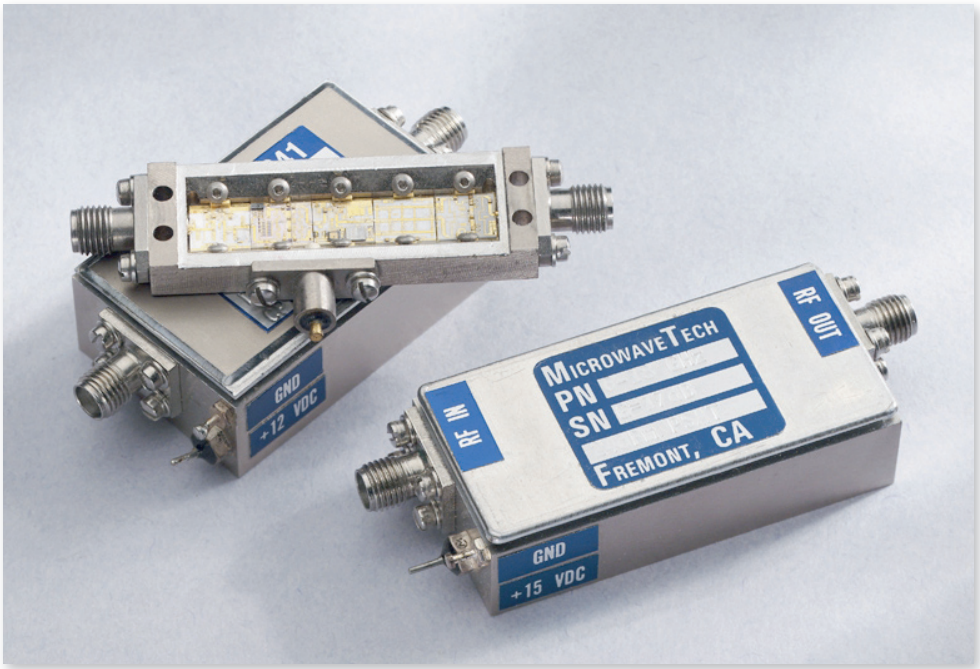
The AT family of amplifiers are based on MwT's standard gain stages and incorporate PIN diode temperature compensation modules for minimum gain variation.

Limiting Amplifier Options

The AL family of limiting amplifiers utilizes MwT's standard gain modules and some units incorporate PIN diode temperature compensation modules for minimum noise power and output variation. MwT has developed proprietary techniques to provide simultaneous-small-signal-suppression where desired.

Narrow-Band GaAs FET and PHEMT Amplifiers

- High Performance GaAs MESFET and PHEMT design
- Rugged Hermetic Package
- Field Proven Reliability
- Miniature Outline (Low Noise Option)
- Ultra Linear Operation (Power Options)
- Power Levels for 2 Watts (Power Options)
- Exceptional 3rd Order Intercept Points (Power Options)
- High Power Efficiency (Power Options)
- Compact Size and Weight (Power Options)



MwT's Standard Amplifiers

Low Noise PHEMT Options

The AN amplifier family utilizes MwT's gain module designs which incorporate Pseudomorphic High Electron Mobility Transistors (PHEMTs) to achieve very low noise figures.

Medium Power GaAs FET and PHEMT Options

The AP power amplifier family utilizes Mwt's medium power modules. In additional to high output power, MwT has developed proprietary techniques to provide exceptionally high linearity, achieving IP3 of up to 12-15dB above P_{1dB} as an option.

Power Telecommunications and Military Communication Options

MwT's family of Telecommunications power amplifiers are designed for high data rate and multi-carrier applications. Making optimal use of MwT's specially processed GaAs devices, these amplifiers are used for high capacity radio link where digital modulation requires improved dynamic range and low distortion. Major applications include VSAT, Microwave Radio, MMDS, Wireless Backhaul, and CATV AM Links, and various military communication systems. Optional features available include output couplers, power monitor detection, temperature compensation, freq, gain and IP3 levels.

