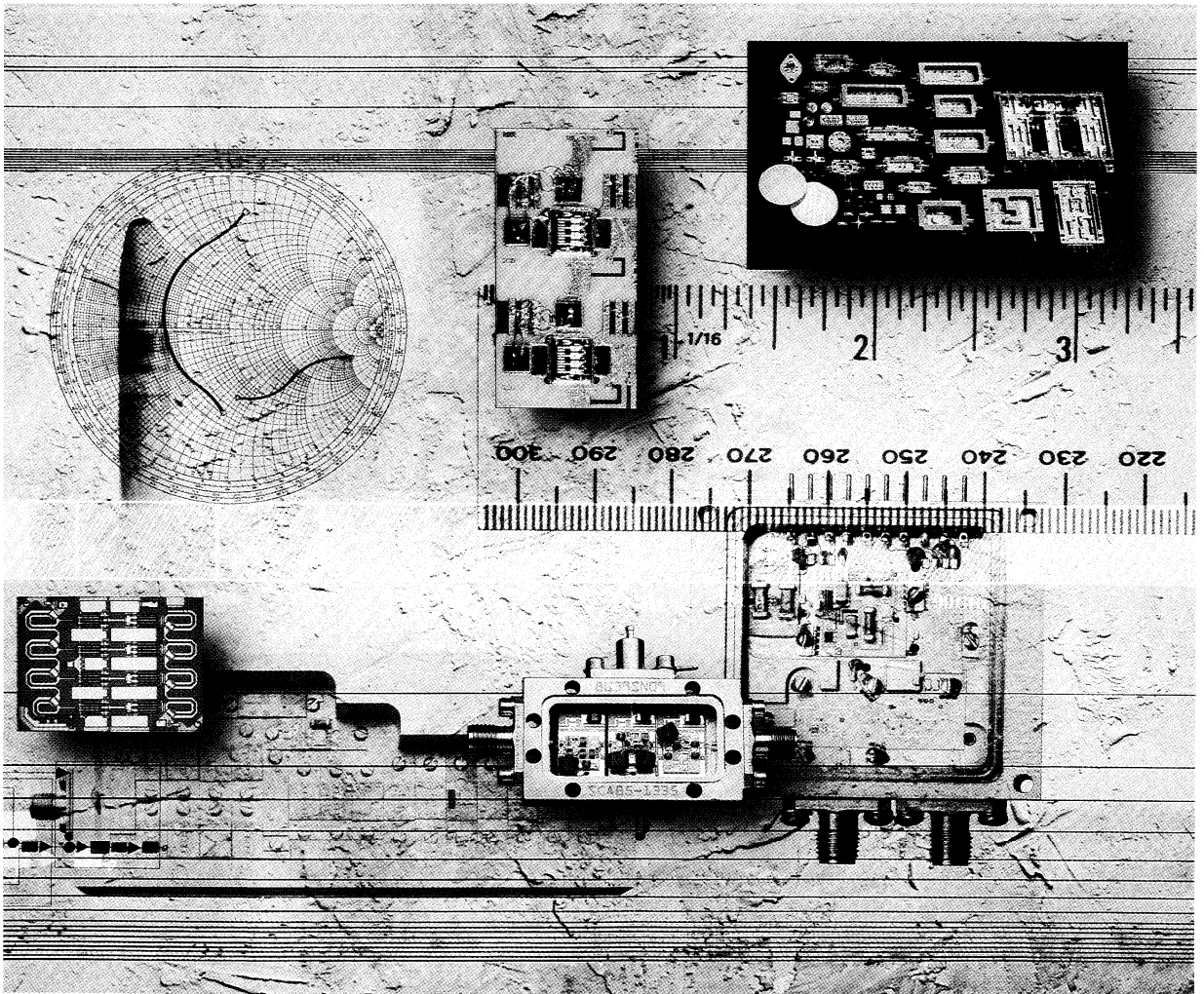


Product Guide



1988

This product guide is intended to provide a listing of the most widely-used solid-state microwave components available from Avantek, and to assist you in selecting the basic product types for your application.

Data sheets detailing the guaranteed and typical performance, and the physical dimensions of most products are available from stocking distributors (thin-film modular components only), from any of the worldwide network of factory-authorized representatives, or by contacting Avantek Component Sales.

Avantek, Inc. reserves the right to make changes to the products described in this catalog to improve performance, reliability or manufacturability at any time without notice. Changes and additions made after the publication of this catalog will be reflected in product data sheets, quarterly catalog updates and in other literature as soon as possible.

Although every effort has been made to insure accuracy of the information contained herein, **Avantek, Inc.** assumes no responsibility for errors or omissions.

Unless otherwise indicated, all specifications indicated as minimum or maximum are guaranteed at the temperature(s) and under the conditions described. All specifications indicated as typical are tested on a periodic basis and are intended to provide a good indication of actual performance, but are not guaranteed. FOR MORE DETAILED INFORMATION ON ANY PRODUCT, CONTACT THE FACTORY OR ANY AVANTEK AUTHORIZED REPRESENTATIVE.

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Avantek®
UNIT®
PlanarPak™
Avanpak™
MODAMP™
IMFET™
Ametrocom™

Some **Avantek** products are manufactured under the following U.S. patents: 3809817, 3931472, 3978282, Rd. 29844

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Note: Indicated characteristics do not necessarily apply to all devices in a listing.

Note: Indicated characteristics do not necessarily apply to all devices in a listing.

Militarized	Commercial	Low cost, general purpose	Premium performance	Point to point communications	Satellite communications	Radar band	Temperature compensated	Low noise	Wide dynamic range	One Watt or more output power	Output limiting	Voltage controlled	Less than octave bandwidth	Octave bandwidth	Greater than octave bandwidth	Monolithic construction	Thin-film construction	Microstrip PC construction
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ACT Series		*	*		*									*					
ACT 141223		*	*		*					*				*					
UTC Series			*	*										*		*			
AMG Series				*												*			*
AFT Series				*					*	*					*	*			
AMT Series		*	*		*			*	*	*				*				*	
AWT Series		*	*		*			*	*	*						*		*	
AMT Series		*	*		*			*	*	*				*				*	
AMT Series		*	*		*	*	*	*		*				*				*	
AMT Series		*	*		*					*				*	*			*	
AGT Series			*		*				*	*			*	*		*		*	
APT Series		*			*			*		*	*					*		*	
LMT/LWT Series		*	*		*			*				*		*	*	*		*	*
APG Series		*	*							*						*			*
APM-1000 Series			*							*						*			*
AMT Series		*	*		*	*	*	*	*	*				*				*	
AMP-10500 Series		*			*			*		*				*					*
AM-4280 Series			*			*	*			*				*					
AM/AW/AWC-2000 Series			*	*	*	*	*			*	*			*				*	
AW-13251			*			*			*					*					
AWP-132400			*			*						*		*					
AM-14500 Series			*			*				*				*					
AW-6400 Series			*			*			*					*					
AW-11700			*			*			*					*					
AWP Series			*		*	*			*	*	*	*		*				*	
AWP-900			*		*					*		*	*	*					
AM-900			*		*				*	*	*	*		*					*
ATR Series		*			*			*						*	*			*	
AWP Series			*		*					*	*	*	*	*					
ACU-64100			*		*					*	*	*	*	*					

Avanpak™ packaged PlanarPak™ packaged Transistor packaged Machined metal cases Coaxial input and/or output Waveguide input and/or output Connectorless (wire-lead)	Frequency range	For more information refer to the Data Book indicated* Products listed on the indicated pg.	Comments
●	10-2000 MHz	M 21	Cascaded, miniature amplifiers with removable SMA connectors
●	1200-1400 MHz	M 21	Ultra low noise, narrow band, connected amplifiers
●	10-2000 MHz	M 22	Low noise, wideband, connected, modular amplifier cascades
●	50-4000 MHz	M 23	Low noise, ultra-wideband, connected amplifier
●	0.5-18 GHz	A 24	Miniature, small-signal, wideband amplifiers with removable SMA connectors
●	2-40 GHz	A 24	Low noise, connected, wideband amplifiers
●	0.5-40 GHz	A 24	Low noise, connected, wideband amplifiers
●	34.5-35.5 GHz & 43.5-45.5 GHz	A 36	Low noise, connected, narrow band, millimeter wave amplifiers
●	20 to 45 GHz	A 35	Narrow band, power, millimeter wave amplifiers
●	9-20(X2 or X4) GHz	A 35	Active frequency doublers and quadrupler
●	2-18 GHz	A 36	Wideband, connected, gain control amplifiers
●	2-18 GHz	A 40	Wideband, medium power, temperature compensated connected amplifiers
●	2-18 GHz	A 46	Thin-film, small signal, connected, limiting amplifiers
●	10-4000 MHz	A 43	Wideband, medium power, connected amplifier
●	10-1000 MHz	A 43	Ultra wideband, medium power, connected amplifiers
●	8.5-21.2 GHz	A 48	Low noise, connected, narrow band amplifiers
●	9.5-10.5 GHz	A 48	Medium power, connected, military, radar band amplifiers
●	3.7-4.2 GHz	51	Point-to-point and TV satellite downlink, commercial, connected LNAs
●	11.7-12.2 GHz	51	Low noise, commercial, communications satellite downlink LNAs
●	12.7-13.25 GHz	51	CARS band, low noise, commercial, receiver preamplifier
●	12.7-13.25 GHz	51	CARS band power amplifiers
●	14.0-14.5 GHz	51	Communications satellite uplink driver amplifier
●	5.9-6.4 GHz	54	Low noise, microwave radio preamplifiers
●	10.7-11.7 GHz	54	Low noise, microwave radio preamplifier
●	3.7-14.5 GHz	55	Medium power, commercial, narrow band, communications amplifiers
●	860-960 MHz	57	Cellular radio, paging and multiple address system base station power amplifiers
●	821-851 MHz	A 57	Cellular radio, base station, low noise pre-amplifiers
●	4-40 GHz	A 58	Militarized, low noise, GaAs FET, TWT replacement amplifiers
●	3.7-11.7 GHz	59	High power, TWT replacement amplifiers for terrestrial point-to-point microwave radio
●	5.925-6.425 GHz	59	High-power TWT replacement amplifier

*(A) Amplifier;(M) Modular; (SS) Oscillator; (S) Semiconductor
See page 20 for descriptions of AvanteK's series of Data Books.

PRODUCT SELECTION CHART

Note: Indicated characteristics do not necessarily apply to all devices in a listing.

	Militarized	Commercial	Low cost, general purpose	Premium performance	Point to point communications	Satellite communications	Radar band	Temperature compensated	Low noise	Wide dynamic range	One Watt or more output power	Output limiting	Voltage controlled	Less than octave bandwidth	Octave bandwidth	Greater than octave bandwidth	Monolithic construction	Thin-film construction	Microstrip PC construction
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MODULAR PRODUCTS—NO COAX CONNECTORS ON BASIC DEVICE PACKAGE

MSA Series	•	•	•	•		•	•		•	•						•	•		
PPA Series	•	•	•	•												•		•	
GPD/GPM Series	•	•	•						•	•						•	•	•	
UTO/UTM Series	•	•		•				•	•	•						•	•	•	
AGC Series	•	•	•	•						•									
UTL-500 Series	•	•	•	•								•	•			•		•	
UDL-500 Series	•	•	•	•								•	•			•		•	
PPL-504	•	•	•	•								•	•			•		•	

SIGNAL SOURCES

	Militarized	Commercial	Low cost, general purpose	Premium performance	Point to point communications	Satellite communications	Radar band	Temperature compensated	Low noise	Wide dynamic range	One Watt or more output power	Output limiting	Voltage controlled	Less than octave bandwidth	Octave bandwidth	Greater than octave bandwidth	Monolithic construction	Thin-film construction	Microstrip PC construction
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AV-7000 Series	•	•		•			•		•					•	•	•		•	
HTO Series	•				•		•						•	•	•			•	
DTO-2500	•			•			•						•	•	•			•	•
VCA Series	•			•										•	•			•	
ADD Series	•	•		•			•		•					•	•	•		•	
AVD Series	•	•		•			•		•					•	•	•		•	
VTO-8000 Series		•			•		•		•				•	•	•			•	
VTO-9000 Series		•			•		•		•				•	•	•			•	
MTO-8000 Series	•				•		•		•				•	•	•			•	
VTD Series	•				•				•				•	•				•	
LNO-550	•			•					•				•	•				•	
LNO-8000	•			•					•				•	•				•	
SO80-1506		•	•		•	•							•	•				•	
DSO-1000 Series	•	•		•														•	
DSO-2000 Series	•	•		•										•				•	
DSO-3000 Series	•	•		•									•	•				•	
DSO-4000 Series	•	•		•									•	•				•	
DSO-6000 Series	•	•		•					•					•				•	

Avanpak™ packaged
PlanarPak™ packaged
Transistor packaged
Machined metal cases
Coaxial input and/or output
Waveguide input and/or output
Connectorless(wire-lead)

Frequency range

For more information refer
to the Data Book indicated*
Products listed on the indicated pg.

Comments

		●				●	DC-6 GHz	S	60	MODAMP™ monolithic microwave integrated circuits (MMICs), connectorless amplifiers
	●						10 MHz to 18 GHz	M	63	PlanarPak, surface-mounted amplifiers
		●				●	5-1000 MHz	M	65	Low cost, thin-film, connectorless amplifiers
		●				●	5-2300 MHz	M	66	High performance, thin-film, connectorless amplifiers
		●				●	5-1000 MHz	M	69	Thin-film, voltage controlled, connectorless amplifiers
		●				●	5-500 MHz	M	70	Thin-film, connectorless, limiting amplifiers
						●	5-500 MHz	M	70	Thin-film, dual-inline, limiting amplifier
	●					●	10-1000 MHz	M	70	PlanarPak, surface-mounted limiting amplifier

Avanpak™ packaged
PlanarPak™ packaged
Transistor packaged
Machined metal cases
Coaxial input and/or output
Waveguide input and/or output
Connectorless(wire-lead)

Frequency range

For more information refer
to the Data Book indicated*
Products listed on the indicated pg.

Comments

			●	●	●		1-50 GHz	SS	71	YIG-tuned oscillators
●		●		●		●	0.9-18 GHz	SS	76	Hyperabrupt, varactor tuned oscillators
			●	●			2.5-6.5 GHz	SS	76	Digitally-tuned, varactor-tuned oscillator assembly
			●	●			0.85-18 GHz	SS	77	Linearized VCO assemblies
			●	●	●		1-26.5 GHz	SS	79	YIG-tuned oscillators with digital drivers
			●	●	●		1-26.5 GHz	SS	79	YIG-tuned oscillators with analog drivers
		●				●	0.3-10.5 GHz	SS	82	Limited frequency range, commercial, connectorless, varactor-tuned oscillators
		●				●	0.32-2.1 GHz	SS	82	Commercial, hyperabrupt, connectorless, varactor-tuned oscillators
		●				●	0.4-10.5 GHz	SS	83	Militarized, connectorless, varactor-tuned oscillators
						●	0.6-6.1 GHz	SS	83	Buffered, connectorless, varactor-tuned oscillators
		●				●	550-775 MHz	SS	84	Militarized, low noise, varactor-tuned oscillator
●				●			7.8-8.5 GHz	SS	84	Low noise VCO with two tuning ports
		●				●	3.63-4.13 GHz	SS	85	Varactor-tuned oscillator for use in TVRO receivers
			●	●			3.5-36 GHz	SS	86	Fixed-tuned, dielectrically-stabilized oscillators
			●	●			4.5-18 GHz	SS	86	Mechanically-tuned, dielectrically-stabilized oscillators
			●	●			8.0-18.0 GHz	SS	86	Electronically-tuned, dielectrically-stabilized oscillators
			●	●			8.0-18.0 GHz	SS	87	Electrically and mechanically-tuned, dielectrically-stabilized oscillators
			●	●			17-19 GHz	SS	87	High-stability, dielectrically-stabilized oscillators

*(A) Amplifier; (M) Modular; (SS) Oscillator; (S) Semiconductor
See page 20 for descriptions of AvanteK's series of Data Books.

PRODUCT SELECTION CHART

Note: Indicated characteristics do not necessarily apply to all devices in a listing.

	Militarized	Commercial	Low cost, general purpose	Premium performance	Point to point communications	Satellite communications	Radar band	Temperature compensated	Low noise	Wide dynamic range	One Watt or more output power	Output limiting	Voltage controlled	Less than octave bandwidth	Octave bandwidth	Greater than octave bandwidth	Monolithic construction	Thin-film construction	Microstrip PC construction
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SIGNAL PROCESSING AND CONTROL PRODUCTS

MSF Series	•	•	•	•												•	•		
TFX/TFY/TFK/TFW Series	•	•		•												•		•	
DBX/DBY Series	•	•		•												•			
MXA Series	•			•												•			
UMX Series	•	•	•	•												•			
PPM-2515M	•	•	•	•												•			
AFP Series	•	•					•	•						•	•	•			•
AFW Series	•	•					•	•						•	•	•			•
FPD Series	•	•					•	•					•	•	•	•			•
FDD Series	•	•					•	•					•	•	•	•			•
UTF Series	•	•	•	•								•	•		•	•		•	
PPF-030	•	•	•	•								•	•		•	•		•	
AHL Series	•			•								•	•		•	•		•	
UTL/GPL Series	•	•	•	•								•	•		•	•		•	
UTD-1000 Series	•	•	•	•									•		•	•		•	
PPD-2001	•	•		•									•		•	•		•	
UTD-2000 Series	•	•	•	•									•		•	•		•	
PPD-6002	•	•		•									•		•	•		•	
AH Series				•									•		•	•		•	
PPS-010			•	•									•		•	•		•	

SEMICONDUCTORS

AT Series		•	•	•		•	•		•	•	•								
AT Series		•	•	•		•			•	•	•								
IM Series		•			•	•	•				•			•				•	

Avanpak™ packaged	PlanarPak™ packaged	Transistor packaged	Machined metal cases	Coaxial input and/or output	Waveguide input and/or output	Connectorless(wire-lead)	Frequency range	For more information refer to the Data Book indicated*	Products listed on the indicated pg.	Comments
	•				•		1.6-9.0 GHz	S	91	Silicon MMIC frequency up/down converters in semiconductor packages
•				•	•		0.75-26 GHz	M	93	Wideband, thin-film, connected, double- and triple-balanced mixers
•				•	•		0.05-18 GHz	M	94	Wideband, double-balanced, miniature, connected mixers
•				•	•		0.5-18 GHz	M	95	Wideband, double-balanced, miniature, connected mixer/pre-amplifier combinations
	•					•	1-4200 MHz	M	96	Modular, double-balanced, connectorless mixers
	•						50-2500 MHz	M	96	PlanarPak, surface-mounted, triple-balanced mixer
			•	•			1-26 GHz	SS	97	Wideband, YIG-tuned, bandpass filters
			•	•			8-18 GHz	SS	97	Wideband, wide bandwidth, YIG-tuned, bandpass filters
			•	•			2-18 GHz	SS	99	Wideband, commercial, YIG-tuned filters with analog drivers
			•	•			2-18 GHz	SS	99	Wideband, commercial, YIG-tuned filters with digital drivers
	•				•		5-2000 MHz	M	101	Thin-film, voltage controlled, connectorless, signal attenuators
	•				•		100-2000 MHz	M	101	PlanarPak, surface-mounted attenuator
•				•	•		2-18 GHz	M	102	Thin-film, connected, power limiters
	•				•		5-1000 MHz	M	103	Thin-film, voltage-controlled, connectorless, signal limiters
	•				•		10-1000 MHz	M	104	Thin-film, voltage-controlled, connectorless, level detectors
	•				•		20-2000 MHz	M	104	PlanarPak, surface-mounted level detector
	•				•		10-2000 MHz	M	104	Thin-film, TTL compatible, connectorless, threshold detector
	•				•		100-6000 MHz	M	104	PlanarPak, surface-mounted threshold detector
•				•	•		0.5-18 GHz	M	106	Thin-film, miniature, connected, PIN diode switches
	•				•		10-2000 MHz	M	111	PlanarPak, surface-mounted, non-reflective, SPDT switch
	•				•		up to 4.5 GHz	S	112	Silicon bipolar transistors
	•				•		2-15 GHz	S	115	Gallium arsenide field effect transistors
	•				•		2.9-8.4 GHz	S	116	Internally matched, power GaAs FETs

*(A) Amplifier; (M) Modular; (SS) Oscillator; (S) Semiconductor
See page 20 for descriptions of AvanteK's series of Data Books.

1987 Product Guide

Model Number Index

Model Type	Frequency Range*	Description	Page Number(s)
ACT Series	10-2000 MHz	Cascaded, miniature amplifiers with removable SMA connectors	21
ACT-141223	1200-1400 MHz	Ultra low noise, narrow band, connected amplifiers	21
ACU-64100	5.925-6.425 GHz	High-power TWT replacement amplifier	59
ADD Series	1-26.5 GHz	Militarized and commercial YIG-tuned oscillators with digital drivers	79
AFP Series	1-26 GHz	Wideband, YIG-tuned, bandpass filters	97
AFT Series	0.5-18 GHz	Avanpak, miniature, small-signal, wideband amplifiers with removable SMA connectors	24
AFW Series	8-18 GHz	Wideband, wide bandwidth, YIG-tuned, bandpass filters	97
AGC Series	5-1000 MHz	Thin-film, voltage controlled, connectorless amplifiers	69
AGT Series	2-18 GHz	Wideband, connected, gain control amplifiers	36
AHD Series	0.5-18 GHz	Thin-film, miniature, connected, PIN diode single-pole, double-throw switches	108
AHF Series	0.5-18 GHz	Thin-film, miniature, connected, PIN diode single-pole, five-throw switches	109
AHL Series	2-18 GHz	Thin-film, connected, power limiters	102
AHQ Series	0.5-18 GHz	Thin-film, miniature, connected, PIN diode single-pole, four-throw switches	109
AHS Series	0.5-18 GHz	Thin-film, miniature, connected, PIN diode single-pole, single-throw switches	106
AHT Series	0.5-18 GHz	Thin-film, miniature, connected, PIN diode single-pole, triple-throw switches	109
AM-4280 Series	3.7-4.2 GHz	Point-to-point and TV satellite downlink, commercial, connected LNAs	51
AM-12000 Series	11.7-12.2 GHz	Low noise, commercial, communications satellite, downlink LNAs	51
AM-14500 Series	14.0-14.5 GHz	Communications satellite uplink driver amplifier	51
AM-900	821-851 MHz	Cellular radio base station, low noise pre-amplifiers	57
AMG Series	50-4000 MHz	Low noise, ultra-wideband, connected amplifier	23
AMP-10500 Series	9.5-10.5 GHz	Medium power, connected, military, radar band amplifiers	48
AMT Series	2-40 GHz	Wideband, low noise, connected amplifiers	24
AMT Series	8.5-21.2 GHz	Narrow band, low noise, connected amplifiers	48
AMT Series	34.5-35.5 GHz & 43.5-45.5 GHz	Millimeter wave, narrow band, low noise, connected amplifiers	35
AMT Series	9-20 (X2 or X4) GHz	Active frequency doublers and quadrupler	35
AMT Series	20-45 GHz	Various narrow band, power, millimeter wave amplifiers	35
APG Series	10-4000 MHz	Wideband, medium power, connected amplifier	43
APM-1000 Series	10-1000 MHz	Ultra wideband, medium power, connected amplifiers	43
APT Series	2-18 GHz	Wideband, medium power, temperature compensated connected amplifiers	40
AT Series	up to 4.5 GHz	Silicon bipolar transistors	112
AT Series	2-15 GHz	Gallium arsenide field effect transistors	114
ATR Series	4-40 GHz	Militarized, low noise, GaAs FET, TWT replacement amplifiers	58
AV-7000 Series	1-20 GHz	Commercial, microwave, YIG-tuned oscillators	71
AV-7000 Series	18-50 GHz	Commercial, millimeter wave, YIG-tuned oscillators	72
AV-7000 Series	1-20 GHz	"-9" series, commercial, low harmonic, YIG-tuned oscillators	72
AV-7000 Series	2-18 GHz	Militarized YIG-tuned oscillators	73
AV-7000 Series	4-18 GHz	"-8" series, commercial, YIG-tuned oscillators with guaranteed phase noise	72
AV-7000 Series	2-18 GHz	Low phase noise, bipolar, YIG-tuned oscillators	72
AV-7248	2-8 GHz	YIG-tuned oscillator with tracking YIG-tuned filter	72
AVD Series	1-26.5 GHz	Militarized and commercial YIG-tuned oscillators with analog drivers	79

*Frequency range may be for individual products or the total coverage of the series.

Model Type	Frequency Range*	Description	Page Number(s)
AW-6400 Series	5.9-6.4 GHz	Low noise, microwave radio preamplifiers	57
AW-11700	10.7-11.7 GHz	Low noise, microwave radio preamplifier	54
AW-12000 Series	11.7-12.2 GHz	Low noise, commercial, communications satellite downlink LNAs	51
AW-13251	12.7-13.25 GHz	CARS band, low noise, commercial, receiver preamplifier	51
AWC-12000 Series	11.7-12.2 GHz	Low noise, commercial, communications satellite downlink LNAs	51
AWP Series	3.7-11.7 GHz	High power, TWT replacement amplifiers for terrestrial point-to-point microwave radio	59
AWP Series	3.7-14.5 GHz	Medium power, commercial, narrow band, communications amplifiers	55
AWP-900	860-960 MHz	Cellular radio, paging and multiple address system base station power amplifiers	56
AWP-132400	12.7-13.25 GHz	CARS band power amplifiers	51
AWT Series	0.5-40 GHz	Ultra wideband, low noise, connected amplifiers	24
DBX Series	0.05-18 GHz	Wideband, double-balanced, miniature, connected mixers	94
DBY Series	0.05-18 GHz	Wideband, double-balanced, miniature, connected mixers	94
DSO-1000 Series	3.5-36 GHz	Fixed-tuned, dielectrically-stabilized oscillators	86
DSO-2000 Series	4.5-18 GHz	Mechanically-tuned, dielectrically-stabilized oscillators	86
DSO-3000 Series	8.0-18.0 GHz	Electronically-tuned, dielectrically-stabilized oscillators	86
DSO-4000 Series	8.0-18.0 GHz	Electrically and mechanically-tuned, dielectrically-stabilized oscillators	87
DSO-6000 Series	17-19 GHz	High-stability, dielectrically-stabilized oscillators	87
DTO-2500	2.5-6.5 GHz	Digitally-tuned, varactor-tuned oscillator assembly	76
FDD Series	2-18 GHz	Wideband, commercial, YIG-tuned filters with digital drivers	99
FPD Series	2-18 GHz	Wideband, commercial, YIG-tuned filters with analog drivers	99
GPD/GPM Series	5-1000 MHz	Low cost, thin-film, connectorless amplifiers	65
GPL-1001	5-1000 MHz	Thin-film, voltage controlled, connectorless, signal limiter	103
HTO Series	0.9-18 GHz	Militarized, hyperabrupt, varactor tuned oscillators	76
IM Series	2.9-8.4 GHz	IMFET™ internally matched power GaAs FETs various narrow frequency bands	116
LMT Series	2-18 GHz	Wideband, output limiting amplifiers	46
LNO-550	550-775 MHz	Militarized, low noise, varactor-tuned oscillator	84
LNO-8000	7.8-8.5 GHz	Low noise VCO with two tuning ports	84
LWT Series	2-18 GHz	Ultra wideband, output limiting amplifiers	46
MSA Series	DC-6 GHz	MODAMP™, silicon MMIC, connectorless amplifiers	60
MSF Series	0.1-8.0 GHz	Silicon MMIC, connectorless frequency up/down converters	91
MTO-8000 Series	0.4-10.5 GHz	Militarized, connectorless, varactor-tuned oscillators	83
MXA Series	0.5-18 GHz	Wideband, double-balanced, miniature, connected mixer/preamplifier combinations	95
PPA Series	5 MHz to 18 GHz	PlanarPak, surface-mounted amplifiers	63
PPD-2001	20-2000 MHz	PlanarPak, surface-mounted level detector	63, 104
PPD-6002	100-6000 MHz	PlanarPak, surface-mounted threshold detector	63, 104
PPF-030	100-2000 MHz	PlanarPak, surface-mounted, voltage-controlled attenuator	63, 101
PPL-504	10-1000 MHz	PlanarPak, surface-mounted limiting amplifier	64, 70
PPM-2515M	50-2500 MHz	PlanarPak, surface-mounted, triple-balanced mixer	63, 96
PPS-010	10-2000 MHz	PlanarPak, surface-mounted, non-reflective, SPDT switch	63, 110
SO80-1506	3.63-4.13 GHz	Varactor-tuned oscillator for use in TVRO receivers	85
TFX/TFY/			
TFK/TFW Series	0.75-26 GHz	Wideband, thin-film, connected, double- and triple-balanced mixers	93
UDL-500 Series	5-500 MHz	Thin-film, dual-inline, limiting amplifier	70
UMX Series	1-4200 MHz	Modular, double balanced, connectorless mixers	96
UTC Series	10-2000 MHz	Low noise, wideband, connected, modular amplifier cascades	22
UTD-1000 Series	10-1000 MHz	Thin-film, connectorless, level detectors	104
UTD-2000 Series	10-2000 MHz	Thin-film, TTL compatible, connectorless, threshold detector	104
UTF Series	5-2000 MHz	Thin-film, voltage controlled, connectorless, signal attenuators	101
UTL-500 Series	5-500 MHz	Thin-film, connectorless, limiting amplifiers	70
UTL-1000 Series	5-1000 MHz	Thin-film, voltage-controlled, connectorless, signal limiters	103
UTO/UTM Series	5-2300 MHz	High performance, thin-film, connectorless amplifiers	66
VCA Series	0.85-18 GHz	Militarized, linearized VCO assemblies	77
VTD Series	0.6-6.1 GHz	Buffered, connectorless, varactor-tuned oscillators	83
VTO-8000 Series	0.3-10.5 GHz	Limited frequency range, commercial, connectorless, varactor-tuned oscillators	82
VTO-9000 Series	0.32-2.1 GHz	Commercial, hyperabrupt, connectorless, varactor-tuned oscillators	82

*Frequency range may be for individual products or the total coverage of the series.

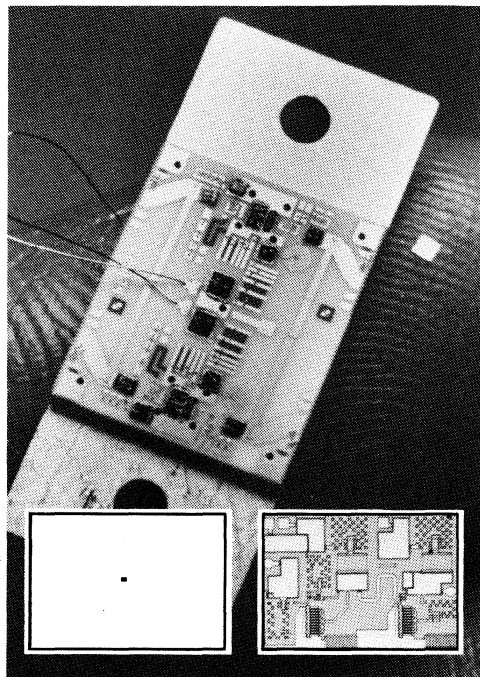
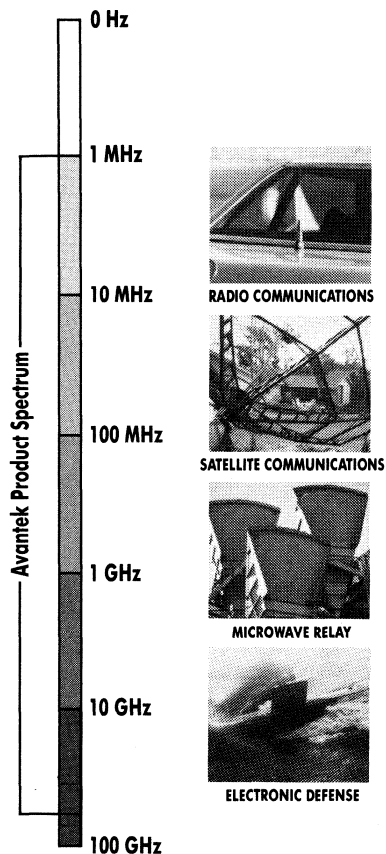
AVANTEK VERTICAL INTEGRATION

From Transistors and MMICs to complete Telecommunications Systems

1. Space-Age Technology:

- Silicon and GaAs Semiconductors
- High Electron Mobility Transistors (HEMT)
- Si and GaAs Monolithic Microwave Integrated Circuits (MMICs)
- Thin-film hybrid Microwave Integrated Circuits (MICs)
- Mixers and RF switches
- Digital microwave radio
- Fiber-optic communications
- Advanced fabrication technology
- Proprietary packaging

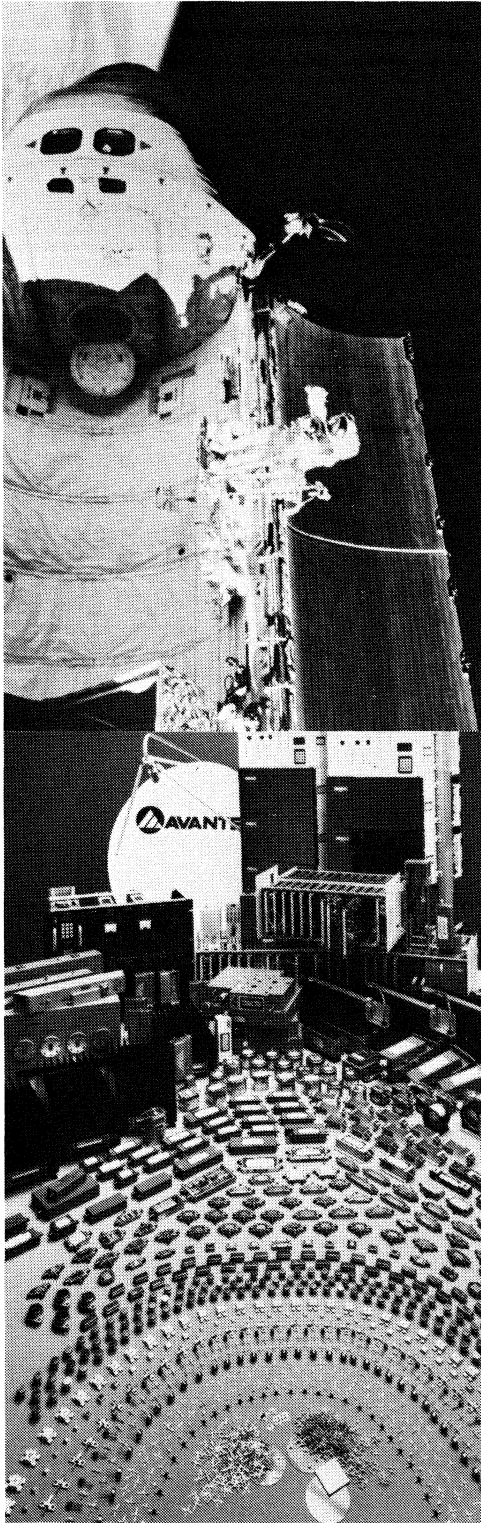
Frequency Spectrum Chart



The tiny GaAs monolithic microwave integrated circuit performs the same basic function as the similar hybrid circuit in 1/25th the area and eliminates most circuit adjustments. Insets: The same MMIC shown actual size and enlarged 35 times.

2. Premium Product Performance:

- GaAs FETs operating beyond 50 GHz
- GaAs MMICs through 20 GHz
- Amplifiers through 44 GHz
- Widest oscillator and amplifier bandwidths
 - Only available 2-18, 18-40 GHz transistor amplifiers
 - Only available 18-26, 26-40 and 33-50 GHz transistor YTOs
- Lowest amplifier noise figures

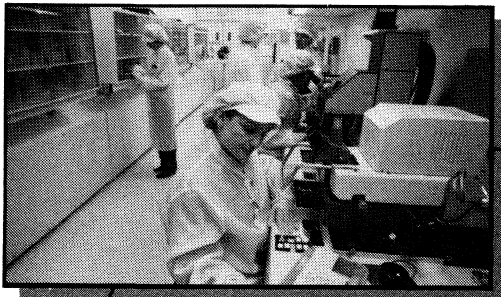


3. High Quality/Reliability:

- Supplier to virtually all airborne electronic warfare systems
- Space-qualified products
- Integrated QA/QC system
- High-reliability screening available
- Dedicated Space Rel Production Time
- Applied for Certification under Mil-Std-1772

4. Vertical Integration:

- Microwave transistors
- Silicon and GaAs MMICs
- Modular amplifiers and signal-processing components
- Modular signal control components
- Wideband and communications/radar-band amplifiers
- Variable- and fixed-frequency oscillators
- Digitally- and voltage-tuned oscillator and filter assemblies
- YIG filters
- Downconverters, amplifier-downconverters and mixer-preamps
- Thin-film and component functional subassemblies
- Telecommunications systems
- Over 700 standard products in all



NEWARK

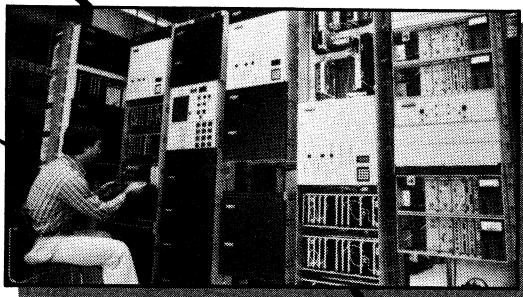
5. Volume Manufacturing Capability:

- Six locations
- Over 700,000 sq. ft.
- Over 3300 employees
- Industry's most advanced microwave semiconductor fabrication facility
- Over 1,500,000 product units shipped in 1986

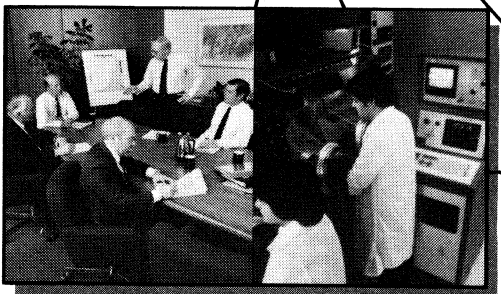
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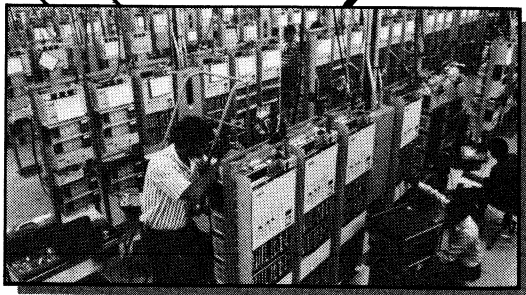
FREMONT



SANTA CLARA (2)



MILPITAS



6. Over 20 Years of Experience:

- Manufacturing solid-state microwave components since 1965
- Semiconductors and thin-film hybrids since 1968
- YIG-tuned oscillators since 1969
- Digital microwave radio since 1972
- Varactor-tuned oscillators since 1973
- Microwave mixers since 1980
- TV earth stations since 1981
- Monolithic microwave ICs since 1982
- Fiber Optic/Lightwave systems since 1985
- Thin-film mixers to 26 GHz since 1986
- MMIC self-oscillating mixers since 1986
- Frequency Synthesizers added in 1987
- HEMT and MSI Silicon MMICs added in 1988

TWENTY-TWO YEARS of Solid State Leadership

Avantek, Inc. was founded in late 1965 to meet the electronic industry's need for high performance solid state VHF, UHF and microwave transistor amplifiers.

By December, 1965, the company had developed and introduced a family of low-noise solid state preamplifiers covering the 30 to 1000 MHz frequency range. Less than six months later, Avantek added solid state microwave amplifiers with octave band coverage through 2300 MHz as well as narrowband amplifiers for specific communications bands in that frequency range. This early family of highly reliable Avantek transistor amplifiers played a significant part in the microwave industry's decision to replace tube-type amplifiers with solid state.

Advances in solid state amplifier technology were hampered in these early years by the limited and sporadic availability of microwave transistors. Device suppliers simply were not able to keep pace with the progress made by Avantek circuit designers.

Consequently, in the spring of 1968, Avantek added the staff and facilities to design, develop and manufacture its own gold-metallized planar epitaxial microwave transistors. The capability to design and produce high performance microwave transistors in-house is one of the important factors leading to Avantek's present success. Today, virtually every microwave transistor used in an Avantek product is an Avantek transistor. In 1968, Avantek also established a facility for the production of hybrid thin-film microwave integrated circuits (MICs).

In February, 1970, Avantek was granted a patent on the techniques of producing unconditionally-stable, cascaded wideband amplifier modules. This concept resulted in a wide variety of modular "gain blocks" in packages ranging from conventional cases with connectors to tiny thin-film modules in TO-8 and TO-12 transistor packages. To meet the needs of both the commercial and military user Avantek introduced thin-film fundamental YIG-tuned transistor oscillators in 1969. In 1973, varactor-tuned transistor oscillators were added to the growing component line. In 1980, Avantek developed and introduced a series of advanced wideband microwave mixers offering a remarkable combination of features with even more remarkable thin-film mixers introduced in 1986.

In 1986, Avantek shipped over 1,500,000 product units. Avantek's more than 3000 customers can now choose from over 700 company developed standard products.

Avantek is organized into three functional groups:

- **Microwave Semiconductors**—Develops and produces high-performance microwave transistors, diodes and monolithic integrated circuits which are used in virtually all Avantek products, most of which are also sold to outside customers.
- **Microwave Products**—Develops and manufactures amplifiers, mixers, control devices, YIG oscillators and filters, varactor and dielectrically-tuned oscillators and multi-function integrated assemblies.
- **Telecommunications**—Develops and manufactures equipment such as digital microwave radios, satellite earth station video receivers and digital earth terminals as well as high-performance amplifiers and functional supercomponents particularly optimized for telecommunications applications. Avantek offers its telecommunications equipment fully integrated into complete, ready-to-operate telecommunications systems.

Today the Avantek microwave product line includes:

- **Microwave Semiconductors:**
 - Silicon Transistors
 - Silicon Diodes
 - Gallium Arsenide Field Effect Transistors
 - Monolithic Microwave Integrated Circuits
 - Internally Matched GaAs FETs
- **Avanpak™ Miniature Flatpack Products**
- **PlanarPak™ Surface Mounted Products**
- **Control Components:**
 - Mixers
 - Switches
 - Limiters
 - Attenuators
- **YIG-Tuned Oscillators and Filters**
- **Varactor-Tuned Oscillators**
- **Dielectrically-Stabilized Oscillators**
- **Wideband Microwave Amplifiers**
- **Low Noise Communications Amplifiers**
- **Medium Power Amplifiers**
- **Modular Amplifiers**
- **Special Purpose Amplifiers including:**
 - TWT Retrofit Power Amplifiers for Microwave Radios
 - Cellular Radio Base Station Amplifiers
- **Multifunction Integrated Assemblies**
- **INMARSAT RF Transceiver**
- **Microwave Digital Radios**
- **Lightwave/Fiber Optic Systems**

These products cover frequencies from DC to over 50 GHz for use in electronic warfare and radar, missiles and satellites, test equipment and instrumentation and various types of communications equipment for the military, commercial, industrial and consumer markets, both domestic and international.

Avantek Employees and Facilities: Today, there are over 3200 employees in the Avantek family supported by some of the industry's most modern equipment and facilities. Manufacturing, engineering and administrative facilities, all located in California, include 255,000 sq. ft. in Santa Clara, 180,000 sq. ft. in Milpitas, an 88,000 sq. ft. engineering and manufacturing facility in Folsom, a 91,000 sq. ft. Telecommunications Group facility in Fremont, and a 90,000 sq. ft. microwave semiconductor fabrication facility in Newark. This staff and floorspace supports Avantek's fundamental vertical integration strategy: to manufacture high-performance microwave transistors and monolithic circuits, to build these components into amplifiers and other functional "blocks," to integrate these various blocks into multifunction assemblies, to provide complete equipment and ready-to-operate "turnkey" telecommunications systems—and to support all products with research, engineering, quality control and customer support.

HOW TO USE THIS PRODUCT GUIDE

This Product Guide contains a complete listing of all standard AvanteK microwave component products presenting their most important specifications. They have been grouped by major product type, such as AMPLIFIERS, SIGNAL SOURCES and MODULAR PRODUCTS. Within these major categories, products are arranged in functionally logical groupings and sequences which can be determined by referring to the TABLE OF CONTENTS. When you have identified the product or products for which you want additional information, you should refer to the appropriate AvanteK Data Book which presents fully detailed information on all products in that volume. See THE AVANTEK DATA BOOK SERIES below for more information.

CASE DRAWINGS

Product case drawings are interspersed throughout the catalog as close as possible to the product listing where that case type is first used. Cases which are used for more than one product type are normally only shown once with subsequent entries referred to the page where the illustration appears although some case drawings are repeated when space permits.

SHADING

Shading within tables is variously used to separate products by the following parameters:

- A constant major parameter such as Frequency Range, Power Output or Noise Figure.
- Families of products with similar characteristics except for one major parameter such as Power Output or Gain.
- To make it easier to read.

THE AVANTEK DATA BOOK SERIES

The AvanteK Data Book set consists of the following items:

1. **Product Guide** (This book). This volume presents summary specifications on most of AvanteK's standard component products. Some telecommunications products are also presented for reference.
2. **Amplifier Data Book**. This volume presents detailed information on all standard AvanteK microwave amplifiers.
3. **Modular Data Book**. This volume presents detailed information on all AvanteK modular amplifiers, mixers, limiters, attenuators, detectors and switches.
4. **Signal Sources and Filters Data Book**. This volume presents detailed information on all standard AvanteK oscillator and filter products.
5. **Semiconductor Data Book-Silicon Products**. Presents detailed specifications on all AvanteK standard silicon bipolar transistors and silicon MMIC products.
6. **Semiconductor Data Book-GaAs Products**. Presents detailed specifications on all AvanteK standard gallium arsenide field effect transistors (GaAs FETs) and internally matched power GaAs FETs.
7. **Subassemblies Capabilities Brochure**. This volume presents AvanteK's capabilities in the design and manufacture of multi-function subassemblies which may combine, with custom matching and interfacing, various standard and/or custom AvanteK products in one lightweight, compact case.

AvanteK Data Books are available from your nearest authorized AvanteK distributor or sales representative or from the AvanteK Corporate Communications Department at the address shown at the bottom of this page. If a particular data book is not available, you should request data sheets for the product(s) of interest.

LOW NOISE WIDEBAND CONNECTED AMPLIFIERS

AVANPAK MINIATURE WIDEBAND AMPLIFIERS

The ACT series is recommended where either small size, premium performance, or microstrip compatibility is required. Each amplifier consists of one, two, or three stages of UTO series amplifier substrates cascaded within the Avanpak miniature flatpack. Each

stage can be tuned for maximum performance and efficient matching with the next unit.

This is a sample of the Avanpak™-packaged cascades available from AvanteK. 5V supply, high efficiency and higher output power versions are also available.

ACT SERIES CASCADED AMPLIFIERS

Guaranteed Specifications @ 0° to 50° C Case Temperature, V = 15 Vdc

PC2

Model #	Frequency Range MHz	Gain (dB) Typ./Min.	Noise Figure (dB) Max.	Power Output at 1.0 dB Gain Compression (dBm), Min.	Gain Flatness (±dB) Maximum	Intercept Point for IM Products (dBm) Typical	VSWR 50 ohms In/Out Maximum	Input Bias Current (mA) Typical	Case Type
10 to 500 MHz									
ACT5-200	10-500	26.5/25	2.7	+6	±1.5	+22	2.0	35	AS2
ACT5-201	10-500	37/35	2.7	+7	±1.5	+20	2.0	33	AS2
ACT5-202	10-500	51.5/49	2.7	+6	±1.5	+18	2.0	60	AS2
ACT5-203	10-500	64.5/62	2.7	+6	±2.0	+18	2.0	70	AS2
ACT5-210	10-500	27.5/26	3.0	+14	±1.5	+30	2.0	78	AS2
ACT5-211	10-500	38/36	3.5	+14	±1.5	+30	2.0	76	AS2
ACT5-212	10-500	47/45	2.7	+14	±1.5	+27	2.0	80	AS2
ACT5-213	10-500	54/52	2.7	+14	±2.0	+27	2.0	92	AS2
ACT5-214	10-500	67/65	2.7	+14	±2.0	+27	2.0	103	AS2
ACT5-220	10-500	24.5/23	3.5	+23	±1.5	+35	2.0	165	AS2
ACT5-221	10-500	35/33	3.0	+23	±2.0	+35	2.0	190	AS2
ACT5-222	10-500	46/44	3.0	+23	±2.0	+35	2.0	193	AS2
ACT5-223	10-500	60.5/58	3.0	+23	±2.0	+35	2.0	210	AS2
10 to 1000 MHz									
ACT10-210	10-1000	21.5/20	4.5	+11	±2.0	+28	2.0	60	AS2
ACT10-211	10-1000	31/29	3.7	+9	±1.5	+20	2.0	37	AS2
ACT10-212	10-1000	41/39	3.7	+9	±2.0	+20	2.0	62	AS2
ACT10-213	10-1000	52/50	3.7	+12	±2.0	+27	2.0	101	AS2
ACT10-220	10-1000	22.5/21	5.0	+20	±1.5	+35	2.0	125	AS2
ACT10-221	10-1000	33/31	4.5	+20	±2.0	+35	2.0	150	AS2
ACT10-222	10-1000	42/40	3.7	+20	±2.0	+35	2.0	127	AS2
ACT10-223	10-1000	49/47	3.7	+20	±2.0	+35	2.0	163	AS2
10 to 2000 MHz									
ACT20-210	10-2000	19.5/18	5.0	+7	±1.5	+17	2.2	41	AS2
ACT20-211	10-2000	28/26	5.0	+14	±2.0	+29	2.2	91	AS2
ACT20-212	10-2000	34/32	6.0	+14	±2.0	+29	2.2	104	AS2
ACT20-213	10-2000	40/38	6.0	+12	±2.0	+29	2.2	126	AS2

ULTRA LOW NOISE, NARROW BAND AMPLIFIER

These ultra low noise, narrow band amplifiers are designed to receive and transport low noise signals with optimum efficiency. The primary application is in RF and IF front ends. Internal regulation is provided

for +12 to +15 VDC operation. These ultra low noise, narrow band amplifiers may be custom aligned for special applications. Contact the factory for information on future releases in this new series.

ULTRA LOW NOISE, NARROW BAND AMPLIFIER

Guaranteed Specifications @ 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz) Min.	Gain (dB) Min.	Noise Figure (dB) Max.	Power Out @ 1 dB Gain Compression (dBm) Min.	Gain Flatness (±dB) Max.	Third Order Intercept Point (dBm) Typ.	Input Power Voltage (VDC)	Current (mA) Typ.	Case Type
ACT-120923	950-1250	35.5	1.5	+14	0.5	26	12-15	95	AX2
ACT-141223	1200-1400	35	1.5	+13	0.5	25	12-15	95	AX2

CASE DRAWINGS— See page 36

PACKAGED MODULAR AMPLIFIER CASCADES WITH COAX CONNECTORS

UTC Series amplifiers contain one to four modular products from any of several of Avantek's modular product lines. They are supplied in sealed aluminum

cases with RFI-filtered DC feedthroughs and SMA connectors installed and are ready for immediate operation. 5V supply versions are also available.

