Avantek Products

Thin-Film Cascadable Amplifier 5 to 1000 MHz

Technical Data

Features

- **Frequency Range: 5 to 1000 MHz**
- **High Output Power: +12.0 dBm (Typ)**
- **5-Volt Supply**
- **Surface Mount Option**

Applications

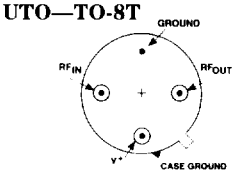
- **IF/RF Amplification**
- **5-Volt Systems**
- **Surface Mount Assembly**

Description

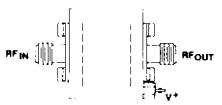
The 1007 Series is a 5-volt wideband thinfilm bipolar RF amplifier that can be used where voltage or power requirements are important. Output choke coupling, resistive feedback and active bias combine to provide a low noise, medium gain amplifier. Blocking capacitors couple the RF through the amplifier. The 1007 Series amplifiers are available in three packages: the surface mount hermetic PP-38 (.375 in. x .375 in.) case, the TO-8 hermetic case and the connectorized TC-1 case.

Pin Configuration

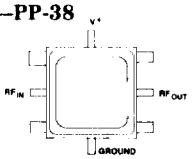
UTO—TO-8T



UTC—TC-1

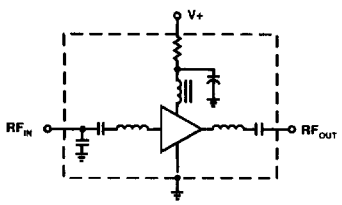


PPA—PP-38



(See Section 5 for detailed case drawings.)

Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+10 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	–55 to +125°C
Storage Temperature	–62 to +150°C
"R" Series Burn-In Temperature	+125°C

Thermal Characteristics[1]

θ_{JC}	105°C/W
Active Transistor Power Dissipation	110 mW
Junction Temperature Above Case Temperature	11.4°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,645,000 Hrs.

Note 1: For further information, see Reliability Screening, Section 6.

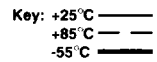
Weight: (typical) UTO—2.1 grams; UTC—21.5 grams

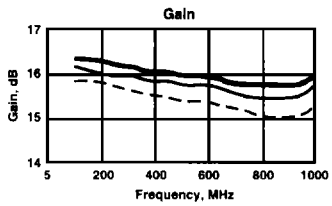
Electrical Specifications

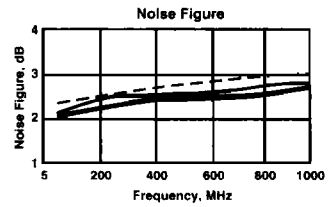
(Measured in 50 Ω system @ +5 VDC nominal unless otherwise noted)

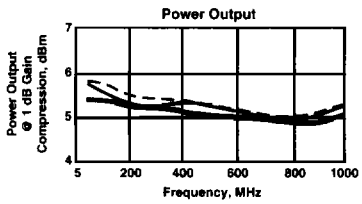
Symbol	Characteristic	Typical	Guaranteed Specifications		Unit
		T_C = 25°C	T_C = 0 to 50°C	T_C = −55 to +85°C	
BW	Frequency Range	5-1000	5-1000	5-1000	MHz
GP	Small Signal Gain (Min.)	13.5	12.5	11.5	dB
—	Gain Flatness (Max.)	±0.1	±0.7	±1.0	dB
NF	Noise Figure (Max.)	3.8	5.0	5.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+12.5	+11.0	+10.0	dBm
—	Input VSWR (Max.)	<1.4:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+21.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+21.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+28.0	—	—	dBm
I_D	DC Current	33	—	—	mA

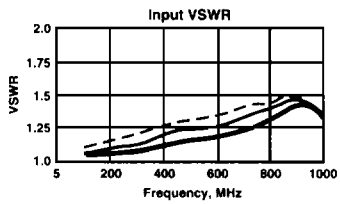
Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