High-Reliability Screening

To assure optimum reliability, all MwT amplifiers are designed to meet the military's most rigorous standards for microwave devices. Each amplifier is built to withstand the stringent environmental conditions specified by MIL-E-5400 and MIL-E-16400.

Every amplifier is subjected to the standard screening program defined below. This program has been designed in accordance with MIL-STD-883 to be a cost effective approach to insuring dependable product performance. More extensive screening programs can be provided to customers with special requirements for enhanced product reliability.

MwT's Standard Amplifer Screening Flow

TEST	MIL-STD METHOD	CONDITION
Stabilization Bake	883/1008	125 °C for 12 hrs. min.
Pre-Cap Visual Inspection	883/2017	
Hermeticity-Gross Leak	202/112	Condition D
Temperature Cycling	883/1010	Condition B modified -55 to 125 °C, 10 cycles min.
Burn-in	883/1015	Condition B modified At 80°C for 24 hrs min., Voltage applied
Final Electrical ATP	Per item specification	
Final Mechanical	883/2009	

Standard Amplifier Selection Guide

AmplifierType	ModelNumber	FreqRange (GHz)	Linear Gain (dB) MIN/TYP	Gain Flatness (±dB) MAX	Noise Figure (dB) MAX/TYP	Pout-1dB (dBm)MIN/TYP	Current@12V (mA) MAX	Case Code
WideBand	AW052202N	0.5-2	30/33	1.4	2.5/2.2	15/17	300	SL-2
WideBand	AW052203	0.5-2	23/26	1.0	3.0/2.5	17/19	260	SL-2
WideBand	AW054201N	0.5-4	19/26	1.0	2.5/2.2	15/17	220	SL-2
WideBand	AW054203	0.5-4	21/24	1.0	4.5/4.0	16/18	260	SL-2
WideBand	AW12201N	1-2	28/31	1.1	2.5/2.2	18/20	225	SL-2
WideBand	AW12203	1-2	27/30	1.1	3.5/3.0	27/28	555	SL-2
WideBand	AW26201N	2-6	21/23	1.0	2.5/2 .2	13/15	155	SL-2
WideBand	AW26204	2-6	19/21	1.0	4.5/4.0	23/24	335	SL-2
WideBand	AW28201N	2-8	29/32	1.5	3.0/2.5	13/15	175	SL-2
WideBand	AW28302	2-8	31/33	1.5	5.5/5.0	23/24	615	SL-3
WideBand	AW612301N	6-12	30/32	1.0	3.5/3.0	16/17	240	SH-3
WideBand	AW612304	6-12	22/23	1.0	6.5/6.0	27/28	750	SH-4
WideBand	AW1218301N	12-18	24/26	0.8	3.5/3.0	14/15	230	SH-3
WideBand	AW1218504	12-18	29/31	1.3	7.5/7.0	27/28	1200	SH-6
WideBand	AW818301N	8-18	24/26	1.0	3.5/3.0	14/15	230	SH-3
WideBand	AW818504	8-18	29/32	1.5	7.5/7.0	27/28	1300	SH-6
WideBand	AW618301N	6-18	24/26	1.3	3.5/3.0	14/15	230	SH-3
WideBand	AW618302	6-18	19/21	1.3	6.0/5.5	20/21	350	SH-3
WideBand	AW618404	6-18	20/22	1.5	7.5/7.0	27/28	1200	SH-5
WideBand	AW218201N	2-18	25/28	1.8	5.0/4.5	6/7	135	SH-2
WideBand	AW218301N	2-18	24/26	2.0	6.5/6.0	15/16	365	SH-3
WideBand	AW218301	2-18	20/22	2.0	6.0/5.5	20/21	500	SH-3