UTC SERIES FACTORY-ASSEMBLED THIN-FILM AMPLIFIERS

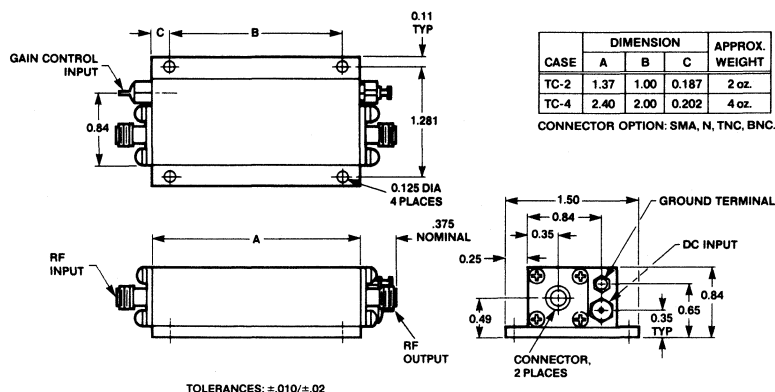
Guaranteed Specifications @ 0° to 50° C, V = +15 Vdc

PC2

Model	Frequency Range MHz	Gain (dB) Typ/Min	Noise Figure (dB) Maximum	Power Output @ 1 dB Gain Compression (dBm), Min.	Gain Flatness (±dB) Maximum	Intercept Point for IM Products (dBm) Typical	VSWR 50 Ohms In/Out Maximum	Input Bias Current (mA) Typical	Case Type
10 to 500 MHz									
UTC5-200	10-500	26.5/25	2.7	+6	±1.5	+22	2.0	35	TC2
UTC5-201	10-500	37/35	2.7	+7	±1.5	+20	2.0	33	TC2
UTC5-202	10-500	51.5/49	2.7	+6	±1.5	+18	2.0	60	TC2
UTC5-203	10-500	64.5/62	2.7	+6	±2.0	+18	2.0	70	TC4
UTC5-210	10-500	27.5/26	3.0	+14	±1.5	+30	2.0	78	TC2
UTC5-211	10-500	38/36	3.5	+14	±1.5	+30	2.0	76	TC2
UTC5-212	10-500	47/45	2.7	+14	±1.5	+27	2.0	80	TC2
UTC5-213	10-500	54/52	2.7	+14	±2.0	+27	2.0	92	TC2
UTC5-214	10-500	67/65	2.7	+14	±2.0	+27	2.0	103	TC4
UTC5-220	10-500	24.5/23	3.5	+23	±1.5	+35	2.0	165	TC2
UTC5-221	10-500	35/33	3.0	+23	±2.0	+35	2.0	190	TC4
UTC5-222	10-500	46/44	3.0	+23	±2.0	+35	2.0	193	TC4
UTC5-223	10-500	60.5/58	3.0	+23	±2.0	+35	2.0	210	TC4
10 to 1000 MHz									
UTC10-210	10-1000	21.5/20	4.5	+11	±2.0	+28	2.0	60	TC2
UTC10-211	10-1000	31/29	3.7	+9	±1.5	+20	2.0	100	TC2
UTC10-212	10-1000	41/39	3.7	+9	±2.0	+20	2.0	62	TC4
UTC10-213	10-1000	52/50	3.7	+12	±2.0	+27	2.0	101	TC4
UTC10-220	10-1000	22.5/21	5.0	+20	±1.5	+35	2.0	125	TC2
UTC10-221	10-1000	33/31	4.5	+20	±2.0	+35	2.0	150	TC4
UTC10-222	10-1000	42/40	3.7	+20	±2.0	+35	2.0	127	TC4
UTC10-223	10-1000	49/47	3.7	+20	±2.0	+35	2.0	163	TC4
10 to 2000 MHz									
UTC20-210	10-2000	19.5/18	5.0	+7	±1.5	+17	2.2	41	TC2
UTC20-211	10-2000	28/26	5.0	+14	±2.0	+29	2.2	91	TC4
UTC20-211	10-2000	34/32	6.0	+14	±2.0	+29	2.2	104	TC4
UTC20-213	10-2000	40/38	6.0	+12	±2.0	+29	2.2	126	TC4

CASE DRAWING

TC-2/4



ULTRA WIDEBAND AMPLIFIERS

The AMG series of ultra wideband amplifiers provides low noise, small signal performance with excellent gain flatness and very wide dynamic range.

AMG SERIES

Guaranteed Specifications @ 25°C Case Temperature

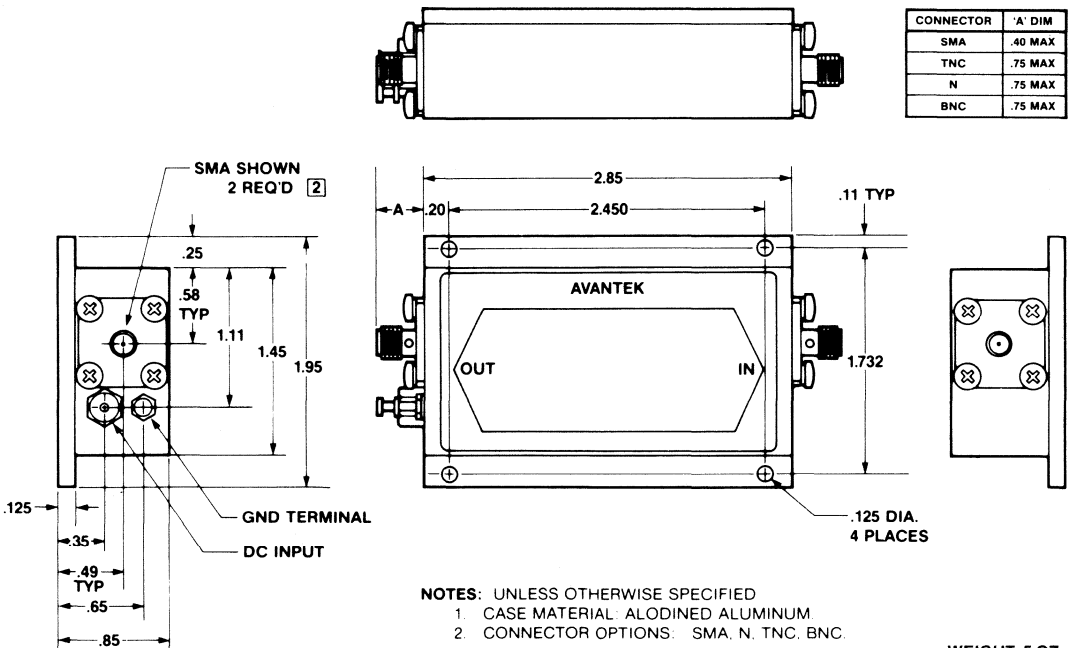
PC4

	Frequency Response (GHz)	Gain (dB)	Noise Figure (dB)	Power Output for 1 db Gain Compression (dBm)	Gain Flatness (±dB)	Typical Intercept Point for IM Products (dBm)	VSWR (50 ohms)		Input Power		Case Type¹
Model	Minimum	Minimum	Maximum	Minimum	Maximum		In	Out	Voltage (VDC)	Typical Current (mA)	
0.05 to 1.0 GHz											
AMG-1020	0.05-1	34	2.7	+10	1.0	+22	2.5	2.2	+15	50	GC4
0.5 to 4.0 GHz											
AMG-4045	0.5-4	22	6.0	+10	1.5	+22	2.5	2.0	+15	125	GC4
AMG-4046	0.5-4	32	6.0	+10	1.5	+22	2.5	2.0	+15	175	GC4
AMG-4047	0.5-4	40	6.0	+10	1.5	+22	2.5	2.0	+15	225	GC4

Notes 1: Connector Options: Types SMA and N.

CASE DRAWING

GC4



CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS

AFT Avanpak Series

Features

- Avanpak™ Package
- Removable Connectors (Miniature Series)
- 0.5 thru 18.0 GHz (Octave/Multi-octave)
- Economically Priced (General Purpose)

AFT amplifiers are general purpose amplifiers, suitable for a wide range of applications in commercial and military systems where low to medium gain "amplifier blocks" are required.

AFTs are compact and rugged and may be designed into commercial and military systems where stringent environments are encountered.

The Avanpak "flat-pak" package is suitable for conventional chassis mounting, using connectors and cables, and when the RF connectors are removed, they are ideal for use in microstrip or stripline integration.

The AFT series is economically priced to facilitate its wide usage, and most models are readily available from stock from AVANTEK's distributor network.

AMT/AWT Series

Features

- High Performance
- 0.5 thru 45.5 GHz
- Low Noise Figure
- Wide Dynamic Range

The AMT/AWT series provides premium performance over octave (AMT) and multi-octave (AWT) bands at 25°C. Temperature compensated amplifiers are specified over full military temperature ranges up to +100°C.

AMT/AWT series amplifiers are ideal for specification in performance driven applications in commercial and military systems. These amplifiers have a wide range of gain options, typically up to 45-50 dB, and are optimized for noise figure and dynamic range, consistent with the best technology available. A complete range of performance specifications is standard on these series and they are guaranteed over the specified temperature range.

The rugged I-series case is designed for chassis mounting and conventional connector/cable system integration.

The MA-series case is equivalent to the Avanpak "flat-pak" package outline and is designed to withstand the same rugged environments as the I-series cases. They too are suitable for conventional chassis mounting, using connectors and cables, and when the RF connectors are removed, are ideal for use in microstrip or stripline integration.

0.1 to 4.0 GHz

PC3

Guaranteed Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Current (mA) Maximum		Case Type
(N) AFT-4001	0.1-4.0	7.0	8.0 Typ.	7.0/8.0	+7	0.5	+17	2.0	2.0	+12	50 Typ.	AS2
(N) AFT-4002	0.1-4.0	14.0	16.0 Typ.	7.0/8.0	+7	0.9	+17	2.0	2.0	+12	100 Typ.	AS2
(N) AFT-4003	0.1-4.0	21.0	24.0 Typ.	7.0/8.0	+7	1.25	+17	2.0	2.0	+12	150 Typ.	AS2

0.5 to 2.0 GHz

Guaranteed Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Typical Current (mA)		Case Type
(N) AFT-2001	0.5-2.0	18.0	20.0 Typ.	4.0/4.5	+7	0.75	+20	2.0	2.0	+12	80 Typ.	AS2
(N) AFT-2002	0.5-2.0	15.0	17.0 Typ.	5.0/6.0	+10	0.75	+20	2.0	2.0	+12	100 Typ.	AS2
(N) AFT-2003	0.5-2.0	22.0	25.0 Typ.	5.0/6.0	+13	0.75	+23	2.0	2.0	+12	150 Typ.	AS2
AFT-2031	0.5-2	10.0	10.5 Typ.	3.3/3.5	+11	0.5	+21	2.0	2.0	+15	60 Typ.	AS2
AFT-2032	0.5-2	20.0	21.0 Typ.	3.5/3.7	+13	0.7	+23	2.0	2.0	+15	120 Typ.	AS2
AFT-2033	0.5-2	30.0	32.0 Typ.	3.5/3.7	+13	1.0	+23	2.0	2.0	+15	180 Typ.	AS4
AFT-2034	0.5-2	40.0	42.0 Typ.	3.5/3.7	+13	1.5	+23	2.0	2.0	+15	250 Typ.	AS4
AFT-2061	0.5-2	10.0	10.5 Typ.	4.5/5.0	+20	0.5	+29	2.0	2.0	+15	180 Typ.	AS2
AFT-2062	0.5-2	20.0	21.0 Typ.	3.5/3.7	+20	0.7	+29	2.0	2.0	+15	250 Typ.	AS2
AFT-2063	0.5-2	30.0	32.0 Typ.	3.5/3.7	+20	1.0	+29	2.0	2.0	+15	300 Typ.	AS4
AFT-2064	0.5-2	40.0	42.0 Typ.	3.5/3.7	+20	1.5	+29	2.0	2.0	+15	350 Typ.	AS4

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Current (mA) Maximum	Case Type
(N) AWT-2071	0.5-2.0	10	13	2.1/2.5	+11	0.50	+20	2.0 2.0	+12	75	IS2
(N) AWT-2072	0.5-2.0	21	26	2.3/2.7	+11	0.75	+20	2.0 2.0	+12	150	IS2
(N) AWT-2073	0.5-2.0	33	40	2.4/2.8	+20	1.00	+29	2.0 2.0	+12	260	IS4
AWT-2032	0.5-2.0	23	27	2.8/3.5	+13	1.25	+21	2.0 2.0	+12	100	IS2
AWT-2033	0.5-2.0	35	40	2.8/3.5	+13	1.25	+21	2.0 2.0	+12	160	IS4
AWT-2034	0.5-2.0	47	53	2.8/3.5	+13	1.25	+21	2.0 2.0	+12	200	IS4
(N) AWT-2053	0.5-2.0	35	40	3.2/3.5	+20	1.25	+28	2.0 2.0	+12	210	IS4
(N) AWT-2054	0.5-2.0	47	53	3.2/3.5	+20	1.25	+28	2.0 2.0	+12	250	IS4

Guaranteed Specifications @ -54° to +100° C Case Temperature

(N) AWT-2082	0.5-2.0	19	23	3.6/4.0	+13	1.50	+21	2.0 2.0	+12	170	IS4
(N) AWT-2083	0.5-2.0	30	34	3.4/3.8	+13	1.75	+21	2.0 2.0	+12	220	IS4
(N) AWT-2084	0.5-2.0	41	46	3.4/3.8	+13	2.00	+21	2.0 2.0	+12	260	IS6
AWT-2042	0.5-2.0	19	23	4.5/4.7	+13	1.50	+21	2.0 2.0	+12	150	IS4
AWT-2043	0.5-2.0	30	34	4.2/4.5	+13	1.75	+21	2.0 2.0	+12	200	IS4
AWT-2044	0.5-2.0	41	46	4.2/4.5	+13	2.00	+21	2.0 2.0	+12	250	IS6
(N) AWT-2063	0.5-2.0	30	34	4.2/4.5	+20	1.75	+28	2.0 2.0	+12	275	IS4
(N) AWT-2064	0.5-2.0	41	46	4.2/4.5	+20	2.00	+28	2.0 2.0	+12	325	IS6

0.5 to 4.5 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Current (mA) Maximum	Case Type
(N) AWT-4532	0.5-4.5	18	22	3.5/3.8	+12	0.75	+21	2.0 2.0	+12	100	IS2
(N) AWT-4533	0.5-4.5	27	33	3.5/3.8	+12	1.0	+21	2.0 2.0	+12	150	IS4
(N) AWT-4534	0.5-4.5	36	44	3.5/3.8	+12	1.0	+21	2.0 2.0	+12	200	IS4

2.0 to 4.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Typical Current (mA)	Case Type
AFT-4231	2-4	11.5	12.0 Typ.	3.6/4.0	+13	1.0	+23	2.0 2.0	+15	75 Typ.	AS2
AFT-4232	2-4	23.0	24.0 Typ.	3.6/4.0	+13	1.0	+23	2.0 2.0	+15	150 Typ.	AS2
AFT-4233	2-4	35.0	36.0 Typ.	3.6/4.0	+13	1.0	+23	2.0 2.0	+15	225 Typ.	AS4
AFT-4234	2-4	47.0	48.0 Typ.	3.6/4.0	+13	1.5	+23	2.0 2.0	+15	300 Typ.	AS4
AFT-4261	2-4	10.0	10.5 Typ.	4.7/5.0	+20	1.0	+29	2.0 2.0	+15	175 Typ.	AS2
AFT-4262	2-4	21.5	22.5 Typ.	3.6/4.0	+20	1.0	+29	2.0 2.0	+15	225 Typ.	AS2
AFT-4263	2-4	34.0	35.0 Typ.	3.6/4.0	+20	1.0	+29	2.0 2.0	+15	275 Typ.	AS4
AFT-4264	2-4	44.5	46.0 Typ.	3.6/4.0	+20	1.5	+29	2.0 2.0	+15	325 Typ.	AS4

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Current (mA) Maximum	Case Type
(N) AMT-4071	2-4	12.0	15.0	1.5/1.7	+9	0.5	+17	2.0 2.0	+12	65	IS2
(N) AMT-4072	2-4	25.5	30.0	1.6/1.8	+9	1.0	+17	2.0 2.0	+12	125	IS2
(N) AMT-4073	2-4	38.0	44.0	1.6/1.8	+18	1.0	+28	2.0 2.0	+12	225	IS4
(N) AMT-4074	2-4	50.0	58.0	1.6/1.8	+20	1.0	+28	2.0 2.0	+12	280	IS4
(N) AMT-4031	2-4	12.5	15.0	1.9/2.1	+12	0.5	+20	2.0 2.0	+12	65	IS2
(N) AMT-4032	2-4	26.0	30.0	2.0/2.2	+12	1.0	+20	2.0 2.0	+12	125	IS2
(N) AMT-4033	2-4	39.0	44.0	2.0/2.2	+20	1.0	+28	2.0 2.0	+12	225	IS4
AMT-4051	2-4	12.5	15.5	3.3/3.8	+20	1.0	+28	2.0 2.0	+12	120	IS2
AMT-4052	2-4	26.0	30.0	2.3/2.7	+20	1.0	+28	2.0 2.0	+12	175	IS2
AMT-4053	2-4	39.0	44.0	2.3/2.7	+20	1.0	+28	2.0 2.0	+12	225	IS4
AMT-4054	2-4	52.0	58.0	2.3/2.7	+20	1.0	+28	2.0 2.0	+12	280	IS4

(N) — New Product Offering — Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

Guaranteed Specifications @ -54° to +100° C Case Temperature

(N) AMT-4082	2-4	22	26	3.2	+15	1.50	+23	2.0	2.0	+12	225	IS4
(N) AMT-4083	2-4	34	38	2.9	+20	1.75	+28	2.0	2.0	+12	330	IS4
(N) AMT-4084	2-4	46	51	2.9	+20	2.00	+28	2.0	2.0	+12	380	IS6
AMT-4062	2-4	22	26	5.0	+20	1.50	+28	2.0	2.0	+12	280	IS4
AMT-4063	2-4	34	38	3.8	+20	1.75	+28	2.0	2.0	+12	330	IS4
AMT-4064	2-4	46	51	3.8	+20	2.00	+28	2.0	2.0	+12	380	IS6

2.0 to 6.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	Maximum Out	Input Voltage (VDC)	Input Power Typical Current (mA)	Case Type
AFT-6231	2-6	8.5	9.0 Typ.	3.3/3.7	+10	0.7	+20	2.0	2.0	+15	60 Typ.	AC2
AFT-6232	2-6	18.0	19.0 Typ.	3.6/4.0	+12	1.0	+22	2.0	2.0	+15	125 Typ.	AC2
AFT-6233	2-6	27.5	28.5 Typ.	3.6/4.0	+12	1.0	+22	2.0	2.0	+15	200 Typ.	AC4
AFT-6234	2-6	37.0	38.5 Typ.	3.6/4.0	+12	1.5	+22	2.0	2.0	+15	275 Typ.	AC4
AFT-6261	2-6	7.0	8.0 Typ.	5.5/6.0	+20	0.7	+29	2.0	2.0	+15	175 Typ.	AC2
AFT-6262	2-6	15.0	16.0 Typ.	6.0/6.5	+20	1.0	+29	2.0	2.0	+15	300 Typ.	AC2
AFT-6263	2-6	24.5	26.0 Typ.	5.0/5.5	+20	1.0	+29	2.0	2.0	+15	350 Typ.	AC4
AFT-6264	2-6	33.5	35.0 Typ.	4.5/5.0	+20	1.5	+29	2.0	2.0	+15	400 Typ.	AC4

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	Maximum Out	Input Voltage (VDC)	Input Power Typical Current (mA)	Case Type
AWT-6032	2-6	19	23	3.3/3.5	+15	1.0	+23	2.0	2.0	+12	130	IC2
AWT-6033	2-6	28	33	3.3/3.5	+15	1.0	+23	2.0	2.0	+12	190	IC4
AWT-6034	2-6	38	44	3.3/3.5	+15	1.25	+23	2.0	2.0	+12	250	IC4
AWT-6035	2-6	48	55	3.3/3.5	+15	1.5	+23	2.0	2.0	+12	310	IC6
AWT-6052	2-6	18	23	5.0/6.0	+23	1.25	+31	2.0	2.0	+12	300	IC2
AWT-6053	2-6	27	33	3.6/4.0	+23	1.25	+31	2.0	2.0	+12	350	IC4
AWT-6054	2-6	36	43	3.2/3.5	+23	1.5	+31	2.0	2.0	+12	400	IC4
AWT-6055	2-6	46	54	3.2/3.5	+23	2.0	+31	2.0	2.0	+12	460	IC6

Guaranteed Specifications @ -54° to +100° C Case Temperature

AWT-6043	2-6	24	28	4.8	+15	1.75	+23	2.0	2.0	+12	230	IC4
AWT-6044	2-6	31	36	4.5	+15	2.0	+23	2.0	2.0	+12	280	IC6
AWT-6045	2-6	40	45	4.5	+15	2.25	+23	2.0	2.0	+12	340	IC6
AWT-6063	2-6	23	28	6.5	+23	2.0	+31	2.0	2.0	+12	420	IC4
AWT-6064	2-6	31	37	5.0	+23	2.25	+31	2.0	2.0	+12	460	IC6
AWT-6065	2-6	38	45	4.5	+23	2.5	+31	2.0	2.0	+12	540	IC6

2.0 to 8.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	Maximum Out	Input Voltage (VDC)	Input Power Typical Current (mA)	Case Type
AFT-8231	2-8	6.5	7.0 Typ.	4.3/4.8	+12	0.7	+22	2.0	2.0	+15	100 Typ.	AC2
AFT-8232	2-8	14.0	14.5 Typ.	4.5/5.0	+12	1.0	+22	2.0	2.0	+15	175 Typ.	AC2
AFT-8233	2-8	21.0	22.0 Typ.	4.5/5.0	+12	1.0	+22	2.0	2.0	+15	235 Typ.	AC4
AFT-8234	2-8	28.0	30.0 Typ.	4.5/5.0	+12	1.5	+22	2.0	2.0	+15	300 Typ.	AC4
AFT-8261	2-8	7.5	8.0 Typ.	5.5/6.0	+17	0.7	+26	2.0	2.0	+15	150 Typ.	AC2
AFT-8262	2-8	16.5	17.0 Typ.	5.5/6.0	+17	1.0	+26	2.0	2.0	+15	300 Typ.	AC2
AFT-8263	2-8	23.0	24.0 Typ.	4.7/5.2	+17	1.0	+26	2.0	2.0	+15	375 Typ.	AC4
AFT-8264	2-8	30.0	32.0 Typ.	4.7/5.2	+17	1.5	+26	2.0	2.0	+15	450 Typ.	AC4

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CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

2.0 to 8.0 GHz

Guaranteed Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
AWT-8032	2-8	16	21	4.0/4.2	+15	1.0	+23	2.0 2.0	+12	165	IC2
AWT-8033	2-8	24	31	3.8/4.0	+15	1.25	+23	2.0 2.0	+12	235	IC4
AWT-8034	2-8	33	41	3.8/4.0	+15	1.5	+23	2.0 2.0	+12	320	IC4
AWT-8035	2-8	41	50	3.8/4.0	+15	1.75	+23	2.0 2.0	+12	400	IC6
AWT-8052	2-8	15	20	5.0/6.0	+20	1.0	+28	2.0 2.0	+12	275	IC2
AWT-8053	2-8	23	30	3.9/4.5	+20	1.25	+28	2.0 2.0	+12	350	IC4
AWT-8054	2-8	32	40	3.8/4.0	+20	1.5	+28	2.0 2.0	+12	425	IC4
AWT-8055	2-8	40	49	3.8/4.0	+20	1.75	+28	2.0 2.0	+12	510	IC6

Guaranteed Specifications @ -54° to +100° C Case Temperature

AWT-8043	2-8	18.5	24.5	5.8	+15	1.75	+23	2.0 2.0	+12	270	IC4
AWT-8044	2-8	26.5	32.5	5.5	+15	2.0	+23	2.0 2.0	+12	340	IC6
AWT-8045	2-8	34	41	5.3	+15	2.25	+23	2.0 2.0	+12	420	IC6
AWT-8063	2-8	18	24	7.5	+20	2.0	+28	2.0 2.0	+12	400	IC4
AWT-8064	2-8	25	32	5.7	+20	2.25	+28	2.0 2.0	+12	470	IC6
AWT-8065	2-8	32.5	41.5	5.5	+20	2.5	+28	2.0 2.0	+12	550	IC6

4.0 to 8.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Input Power Typical Current (mA)	Case Type
AFT-8431	4-8	8.5	9.0 Typ.	4.0/4.5	+10	1.0	+20	2.0 2.0	+15	75 Typ.	AC2
AFT-8432	4-8	17.0	18.0 Typ.	4.0/4.5	+10	1.0	+20	2.0 2.0	+15	125 Typ.	AC2
AFT-8433	4-8	28.0	29.0 Typ.	3.5/4.0	+12	1.0	+22	2.0 2.0	+15	200 Typ.	AC4
AFT-8434	4-8	37.5	39.0 Typ.	3.5/4.0	+12	1.5	+22	2.0 2.0	+15	250 Typ.	AC4
AFT-8461	4-8	6.5	7.0 Typ.	7.5/8.0	+20	0.7	+29	2.0 2.0	+15	125 Typ.	AC2
AFT-8462	4-8	13.0	14.0 Typ.	7.5/8.0	+20	1.0	+29	2.0 2.0	+15	250 Typ.	AC2
AFT-8463	4-8	24.0	25.0 Typ.	5.0/5.5	+20	1.0	+29	2.0 2.0	+15	300 Typ.	AC4
AFT-8464	4-8	32.0	34.0 Typ.	4.0/4.5	+20	1.5	+29	2.0 2.0	+15	350 Typ.	AC4

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
(N) AMT-8071	4-8	10	12	2.1/2.5	+7	0.50	+15	2.0 2.0	+12	50	IC2
(N) AMT-8072	4-8	20	24	2.3/2.7	+7	1.00	+15	2.0 2.0	+12	100	IC2
(N) AMT-8073	4-8	30	35	2.3/2.7	+13	1.50	+21	2.0 2.0	+12	175	IC4
(N) AMT-8074	4-8	39	45	2.3/2.7	+18	2.00	+26	2.0 2.0	+12	275	IC4
AMT-8032	4-8	19	23	3.3/3.7	+15	1.0	+23	2.0 2.0	+12	125	IC2
AMT-8033	4-8	29	34	3.0/3.5	+15	1.0	+23	2.0 2.0	+12	180	IC4
AMT-8034	4-8	38	45	3.0/3.5	+15	1.25	+23	2.0 2.0	+12	220	IC4
AMT-8035	4-8	48	56	3.0/3.5	+15	1.5	+23	2.0 2.0	+12	275	IC6
AMT-8052	4-8	18	22	4.0/5.2	+20	1.0	+28	2.0 2.0	+12	200	IC2
AMT-8053	4-8	27	32	3.2/3.8	+20	1.0	+28	2.0 2.0	+12	250	IC4
AMT-8054	4-8	37	44	3.0/3.5	+20	1.25	+28	2.0 2.0	+12	300	IC4
AMT-8055	4-8	46	54	3.0/3.5	+20	1.5	+28	2.0 2.0	+12	350	IC6

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC)	Input Power Typical Current (mA)	Case Type
(N) AMT-8083	4-8	25.0	29	4.2	+15	1.25	+23	2.0 2.0	+12	225	IC4
(N) AMT-8084	4-8	34.0	39.5	3.8	+15	1.50	+23	2.0 2.0	+12	250	IC6
(N) AMT-8085	4-8	43.0	50	3.8	+15	1.75	+23	2.0 2.0	+12	300	IC6
AMT-8043	4-8	24	28	5.0	+15	1.25	+23	2.0 2.0	+12	225	IC4
AMT-8044	4-8	31.5	37	4.5	+15	1.5	+23	2.0 2.0	+12	250	IC6
AMT-8045	4-8	40	47	4.5	+15	1.75	+23	2.0 2.0	+12	300	IC6
AMT-8063	4-8	22	26	7.0	+20	1.5	+28	2.0 2.0	+12	350	IC4
AMT-8064	4-8	29	35	5.2	+20	1.75	+28	2.0 2.0	+12	400	IC6
AMT-8065	4-8	37	44	5.0	+20	2.0	+28	2.0 2.0	+12	450	IC6

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

4.5 to 10.5 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Current (mA) Maximum		Case Type
(N) AWT-10571	4.0-11.0	8	11	2.1/2.5	+10	0.75	+18	2.0	2.0	+12	65	IX2
(N) AWT-10572	4.0-11.0	17	21	2.3/2.7	+10	1.00	+18	2.0	2.0	+12	130	IX2
(N) AWT-10573	4.0-11.0	26	31	2.3/2.7	+15	1.25	+23	2.0	2.0	+12	200	IX4
(N) AWT-10574	4.0-11.0	34	41	2.3/2.7	+20	1.50	+28	2.0	2.0	+12	380	IX4
AWT-10532	4.5-10.5	17	21	4.3/4.5	+15	1.0	+23	2.0	2.0	+12	120	IC2
AWT-10533	4.5-10.5	26	31	4.2/4.5	+15	1.0	+23	2.0	2.0	+12	160	IC4
AWT-10534	4.5-10.5	34	41	4.2/4.5	+15	1.25	+23	2.0	2.0	+12	210	IC4
AWT-10535	4.5-10.5	43	51	4.2/4.5	+15	1.5	+23	2.0	2.0	+12	250	IC6
AWT-10552	4.5-10.5	15	20	5.5/6.0	+20	1.0	+28	2.0	2.0	+12	275	IC2
AWT-10553	4.5-10.5	24	30	4.8/5.0	+20	1.25	+28	2.0	2.0	+12	320	IC4
AWT-10554	4.5-10.5	32	40	4.2/4.5	+20	1.5	+28	2.0	2.0	+12	360	IC4
AWT-10555	4.5-10.5	41	50	4.2/4.5	+20	1.75	+28	2.0	2.0	+12	400	IC6

Guaranteed Specifications @ -54° to +100° C Case Temperature

AWT-10543	4.5-10.5	21	26	6.0	+15	1.75	+23	2.0	2.0	+12	230	IC4
AWT-10544	4.5-10.5	28	34	6.0	+15	2.0	+23	2.0	2.0	+12	250	IC6
AWT-10545	4.5-10.5	35.5	42	6.0	+15	2.25	+23	2.0	2.0	+12	290	IC6
AWT-10563	4.5-10.5	19	24	7.0	+20	1.75	+28	2.0	2.0	+12	375	IC4
AWT-10564	4.5-10.5	27	34	6.5	+20	2.0	+28	2.0	2.0	+12	450	IC6
AWT-10565	4.5-10.5	33	41	6.0	+20	2.25	+28	2.0	2.0	+12	475	IC6

6.0 to 12.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Typical Current (mA)		Case Type
AFT-12631	6-12	7.5	8.0 Typ.	6.0/6.5	+10	0.7	+20	2.0	2.0	+15	75 Typ.	AX2
AFT-12632	6-12	15.0	16.0 Typ.	5.7/6.0	+10	1.0	+20	2.0	2.0	+15	150 Typ.	AX2
AFT-12633	6-12	22.5	24.0 Typ.	4.2/4.5	+14	1.0	+24	2.0	2.0	+15	175 Typ.	AX4
AFT-12634	6-12	30.5	32.0 Typ.	4.2/4.5	+14	1.5	+24	2.0	2.0	+15	225 Typ.	AX4
AFT-12635	6-12	38.0	40.0 Typ.	4.2/4.5	+14	2.0	+24	2.0	2.0	+15	275 Typ.	AX6
AFT-12661	6-12	5.0	5.5 Typ.	7.5/8.0	+20	0.7	+29	2.0	2.0	+15	175 Typ.	AX2
AFT-12662	6-12	13.0	14.0 Typ.	6.0/6.5	+20	1.0	+29	2.0	2.0	+15	250 Typ.	AX2
AFT-12663	6-12	21.0	22.0 Typ.	5.0/5.5	+20	1.0	+29	2.0	2.0	+15	300 Typ.	AX4
AFT-12664	6-12	28.0	29.0 Typ.	4.5/5.0	+20	1.5	+29	2.0	2.0	+15	350 Typ.	AX4
AFT-12665	6-12	36.5	38.0 Typ.	4.5/5.0	+20	2.0	+29	2.0	2.0	+15	400 Typ.	AX6

Guaranteed Specifications @ -54° to +100° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Maximum	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Current (mA) Maximum		Case Type
AMT-12064	6-12	21	29	7.7	+20	1.5	+28	2.0	2.0	+12	520	IX6
AMT-12065	6-12	32	40	5.0	+20	1.5	+28	2.0	2.0	+12	460	IX6
AMT-12066	6-12	37	45	4.5	+20	2.0	+28	2.0	2.0	+12	520	IX8

(N) — New Product Offering — Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

5.0 to 13.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Typ./Max.	Minimum	Maximum		In	Out	Voltage (VDC)	Current (mA)	
(N) AWT-13531	5-13	6	9	2.6/3.2	+10	0.75	+18	2.0	2.0	+12	65	IX2
(N) AWT-13532	5-13	13	17	3.1/3.5	+10	1.0	+18	2.0	2.0	+12	130	IX2
(N) AWT-13533	5-13	20	26	3.1/3.5	+15	1.25	+23	2.0	2.0	+12	185	IX4
(N) AWT-13534	5-13	28	36	3.1/3.5	+15	1.5	+23	2.0	2.0	+12	245	IX4
AWT-13032	5-13	17	21	4.3/4.5	+15	1.0	+23	2.0	2.0	+12	140	IX2
AWT-13033	5-13	25	30	4.3/4.5	+15	1.0	+23	2.0	2.0	+12	200	IX4
AWT-13034	5-13	33	40	4.3/4.5	+15	1.0	+23	2.0	2.0	+12	260	IX4
AWT-13035	5-13	41	49	4.3/4.5	+15	1.5	+23	2.0	2.0	+12	320	IX6
AWT-13036	5-13	49	57	4.3/4.5	+15	1.5	+23	2.0	2.0	+12	380	IX6

Guaranteed Specifications @ -54° to +100° C Case Temperature

(N) AWT-13083	5-13	20	25	5.2	+13	1.5	+21	2.0	2.0	+12	220	IX4
(N) AWT-13084	5-13	26	32	5.0	+13	1.5	+21	2.0	2.0	+12	280	IX6
(N) AWT-13085	5-13	33	41	5.0	+15	2.0	+23	2.0	2.0	+12	340	IX6
(N) AWT-13086	5-13	40	48	5.0	+15	2.5	+23	2.0	2.0	+12	400	IX8
AWT-13043	5-13	20	25	6.0	+13	1.5	+21	2.0	2.0	+12	220	IX4
AWT-13044	5-13	27	33	6.0	+15	1.5	+23	2.0	2.0	+12	280	IX6
AWT-13045	5-13	34	42	6.0	+15	2.0	+23	2.0	2.0	+12	340	IX6
AWT-13046	5-13	41	49	6.0	+15	2.5	+23	2.0	2.0	+12	400	IX8

7.0 to 12.4 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Typ./Max.	Minimum	Maximum		In	Out	Voltage (VDC)	Current (mA)	
(N) AMT-12471	7-12.4	7	10	2.2/2.6	+10	0.75	+18	2.0	2.0	+12	65	IX2
(N) AMT-12472	7-12.4	15	19	2.5/2.9	+10	1.00	+18	2.0	2.0	+12	130	IX2
(N) AMT-12473	7-12.4	23	29	2.5/2.9	+15	1.25	+23	2.0	2.0	+12	200	IX4
(N) AMT-12474	7-12.4	29	37	2.5/2.9	+20	1.50	+28	2.0	2.0	+12	380	IX4
AMT-12432	7-12.4	17	21	3.9/4.5	+15	1.0	+23	2.0	2.0	+12	140	IX2
AMT-12433	7-12.4	25	31	3.9/4.5	+15	1.0	+23	2.0	2.0	+12	210	IX4
AMT-12434	7-12.4	31	39	3.7/4.0	+15	1.0	+23	2.0	2.0	+12	230	IX4
AMT-12435	7-12.4	38	45	3.7/4.0	+15	1.5	+23	2.0	2.0	+12	290	IX6
AMT-12436	7-12.4	47	55	3.7/4.0	+15	1.5	+23	2.0	2.0	+12	350	IX6
AMT-12453	7-12.4	23	29	4.5/5.0	+20	1.0	+28	2.0	2.0	+12	330	IX4
AMT-12454	7-12.4	32	40	3.9/4.5	+20	1.0	+28	2.0	2.0	+12	390	IX4
AMT-12455	7-12.4	36	44	3.8/4.0	+20	1.5	+28	2.0	2.0	+12	400	IX6
AMT-12456	7-12.4	45	53	3.8/4.0	+20	1.5	+28	2.0	2.0	+12	450	IX6

Guaranteed Specifications @ -54° to +100° C Case Temperature

(N) AMT-12483	7-12.4	18	24	4.9	+13	1.0	+21	2.0	2.0	+12	230	IX4
(N) AMT-12484	7-12.4	25	33	5.2	+15	1.5	+23	2.0	2.0	+12	300	IX6
(N) AMT-12485	7-12.4	32	41	4.7	+15	1.5	+23	2.0	2.0	+12	330	IX6
(N) AMT-12486	7-12.4	38	47	4.4	+15	2.0	+23	2.0	2.0	+12	370	IX8
(N) AMT-12487	7-12.4	45	55	4.2	+15	2.5	+23	2.0	2.0	+12	420	IX8
AMT-12443	7-12.4	20	26	5.7	+13	1.0	+21	2.0	2.0	+12	230	IX4
AMT-12444	7-12.4	27	35	6.0	+15	1.5	+23	2.0	2.0	+12	300	IX6
AMT-12445	7-12.4	31	40	5.5	+15	1.5	+23	2.0	2.0	+12	320	IX6
AMT-12446	7-12.4	36	45	5.2	+15	2.0	+23	2.0	2.0	+12	350	IX8
AMT-12447	7-12.4	44	54	5.0	+15	2.5	+23	2.0	2.0	+12	410	IX8
AMT-12464	7-12.4	21	29	7.7	+20	1.5	+28	2.0	2.0	+12	520	IX6
AMT-12465	7-12.4	30	38	6.0	+20	1.5	+28	2.0	2.0	+12	460	IX6
AMT-12466	7-12.4	36	45	5.6	+20	2.0	+28	2.0	2.0	+12	640	IX8

(N) — New Product Offering — Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

1.0 to 20.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power Maximums		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		In	Out	Voltage (VDC)	Current (mA)	
AFT-18232	2-18	9.0	17	10.0	+10.0	2.0	+18	2.2		+12	225	AX2
AFT-18234	2-18	18.0	28	10.0	+10.0	4.0	+18	2.2		+12	425	AX2

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power Maximums		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		In	Out	Voltage (VDC)	Current (mA)	
(N) AWT-12133	1-12.4	14.5	19	8.5	+10	1.5	+18	2.2	2.2	+12	275	IX4
(N) AWT-12134	1-12.4	20.0	27	8.5	+10	2.0	+18	2.2	2.2	+12	365	IX4
(N) AWT-12135	1-12.4	25.0	34	8.5	+10	2.5	+18	2.2	2.2	+12	455	IX6
(N) AWT-19133	1-19	14.5	19	10.5	+10	2.0	+18	2.2	2.2	+12	275	IX4
(N) AWT-19134	1-19	20.0	27	10.5	+10	2.5	+18	2.2	2.2	+12	365	IX4
(N) AWT-19135	1-19	25.0	34	10.5	+10	3.0	+18	2.2	2.2	+12	455	IX6
(I) AWT-18233	2-18	14.5	19	10.0	+10	1.5	+18	2.2	2.2	+12	275	IX4
(I) AWT-18234	2-18	20.0	27	10.0	+10	2.0	+18	2.2	2.2	+12	365	IX4
(I) AWT-18235	2-18	25.0	34	10.0	+10	2.5	+18	2.2	2.2	+12	455	IX6
(I) AWT-18236	2-18	30.0	40	10.0	+10	3.0	+18	2.2	2.2	+12	545	IX6
(N) AWT-18252	2-18	10.0	15	10.0	+20	1.0	+28	2.2	2.2	+12	375	IX2
(N) AWT-18253	2-18	15.0	22	10.0	+20	1.5	+28	2.2	2.2	+12	550	IX4
(N) AWT-18254	2-18	20.0	28	10.0	+20	2.0	+28	2.2	2.2	+12	650	IX4
(N) AWT-20233	2-20	14.5	19	11.0	+10	1.5	+18	2.2	2.2	+12	275	IX4
(N) AWT-20234	2-20	20.0	27	11.0	+10	2.0	+18	2.2	2.2	+12	365	IX4
(N) AWT-20235	2-20	25.0	34	11.0	+10	2.5	+18	2.2	2.2	+12	455	IX6
(N) AWT-20236	2-20	30.0	40	11.0	+10	3.0	+18	2.2	2.2	+12	545	IX6

AWT SERIES—TEMPERATURE COMPENSATED

Guaranteed Specifications @ -54° C to +100° C Case Temperature

(N) AWT-18244	2-18	18	26	11.0	+9	3.0	+17	2.2	2.2	+12	425	IX4
(N) AWT-18245	2-18	22	31	11.0	+9	3.5	+17	2.2	2.2	+12	510	IX6
(N) AWT-18246	2-18	26	36	11.0	+9	4.0	+17	2.2	2.2	+12	600	IX6

(I)—Improved Specifications (no change to existing model number)—Fall 1987

(N)—New Product Offering—Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

6.0 to 18.0 GHz

Guaranteed Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Typical Current (mA)		Case Type
AFT-18631	6-18	7.0	7.5 Typ.	6.4/6.7	+10	1.0	+20	2.0	2.0	+15	75 Typ.	AX2
AFT-18632	6-18	13.0	14.0 Typ.	6.5/7.0	+10	1.0	+20	2.0	2.0	+15	125 Typ.	AX2
AFT-18633	6-18	18.5	20.0 Typ.	6.5/7.0	+10	1.0	+20	2.0	2.0	+15	175 Typ.	AX4
AFT-18634	6-18	24.5	26.0 Typ.	6.5/7.0	+10	1.5	+20	2.0	2.0	+15	250 Typ.	AX4
AFT-18635	6-18	30.0	32.0 Typ.	6.5/7.0	+10	2.0	+20	2.0	2.0	+15	300 Typ.	AX6
AFT-18651	6-18	5.0	6.0 Typ.	7.0/7.3	+15	1.0	+25	2.0	2.0	+15	100 Typ.	AX2
AFT-18652	6-18	11.0	12.0 Typ.	7.0/7.3	+15	1.0	+25	2.0	2.0	+15	165 Typ.	AX2
AFT-18653	6-18	18.5	20.0 Typ.	6.6/7.1	+15	1.0	+25	2.0	2.0	+15	225 Typ.	AX4
AFT-18654	6-18	24.5	26.0 Typ.	6.6/7.1	+15	1.5	+25	2.0	2.0	+15	275 Typ.	AX4
AFT-18655	6-18	32.0	34.0 Typ.	6.6/7.1	+15	2.0	+25	2.0	2.0	+15	325 Typ.	AX6
AFT-18662	6-18	9.5	10.5 Typ.	8.7/9.2	+20	1.0	+29	2.0	2.0	+15	325 Typ.	AX2
AFT-18663	6-18	15.0	16.5 Typ.	8.2/8.7	+20	1.0	+29	2.0	2.0	+15	360 Typ.	AX4
AFT-18664	6-18	23.0	24.5 Typ.	6.6/7.1	+20	1.5	+29	2.0	2.0	+15	425 Typ.	AX4
AFT-18665	6-18	30.5	32.5 Typ.	6.6/7.1	+20	2.0	+29	2.0	2.0	+15	475 Typ.	AX6

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Current (mA) Maximum		Case Type
(I) AWT-18673	6-18	20	26	3.6/4.0	+10	1.0	+18	2.0	2.0	+12	200	IX4
(I) AWT-18674	6-18	26	32	3.6/4.0	+15	1.0	+23	2.0	2.0	+12	250	IX4
(I) AWT-18675	6-18	32	38	3.6/4.0	+15	1.5	+23	2.0	2.0	+12	310	IX6
(I) AWT-18676	6-18	38	44	3.6/4.0	+18	1.5	+26	2.0	2.0	+12	375	IX6
AWT-18632	6-18	14	20	5.7/6.5	+13	1.0	+21	2.0	2.0	+12	140	IX2
AWT-18633	6-18	20	26	5.5/6.5	+13	1.0	+21	2.0	2.0	+12	200	IX4
AWT-18634	6-18	26	32	5.5/6.5	+15	1.0	+23	2.0	2.0	+12	260	IX4
AWT-18635	6-18	32	38	5.5/6.5	+15	1.5	+23	2.0	2.0	+12	320	IX6
AWT-18636	6-18	38	44	5.5/6.5	+15	1.5	+23	2.0	2.0	+12	380	IX6
AWT-18637	6-18	44	50	5.5/6.5	+15	2.0	+23	2.0	2.0	+12	440	IX8
AWT-18654	6-18	24	30	6.0/7.0	+20	1.0	+28	2.0	2.0	+12	370	IX4
AWT-18655	6-18	30	36	6.0/7.0	+20	1.5	+28	2.0	2.0	+12	430	IX6
AWT-18656	6-18	36	42	6.0/7.0	+20	1.5	+28	2.0	2.0	+12	490	IX6
AWT-18657	6-18	42	50	6.0/7.0	+20	2.0	+28	2.0	2.0	+12	560	IX8

Guaranteed Specifications @ -54° to +100° C Case Temperature

AWT-18685	6-18	26	32	5.5	+10	2.5	+18	2.0	2.0	+12	350	IX6
AWT-18686	6-18	30	38	5.0	+10	2.5	+18	2.0	2.0	+12	410	IX8
AWT-18688	6-18	40	48	5.0	+15	3.0	+23	2.0	2.0	+12	520	IX10
AWT-18695	6-18	26	32	6.0	+15	2.5	+23	2.0	2.0	+12	350	IX6
AWT-18696	6-18	30	36	6.0	+18	2.5	+26	2.0	2.0	+12	510	IX8
AWT-18698	6-18	40	48	5.5	+20	3.0	+28	2.0	2.0	+12	630	IX10
AWT-18644	6-18	20	25	7.5	+12	2.0	+20	2.0	2.0	+12	290	IX6
AWT-18645	6-18	25	30	7.5	+15	2.5	+23	2.0	2.0	+12	350	IX6
AWT-18646	6-18	30	36	7.5	+15	2.5	+23	2.0	2.0	+12	440	IX8
AWT-18647	6-18	36	44	7.5	+18	3.0	+26	2.0	2.0	+12	510	IX8
AWT-18648	6-18	42	50	7.5	+18	3.0	+26	2.0	2.0	+12	570	IX10
AWT-18666	6-18	28	36	8.5	+20	2.5	+28	2.0	2.0	+12	520	IX8
AWT-18667	6-18	36	44	7.5	+20	3.0	+28	2.0	2.0	+12	600	IX8
(N) AWT-18606	6-18	30	34	5.0	+10	1.5	+18	2.0	2.0	+12	450	IX8
(N) AWT-18608	6-18	40	45	5.0	+15	2.0	+23	2.0	2.0	+12	550	IX8
(N) AWT-18616	6-18	30	34	7.5	+15	1.5	+23	2.0	2.0	+12	475	IX8
(N) AWT-18618	6-18	40	45	7.5	+18	2.0	+26	2.0	2.0	+12	575	IX8
(N) AWT-18626	6-18	28	32	8.5	+20	1.5	+28	2.0	2.0	+12	550	IX8
(N) AWT-18627	6-18	35	40	7.5	+20	2.0	+28	2.0	2.0	+12	640	IX8

(I) — Improved Specifications (no change to existing model number) — Fall 1987

(N) — New Product Offering — Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

8.0 to 18.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Typical Gain (dB)	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Typical Current (mA)		Case Type
AFT-18831	8-18	7.0	7.5 Typ.	6.4/6.7	+10	1.0	+20	2.0	2.0	+15	75 Typ.	AX2
AFT-18832	8-18	13.0	14.0 Typ.	6.5/7.0	+10	1.0	+20	2.0	2.0	+15	125 Typ.	AX2
AFT-18833	8-18	18.5	20.0 Typ.	6.5/7.0	+10	1.0	+20	2.0	2.0	+15	175 Typ.	AX4
AFT-18834	8-18	24.5	26.0 Typ.	6.5/7.0	+10	1.5	+20	2.0	2.0	+15	250 Typ.	AX4
AFT-18835	8-18	30.0	32.0 Typ.	6.5/7.0	+10	2.0	+20	2.0	2.0	+15	300 Typ.	AX6
AFT-18851	8-18	5.0	5.5 Typ.	7.0/7.3	+15	1.0	+25	2.0	2.0	+15	100 Typ.	AX2
AFT-18852	8-18	11.0	12.0 Typ.	7.0/7.3	+15	1.0	+25	2.0	2.0	+15	165 Typ.	AX2
AFT-18853	8-18	18.5	20.0 Typ.	6.6/7.1	+15	1.0	+25	2.0	2.0	+15	225 Typ.	AX4
AFT-18854	8-18	24.5	26.0 Typ.	6.6/7.1	+15	1.5	+25	2.0	2.0	+15	275 Typ.	AX4
AFT-18855	8-18	32.0	34.0 Typ.	6.6/7.1	+15	2.0	+25	2.0	2.0	+15	325 Typ.	AX6
AFT-18862	8-18	9.5	10.5 Typ.	8.7/9.2	+20	1.0	+29	2.0	2.0	+15	325 Typ.	AX2
AFT-18863	8-18	15.0	16.5 Typ.	8.2/8.7	+20	1.0	+29	2.0	2.0	+15	360 Typ.	AX4
AFT-18864	8-18	23.0	24.5 Typ.	6.6/7.1	+20	1.5	+29	2.0	2.0	+15	425 Typ.	AX4
AFT-18865	8-18	30.5	32.5 Typ.	6.6/7.1	+20	2.0	+29	2.0	2.0	+15	475 Typ.	AX6

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Typ./Max.	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out		Input Power Voltage (VDC) Current (mA) Maximum		Case Type
AWT-18032	8-18	14	20	5.5/6.5 ¹	+13	1.0	+21	2.0	2.0	+12	140	IX2
AWT-18033	8-18	20	26	5.5/6.5 ¹	+13	1.0	+21	2.0	2.0	+12	190	IX4
AWT-18034	8-18	26	32	5.5/6.5 ¹	+15	1.0	+23	2.0	2.0	+12	260	IX4
AWT-18035	8-18	32	38	5.5/6.5 ¹	+15	1.5	+23	2.0	2.0	+12	310	IX6
AWT-18036	8-18	38	44	5.5/6.5 ¹	+15	1.5	+23	2.0	2.0	+12	370	IX6
AWT-18037	8-18	44	50	5.5/6.5 ¹	+15	2.0	+23	2.0	2.0	+12	430	IX8
AWT-18054	8-18	24	30	5.5/7.0	+20	1.0	+28	2.0	2.0	+12	370	IX4
AWT-18055	8-18	30	36	5.5/7.0	+20	1.5	+28	2.0	2.0	+12	420	IX6
AWT-18056	8-18	36	42	5.5/7.0	+20	1.5	+28	2.0	2.0	+12	480	IX6
AWT-18057	8-18	42	50	5.5/7.0	+20	2.0	+28	2.0	2.0	+12	520	IX8

Guaranteed Specifications @ -54° to +100° C Case Temperature

AWT-18044	8-18	20	25	7.5	+12	2.0	+20	2.0	2.0	+12	290	IX6
AWT-18045	8-18	25	30	7.5	+15	2.5	+23	2.0	2.0	+12	350	IX6
AWT-18046	8-18	30	36	7.5	+15	2.5	+23	2.0	2.0	+12	430	IX8
AWT-18047	8-18	36	44	7.5	+18	3.0	+26	2.0	2.0	+12	500	IX8
AWT-18048	8-18	42	50	7.5	+18	3.0	+26	2.0	2.0	+12	575	IX10
AWT-18066	8-18	28	36	8.5	+20	2.5	+28	2.0	2.0	+12	520	IX8
AWT-18067	8-18	36	44	7.5	+20	3.0	+28	2.0	2.0	+12	600	IX8

Note 1: 4.0 dB Noise Figure versions are available on Special Request.

8 to 20 GHz

Guaranteed Specifications @ 25° C Case Temperature

(N) AWT-20832	8-20	10	14	8.0	+16.0	1.0	+24	2.0	2.0	+12	175	IX2
(N) AWT-20833	8-20	15	20	8.0	+16.0	1.0	+24	2.0	2.0	+12	250	IX4
(N) AWT-20834	8-20	21	27	8.0	+16.0	1.5	+24	2.0	2.0	+12	325	IX4
(N) AWT-20835	8-20	26	33	8.0	+16.0	1.5	+24	2.0	2.0	+12	400	IX6
(N) AWT-20836	8-20	32	40	8.0	+16.0	2.0	+24	2.0	2.0	+12	475	IX6

Note 1: 4.0 dB Noise Figure versions are available on Special Request.

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

12.0 to 18.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		Maximum	Out	Voltage (VDC)	Current (mA) Maximum	
AMT-18032	12-18	14	20	5.5/6.5 ¹	+13 ²	1.0	+21	2.0	2.0	+12	140	IX2
AMT-18033	12-18	20	26	5.0/6.5 ¹	+13 ²	1.0	+21	2.0	2.0	+12	190	IX4
AMT-18034	12-18	26	32	5.0/6.5 ¹	+15 ²	1.0	+23	2.0	2.0	+12	260	IX4
AMT-18035	12-18	32	38	5.0/6.5 ¹	+15 ²	1.5	+23	2.0	2.0	+12	310	IX6
AMT-18036	12-18	38	44	5.0/6.5 ¹	+15 ²	1.5	+23	2.0	2.0	+12	360	IX6
AMT-18037	12-18	44	50	5.0/6.5 ¹	+15 ²	2.0	+23	2.0	2.0	+12	410	IX8

Guaranteed Specifications @ -54° to +100° C Case Temperature

AMT-18044	12-18	20	25	7.5	+12	2.0	+20	2.0	2.0	+12	290	IX6
AMT-18045	12-18	25	30	7.5	+15	2.5	+23	2.0	2.0	+12	350	IX6
AMT-18046	12-18	30	36	7.5	+15	2.5	+23	2.0	2.0	+12	440	IX8
AMT-18047	12-18	36	44	7.5	+18	3.0	+26	2.0	2.0	+12	410	IX8
AMT-18048	12-18	42	50	7.5	+18	3.0	+26	2.0	2.0	+12	570	IX10

12.0 to 20.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		Maximum	Out	Voltage (VDC)	Current (mA) Maximum	
AMT-20032	12-20	10	14	7.0	+17	1.0	+25	2.0	2.0	+12	175	IX2
AMT-20033	12-20	15	20	7.0	+17	1.0	+25	2.0	2.0	+12	250	IX4
AMT-20034	12-20	21	27	7.0	+17	1.5	+25	2.0	2.0	+12	325	IX4
AMT-20035	12-20	26	33	7.0	+17	1.5	+25	2.0	2.0	+12	400	IX6
AMT-20036	12-20	32	40	7.0	+17	2.0	+25	2.0	2.0	+12	475	IX6

18.0 to 26.5 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		Maximum	Out	Voltage (VDC)	Current (mA) Maximum	
(I) AMT-26132	18-26.5	11	16	7.0	+12	1.0	+19	2.2	2.2	+12	160	IK2
(I) AMT-26133	18-26.5	17	22	6.0	+12	1.25	+19	2.2	2.2	+12	200	IK4
(I) AMT-26134	18-26.5	23	28	6.0	+12	1.5	+22	2.2	2.2	+12	280	IK4
(I) AMT-26135	18-26.5	25	31	7.0	+21	2.5	+28	2.2	2.2	+12	1050	IK4
(I) AMT-26136	18-26.5	30	36	7.0	+21	2.5	+28	2.2	2.2	+12	1100	IK6
(I) AMT-26137	18-26.5	37	45	7.0	+21	3.0	+28	2.2	2.2	+12	1150	IK6

Guaranteed Specifications @ -54° to +71° C Case Temperature

AMT-26145	18-26.5	20	27	9.5	+12	2.5	+19	2.2	2.2	+12	400	IK6
AMT-26146	18-26.5	26	34	9.0	+12	3.0	+19	2.2	2.2	+12	440	IK6
AMT-26147	18-26.5	31	39	9.0	+12	3.0	+19	2.2	2.2	+12	480	IK8
AMT-26148	18-26.5	38	46	9.0	+12	3.0	+19	2.2	2.2	+12	520	IK8

Note: Maximum safe input power = +15 dBm.

