



UTO/UTC 111
Thin-Film Cascadable Amplifier
10 to 100 MHz

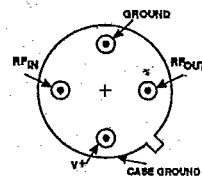
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FEATURES

- Frequency Range: 10 to 100 MHz
- Low Noise: 1.4 dB (Typ)
- Medium Power: 16.8 dBm (Typ)
- Temperature Compensated

APPLICATIONS

- Low Frequency IF Stages
- Medical Instruments: Ultra-Sound, Magnetic Resonance
- High Efficiency or Battery Powered Systems

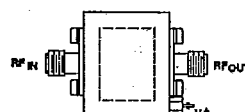


UTO—TO-8T, p. 16-48

DESCRIPTION

The 111 Series is a single-stage, high-gain silicon bipolar amplifier that incorporates thin-film technology. Low noise figure and high efficiency are the result of an output transformer coupling design. Active bias circuits provide temperature compensation and increased immunity to bias voltage

variations. Blocking capacitors couple the RF through the amplifier, while a low VSWR is maintained through unique transformer designs. The 111 Series is available in either the TO-8 hermetic package or the connected TC-1 package.

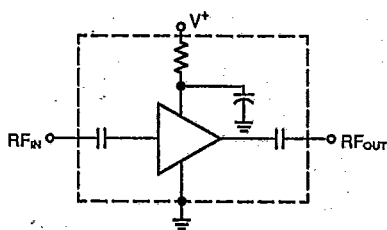


UTC—TC-1, p. 16-42

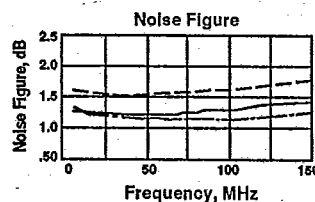
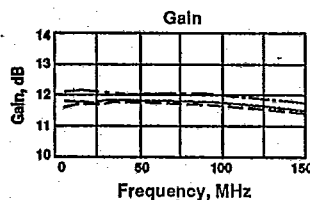
ELECTRICAL SPECIFICATIONS (Measured in a 50-ohm system @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical $T_c = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_c = 0^\circ \text{ to } 50^\circ\text{C}$	$T_c = -55^\circ \text{ to } +85^\circ\text{C}$	
BW	Frequency Range	10-100	10-100	10-100	MHz
GP	Small Signal Gain (Min.)	11.5	10.5	10.0	dB
—	Gain Flatness (Max.)	± 0.1	± 0.3	± 0.5	dB
NF	Noise Figure (Max.)	1.4	1.7	2.0	dB
$P_{1\text{dB}}$	Power Output @ +1 dB Compression (Min.)	+16.8	+15.5	+15.5	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	+33.0	+28.0	+28.0	dBm
IP_2	Two Tone 2nd Order Intercept Point	+47.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+53.0	—	—	dBm
I_0	DC Current	14	—	—	mA

SCHEMATIC

TYPICAL PERFORMANCE OVER TEMPERATURE
(@ +15 VDC unless otherwise noted)

KEY: +25°C ———
+85°C - - - - -
-55°C - - - - -



MAXIMUM RATINGS

DC Voltage	17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55°C to +125°C
Storage Temperature	-62°C to +150°C
"R" Series Burn-In Temperature	+125°C

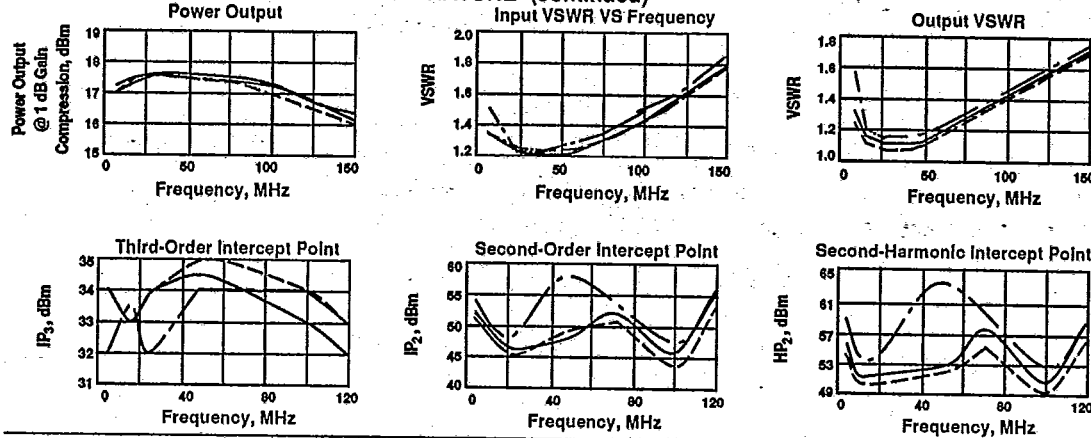
THERMAL CHARACTERISTICS*

θ_{JC}	105°C/W
Active Transistor Power Dissipation	110 mW
Junction Temperature Above Case Temperature	12°C
MTBF (MIL-HDBK-217E, A_{UT} @ 90°C)	848,400 Hrs.

