

Avantek Products

Thin-Film Cascadable Amplifier 10 to 100 MHz

Technical Data

UTO/UTC 101 Series

Features

- **Frequency Range:** 10 to 100 MHz
- **Low Power Consumption:** 20 mA @15VDC
- **Low Noise Figure:** 1.7 dB (Typ)
- **High Gain:** 27.5 dB (Typ)
- **High Output Power:** +16 dBm (Typ)
- **Wide Dynamic Range**
- **Temperature Compensated**

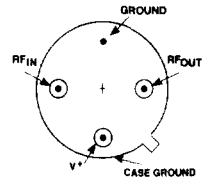
Applications

- **Receiver IF Gain Stages**
- **Medical Instruments:** Ultra-Sound, Magnetic Resonance

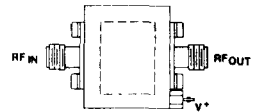
Description

The 101 Series is a wideband, single-stage, high-gain silicon bipolar amplifier that incorporates thin-film technology. The low noise figure and high efficiency are the result of an output transformer coupling design. This also provides the unit with a high dynamic range. Resistive feedback and active bias provide temperature compensation and increased immunity to supply voltage variations. The 101 Series is available in either the T0-8 hermetic package or the connected TC-1 package.

Pin Configuration UTO—T0-8T

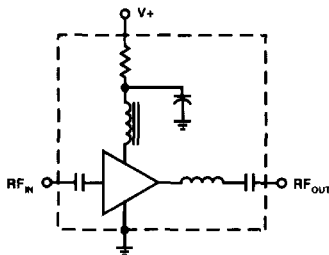


UTC—TC-1



(See Section 5 for detailed case drawings.)

Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	17 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 Characteristics¹

θ_{JC}	105°C/W
Active Transistor Power Dissipation	162 mW
Junction Temperature Above Case Temperature	17°C
MTBF (MIL-HDBK-217E, A_{1VF} @ 90°C)	653,900 Hrs.

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

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

Electrical Specifications

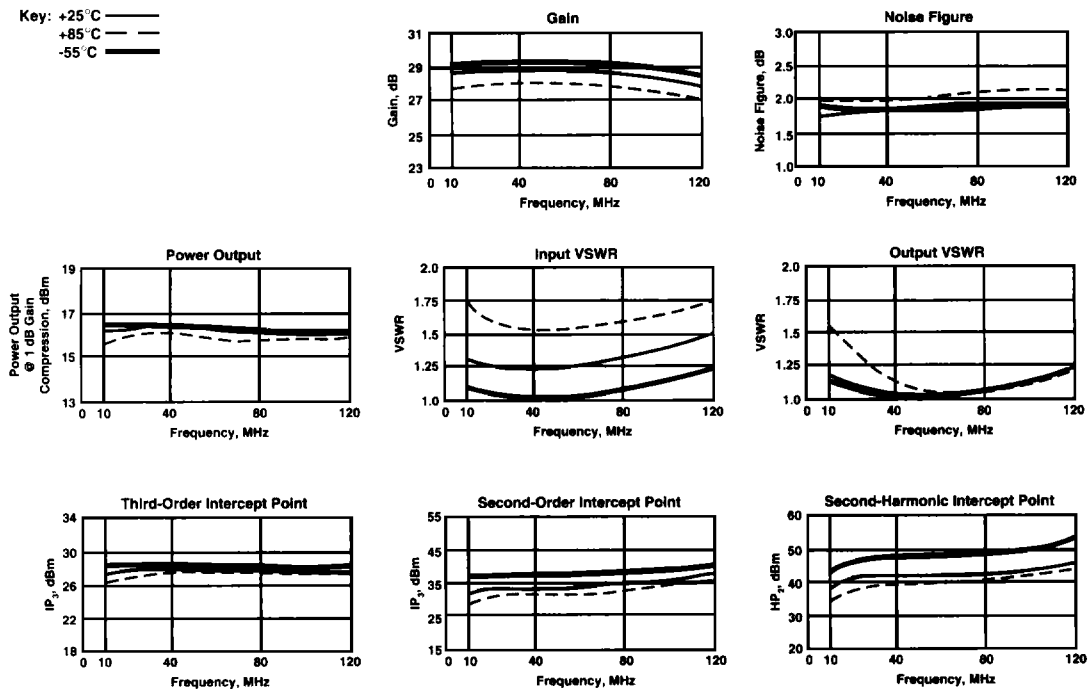
(Measured in 50 Ω system @ +15 VDC nominal)

Symbol	Characteristic	Typical T _C = 25°C	Guaranteed Specifications		Unit
			T _C = 0 to 50°C	T _C = -55 to +85°C	
BW	Frequency Range	5-120	10-100	10-100	MHz
GP	Small Signal Gain (Min.)	27.5	26.5	25.5	dB
—	Gain Flatness (Max.)	±0.3	±1.0	±1.0	dB
NF	Noise Figure (Max.)	1.7	2.2	2.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+16.0	+14.5	+14.0	dBm
VSWR	Input VSWR (Max.)	1.5:1	2.0:1	2.0:1	—
VSWR	Output VSWR (Max.)	1.3:1	2.0:1	2.0:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+26.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+33.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Pt.	+40.0	—	—	dBm
I _D	DC Current	20	—	—	mA