18.0 to 40.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz)	Gain (dB)	Gain (dB)	Noise Figure (dB)	Power Output for 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms)		Input Power		Case Type
	Minimum	Minimum	Maximum	Maximum	Minimum	Maximum		Maximum	Out	Voltage (VDC)	Current (mA) Maximum	
(I) AWT-40032	18-40	8	14	10.0	+6	1.0	+16	3.0	3.0	+12	110	IK2
(I) AWT-40034	18-40	15	21	10.0	+6	2.0	+16	3.0	3.0	+12	200	IK4
(I) AWT-40035	18-40	21	28	9.0	+10	2.0	+16	3.0	3.0	+12	250	IK4
(I) AWT-40036	18-40	24	32	9.0	+10	2.0	+16	3.0	3.0	+12	300	IK6
(I) AWT-40038	18-40	33.5	42.5	9.0	+10	3.0	+16	3.0	3.0	+12	400	IK8
(I) AWT-40039	18-40	39.5	49.5	9.0	+10	4.0	+16	3.0	3.0	+12	450	IK8

Notes 1: 4.0 dB Noise Figure versions are available on Special Request

2: +20 dBm at 1 dB Compression versions are available on Special Request

(N) - New Product Offering - Fall 1987 (I) - Improved Specifications (no change to existing model number) - Fall 1987

CONNECTED WIDEBAND SMALL SIGNAL AMPLIFIERS, Continued

18.0 to 40.0 GHz

Guaranteed Specifications @ -25° to +71° C Case Temperature

(I) AWT-40046	18-40	17	25	12.0	+6	3.75	+11	3.0	3.0	+12	375	IK6
(I) AWT-40048	18-40	24.5	34.5	10.0	+6	4.25	+11	3.0	3.0	+12	475	IK8
(I) AWT-40410	18-40	32.5	43.5	10.0	+6	4.75	+11	3.0	3.0	+12	575	IK10

26.5 to 40.0 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Maximum	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	VSWR (50 ohms) Maximum Out	Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
(I) AMT-40032	26.5-40	10	15	10.0	+6	1.0	+13	2.5	2.5	+12	100	IK2
(I) AMT-40033	26.5-40	13	18	10.0	+6	1.25	+13	2.5	2.5	+12	130	IK4
(I) AMT-40034	26.5-40	20	26	9.0	+10	1.5	+13	2.5	2.5	+12	170	IK4
(I) AMT-40035	26.5-40	27	33	9.0	+10	2.0	+13	2.5	2.5	+12	210	IK4
(I) AMT-40036	26.5-40	31	38	9.0	+10	2.5	+13	2.5	2.5	+12	250	IK6
(I) AMT-40037	26.5-40	38	46	9.0	+10	3.0	+13	2.5	2.5	+12	300	IK6

Guaranteed Specifications @ -25° to +71° C Case Temperature

(I) AMT-40046	26.5-40	24	32	11.0	+6	3.0	+13	2.5	2.5	+12	325	IK6
(I) AMT-40047	26.5-40	27	35	10.0	+6	3.5	+13	2.5	2.5	+12	375	IK8
(I) AMT-40048	26.5-40	34	43	10.0	+6	4.0	+13	2.5	2.5	+12	425	IK8

Note: Maximum safe input power = +15 dBm.

(I)—Improved Specifications (no change to existing model number) -Fall 1987

CONNECTED NARROW BAND, LOW NOISE SMALL SIGNAL AMPLIFIERS

34.5 to 35.5 GHz

PC3

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Maximum	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	VSWR (50 ohms) Maximum Out	Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
AMT-36032	34.5-35.5	12	16	4.5	+6	1.0	+13	2.0	2.0	+12	110	IK2 ¹
(I) AMT-36033	34.5-35.5	15	20	4.5	+10	1.0	+17	2.0	2.0	+12	150	IK4 ¹
(I) AMT-36034	34.5-35.5	23	29	4.5	+10	1.0	+17	2.0	2.0	+12	200	IK4 ¹
(I) AMT-36035	34.5-35.5	31	37	4.5	+10	2.0	+17	2.0	2.0	+12	250	IK4 ¹
(I) AMT-36036	34.5-35.5	36	42	4.5	+10	2.0	+17	2.0	2.0	+12	300	IK6 ¹

Guaranteed Specifications @ -25° to +71° C Case Temperature

(I) AMT-36044	34.5-35.5	18	25	5.5	+6	1.0	+13	2.0	2.0	+12	275	IK4 ¹
(I) AMT-36046	34.5-35.5	30	38	5.5	+10	2.0	+17	2.0	2.0	+12	350	IK6 ¹
(I) AMT-36047	34.5-35.5	35	43	5.5	+10	2.0	+17	2.0	2.0	+12	400	IK8 ¹

Note 1: Waveguide input only with external isolator.

Maximum safe input power = +15 dBm.

43.5 to 45.5 GHz

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Maximum	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In	VSWR (50 ohms) Maximum Out	Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
AMT-46035	43.5-45.5	22	30	8.0	+6	2.0	+13	2.5	2.5	+12	300	IK4
AMT-46037	43.5-45.5	30	38	8.0	+6	2.0	+13	2.5	2.5	+12	400	IK6
AMT-46055	43.5-45.5	22	30	8.0	+15	2.0	+22	2.5	2.5	+12	350	IK4
(I) AMT-46057	43.5-45.5	30	38	8.0	+15	2.0	+22	2.5	2.5	+12	450	IK6
(I) AMT-46075	43.5-45.5	22	30	6.0	+6	2.0	+13	1.5	2.5	+12	300	IK4 ¹

Note 1: Waveguide input only with external isolator.

Maximum safe input power = +15 dBm.

(I)—Improved Specifications (no change to existing model number) -Fall 1987

NARROW BAND POWER MILLIMETER AMPLIFIERS

20 to 45 GHz

PC3

Preliminary Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz)	Gain (dB) Minimum	Saturated Output Power (dBm) Minimum	VSWR		Input Power Voltage (VDC)	Input Power Current (mA) Maximum	Case Type
	Minimum			In	Out			
(N) AMT-24155	20-24	28	25	2.2	2.2	+12	382	IK4
(N) AMT-28155	27-28	27	22	2.2	2.2	+12	361	IK4
(N) AMT-36054	34.5-35.5	23	19	2.0	2.0	+12	300	IK6
(N) AMT-36056	34.5-35.5	36	19	2.0	2.0	+12	400	IK6
(N) AMT-36155	35-36	28	23	2.2	2.2	+12	239	IK4
(N) AMT-46157	43-45	22	20	2.5	2.5	+12	650	IK6

Note: Maximum safe input power = +15 dBm

ACTIVE FREQUENCY DOUBLERS AND QUADRUPLER

18.0 to 45.5 GHz

PC3

Guaranteed Specifications @ 25°C Case Temperature

Model	Input Frequency (GHz)	Output Frequency (GHz)	Power Input (dBm)	Power Output (dBm)	Signal Purity ² (dBc)	Input Power		Case Type
	Minimum	Minimum	Maximum	Minimum	Maximum	Voltage (VDC)	Current (mA) Maximum	
AMT-260X2	9.0-13.25	18.0-26.5	+10	+15	-20	12	350	IK4
(N) AMT-261X2	9.0-13.25	18.0-26.5	+10	+21	-20	12	750	IK4
AMT-400X2	13.25-20.0	26.5-40.0	+10	+11	-20	12	200	IK4
(N) AMT-401X2	13.25-20.0	26.5-40.0	+10	+15	-20	12	350	IK6
AMT-460X4	10.87-11.37	43.5-45.5	+10	+10	-30	12	300	IK6 ¹
(N) AMT-461X4	10.87-11.37	43.5-45.5	+10	+15	-30	12	450	IK6 ¹

Notes 1: Input coax isolator.

2: Maximum safe input power = +20 dBm.

(N) - New Product Offering - Fall 1987

WIDEBAND GAIN CONTROL AMPLIFIERS

Guaranteed Specifications @ 25°C Case Temperature

PC3

Model	Frequency Response Minimum (GHz)	Small Signal Gain Minimum with No Gain Control (dB)	Max Gain Control Range ¹ (dB)	Noise Figure Maximum with No Gain Control (dB)	Noise Figure Maximum @ Max Gain Control (dB)	Power Output for 1 dB Gain Compression Minimum with No Gain Control (dBm)	Power Output for 1 dB Gain Compression @ Max Gain Control (dBm)	Gain Flatness Maximum (±dB)	Typical Third-Order Intercept Above 1 dB Compression (dBm)	VSWR (50 ohms) Maximum In	VSWR (50 ohms) Maximum Out	Input Power Voltage ² (VDC)	Typical Current (mA)	Case Type ³
2 to 8 GHz														
AGT-8233	2-8	25	10	5.5	7.0	+15	+12	2.0	8.0	2.0	2.0	+12	300	IC4
AGT-8235	2-8	45	20	5.5	7.0	+15	+12	3.0	8.0	2.0	2.0	+12	500	IC6
6 to 18 GHz														
AGT-18634	6-18	25	10	6.0	7.0	+15	+10	2.0	8.0	2.0	2.0	+12	300	IX4
AGT-18637	6-18	45	20	6.0	8.0	+15	+12	3.5	8.0	2.0	2.0	+12	500	IX8

Notes 1. Gain Control Voltage: 0 to +10 VDC MAX No Gain Control for 0 VDC. Increasing Gain Control voltage decreases amplifier gain. Maximum Gain control (minimum gain) at +10 VDC Maximum

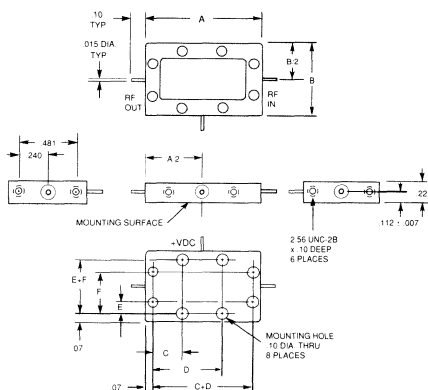
Gain Control Current: 10 dB control range <5 mA typical
20 dB control range <10 mA typical

2. Contains integral voltage regulator permitting operation from unregulated +12 to +15 VDC power supply. Specified current is typical at +12 VDC.

3. Case is the standard type indicated except for the addition of the AGC control via a Sealectro Nanohex connector. See page 39.

CASE DRAWINGS

ACT/AFT SERIES



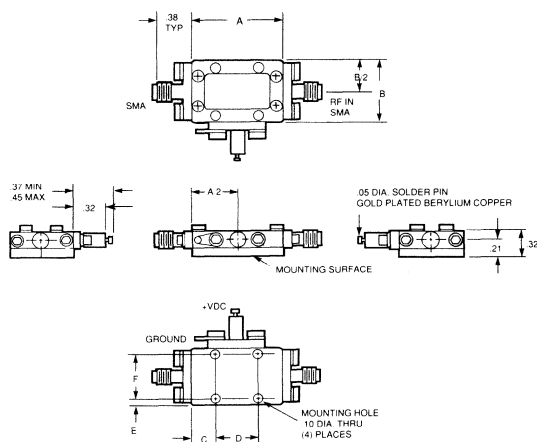
CASE	DIMENSIONS						WEIGHT TYP gms
	A	B	C	D	E	F	
AX2	1.364	.664	.237	.987	.137	.387	26
AC2	1.500	.764	.267	1.093	.167	.437	26
AS2	1.500	.862	.267	1.093	.236	.486	31
AX4	1.850	.664	.237	1.473	.137	.387	36
AC4	2.170	.764	.602	1.428	.167	.437	46
AS4	2.170	.862	.602	1.428	.236	.486	48
AX6	2.336	.664	.237	1.959	.137	.387	44

NOTES: (Unless Otherwise Specified)

DIMENSIONS IN INCHES

TOLERANCES: XX± .01
XXX± .005

MATERIAL:
BODY AND RF CONNECTORS - 30 STAINLESS STEEL
MOUNTING SPACER - ALUMINUM ALLOY
FILTER BODY - NICKEL PLATED BRASS



CASE	DIMENSIONS						WEIGHT TYP gms
	A	B	C	D	E	F	
AX2	1.364	.664	.31	.750	.07	.524	35
AC2	1.500	.764	.34	.826	.07	.624	35
AS2	1.500	.862	.34	.826	.07	.722	40
AX4	1.850	.664	.31	1.236	.07	.524	45
AC4	2.170	.764	.672	.826	.07	.624	55
AS4	2.170	.862	.672	.826	.07	.722	57
AX6	2.336	.664	.307	1.722	.07	.524	53

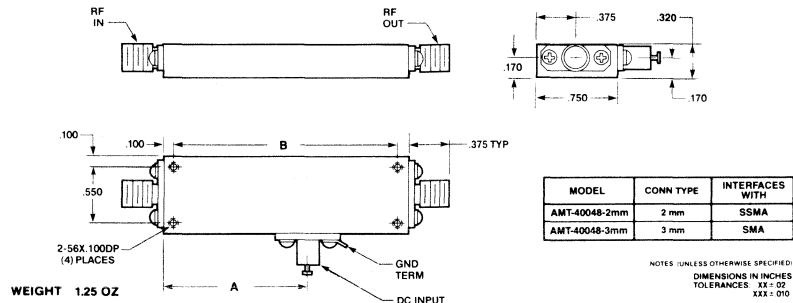
NOTES: (Unless Otherwise Specified)

DIMENSIONS IN INCHES

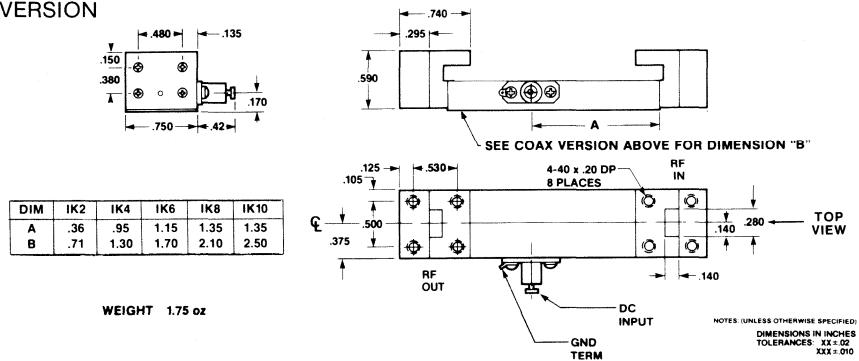
TOLERANCES: XX± .02
XXX± .010

CASE DRAWINGS (cont.)

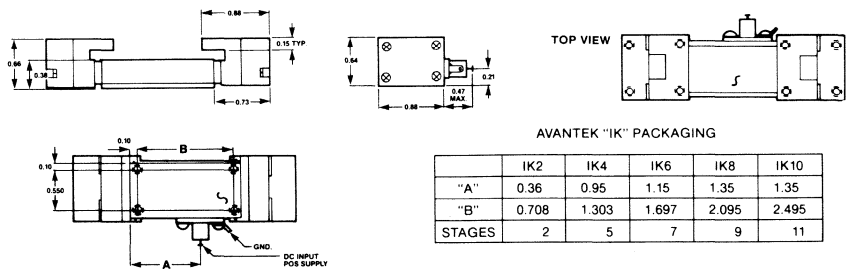
IK_
COAX VERSION



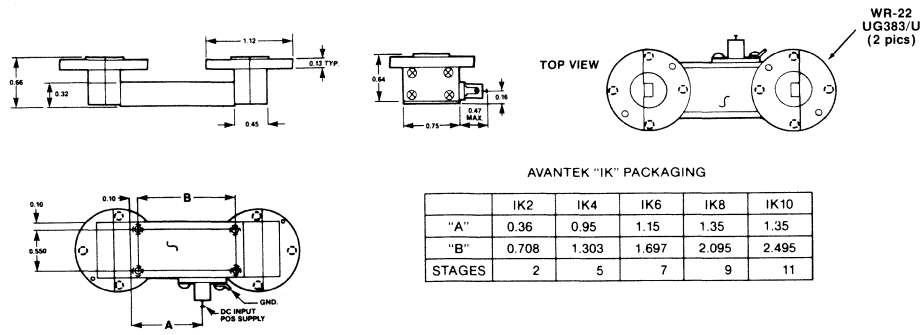
IK_WG
WAVEGUIDE VERSION



IK-WR-42

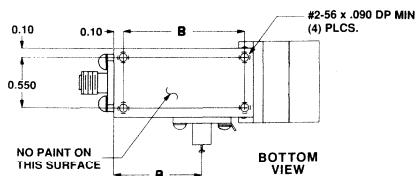
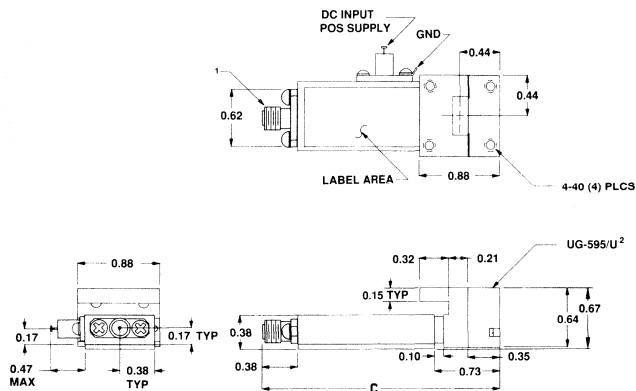


IK-WR-22



CASE DRAWINGS (cont.)

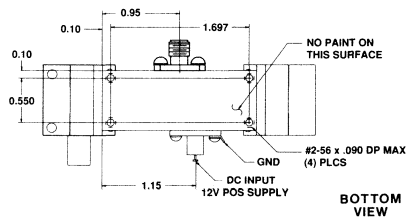
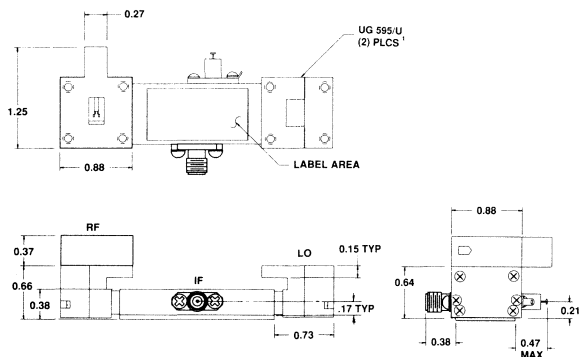
IK-COAX/WR-42



CASE	DIMENSION			STAGES
	A	B	C	
IK4	0.95	1.303	2.62	5
IK6	1.15	1.697	3.02	7

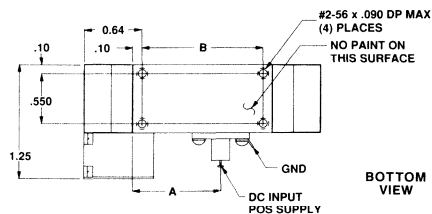
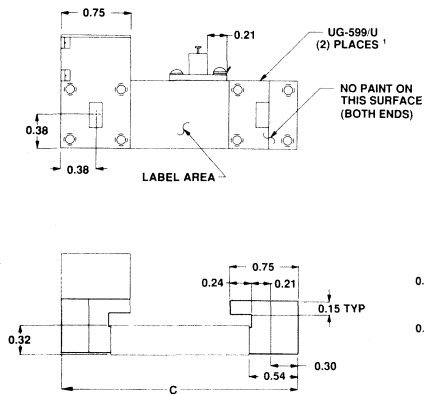
NOTES: (Unless Otherwise Specified)
 1. RF Input Connector; 3mm SMA Compatible
 2. RF Output Connector; WR-42, UG 595/U

IK-WR-42 I/P ISOLATOR



NOTES: (Unless Otherwise Specified)
 1. RF Input/Lo Input Connector: WR-42, UG 595/U
 2. IF Output Connector: SMA

IK-WR-28, INPUT ISOLATOR



CASE	DIMENSIONS			STAGES
	A	B	C	
IK2	0.36	0.708	1.98	2
IK4	0.95	1.303	2.58	5
IK6	1.15	1.697	3.34	7
IK8	1.35	2.095	3.74	9

NOTES: (Unless Otherwise Specified)
 1. RF Input/Output Connector; WR-28, UG 599/U

The Millimeter Wave Product Series are available with the following connector options that need to be specified at time of order:

**TABLE I
CONNECTOR OPTIONS AVAILABLE**

PRODUCT SERIES

18-26.5 GHz AMPS

26.5-40 GHz AMPS

18-40 GHz AMPS

34.5-35.5 GHz AMPS*

43.5-45.5 GHz AMPS*

18-26.5 GHz DOUBLER

26.5-40 GHz DOUBLER

43.5-45.5 GHz QUADRUPLER

	INPUT			OUTPUT		
	2mm	3mm	WR-42	2mm	3mm	WR-42
	2mm	3mm	WR-28	2mm	3mm	WR-28
	2mm	3mm	—	2mm	3mm	—
	2mm	3mm	WR-28	2mm	3mm	WR-28
	—	3mm	WR-22	—	3mm	WR-22
	—	SMA	—	2mm	3mm	WR-42
	—	SMA	—	2mm	3mm	WR-28
	—	SMA**	—	—	—	WR-22

*Low noise versions (36030, 36040 and 46070 Series) available *only* with waveguide input, with integral isolator.

**Includes input isolator.

Connector options may be specified differently for input and output

**TABLE II
CONNECTOR OPTION MODEL NUMBER SUFFIX**

OUTPUT	INPUT		
	WG*	2mm	3mm
	WG*	-11	-21
	2mm	-12	-22
	3mm	-13	-23

*WG appropriate to Freq. Band — See Table I.

Example: AMT-26135 with WR-28 input, 3mm coaxial output.

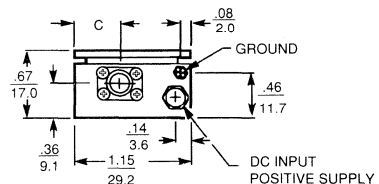
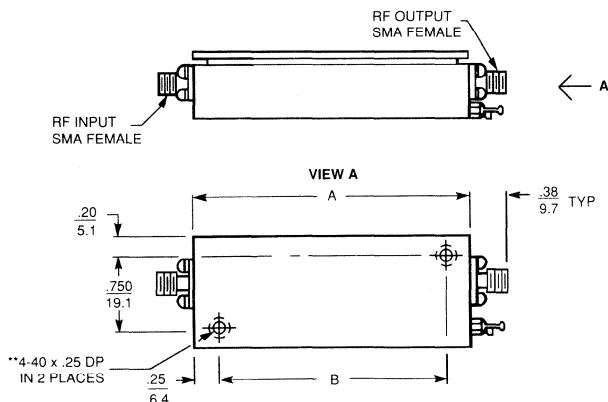
Model # is: AMT-26135-13

WG Input

3mm Output

CASE DRAWING

AMT/AWT SERIES



**AVAILABLE WITH METRIC
THREAD M3 ON REQUEST
NO THREADS FIRST .062"

TOLERANCES (inches): .XX±.02
.XXX±.010

DIMENSIONS IN INCHES
MILLIMETERS

CASE	DIMENSIONS						WEIGHT	
	A		B		C			
	in.	mm.	in.	mm.	in.	mm.	oz.	gms
IS2	1.417	35.9	.917	23.2	.375	9.5	2	47
IS4	2.083	52.9	1.583	40.2	.375	9.5	3	68
IS6	2.750	69.8	2.250	57.1	.375	9.5	4	90
IC2	1.417	35.9	.917	23.2	.465	11.8	2	47
IC4	2.083	52.9	1.583	40.2	.465	11.8	3	68
IC6	2.750	69.8	2.250	57.1	.465	11.8	4	90
IX2	1.250	31.8	.750	19.1	.510	12.9	2	47
IX4	1.750	44.4	1.250	31.7	.510	12.9	2	58
IX6	2.250	57.1	1.750	44.4	.510	12.9	3	78
IX8	2.750	69.8	2.250	57.1	.510	12.9	4	92
IX10	3.250	82.5	2.750	69.8	.510	12.9	4	108

WIDEBAND, MEDIUM POWER TEMPERATURE COMPENSATED THIN-FILM AMPLIFIERS

Features:

- GaAs FET and MIC Reliability For Military Applications
- Compact Designs Replace Bulky TWTs
- 2 Watts Of Power To 8 GHz
- 1 Watt Of Power To 18 GHz
- Octave And Straddle Band Frequency Ranges
- Welded Aluminum Hermetic Cases

Typical Applications Include:

- Driver Amplifiers In ECM Transmitters, and Expendables
- Output Amplifiers In Decoy Transmitters
- Driver Amplifiers In RF Distribution Networks
- Augmentor Amplifiers In Target Drones
- Output Amplifiers In Test Equipment (ATE & AGE)

Description

The AvanteK APT Series of GaAs FET amplifiers provides linear power output levels (at 1 dB gain compression) of up to 2 WATTS in a wide range of microwave frequency bands.

The compact and rugged thin-film MIC construction makes these amplifiers particularly well suited for the most demanding environments.

AvanteK's own GaAs FETs and MMICs are used to provide the high performance and reliability demanded by Military applications.

Stable operation regardless of source or load conditions is the result of balanced module design used throughout the amplifier.

Thorough characterization of cascadable amplifier modules makes custom gain and power needs readily achievable.

All APT amplifiers feature internal temperature compensation, voltage regulation, and protection for both reverse and dual bias.

APT SERIES

Guaranteed Specifications @ 0° to +50° C Case Temperature

PC4

Model	Frequency Response (GHz) Min.	Gain (dB) Min.	Gain (dB) Max.	Noise Figure (dB) Max.	Power Output for 1 dB Gain Comp. (dBm) Min.	Power Output (Watts) Min.	Gain Flatness (±dB) Max.	Typical Intercept Point for Third Order Intermod Products (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC ±3%)	Typical Current (mA)	Case Type
APT-4063	2-4	28.0	38.0	5.5	+30	1.0	1.5	+37	2.0 2.0	+15 ¹	1000	IS6P ²
APT-4064	2-4	39.0	49.0	5.5	+30	1.0	1.5	+37	2.0 2.0	+15 ¹	1050	IS6P ²
APT-4074	2-4	33.0	43.0	6.0	+33	2.0	1.5	+40	2.0 2.0	+15 ¹	1700	IS6P ²
APT-6065	2-6	35.0	45.0	6.0	+30	1.0	1.5	+37	2.0 2.0	+15 ¹	1200	IC6 ²
APT-6077	2-6	40.0	50.0	6.0	+33	2.0	1.5	+40	2.0 2.0	+15 ¹	2300	IC8 ²
APT-8255	2-8	30.0	40.0	6.0	+27	0.5	2.0	+34	2.0 2.0	+15 ¹	800	IC6 ²
APT-8266	2-8	35.0	45.0	7.0	+30	1.0	2.0	+37	2.0 2.0	+15 ¹	1300	IC8 ²
APT-8056	4-8	35.0	45.0	7.0	+29	0.8	1.5	+36	2.0 2.0	+15 ¹	1300	IC8 ²
APT-8066	4-8	35.0	45.0	7.0	+30	1.0	1.5	+37	2.0 2.0	+15 ¹	1300	IC8 ²
APT-8076	4-8	30.0	40.0	10.0	+33	2.0	1.5	+40	2.0 2.0	+15 ¹	2500	IC7P ²
APT-10555	4.5-10.5	34.0	44.0	6.0	+26	0.4	1.5	+33	2.0 2.0	+12 ¹	700	IC6 ²
(P) APT-10566	4.5-10.5	29.0	40.0	8.0	+30	1.0	2.0	+38	2.0 2.0	+15 ^{1,3}	2200	ICD8 ²
										-15	250	
APT-12057	6-12	35.0	45.0	7.0	+26	0.4	1.5	+33	2.0 2.0	+12 ¹	1300	IX8 ²
APT-12066	6-12	28.0	39.0	8.0	+30	1.0	1.5	+37	2.0 2.0	+15	2500	IK7P ²
APT-18646	6-18	20.0	30.0	10.0	+23	0.2	2.0	+30	2.0 2.0	+12 ¹	1200	IX8 ²
APT-18649	6-18	35.0	45.0	10.0	+23	0.2	2.0	+30	2.0 2.0	+12 ¹	1350	IX10 ²
APT-18656	6-18	18.0	28.0	12.0	+27	0.4	2.0	+33	2.0 2.0	+12 ¹	2300	IK7P ²
APT-18659	6-18	36.0	46.0	12.0	+27	0.4	2.0	+33	2.0 2.0	+12 ¹	2500	IK11P ²
(N) APT-18667	6-18	26.0	34.0	13.0	+30 ⁵	1.0	3.0	+36	2.0 2.0	+15 ^{1,4}	2200	IKD12P ²
										+12	2500	
(N) APT-18668	6-18	34.0	42.0	10.0	+30 ⁵	1.0	3.0	+36	2.0 2.0	+15 ^{1,4}	2200	IKD12P ²
										+12	2600	
(N) APT-18660	6-18	42.0	50.0	9.0	+30 ⁵	1.0	3.0	+36	2.0 2.0	+15 ^{1,4}	2200	IKD14P ²
										+12	2700	

CASE DRAWINGS—See page 39 for IC6, IC8, IX8 and IX10.

(N) New Product Offering—Fall 1987

(P) Preliminary

Notes 1: Integral Voltage Regulator

2: SMA Connector Only

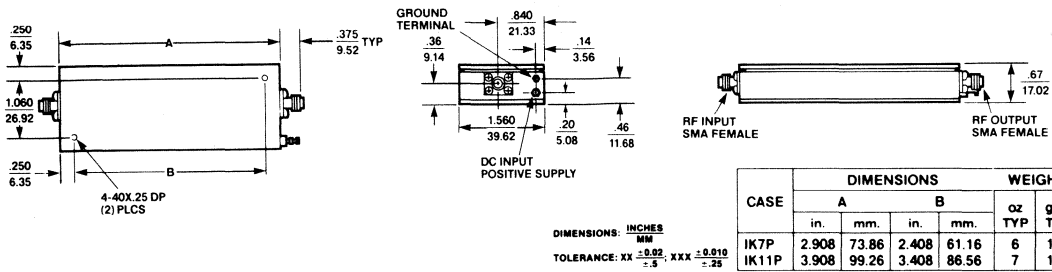
3: Contains Internal Gate/Drain Bias Sequencing

4: Single +15v Supply Can Be Used Instead of +15v And +12v Dual Supply

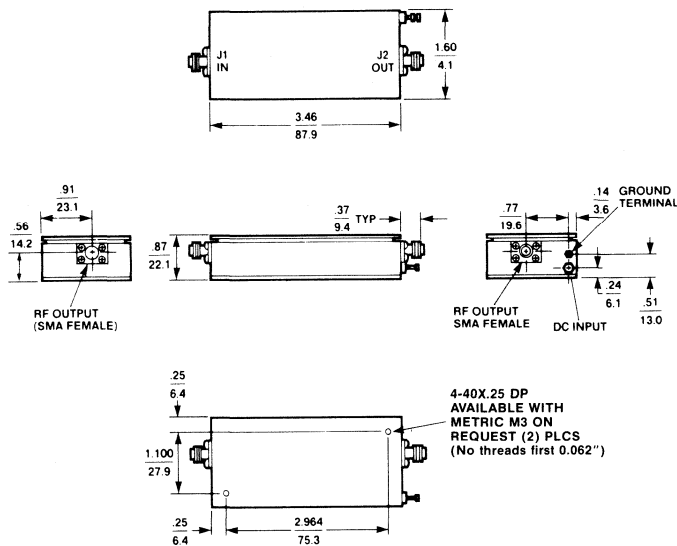
5: Power Output Saturated (dBm)

CASE DRAWINGS

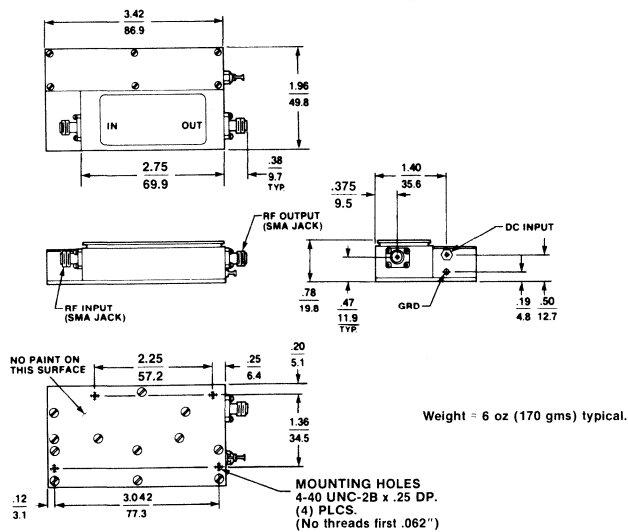
IK-P SERIES



IC-7P

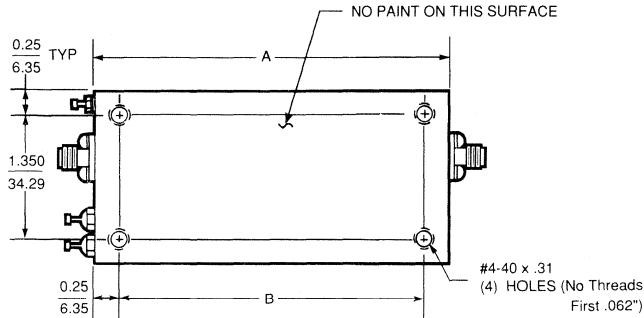
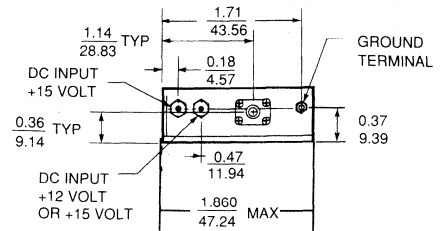
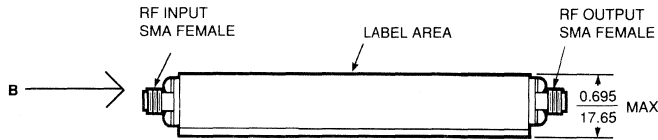


IS6P



CASE DRAWINGS

IKD_P SERIES

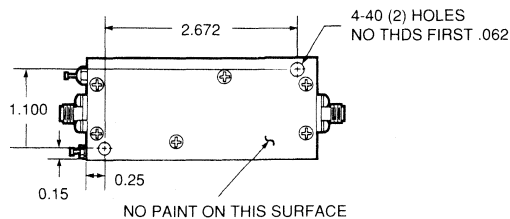
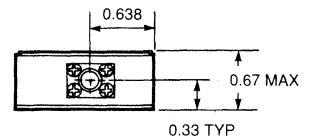
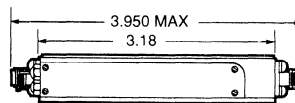
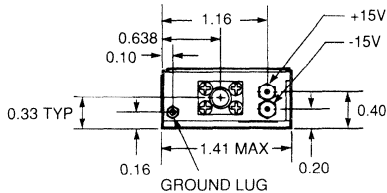


CASE	DIMENSIONS			
	A		B	
	Inches	MM	Inches	MM
IKD12P	3.920 Max.	99.57 Max.	3.408	86.56
IKD14P	4.420 Max.	112.27 Max.	3.908	99.26

DIMENSIONS IN INCHES
MM

TOLERANCES (Inches): XX ± .02
XXX ± .010

ICD8



DIMENSIONS IN INCHES

TOLERANCES (Inches): XX ± .02
XXX ± .010

WIDEBAND MEDIUM POWER CONNECTED AMPLIFIERS

WIDE FREQUENCY RANGE MEDIUM POWER AMPLIFIERS

APG Series discrete component amplifiers offer medium power output, wide dynamic range, low noise figure and high gain making them excellent choices for use as intermediate power amplifiers to drive

TWTAs in jammers and other electronic defense systems, as laboratory test equipment drivers or other applications requiring moderate power output.

APM — Connectorized Amplifier Series

Guaranteed Specifications @ 25° C Case Temperature

PC4

Model	Frequency Response (GHz) Min.	Gain (dB) Min.	Gain (dB) Max.	Noise Figure (dB) Max.	Power Output for 1 dB Gain Comp. (dB) Min.	Power Output (Watts) Min.	Gain Flatness (±dB) Max.	Typical Intercept Point for Third Order Intermod Products (dBm)	VSWR (50 ohms) Maximum		Input Power Voltage (VDC ±3%) Typical Current (mA)		Case Type
APM-1013	0.01-1	30.0	36.0	7.0	+24	0.25	Note 4	+31	2.0	2.0	+12	315	GC5
APM-1014	0.01-1	36.0	46.0	7.0	+24	0.25	Note 4	+31	2.0	2.0	+12	360	GC5
APM-1023	0.01-1	30.0	36.0	7.0	+27	0.5	Note 4	+34	2.0	2.0	+12	500	GC5
APM-1024	0.01-1	36.0	46.0	7.0	+27	0.5	Note 4	+34	2.0	2.0	+12	535	GC5
APM-1033	0.01-1	30.0	36.0	7.0	+30 ¹	1.0	Note 4	+37	2.0	2.0	+12	710	GC5
APM-1034	0.01-1	36.0	46.0	7.0	+30 ¹	1.0	Note 4	+37	2.0	2.0	+12	750	GC5

APG — Connectorized Amplifier Series

Guaranteed Specifications @ 0° C to +50° C Case Temperature

APG-1001	0.01-1	25.0	34.0	9.0	+30 ¹	1.0	1.0	+39	2.0	2.5	+24	775	FM ^{2,3}
APG-1002	0.01-1	34.0	44.0	8.0	+30 ¹	1.0	1.0	+39	2.0	2.5	+24	775	FM ^{2,3}
APG-1003	0.01-1	45.0	55.0	6.5	+30 ¹	1.0	1.0	+39	2.0	2.5	+24	810	FM ^{2,3}
APG-1011	0.5-1	14.0	24.0	3.5	+30	1.0	0.75	+40	2.0	2.0	+15	1000	FS ^{2,5}
APG-1012	0.5-1	24.0	33.0	5.0	+30	1.0	0.75	+40	2.0	2.0	+15	1100	FS ^{2,5}
APG-1013	0.5-1	33.0	43.0	6.0	+30	1.0	1.0	+40	2.0	2.0	+15	1125	FS ^{2,5}
APG-1021	0.5-1	14.0	24.0	3.5	+33	2.0	0.75	+43	2.0	2.0	+15	1150	FS ^{2,5}
APG-1022	0.5-1	24.0	33.0	5.0	+33	2.0	0.75	+43	2.0	2.0	+15	1250	FS ^{2,5}
APG-1023	0.5-1	33.0	43.0	6.0	+33	2.0	1.0	+43	2.0	2.0	+15	1275	FS ^{2,5}
APG-2050	0.05-2	18.0	28.0	6.0	+23	0.2	1.0	+33	2.0	2.0	+15	275	FM ^{2,3}
APG-2052	0.05-2	28.0	38.0	6.0	+27 ¹	0.5	1.0	+37	2.0	2.0	+15	525	FM ^{2,3}
APG-2053	0.5-2	30.0	40.0	6.0	+30	1.0	1.0	+40	2.0	2.0	+15	1200	FN ^{2,5}
APG-2001	1-2	10.0	20.0	5.0	+30	1.0	0.5	+40	2.0	2.0	+15	875	FN ^{2,5}
APG-2002	1-2	20.0	30.0	4.5	+30	1.0	0.75	+40	2.0	2.0	+15	950	FN ^{2,5}
APG-2003	1-2	30.0	40.0	4.5	+30	1.0	1.0	+40	2.0	2.0	+15	975	FN ^{2,5}
APG-2021	1-2	10.0	20.0	5.0	+30	2.0	0.5	+43	2.0	2.0	+15	975	FN ^{2,5}
APG-2022	1-2	20.0	30.0	6.0	+33	2.0	0.75	+43	2.0	2.0	+15	1150	FN ^{2,5}
APG-2023	1-2	30.0	40.0	4.5	+33	2.0	1.0	+43	2.0	2.0	+15	1200	FN ^{2,5}
APG-4002	2-4	15.0	24.0	6.5	+30	1.0	1.0	+40	2.0	2.0	+15	1100	FO ^{2,6}
APG-4003	2-4	24.0	32.0	4.0	+30	1.0	1.0	+40	2.0	2.0	+15	1150	FO ^{2,6}
APG-4004	2-4	32.0	42.0	3.0	+30	1.0	1.0	+40	2.0	2.0	+15	1200	FO ^{2,6}

Notes 1: Minimum Power Output for 2dB Gain Compression

2: Including Cooling Fins

3: SMA, N, TNC, or BNC Connectors

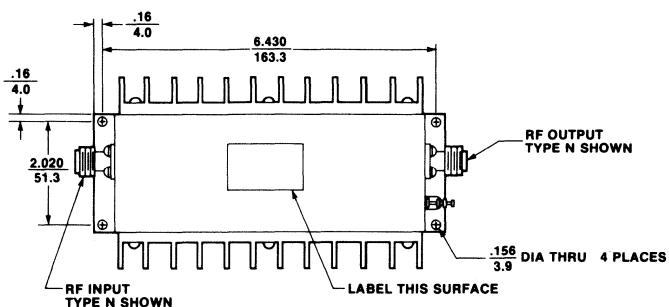
4: ±0.5 dB per 200 MHz

5: SMA, N, or TNC Connectors

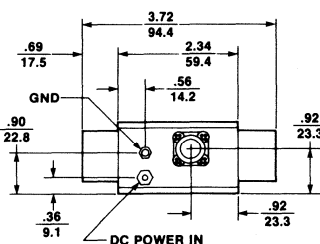
6: SMA or N Connectors

CASE DRAWINGS, continued

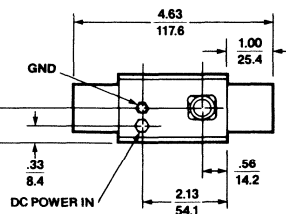
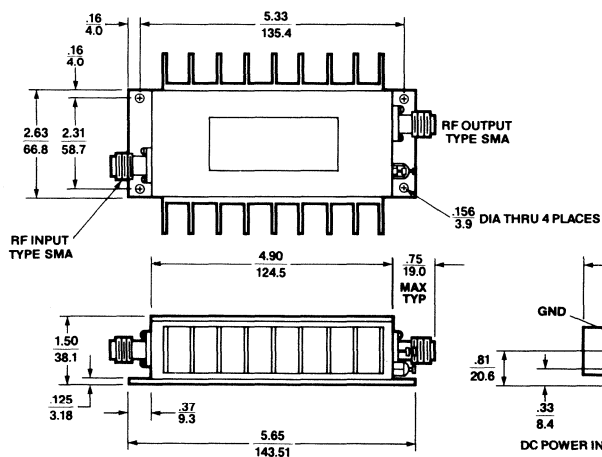
FM/FO



CASE	DIM A
FM	1.45/36.8
FO	1.38/35.0



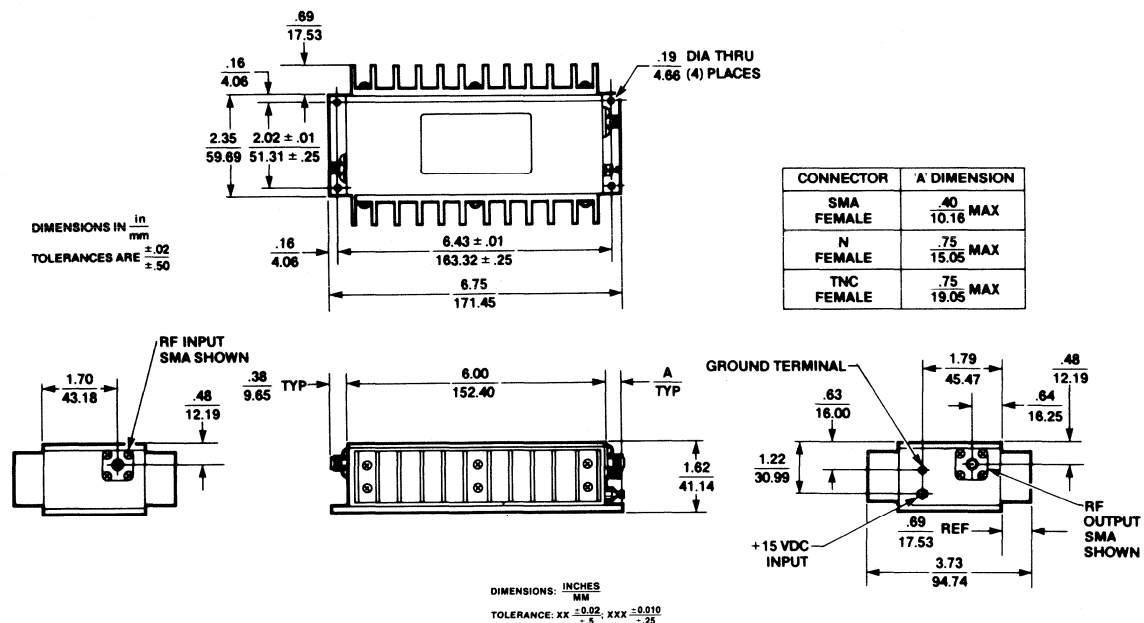
FN



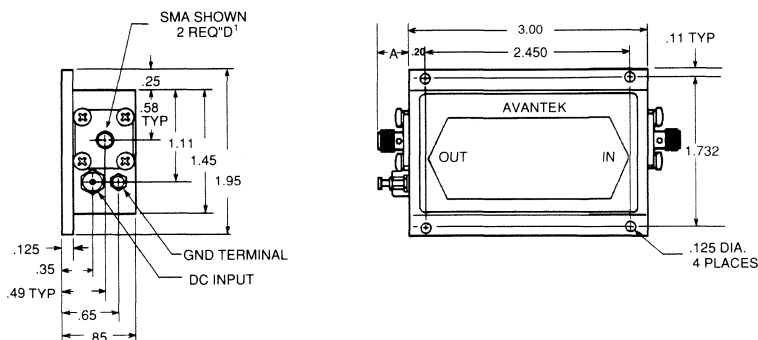
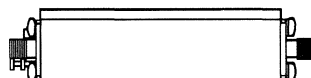
DIMENSIONS: INCHES
MM
TOLERANCE: XX ± 0.02 , XXX ± 0.010
 $\pm .5$ $\pm .25$

CASE DRAWING

FS



GC5



NOTES (Unless Otherwise Specified):

1. CONNECTOR OPTIONS: SMA, N, TNC, BNC

CASE MATERIAL: ALODINED ALUMINUM

DIMENSIONS IN INCHES

TOLERANCES: XXX ± 0.010
XX ± 0.02

CONNECTED LIMITING AMPLIFIERS

GaAs FET THIN-FILM LIMITING AMPLIFIERS

The AvanteK LMT/LWT series Limiting Wideband Amplifiers combine the proven circuit design and thin-film gold construction of the AvanteK AMT/AWT series of Low Noise Amplifiers with a GaAs FET output limiting stage. Available in the 0.5-2.0 through 6-18 GHz frequency bands, LMT/LWT series amplifiers offer nominal 35 dB and 70 dB of small signal gain combined with saturated power outputs that remain within a very narrow window for an extremely wide range of input signal levels. Other important features

include excellent full-band saturated power flatness, low small signal noise figure, VSWR and harmonics, and an integral voltage regulator for reliable operation from a +12 to +15 VDC unregulated power source.

To complement its performance features, the LMT/LWT series amplifier is packaged in a compact, hermetically welded aluminum case. This makes the LMT/LWT series amplifier the ideal choice for incorporation into the latest generation of compact, lightweight ECM/EW systems.

"30" Series; 35 dB Small Signal Gain

Guaranteed Specifications @ 25°C Case Temperature

PC4

Model	Frequency Response (GHz)	Small Signal Gain (dB)		Gain Flatness (±dB)	Saturated Output Power (dBm)		Noise Figure (dB)	VSWR		Input Power		Case Type
		Minimum	Maximum		Min.	Max.		In	Out	Voltage (VDC)	Current (mA)	
(I) LWT-2034	0.5-2	35	40	1.5	+3	+7	3.5	2.0	2.0	+12	250	IS4
(U) LMT-4035	2-4	35	40	1.5	+7	+11	3.0	2.0	2.0	+12	300	IS6
(I) LWT-6034	2-6	35	40	1.5	+14	+18	4.0	2.0	2.0	+12	300	IC4
(U) LWT-8035	2-8	35	40	1.5	+16	+20	4.0	2.0	2.0	+12	450	IC6
(U) LMT-8033	4-8	35	40	1.5	+14	+17	4.5	2.0	2.0	+12	300	IC4
(U) LMT-12436	7-12.4	35	40	1.5	+14	+19	5.5	2.0	2.0	+12	400	IX6
(U) LMT-18036	12-18	35	40	1.5	+14	+19	6.0	2.0	2.0	+12	400	IX6
(U) LWT-18036	8-18	35	40	1.5	+14	+19	6.0	2.0	2.0	+12	400	IX6
(N) LWT-18636	6-18	35	40	1.5	+14	+19	6.0	2.0	2.0	+12	400	IX6

"40" Series; Nominal 70 dB Small Signal Gain

Guaranteed Specifications -54°C to +100°C Case Temperature

Model	Frequency Response (GHz)	Input Signal Range (dBm)	Saturated Output Power Range (dBm)		VSWR		Input Power		Case Type
			Min.	Max.	In	Out	Voltage (VDC)	Current (mA)	
(U) LWT-2046	0.5-2	-61 to +20	+3	+7	2.0	2.0	+12	600	LS12
(I) LMT-4046	2-4	-57 to +20	+7	+11	2.0	2.0	+12	700	LS12
(U) LWT-6045	2-6	-50 to +20	+14	+18	2.0	2.0	+12	600	IC6
(U) LWT-8046	2-8	-55 to +20	+16	+20	2.0	2.0	+12	900	LC12
(U) LMT-8045	4-8	-50 to +20	+14	+17	2.0	2.0	+12	625	IC6
(U) LMT-12448	7-12.4	-50 to +20	+14	+19	2.0	2.0	+12	900	LX16
(U) LMT-18048	12-18	-50 to +20	+14	+19	2.0	2.0	+12	900	LX16
(U) LWT-18048	8-18	-50 to +20	+14	+19	2.0	2.0	+12	900	LX16
(N) LWT-18648	6-18	-50 to +20	+14	+19	2.0	2.0	+12	900	LX16

(I) — Improved Specifications (no change to existing model number) — Fall 1987

(N) — New Product Offering — Fall 1987

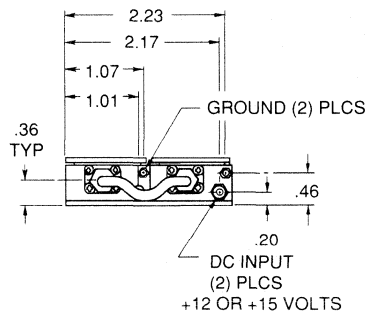
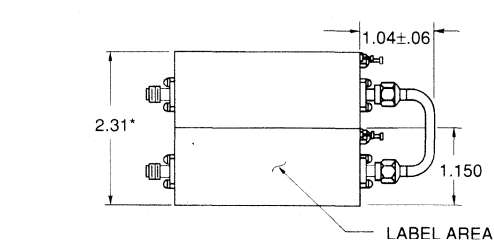
(U) — Updated Model Number With Improved Specifications — Fall 1987

Other Specifications — Both "30" and "40" Series

- Power output for 1 dB gain compression is a maximum of 4 dB below Saturated Power Output at any frequency.
- Saturated Power Flatness is 2.0 dB p-p, maximum.
- Saturated Power variation over temperature is 1.5 dB p-p, maximum.
- Maximum Input Power without damage: +20 dBm (CW).
- Harmonics: -9 dBc maximum (-6 dBc 2nd Harmonic, -8 dBc 3rd Harmonic — LWT-2034, LWT-2046)
- Pulse Response: Overshoot, 0.25 dB maximum.
Settling time, 25 ns maximum.
Recovery time, 100 ns maximum.
- Small Signal Suppression: 3 dB minimum.
- AM/PM Conversion: 5°/dB maximum.
- Output Noise Power will be less than $P_{SAT}(\text{Min})$ -6 dB for the "40" series.
- "30" and "40" series amplifiers contain an integral voltage regulator. The input voltage can be +12 to +15 VDC with 3% maximum ripple. All units also contain overvoltage and reverse polarity protection to ±25 VDC. Contact your AvanteK representative for operation outside these parameters.