AmplifierType	ModelNumber	FreqRange (GHz)	Linear Gain (dB) MIN/TYP	Gain Flatness (±dB) MAX	Noise Figure (dB) MAX/TYP	Gain vs Temp (±dB) MAX	Current@12V (mA) MAX	Case Code
Temp Comp	AT26301	2-6	21/23	1.0	6.0/5.5	0.8	300	SL-3
Temp Comp	AT26401	2-6	36/40	1.5	5.5/5.0	1.0	470	SL-4
Temp Comp	AT618401	6-18	22/24	1.0	7.5/7.0	0.8	380	SH-4
Temp Comp	AT618501	6-18	31/33	1.3	7.0/6.5	0.8	500	SH-5

AmplifierType	ModelNumber	FreqRange (GHz)	Pin Dynamic (dBm)MIN/MAX	Noise Power (dBm) MAX	Pout-sat (dBm)MIN/MAX	Pout Flatness (±dB) MAX	Current@12V (mA) MAX	Case Code
Limiting	AL26501	2-6	-50/10	7.0	+15/+20	1.0	500	SL-5
Limiting	AL618801	6-18	-50/10	10.0	+15/+20	2.0	800	LH-44

AmplifierType	ModelNumber	FreqRange (GHz)	Linear Gain (dB) MIN	Gain Flatness (±dB) MAX	Noise Figure (dB) MAX/TYP	Pout-1dB (dBm)MIN/TYP	Current@12V (mA) MAX	Case Code
Low Noise	AN12201N	1.2-1.8	28/31	0.5	1.7	15/17	180	CL-1
Low Noise	AN23201N	2.2-2.9	28/31	0.5	1.7	15/17	180	CL-1
Low Noise	AN45201N	4.4-5.0	25/27	0.5	1.7	15/17	180	CL-1
Low Noise	AN78201N	7.2-7.8	23/25	0.5	1.8	14/16	150	CH-1
Low Noise	AN910201N	9.0-10.0	21/23	0.5	1.8	14/16	150	CH-1
Low Noise	AN1415301N	14.5-15.3	24/27	0.5	2.1	13/15	200	CH-3
Low Noise	AN1718401N	17.7-18.7	29/32	1.0	2.8	12/14	250	CH-3

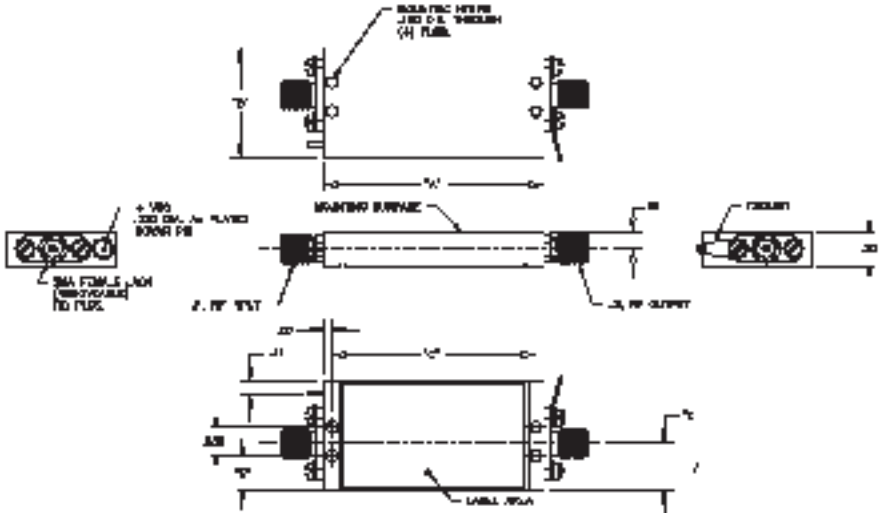
AmplifierType	ModelNumber	FreqRange (GHz)	Linear Gain (dB) MIN	Gain Flatness (±dB) MAX	VSWR In/Out MAX	Pout-1dB (dBm)MIN/TYP	Current@12V (mA) MAX	Case Code
Med Power	AP45401	4.4-5.0	35.0	0.6	1.5/1.5	30.0/30.5	1400	CL-3
Med Power	AP67402	5.9-6.4	33.0	0.6	1.5/1.5	33.0/33.5	2700	CL-3
Med Power	AP78401	7.2-8.4	33.0	0.8	1.5/1.5	30.0/30.5	1450	CH-3
Med Power	AP910401	9.0-10.0	32.0	0.8	1.5/1.5	30.0/30.5	1450	CH-3
Med Power	AP1011401	10.7-11.7	27.0	0.8	1.5/1.5	30.0/30.5	1550	CH-3
Med Power	AP1415401	14.0-14.5	23.0	0.5	1.5/1.5	29.0/30.0	1700	CH-3
Med Power	AP1718501	17.7-18.7	24.0	1.0	1.8/1.8	26.0/27.0	1250	CH-5