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

Key: +25°C —
+85°C - - -
-55°C = = =



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

S-Parameters

Blas = 15 Volts, Current = 19.5 mA

Freq. GHz	S ₁₁		S ₁₁		S ₁₁		S ₁₁		GPDEL (ns)	PHASE DEV (deg)
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang		
5	.17	-45.2	28.2	-166.2	-32.8	16.3	.14	126.71	5.96	
10	.13	-28.2	28.2	-176.9	-32.5	8.9	.07	112.23	5.96	2.82
20	.12	-17.6	28.2	174.4	-32.5	5.5	.03	102.68	2.43	-45
30	.12	-15.1	28.2	168.3	-32.4	4.3	.02	90.30	1.69	-1.10
40	.13	-15.1	28.2	162.8	-32.3	3.7	.00	35.77	1.53	-1.16
50	.13	-16.5	28.1	157.5	-32.3	3.7	.01	-52.02	1.46	-96
60	.14	-18.6	28.1	152.4	-32.3	3.8	.02	-67.47	1.42	-63
70	.15	-21.5	28.0	147.3	-32.3	4.1	.03	-74.83	1.41	-23
80	.16	-24.8	27.9	142.3	-32.3	4.3	.04	-79.82	1.41	.16
90	.17	-28.8	27.8	137.2	-32.2	4.4	.05	84.82	1.40	.56
100	.18	-32.7	27.7	132.2	-32.2	5.0	.07	-89.41	1.39	.99
110	.19	-37.1	27.5	127.2	-32.1	5.5	.08	-94.15	1.39	
120	.20	-41.3	27.3	122.2	-32.1	5.7	.09	-98.73	1.38	
130	.21	-45.9	27.1	117.3	-32.0	6.2	.11	-103.38	1.36	
140	.2	50.3	26.9	112.4	-32.0	6.7	.12	-108.20	1.36	
150	.23	-54.5	26.7	107.7	-31.8	7.1	.13	-112.95	1.33	
160	.24	-58.8	26.4	103.0	-31.7	7.5	.14	-117.56	1.31	
170	.25	-63.1	26.2	98.4	-31.6	7.8	.16	-122.23	1.28	
180	.25	-67.0	25.9	93.9	-31.5	8.4	.17	-126.85	1.24	
190	.26	-70.8	25.6	89.6	-31.3	8.4	.18	-131.37	1.21	
200	.27	-74.7	25.3	85.3	-31.2	8.4	.19	-135.77	1.17	
210	.27	-78.0	24.9	81.2	-30.9	8.7	.21	-140.11	1.14	
220	.27	-81.3	24.6	77.2	-30.8	8.1	.22	-144.30	1.11	
230	.28	-84.5	24.2	73.4	-30.7	8.0	.23	-148.37	1.07	
240	.28	-87.4	23.9	69.6	-30.5	7.6	.24	-152.27	1.03	
250	.28	-90.2	23.6	66.0	-30.3	7.4	.25	-156.15	1.01	
260	.28	92.7	23.2	62.5	-30.2	6.8	.26	-159.84	.97	
270	.28	95.1	22.9	59.1	-30.0	5.9	.27	-163.43	.94	
280	.28	-97.3	22.5	55.8	-29.9	5.2	.28	-166.99	.93	
290	.28	-99.2	22.2	52.5	-29.8	4.7	.29	-170.42	.89	
300	.28	-101.0	21.8	49.4	-29.6	3.9	.30	-173.80	.88	
310	.28	-102.7	21.5	46.3	-29.5	3.0	.30	-177.10	.86	
320	.28	-104.2	21.2	43.3	-29.4	2.0	.31	179.76	.84	
330	.28	-105.5	20.8	40.3	-29.3	1.1	.32	176.53	.82	
340	.28	-106.6	20.5	37.4	-29.2	.1	.33	173.39	.82	
350	.28	-107.7	20.2	34.5	-29.0	-1.0	.34	170.33	.80	
360	.28	-108.4	19.9	31.6	-29.0	-2.2	.35	167.32	.79	
370	.28	-109.1	19.5	28.8	-28.9	-3.6	.36	164.36	.77	
380	.28	-109.6	19.2	26.1	-28.9	4.7	.37	161.46	.77	
390	.28	-110.1	18.9	23.3	-28.8	-5.7	.38	158.57	.76	
400	.28	-110.3	18.6	20.6	-28.8	-7.2	.38	155.69	.75	
410	.28	-110.5	18.3	17.9	-28.8	-8.6	.39	152.92	.75	
420	.28	-110.5	18.0	15.2	-28.7	-9.7	.40	150.10	.74	
430	.28	-110.5	17.7	12.6	-28.7	-11.2	.41	147.35	.74	
440	.28	-110.5	17.3	10.0	-28.7	-12.4	.42	144.58	.73	
450	.29	-110.3	17.0	7.4	-28.7	-14.1	.43	141.84	.72	
460	.29	-110.1	16.7	4.7	-28.8	-15.4	.44	139.10	.74	
470	.29	-109.8	16.4	2.1	-28.8	-16.7	.45	136.39	.73	
480	.30	-109.5	16.1	-4	-28.8	-18.1	.46	133.73	.71	
490	.30	-109.3	15.8	-3.0	-28.9	-19.5	.46	131.00	.72	
500	.31	-109.1	15.5	-5.6	-29.0	-20.6	.47	128.37	.72	