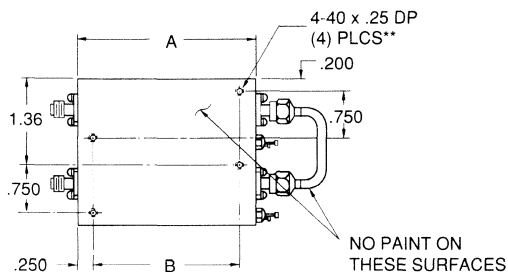
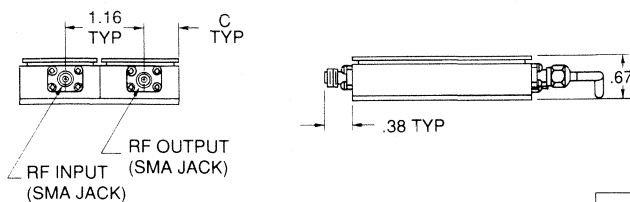
CASE DRAWINGS

LC12, LS12, and LX16



DIMENSIONS IN INCHES

TOLERANCES: .xx ± 0.02
.xxx ± .010



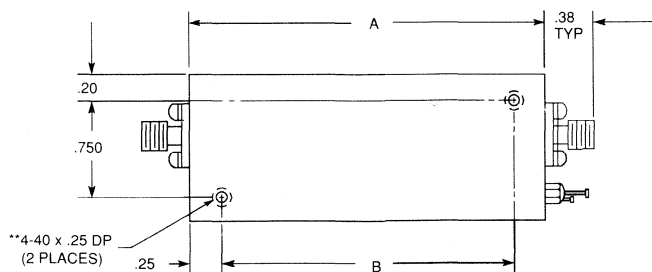
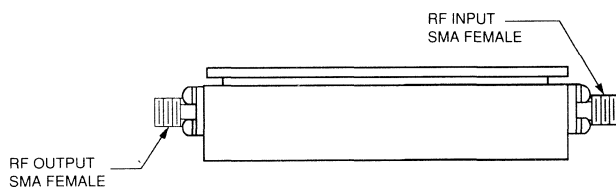
BAND	CASE	DIMENSION			WEIGHT GRAMS (approx)
		A	B	C	
S	LS12	2.75	2.250	.38	220
C	LC12	2.75	2.250	.47	220
X/KU	LX16	2.75	2.250	.51	260

*Width Dimension Does Not Include Any Customer Required Labels

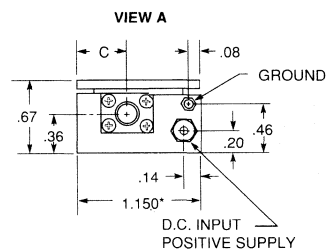
**No Threads First .062"

CASE DRAWINGS

IS4, IS6, IC4, IC6, and IX6



*Width Dimension Does Not Include Any Customer Required Labels
**No Threads First .062"



CASE	DIMENSIONS			WEIGHT GRAMS (approx)
	A	B	C	
IS4	2.083	1.583	.375	68
IS6	2.750	2.250	.375	90
IC4	2.083	1.583	.465	68
IC6	2.750	2.250	.465	90
IX6	2.250	1.750	.510	78

DIMENSIONS IN INCHES

TOLERANCES: .xx ± 0.20
.xxx ± .005

APPLICATIONS SPECIALIZED NARROW BAND CONNECTED AMPLIFIERS

AMT SERIES

Guaranteed Specifications @ 25°C Case Temperature

PC4

Model	Frequency Response (GHz) Minimum	Gain (dB) Minimum	Gain (dB) Maximum	Noise Figure (dB) Maximum	Power Output for 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Typical Third Order Intercept Point (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC) Current (mA) Maximum	Case Type
(N) AMT-9544	8.5-9.5	28	32	2.0	12	0.5	20	1.50 1.50	12 275	IX8
(N) AMT-9545 ¹	8.5-9.5	33	40	2.3	15	0.5	23	1.25 1.50	12 325	— ²
(I) AMT-9632	8.5-9.6	16	19	4.0	10	0.5	18	1.50 1.50	12 55	IX4
(I) AMT-9633	8.5-9.6	24	28	4.0	10	0.5	18	1.50 1.50	12 85	IX4
(I) AMT-9634	8.5-9.6	32	37	4.0	10	0.8	18	1.50 1.50	12 115	IX4
(N) AMT-10044	9.0-10.0	27	31	2.0	12	0.5	20	1.50 1.50	12 275	IX8
(N) AMT-10045 ¹	9.0-10.0	33	40	2.3	15	0.5	23	1.25 1.50	12 325	— ²
(I) AMT-10544	9.5-10.5	26	30	2.0	12	0.5	20	1.50 1.50	12 275	IX8
(I) AMT-10545 ¹	9.5-10.5	33	40	2.3	15	0.5	23	1.25 1.50	12 325	— ²
AMT-14545	13.5-14.5	29	33	3.0	15	0.5	23	1.50 1.50	12 290	IX6
(I) AMT-21044	20.2-21.2	30	36	3.5	10	1.0	19	1.50 1.50	12 220	IX6

AMT SERIES—Temperature Compensated

Guaranteed Specifications @ -54° to +100°C Case Temperature

(N) AMT-9544	8.5-9.5	28	32	2.8	10	1.5	18	1.50 1.50	12 275	IX8
(N) AMT-9545 ¹	8.5-9.5	33	40	3.1	12	1.5	20	1.25 1.50	12 325	— ²
AMT-10044	9.0-10.0	27	31	2.8	10	1.5	18	1.50 1.50	12 275	IX8
(N) AMT-10045 ¹	9.0-10.0	33	40	3.1	12	1.5	20	1.25 1.50	12 325	— ²
(N) AMT-10544	9.5-10.5	26	30	2.8	10	1.5	18	1.50 1.50	12 275	IX8
(N) AMT-10545 ¹	9.5-10.5	33	40	3.1	12	1.5	20	1.25 1.50	12 325	— ²
AMT-14545	13.5-14.5	29	33	3.8	10	1.5	18	1.50 1.50	12 290	IX6
AMT-21044	20.2-21.2	30	36	4.3	8	1.5	17	1.50 1.50	12 220	IX6

(I)—Improved Specifications (no change to existing model number)—Fall 1987

(N)—New Product Offering—Fall 1987

Notes: The nominal Noise Figure change over temperature is 0.01 dB/°C

1: Other Specifications:

Gain Control (dB)

	Min.	Max.
Small Signal Gain (dB)	0.0	40.0
Supply Voltage (Vdc)	0.0	10.0
Supply Current (mA)	0.0	1.5

Noise BIT @ center frequency, 25°C

	Min.	Max.
Noise Bit (dB)	13.75	14.25
Supply Voltage (Vdc)	0	-15
Supply Current (mA)	0	4

2. IX10 case with Waveguide

SPECIAL APPLICATIONS

Guaranteed Specifications @ 25°C Case Temperature

Model	Frequency Response (GHz) Min.	Gain (dB) Min.	Gain (dB) Max.	Noise Figure (dB) Max.	Power Output (Watts) Min.	Power Output for 2 dB Gain Comp. (dBm) Min.	Gain Flatness (±dB) Max.	Typical Intercept Point for Third Order Intermod. Products (dBm)	VSWR (50 ohms) Maximum In Out	Input Power Voltage (VDC±3%) Current (mA)	Case Type
APG-3214	2.8-3.2	30.0	40.0	5.0	5.0	37	0.75	+46	1.5 1.5	+15 3200	NC ¹
APG-3215	2.8-3.2	40.0	50.0	4.5	5.0	37	0.75	+46	1.5 1.5	+15 3250	NC ¹
APG-3216	2.8-3.2	50.0	60.0	4.0	5.0	37	0.75	+46	1.5 1.5	+15 3280	NC ¹
APG-3514	3.1-3.5	30.0	40.0	5.0	5.0	37	0.75	+46	1.5 1.5	+15 3200	NC ¹
APG-3515	3.1-3.5	40.0	50.0	4.5	5.0	37	0.75	+46	1.5 1.5	+15 3250	NC ¹
APG-3516	3.1-3.5	50.0	60.0	4.0	5.0	37	0.75	+46	1.5 1.5	+15 3280	NC ¹
APT-8465 ⁷	7.9-8.4	30.0	40.0	7.0	1.0	30 ²	1.0	+37	2.0 2.0	+15 ³ 1200	IC6 ^{4,5}
AMP-10504	9.5-10.5	20.0	30.0	8.0	1.0	30	1.0	+36	1.5 1.5	+15 1350	LM ^{4,6}
AMP-10505	9.5-10.5	30.0	40.0	8.0	1.0	30	1.0	+36	1.5 1.5	+15 1400	LM ^{4,6}
AMP-10506	9.5-10.5	40.0	50.0	8.0	1.0	30	1.0	+36	1.5 1.5	+15 1450	LM ^{4,6}

Notes 1: SMA, N or TNC Connectors

2: Minimum Power Output for 1 dB Gain Compression

3: Integral Voltage Regulator

4: SMA Connector Only

5: Thin Film Construction

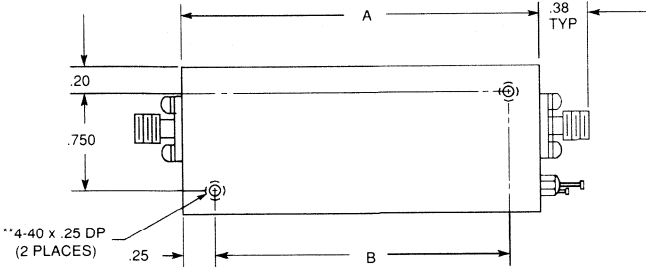
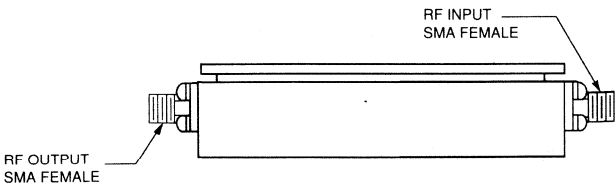
6: Optional Integral Power Detector Available

7: Temperature Compensated: Specifications

Guaranteed @ 0° to 50°C Case Temperature

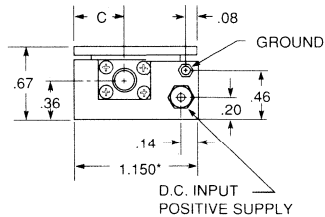
CASE DRAWINGS

IX4, 6, 8, IC6



*Width Dimension Does Not Include
Any Customer Required Labels
**No Threads First .062"

VIEW A

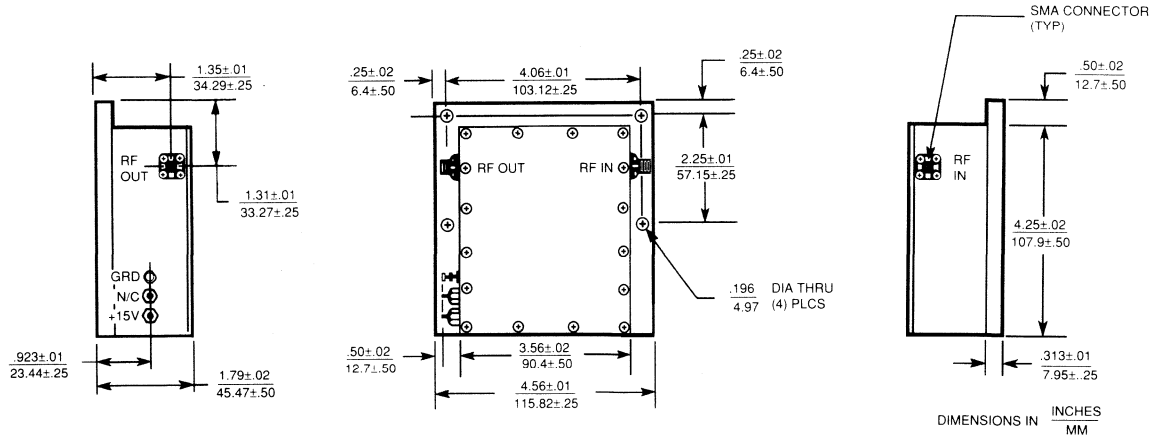


CASE	DIMENSIONS			WEIGHT GRAMS (approx)
	A	B	C	
IS4	2.083	1.583	.375	68
IS6	2.750	2.250	.375	90
IC4	2.083	1.583	.465	68
IC6	2.750	2.250	.465	90
IX6	2.250	1.750	.510	78

DIMENSIONS IN INCHES

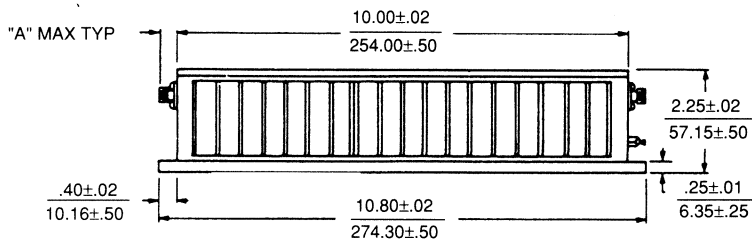
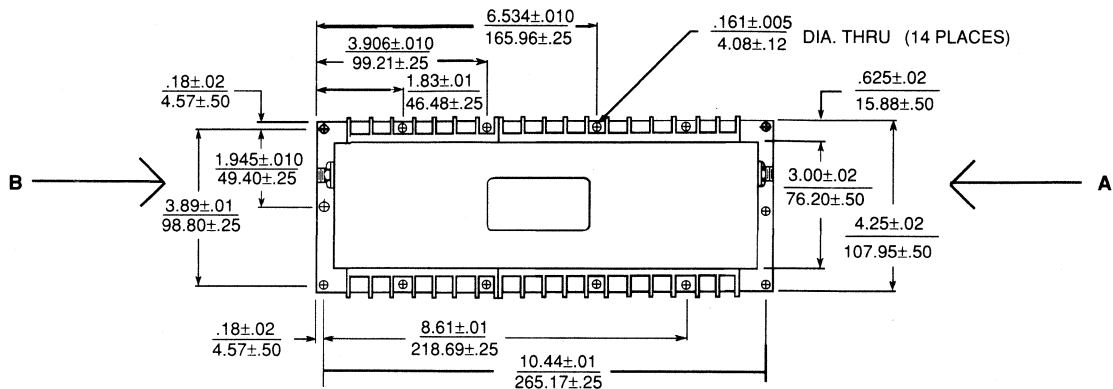
TOLERANCES: .xx ± 0.20
.xxx ± .005

LM

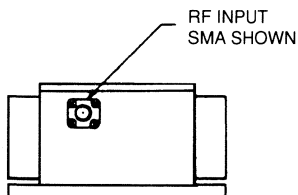


CASE DRAWINGS

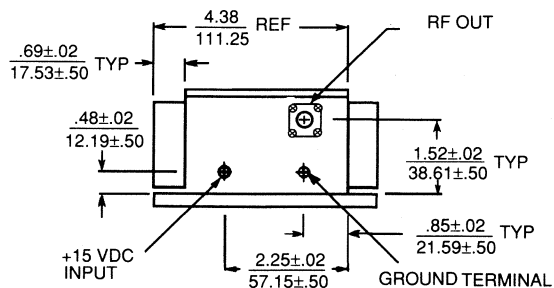
NC



VIEW B



VIEW A



CONNECTOR	"A" DIMENSION
SMA FEMALE	$\frac{.400}{10.16}$
N FEMALE	$\frac{.750}{19.05}$
TNC FEMALE	$\frac{.750}{19.05}$
SMA MALE	$\frac{.500}{12.70}$

Notes:

Connector Options: SMA (female or male), Type N (female only), Type TNC (female only)

Weight: Approximately 5 lb, 2.52 kg

DIMENSIONS IN $\frac{\text{INCHES}}{\text{MM}}$

LOW NOISE, COMMERCIAL, COMMUNICATIONS BAND AMPLIFIERS

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Range (GHz)	Noise Figure (dB)	Gain (dB)	Gain Flatness (±dB)	Power Output at 1 dB Gain (dBm)	Typical Intercept Point for Third Order Intermod Products (dBm)	VSWR (50 ohms)		Input Power ²		Case ³ Type
							Maximum	Out	Voltage (VDC)	Current (mA) Typical	
3.7 to 4.2 GHz Point-to-Point Communications and TV Satellite Downlink LNA PC5											
AM-42812	3.7-4.2	1.5	20	0.5	+12	+22	1.25	1.5	+15	70	AN
AM-42813	3.7-4.2	1.5	30	0.5	+15	+25	1.25	1.5	+15	90	AN
AM-42814	3.7-4.2	1.5	40	0.5	+15	+25	1.25	1.5	+15	120	AN
AM-42815	3.7-4.2	1.5	50	0.5	+15	+25	1.25	1.5	+15	150	AN

Notes 1: Contains integral filter specifically tailored for any 10 MHz bandwidth. Applications include INMARSAT and GPS.

2: Nominal. Contains integral voltage regulator for operation from +15 to +28 VDC.

3: Type SMA connector only.

Model	Frequency Range (GHz)	Noise Figure (dB)	Gain (dB)	Gain Flatness (± dB)	Power Output at 1 dB Gain (dBm)	Typical Intercept Point for Third Order Intermod Products (dBm)	VSWR (50 ohms)		Input Power ^{1, 2}		Case Type
							Maximum	Out	Voltage (VDC)	Current (mA) Typical	
11.7 to 12.2 GHz Communications Satellite Downlink LNA											
AM-12212	11.7-12.2	2.5	18	0.5	+7	+17	1.25	1.25	+15	60	AMK
AM-12213	11.7-12.2	2.5	27	0.5	+7	+17	1.25	1.25	+15	80	AMK
AM-12214	11.7-12.2	2.5	36	0.5	+7	+17	1.25	1.25	+15	100	AMK
AM-12215	11.7-12.2	2.5	45	0.5	+7	+17	1.25	1.25	+15	120	AMK

11.7 to 12.2 GHz Communications Satellite Downlink LNA											PC5
AW-12212	11.7-12.2	2.5	18	0.5	+7	+17	1.25	1.25	+15	60	AWK
AW-12213	11.7-12.2	2.5	27	0.5	+7	+17	1.25	1.25	+15	80	AWK
AW-12214	11.7-12.2	2.5	36	0.5	+7	+17	1.25	1.25	+15	100	AWK
AW-12215	11.7-12.2	2.5	45	0.5	+7	+17	1.25	1.25	+15	120	AWK

11.7 to 12.2 GHz Communications Satellite Downlink LNA											PC5
AWC-12212	11.7-12.2	2.5	18	0.5	+7	+17	1.25	1.25	+15	60	AWM
AWC-12213	11.7-12.2	2.5	27	0.5	+7	+17	1.25	1.25	+15	80	AWM
AWC-12214	11.7-12.2	2.5	35	0.5	+7	+17	1.25	1.25	+15	100	AWM
AWC-12215	11.7-12.2	2.5	45	0.5	+7	+17	1.25	1.25	+15	120	AWM

Notes 1: Nominal. Contains integral voltage regulator powered from center conductor of BF cable

2: Also available for AC operation from 115 VAC. Overall height increases (see case drawing).

12.7 to 13.25 GHz CARS Band Receiver Preamplifier											PC5
AW-13251	12.7-13.25	4.0	15	0.5	+10	+20	1.25	1.25	+15	50	AWJ

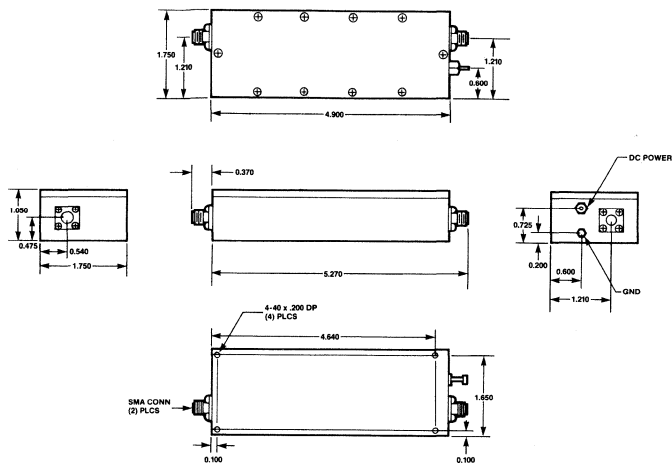
12.7 to 13.25 GHz CARS Band Power Amplifier											PC5
AWP-132400	12.7-13.25	10	15	1.0	+35(4W)	+40	1.25	1.25	+15	4500	Note 1

Note 1: For case drawings, contact Avantek, Inc., 180 Blue Ravine Road, Folsom, CA 95630–Phone (916) 985-1201.

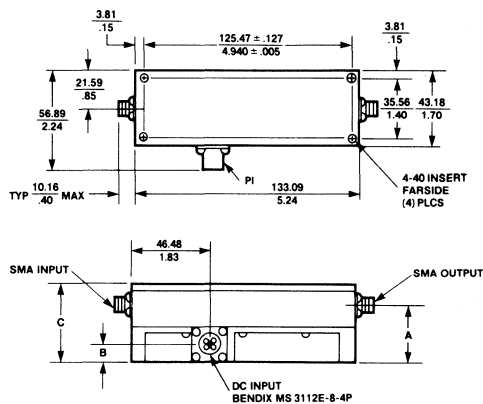
14.0 to 14.5 GHz Communication Satellite Uplink Driver											PC5
AM-14512	14.0-14.5	3.0	16	0.5	+7	+17	1.25	1.25	+15	60	AMK
AM-14513	14.0-14.5	3.0	24	0.5	+7	+17	1.25	1.25	+15	80	AMK
AM-14514	14.0-14.5	3.0	32	0.5	+7	+17	1.25	1.25	+15	100	AMK
AM-14515	14.0-14.5	3.0	40	0.5	+7	+17	1.25	1.25	+15	120	AMK

CASE DRAWINGS

AN



AMK



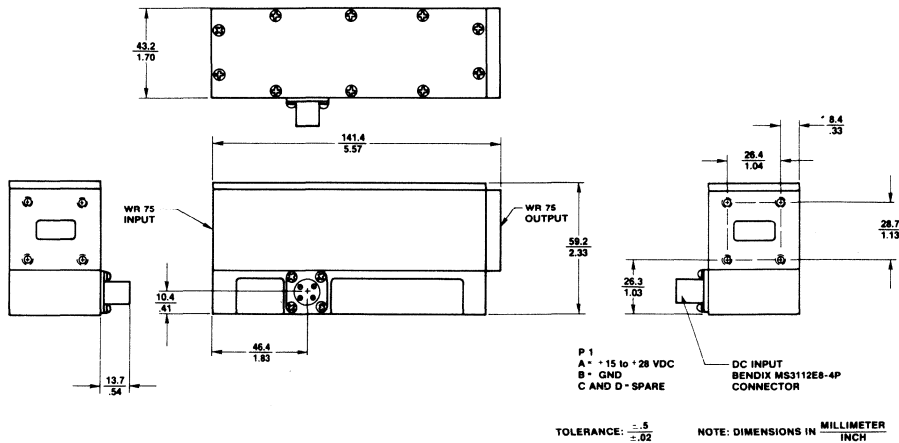
—001 IS DC
—002 IS AC

CODE	PWR SUPPLY	INCHES	MILLI-METER
A	AC	2.08	73.15
	DC	1.81	45.97
B	AC	1.05	26.67
	DC	.41	10.41
C	AC	2.48	62.99
	DC	1.41	35.81

WEIGHT: 16 OZ.

NOTE: DIMENSIONS IN MILLIMETER
INCH
TOLERANCE: $\pm .5$
 $\pm .02$

AWJ

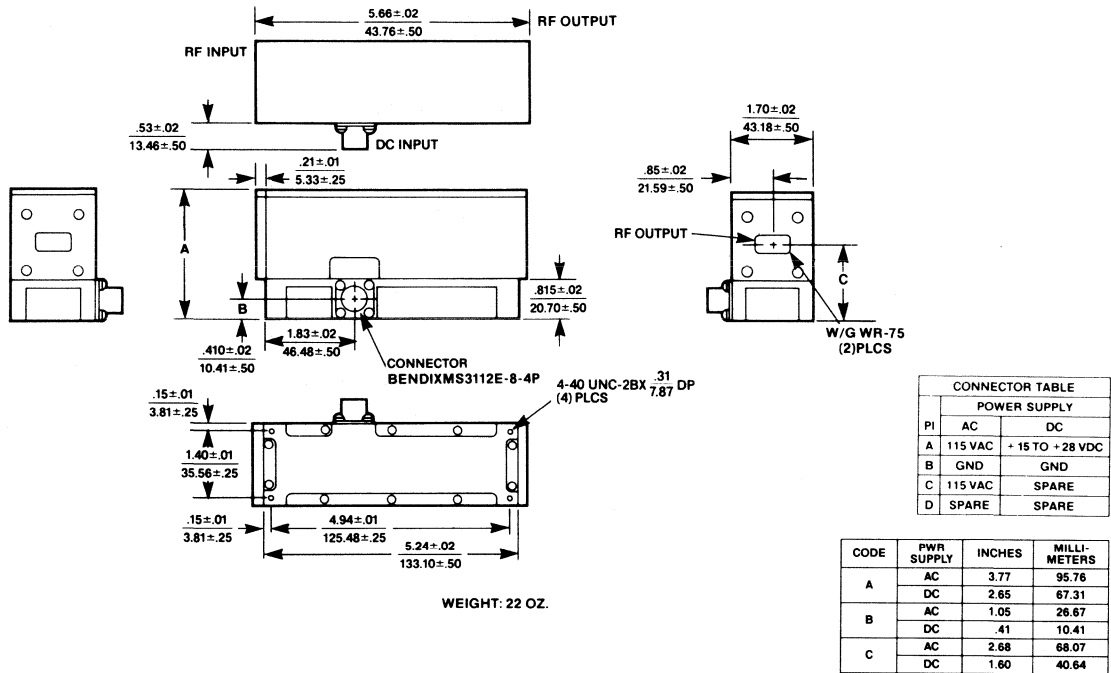


TOLERANCE: $\pm .5$
 $\pm .02$

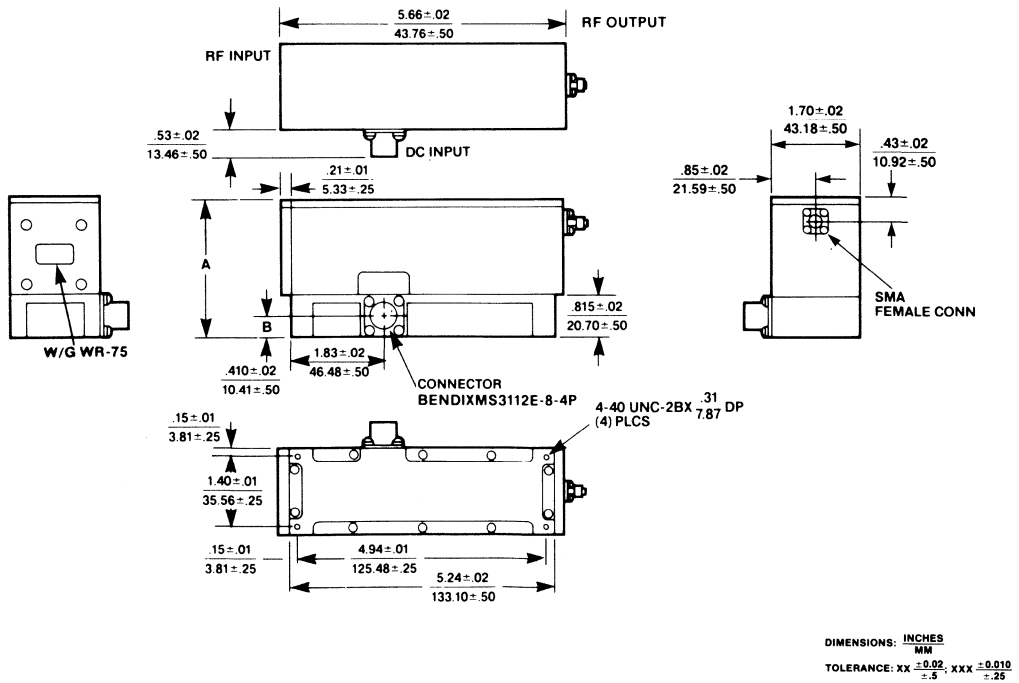
NOTE: DIMENSIONS IN MILLIMETER
INCH

CASE DRAWINGS, continued

AWK



AWM



LOW NOISE, MICROWAVE RADIO PREAMPLIFIERS

Guaranteed Specifications @ 25° C Case Temperature

Model	Frequency Range (GHz) Minimum	Noise Figure (dB) Maximum	Gain (dB) Minimum	Gain Flatness (±dB) Maximum	Power Output at 1 dB Gain Comp. (dBm) Minimum	Typical Intercept Point for Third Order Intermod Products (dBm) Min.	VSWR (50 ohms) Maximum In	VSWR (50 ohms) Maximum Out	Input Power Volts DC	Current (mA) Typical	Case Type	Waveguide Type
5.9 to 6.4 GHz												
AW-6400	5.9-6.4	3.0	8.0	1.0	+10	+22	1.25	1.25	-24	50	1B	CMR159
AW-6401	5.9-6.4	3.0	8.0	1.0	+10	+22	1.25	1.25	-24	50	1C	CMR137
AW-6402	5.9-6.4	3.0	8.0	1.0	+10	+22	1.25	1.25	+24	50	1C	CMR137

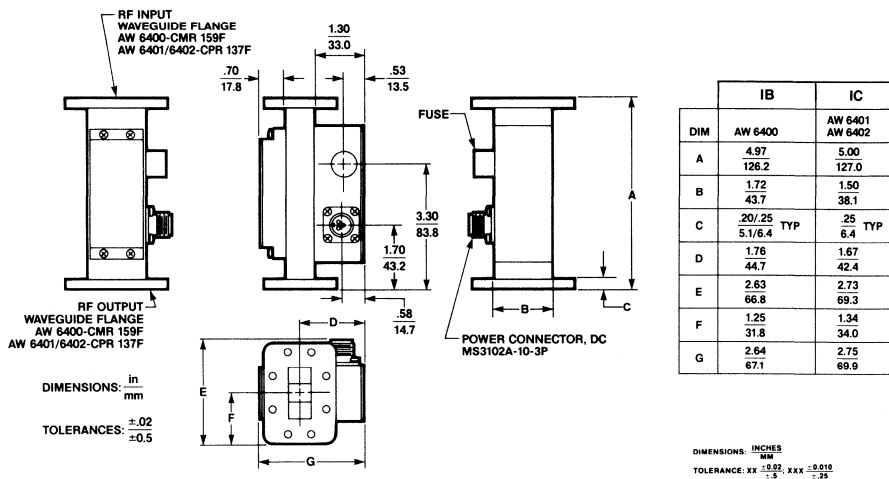
PC5

	Frequency Range (GHz)	Noise Figure (dB)		Gain (dB)		Gain Flatness (±dB)		Group Delay Variation (±ns)		Output Power for 1 dB Gain Compression (dBm)	Intercept Point for 3rd Order Intermod. Products Min. (dBm)	VSWR Input & Output	Input Power (±1% regulation) Volts Current		Case	Wave-
Model	Minimum	Max.	Typ.	Min.	Typ.	Overall	per 40 MHz	Overall	per 40 MHz	Minimum	Min. (dBm)	Max.	DC	(mA), Max.	Type	guide Typ.
10.7 to 11.7 GHz																
AW-11700	10.7-11.7	4.0	3.5	14	18	1.0	0.1	1.0	0.1	+7	+20	1.25	-20 to -24	100	1G	CMR90

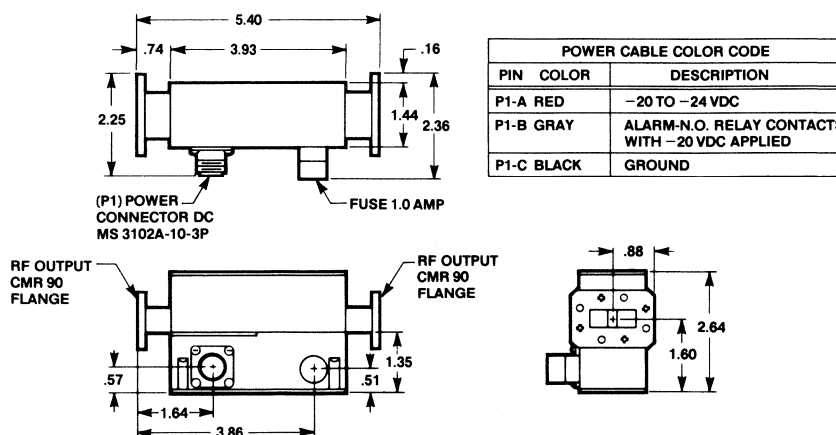
PC5

CASE DRAWINGS

1B/1C



1G



MEDIUM POWER, COMMERCIAL COMMUNICATIONS BAND AMPLIFIERS

Avantek's line of 4, 6, 7, 8 and 11 GHz amplifiers are cost effective TWTAs replacements with more than 10,000 now in use throughout the world. The AMT series uses substantially less input power than a TWT, has more gain thus reducing AM/PM problems

due to the lower output needed from the upconverter and does not lose output power over its calculated lifetime (MTBF) of 30 years. In digital systems, at lowered gain levels, AWP amplifiers offer less than 0.25 dB compression with AM/PM of less than 0.25°/dB over the entire band.

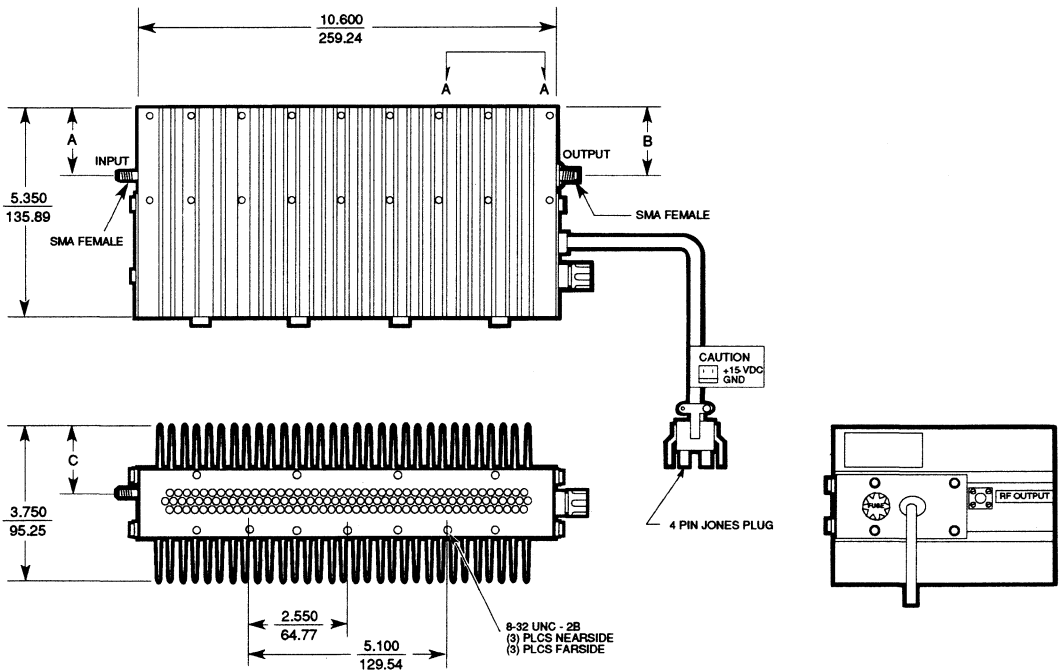
Guaranteed Specifications @ 25° C Case Temperature

PC5

Model	Frequency Response (MHz) Minimum	Power Output for 1 dB Gain Compression (dBm/Watts) Minimum	Gain (dB) Minimum	Gain Flatness (±dB) Maximum	Typical Intercept Point for IM Products (dBm)	Noise Figure (dB) Maximum	VSWR (50 ohms) Maximum	Input Power Voltage (VDC ±3%)	Current (mA) Typical
3700 to 4200 MHz Point-to-Point Communications Amplifiers									
AWP-42107	3700-4200	+25/3	26	2	+35	10	1.2	+15	500
AWP-42108	3700-4200	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-42109	3700-4200	+40/10	41	2	+47	10	1.2	+15	6000
5925 to 6425 MHz Point-to-Point Communications or Satellite Uplink Amplifiers									
AWP-64107	5925-6425	+25/3	26	2	+34	10	1.2	+15	500
AWP-64108	5925-6425	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-64109	5925-6425	+40/10	41	2	+46	10	1.2	+15	6000
6425 to 7125 MHz Point-to-Point Communications Amplifiers									
AWP-71107	6425-7125	+25/3	26	2	+34	10	1.2	+15	500
AWP-71108	6425-7125	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-71109	6425-7125	+40/10	41	2	+46	10	1.2	+15	6000
7125 to 7725 MHz Point-to-Point Communications Amplifiers									
AWP-77107	7125-7725	+25/3	26	2	+34	10	1.2	+15	500
AWP-77108	7125-7725	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-77109	7125-7725	+40/10	41	2	+46	10	1.2	+15	6000
7725 to 8500 MHz Point-to-Point Communications Amplifiers									
AWP-85107	7725-8500	+25/3	26	2	+34	10	1.2	+15	500
AWP-85108	7725-8500	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-85109	7725-8500	+40/10	41	2	+47	10	1.2	+15	6000
7725 to 8275 MHz Point-to-Point Communications Amplifiers									
AWP-83107	7725-8275	+25/3	26	2	+34	10	1.2	+15	500
AWP-83108	7725-8275	+32/1.5	33	2	+40	10	1.2	+15	1200
AWP-83109	7725-8275	+40/10	41	2	+47	10	1.2	+15	6000
10.7 to 11.7 GHz Point-to-Point Communications Amplifiers									
AWP-117107	10.7-11.7	+25/3	26	2	+32	10	1.2	+15	500
AWP-117108	10.7-11.7	+32/1.5	33	2	+39	10	1.2	+15	1200
AWP-117109	10.7-11.7	+40/10	41	2	+47	10	1.2	+15	6000
14.0 to 14.5 GHz Communications Satellite Uplink Drivers									
AWP-145001	14.0-14.5	+24/25	20	.25/40 MHz	+30	10	1.2	+15	400
AWP-145001	14.0-14.5	+27/5	20	.25/40 MHz	+33	10	1.2	+15	900
AWP-145101	14.0-14.5	+30/1.0	30	.25/40 MHz	+36	10	1.2	+15	1000
AWP-145102	14.0-14.5	+33/2	30	.25/40 MHz	+39	10	1.2	+15	4500
AWP-145103	14.0-14.5	+34/3	30	.25/40 MHz	+40	10	1.2	+15	4500
AWP-145503	14.0-14.5	+34/3	40	.25/40 MHz	+40	10	1.2	+15	4500
AWP-145504	14.0-14.5	+36/4	40	.25/40 MHz	+41	10	1.2	+15	6000
AWP-145505	14.0-14.5	+37/5	40	.25/40 MHz	+42	10	1.2	+15	6000

Note 1: Units are available with or without top and/or bottom heatsinks.

CASE DRAWINGS



DIMENSIONS: INCHES
MM
TOLERANCE: XX ± 0.02 ; XXX ± 0.010
 ± 0.5 ± 0.25

Part Number	A	B	C
AWP-4210X	1.400	.665	1.907
AWP-6410X	1.580	.674	1.891
AWP-7110X	1.525	.975	1.891
AWP-7710X	1.525	.975	1.891
AWP-8310X	1.525	.975	1.891
AWP-8510X	1.525	.975	1.891
AWP-117107, 8	1.750	1.645	1.650
AWP-117109	1.475	1.065	1.650

CELLULAR RADIO, PAGING AND MULTIPLE ADDRESS SYSTEM
BASE STATION AMPLIFIERS

Avantek manufactures Cellular Radio Cellsite Power Amplifiers in the 860 to 900 MHz range with output power of 45 watts ± 1 dB. The output power is continuously variable down to 7 watts. In addition to the Cellular Frequency Range, amplifiers can be furnished for 928-929 MHz paging use and the 952-960 MHz multiple Address System Range.

The units operate with an input power range of .75-1.6 watts. A companion Low Noise Receiving Amplifier is available for operation in the Cellsite Receiving Band of 821-851 MHz. The unit has a typical noise figure of 2.5 dB and a nominal gain of 44 dB.

Guaranteed Specifications 0° to 50° C Case Temperature/

PC5

Model	Frequency Range ¹	RF Input Power (Watts)	RF Output Power (Watts) ^{2,4}	DC Current	Second Harmonic Output	Third Harmonic Output	VSWR (50 ohms) In	VSWR (50 ohms) Out	ON-OFF Control	Carrier Leakage	Spurious Signals and Noise
AWP-900	860-900	.75-1.6	45 $\pm$ dB @ +26 VDC	6A @ +26 VDC	>30 dBc	>60 dBc	1.5	1.5	Note 3	Note 4	Note 5
	928-929		25 Min. @ +22 VDC								
	952-960		12 Min. @ +19 VDC								

Notes 1: Specify when ordering.

2: Adjustable to 7 watts output at input DC voltage shown.

3: TTL compatible logic: Logic 1, unit ON
Logic 0, unit OFF

4: $\leq +5$ dBm with Logic 0 applied.

5: At 860-990 MHz >200 KHz from carrier ≤ -15 dBm (30 KHz bandwidth).

6: RF Output power applies to all frequency ranges.

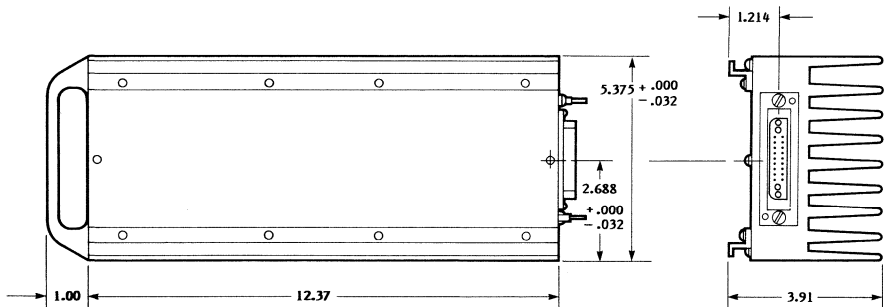
7: Forced air cooling with 150 cfm required.

PC5

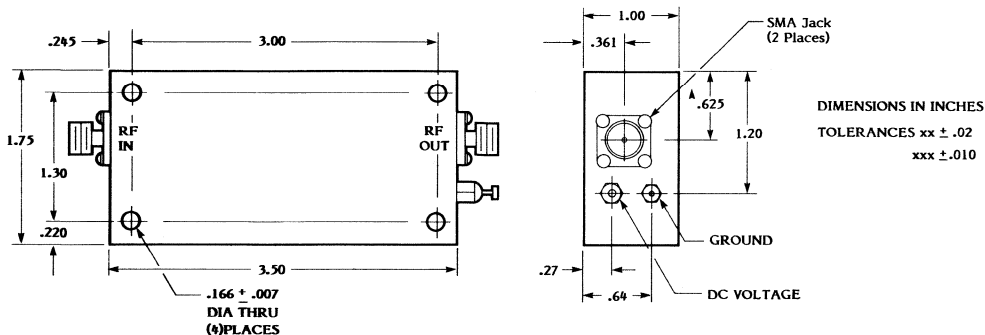
Model	Frequency Range	Output Power at 1 dB Gain Compression	Gain	Noise Figure	VSWR (50 ohms) In	VSWR (50 ohms) Out	3rd Order Intercept	DC Current	DC Voltage Range (VDC)
AM-900	821-851 MHz	+19 dBm	44 dB	3.0 dB	2.0	2.0	+30 dBm (min)	250 MA	+13.5 to +16.5

CASE DRAWINGS

AWP-900



AM-900



TWT DIRECT REPLACEMENT SOLID STATE AMPLIFIERS

MILITARIZED, LOW-NOISE TWT REPLACEMENT AMPLIFIERS

ATR Series Thin-Film GaAs FET Amplifiers with Integral DC Power Supplies

Avantek ATR Series amplifiers consist of state-of-the-art, thin-film GaAs FET amplifier circuits packaged as form, fit and functional replacements for the most common low-noise TWT amplifiers found in present

airborne radar and ECM receiving systems. They will fit within the same volume and use the same mounting hardware and cabling as the tube amplifiers and are powered directly from available 115 or 230 VAC power sources.

Top Access ATR "7 Series" U.S. Navy Qualified Units¹

Guaranteed Specifications @ -25 to +65°C Case Temperature

PC3

Model Number ¹	Frequency Response (GHz)	Noise Figure (dB)	Small Signal Gain (dB)		Gain Flatness (±dB)	Power Output for 1 dB Gain Compression (dBm)	Intercept Point for IM Products (dBm)	VSWR		Input Power (Watts)	Case Type
	Minimum	Maximum	Minimum	Maximum	Maximum	Minimum	Typical	In	Out	Maximum	
ATR-8071	4-8	8	36	41	1.5	+10	+20	2.3	2.3	20	ATR-7
ATR-12071	7-12	9	37	41	1.5	+7	+20	2.3	2.3	20	ATR-7
ATR-18071	10.75-18	10.5	37	43.5	3.0	+7	+17	2.3	2.3	20	ATR-7
ATR-26071 ²	18-26.5	9	40	48	3.0	+12	+20	2.3	2.3	20	ATR-7/WG
ATR-40071 ²	26.5-40	12	35	43	4.0	+6	+15	3.0	3.0	15	ATR-7/WG

Notes 1: These are U.S. Navy Qualified Units and may be ordered under the following National Stock Numbers:

ATR-8071: NSN 4G 5865-01-067-3156

ATR-12071: NSN 4G 5865-01-062-8494

ATR-18071: NSN 4G 5865-LL-HHA-5002

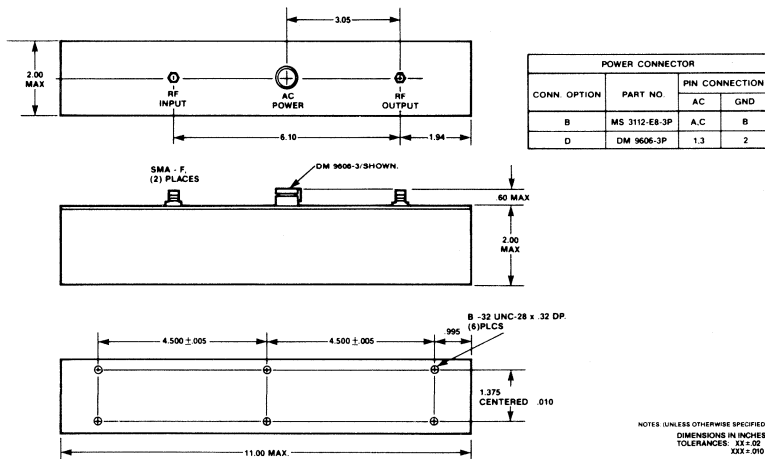
ATR-26071: NSN 7H 2040-LL-HHB-3719

ATR-40071: NSN 7H 2040-01-162-2997

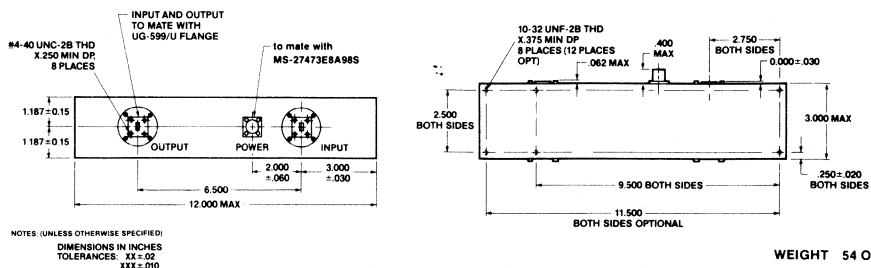
2: 0° to 50°C.

CASE DRAWINGS

ATR 7



ATR 7/WG



HIGH POWER, SOLID STATE, TWT REPLACEMENT AMPLIFIER RETROFIT KITS FOR TERRESTRIAL POINT-TO-POINT MICROWAVE RADIO

Avantek manufactures solid state retrofit kits including the amplifier and installation accessories and instructions to replace TWTs and their associated radio power supplies in terrestrial point-to-point microwave radio transmitters. Full band kits with 10 watts output power are available as shown below. These kits include all parts including transitions, hardware and complete installation instructions.

The standard unit is one piece with an internal power supply which operates from -24 or -48 VDC. A two piece unit is also available with a separate power

supply. This unit's RF section is mechanically similar to a high efficiency TWT and is identified with a "5" in the last field of the model number.

All amplifier units are interchangeable between radio types within a frequency band minimizing the required spare parts. Only the installation kit is unique.

If you desire more information on any of these products, or have similar needs not covered here, please contact TMA sales at (913) 677-1602 or contact the factory at 180 Blue Ravine Road, Folsom, CA 95630 (916) 985-1201.

PC5

THE AVANTEK RETROFIT FAMILY

	COLLINS											LENKURT				NORTHERN TELECOM				WESTERN ELECTRIC							RAYTHEON					RCA			
	MS109	MS109E	MS109ES	MW109E	MW109E1	MDR6	MW109A3	MW109B3	MW609E	MW609E1	MDR11	CTR108	775G	775A	775C	775D	RA3T4	RA3T6	RD3	TD-2	TD-3D	TH-1	TH-3	TMA1	TM2A	TN1	TL2	TN1A	KTR3A/E	KTR3TS	RDS6200	KTR3A/E11	MM600		
AWP-42100	X	X	X									X	X				X				X	X								X	X	X			
AWP-64100				X	X		X	X						X				X					X	X	X	X								X	
AWP-64105						X																													
AWP-71100														X																					
AWP-77100															X																				
AWP-83100																		X																	
AWP-85100																																			
AWP-117100									X	X						X																	X		
AWP-117105											X																X	X	X						

AWP SERIES, HIGH POWER TWT REPLACEMENT AMPLIFIERS

Guaranteed Specifications @ 25° C Case Temperature

PC5

Model	Frequency Range (GHz)	R.F. Input Power (dBm)	Gain (dB)	Output Power ¹² (Watts/dBm)	Noise Figure (dB) Max.	AM/PM Conver (*dB)@		Output Power Variation 0° to +55° C (dB), Max.	Output Power Flatness (dB), P-P	Envelope Delay Distortion (nsec), P-P	Harmonics (dBc), Max.	Spurious (dBc), Max.	Return Loss (dB), Min.		Input Power ¹³ Watts ⁹	
						Typ.	Max.						Input	Output		
AWP-42100	3.7-4.2	Note 1	Note 2	10/+40	10 ³	1.5/3	±2.5	±2.5 ⁴	±1 ⁶	-53	-60	20	20	76		
AWP-64100	5.925-6.425	Note 1	Note 2	10/+40	10 ³	1.5/2	±2.5	±2.5 ⁵	±1 ⁷	-53	-60	20	20	76		
ACU-64100	5.925-6.425	Note 1	42-53	10/+40 ⁸	10 ³	1.5/3	±2.5	±.25	±1 ¹¹	-53	-60	20	20	110		
AWP-71100	6.4-7.1	Note 1	Note 2	10/+40	10 ³	1.5/3	±2.5	±2.5 ¹⁰	±1 ¹¹	-53	-60	20	20	76		
AWP-77100	7.1-7.7	Note 1	Note 2	10/+40	10 ³	1.5/3	±2.5	±2.5 ¹⁰	±1 ¹¹	-53	-60	20	20	76		
AWP-83100	7.7-8.3	Note 1	Note 2	10/+40	10 ³	1.5/3	±2.5	±2.5 ¹⁰	±1 ¹¹	-53	-60	20	20	76		
AWP-85100	7.7-8.5	Note 1	Note 2	10/+40	10 ³	1.5/3	±2.5	±2.5 ¹⁰	±1 ¹¹	-53	-60	20	20	76		
AWP-117100	10.7-11.7	Note 1	Note 2	10/+40	10 ³	1.5/3 ⁹	±2.5	±2.5 ¹⁰	±1 ¹¹	-53	-60	20	20	120		

Notes 1: Accepts any input level from -1 to +10 dBm for rated output power.

2: Gain adjustable from 30 to 41 dB for an output power level of +40 dBm.

3: At maximum gain.

4: Peak-to-peak across any 20 MHz band at +40 dBm output power.

5: Peak-to-peak across any 30 MHz band at +40 dBm output power.

6: Peak-to-peak across any 20 MHz band.

7: Peak-to-peak across any 30 MHz band.

8: Designed for linear operation (multi-carrier SAT uplink).

9: At -24 or -48 VDC.

10: Peak-to-peak cross any 40 MHz band at rated output power.

11: Peak-to-peak across any 40 MHz band.

12: At nominal input.

13: 1 dB compressed.

The above amplifiers are only representative of our complete Retrofit product line. Please contact the factory at (916) 985-1201 for additional information.