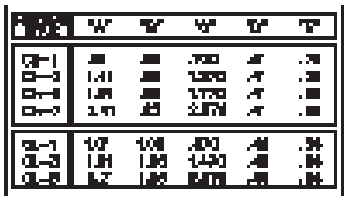
AmplifierType	ModelNumber	FreqRange (GHz)	Linear Gain (dB) MIN	Gain Flatness (±dB) MAX	IMD3(dBc)@Po (dBm)/Tone	Pout-1dB (dBm)MIN/TYP	Current@12V (mA) MAX	Case Code
TelecomPower	AP1819701	18.1-18.6	30	0.5	-50@+15	+27	2300	PH-01
TelecomPower	AP1819801	18.1-18.6	35	0.5	-54@+15	+29	2700	PH-01

Complete product datasheets can be downloaded from www.mwtinc.com

Com-Pak

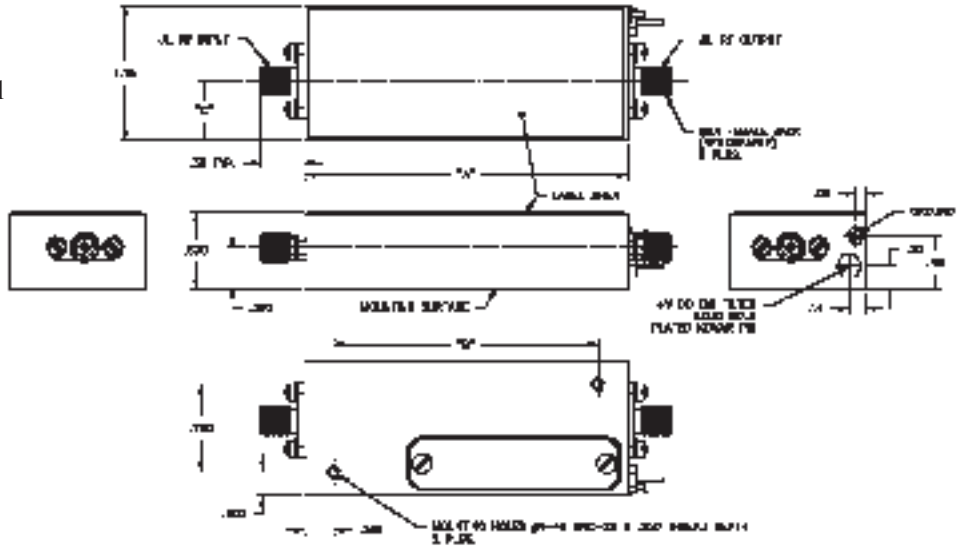
CH & CL Housing Series
SMA Female, DC Filter Feedthru
Though Hole Mounting

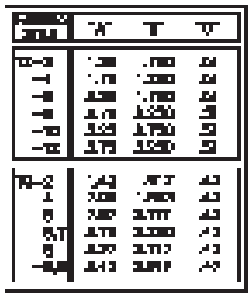




T-Pak

TX & TC Housing Series
SMA Female, DC Filter Terminal
#4-40 Threaded Mounting Holes





Slim-Pak

SH & SL Housing Series
SMA Female, DC Filter Feedthru
Though Hole Mounting