



UTO/UTC/PPA 441 Series
Thin-Film Cascadable Amplifier
20 to 400 MHz

T-74-09-01

FEATURES

- Frequency Range: 20 to 400 MHz
- Low Current Drain: 32 mA (Typ)
- Medium Output Power:
+16 dBm (Typ)
- High Dynamic Range,
85 dB (Typ)¹
- Three Package Options
- Temperature Compensated

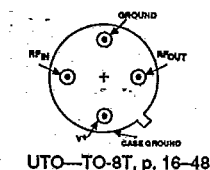
APPLICATIONS

- Medium Gain RF/IF
Signal Processing
- Surface Mount Assembly

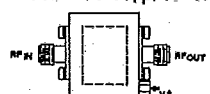
DESCRIPTION

The 441 Series RF amplifiers are medium gain, bipolar components built on a thin-film substrate, using output transformer coupling to increase efficiency. Internal blocking capacitors couple the RF signal through the amplifier. The 441

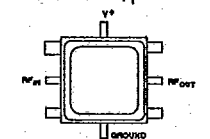
Series amplifiers are available in three packages: the hermetic surface mount PP-38 (.375 in. x .375 in.) case weighing 0.5 grams, the connectorized TC-1 case weighing 21.5 grams and the hermetic TO-8T case weighing 2.1 grams.



UTO—TO-8T, p. 16-48



UTC—TC-1, p. 16-42



PPA—PP-38, p. 16-35

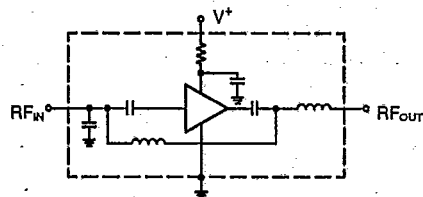
ELECTRICAL SPECIFICATIONS² (Measured in a 50-ohm system @ +15 VDC nominal unless otherwise noted)

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	20-400	20-400	20-400	MHz
GP	Small Signal Gain (Min.)	14.4	13.5	13.0	dB
—	Gain Flatness (Max.)	±0.1	±0.7	±0.7	dB
NF	Noise Figure (Max.)	3.7	4.5	5.0	dB
P _{1dB}	Power Output @ +1 dB Compression (Min.)	+16.0	+15.0	+15.0	dBm
—	Input VSWR (Max.)	1.3:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.6:1	2.0:1	2.0:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+32.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+44.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+53.0	—	—	dBm
I _o	DC Current	32	—	—	mA

NOTES 1: Calculated spurious free dynamic range in 1 MHz bandwidth.

2: 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.

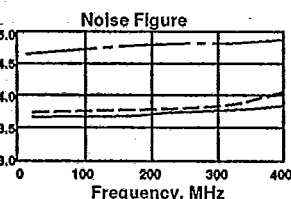
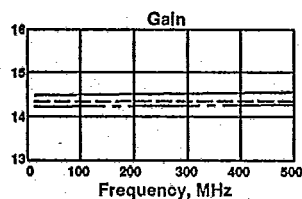
SCHEMATIC



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	275 mW
Junction Temperature Above Case Temperature	29°C
MTBF (MIL-HDBK-217E, A _{UT} @ 90°C)	523,897 Hrs.

*For further information, see High Reliability section, p. 17-2.