MODULAR CONNECTORLESS AMPLIFIERS

MODAMP™ MONOLITHIC MICROWAVE INTEGRATED CIRCUITS (MMICs)

The MSA series of monolithic silicon amplifiers is a family of silicon bipolar Monolithic Microwave Integrated Circuits (MMICs) using nitride self-alignment, ion-implantation for precise control of doping and nitride passivation for high reliability. They use series

and shunt feedback and exhibit very high uniformity from amplifier to amplifier. Typical applications include narrow and broadband IF and RF amplifiers in commercial, industrial and military mobile, airborne and land based systems.

MSA SERIES

Typical Specifications at 25°C Case Temperature

PC1

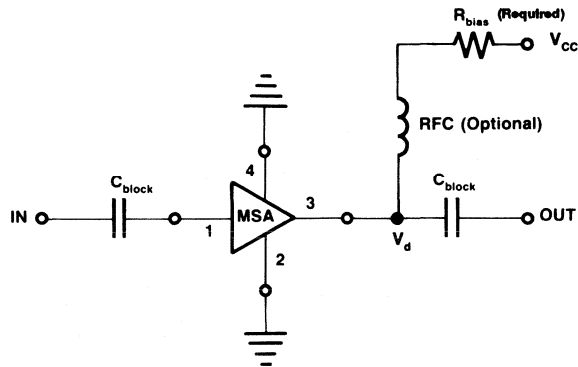
Part Number	Maximum Usable Frequency ¹ (GHz)	S ₂₁ ² Gain @ 0.1 GHz (dB)	S ₂₁ ² Gain @ 1.0 GHz (dB)	Noise Figure @ 1.0 GHz (dB)	P _{1dB} @ 1.0 GHz (dBm)	Minimum Power Supply Voltage ³ (V _{CC})	Device Voltage ³ (V _d)	Device Current ³ (mA)	Case Type
MSA-0104 —	3.5	18.5	15.0	6.0	1.5	7	5	17	4-pac plastic
MSA-0204 —	4.0	12.5	11.0	6.5	4.5	7	5	25	4-pac plastic
MSA-0304 —	3.5	12.5	11.0	6.0	10.0	7	5	35	4-pac plastic
MSA-0404	2.5	8.3	7.7	7.0	11.5	7	5.3	50	4-pac plastic
MSA-0420	4.0	8.5	8.5	6.5	16.0	10	6.3	90	200 mil BeO
MSA-0520	2.5	9.0	8.5	6.5	23.0	15	12	165	200 mil BeO
MSA-1023	2.5	8.5	8.5	7.0	27.0	20	15	325	230 mil flange
MSA-1120 ²	3.0	12.5	11.0	4.0	15.0	8	5.5	60	200 mil BeO
MSA-0135 —	4.5	19.0	16.5	6.0	1.5	7	5	17	micro-X
MSA-0235 —	4.5	12.5	12.0	6.5	4.5	7	5	25	micro-X
MSA-0335	4.5	12.5	12.0	6.0	10.0	7	5	35	micro-X
MSA-0435 —	3.8	8.5	8.3	6.5	12.5	7	5.3	50	micro-X
MSA-0635	4.0	20.5	16.5	3.0	1.5	5	3.5	16	micro-X
MSA-0735	4.0	13.5	13.0	4.5	5.5	5	4	22	micro-X
MSA-0835	6.5	32.5	23.0	3.0	12.5	10	7.8	36	micro-X
MSA-0170	4.5	19.0	16.5	6.0	1.5	7	5	17	70 mil hermetic
MSA-0270 —	4.5	12.5	12.0	6.5	4.5	7	5	25	70 mil hermetic
MSA-0370	4.5	12.5	12.0	6.0	10.0	7	5	35	70 mil hermetic
MSA-0470	4.0	8.5	8.3	6.5	12.5	7	5.3	50	70 mil hermetic
MSA-0670	4.0	20.5	17.5	3.0	1.5	5	3.5	16	70 mil hermetic
MSA-0770	4.0	13.5	13.0	4.5	5.5	5	4	22	70 mil hermetic
MSA-0870	6.0	32.5	23.5	3.0	12.5	10	7.8	36	70 mil hermetic
MSA-0910 ²	6.0	8.0	8.0	6.0	12.0	12	7.7	35	100 mil hermetic
MSA-0185	4.5	18.5	15.5	6.0	1.5	7	5	17	85 mil plastic
MSA-0285	4.5	12.5	12.0	6.5	4.5	7	5	25	85 mil plastic
MSA-0385 —	4.0	12.5	12.0	6.0	10.0	7	5	35	85 mil plastic
MSA-0485 —	3.6	8.3	8.0	7.0	12.5	7	5.3	50	85 mil plastic
MSA-0685	4.0	20.0	17.0	3.2	1.5	5	3.5	16	85 mil plastic
MSA-0785	3.8	13.5	12.5	5.0	5.5	5	4	22	85 mil plastic
MSA-0885	6.0	32.5	22.5	3.3	12.5	10	7.8	36	85 mil plastic
MSA-0186	4.5	18.5	15.5	6.0	1.5	7	5	17	surface mount plastic
MSA-0286	4.5	12.5	12.0	6.5	4.5	7	5	25	surface mount plastic
MSA-0386	4.0	12.5	12.0	6.0	10.0	7	5	35	surface mount plastic
MSA-0486	3.6	8.3	8.0	7.0	12.5	7	5.3	50	surface mount plastic
MSA-0686	4.0	20.0	17.0	3.2	1.5	5	3.5	16	surface mount plastic
MSA-0786	3.8	13.5	12.5	5.0	5.5	5	4	22	surface mount plastic
MSA-0886	6.0	32.5	22.5	3.3	12.5	10	7.8	36	surface mount plastic

Notes 1: Frequency at which |S₂₁|² gain equals 6 dB.

2. Recent product addition.

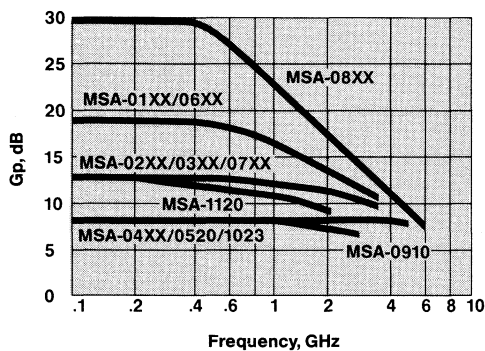
3. Refer to biasing configuration on next page.

TYPICAL BIASING CONFIGURATION

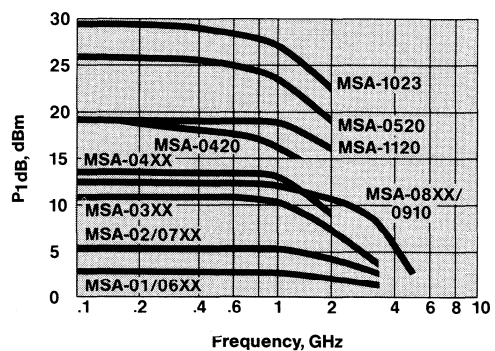


TYPICAL PERFORMANCE: Si MMIC AMPLIFIERS

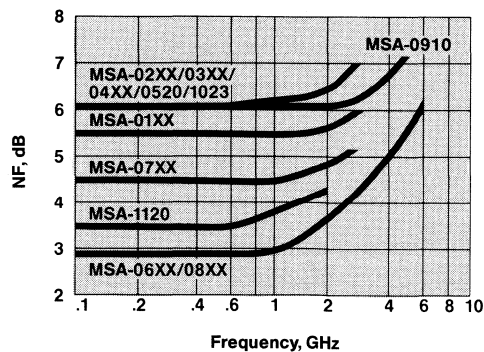
TYPICAL POWER GAIN vs. FREQUENCY
 $T_A = 25^\circ\text{C}$



TYPICAL OUTPUT POWER @ 1 dB GAIN COMPRESSION
vs. FREQUENCY, $T_A = 25^\circ\text{C}$

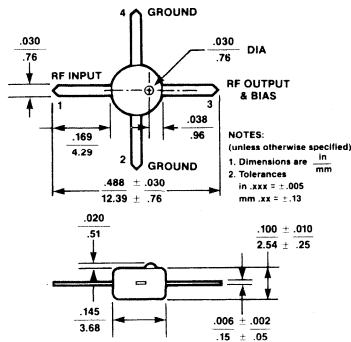


TYPICAL NOISE FIGURE vs. FREQUENCY
 $T_A = 25^\circ\text{C}$

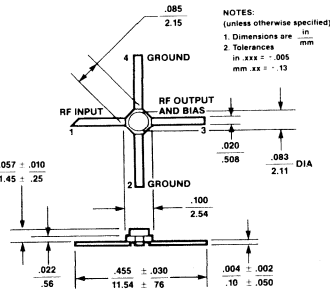


CASE DRAWINGS

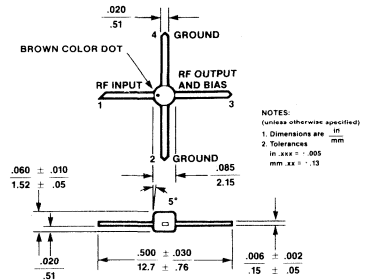
AVANTEK 04 PLASTIC PACKAGE



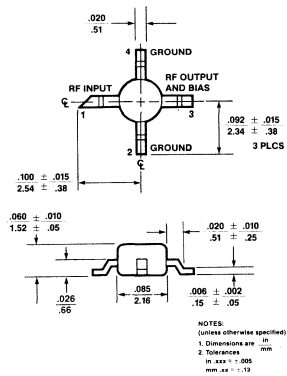
AVANTEK micro-X PACKAGE



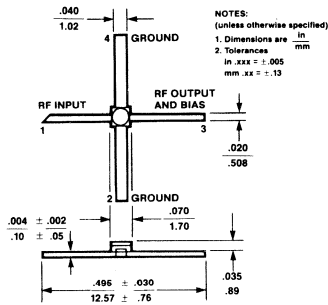
AVANTEK 85 PLASTIC PACKAGE



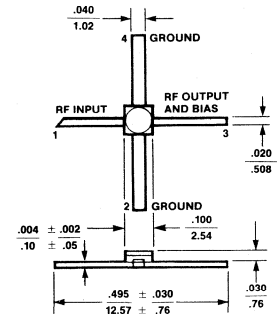
AVANTEK SURFACE MOUNT



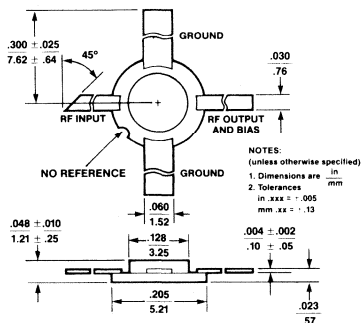
AVANTEK 70 mil PACKAGE



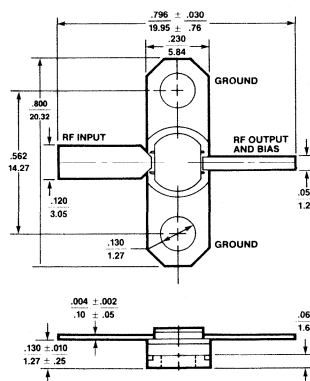
AVANTEK 100 mil STRIPLINE



AVANTEK 200 mil BeO PACKAGE



AVANTEK 230 mil BeO FLANGE PACKAGE



NOTES:

PLANARPAK™ SERIES SURFACE-MOUNTED COMPONENTS

Avantek PlanarPak™ surface-mounted components bring a new dimension to the design of microwave systems. The new surface-mount package allows the

use of simpler microstrip installations at higher densities and with improved performance over previously available packages.

PLANARPAK™ SERIES SURFACE MOUNTED AMPLIFIERS

Guaranteed Specifications @ 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz)	Gain (dB)	Noise Figure (dB)	Power Output at 1 dB Gain Compression (dBm)	Power Requirements		Case Type
	Minimum	Minimum	Maximum	Minimum	Voltage (VDC)	Current (mA) Nominal	
PPA-210	10-200	8.0	2.0	+11	+15	15	PP-38
PPA-211	10-200	7.5	2.7	+17	+15	30	PP-38
PPA-253	5-200	29.0	4.0	0	+5	30	PP-25
PPA-543	10-500	10.0	2.7	+6	+15	25	PP-38
PPA-544 ¹	10-500	10.0	3.0	+12	+15	35	PP-38
PPA-519	5-500	13.0	5.5	+18	+15	70	PP-38
PPA-509	5-500	13.0	5.5	+20	+15	90	PP-38
PPA-520	5-500	14.0	4.5	+12	+5	33	PP-38
PPA-1043 ¹	10-1000	10.0	4.0	+6	+15	25	PP-38
PPA-1005	5-1000	11.0	6.0	+19.5	+15	90	PP-38
PPA-1006	5-1000	11.0	6.0	+17	+15	70	PP-38
PPA-1007	5-1000	12.5	5.0	+11	+5	33	PP-38
PPA-2012 ²	500-2000	9.0	4.0	+12	+15	50	PP-38
PPA-2013 ²	500-2000	9.0	5.5	+19	+15	100	PP-38
PPA-4132	1000-4000	20.0	6.0	+17	+8	150	PP-38
PPA-6232	2-6 GHz	17.0	6.0	+17	+8	150	PP-38
PPA-18232	2-18 GHz	9.0	9.5	+11	+8	155	PP-25
PPA-18632	6-18 GHz	12.0	6.5	+13	+9	50	PP-25

(P) Preliminary

Notes 1: Both RF input & RF output pins are at DC ground—No blocking capacitor.

2: RF Input pin is at DC ground—No input blocking capacitor.

PPF-030, PLANARPAK™ SURFACE MOUNTED ATTENUATOR

Guaranteed Specifications at 0 to +50° C Case Temperature

PC2

Model	Frequency Range (MHz)	Insertion Loss (dB)	Attenuation (dB)	VSWR (50Ω)	Switching Speed (μsec)	Control Voltage (V)	Case Type
		Maximum	Minimum	Maximum	Maximum		
PPF-030	100-500	2.5	40	2.0	1.0	0 to +15	PP-25F
	500-1000	3.0	35	2.0	1.0		
	1000-2000	3.5	25	2.0	1.0		

PPS-010, PLANARPAK™ SURFACE MOUNTED, NON-REFLECTIVE, SPDT SWITCH

Guaranteed Specifications at 0° to 50° C. Case Temperature

PC2

Model	Frequency Range (MHz)	Insertion Loss (dB)	Isolation (dB)	VSWR (50Ω)	Switching Speed (μsec)	Control Voltage (VDC)	Case Type
		Maximum	Minimum	Maximum	Maximum		
PPS-010	10-200	1.5	40	1.7	5.0	±15	PP-25S
	200-500	1.5	30				
	500-2000	2.5	20				

PLANARPAK™ SURFACE MOUNTED DETECTORS

Guaranteed Specifications at 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz)	VSWR (50Ω)	Sensitivity Typical	Flatness (@ input) (dB)	Video B/W Typical	Power (VDC) Nominal	Case Type
		Maximum		Maximum			
PPD-2001 ¹	20-2000	1.8	.9V/mW	±0.3	150 kHz	+15	PP-25DA
PPD-6002 ²	100-6000	2.0	-10 to +10 dBm	±1.0	1000 nsec	+15	PP-25DD

Notes 1: Level detector.

2: Threshold detector.

PPL-504, PLANARPAK™, SURFACE MOUNTED LIMITING AMPLIFIER

Guaranteed Specifications @ 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz)	Input Power Limiting Range (dBm) Minimum	Saturated Output Power (dBm) Minimum	Output Power Flatness (dB) Maximum	Noise Figure (dB) Maximum	Operating Bias (Vdc)	Case Type
PPL-504	10-1000	-25 to +10	-2.0	±1.0	10.0	+15	PP-48

PPM-2515M, PLANARPAK™ SURFACE MOUNTED TRIPLE BALANCED MIXER

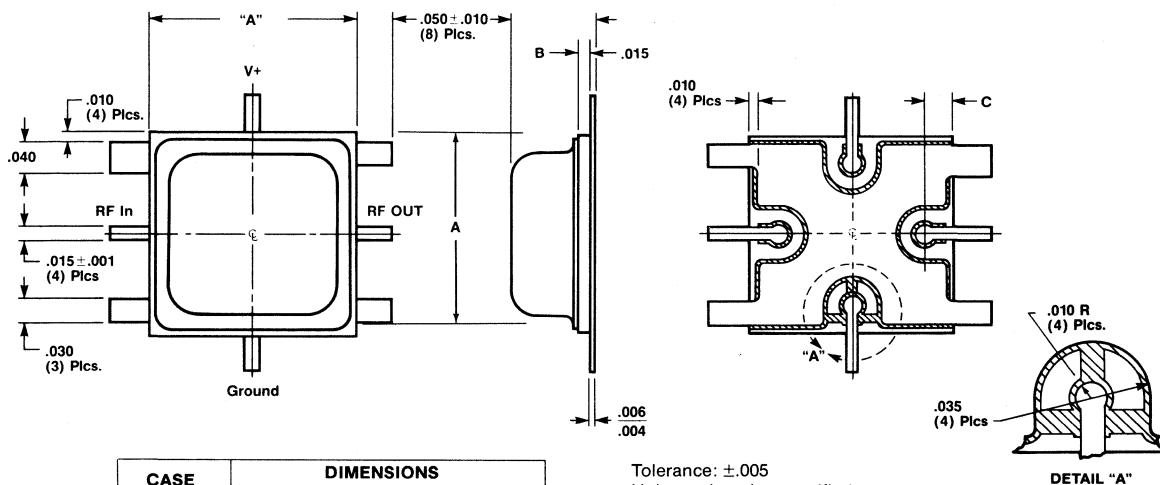
Typical Specifications @ 25° C Case Temperature

PC2

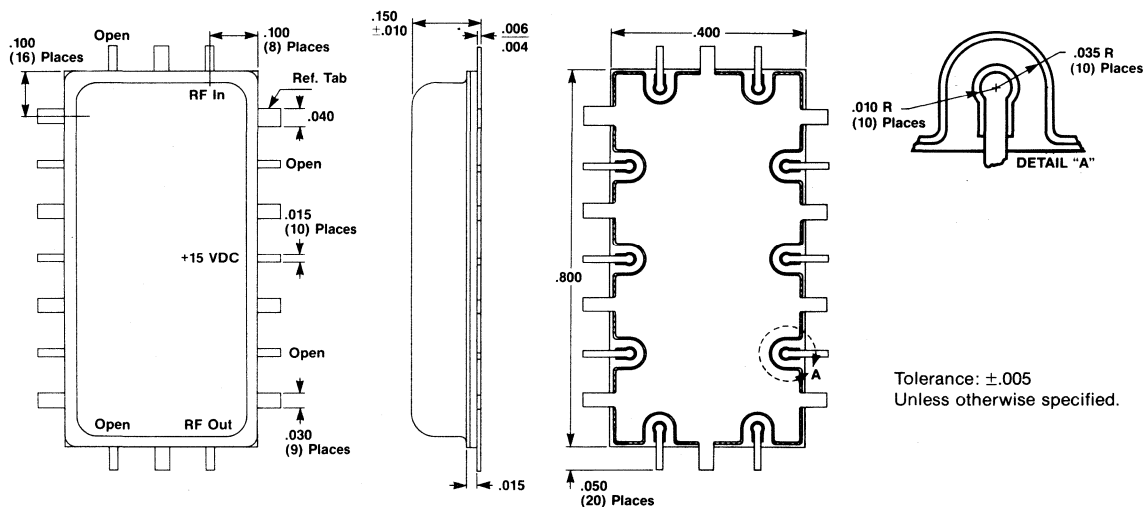
Model	Frequency Range (GHz) RF/LO	Frequency Range (GHz) IF	Conv. Loss (dB) Typical	ISOL. LO/Rf (dB) Typical	ISOL. LO/IF (dB) Typical	VSWR RF/IF	LO	Case Type
PPM-2515M	.05-2.5	.001-1.5	7.6	35	35	1.5	2.5	PP-38M

CASE DRAWINGS

PP-25/38



PP-48



THIN-FILM AMPLIFIER MODULES

AMPLIFIER MODULES

Avantek's broad selection of GPD and UTO series of products provides the design engineer with an immediate solution for RF and IF gain requirements. Proven reliability, guaranteed performance, reduced size and reduced part count—add up to significant savings in cost and time with Avantek Modular Amplifiers.

The factory guarantees operation of most UTO and GPD Series amplifier modules over -54°C to $+105^{\circ}\text{C}$. Consult specific data sheets or the Avantek Modular Products Data book for complete specifications.

GPD SERIES LOW COST AMPLIFIERS, TO-39 PACKAGE¹

Guaranteed Specifications at 0° to 50°C Case Temperature

PC2

Model	Frequency Response (MHz) Minimum	Gain (dB) Minimum	Noise Figure (dB) Typical	Power Output for 1 dB Gain Compression (dBm) Typical	Gain Flatness ($\pm$ dB) Typical	3rd Order Intercept Point (dBm) Typical	Input Power ($\pm 1\%$ Reg.) Voltage (VDC) Current (mA) Typical
GPD-110	0.1-400	12	4.0	-2.0	1.0	+12	2.5 10
GPD-120	0.1-400	13	5.5	+8.0	1.0	+24	5.5 25
GPD-130	0.1-400	12	7.0	+17.0	1.0	+27	6.0 60
GPD-310	0.1-1000	7	5.0	-1.0	1.0	+11	2.3 10
GPD-320	0.1-1000	7	5.0	+8.0	1.0	+18	3.0 25
GPD-330	0.1-1000	6	6.5	+16.0	1.0	+26	4.5 60
GPD-311	0.1-1000	11	4.5	+3.0	1.0	+15	2.7 15
GPD-321	0.1-1000	11	4.7	+8.0	1.0	+20	3.5 25
GPD-331	0.1-1000	9	6.0	+16.0	1.0	+28	5.5 60
GPD-410	0.1-1500	11	4.2	+2.5	1.0	+15	2.5 15
GPD-420	0.1-1500	10	4.7	+8.0	1.0	+20	2.8 25
GPD-430	0.1-1500	9	6.3	+16.0	1.0	+28	5.0 60

GPD SERIES LOW COST AMPLIFIERS, TO-12 PACKAGE

Guaranteed Specifications at 0° to 50°C Case Temperature

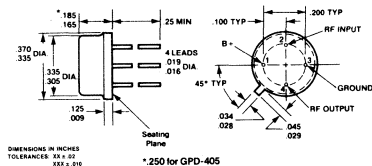
GPD-201	5-200	30	3.5	+5	1.0	+13	+15 30
GPD-202	5-200	25	5.5	+9	1.0	+18	+15 60
GPM-552	5-500	33	4.5	0	0.2	+14	+15 34
GPM-1052	5-1000	20	7.0	+8	0.3	+20	+15 60
GPD-251	5-200	25	4.0	+1	1.0	+10	+5 30
GPD-252	5-200	15	4.0	0	1.0	+12	+5 11
GPD-401/461 ²	5-400	13	4.5	-2	1.0	+9	+15 10
GPD-411	5-400	12	3.2	-6	1.0	+4	+15 7
GPD-402/462 ²	5-400	13	6.0	+6	1.0	+18	+15 24
GPD-403/463 ²	5-400	9	7.5	+15	1.0	+25	+24 65
GPD-404/464 ²	5-400	9	7.5	+15	1.0	+26	+15 70
GPD-405	10-400	13	6.5	+20	1.0	+29	+15 90
GPD-1001/1061 ²	5-1000	12	6.0	0	1.0	+12	+15 15
GPD-1002/1062 ²	5-1000	12	7.0	+6	1.0	+16	+15 27
GPD-1003/1063 ²	5-1000	10	8.0	+14	1.0	+24	+15 55

Notes 1: Three external capacitors (input, output coupling and RF bypass) are required to establish low frequency roll-off. An external bias resistor, with a value determined by the available bias voltage, ($R_D = [V_{CC} - V_D] \div I_D$), where R_D is the value of the bias resistor (Ohms), V_{CC} is the available source voltage, V_D is the required device bias voltage (per specification) and I_D is the device current (per specification), is also required.

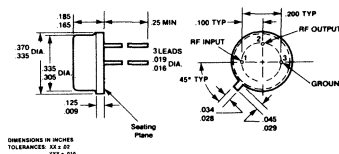
2: The 60 Series is the same as the standard series except that three external capacitors are required to establish low frequency roll-off.

CASE DRAWINGS

TO-12



TO-39



HIGH PERFORMANCE AMPLIFIERS

The premium UTO/UTC Series of amplifiers offers the best possible performance and high reliability under the most difficult operating conditions. They provide

very stable and repeatable performance over a wide range of frequencies, temperatures and supply voltages.

UTO/UTC SERIES

Guaranteed Specifications at 0° to 50° C Case Temperature

PC2

Model UTO/UTC	Frequency Range (MHz) Minimum	Gain (dB) Minimum	Noise Figure (dB) Maximum	Power Output at 1 dB Gain Compression (dBm) Minimum	Gain Flatness (±dB) Maximum	Third Order Intercept Point (dBm) Typical	Input Power (±1% Reg.) Voltage (VDC) Current (mA), Typ.		Case Type
10 to 150 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
103	10-100	25.5	2.1	+9.5	1.0	+22	+5	15	TO-8T
101	10-100	26.5	2.2	+14.5	1.0	+26	+15	20	TO-8T
104	10-150	24.0	2.3	+9	1.0	+22	+5	20	TO-8T
102	20-150	23.5	3.2	+18	1.0	+32	+15	31	TO-8T
10 to 200 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
514	30-200	15	2.0	-3	0.75	+7	+15	8	TO-8U
210	10-200	8.0	2.0	+11	1.0	+29	+15	8	TO-8T
221	10-200	27	2.5	+13.5	0.7	+27	+15	29	TO-8T
211	10-200	7.5	2.7	+17	1.0	+28	+15	30	TO-8T
222	20-200	28	3.5	+19	0.7	+32	+15	47	TO-8T
250	10-200	30	4.0	-3	1.0	+9	+5	13	TO-8U
5 to 400 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
443 ³	10-400	12.5	4.5	+4.5	0.7	+19	+5	10	TO-8T
440 ³	10-400	12.5	4.5	+8	0.7	+23	+15	15	TO-8T
441 ³	20-400	13.5	4.5	+15	0.7	+32	+15	32	TO-8T
444 ³	10-400	12.5	5.0	+8.0	0.7	+22	+5	15	TO-8T
421	5-400	27	5.5	+6	1.0	+18	+15	38	TO-8U
416	5-400	14	5.5	+10	1.0	+23	+15	35	TO-8U
442 ³	10-400	13	5.5	+20	0.7	+33	+15	62	TO-8T
2 to 500 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
511	5-500	15	2.5	-2	1.0	+8	+15	10	TO-8U
517	5-500	22	2.5	+5	1.0	+15	+15	22	TO-8U
543 ¹	10-500	10	2.5	+6	1.0	+22	+15	25	TO-8U
510	5-500	15	3.0	-2	1.0	+8	+15	10	TO-8U
512	5-500	20	3.0	+7	1.0	+20	+15	23	TO-8U
554	5-500	28.0	3.0	9.0	0.7	21.0	+5	40	TO-8T
544 ¹	10-500	10	3.0	+12	1.0	+28	+15	35	TO-8T
558	5-500	28.0	3.2	13.5	0.7	23.0	+5	73	TO-8T
572 ⁴	50-500	18	3.5	+11	0.5	+24	+15	32	TO-8T
501	5-500	14	4.0	-2	1.0	+11	+15	10	TO-8U
521	5-500	27	4.0	+6	1.0	+18	+15	38	TO-8U
552	5-500	13.5	4.0	+6.5	0.7	+21	+5	18	TO-8T
502	5-500	14	4.0	+7	1.0	+21	+15	23	TO-8U
571 ⁴	50-500	14.5	4.0	+10	0.5	+27	+15	32	TO-8T
524	5-500	30	4.0	+14	1.0	+27	+15	70	TO-8T
516	5-500	14	4.5	+10	1.0	+23	+15	35	TO-8T
520	5-500	14	4.5	+12	0.7	+22	+5	33	TO-8T
533	5-500	16	5.0	+14	0.7	+30	+15	53	TO-8T
545	10-500	10	5.0	+17	0.5	+36	+15	60	TO-8T
519	5-500	13	5.5	+18	0.7	+33	+15	70	TO-8T
509	5-500	13	5.5	+20	1.0	+35	+15	90	TO-8T
513	5-500	16	6.0	+14	1.0	+31	+24	50	TO-8U
518	5-500	13	6.0	+23	0.7	+38	+15	130	TO-8T
523	5-500	23	7.0	+12	1.0	+25	+15	80	TO-8U
503	5-500	9	7.0	+13	1.0	+33	+24	50	TO-8U
515	2-500	12	7.0	+14	0.5	+28	+15	65	TO-8U
505	10-500	9	7.0	+18	1.0	+33	+15	95	TO-8T
546 ³	10-500	10	8.0	+23	0.5	+38	+15	110	TO-8T
561 ²	10-500	11	9.0	+26	0.7	+39	+15	190	TO-8T
504	5-500	6	11.0	+17	1.0	+34	+24	100	TO-8U

Notes: See notes on following page.

HIGH PERFORMANCE AMPLIFIERS, Continued

PC2

Model	Frequency Range (MHz)	Gain (dB)	Noise Figure (dB)	Power Output at 1 dB Gain Compression (dBm)	Gain Flatness (±dB)	Third Order Intercept Point (dBm)	Input Power (±1% Reg.)		Case Type
UTO/UTC	Minimum	Minimum	Maximum	Minimum	Maximum	Typical	Voltage (VDC)	Current (mA), Typ.	
2 to 1000 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
1011	2-1000	14	3.5	-5	0.7	+10	+15	8	TO-8U
1012	5-1000	15	4.0	+4	1.0	+17	+15	18	TO-8U
1043 ¹	10-1000	10	4.0	+6	1.0	+22	+15	25	TO-8T
1054	5-1000	23.5	4.0	+9.5	0.7	+21	+5	40	TO-8T
1058	5-1000	23.5	4.2	+13	0.7	+22	+5	70	TO-8T
1013	5-1000	15	4.5	+9	1.0	+20	+15	29	TO-8U
1044 ¹	10-1000	10	4.5	+12	1.0	+28	+15	35	TO-8T
1021	5-1000	22	4.5	+12	1.0	+27	+15	85	TO-8U
1001	5-1000	14	5.0	-2	1.0	+11	+15	10	TO-8U
1052	5-1000	13	5.0	+7	0.7	+18	+5	18	TO-8T
1007	5-1000	12.5	5.0	+11	0.7	+21	+5	33	TO-8T
1006	5-1000	11	6.0	+17	1.0	+30	+15	70	TO-8T
1005	5-1000	11	6.0	+20	1.0	+33	+15	90	TO-8T
1002	5-1000	14	6.5	+7	1.0	+21	+15	23	TO-8T
UTM-1056	10-1000	25.6	6.5	+12	0.7	+26	+15	135	TO-8T
UTM-1057	10-1000	26	6.5	+14	0.7	+29	+15	170	TO-8T
1033	5-1000	10	6.5	+14	1.0	+28	+15	48	TO-8T
1024	10-1000	12	6.5	+22 ⁵	1.0	+35	+15	155	TO-8T
1055	10-1000	15.5	7.5	+15	0.7	+29	+15	135	TO-8T
1023	10-1000	12	8.5	+24.5 ⁶	1.0	+36	+15	205	TO-8T
UTM-1053	5-1000	27	9.0	+5	2.0	+21	+15	90	TO-8T
1004	10-1000	6	12.0	+20	0.7	+40	+15	110	TO-8T
1 to 1500 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
1524	10-1500	21	4.5	+7	1.5	+19	+15	60	TO-8U
1511	5-1500	10	4.5	-9	0.5	+1	+15	7	TO-8U
1522	5-1500	18	5.5	+11	1.5	+23	+15	85	TO-8U
1501	5-1500	9	5.5	-3	0.5	+10	+15	10	TO-8U
1502	5-1500	9	7.5	+6	0.5	+19	+15	23	TO-8U
1 to 2000 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
2031	1-2000	9	5.5	+2	1.0	+14	+15	16	TO-8U
2032	1-2000	9	6.0	+7	1.0	+17	+15	25	TO-8U
2033	1-2000	8	8.5	+14	1.0	+30	+15	50	TO-8T
5 to 2000 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
2021	10-2000	9	4.0	+2	1.0	+14	+15	16	TO-8U
2012 ²	500-2000	9	4.0	+12	1.0	+23	+15	50	TO-8U
2052	5-2000	9	5.0	+5.5	0.7	+16	+5	18	TO-8T
2024	5-2000	15	5.5	+5	1.0	+18	+15	38	TO-8T
2013 ²	500-2000	9	5.5	+19	1.0	+33	+15	100	TO-8U
2022	10-2000	9	6.0	+7	1.0	+17	+15	25	TO-8U
2055	5-2000	8.5	6.0	+10	0.7	+22	+5	32	TO-8T
2026	10-2000	13.5	7.0	+19	1.0	+31	+15	155	TO-8T
2027	10-2000	13.5	7.0	+16	1.0	+30	+15	108	TO-8T
2023	10-2000	8	8.5	+14	1.0	+29	+15	50	TO-8T
2025	100-2000	9.5	4.5	+25	1.0	+37	+15	175	TO-8T
1700 to 2300 MHz		(Listed in order of Increasing Noise Figure, Increasing Power Output)							
2311	1700-2300	8	5.0	-3	0.5	+10	+15	15	TO-8U
2302	1700-2300	8	6.5	+3	0.5	+13	+15	18	TO-8U
2303	1700-2300	8	8.0	+10	0.5	+20	+15	30	TO-8U
2321	1700-2300	14	8.0	+10	1.0	+23	+15	70	TO-8U

(P) Preliminary

Notes 1: Both RF input and RF output pins are at DC ground—no blocking capacitor.

2: RF input pin is at DC ground—no input blocking capacitor.

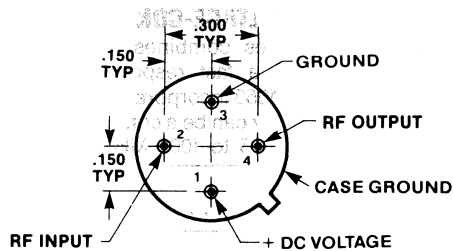
3: A portion of any DC voltage applied to the RF input pin will appear at the RF output pin (i.e., a resistive DC path exists between pins). There is no input or output blocking capacitor.

4: High reverse isolation.. Typ S₁₂ = -48 dB at 500 MHz.

5: From 10-500 MHz, Power Output for 1 dB Comp = +24.5 dBm.

6: From 10-500 MHz, Power Output for 1 dB Comp = +26 dBm.

TO-8T/U (UTO MODELS)



DIMENSIONS IN INCHES
TOLERANCES: XX ± .02
XXX ± .010

CASE TYPE	DIM A
TO-8T	.210
TO-8U	.175

Technical drawings of the 100W 100MHz CW Amplifier showing dimensions and labels:

- Top View:** Shows the overall dimensions of 1.000 (height) and .820 (width). It includes labels for "RF INPUT", "RF OUTPUT", and a "PRODUCT MARKING AREA" (indicated by a dashed rectangle).
- Side View (Left):** Shows a height of .500 and a width of .460. The mounting hole offset is .310.
- Side View (Right):** Shows a height of .310 and a width of .460. It includes labels for "SMA JACK (FEMALE) (2) PL" and "DC INPUT". The distance from the DC input to the center of the SMA jacks is .350, and the distance between the SMA jacks is .100.
- Front View:** Shows a height of .810 and a width of .460. It includes labels for "2-56 UNC-2B x .15 DP THREADED INSERT (4) PL" and "GND". The distance from the bottom edge to the center of the threaded inserts is .095, and the distance between the inserts is .320.

DIMENSIONS IN INCHES
TOLERANCES: XX $\pm .02$
XXX $\times .010$

VOLTAGE CONTROLLED AMPLIFIERS

THIN-FILM VOLTAGE-CONTROLLED AMPLIFIERS

The AGC series combines a thin-film cascaded amplifier with a fast response attenuator. Models AGC-553 and 1053 incorporate monolithic gain stages. Used alone, they can be a complete AGC controlled IF amplifier in the 5 to 1000 MHz range. They may be

combined with other wideband amplifier modules such as the GPD, GPM, UTM or UTO series to produce a voltage controlled amplifier with any reasonable amount of gain and power output without degrading the frequency response of the cascade.

AGC SERIES

Guaranteed Specifications at 0° to 50° C Case Temperature

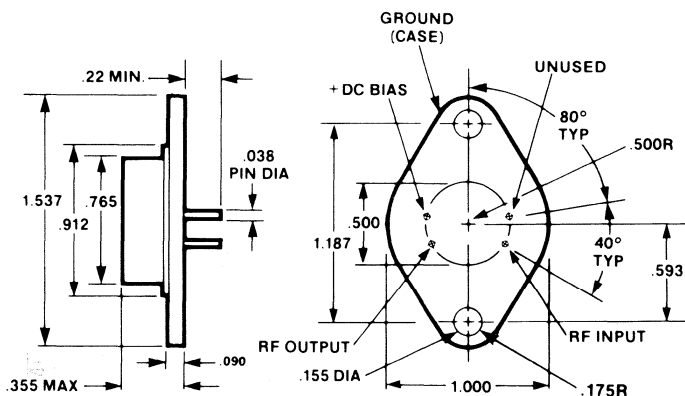
PC2

Model	Frequency Response (MHz)	Gain (dB) Typ./Min.	AGC Range (dB) Typ.	AGC Voltage Range (Volts)	AGC Current Range (mA)	Maximum Noise Figure (dB) Typ./Max.	Power Output at 1 dB Gain Compression (dBm) Minimum	Typical Response Time (μsec)	Bias Voltage (VDC)	Bias Current (mA)	Typical VSWR	Case Type
AGC-330	5-300	22/20	36	0 to 5	0 to 30	4.0/5.0	0	1.5	+15	25	<2.0	TO-3
AGC-553	10-500	44/40	45	0 to 5	0 to 12	6.0/8.0	-4	25	+15	50	<2.0	TO-8F
AGC-1053	10-1000	22/18	35	0 to 5	0 to 12	11.0/12.0	+5	25	+15	90	<2.0	TO-8F

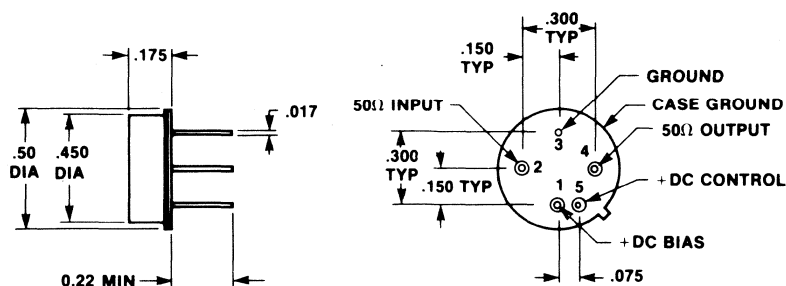
Note 1: At 0 AGC.

CASE DRAWINGS

TO-3



TO-8F



THIN-FILM LIMITING AMPLIFIERS

These devices amplify a wide range of weak input signals to the same, relatively constant (limited) output power level.

UTL SERIES THIN-FILM LIMITING AMPLIFIERS

Guaranteed Specifications @ 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz)	Input Power Limiting Range (dBm)	Saturated Output Power (dBm)	Output Power Flatness (dB)	Noise Figure (dB)	Operating Bias (Vdc)	Case Type
		Minimum	Minimum	Maximum	Maximum		
UTL-502	5-500	-10 to +7	-4.0	±0.5	11.0	+15, -15	TO-8F
UTL-503	5-500	-11 to +7	-4.0	±1.0	10.0	+15	TO-8F
UDL-502	5-500	-33 to +7	-4.0	±0.5	11.0	+15, -15	DIP
UDL-503	5-500	-33 to +10	-2.0	±1.0	10.0	+15	DIP

PPL-504, PLANARPAK™, SURFACE MOUNTED LIMITING AMPLIFIER

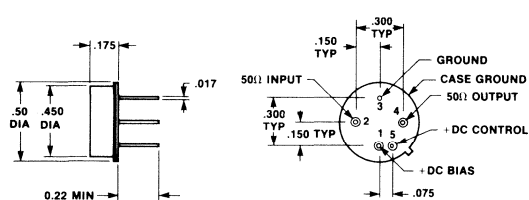
Guaranteed Specifications @ 0° to 50° C Case Temperature

PC2

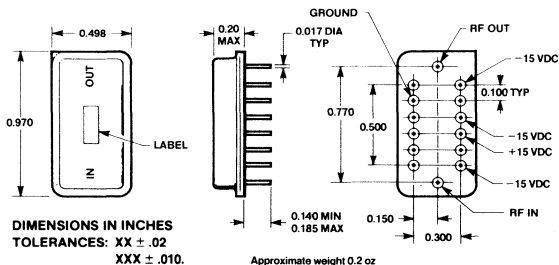
Model	Frequency Range (MHz)	Input Power Limiting Range (dBm)	Saturated Output Power (dBm)	Output Power Flatness (dB)	Noise Figure (dB)	Operating Bias (Vdc)	Case Type
		Minimum	Minimum	Maximum	Maximum		
PPL-504	10-1000	-25 to +10	-4.0	±0.8	10.0	+15	PP-48

CASE DRAWINGS

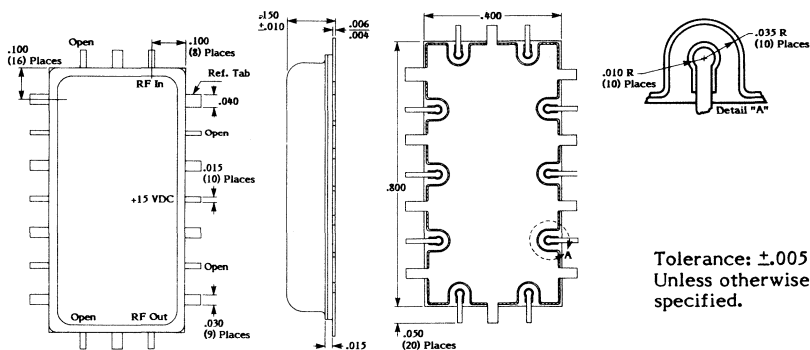
TO-8F



DIP



PP-48



Note: Leads are for testing only and may be trimmed flush at time of installation.

WIDE FREQUENCY RANGE OSCILLATORS

COMMERCIAL YIG-TUNED OSCILLATORS

Avantek AV Series of YIG-tuned fundamental transistor oscillators are designed for wideband applications in receivers and instruments where tuning linearity, phase noise and spectral purity are crucial. They make ideal

local oscillators for frequency-agile receivers and spectrum analyzers, and are excellent as signal sources for microwave sweep generators and synthesizers.

AV-7000 SERIES COMMERCIAL YIG-TUNED OSCILLATORS

Guaranteed Specifications @ 0 to +65°C Case Temperature

PC6

Model Number	Frequency Range (GHz)	Power Output @ 25°C (dBm) Minimum	Power Variation (dB) Maximum	Frequency Drift over Temperature (MHz) Maximum	Second Harmonic Below Carrier @ 25°C (dBc), Min.	Case Type
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NARROW BAND OSCILLATORS

AV-7224-2	3.7-4.2	+20	2	10	20	C-45
AV-7443-2	5.4-5.9	+20	2	20	20	C-45
AV-7443-3	5.9-6.5	+20	2	20	20	C-45
AV-7443-4	7.2-7.8	+20	2	20	20	C-45
AV-74010-2	7.9-8.4	+16	2	20	20	C-45
AV-74010-3	8.5-9.6	+16	2	20	20	C-45
AV-74010-4	9.5-10.5	+16	2	20	20	C-45
AV-7872-3	10.7-11.7	+20	2	25	20	M4-45
AV-71261-2	11.7-12.7	+19	2	40	20	M3-60
AV-71261-3	12.7-13.2	+19	2	40	20	M3-60
AV-71261-4	14.0-14.5	+19	2	40	20	M3-60

OCTAVE BAND OSCILLATORS

AV-7104	1.0-2.2	+16	3	10	15	A-45
AV-7203	2-4	+14	3	10	12	A-45
AV-7204	2-4	+16	3	10	20	B-45
AV-7224	2-4	+20	3	10	12	C-45
AV-7238-2	2.6-5.2	+17	6	20	20	C-45
AV-7403	4-8	+13	6	20	12	C-38
AV-7453	4-8	+17	6	20	12	C-38
AV-7443	4-8	+20	6	20	12	C-45
AV-77011	7-11	+17.8	6	25	12	M4-45
AV-7871	8-12.4	+14.8	6	25	12	M4-45
AV-7872	8-12.4	+17.8	6	25	12	M4-45
AV-7873	8-12.4	+20	6	25	12	M4-45
AV-71241	12-18	+13	6	40	12	M3-45
AV-71251	12-18	+16	6	40	12	M3-60
AV-71261	12-18	+19	6	40	12	M3-60

MULTI-OCTAVE BAND OSCILLATORS

AV-70502	0.5-2	+14.8	6	10	12	M1-45
AV-7124	1-4	+14.8	6	10	12	C-45
AV-7236	2-6	+13	6	15	12	A-45
AV-7238	2-8	+14.8	6	20	12	C-45
AV-7288	2-8	+20	6	20	8	C-45
AV-72010	2-10	+14	6	20	8	C-45
AV-74010	4-10	+16	6	20	12	C-45
AV-76018	6-18	+14.8	8	40	10	M3-60
AV-77016	7-16	+17	6	40	12	M4-45
AV-78318	8-18	+10	6	40	12	M3-45
AV-78218	8-18	+14.8	6	40	12	M3-45
AV-78518	8-18	+17	6	40	12	M3-60
AV-78020	8-20	+13	8	40	12	M3-60
AV-71220	12-20	+16	6	40	15	M3-60

WIDEBAND OSCILLATOR

AV-74018	4-18	+17	6	40	10	M3-60
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AV-7000 COMMERCIAL YIG-TUNED OSCILLATORS, Continued

Model Number	Frequency Range (GHz)	Power Output @ 25° C (dBm) Minimum	Power Variation (dB) Maximum	Frequency Drift over Temperature (MHz) Maximum	Second Harmonic Below Carrier @ 25° C (dBc), Min.	Case Type
MILLIMETER BAND OSCILLATORS						
AV-71826	18-26.5	+13	6	60	—	M5-60
AV-718226	18-26.5	+16	6	60	—	M5-60
AV-26040M	26.5-40	+10	6	60	—	M5-45
AV-26040W	26.5-40	+10	6	60	—	M5-45WR28
AV-26240M	26.5-40	+13	4	60	—	M5-60
AV-26240W	26.5-40	+13	4	60	—	M5-60WR28
AV-33050W	33-50	+7	6	60	—	M5-45WR22

PC6

Model Number	Frequency Range (GHz)	Power Output @ 25° C (dBm) Min.	Power Variation (dB) Max.	Frequency Drift over Temperature (MHz) Max.	Second Harmonic @ 25° C Below Carrier (dBc), Min.	Phase Noise dBc/Hz @ 20 kHz	Case Type
OCTAVE BAND OSCILLATORS WITH GUARANTEED PHASE NOISE							
AV-7443-8	4-8	+20	6	20	12	-95	C-45
AV-7872-8	8-12.4	+17.8	6	25	12	-80	M4-45
AV-71261-8	12-18	+19	6	40	12	-80	M3-60

MULTI-OCTAVE BAND OSCILLATORS WITH GUARANTEED PHASE NOISE

AV-7236-8	2-6	+13	6	15	12	-105	A-45
AV-7238-8	2-8	+14.8	6	20	12	-95	C-45
AV-76018-8	6-18	+14.8	8	40	10	-75	M3-60
AV-78518-8	8-18	+17	6	40	12	-80	M3-60

LOW NOISE BIPOLAR OSCILLATORS

AV-7298	2-8	+14.8	6	20	12	108	C-45
AV-12018	12-18	+16	6	40	20	100	M3-60
AV-76318	6-18	+16	6	40	10	100	M3-60
AV-78012	8-12.4	+17.8	6	25	12	105	M4-45
AV-78718	8-18	+16	6	40	15	100	M3-60

Model Number	Frequency Range (GHz)	Power Output @ 25° C (dBm) Min.	Power Variation (dB) Max.	Frequency Drift over Temperature (MHz) Max.	Second Harmonic @ 25° C Below Carrier (dBc), Min.	Case Type
OCTAVE BAND LOW HARMONIC OSCILLATORS						
AV-7104-9	1.0-2.2	+16	3	10	20	A-45
AV-7224-9	2-4	+20	3	10	20	C-45
AV-7403-9	4-8	+13	6	20	20	C-38
AV-7453-9	4-8	+16	6	20	20	C-38
AV-7443-9	4-8	+17.8	6	20	20	C-45
AV-7871-9	8-12.4	+14.8	6	25	20	M4-45
AV-7872-9	8-12.4	+17.8	6	20	20	M4-45
AV-7873-9	8-12.4	+20	6	25	20	M4-45
AV-71241-9	12-18	+13	6	40	20	M3-45
AV-71251-9	12-18	+14.8	6	40	20	M3-60
AV-71261-9	12-18	+17	6	40	20	M3-60

MULTI-OCTAVE BAND LOW HARMONIC OSCILLATORS

AV-7238-9	2-8	+14.8	6	20	20	C-45
AV-78020-9	8-20	+13	8	40	20	M3-60

YIG-TUNED OSCILLATOR WITH TRACKING YIG FILTER, AV-7248

Guaranteed Specifications @ 0 to +65°C Case Temperature

PC6

Model	Frequency Range (GHz)	Power Output @ 25° C (dBm) Minimum	Power Output Variation (dB) Maximum	Frequency Drift over Temperature (MHz) Maximum	Second Harmonic @ 25° C Below Carrier (dBc), Min.	Case Type
AV-7248	2-8	+14.8	6	20	40	F1

YIG TUNED OSCILLATORS, EXTENDED TEMPERATURE RANGE

Avantek AV Series YIG-tuned transistor fundamental oscillators (with extended temperature ranges) are extremely compact and lightweight, yet are designed and manufactured to offer excellent performance and high MTBF's over the -54° to +85°C temperature range. They meet the environmental conditions of MIL-E-5400 and MIL-E-16400.

This family of YTO's offers complete 1 to 18 GHz frequency coverage and they are ideal for systems requiring signal sources with moderate power levels, excellent tuning linearity, low spurious outputs and a flat power out vs. frequency characteristic

AV-7000 SERIES EXTENDED TEMPERATURE RANGE OSCILLATORS

Guaranteed Specifications -54° to +85°C Case Temperature

PC6

Model	Frequency Range (GHz)	Power Output Over Temp. & Freq. (dBm)		Frequency Drift over Temperature (MHz)	Second Harmonic Below Carrier (dBc), Min.	Case Type
		Minimum	Maximum	Maximum		
NARROW BAND OSCILLATORS						
AV-7278-5	5.4-5.9	+16	+23	30	12	M4-45
AV-7278-6	5.9-6.5	+16	+23	30	12	M4-45
AV-77116-3	7.9-8.4	+17.8	+24	30	12	M4-45
AV-77116-4	8.5-9.6	+17.8	+24	30	12	M4-45
AV-77116-5	9.5-10.5	+17.8	+24	30	12	M4-45
AV-77116-6	14.0-14.5	+16	+23	40	20	M4-45

OCTAVE BAND OSCILLATORS

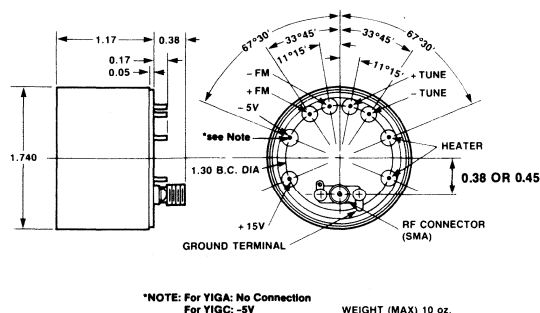
AV-7214	2-4	+17	+23	20	12	M4-45
AV-7278-4	2.6-5.2	+16	+23	30	10	M4-45
AV-7413	4-8	+8	+20	40	12	M2-38
AV-7418	4-8	+14.8	+23	40	12	M4-45
AV-77111	7-11	+17	+24	40	12	M4-45
AV-7814	8-12.4	+13	+24	50	10	M3-60
AV-78112	8-12.4	+19	+24	40	12	M3-60
AV-72118	12-18	+16	+23	60	15	M3-60

MULTI-OCTAVE BAND OSCILLATORS

AV-7114	1-4	+13	+21	20	12	M1-45
AV-7246	2-6	+16	+23	30	8	M4-45
AV-7218	2-8	+5	+17	40	5	M2-38
AV-7278	2-8	+14.8	+23	40	8	M4-45
AV-76118	6-18	+13	+23	60	8	M3-60
AV-77116	7-16	+16	+24	50	12	M4-45
AV-78418	8-18	+13	+24	70	10	M3-45
AV-78618	8-18	+16	+24	60	10	M3-60

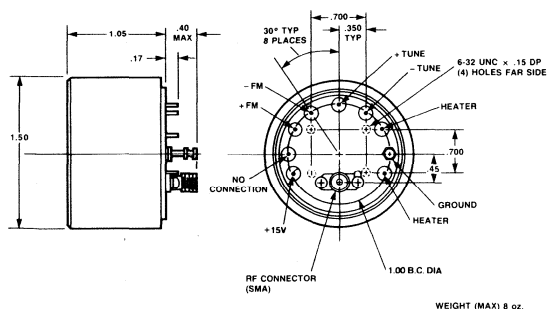
CASE DRAWINGS

A, B and C



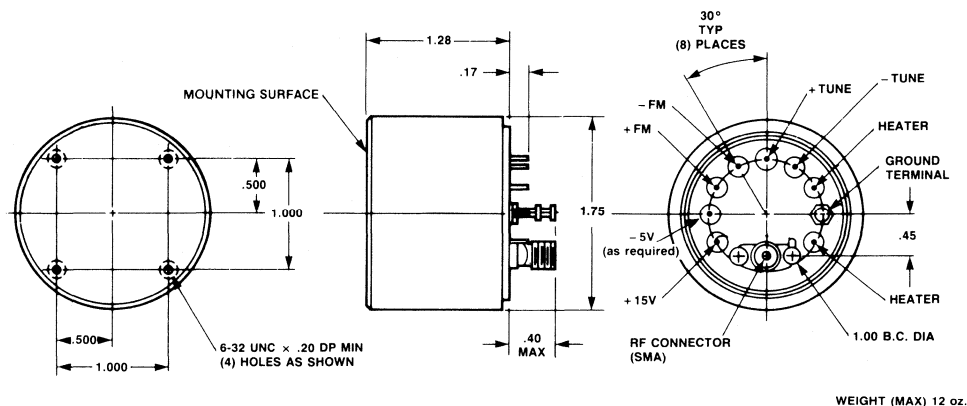
Note: Electrical connections vary between models.
See data sheet or Signal Sources Data Book for details.