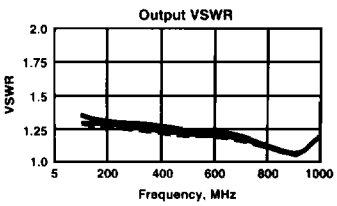


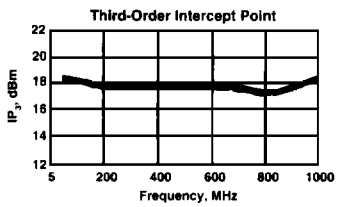


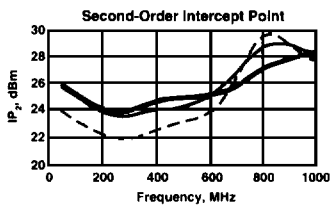


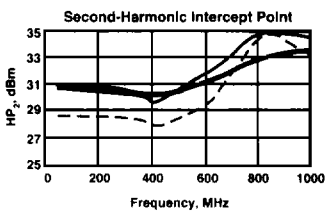












Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings **Bias = 5.00 Volts**

FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.46	13.90	166.73	–.31	.00	1.28	19.39
200.0	1.31	13.66	152.58	–1.11	.37	1.27	18.15
300.0	1.32	13.82	139.76	–.58	.36	1.25	18.36
400.0	1.25	13.61	126.72	–.29	.35	1.24	18.59
500.0	1.20	13.65	114.26	.58	.34	1.19	18.31
600.0	1.14	13.72	102.22	1.89	.35	1.16	18.19
700.0	1.06	13.66	88.96	1.96	.38	1.15	18.14
800.0	1.09	13.45	74.69	1.06	.41	1.11	18.03
900.0	1.16	13.42	59.41	–.88	.42	1.06	17.90
1000.0	1.26	13.48	44.64	–2.31	.41	1.04	17.83
1200.0	1.60	13.32	12.61	—	.47	1.18	17.85
1400.0	2.57	13.00	–23.11	—	.53	1.47	18.20
1600.0	6.10	11.17	–64.48	—	.60	2.03	19.81
1800.0	25.80	8.00	–104.89	—	.48	2.53	21.54
2000.0	88.94	4.10	–135.14	—	.00	3.14	22.93

LINEARIZATION RANGE: 100.0 to 1000.0 MHz

S-Parameters **Bias = 5.00 Volts**

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.170	170.2	13.870	168.9	–18.380	–2.1	.117	158.2
200.00	.147	155.0	13.762	156.3	–18.454	–7.1	.116	132.7
300.00	.123	142.9	13.754	144.5	–19.224	–11.2	.112	111.2
400.00	.094	127.4	13.756	132.7	–18.194	–16.0	.108	87.8
500.00	.069	110.5	13.821	121.6	–18.042	–20.6	.106	66.8
600.00	.048	72.1	13.822	110.7	–17.984	–25.4	.101	43.1
700.00	.045	25.1	13.657	98.6	–17.959	–30.2	.090	17.4
800.00	.064	–10.0	13.486	84.9	–18.041	–35.4	.072	–11.4
900.00	.091	–28.5	13.458	70.9	–17.926	–41.1	.054	–48.2
1000.00	.124	–36.4	13.431	57.3	–18.029	–47.0	.037	–106.5
1100.00	.161	–43.2	13.368	42.3	–17.932	–54.3	.057	176.1
1200.00	.210	–48.1	13.250	26.5	–17.836	–61.7	.113	135.4
1300.00	.275	–52.1	12.931	9.2	–18.122	–69.7	.180	102.3
1400.00	.357	–58.2	12.369	–10.1	–18.616	–80.6	.261	73.4
1500.00	.455	–66.9	11.215	–29.9	–19.290	–90.4	.343	45.9
1600.00	.556	–76.7	9.380	–49.3	–20.354	–100.1	.404	20.4
1700.00	.630	–87.8	7.117	–66.8	–21.351	–106.9	.436	–3.0
1800.00	.679	–98.1	5.462	–78.1	–22.819	–107.9	.454	–24.0
1900.00	.714	–107.6	3.348	–88.5	–23.328	–112.1	.458	–41.5
2000.00	.741	–116.1	1.435	–97.7	–24.279	–115.2	.452	–57.6