WEIGHT: (typical) UTO—1.7 grams; UTC—21.5 grams

Avantek, Inc. • 481 Cottonwood Drive, Milpitas, CA 95035 • Contact your local representative, distributor or field sales office for further information. Listings are in the back of this Data Book.

TYPICAL PERFORMANCE OVER TEMPERATURE (continued)



AUTOMATIC NETWORK ANALYZER MEASUREMENTS (Typical production unit at +25°C ambient)

							BIAS = 15.00 VOLTS
FREQ MHz	VSWR IN	GAIN dB	PHASE DEG	PHASE DEV	GPDEL ns	VSWR OUT	ISOL dB
10.0	1.35	11.8	15.8	6.90	3.63	1.35	14.5
20.0	1.25	11.8	2.7	-1.12	3.63	1.15	14.6
30.0	1.20	11.8	-4.2	-2.93	1.91	1.13	14.6
40.0	1.22	11.9	-8.9	-2.57	1.31	1.13	14.6
50.0	1.22	11.9	-13.6	-2.20	1.31	1.17	14.6
60.0	1.27	11.9	-18.0	-1.53	1.21	1.22	14.6
70.0	1.30	11.9	-22.1	-.65	1.16	1.25	14.6
80.0	1.35	11.8	-26.2	.30	1.14	1.30	14.6
90.0	1.41	11.8	-30.2	1.35	1.12	1.35	14.7
100.0	1.47	11.8	-34.2	2.47	1.09	1.41	14.8
110.0	1.53	11.7	-38.1		1.09	1.47	14.8
120.0	1.56	11.7	-42.0		1.07	1.53	14.9
130.0	1.63	11.6	-45.8		1.07	1.60	15.0
140.0	1.70	11.6	-49.7		1.06	1.67	15.1
150.0	1.78	11.5	-53.5		1.06	1.74	15.2
160.0	1.86	11.4	-57.3		1.06	1.82	15.4
170.0	1.94	11.3	-61.1		1.05	1.90	15.5
180.0	2.03	11.2	-64.9		1.06	1.94	15.6
190.0	2.13	11.2	-68.7		1.06	2.03	15.8
200.0	2.17	11.1	-72.5		1.06	2.13	15.9
210.0	2.28	11.0	-76.4		1.06	2.23	16.1
220.0	2.39	10.9	-80.2		1.07	2.28	16.2
230.0	2.45	10.7	-84.1		1.07	2.39	16.4
240.0	2.57	10.6	-88.0		1.08	2.51	16.6
250.0	2.70	10.5	-91.9		1.09	2.57	16.8

LINEARIZATION RANGE: 10.0 to 100.0 MHz

S-PARAMETERS

BIAS = 15.00 VOLTS

FREQ MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
10.0	.15	136.7	11.8	15.8	-14.5	15.9	.07	83.80
20.0	.11	160.1	11.8	2.7	-14.6	2.7	.06	49.21
30.0	.09	172.5	11.8	-4.2	-14.6	-4.2	.06	11.44
40.0	.10	-170.6	11.9	-8.9	-14.6	-8.9	.06	-29.34
50.0	.10	-160.7	11.9	-13.6	-14.6	-13.5	.08	-51.48
60.0	.12	-153.5	11.9	-18.0	-14.6	-17.8	.10	-67.04
70.0	.13	-149.0	11.9	-22.1	-14.6	-22.0	.11	-78.78
80.0	.15	-146.5	11.8	-26.2	-14.6	-26.0	.13	-88.38
90.0	.17	-145.3	11.8	-30.2	-14.7	-29.9	.15	-96.66
100.0	.19	-145.2	11.7	-34.2	-14.8	-33.8	.17	-104.03
110.0	.21	-147.1	11.7	-38.1	-14.8	-37.7	.19	-110.73
120.0	.22	-148.7	11.6	-42.0	-14.9	-41.5	.21	-116.99
130.0	.24	-148.7	11.6	-45.8	-15.0	-45.2	.23	-122.91
140.0	.26	-150.7	11.6	-49.7	-15.1	-49.0	.25	-128.48
150.0	.28	-152.8	11.5	-53.5	-15.2	-52.7	.27	-133.87
160.0	.30	-155.2	11.4	-57.3	-15.4	-56.4	.29	-139.02
170.0	.32	-157.7	11.3	-61.1	-15.5	-60.2	.31	-144.01
180.0	.34	-160.4	11.2	-64.9	-15.6	-63.8	.32	-148.89
190.0	.36	-163.2	11.2	-68.7	-15.8	-67.5	.34	-153.58
200.0	.37	-166.1	11.1	-72.5	-15.9	-71.2	.36	-158.18
210.0	.39	-169.1	11.0	-76.4	-16.1	-74.9	.38	-162.61
220.0	.41	-172.1	10.9	-80.2	-16.2	-78.6	.39	-167.07
230.0	.42	-175.3	10.7	-84.1	-16.4	-82.3	.41	-171.36
240.0	.44	-178.5	10.6	-88.0	-16.6	-86.0	.43	-175.65
250.0	.46	-178.3	10.5	-91.9	-16.8	-89.7	.44	-179.76