M1-45

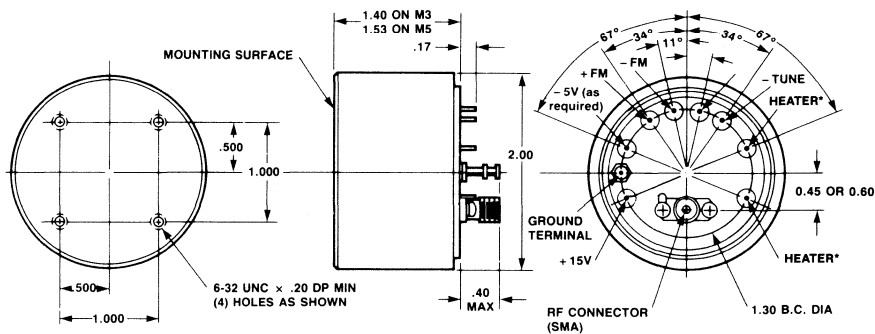


CASE DRAWINGS, continued

M4-45

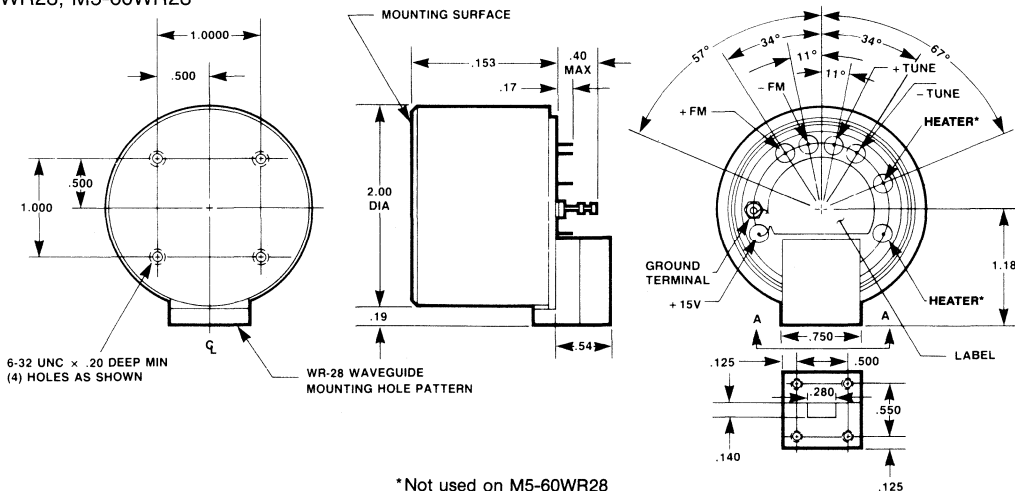


M3-45, M3-60, M5-45, M5-60



*Not used on M5-60

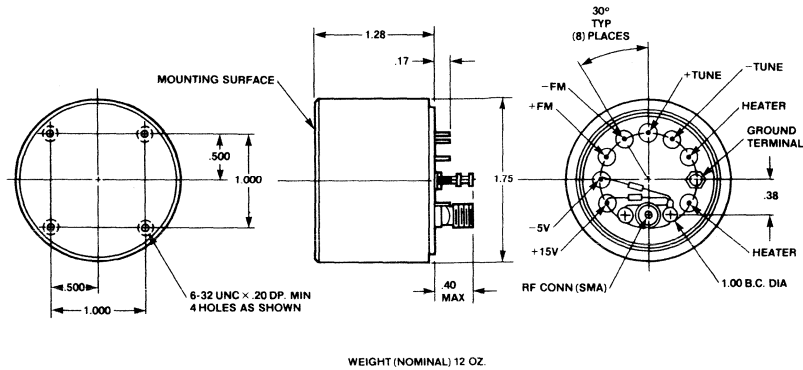
M5-45WR28, M5-60WR28



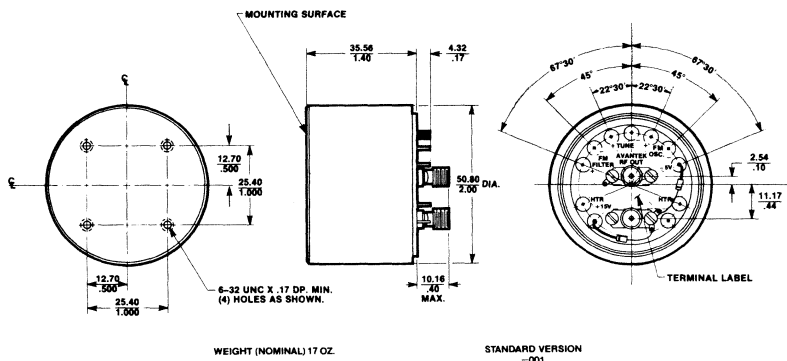
*Not used on M5-60WR28

CASE DRAWINGS

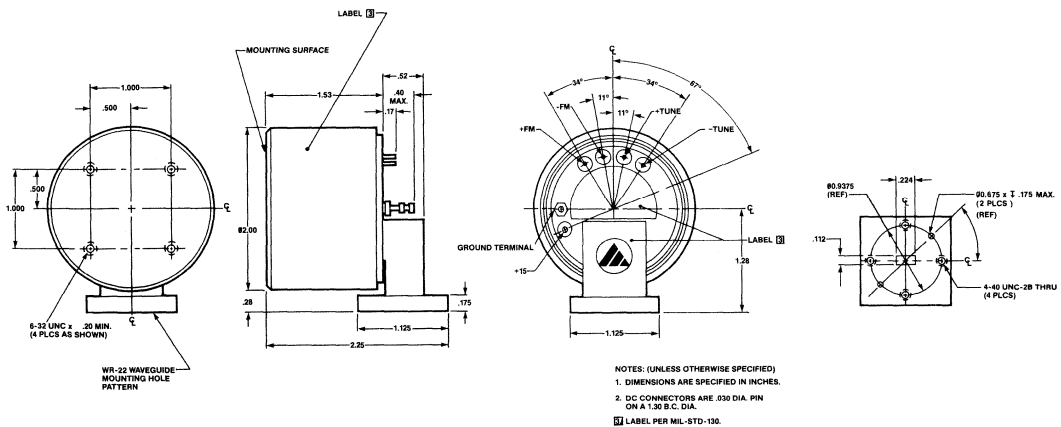
M2



F1



M5-45WR22



HYPERABRUPT VARACTOR TUNED OSCILLATORS, EXTENDED TEMPERATURE RANGE

Avantek HTO Series hyperabrupt varactor-tuned fundamental oscillators combine a negative-resistance transistor oscillator with a buffer amplifier in a compact, hermetically-welded TO-8 or AvanPak package. The frequency of oscillation is determined by a hyperabrupt varactor diode acting as a voltage-variable capacitor in a thin-film microstripline resonant circuit. As with conventional (or abrupt) varactor-tuned oscillators, this design provides extremely high tuning

rates, limited primarily by the internal impedance of the user-supplied tuning voltage source.

An integral buffer amplifier stage isolates the oscillator from variations in load impedance, minimizing frequency pulling while producing a full +10 dBm minimum output power level. This permits the HTO Series oscillator to be used without external amplifiers or isolators.

HTO SERIES

Guaranteed Specifications, -54° to +85° C Case Temperature

PC6

Model	Frequency Range (GHz)	Power Output Into 50 Ohms, Min. (dBm)	Power Output Variation Maximum (dB)	Tuning Voltage Limits		Input Bias Power ('1% Reg.)		Harmonics Typical (dBc)	Case Type
				+VDC Low Freq.	+VDC High Freq.	Voltage (VDC)	Current (mA) Maximum		
HTO-0900	0.9-1.6	+10	±2.5	3+2; -1	16±2	+15	50	-8	TO-8V
HTO-1000	1.0-2.0	+10	±2.5	2±1	15+5; -2	+15	55	-7	TO-8V
HTO-2000	2.0-4.0	+10	±2.5	1+2; -0.7	14±4	+15	100	-12	TO-8V
HTO-2600	2.6-5.2	+10	±2.5	1+2; -0.7	14±4	+15	100	-12	TO-8V
HTO-4000	4.0-8.0	+10	±2.5	1+2; -0.5	14±4	+15	100	-12	TO-8V
HTO-7500	7.5-11.0	+10	±2.5	1+2; -0.5	14±4	+15	100	-15	TO-8V
HTO-8000	8.0-12.4	+10	±2.5	2.5±1.5	17±3	+10+15	150	-20	OX-2
HTO-12000	12.4-18.0	+10	±2.5	2.5±1.5	17±3	+10+15	150	-20	OX-2

CASE DRAWINGS — See page 86 for TO-8V

DTO 2500, DIGITALLY TUNED VARACTOR TUNED OSCILLATOR ASSEMBLY

Guaranteed Specifications @ -54° to +85° C Case Temperature

PC6

Model	Frequency Range* (GHz)	Frequency Crossover (MHz)		Power Output* (dBm)		Linearity (MHz) Maximum	Harmonics (dBc) Minimum	Phase Noise 100 kHz from Carrier (dBc/Hz), Max.	Residual FM (kHz) Maximum	Settling Time* @ 2 μ seconds (MHz)	Post Tuning Drift* (MHz) Max.	Case Type
		Min.	Max.	Min.	Max.							
DTO-2500	2.5-6.5	0	160	+7	+15	±80	15	-73	100	2	2	IN-800469

Notes 1: Unit utilizes three oscillators to cover the frequency range.

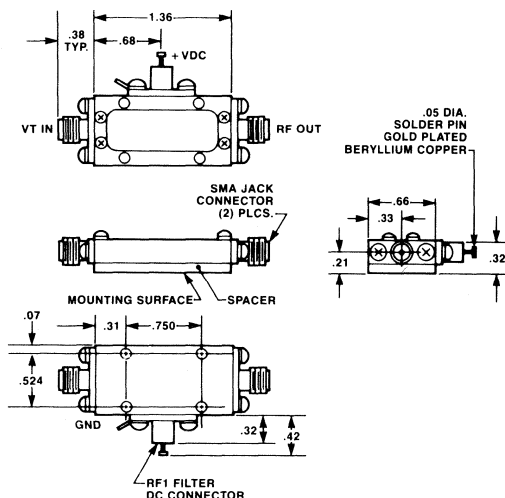
2: Unit provides dual output ports.

3: Measured at 1.0 millisecond from an input tuning command for a step from any inband frequency to any other inband frequency.

4: From 1.0 millisecond to 10 seconds.

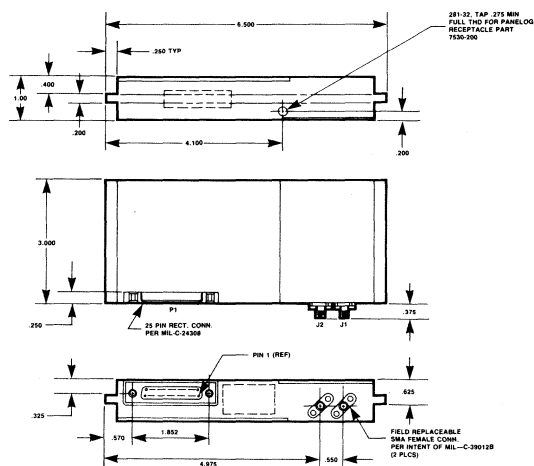
CASE DRAWINGS

OX 2



Note: Connectors are user removable for 50 ohm stripline use.

IN-800469



LINEARIZED VCO ASSEMBLIES

The Avantek® VCA Series of assemblies are ideal for wideband applications requiring extended temperature ranges. The units incorporate hyperabrupt voltage controlled oscillators with linearization circuits, voltage regulators, amplifiers and heaters in one rugged

package. Careful attention is paid in the integration process which yields excellent linearity, power flatness and residual FM characteristics under severe environments.

VCA SERIES

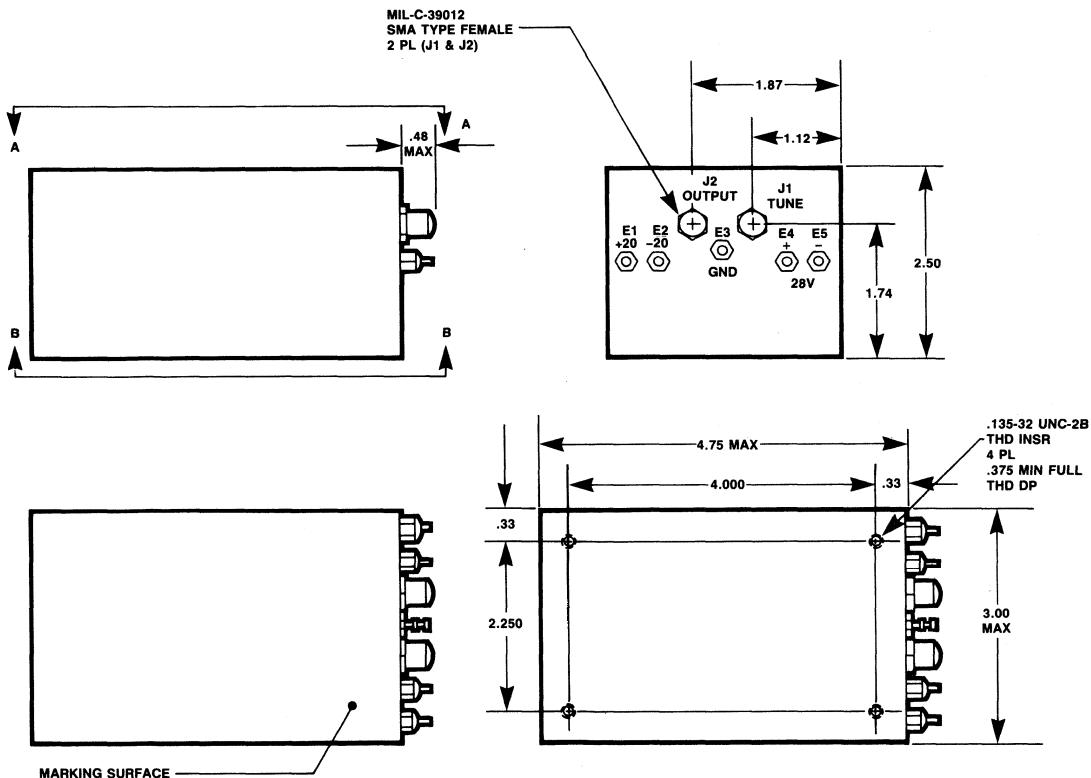
Guaranteed Specifications @ -54° to +85° C Case Temperature (Partial Listing)

PC6

Model No.	VCA-0850	VCA-8000	VCA-12000
Frequency Range (GHz)	.85-1.45	8-12.4	12.4-18
Power Output (min.) @ 50Ω	+15 dBm	+13 dBm	+13 dBm
Power Flatness (max.) @ 50Ω	±2 dB	±2 dB	±2 dB
Harmonics (min.)	20 dBc	20 dBc	20 dBc
Spurious (min.)	60 dBc	60 dBc	60 dBc
Residual FM (PK-PK, max.)	25 kHz	150 kHz	150 kHz
Load VSWR	1.5:1	1.5:1	1.5:1
Linearity	±1.0%	±1.0%	±1.0%
Mod. Sense Ratio	1.8:1	2.0:1	2.0:1
Operating Temperature	-54° to +85° C	-54° to +85° C	-54° to +85° C
Tuning Voltage	0 to +10 V	0 to +10 V	0 to +10 V
Input Power	+20 V @ 600 mA -20 V @ 250 mA +28 V @ 4.0 A (heater)	+20 V @ 600 mA -20 V @ 250 mA +28 V @ 4.0 A (heater)	+20 V @ 600 mA -20 V @ 250 mA +28 V @ 4.0 A (heater)
Modulation Bandwidth (Full Power)	1 MHz	1 MHz	1 MHz
Case Type	IN-842177	IN-842177	IN-842177

CASE DRAWING

IN-842177



YIG-TUNED OSCILLATORS WITH DIGITAL OR ANALOG DRIVERS

All Avantek YIG-tuned oscillators are now available with either digitally-tuned or analog voltage-tuned drivers. These drivers control the main tuning coil current via 12 bit digital logic or via an analog voltage, thus eliminating the need to build and align tuning current sources.

Both the digital and analog drivers are available in either commercial or extended temperature range

versions. The commercial version, used with Avantek's commercial YIG-tuned devices, is specified over 0° C to +65° C, while the extended temperature range version will meet all of the environmental specifications of Avantek's militarized YIG-tuned devices, including operation over the -54° C to +85° C temperature range.

DRIVER SELECTION GUIDE

Guaranteed Specifications¹ at 25° C Case Temperature (Operating Temperature per Device)

PC6

Specification	Analog Driver	Digital Driver
Tuning Range	0.000 volts at input corresponds to lowest frequency 10.000 volts at input corresponds to highest frequency	All zeros at input corresponds to lowest frequency All ones at input corresponds to highest frequency
Tuning Accuracy: at 25° C on baseplate, 1/2 hour after turn-on, excluding hysteresis and non-linearity	±(0.1% of frequency +2 MHz)	±(0.1% of frequency +2 MHz)
Resolution	NA	12 bit positive true logic for increasing frequency
Interface Logic	NA	TTL or CMOS
Tuning Input Resistance	≥10 Kohm	NA
Common Mode Rejection	≥40 dB	NA
Residual FM: (15 Hz-15 kHz bandwidth)	4x10 ⁻⁶ of oscillator frequency in hertz +40 kHz, typ.	4x10 ⁻⁶ of oscillator frequency in hertz +40 kHz, typ
Non-Linearity	Device specification applies	±(½ bit + device non-linearity)
Pushing: +15 Volts:	±(0.01% of frequency +1 MHz + oscillator pushing)/volt, typ.	±(0.001% of frequency +0.1 MHz + oscillator pushing)/volt, typ.
-15 Volts:	±(0.01% of frequency +1 MHz)/volt, typ.	±(0.001% of frequency +1 MHz)/volt, typ.
Power Supply Voltage:	±15 volts: ±5%	±15 volts: ±5%
Power Supply Current:		
+15 Volts:	Oscillator bias current + tuning current at max freq ² +30 mA	Oscillator bias current + tuning current at max freq ² +40 mA
-15 Volts:	(Current requirement of -5 volt of oscillator if present +30 mA)	(Current requirement of -5 volt of oscillator if present +40 mA)
Weight	Oscillator weight +12 oz.	Oscillator weight +13 oz.
Device Specifications That Do Not Apply	Main Tuning Coil Sensitivity Main Tuning Coil Input Impedance at 1 kHz Pushing Figure, -5 volts if used	Main Tuning Coil Sensitivity Main Tuning Coil Input Impedance at 1 kHz Pushing Figure, -5 volts if used

Notes 1: These specifications are in addition to the standard specifications for the basic YIG device to which the driver is coupled except as noted.

2: Tuning current at max freq is: $\frac{\text{Max freq (MHz)}}{\text{Sensitivity (MHz/mA)}} = \text{Max current (mA)}$

YIG-TUNED OSCILLATORS WITH DRIVERS

Guaranteed Specifications at 25°C Case Temperature (Operating Temperature per Device)

PC6

Model Number	Frequency (GHz)	Power Supply Current (mA), Max.		Residual FM (kHz, p-p) Typical	YTO Model	Case Type
		+15 V	-15 V			
COMMERCIAL OSCILLATORS WITH ANALOG DRIVERS (Partial Listing)						
AVD-7104	1-2.2	300	30	50	AV-7104	AD 1
AVD-7224	2-4	400	100	60	AV-7224	AD 1
AVD-7236	2-6	500	30	70	AV-7236	AD 1
AVD-7238	2-8	625	125	75	AV-7238	AD 1
AVD-7453	4-8	600	100	75	AV-7453	AD 1
AVD-74010	4-10	725	100	80	AV-74010	AD 1
AVD-7873	8-12.4	900	30	90	AV-7873	AD 2
AVD-78218	8-18	1200	30	120	AV-78218	AD 2
AVD-71261	12-18	1225	30	120	AV-71261	AD 2
AVD-71826	18-26.5	1075	30	150	AV-71826	AD 2

COMMERCIAL OSCILLATORS WITH DIGITAL DRIVERS (Partial Listing)

ADD-7104	1-2.2	300	40	50	AV-7104	DD 1
ADD-7224	2-4	400	100	60	AV-7224	DD 1
ADD-7236	2-6	525	40	70	AV-7236	DD 1
ADD-7238	2-8	650	125	75	AV-7238	DD 1
ADD-7453	4-8	600	100	75	AV-7453	DD 1
ADD-74010	4-10	750	100	80	AV-74010	DD 1
ADD-7873	8-12.4	925	40	90	AV-7873	DD 2
ADD-78218	8-18	1225	40	120	AV-78218	DD 2
ADD-71261	12-18	1250	40	120	AV-71261	DD 2
ADD-71826	18-26.5	1100	40	150	AV-71826	DD 2

MILITARY OSCILLATORS WITH ANALOG DRIVERS (Partial Listing)

AVD-7214	2-4	400	100	60	AV-7214	AD 2
AVD-7218	2-8	700	100	75	AV-7218	AD 2
AVD-7413	4-8	700	100	75	AV-7413	AD 2
AVD-7814	8-12.4	900	40	90	AV-7814	AD 2
AVD-78418	8-18	1225	40	120	AV-78418	AD 2
AVD-71214	12-18	1225	40	120	AV-71214	AD 2

MILITARY OSCILLATORS WITH DIGITAL DRIVERS (Partial Listing)

ADD-7214	2-4	400	125	60	AV-7214	DD 2
ADD-7218	2-8	725	125	75	AV-7218	DD 2
ADD-7413	4-8	725	125	75	AV-7413	DD 2
ADD-7814	8-12.4	925	50	90	AV-7814	DD 2
ADD-78418	8-18	1225	50	120	AV-78418	DD 2
ADD-71214	12-18	1225	50	120	AV-71214	DD 2

Notes 1: All other specifications are the same as the YTO model

2: The following specifications are typical for all AVD units:

a) Input Tuning Voltage (VDC): 0 to 10

b) Power Supply Voltage Sensitivity (MHz/V): 0.5 typical up to 8 GHz, 1 typical up to 18 GHz

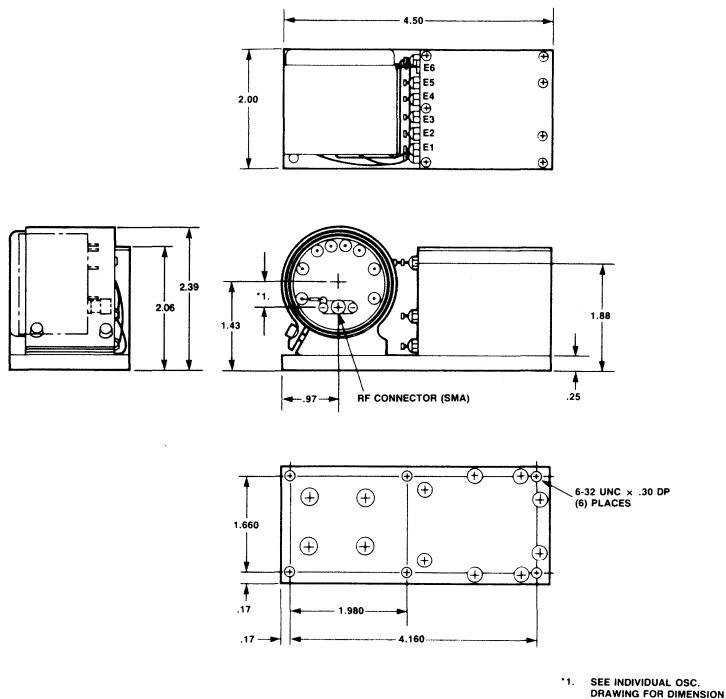
c) CMRR (dB): 40 typical

3: Frequency drift with temperature of the YTO/Driver Assembly will be no greater than that specified for the YTO model alone.

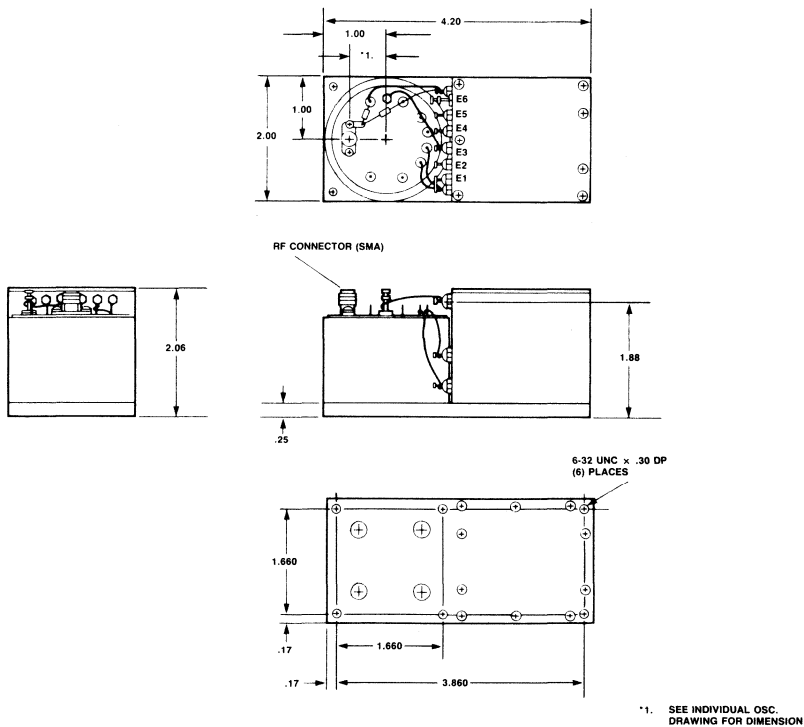
For applications requiring lower drift with temperature, contact factory.

CASE DRAWINGS

AD 1

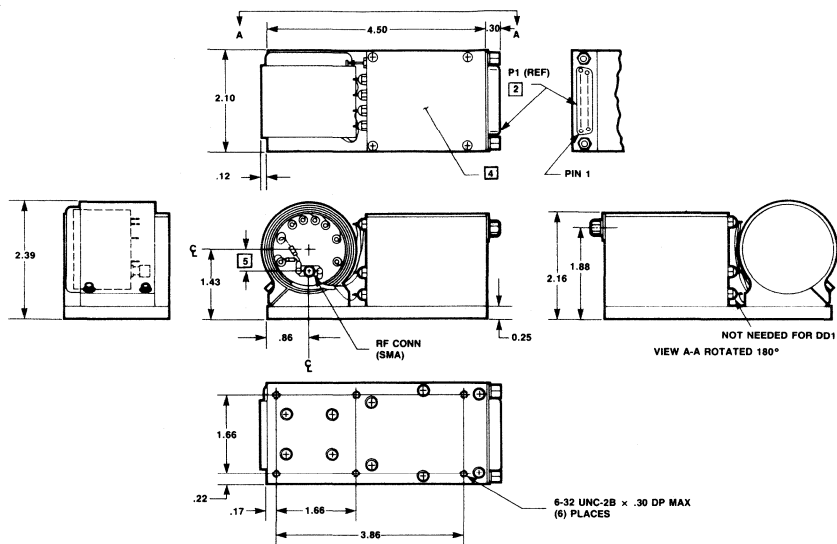


AD 2

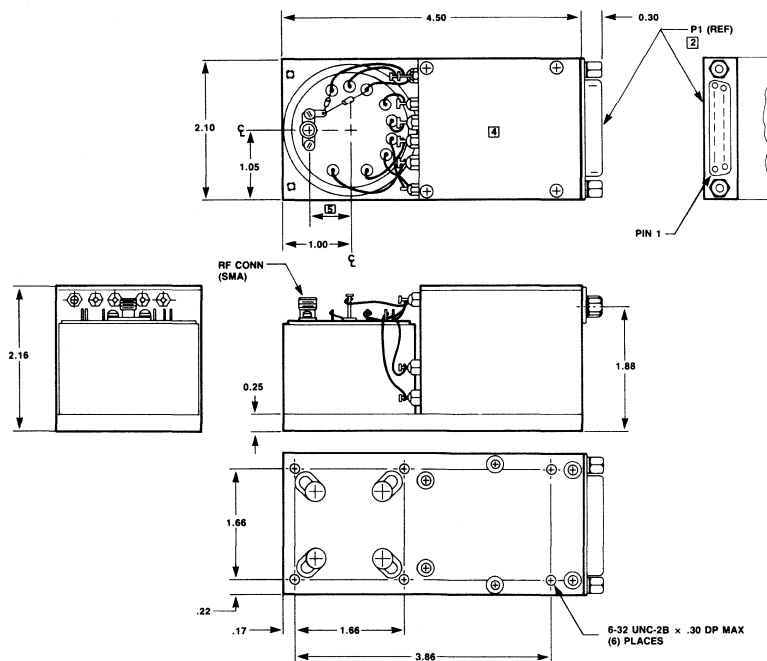


CASE DRAWINGS

DD 1



DD 2



LIMITED FREQUENCY RANGE VARACTOR-TUNED OSCILLATORS

COMMERCIAL VARACTOR TUNED OSCILLATORS

Avantek VTO-8000 Series oscillators use a silicon transistor chip as a negative resistance oscillator. The oscillation frequency is determined by a varactor diode acting as a voltage-variable capacitor in a thin-film microstripline resonator. This provides extremely fast tuning speed, limited primarily by the internal impedance of the user-supplied voltage driver.

A typical oscillator can be swept across its frequency band in less than one microsecond.

The VTO-8000 Series varactor-tuned oscillators are packaged in TO-8 transistor cans for simple installation in a conventional 50-Ohm microstripline PC board. They are ideal for the most compact, lightweight commercial and military equipment designs.

VTO-8000 SERIES

Guaranteed Specifications at 25° C Case Temperature (0 to 65° C Operating Temperature)

PC6

Model	Frequency Range (GHz)	Power Output Into 50 Ohms, Min. (dBm)	Power Output Variation Maximum (dB)	Tuning Voltage Limits (at each end of specified freq. range)		Input Power (±1% Reg.)		All Harmonics Typical (dBc)	Case Type
				+VDC @ Low Freq.	+VDC @ High Freq.	Voltage (VDC)	Current (mA) Maximum		
VTO-8030	0.3-0.45	+10	±1.5	5±4	50±10	+15	50	-15	TO-8V
VTO-8040	0.4-0.6	+13	±1.5	3±1	40±8	+15	50	-15	TO-8V
VTO-8060	0.6-1.0	+13	±1.5	3±1	40±8	+15	50	-15	TO-8V
VTO-8080	0.8-1.4	+13	±1.5	2±1.5	35±10	+15	50	-15	TO-8V
VTO-8090	0.9-1.6	+13	±1.5	2±1	48±8; -10	+15	50	-15	TO-8V
VTO-8100	1.0-1.4	+10	±1.5	2±1	48±8	+15	50	-15	TO-8V
VTO-8150	1.5-2.5	+10	±1.5	2.5±1	47±8	+15	50	-18	TO-8V
VTO-8200	2.0-3.0	+10	±1.5	2±2, -1	30±8	+15	50	-18	TO-8V
VTO-8240	2.4-3.7	+10	±1.5	2±2; -1	30±8	+15	50	-18	TO-8V
VTO-8300	3.0-3.5	+10	±1.5	3.5 min.	11 max.	+15	50	-18	TO-8V
VTO-8350	3.5-4.5	+10	±1.5	5 min.	35 max.	+15	50	-20	TO-8V
VTO-8360	3.6-4.3	+10	±1.5	8±2	24±4	+15	50	-25	TO-8V
VTO-8400	4.0-4.5	+10	±1.5	2 min.	14 max.	+15	50	-25	TO-8V
VTO-8420	4.2-5.0	+10	±1.5	7.5±2.5	25±2.5; -4	+15	50	-25	TO-8V
VTO-8430	4.3-5.8	+10	±1.5	5.5±2	24±3	+15	50	-25	TO-8V
VTO-8490	4.9-5.9	+10	±1.5	5.5±2	24±3; -4	+15	50	-25	TO-8V
VTO-8520	5.2-6.1	+10	±1.5	5.5±2	24±3	+15	50	-25	TO-8V
VTO-8540	5.4-5.9	+10	±1.5	8 min.	28 max.	+15	50	-15	TO-8V
VTO-8580	5.8-6.6	+7	±1.5	5±2.5	24±3; -5	+15	50	-25	TO-8V
VTO-8650	6.5-8.6	+10	±1.5	2±1	20±5	+15	100	-20	TO-8V
VTO-8790	7.9-10.1	+10	±2	3±2	26±4	+15	150	-10	TO-8V
VTO-8810	8.1-9.1	+10	±2	2 min.	16 max.	+15	100	-15	TO-8V
VTO-8850	8.5-9.6	+10	±1.5	5±2	13±5	+15	100	-25	TO-8V
VTO-8950	9.5-10.5	+10	±1.5	4±1	10 max.	+15	100	-20	TO-8V
VTO-81000	10.0-10.25	+10	±1.5	0 min.	15 max.	+15	100	-15	TO-8V

COMMERCIAL HYPERABRUPT VARACTOR TUNED OSCILLATORS

This family of oscillators is similar to the standard commercial VTO-8000 Series except for the incorporation of a silicon hyperabrupt varactor tuning diode. This enables the oscillator to be tuned over the

specified range in less than 20 volts rather than 40-50 volts in conventional oscillators. They feature extremely fast tuning speed, limited primarily by the internal impedance of the user-supplied voltage driver.

VTO-9000 SERIES

Guaranteed Specifications at 25° C Case Temperature (0° to 65° C Operating Temperature)

PC6

Model	Frequency Range (GHz)	Power Output Into 50 Ohms, Min. (dBm)	Power Output Variation Maximum (dB)	Tuning Voltage Limits (at each end of specified freq. range)		Input Power (±1% Reg.)		All Harmonics Typical (dBc)	Case Type
				+VDC @ Low Freq.	+VDC @ High Freq.	Voltage (VDC)	Current (mA) Maximum		
VTO-9032	0.32-0.64	+10	±2	0 min.	+20 max.	+15	50	-14	TO-8V
VTO-9050	0.5-0.9	+10	±2	0 min.	+20 max.	+15	50	-10	TO-8V
VTO-9068	0.68-1.36	+10	±2	0 min.	+20 max.	+15	50	-14	TO-8V
VTO-9090	0.9-1.6	+10	±2	+2 min.	+18 max.	+15	50	-14	TO-8V
VTO-9120	1.2-2.0	+10	±2	+2 min.	+14 max.	+15	50	-14	TO-8V
VTO-9130	1.3-2.3	+10	±1.5	+2 min.	+20 max.	+15	50	-15	TO-8V
VTO-9140	1.4-2.1	+10	±1.5	+4±2	+10±2	+15	50	-15	TO-8V

VARACTOR TUNED OSCILLATORS, EXTENDED TEMPERATURE RANGE

Avantek MTO-8000 Series oscillators are extended temperature range versions of the widely used VTO-8000 Series commercial varactor-tuned oscillators. They are designed, manufactured, tested and guaranteed to perform over the temperature range of -54° to +85°C. For applications demanding even higher reliability, screened units ("R" series) are

also available.

The MTO-8000 Series varactor-tuned oscillators are packaged in TO-8 transistor cans for simple installation in a conventional 50-Ohm microstripline PC board. They are ideal for the most compact, lightweight, commercial and military equipment designs.

MTO-8000 SERIES

Guaranteed Specifications, -54° to +85°C Case Temperature

PC6

Model	Frequency Range (MHz)	Power Output Into 50 Ohms, Min. (dBm)	Power Output Variation Maximum (dB)	Tuning Voltage Limits (at each end of specified freq. range):		Input Bias Power (±1% Reg.)		All Harmonics Typical (dBc)	Case Type
				+VDC @ Low Freq.	+VDC @ High Freq.	Voltage (VDC)	Current (mA) Maximum		
MTO-8040	400-600	+10	±2.5	3.5±1.5	38±8	+15	50	-10	TO-8V
MTO-8060	600-900	+10	±2.5	3±1	26±10; -8	+15	50	-12	TO-8V
MTO-8090	900-1500	+10	±2.5	2±1	30±10; -8	+15	50	-11	TO-8V
MTO-8240	2400-3700	+10	±2.0	2+2; -1	30±8	+15	50	-10	TO-8V
MTO-8360	3600-4300	+10	±2.0	8±2	24±4	+15	50	-22	TO-8V
MTO-8650	6500-8600	+10	±2.0	2±1	20±4	+15	100	-18	TO-8V
MTO-8950	9500-10500	+10	±2.5	4±1.5	10 max	+15	100	-20	TO-8V

CASE DRAWING— See page 85 for TO-8V.

CASE DRAWING— See page 85 for VTD.

BUFFERED VARACTOR TUNED OSCILLATORS

The VTD Series varactor-tuned oscillators with integral buffer amplifiers are packaged in a hermetic dual-in-line package 0.97 by 0.498 by 0.2 in., weighing less than 0.2 oz. The oscillator and buffer stages are fabricated on precision-finished alumina substrates using advanced thin-film technology and Avantek silicon transistor chips.

Internal buffering isolates the oscillator from variations in load impedance, minimizes frequency pulling while producing +13 dBm of output power. This permits the VTD to be used without external buffer amplifiers or wideband isolators. In addition, the combination of a lightly-loaded oscillator and a matched buffer provides

clean output signal with low harmonic content and a minimum of spurious signals.

The small size and mass of the VTD permits them to be maintained at their optimum operating temperature with a small, low power heater. This isolates the oscillator from variations in ambient temperature—minimizing frequency drift.

These units have the frequency agility, fast settling times and dependability required for ECM systems and can be qualified to MIL specifications. They are also ideal for many civilian applications including instrumentation, phase-locked local oscillators in receivers, and other communications equipment.

VTD SERIES

Guaranteed Specifications at 80°C ±5°C Case Temperature

PC6

Model	Frequency Range (GHz)	Power Output (dBm) Minimum	Output Power Variation (±dB) Maximum	Tuning Voltage Limits		Pushing Figure (MHz/V) Typical	Pulling Figure (3:1 VSWR) all phases (MHz) Maximum	All Harmonics (dBc) Maximum	Input Power (+1% regulation) Voltage (VDC)	Current (mA) Maximum	Case Type
				+VDC @ Low Freq.	+VDC @ High Freq.						
VTD-600	0.6-1.0	+13	1.5	3.0±1.0	40±8	6	2	-20	+12	125	VTD
VTD-2000	2.0-2.8	+13	2.0	4.5±1.5	25±3	6	2	-20	+12	125	VTD
VTD-2800	2.8-3.8	+13	2.0	4.5±1.5	25±3	6	2	-20	+12	125	VTD
VTD-3800	3.8-4.9	+13	2.0	4.5±1.5	25±3	10	3	-20	+12	125	VTD
VTD-4900	4.9-6.1	+13	2.0	4.5±1.5	25±3	10	5	-20	+12	125	VTD

LOW NOISE VARACTOR-TUNED OSCILLATOR

The Avantek® LNO-550 varactor-tuned oscillator has been designed specifically for low noise applications. The oscillator uses a silicon transistor chip along with a silicon abrupt tuning varactor in a thin-film microstrip circuit. This design provides extremely good noise performance under acoustic and vibration environments.

The LNO-550 is packaged in a hermetic TO-8 transistor can for simple installation in conventional 50-ohm microstripline PC boards. It is ideal for compact, light-weight military and commercial equipment designs.

LNO-550

Guaranteed Specifications @ -54° to +85° C Case Temperature

PC6

Model	Frequency Range (MHz) Minimum	Power Output (dBm) Minimum	Power Output Variation (dB) Maximum	Drift (MHz) Maximum	Second Harmonics (dBc) Minimum	Tuning Voltage (VDC)	Phase Noise 50 kHz from Carrier (dBc/Hz), Max.	Input Current @ +12 VDC (mA), Nom.	Case Type
LNO-550	550-775	+10	±2.5	20	-10	+2.5±1 to +17±3	-110	50	TO-8V

CASE DRAWINGS— See page 85 for TO-8V.

LOW NOISE VCO WITH TWO TUNING PORTS

The Avantek® LNO-8000 varactor tuned oscillator is specifically designed for low noise performance in the X-Band frequency range. It features a separate fine tuning port which is ideal for phase lock applications. The oscillator utilizes a silicon transistor chip along with two silicon abrupt diodes in a thin-film microstrip circuit.

This type of oscillator has comparable noise performance to Gunn oscillators currently in use with significant savings in input power consumption. The LNO-8000 is packaged in a hermetic low profile Avapack™ case and is available with or without RF connectors. It is well suited for military or commercial equipment where size, weight or noise performance is critical.

LNO-8000, LOW NOISE VCO with TWO TUNING PORTS

Guaranteed Specifications at -54° to +85° C Case Temperature

PC6

Frequency Range, Minimum	7.8-8.5 GHz
Output Power, Minimum	+10 dBm
Power Variation, Maximum	±2.5 dB
Drift, Maximum	150 MHz
Pulling @ 25° C, Maximum (12 dB Return Loss)	8 MHz
2nd Harmonics, Minimum	-15 dBc
Course Tuning Voltage	-2 to -20 VDC
Maximum Tuning Voltage	-25 VDC
Fine Tuning Voltage	+10±0.5 VDC
Course Tuning Modulation Sensitivity, Maximum	125 MHz/V
Fine Tuning Modulation Sensitivity @ 25° C, Maximum	4.5 to 6.5 MHz/V
Phase Noise	
10 kHz from Carrier, Typical	-72 dBc/Hz
100 kHz from Carrier, Maximum	-98 dBc/Hz
Typical	-100 dBc/Hz
1 MHz from Carrier, Typical	-128 dBc/Hz
Power Input	
+15 VDC, Nominal	100 mA
-15 VDC, Nominal	50 mA
Installation Drawing Number	IN-029186

The Avantek SO80-1506 varactor-tuned transistor oscillator is specifically designed to offer performance, reliability and economy as a voltage variable or phase-

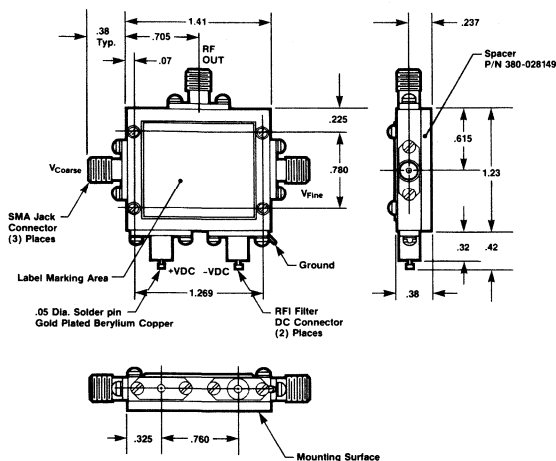
locked local oscillator in satellite earth station (TVRO) receivers. Covering the 3.6–4.2 GHz frequency band, the SO80-1506 may be used as a low-side LO for IFs in the 50 to 100 MHz range.

Guaranteed Performance at 25° C Case Temperature

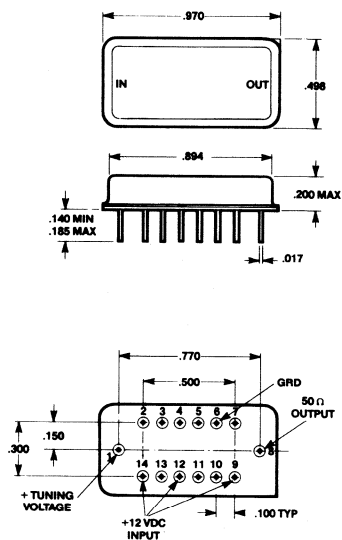
PC6

Model	Frequency Range (GHz) Min.	Power Output (dBm) Minimum	Power Output Variation (dBm) Maximum	Tuning Voltage (VDC) @ 3.63 GHz @ 4.13 GHz		Input Current @ +15 DVC $\pm 1\%$ (mA) Maximum	Case Type
SO80-1506	3.63-4.13	+7	± 1.5	1-4	5.5-13	50	TO-8V

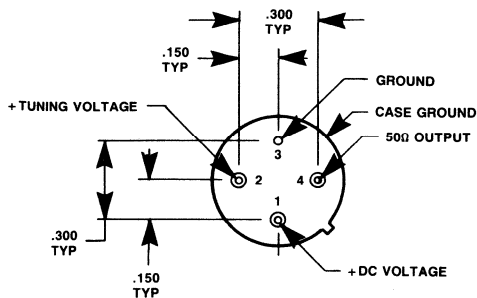
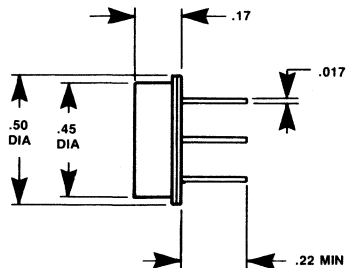
IN-029186



VTD PACKAGE



TO-8V



DIELECTRICALLY STABILIZED OSCILLATORS

The DSO series of dielectrically stabilized oscillators use high-Q dielectric resonators which produce highly stable low noise oscillators that operate over wide temperature ranges and in severe environmental conditions. They use much less power and have far fewer components than crystal oscillators. Their high Q provides good noise performance and they are less sus-

ceptible to vibration than cavity stabilized VCOs. Oscillator-to-load coupling is minimized by an internal buffer amplifier resulting in higher Q and minimum frequency pulling due to load variations. All Avantek DSOs are housed in hermetically sealed packages with or without SMA connectors.

DSO 1000 SERIES FIXED TUNED DSOs

Guaranteed Specifications at -54° to +85°C Case Temperature (Partial Listing)¹

PC6

Model	Fixed Frequency (GHz) ¹	Temperature Stability (PPM/°C), Max.	Power Output Into 50 Ohms (dBm), Min.	Input Bias Power (±1% Reg.)		Case Type ²
				Voltage (VDC)	Current (mA) Maximum	
DSO-1030	3.0	3	+10	+15	75	OD-40
DSO-1045	4.5	3	+10	+15	75	OD-50
DSO-1075	7.5	3	+10	+15	75	OD-20
DSO-1120	12.0	3	+10	+15	75	OD-10
DSO-1150	15.0	3	+10	+15	75	OD-10
DSO-1180	18.0	3	+10	+15	75	OD-10
DSO-1265	26.5	3	+7	+15	75	OD-10
DSO-1400	40.0	3	+7	+15	75	OD-70

Notes 1: The factory can set the frequency of these oscillators to any user specified frequency within the frequency range of 3.0 to 40.0 GHz.

2: Available in a connectorless package.

DSO 2000 SERIES MECHANICALLY TUNED DSOs

Guaranteed Specifications at -54° to +85°C Case Temperature (Partial Listing)¹

Model	Fixed Frequency (GHz) ¹	Temperature Stability (PPM/°C), Max.	Power Output Into 50 Ohms (dBm), Min.	Mechanical Tuning Range (MHz), Min.	Input Bias Power (±1% Reg.)		Case Type ²
					Voltage (VDC)	Current (mA) Maximum	
DSO-2030	3.0	5	+10	±10	+15	75	OD-42
DSO-2045	4.5	5	+10	±10	+15	75	OD-52
DSO-2075	7.5	5	+10	±25	+15	75	OD-22
DSO-2120	12.0	5	+10	±25	+15	75	OD-12
DSO-2180	18.0	5	+10	±25	+15	75	OD-12
DSO-2265	26.5	5	+7	±25	+15	100	OD-12

Notes 1: The factory can supply mechanically tuned DSOs at any frequency between 3.0 and 26.5 GHz.

2: Available in a connectorless package.

DSO 3000 SERIES ELECTRONICALLY TUNED DSOs

Guaranteed Specifications at -54° to +85°C Case Temperature (Partial Listing)¹

Model	Fixed Frequency (GHz)	Temperature Stability (PPM/°C), Max.	Power Output Into 50 Ohms (dBm), Min.	Electronic Tuning Range (MHz), Min. ²	Input Bias Power (±1% Reg.)		Case Type ²
					Voltage (VDC)	Current (mA) Maximum	
DSO-3030	3.0	5	+10	0.1%	+15	100	OD-41
DSO-3045	4.5	5	+10	0.1%	+15	100	OD-51
DSO-3075	7.5	5	+10	0.1%	+15	100	OD-21
DSO-3120	12.0	5	+10	0.1%	+15	100	OD-11
DSO-3180	18.0	5	+10	0.1%	+15	100	OD-11

Notes 1: The factory can supply electronically tuned DSO's at any frequency between 3.0 and 18.0 GHz.

2: Electronic tuning with a 0 to 20 volt input.

3: Also available in connectorless packages.

DSO-4000 SERIES ELECTRONICALLY AND MECHANICALLY TUNED DSOs

Guaranteed Specifications at -54° to +85° C Case Temperature (Partial Listing)¹

Model	Center Frequency (GHz) ¹	Temperature Stability (PPM/°C), Max.	Power Output Into 50 ohms (dBm), Min.	Mechanical Tuning Range (MHz), Min.	Electronic Tuning Range Min. ²	Input Bias Power (±1% Reg.)		Case Type
						Voltage (VDC)	Current (mA) Max.	
DSO-4030	3.0	5	+10	±10	0.1%	+15	100	OD-44
DSO-4045	4.5	5	+10	±10	0.1%	+15	100	OD-54
DSO-4075	7.5	5	+10	±25	0.1%	+15	100	OD-24
DSO-4120	12.0	5	+10	±25	0.1%	+15	100	OD-14
DSO-4180	18.0	5	+10	±25	0.1%	+15	100	OD-14

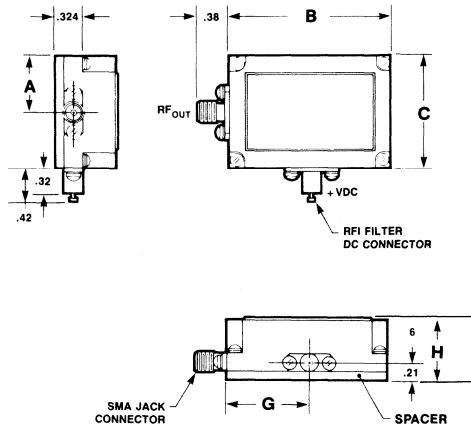
Notes 1: The factory can supply electronically/mechanically tuned DSO's at any frequency between 3.0 and 18.0 GHz.

2: Electronic tuning with a 0 to 20 volt input.

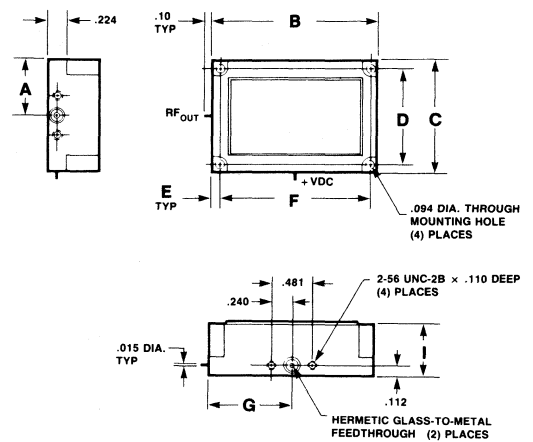
3: Also available in connectorless packages.

CASE DRAWINGS

OD-10/20/50



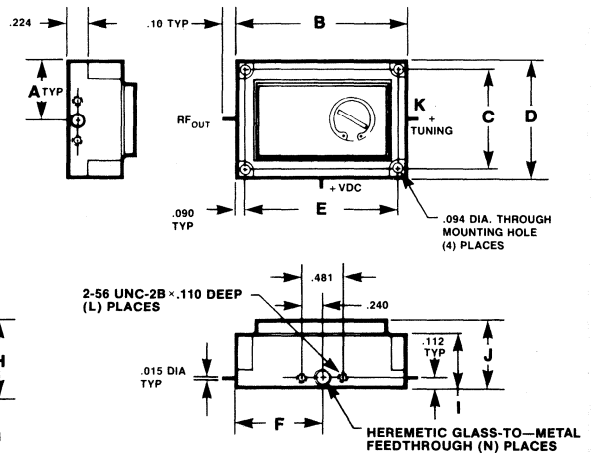
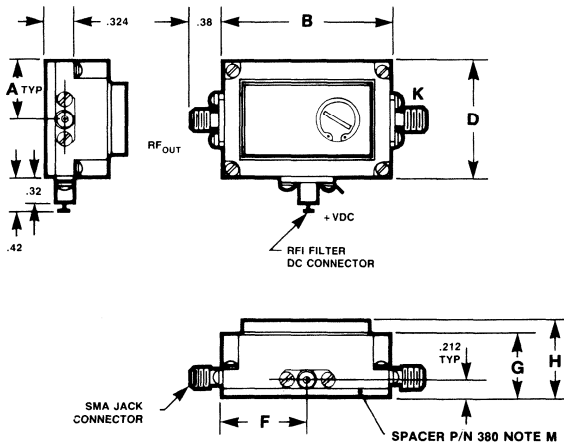
SMA PACKAGE



PIN PACKAGE

CASE TYPE	DIMENSION									SPACER J
	A	B	C	D	E	F	G	H	I	
OD-10	.530	1.63	1.06	.872	.094	1.442	.82	.59	.49	380-029135
OD-20	.675	1.98	1.35	1.17	.090	1.795	.99	.69	.59	380-028928
OD-50	.800	2.40	1.60	1.42	.090	2.22	1.20	.810	.710	—

OD-12/14/22/24/42/44/52/54



CASE TYPE	DIMENSION										NOTES			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
OD-12	.53	1.63	.872	1.06	1.442	.82	.60	.72	.50	.62	N.A.*	4	029135	2
OD-14	.53	1.63	.872	1.06	1.442	.82	.60	.72	.50	.62	TUNING	6	029135	3
OD-22	.675	1.98	1.17	1.35	1.795	.99	.70	.875	.60	.775	N.A.*	4	028928	2
OD-24	.675	1.98	1.17	1.35	1.795	.99	.70	.875	.60	.775	TUNING	6	028928	3
OD-42	1.00	2.50	1.82	2.00	2.32	1.25	.895	1.080	.795	.980	N.A.	4	—	2
OD-44	1.00	2.50	1.82	2.00	2.32	1.25	.895	1.080	.795	.980	TUNING	6	—	3
OD-52	.80	2.40	1.42	1.60	2.22	1.20	.805	.980	.705	.880	N.A.	4	—	2
OD-54	.80	2.40	1.42	1.60	2.22	1.20	.805	.980	.705	.880	TUNING	6	—	3

*No connection this side.

OD-23



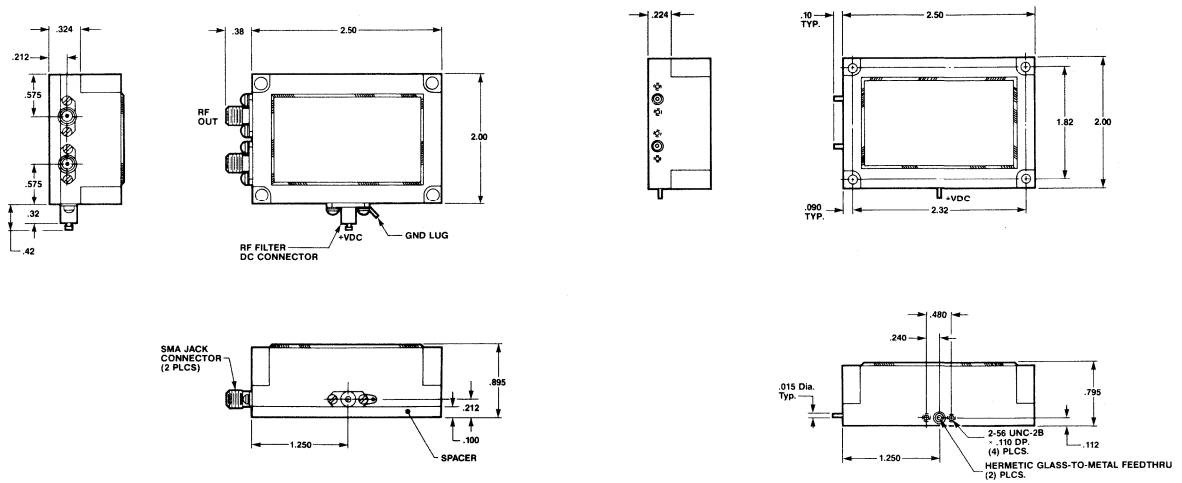
OD 11/21/41/51



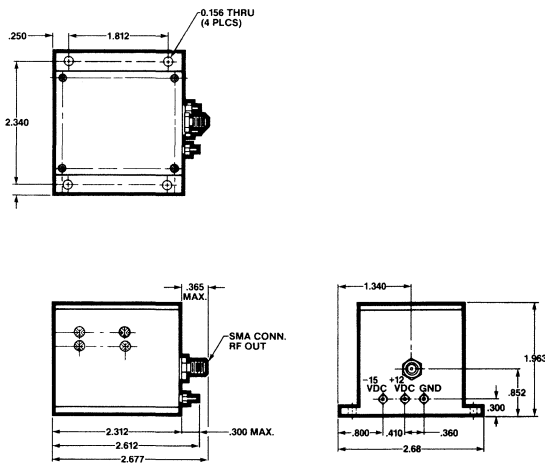
CASE TYPE	DIMENSION									SPACER
	A	B	C	D	E	F	G	H	I	
OD-11	.530	1.63	1.06	.872	.094	1.442	.82	.60	.49	380-029135
OD-21	.675	1.98	1.35	1.170	.090	1.795	.99	.70	.59	380-028928
OD-41	1.00	2.50	2.00	1.82	.090	2.32	1.25	.895	.795	—
OD-51	.80	2.40	1.60	1.42	.090	2.22	1.20	.805	.705	—

CASE DRAWINGS

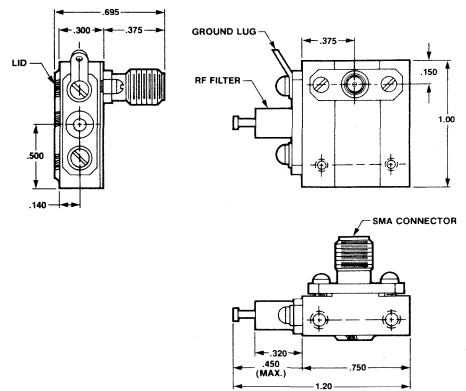
OD-40



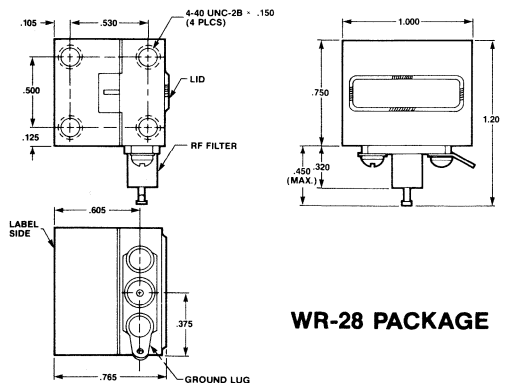
OD-60



OD-70

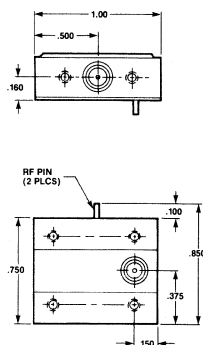
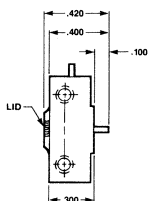


SMA PACKAGE



WR-28 PACKAGE

PIN PACKAGE



SILICON MMIC FREQUENCY CONVERTERS

SILICON MMIC FREQUENCY CONVERTERS

The MSF series is a family of silicon Monolithic Microwave Integrated Circuit (MMIC) frequency converters. These devices are optimized to simultaneously function as a self-oscillating LO and two-port active mixer with up or down conversion gain, or as a simple active mixer with a low-power injected LO at the input or output. They are ideally suited for very low cost or size constrained applications where adequate conversion gain flatness, LO-RF and LO-IF isolation or spurious signal rejection can be achieved using simple external filters.

The MSF-88XX series is designed for applications from 0.5 to 8.0 GHz. The MSF-86XX series is designed for applications from 0.1 to 2.0 GHz. Both MSF series are fabricated using a 10 GHz F_T silicon bipolar MMIC process that features sub-micrometer nitride self-alignment and ion-implantation to achieve excellent unit-unit uniformity. Biasing requires a fixed single polarity supply with an external current stabilizing resistor.

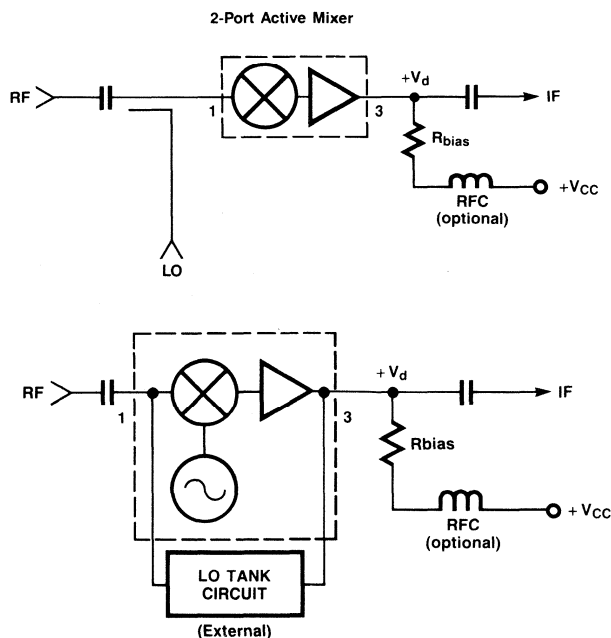
MSF Series

Typical Specifications @ 25°C Case Temperature

PC1

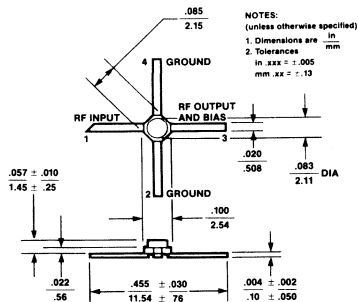
Part Number	RF Frequency (GHz)	RF-IF Conversion Gain (dB)	P _{1dB} (dBm)	Third Order Intercept Point (dBm)	Minimum Power Supply Voltage (V _{cc})	Device Voltage (V _d)	Device Current (I _d)	Case Type
-20 dBm RF Input at 4.2 GHz and L.O. at 5.15 GHz								
MSF-8835	4.2	9.0	9.0	16	10	7.5	35	micro-X
MSF-8870	4.2	9.0	9.0	16	10	7.5	35	70-mil hermetic
MSF-8885	4.2	8.5	9.0	16	10	7.5	35	85-mil plastic
-20 dBm RF Input at 1.575 GHz and L.O. at 1.4 GHz								
MSF-8635	1.575	8.5	-2.5	7	5	3.6	16	micro-X
MSF-8670	1.575	8.5	-2.5	7	5	3.6	16	70-mil hermetic
MSF-8685	1.575	8.0	-2.5	7	5	3.6	16	85-mil plastic

FUNCTIONAL BLOCK DIAGRAMS

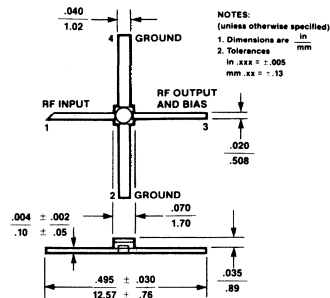


CASE DRAWINGS

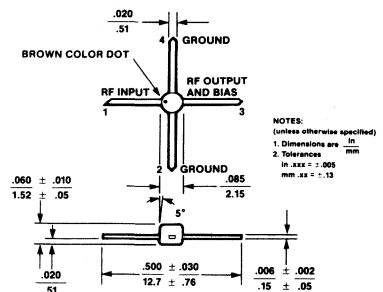
MICRO-X



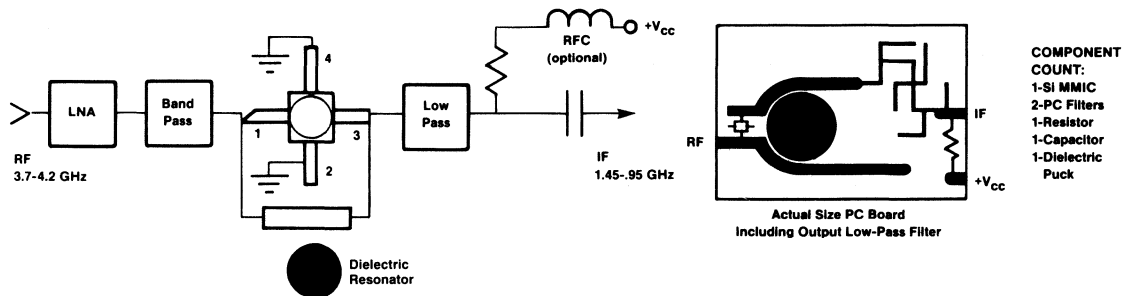
70 MIL STRIPLINE



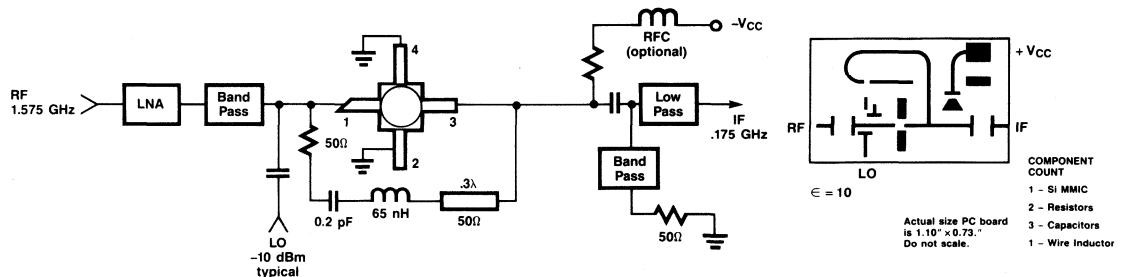
85 MIL PLASTIC



EXAMPLE OF TVRO BLOCK DOWN CONVERTER USING MSF-88XX SERIES— CONVERSION GAIN = $7.5 \pm .5$ dB FROM 3.7-4.2 GHz WITH SELF-OSCILLATING LO AT 5.15 GHz



EXAMPLE OF GPS DOWNCONVERTER USING MSF-86XX SERIES— CONVERSION GAIN = 9 dB AT 1.575 GHz WITH INJECTION-LOCKED SELF-OSCILLATING LO AT 1.273 GHz



NEW WIDEBAND THIN FILM DOUBLE & TRIPLE BALANCED CONNECTED MIXERS

The new Thin Film Mixer Series features RF/LO frequency ranges from 0.75 GHz to 26 GHz and IF ranges from DC to 10 GHz.

The TF Series of Mixers offers excellent gain and phase matching and tracking from unit-to-unit and lot-to-lot as well as superior stability over temperature. Conversion loss typically varies <0.5 dB from -55 to +100° C.

NEW THIN FILM MIXERS

Typical Specifications at 25° C Case Temperature

PC2

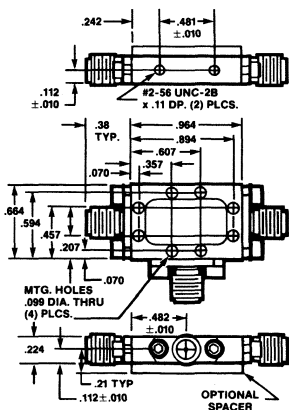
Model	Frequency Range		Conversion Loss (dB)	Isolation		RF Port VSWR	LO Port VSWR	Case Type
	RF & LO (GHz)	IF (GHz)		LO to RF (dB)	LO to IF (dB)			
TFX-72	2-7	DC-1.0	6.0	35	35	2.5:1	2.0:1	TFX/TFY
TFX-824	2-8	0.005-4.0	6.5	22	35	2.0:1	2.0:1	TFX/TFY
TFX-1221(P)	2-12	DC-1.0	6.5	25	25	2.5:1	2.0:1	TFX/TFY
TFX-158	8-15	DC-1.0	6.0	30	30	2.0:1	2.0:1	TFX/TFY
TFX-167	7-16	DC-4.0	6.5	30	20	2.5:1	2.0:1	TFX/TFY
TFX-184	4-18	DC-4.0	7.0	25	20	2.5:1	2.5:1	TFX/TFY
TFX-185	5-18	DC-5.0	6.5	25	20	2.5:1	2.5:1	TFX/TFY
TFX-186	6-18	DC-5.5	6.5	30	25	2.5:1	2.5:1	TFX/TFY
TFX-1866	6-18	0.05-6.0	7.5	25	30	2.0:1	2.0:1	TFX/TFY
TFX-1824	2-18	0.005-4.0	7.5	25	25	2.0:1	2.0:1	TFX/TFY
TFX-18210	2-18	1.0-10.0	7.5	25	30	2.0:1	2.0:1	TFX/TFY
TFX-18075	0.75-18.0	DC-0.5	10.0	25	20	2.7:1	2.5:1	TFX/TFY
TFW-18075D	0.75-18.0	DC-0.3	8.0	25	20	2.7:1	2.5:1	TFW
TFX-2021	2-20	DC-0.5	7.5	25	30	2.5:1	2.0:1	TFX/TFY
TFK-2621	2-26	DC-0.5	8.0	35	25	2.5:1	2.5:1	TFK

(P) Preliminary

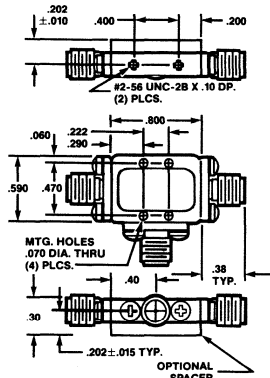
Note 1: Mixers are available for use with low-power (+7 to +13 dBm), medium power (+10 to +17 dBm), and high-power (+17 to +24 dBm) LOs. Models TFX-1866, TFX-824 and TFX-18210 have two diode quads each and operate only with medium (+10 to +17 dBm) and high-power (+13 to +20 dBm) LOs.

CASE DRAWINGS

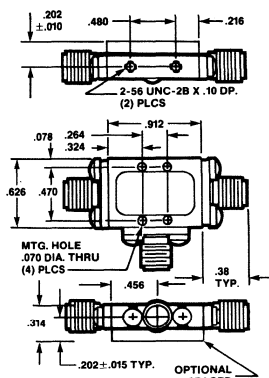
TFX



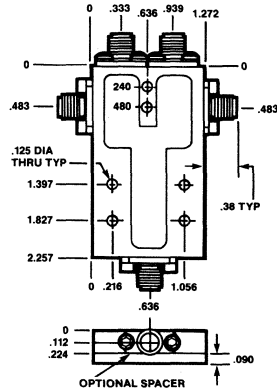
TFY



TFK



TFW



WIDEBAND DOUBLE BALANCED CONNECTED MIXERS

Covering the frequency range from 2 to 26.0 GHz, these Avanpak packaged mixers feature high isolation, relatively low conversion loss and good 50-ohm match (low VSWR) at all ports. DBX and DBY mixers are identical electrically except the DBYs are somewhat smaller for use where size is a critical factor.

Three versions of the basic mixers are available requiring nominal local oscillator drive levels, and providing two-tone, third-order input intercept points as follows:

L-suffix:

+7 dBm LO drive, +8 dBm intercept point

M-suffix:

+10 dBm LO drive, +13 dBm intercept point

H-suffix:

+20 dBm LO drive, +25 dBm intercept point

For new design, the TFX series of thin-film mixers, listed on page ___, is recommended.

AVANPAK™ DOUBLE BALANCED MIXER SELECTION GUIDE

Typical Specifications at 25° C Case Temperature

PC2

Model DBX/DBY	Frequency Range		Conversion Loss (dB)	Isolation		VSWR		Case Type
	RF & LO (GHz)	IF (GHz)		LO to RF (dB)	LO to IF (dB)	RF Port	LO Port	
3503M/H	.05-3.0 ¹	.001-3.0	8.0	30	35	2.0	2.0	DBX/DBY
72L/M/H	2-7	DC-1.3	6.0	35	25	2.5	1.7	DBX/DBY
824M/H	2-8	.005-4.0	6.5	25	30	2.0	2.0	DBX/DBY
1221L/M/H	2-12	DC-1.3	6.0	35	25	2.5	2.0	DBX/DBY
158L/M/H	8-15	DC-1.0	6.0	30	20	2.0	1.7	DBX/DBY
167L/M/H	7-16	DC-4.0	6.5	30	20	2.0	1.7	DBX/DBY
184L/M/H ²	4-18	DC-4.0	6.5	30	20	2.5	2.0	DBX/DBY
185L/M/H	5-18	DC-6.0	6.5	30	20	2.5	2.0	DBX/DBY
186L/M/H	6-18	DC-7.0	7.0	30	20	2.5	2.0	DBX/DBY
1824M/H	2-18	.005-4.0	7.0	25	30	2.5	2.0	DBX/DBY
18212M/H	2-18 ³	0.5-12	7.5	30	20	2.5	2.0	DBX/DBY

Notes 1: LO = .05-3.5 GHz.

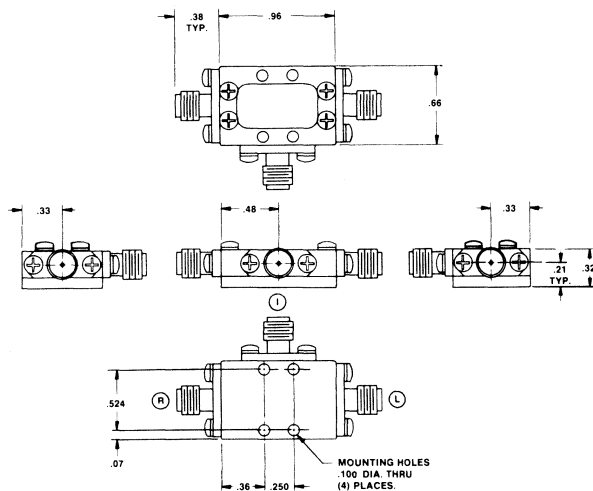
2: Also available with LS/MS/HS suffix with 30 dB typ LO to IF isolation & IF response to 1.5 GHz for swept frequency applications.

3: LO = 2-26 GHz.

CASE DRAWINGS

DBX

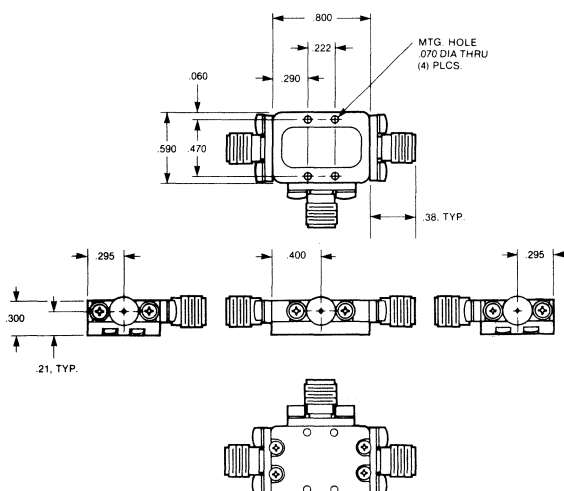
CASE (WITH CONNECTORS
AND BOTTOM SPACER PLATE)



Approx. Weight 22 grams (0.8 oz)

DBY

CASE (WITH CONNECTORS
AND BOTTOM SPACER PLATE)



Approx. Weight 16 grams (0.6 oz)

CONNECTED MIXER/PREAMPLIFIER COMBINATIONS

AVANPAK™ MIXER/PREAMPLIFIER SELECTION GUIDE

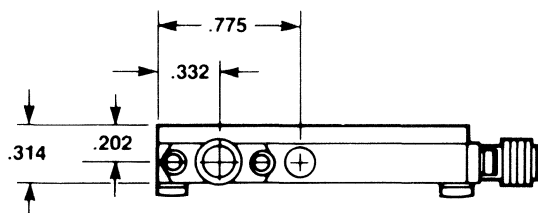
Guaranteed Specifications at 25° C Case Temperature

PC2

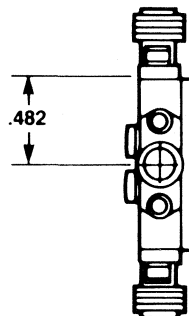
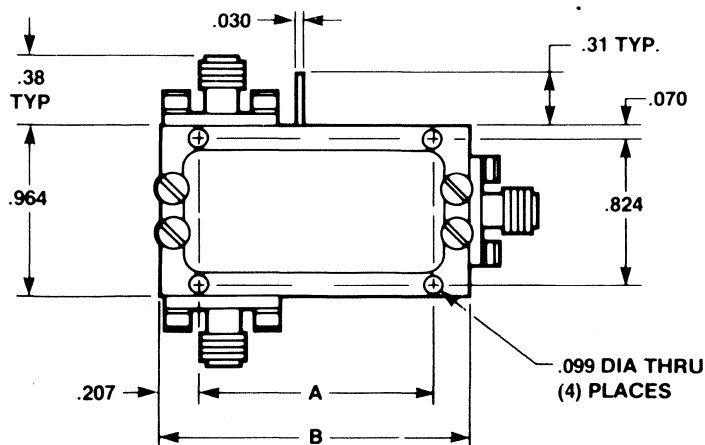
Model Number	Consisting of the Following Products	Frequency Range			RF-IF Gain (dB) Min.	Noise Figure (dB) Typ.	Power Output for 1 dB Gain Compression (dBm) Min.	DC Current (mA) Typ.	Case Type
		RF (GHz)	LO (GHz)	IF (MHz)					
MXA-2512	DBX-3503M, UTO-210, UTO-210	.5-2	.5-2	10-200	10	11	8	30	MA-3
MXA-3012	DBX-3503M, UTO-1012, UTO-1013	.05-3.0	.05-3.5	10-1000	22	10.5	7	50	MA-2
MXA-7202	TFX-72M, UTO-514, UTO-516	2-7	2-7	30-160	22	8.5	9	45	MA-2
MXA-7203	TFX-72M, UTO-514, UTO-519, UTO-509	2-7	2-7	30-160	33	8.5	20	135	MA-3
MXA-8203	TFX-1824, UTO-210, UTO-210, UTO-210	2-8	2-8	10-200	18	11.0	12	45	MA-3
MXA-10911	TFX-186M, UTO-222	9-10	9-10	70	20	9	19	50	MA-1
MXA-18422	TFX-184M, UTO-2012, UTO-2012	4-18	4-18	500-2000	9	11.5	12	100	MA-2
MXA-18423	TFX-184M, UTO-2012, UTO-2012, UTO-2013	4-18	4-18	500-2000	18	11.5	19	200	MA-3
MXA-18662	TFX-1866M, PPA-6232	6-18	8-16	2000-6000	9	12	12	150	MA-2
MXA-18803	TFX-1824, UTO-210, UTO-210	8-18	8-18	10-200	10	11.0	8	30	MA-3
MXA-18201	TFX-1824M, UTO-222	2-18	2-18	10-200	18	10.5	20	50	MA-1
MXA-18202	TFX-1824M, UTO-511, UTO-516	2-18	2-18	10-250	22	9.5	9	45	MA-2
MXA-18203	TFX-1824M, UTO-511, UTO-516, UTO-509	2-18	2-18	10-250	37	9.5	20	135	MA-3

CASE DRAWINGS

MA-X



CASE TYPE	DIM. A	DIM. B	TYPICAL WEIGHT
MA-1	.763	1.040	40 grams
MA-2	.956	1.370	50 grams
MA-3	1.286	1.700	60 grams



MODULAR DOUBLE BALANCED CONNECTORLESS MIXERS

UMX MIXER SELECTION GUIDE

Typical Specifications at 25° C Case Temperature

PC2

Model	Frequency Range RF & LO (MHz)	IF (MHz)	Conversion Loss (dB)	Isolation LO to RF (dB)	LO to IF (dB)	RF Port	VSWR	LO Port	Case Type
UMX-520	1-500	DC-500	6.0	55	45	1.7		2.5	TO-8M
UMX-570 ¹	1-500	DC-500	5.5	35	45	1.7		3.0	TO-8M
UMX-2020	10-2000	DC-1000	7.0	40	30	2.0		3.0	TO-8M
UMX-4220	3700-4200 ²	DC-1300	5.0	35	25	1.5		1.5	TO-8M

Notes 1: +27 dBm LO drive, +32 dBm intercept point.

2: LO = 2400-5500 MHz.

PPM-2515M, PLANARPAK™ SURFACE MOUNTED TRIPLE BALANCED MIXER

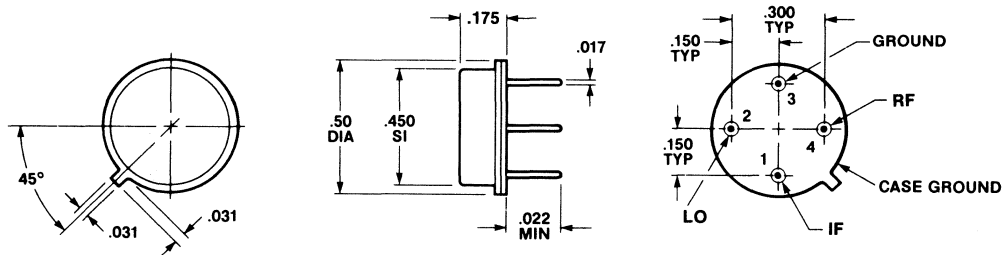
Typical Specifications @ 25° C Case Temperature

PC2

Model	Frequency Range (GHz) RF/LO	Frequency Range (GHz) IF	Conv. Loss (dB) Typical	ISOL. LO/RF Typical	LO/IF Typical	RF/IF	VSWR	LO	Case Type
PPM-2515M	.05-2.5	.001-1.5	7.6	35	35	1.5		2.5	PP-38M

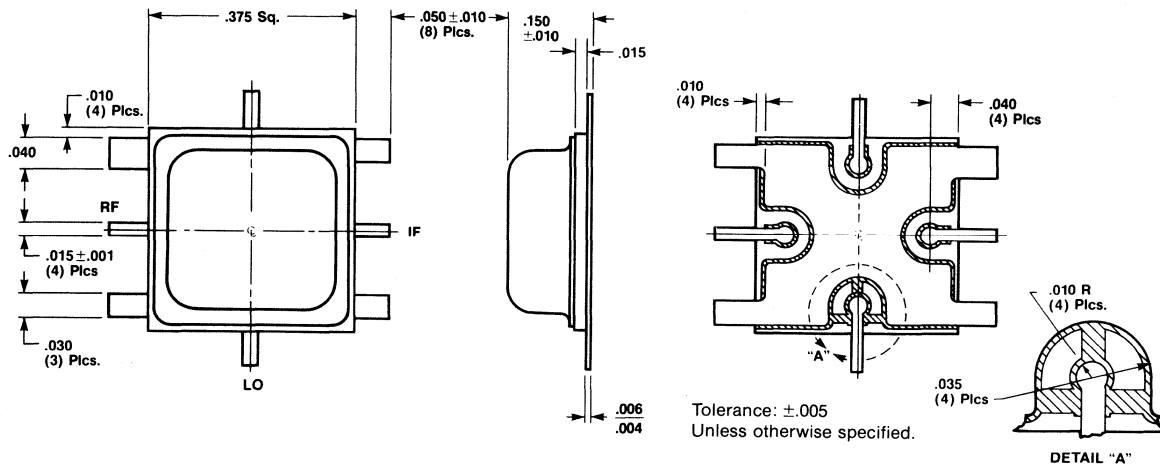
CASE DRAWINGS

TO-8M



Approximate weight .06 oz/2.1 grams

PP-38M



Note: Leads are for testing only and may be trimmed flush at time of installation.

WIDEBAND YIG-TUNED BANDPASS FILTERS

Avantek YIG filters offer performance equivalent to high-Q cavity resonators, but may be tuned over multi-octave frequency ranges by varying the current through their magnetic coils. They are available in two-, three- and four-sphere versions to offer a choice of skirt selectivity, off-resonance isolation and insertion loss

with all versions optimized to provide approximately maximally-flat phase response. Since they use the same basic magnetic circuit and tuning coils as the YIG-tuned oscillators, these YIG filters offer equivalent dynamic tuning characteristics to simplify the design of tracking oscillator/filter combinations.

MULTI-OCTAVE FILTERS

Guaranteed Specifications at 25° C Case Temperature (+10° to +60° C Operating Temperature)

PC6

Model	Frequency Range (GHz)	3 dB Bandwidth (MHz) Minimum	Insertion Loss (dB) Maximum	Off Resonance Isolation (dB) Minimum	Passband Ripple & Spurious (dB) Maximum	Case Type
2 to 8 GHz						
AFP-20821	2-8	25	3	45	2.0	FIL 1
AFP-30821	2-8	25	4	70	2.0	FIL 1
AFP-40821	2-8	20	5	80	2.0	FIL 1

8 to 18 GHz

AFP-21821	8-18	25	3	45	2.0	FIL 2
AFP-31821	8-18	25	5	70	2.5	FIL 2
AFP-41821	8-18	25	5	80	2.5	FIL 2

EXTENDED RANGE FILTERS

Guaranteed Specifications at 25° C Case Temperature (+10° to +60° C Operating Temperature)

PC6

1 to 18 GHz

AFP-21851	1-18	25	5	45	2.5	FIL 2
AFP-31851	1-18	20	7	70	2.5	FIL 2
AFP-41851	1-18	20	9	80	2.5	FIL 2

2 to 18 GHz

AFP-21841	2-18	25	4	45	2.5	FIL 2
AFP-31841	2-18	25	5	70	2.5	FIL 2
AFP-41841	2-18	20	8	80	2.5	FIL 2

2 to 26 GHz

AFP-12641	2-26	20	5	25	1.0	FIL 2
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MULTI-OCTAVE WIDE BANDWIDTH FILTERS

Guaranteed Specifications at 25° C Case Temperature (+10° to +60° C Operating Temperature)

PC6

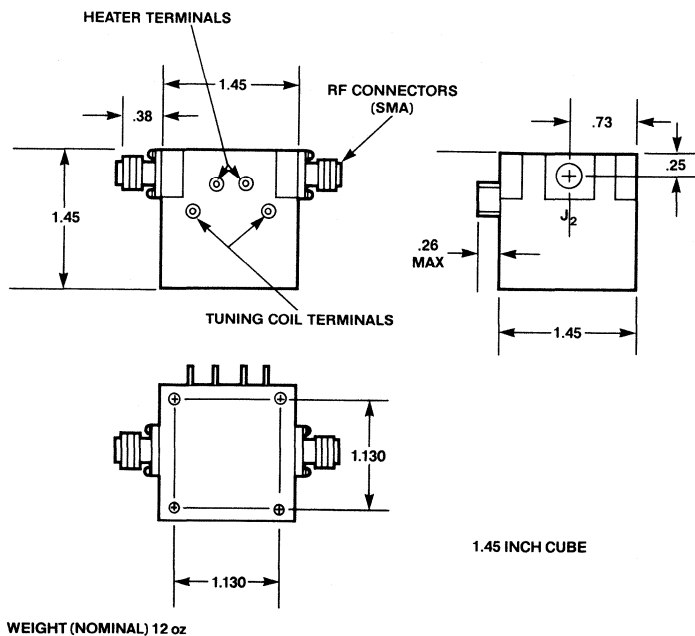
8 to 18 GHz

AFW-21821	8-18	250	4	45	2.0	FIL 2
AFW-31821	8-18	300	5	70	2.5	FIL 2
AFW-41821	8-18	400	7	80	2.5	FIL 2

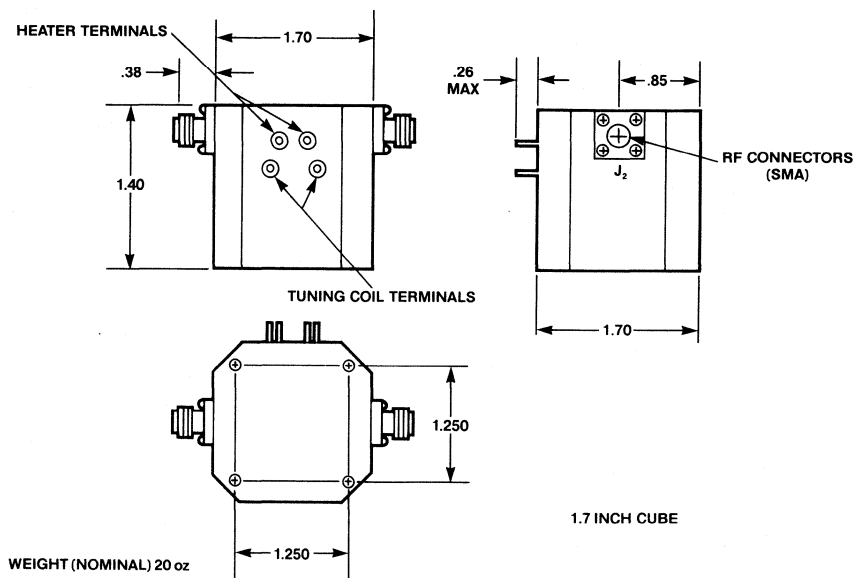
*3 dB bandwidths from 100 to 500 MHz are available on special order.

CASE DRAWINGS

FIL 1



FIL 2



YIG-TUNED BANDPASS FILTERS WITH ANALOG OR DIGITAL DRIVERS

DRIVER SELECTION GUIDE

Guaranteed Specifications at 25°C Case Temperature (Operating Temperature per Device)

PC6

Specification	Analog Driver	12 Bit Digital Driver
Tuning Range	0.000 volts at input corresponds to lowest frequency 10.000 volts at input corresponds to highest frequency	All zeroes at input corresponds to lowest frequency All ones at input corresponds to highest frequency
Tuning Accuracy: at 25°C on baseplate, 1/2 hour after turn-on, excluding hysteresis and non-linearity	±(0.08% of frequency + 2 MHz)	±(0.08% of frequency + 2 MHz)
Resolution	NA	12 bit positive true logic for increasing frequency
Interface Logic	NA	TTL or CMOS
Tuning Input Resistance	≥10 kohm	NA
Common Mode Rejection	≥40 dB	NA
Residual FM: (15 Hz-15 kHz bandwidth)	NA	NA
Non-Linearity:	Device specification applies	±(½ bit + device non-linearity)
Pushing: +15 Volts:	±(0.01% of frequency + 1 MHz)/volt, typ	±(0.001% of frequency + 0.1 MHz)/volt typical
-15 Volts:	±(0.01% of frequency + 1 MHz)/volt, typical	±(0.001% of frequency + 0.1 MHz)/volt, typical
Power Supply Voltage:	±15 volts: ±5%	±15 volts: ±5%
Power Supply Current:		
+15 Volts:	Tuning coil current at max frequency* + 30 mA	Filter coil current at max frequency + 40 mA
-15 Volts:	30 mA	40 mA
Weight	Filter weight + 10 oz.	Filter weight + 10 oz.
Device Specifications That Do Not Apply	Tuning Sensitivity Tuning Coil Resistance Tuning Coil Impedance	Tuning Sensitivity Tuning Coil Resistance Tuning Coil Impedance

Notes 1: Tuning current at max freq is: $\frac{\text{Max freq (MHz)}}{\text{Sensitivity (MHz/mA)}} = \text{Max current (mA)}$

2: These specifications are in addition to the standard specifications for the basic YIG device to which the driver is coupled except as noted.

YIG-TUNED FILTERS WITH DRIVERS

Guaranteed Specifications at 25°C Case Temperature (Operating Temperature per Drive)

PC6

Model Number	Frequency (GHz)	Off Resonance Isolation (dB)	Power Supply Current (mA), Maximum		YTF Model	Case Type
		Minimum	+15 V	-15 V		
FPD-20821	2-8	45	450	50	AFP-20821	FPD 1
FPD-30821	2-8	70	450	50	AFP-30821	FPD 1
FPD-40821	2-8	80	450	50	AFP-40821	FPD 1
FPD-21821	8-18	45	950	50	AFP-21821	FPD 2
FPD-31821	8-18	70	950	50	AFP-31821	FPD 2
FPD-41821	8-18	80	950	50	AFP-41821	FPD 2

EXTENDED RANGE COMMERCIAL FILTERS WITH ANALOG DRIVERS

FPD-21841	2-18	45	950	50	AFP-21841	FPD 2
FPD-31841	2-18	70	950	50	AFP-31841	FPD 2
FPD-41841	2-18	80	950	50	AFP-41841	FPD 2

MULTI-OCTAVE COMMERCIAL FILTERS WITH DIGITAL DRIVERS

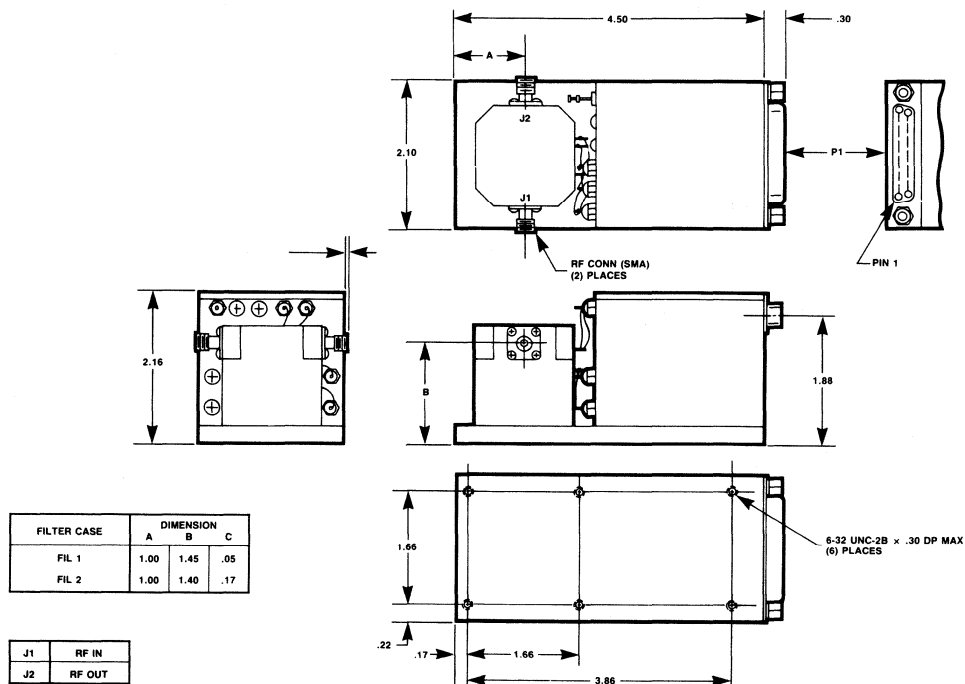
FDD-20821	2-8	45	450	50	AFP-20821	FDD 1
FDD-30821	2-8	70	450	50	AFP-30821	FDD 1
FDD-40821	2-8	80	450	50	AFP-40821	FDD 1
FDD-21821	8-18	45	950	50	AFP-21821	FDD 2
FDD-31821	8-18	70	950	50	AFP-31821	FDD 2
FDD-41821	8-18	80	950	50	AFP-41821	FDD 2

EXTENDED RANGE COMMERCIAL FILTERS WITH DIGITAL DRIVERS

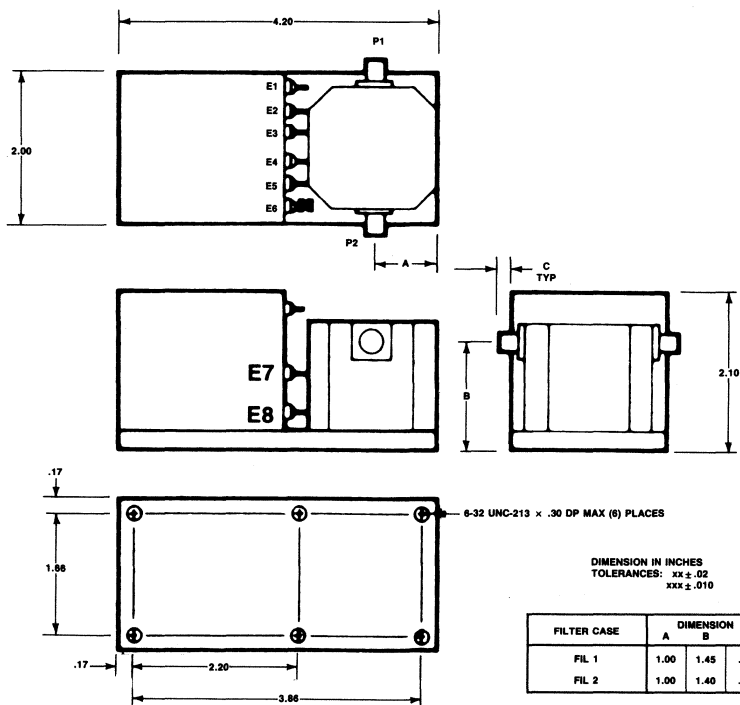
FDD-21841	2-18	45	950	50	AFP-21841	FDD 2
FDD-31841	2-18	70	950	50	AFP-31841	FDD 2
FDD-41841	2-18	80	450	50	AFP-41841	FDD 2

CASE DRAWINGS

FDD 1/2



FPD 1/2



VOLTAGE CONTROLLED ATTENUATORS

THIN-FILM ATTENUATORS

The UTF and PPF series thin-film, precision, broad-band voltage controlled attenuators are specifically designed to provide flexible gain control in a cascade of amplifiers. Installed near the input of a cascade they provide the widest control range while near the output

they provide the best noise figure. The consistent input and output impedance allows several modules to be cascaded for even wider attenuation range. Their long-term stability allows them to be used as trimmers to precisely match the performance of two or more amplifier cascades without frequent adjustment.

UTF Series Signal Attenuators

Guaranteed Specifications at 0° to 50° C Case Temperature¹

PC2

Model	Frequency Range (MHz)	Insertion Loss, Maximum (dB)	Attenuation Minimum (dB)	Typical Switching Speed 10 to 90%	VSWR Maximum	Control Power Typical	Input Power Typical	Case Type
UTF-015	5-1000	2.0, 5-500 MHz 2.5, 500-1000 MHz	15	.5 msec	2.0	0 to -10 VDC, 0 to 7 mA	+15 VDC, 7 mA	TO-8F
UTF-025	5-500	2.5	30	75 μ sec	2.0	0 to +15 VDC,	+15 VDC,	TO-8F
	5-1000	2.5	25	75 μ sec	2.0	0 to 7 mA	15 mA	
	5-2000	3.3	20	75 μ sec	2.5			
UTF-030	100-500	2.5	40	500 nsec	2.0	0 to +15 VDC	+15 VDC	TO-8F
	500-1000	3.0	35	500 nsec	2.0	0 to 10 mA	10 mA	
	1000-2000	3.5	25	500 nsec	2.0			
UTF-040	10-1000	2.0, 5-500 MHz	40, 30-250 MHz	.4 msec	2.0, 10-500 MHz	0 to -12 VDC,	+15 VDC,	TO-8F
		2.5, 500-1000 MHz	35, 10-500 MHz		2.5, 10-1000 MHz			
			30, 10-1000 MHz					

Note 1: The factory can guarantee operation over -55° to +105° C if required.

CASE DRAWING See page 104 for TO-8F.

PPF-030, PLANARPAK™ SURFACE MOUNTED ATTENUATOR

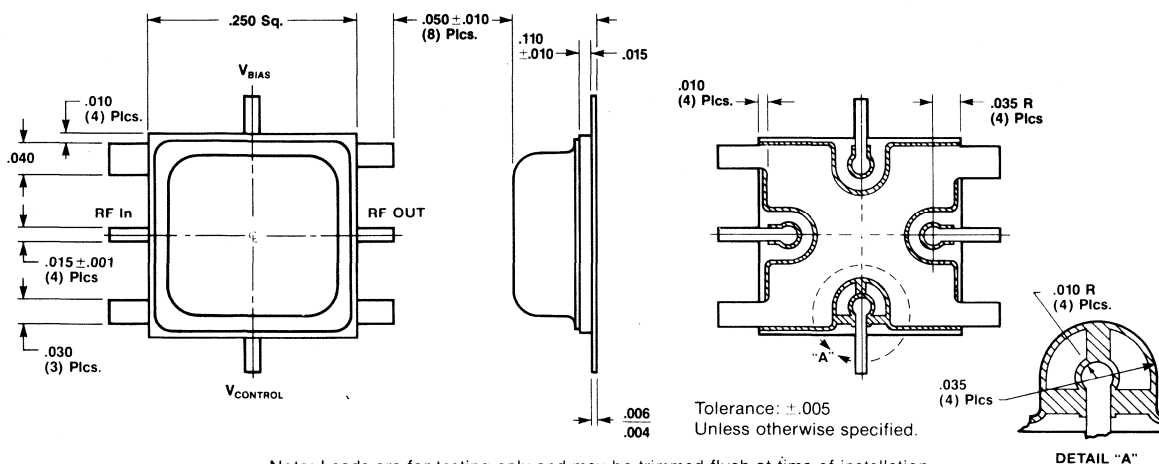
Guaranteed Specifications at 0 to +50° C Case Temperature

PC2

Model	Frequency Range (MHz)	Insertion Loss (dB) Maximum	Attenuation (dB) Minimum	VSWR (50 Ω) Maximum	Switching Speed (μ sec) Maximum	Control Voltage (V)	Case Type
PPF-030	100-500	2.5	40	2.0	1.0	0 to +15	PP-25F
	500-1000	3.0	35	2.0	1.0		
	1000-2000	3.5	25	2.0	1.0		

CASE DRAWING See page 104 for TO-8F.

PP-25F



Note: Leads are for testing only and may be trimmed flush at time of installation.

LIMITERS

THIN FILM POWER LIMITERS

Avanpak limiters are designed to provide passive protection against high peak and moderate CW power levels while maintaining low insertion loss and VSWR at normal operating levels. Two series are offered: one

for peak levels up to 200 watts (-0 series) and one for peak levels up to 1000 watts (-1 series). Both feature removable SMA connectors and laser welded hermetic cases.

AVANPAK THIN-FILM LIMITERS

Guaranteed Specifications @ 25° C Case Temperature (-55° to +85° C Operating Temperature)

PC2

Model	Frequency Range (GHz)	VSWR Maximum	Maximum Insertion Loss (dB) at Frequency (GHz)				Case Type
			2-4	4-8	8-12	12-18	
AHL-0402-0	2-4	1.8	1.0	—	—	—	AHL
AHL-0802-0	2-8	1.8	1.0	1.3	—	—	AHL
AHL-1202-0	2-12	1.8	1.0	1.3	1.8	—	AHL
AHL-1802-0	2-18	1.8	1.0	1.3	1.8	2.2	AHL
AHL-0402-1	2-4	1.8	1.4	—	—	—	AHL
AHL-0802-1	2-8	1.8	1.4	1.8	—	—	AHL
AHL-1202-1	2-12	1.8	1.4	1.8	2.2	—	AHL
AHL-1802-1	2-18	1.8	1.4	1.8	2.2	2.8	AHL

Notes 1: All specifications at -10 dBm power.

2: Case dimensions and weight are exclusive of connectors.

Additional Specifications which apply to all units

1: Limiting threshold +6 dBm, minimum, +10 dBm, typical.

2: Flat leakage: 100 mW maximum with 200 watts (-0 series) or 1000 watts (-1 series) peak; 1.0 microsecond pulse width; 0.1% duty cycle.

3: Spike leakage: 0.1 erg maximum with 20 nanosecond risetime pulses.

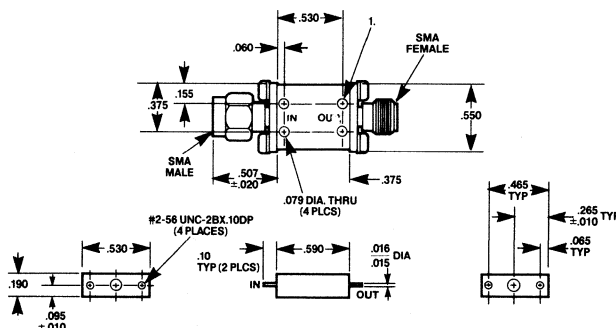
4: Maximum continuous input 2 Watts (-0 series), 4 watts (-1 series).

5: Recovery time: 100 nanoseconds Max (-0 series), 200 nanoseconds Max (-1 series).

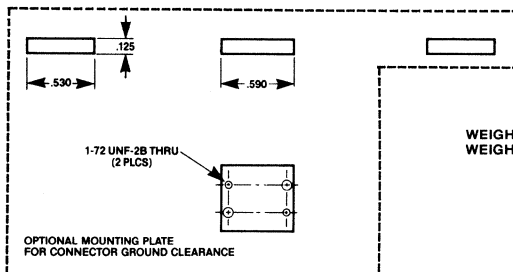
6: Case Weight: 5.0 grams (excluding connectors).

CASE DRAWING

AHL



CONNECTOR OPTION TABLE		
DASH NO.	INPUT	OUTPUT
-001	FEM	FEM
-002	NONE	NONE
-003	MALE	MALE
-004	MALE	FEM
-005	FEM	MALE



WEIGHT WITH CONNECTORS AND SPACER = 10.5 GRAMS
WEIGHT WITHOUT CONNECTORS AND SPACER = 5.0 GRAMS

NOTES (UNLESS OTHERWISE SPECIFIED)
DIMENSIONS IN INCHES
TOLERANCES: XX ± .02
XXX ± .010

UTL/GPL SERIES, VOLTAGE CONTROLLED SIGNAL LIMITERS

These thin-film limiters feature voltage programmable output levels with input levels as high as +26 dBm. They have VSWR of less than 2:1, low insertion loss,

excellent second and third harmonic suppression, and very low AM-to PM conversion. Recovery from fully saturated input levels is less than 50 nanoseconds.

Guaranteed Specifications @ 25°C Case Temperature

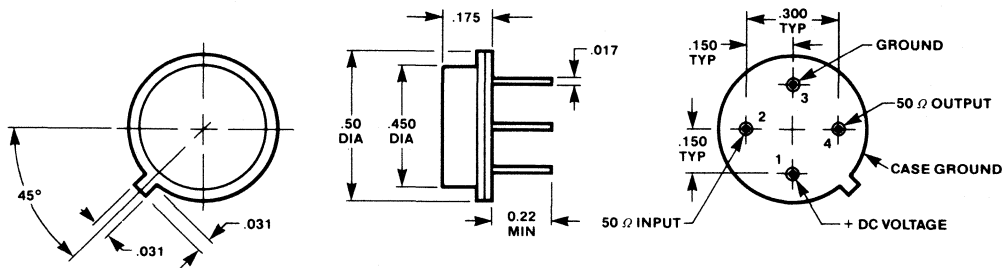
PC2

Model	Frequency Range (MHz)	Input Power Limiting Range (dBm) Minimum	Saturated Output Power (dBm) Maximum	Output Flatness (dB) Typical	Insertion Loss (dB) Maximum	Operating Bias (VAC) Nominal	Case Type
UTL-1001	50-1000	0 to +20	-10 to 0 ¹	±1.0	3.0	+5 to +20	TO-8U
UTL-1002	5-1000	0 to +20	-10 to 0 ¹	±1.0	3.0	+5 to +20	TO-8U
GPL-1001	5-1000	0 to +20	-4.0	±1.0	5.0	+15	TO-12

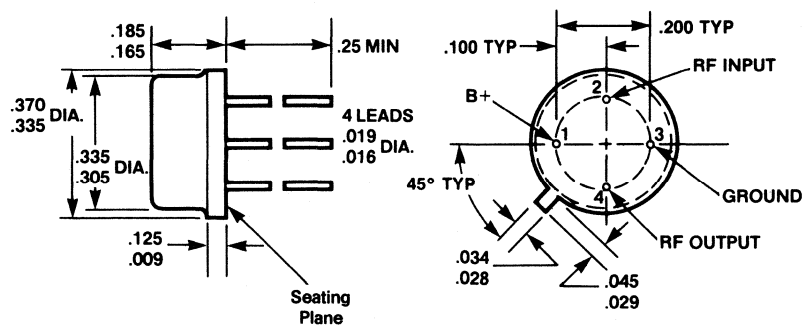
Note 1: Determined by bias voltage.

CASE DRAWINGS

TO-8U



TO-12



DIMENSIONS IN INCHES
TOLERANCES: XX ± .02
XXX ± .010

ANALOG AND DIGITAL DETECTORS

THIN-FILM DETECTORS

Avantek offers both analog and one bit digital detector products. All are temperature compensated and impedance matched to simplify power measurements.

Internal biased Schottky diodes and integral video circuitry provide a one part, drop in solution for the systems designer.

UTD SERIES, LEVEL DETECTORS

Guaranteed Specifications @ 25° C Case Temperature

PC2

Model	Frequency Range (MHz)	Detected Voltage at $P_{IN} = 10$ dBm (mV), Typ.	Flatness (dB), Max.	Tangential Sensitivity w/BW = 1 MHz (dB)	Input Impedance (Ohms)	Input VSWR Maximum	Output Offset Voltage (mV), Typ.	Differential Voltage Tracking (mV), Typ.	Case Type
UTD-1000	10-1000	-90	±1.0	-40	50	1.7:1	±15	±5	TO-8F
UTD-1001	10-1000	-90	±1.0	-40	300	—	±15	±5	TO-8F

PPD-2001, PLANARPAK™ SURFACE MOUNTED LEVEL DETECTOR

Guaranteed Specifications at 0° to 50° C Case Temperature

PC2

Model	Frequency Range (MHz)	VSWR (50:1) Maximum	Sensitivity (V/mW) Typical	Flatness (@ Input) (dB) Maximum	Video B/W (kHz) Typical	Power (VDC) Nominal	Case Type
PPD-2001	20-2000	1.8	.9	±.3	150	±15	PP-25DA

TTL COMPATIBLE THRESHOLD DETECTORS

The new threshold detectors feature voltage or resistance adjustable threshold level and TTL compatible

output. They are extremely compact parts for built-in-test applications.

Guaranteed Specifications at 25° C Case Temperature

PC2

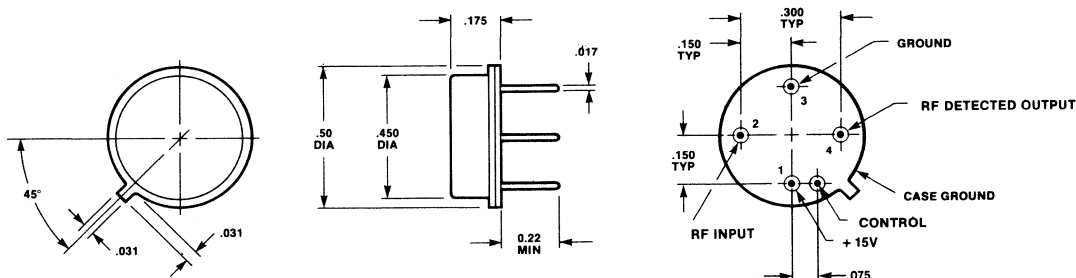
Model	Frequency Range (MHz)	Input Flatness ¹ (dB), Max.	Input Operating Range (dBm), Typ.	Input VSWR Max.	Threshold Control Level Typ.	Supply Voltage Range Min./Max.	Supply Current @ 15 VDC (mA), Typ.	Case Type
UTD-2002 ¹	10-2000	±0.7	-10 to +10	1.7	0-1 Volts 300-3K ohms	+11 to +16	12	TO-8F
UTD-2004	10-2000	±1.0	-30 to -10	2.0 ²	1-10K ohms	+5 to +20	3	TO-8F
PPD-6002	100-6000	±1.0	-10 to +10	2.0	0-1 Volts 300-3K ohms	+11 to +16	12	PP-25DD
ATD-18021	10-18000	±1.5	-30 to -10	3.0	1-10K ohms	+5 to +20	3	AT-1

Notes 1: $P_{IN} = -10$ to +10 dBm

2: $P_{IN} < -20$ dBm

CASE DRAWING

TO-8F



NOTE:
ALL DIMENSIONS IN INCHES
TOLERANCES: XX ± .02
XXX ± .010

APPROXIMATE WEIGHT .06 OZ.

AT-1

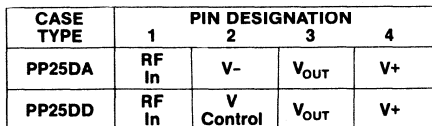


WEIGHT WITH CONNECTORS AND SPACER = 14.5 GRAMS
WEIGHT WITHOUT CONNECTORS AND SPACER = 7.1 GRAMS

DASH NO.	J1	J2
-XX1	FEM	FEM
-XX2	NONE	NONE
-XX3	MALE	MALE
-XX4	MALE	FEM
-XX5	FEM	MALE

Notes 1: Clearance hole is for #1-72 UNC-2A x 5/16" for mounting optional spacer plate.
2: Use connector kits SK-005 and SK-006.
3: SMA connectors optional at J1 and J2, shown for dimensional purposes.

PP-25DA/DD



Tolerance: $\pm .005$
Unless otherwise specified.

Note: Leads are for testing only and may be trimmed flush at time of installation.

THIN-FILM PIN-DIODE SWITCHES

AVANPAK™, THIN-FILM PIN-DIODE SWITCHES

Avantek's line of microwave switches has given the industry a new standard to measure by. All thin-film construction and the Avandak packaging system results in a switch more compact and a lot more rugged than anything else available.

This line of extremely small switches uses Avantek's proven thin-film hybrid processing techniques found in other products for the EW market: laser-machined

substrates, gold metalization, precise photolithography, laser trimmed resistors and laser welded packages. The result is a great savings in space, with the premium quality and reliability found in all Avantek components.

Avantek's line of microwave switches will soon be expanded to include both reflective and non-reflective models designed to operate over the full 0.5-18 GHz band. Contact Avantek for details.

AH SERIES, SINGLE POLE, SINGLE THROW (SPST) PIN-DIODE SWITCHES

Guaranteed Specifications² at 25°C Case Temperature³

PC2

Model Number	Frequency (GHz)	Switching Speed ¹ (Nanoseconds) Maximum	Isolation (dB), Min.	VSWR Maximum	Insertion Loss Max. (dB) Freq. GHz					Case Type	Weight* (Grams)
					.5-2.0	2.0-4.0	4.0-8.0	8.0-12.0	12.0-18.0		

LOW LOSS

AHS-0402-0XX	2.0-4.0	25	40	1.8	—	0.9	—	—	—	SPST-0	5.5
AHS-0802-0XX	2.0-8.0	25	40	1.8	—	0.9	1.2	—	—	SPST-0	5.5
AHS-1202-0XX	2.0-12.0	25	40	1.8	—	0.9	1.2	1.7	—	SPST-0	5.5
AHS-1802-0XX	2.0-18.0	25	40	1.8	—	0.9	1.2	1.7	2.1	SPST-0	5.5

HIGH ISOLATION

AHS-0402-1XX	2.0-4.0	25	60	1.8	—	1.1	—	—	—	SPST-1	6.5
AHS-0802-1XX	2.0-8.0	25	60	1.8	—	1.1	1.4	—	—	SPST-1	6.5
AHS-1202-1XX	2.0-12.0	25	60	1.8	—	1.1	1.4	1.9	—	SPST-1	6.5
AHS-1802-1XX	2.0-18.0	25	60	1.8	—	1.1	1.4	1.9	2.4	SPST-1	6.5

Notes 1: Speed is defined as 50% input trigger to 90% detected R.F. change including driver delay. Rise and fall times are less than 10 nS typical.

2: All specifications are at +10 dBm input power. Maximum input is +30 dBm.

3: Operating temperature: -55°C to +100°C.

4: Weight excluding connectors.

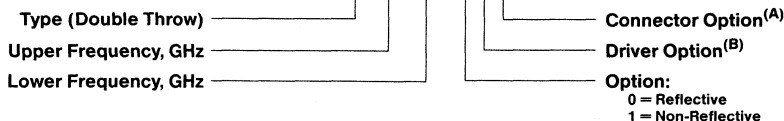
5: 40 dB min > 2 GHz.

6: 60 dB min > 2 GHz.

MODEL NUMBERING DESCRIPTION

TYPICAL PART NUMBER

A H D 1 2 0 2 - 0 2 4



(A) CONNECTOR OPTION TABLE

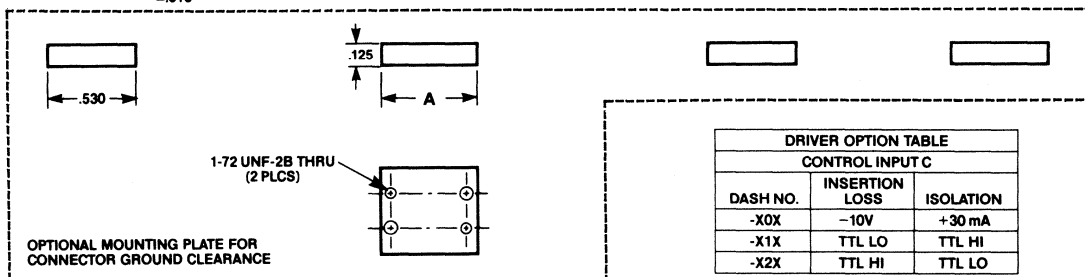
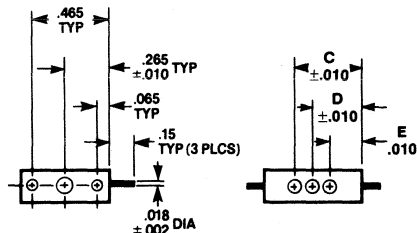
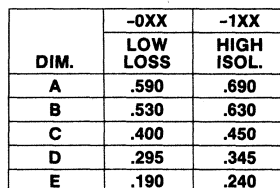
Dash	J0	J1	J2
-XX1	FEM	FEM	FEM
-XX2	NONE	NONE	NONE
-XX3	MALE	MALE	MALE
-XX4	MALE	FEM	FEM
-XX5	FEM	MALE	MALE

(B) DRIVER OPTION TABLE

Dash No.	C1		C2	
	Insertion Loss	Isolation	Insertion Loss	Isolation
-X0X	-30 mA	+30 mA	-30 mA	+30 mA
-X1x	TTL LO	TTL HI	TTL LO	TTL HI
-X2X	TTL HI	TTL LO	TTL HI	TTL LO
-X3X	TTL LO	TTL HI	TTL HI	TTL LO
-X4X	TTL HI	TTL LO	TTL LO	TTL HI

Driver Bias: +5.0±0.5V at 150 mA maximum
-5.0 to -15.0V at 150 mA maximum
TTL LO=0 to 0.8V at 1.6 mA maximum sink
TTL HI=2.0 to 5.0V at 40 µA maximum source

SPST



DIMENSIONS IN INCHES
TOLERANCES: XX±.02
XXX±.010

DRIVER OPTION TABLE		
CONTROL INPUT C		
DASH NO.	INSERTION LOSS	ISOLATION
-X0X	-10V	+30 mA
-X1X	TTL LO	TTL HI
-X2X	TTL HI	TTL LO

DASH NO.	J1	J2
-XX1	FEM	FEM
-XX2	NONE	NONE
-XX3	MALE	MALE
-XX4	MALE	FEM
-XX5	FEM	MALE

- Notes 1: Clearance hole is for #1-72 UNC-2A $\times$ 5/16" for mounting optional spacer plate.
2: Use connector kits SK-005 and SK-006.
3: SMA connectors optional at J1 and J2, shown for dimensional purposes.

WEIGHT (Grams)	-0XX	-1XX
	LOW LOSS	HIGH ISOLATION
WITH CONNECTORS AND SPACER	11.5	13.0
WITHOUT CONNECTOR AND SPACER	5.5	6.5

AH SERIES, SINGLE POLE, DOUBLE THROW (SPDT) PIN-DIODE SWITCHES

Guaranteed Specifications² at 25° C Case Temperature³

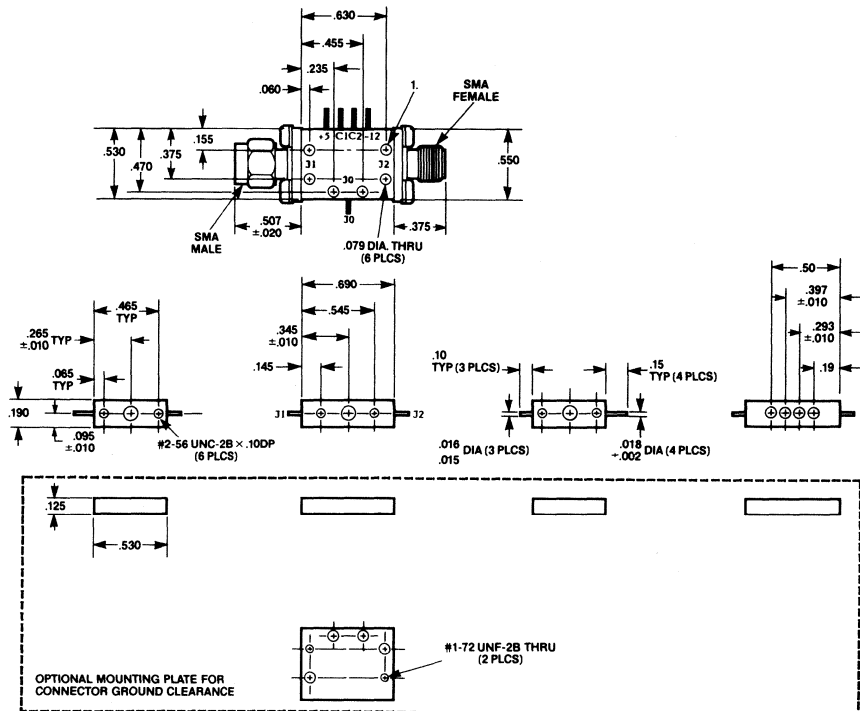
PC2

Model Number	Frequency (GHz)	Switching Speed¹	Isolation (dB) Min.	VSWR Maximum	Insertion Loss Max. (dB) Freq. GHz					Case Type	Weight⁴ (Grams)
		(Nanoseconds) Maximum			.5-2.0	2.0-4.0	4.0-8.0	8.0-12.0	12.0-18.0		
REFLECTIVE											
AHD-0402-OXX	2.0-4.0	50	50	1.8	—	1.3	—	—	—	SPDT	6.5
AHD-0802-OXX	2.0-8.0	50	50	1.8	—	1.3	1.8	—	—	SPDT	6.5
AHD-1202-OXX	2.0-12.0	50	50	1.8	—	1.3	1.8	2.3	—	SPDT	6.5
AHD-1802-OXX	2.0-18.0	50	50	1.8	—	1.3	1.8	2.3	2.9	SPDT	6.5

- Notes 1: Speed is defined as 50% input trigger to 90% detected R.F. change including driver delay. Rise and fall times are less than 15 nS typical.
2: All specifications are at +10 dBm input power. Maximum input is +30 dBm.
3: Operating temperature: -55° C to +100° C.
4: Weight excluding connectors.

CASE DRAWING

SPDT



MODEL NUMBERING DESCRIPTION

TYPICAL PART NUMBER

AHS1202-124

Type (Single Throw)
Upper Frequency, GHz
Lower Frequency, GHz

Connector Option^(A)
Driver Option^(B)
Isolation Option:
0 = Reflective
1 = Non-Reflective

(A) CONNECTOR OPTION TABLE		
Dash	J0	J2
-XX1	FEM	FEM
-XX2	NONE	NONE
-XX3	MALE	MALE
-XX4	MALE	FEM
-XX5	FEM	MALE

(B) DRIVER OPTION TABLE		
Control Input C		
Dash No.	Insertion Loss	Isolation
-XX0	-10V	+30 mA
-X1X	TTL LO	TTL HI
-X2X	TTL HI	TTL LO

Driver Bias: +5 ±.5V at 150 mA maximum
-5 to -15V at 75 mA maximum
TTL LO=0 to .8V at 1.6 mA maximum sink
TTL HI=2 to 5V at 40 μA maximum source

DRIVER OPTION TABLE				
DASH	C1	C2		
	INSERTION LOSS	ISOLATION	INSERTION LOSS	ISOLATION
-X0X	-30 mA	+30 mA	-30 mA	+30 mA
-X1X	TTL LO	TTL HI	TTL LO	TTL HI
-X2X	TTL HI	TTL LO	TTL HI	TTL LO
-X3X	TTL LO	TTL HI	TTL LO	TTL HI
-X4X	TTL HI	TTL LO	TTL LO	TTL HI

CONNECTED OPTION TABLE			
DASH	J0	J1	J2
-XX1	FEM	FEM	FEM
-XX2	NONE	NONE	NONE
-XX3	MALE	MALE	MALE
-XX4	MALE	FEM	FEM
-XX5	FEM	MALE	MALE

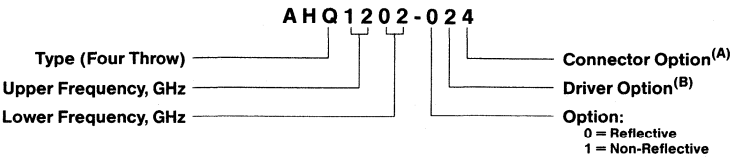
NOTES (UNLESS OTHERWISE SPECIFIED)
DIMENSIONS IN INCHES
TOLERANCES: XX ±.02
XXX ±.010

WEIGHT WITH CONNECTORS AND SPACER = 14.5 GRAMS
WEIGHT WITHOUT CONNECTORS AND SPACER = 6.5 GRAMS

PC2

MODEL NUMBERING DESCRIPTION

TYPICAL PART NUMBER



(A) CONNECTOR OPTION TABLE		
Dash	J0	J1-J5
XX1	FEM	FEM
XX2	NONE	NONE
XX3	MALE	MALE
XX4	MALE	FEM
XX5	FEM	MALE

(B) DRIVER OPTION			
Dash No.	Type	Low Insertion Loss	Isolation
X0X	No Driver	+30 mA	-20mA
X1X	No Driver	-30 mA	+20 mA
X2X	Decoded Driver	See truth table	
X3X	Standard Driver	TTL LO	TTL HI
X4X	Inverted Driver	TTL HI	TTL LO

Note: X3X and X4X dash # not available with SP5T models.

Truth Table for X2X Decoded Driver				
	TTL Input Level			
	A0	A1	A2	E
J1	1	0	0	1
J2	0	1	0	1
J3	1	1	0	1
J4	0	0	1	1
J5	1	0	1	1
ALL OFF	X	X	X	0

Driver Bias: +5.0±0.5V at 75 mA maximum.
-5.0 to -15.0V at 150 mA maximum.
TTL LO=0 to 0.8V at 1.6 mA maximum sink.
TTL HI=2.0 to 5.0V at 40 µA maximum source.

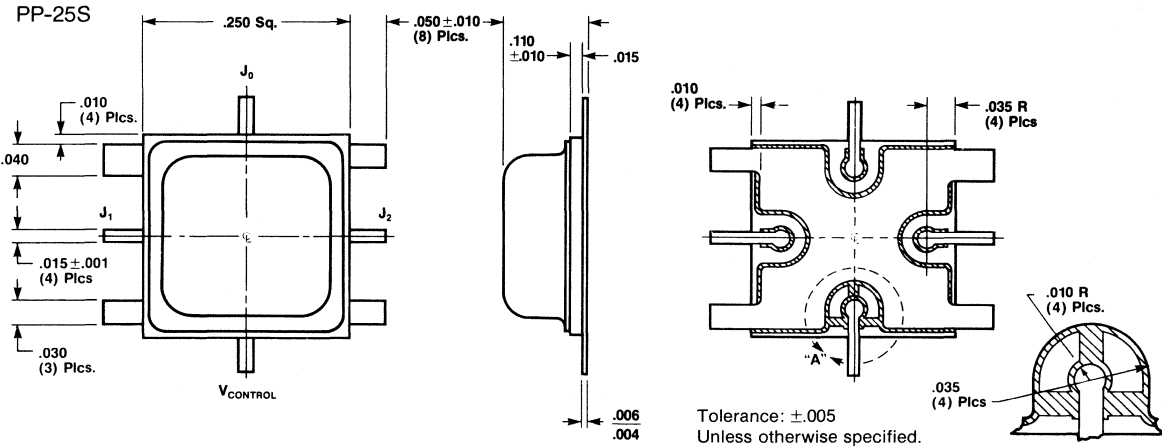
PPS-010, PLANARPAK™ SURFACE MOUNTED, NON-REFLECTIVE, SPDT SWITCH

Guaranteed Specifications at 0° to 50° C. Case Temperature

PC2

Model	Frequency Range (MHz)	Insertion Loss (dB) Maximum	Isolation (dB) Minimum	VSWR (50Ω) Maximum	Switching Speed (µsec) Maximum	Control Voltage (VDC)	Case Type
PPS-010	10-200	1.5	40	1.7	5.0	±15	PP-25S
	200-500	1.5	30				
	500-2000	2.5	20				

CASE DRAWING



Note: Leads are for testing only and may be trimmed flush at time of installation.

SILICON BIPOLAR TRANSISTORS

Avantek's line of VHF, UHF and microwave silicon bipolar transistors combine high gain, low noise figures and moderate power output for applications up to 6 GHz (oscillator applications up to 12 GHz). Special attention is paid to the industry's need for wide dynamic range VHF-UHF transistors.

All Avantek silicon bipolar transistors use nitride self-alignment and ion-implantation for precise control of emitter and base doping. The transistor die are metalized with one micrometer thick gold and passivated with silicon nitride.

SILICON BIPOLAR TRANSISTORS

Typical Specifications at 25°C Case Temperature

PC1

LOW NOISE

Part Number	Maximum Useable Frequency ¹ (GHz)	Test Frequency (GHz)	NF ₀ (dB)	P _{1dB} (dBm)	S _{21E} ² @ 1 GHz (dB)	f _{max} ¹ (GHz)	Case Type
AT-41400	4.5	2.0	1.6	19.0	18.0	16.0	chip
AT-60100	3.0	2.0	1.9	4.0	12.5	15.0	chip
AT-60200	3.5	2.0	1.9	6.5	15.5	15.0	chip
AT-60500	4.0	2.0	1.8	16.0	17.5	15.0	chip
AT-41410	4.5	2.0	1.6	19.0	18.0	15.0	100 mil stripline
AT-60510	4.0	2.0	1.8	16.0	17.5	14.0	100 mil stripline
AT-41435	4.2	2.0	1.7	19.0	17.5	14.0	micro-X
AT-60535	4.0	2.0	1.8	16.0	17.0	13.0	micro-X
AT-41470	4.5	2.0	1.6	19.0	18.0	16.0	70 mil stripline
AT-60570	4.0	2.0	1.8	16.0	17.5	15.0	70 mil stripline
AT-41472	1.0	0.5	1.3	20.5	11.5	8.0	TO-72
AT-41485	4.0	1.0	1.4	18.5	17.5	13.0	85 mil plastic
AT-60585	4.0	1.0	1.4	15.0	17.0	12.0	85 mil plastic
AT-41486	4.0	1.0	1.4	18.0	17.5	13.0	surface mount plastic
AT-60586	4.0	1.0	1.4	15.0	17.0	12.0	surface mount plastic

GENERAL PURPOSE AND MEDIUM POWER

PC1

Part Number	Maximum Useable Frequency ¹ (GHz)	Test Frequency (GHz)	NF ₀ (dB) Typ.	P _{1dB} (dBm)	S _{21E} ² @ 1 GHz (dB)	f _{max} (GHz)	Case Type
AT-00500	3.0	2.0	2.5	16.0	15.5	9.0	chip
AT-01600	2.3	2.0	3.0	22.0	13.0	9.0	chip
AT-42000	3.8	2.0	1.9	21.0	17.0	15.0	chip
AT-00510	3.0	2.0	2.5	16.0	15.0	8.0	100 mil stripline
AT-01610	2.3	2.0	3.0	22.0	12.5	8.0	100 mil stripline
AT-42010	3.8	2.0	1.9	21.0	17.0	14.0	100 mil stripline
AT-00535	3.0	2.0	2.5	16.0	15.0	8.0	micro-X
AT-01635	2.2	2.0	3.0	22.0	12.0	8.0	micro-X
AT-42035	3.8	2.0	1.9	21.0	17.0	14.0	micro-X
AT-00570	3.0	2.0	2.5	16.0	15.5	9.0	70 mil stripline
AT-01670	2.3	2.0	3.0	22.0	13.0	9.0	70 mil stripline
AT-42070	3.8	2.0	1.9	21.0	17.5	15.0	70 mil stripline
AT-00572	1.0	0.5	1.9	19.0	10.0	4.0	TO-72
AT-01672	1.0	0.5	2.0	24.0	9.0	3.0	TO-72
AT-42085	3.0	1.0	1.4	20.5	17.0	12.0	85 mil plastic
AT-42086	3.0	1.0	1.4	20.0	17.0	12.0	surface mount plastic

LINEAR POWER

PC1

Part Number	Maximum Useable Frequency ¹ (GHz)	Test Frequency (GHz)	P _{1dB} (dBm)	G _{1dB} (dB)	S _{21E} ² @ 1 GHz (dB)	f _{max} (GHz)	Case Type
AT-64020	2.0	2.0	28.0	10.0	12.5	8.0	200 mil BeO
AT-64023	2.2	4.0	27.0	9.5	12.0	8.0	Flange BeO

Note 1: Frequency at which |S_{21E}|² gain equals 6 dB.

2: Frequency at which MAG equals unity or 0 dB. See Glossary for definitions.

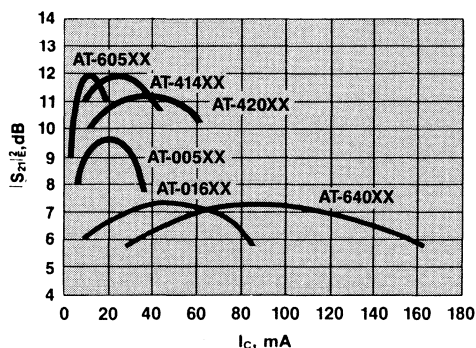
SILICON BIPOLAR TRANSISTORS, Continued

RECOMMENDED Si BIPOLAR TRANSISTORS FOR CLASS-A AMPLIFIER APPLICATIONS

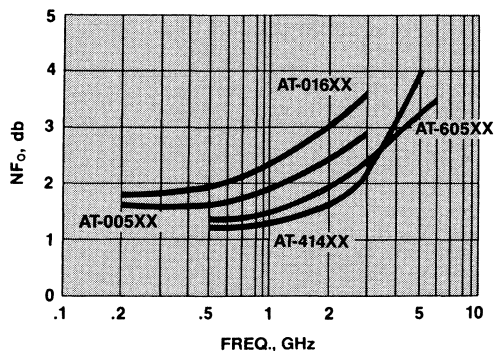
Frequency	Low Noise Amplifier Stages		Intermediate Amplifier Stages		Driver/Output Amplifier Stages	
100 MHz		AT-00572	AT-00572	AT-01672	AT-01672	
500 MHz	AT-00572	AT-41435-3	AT-00572	AT-41485	AT-01672	AT-64020
	AT-60570	AT-41470	AT-01635	AT-42070	AT-01635	
	AT-60585	AT-41485	AT-41435-5	AT-42085		
	AT-60586			AT-42086		
1 GHz	AT-01670	AT-41435-3	AT-41435-5	AT-42035	AT-64020	AT-42035
	AT-60570	AT-41470	AT-41410	AT-42070	AT-01610	AT-42070
	AT-60585	AT-41485	AT-41485	AT-42085	AT-01635	AT-42085
	AT-60586	AT-41486	AT-41486	AT-42086		AT-42086
2 GHz	AT-60570	AT-41435-3	AT-41435-5	AT-42035	AT-64023	AT-42035
	AT-60585	AT-41470	AT-41410	AT-42070	AT-64020	AT-42070
	AT-60586	AT-41485	AT-41485	AT-42085	AT-01610	AT-42085
		AT-41486	AT-41486	AT-42086	AT-01635	AT-42086
4 GHz	AT-60570	AT-41435-3	AT-41435-5	AT-41485	AT-64023	AT-42085
	AT-60585	AT-41470	AT-42035	AT-42085	AT-42035	
		AT-41485	AT-42070		AT-42070	

TYPICAL PERFORMANCE: Si BIPOLAR TRANSISTORS

TYPICAL OPTIMUM NOISE FIGURE (NF_o)
vs. FREQUENCY

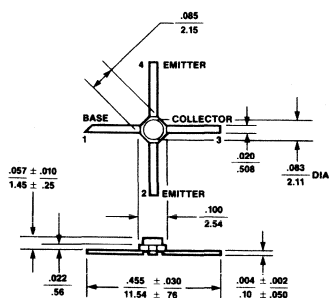


TYPICAL INSERTION POWER GAIN ($|S_{21}|^2$)
vs. COLLECTOR CURRENT
FREQUENCY = 2 GHz

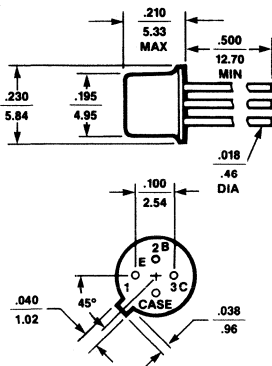


CASE DRAWINGS

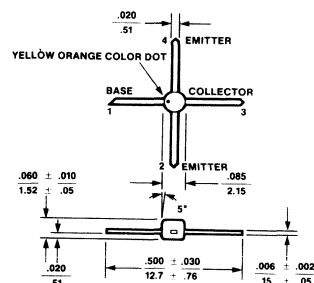
AVANTEK micro-X PACKAGE



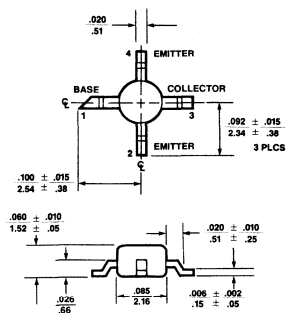
AVANTEK TO-72 PACKAGE



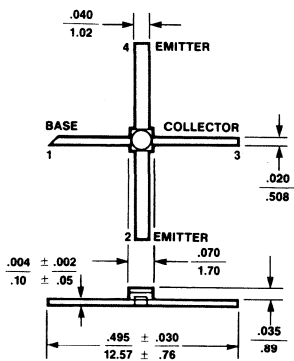
AVANTEK 85 PLASTIC PACKAGE



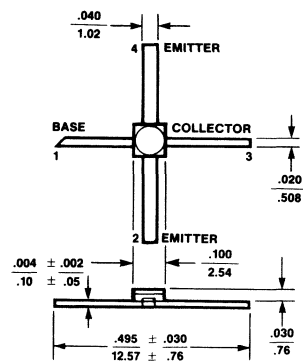
AVANTEK SURFACE MOUNT PLASTIC



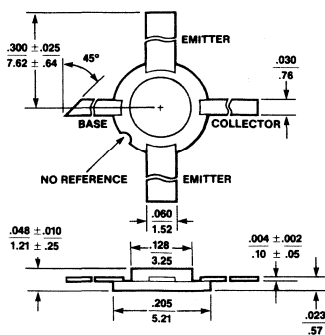
AVANTEK 70 mil PACKAGE



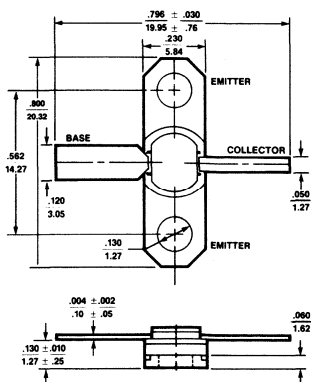
AVANTEK 100 mil PACKAGE



AVANTEK 20 mil BeO PACKAGE



AVANTEK 230 mil BeO FLANGE PACKAGE



NOTES:

(Unless otherwise specified)

1. Dimensions are in mm
2. Tolerances in .xxx = ±.005
mm .xx = ±.13

GaAs FIELD EFFECT TRANSISTORS

LOW NOISE AND GENERAL PURPOSE GaAs FETs

Avantek's line of low noise and general purpose gallium arsenide field effect transistors offer high gain, low noise figure and moderate power output for amplifier applications up to 18 GHz. These devices are suitable for use in space, airborne, military ground and ship-board, and commercial environments.

All Avantek small signal FETs have nominal gate lengths of .3 microns. Proven gold based metalization systems and nitride passivation assure a rugged, reliable device.

LOW NOISE and GENERAL PURPOSE GaAs FETs

Typical Specifications at $T_A = 25^\circ\text{C}$

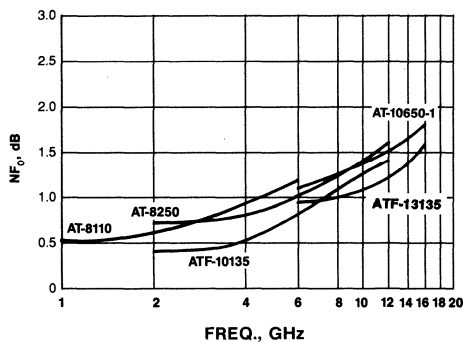
PC1

Model	Gate Width (um)	Optimum Frequency Range (GHz)	Test Frequency (GHz)	NF ₀ (dB)	G _A (dB)	P _{1dB} (dBm)	Case Type
Low Noise GaAs FETs							
AT-8111	750	1-6	4	0.9	13.0	23.0	chip
AT-8251	500	2-10	4	0.8	14.0	21.0	chip
AT-10600	250	6-18	12	1.6	9.0	18.0	chip
AT-8110	750	1-6	4	0.9	13.0	23.0	70 mil
AT-8250	500	2-10	4	0.8	14.0	21.0	70 mil
AT-10650-1	250	6-16	12	1.5	9.0	18.0	50 mil
AT-10650-3	250	6-16	12	1.7	9.0	18.0	50 mil
ATF-10135	500	2-12	4	0.5	13.0	20.0	micro-X
ATF-10235	500	2-12	4	0.8	13.0	20.0	micro-X
ATF-10335	250	6-16	12	1.2	9.5	17.5	micro-X
AT-10435	250	6-16	12	1.4	9.0	17.5	micro-X

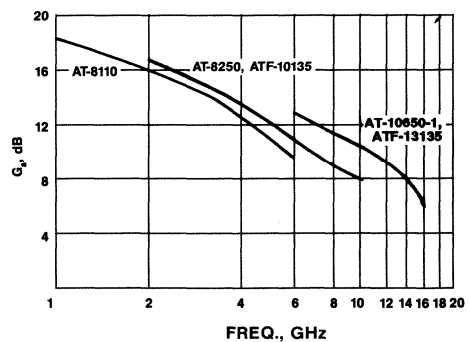
Model	Gate Width (um)	Optimum Frequency Range (GHz)	Test Frequency (GHz)	NF ₀ (dB)	G _A (dB)	P _{1dB} (dBm)	Case Type
General Purpose GaAs FETs							
AT-12570-5	500	2-10	4	1.0	14.0	20.5	70 mil
AT-10650-5	250	6-16	12	2.1	9.0	18.0	50 mil
AT-12535	500	2-10	4	1.2	13.0	19.0	micro-X
ATF-20135	500	2-12	4	1.2	13.0	20.0	micro-X
AT-10635	250	6-16	12	2.2	8.0	18.0	micro-X
ATF-20235	250	6-16	12	1.8	9.0	17.5	micro-X

Typical Performance = Low Noise and General Purpose GaAs FETs

OPTIMUM NOISE FIGURE (NF₀)
vs. FREQUENCY



ASSOCIATED GAIN (G_A)
vs. FREQUENCY



MEDIUM POWER GaAs FETs

Avantek's line of medium power gallium arsenide field effect transistors are designed for linear amplification up to 14 GHz. These devices are suitable for applications in space, airborne, military ground and shipboard, and commercial environments.

All Avantek medium power FET's have nominal 0.5 micron gate lengths and an interdigitated four-cell structure using airbridge interconnects between fingers. Proven gold based metalization systems and nitride passivation assure a rugged, reliable device.

MEDIUM POWER GaAs FETs

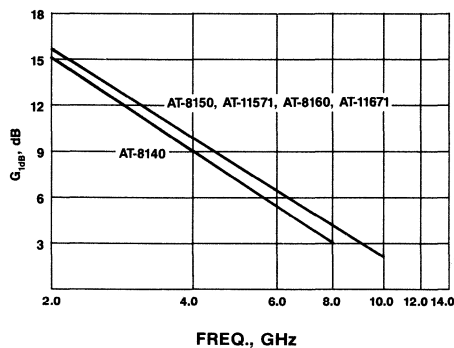
Typical Specifications at 25° C Case Temperature

PC1

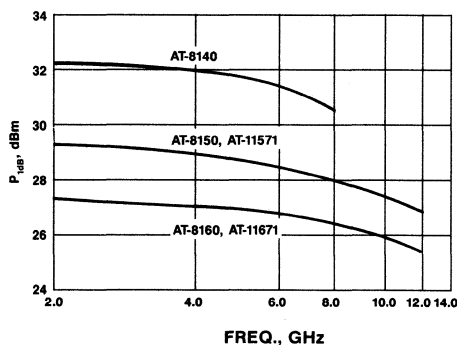
Model	Optimum Frequency Range (GHz)	Test Frequency (GHz)	P _{1dB} (dBm)	G _{1dB} (dB)	Case Type
AT-8141	2-8	4	32.0	90	chip
AT-8151	2-12	4	29.0	11.0	chip
AT-8161	2-14	4	27.0	12.0	chip
AT-8140	2-8	4	32.0	9.0	100 mil flange
AT-8150	2-8	4	29.0	10.0	100 mil flange
AT-8160	2-10	4	27.0	10.0	100 mil flange
AT-11571	2-8	4	29.0	10.5	70 mil flange
AT-11671	2-10	4	27.0	11.0	70 mil flange

TYPICAL PERFORMANCE: MEDIUM POWER GaAs FETs

OUTPUT POWER @ 1dB COMPRESSION
GAIN (P_{1dB}) vs. FREQUENCY



1 dB COMPRESSED GAIN vs. FREQUENCY



RECOMMENDED GaAs FETs FOR CLASS-A AMPLIFIER APPLICATIONS

Frequency	Low Noise Amplifier Stages	Intermediate Amplifier Stages	Driver/Output Amplifier Stages
2 GHz	AT-8110/8250 AT-12535	AT-8110/8160/12570-5	AT-8150/8140
4 GHz	AT-8110/8250 AT-12535	AT-8110/8160/12570-5	AT-8150/8140
8 GHz	AT-10650-1 AT-8250	AT-8160	AT-8150
12 GHz	AT-10650-1 AT-8250/8251	AT-11671	AT-11571
18 GHz			AT-10650-3

IMFET™ INTERNALLY MATCHED POWER GaAs FETs

Avantek's IMFET™ family of internally matched field effect transistors offers the designer entirely matched power amplifier modules suitable for use in commercial and military applications. These devices are optimized to operate over specific telecommunications and radar bands.

Avantek IMFET devices offer high gain, power added efficiency and linearity. Power outputs are typical 4 watts for the "-3" devices and 7 watts for the "-6" devices.

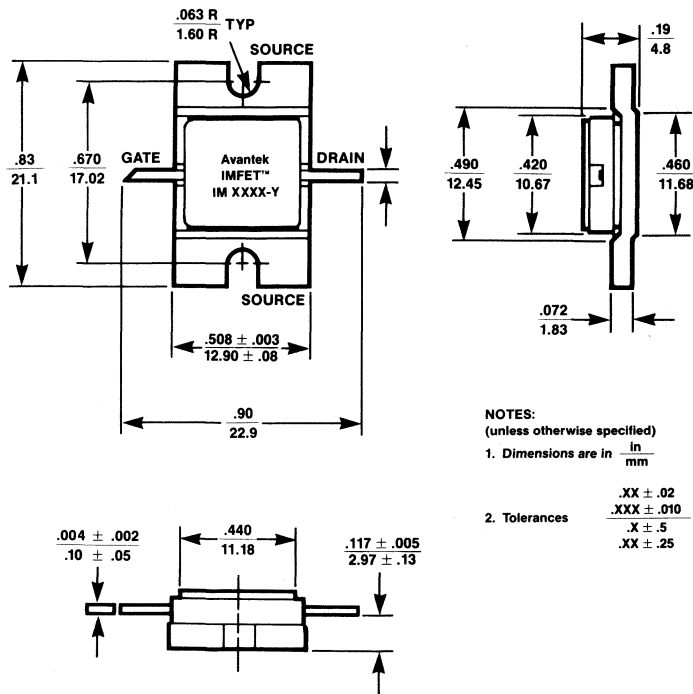
Fully distributed input and output thin-film matching circuitry incorporated into the package allow all guaranteed specifications to be achieved without the use of external tuning elements when the device is operated in a 50 ohm system. The active GaAs FET die use a nominal 0.5 micron gate length geometry and provide a total gate periphery of 10 mm for the -3 and 20 mm for the -6. Proven gold metalization systems and nitride passivation assure a rugged, reliable device.

IMFET™ INTERNALLY MATCHED POWER GaAs FETs

Typical Specifications @ $T_A = 25^\circ\text{C}$

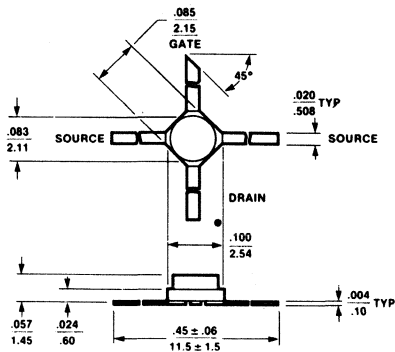
Model	Optimum Frequency Range (GHz)	P _{1dB} (dBm)	G _{1dB} (dB)	η_{ADD} (%)	Case Type
IM-2935-3	2.9-3.5	36.0	11.5	35.0	IMFET
IM-3742-3	3.7-4.2	36.0	11.5	35.0	IMFET
IM-3742-6	3.7-4.2	38.5	9.5	30.0	IMFET
IM-4450-3	4.4-5.0	36.0	10.5	35.0	IMFET
IM-4450-6	4.4-5.0	38.5	8.5	30.0	IMFET
IM-5459-3	5.4-5.9	36.0	9.0	35.0	IMFET
IM-5964-3	5.9-6.4	36.0	9.0	35.0	IMFET
IM-5964-6	5.9-6.4	38.5	7.5	30.0	IMFET
IM-6471-3	6.4-7.1	36.0	8.0	35.0	IMFET
IM-7178-3	7.1-7.8	36.0	7.5	35.0	IMFET
IM-7984-3	7.9-8.4	36.0	7.0	35.0	IMFET

IMFET PACKAGE DRAWING

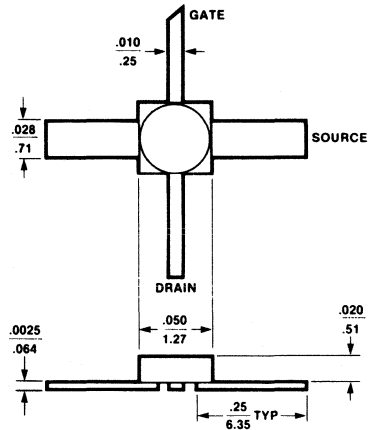


CASE DRAWINGS

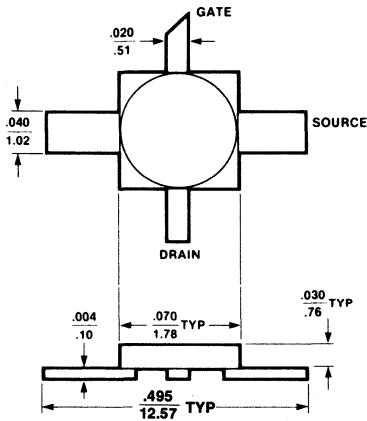
micro-X PACKAGE



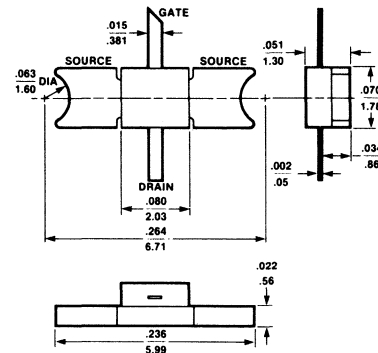
50 mil STRIPLINE PACKAGE



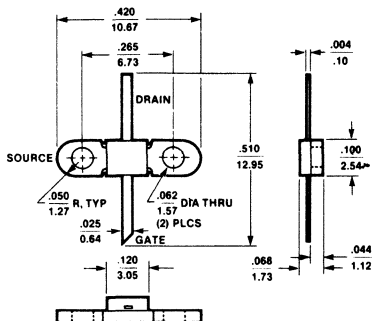
70 mil STRIPLINE PACKAGE



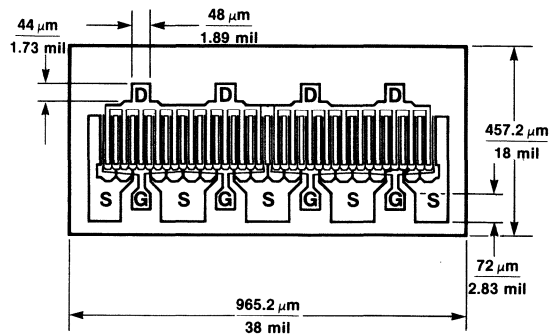
70 mil FLANGE PACKAGE



100 mil FLANGE PACKAGE



CHIP



OTHER AVANTEK CAPABILITIES

INTEGRATED SUBASSEMBLIES AND "SUPERCOMPONENTS"

In addition to supplying one of the industry's widest lines of solid-state microwave and millimeter-wave components, AvanteK is also committed to providing a broad capability of integrating these components into complete, functional subassemblies. An AvanteK integrated subassembly offers a number of significant advantages to the customer, including:

- Minimizing outside vendor problems, which means a much higher probability of on-time delivery and fewer potential technical problems.
- Better subassembly performance margins based upon AvanteK's superior component performance.
- Smaller size due to the elimination of interconnects and reduction of components dimensions.
- Higher reliability due to strict AvanteK workmanship standards and precision thin-film implementation.
- Cost-effective production, with an emphasis on repeatability and process control.
- More gain per unit area which results in smaller size, less variation in gain over temperature and less power dissipation.
- Consistently lower noise figure because of AvanteK FETs which exhibit the lowest noise figure in the microwave industry on a consistent, repeatable basis in production quantities.
- Lower risk because AvanteK will not commit to a specification unless it is really achievable.
- A producible design which can be manufactured in large quantities on a consistent, repeatable basis.
- Military qualification to applicable standards.
- Program support and management.

AvanteK is currently incorporating two innovative state-of-the-art MMIC chips into its products: 1) a GaAs FET distributed amplifier covering 2-18 GHz and 2) a high gain feedback amplifier covering 2-12 GHz. AvanteK also has a GaAs MMIC design effort devoted to specific functions needed for subassembly applications. AvanteK has also developed a strong filter design synthesis capability which allows implementation of both narrowband and broadband filters on thin-film substrates, with minimum development time.

Thin-film (or hybrid MIC) subassemblies use AvanteK unpackaged chip transistors, which are optimized for performance in a hybrid configuration without package parasitics, and an advanced thin-film process technology. Thin-film construction routinely produces circuits in volume using advanced techniques such as vacuum deposition and laser trimming of resistor networks, automated wire bonding, and laser drilling of plated through holes.

The single most significant criterion for implementing a microwave function in a thin-film integrated subassembly is small size. The volume occupied by discrete microwave components which are interconnected by semi-rigid coax, can be significantly reduced by connectorless integration into a single machined housing. The fact that all functions are implemented with thin-film circuitry makes this size reduction even more dramatic.

AvanteK's capabilities in the thin-film subassemblies area include the following:

- Microwave front-end assemblies containing switches, filters, mixers, amplifiers, multipliers, couplers, attenuators, etc.
- Phase and/or amplitude matched multichannel microwave front-end assemblies including the LO distribution chain.
- Up/down converters containing FET preamplifiers, filters, mixers, with LO distribution including multipliers and limiting amplifiers.
- Gain block subassemblies containing FET preamplifiers, filters, switched or analog attenuators, power dividers, couplers, etc.
- Transmit/receive modules containing low noise FET preamps, T/R switches, attenuators, phase shifters and power amplifiers.
- Voltage controlled oscillator subassemblies including varactor, YIG analog and digitally tuned models.

- Shipboard maritime transceiver for INMARSAT communications.

AVANTEK ADVANTAGES

- The broad base of AvanteK standard microwave components, coupled with the high level of component design expertise resident in the various product areas, provides the subsystem designer with the best system building blocks available in the world today.
- The high level of vertical integration combined with the large component production volume assures a reliable supply of microwave components.
- AvanteK design expertise and easy access to component knowledge in the various product divisions, assures our customers the most effective component selection and system design to meet the overall requirements.

The bottom line is that AvanteK is a high quality, low risk supplier of microwave components and subassemblies.

Please contact AvanteK Component Sales to discuss your specific component and subassembly requirements.

DIGITAL AND ANALOG LIGHTWAVE SYSTEMS

AvanteK lightwave systems integrate with other communications products or operate separately in a variety of applications. Analog, digital and video transmission over fiber optic cable offers the user a wide range of technology to most efficiently match AvanteK lightwave communications with your applications.

Digital lightwave systems with integral multiplexing capabilities are particularly attractive for metropolitan or local distribution of T1 circuits for telephone companies or private networks. They also serve as links to digital microwave systems.

A unique multiplex architecture in the digital lightwave products provides comprehensive network management capabilities and flexible network design.

Networks using drop/insert or loop protected configurations enable users to reduce the equipment required at each site and the number of optical fiber cables needed. These configurations increase system reliability and capability.

Analog lightwave systems serve as excellent extenders for analog-based networks. Broadcast quality video also can be implemented on AvanteK lightwave systems.

These lightwave systems are often more economical than other distribution methods. And, in special applications, where isolation of other electronics and freedom from electromagnetic interference is required, this may be the only feasible transmission method.

DIGITAL MICROWAVE RADIOS

AvanteK manufactures a variety of microwave digital radio terminals and repeaters for the transmission of digitally encoded voice or data in the 2, 4, 6, 18 and 23 GHz frequency bands. Models are available that satisfy FCC Rules Part 21 for operation of point-to-point microwave radio in the common carrier frequency bands as well as Part 94 for operation in the private operational fixed service frequency bands. Specialized products operating in the narrow 2 GHz band are available for use by businesses such as banks, insurance companies and retailers. Other models are specifically designed to meet the requirements of the Federal Government.

These radio systems can transmit up to 672 voice and/or data channels simultaneously with transmission rates as high as 45 Mbps.

AvanteK can provide a complete service to customers ranging from consultation to determine the proper system configuration to a complete "turnkey" offering in which AvanteK, acting as prime contractor, engineers, furnishes and installs a complete microwave radio system such that the customer need do nothing but count the savings realized through a privately owned digitally microwave radio systems.

For further information on AvanteK Microwave Digital Radio and Lightwave Systems, please call (415) 498-1400.

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