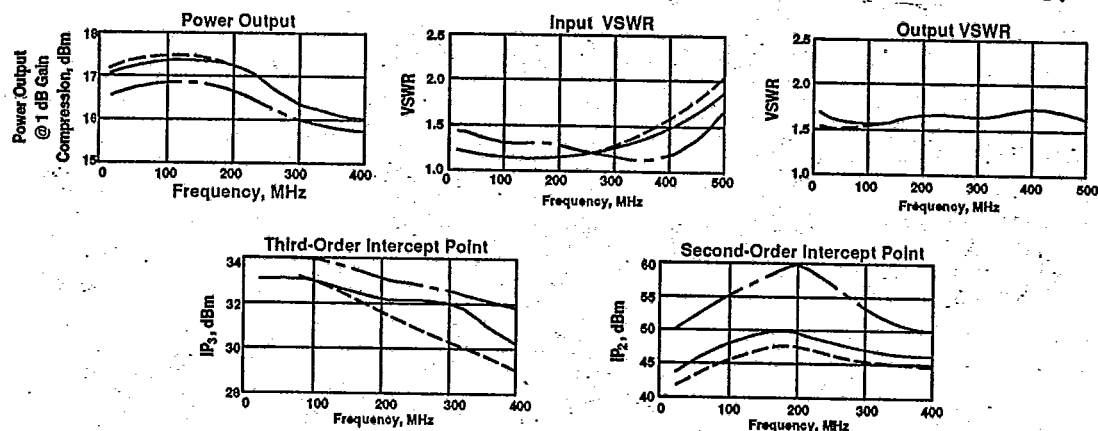
WEIGHT: (typical) PPA—0.5 grams; UTO—2.1 grams; UTC—21.5 grams

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.

UTO/UTC/PPA 441 Series
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TYPICAL PERFORMANCE OVER TEMPERATURE (continued)

T-74-09-01



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

NUMERICAL READINGS

BIAS = 15.00 VOLTS

FREQ. MHz	VSWR IN	GAIN dB	PHASE DEG	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOL dB
100.0	1.29	14.47	159.85	-20	.00	1.58	20.57
200.0	1.16	14.48	137.59	-04	.61	1.60	20.54
300.0	1.10	14.47	115.94	.71	.63	1.62	20.67
400.0	1.31	14.55	92.37	-46	.66	1.61	20.80
500.0	1.65	14.55	68.22		.71	1.58	20.75
600.0	2.06	14.02	40.97		.81	1.62	20.80
700.0	2.42	12.99	9.62		.86	2.05	21.14
800.0	2.67	11.24	-20.83		.81	2.97	21.80
900.0	2.62	8.62	-48.65		.69	4.23	22.93
1000.0	2.85	5.58	-70.55		.56	5.82	24.28
1100.0	3.22	2.48	-88.84		.48	7.37	25.47
1200.0	3.73	-3.88	-105.01		.39	8.14	26.46
1300.0	4.35	-3.09	-116.83		.30	8.94	27.45
1400.0	4.91	-5.59	-126.82		.31	10.05	28.28
1500.0	5.33	-7.73	-136.87		.29	11.49	28.62
1600.0	5.80	-8.13	-147.96		.26	11.93	29.21
1700.0	6.49	-10.02	-157.56		.33	14.13	29.82
1800.0	7.49	-10.22	-171.66		.43	15.96	31.03
1900.0	8.86	-10.72	171.53		.52	17.35	32.54
2000.0	10.69	-11.10	151.12		.00	19.05	32.88

LINEARIZATION RANGE: 100.0 to 400.0 MHz

S-PARAMETERS

BIAS = 15 VOLTS

FREQ MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.125	-175.3	14.498	159.7	-20.566	-9.0	.228	175.3
200.00	.067	-173.3	14.473	137.4	-20.541	-20.6	.231	170.6
300.00	.044	-98.1	14.512	115.4	-20.672	-29.1	.235	159.9
400.00	.140	-79.8	14.572	92.0	-20.798	-40.4	.230	141.4
500.00	.251	-90.2	14.575	67.6	-20.749	-51.7	.215	108.7
600.00	.349	-102.5	14.047	40.0	-20.802	-63.7	.233	56.4
700.00	.408	-118.5	12.979	8.1	-21.145	-77.8	.336	-4
800.00	.430	-125.3	11.186	-22.4	-21.804	-93.2	.493	-41.5
900.00	.441	-129.2	8.527	-50.5	-22.933	-107.6	.625	-71.5
1000.00	.476	-130.8	5.423	-71.7	-24.275	-118.8	.711	-92.8
1100.00	.522	-133.1	2.179	-89.8	-25.472	-128.5	.765	-108.7
1200.00	.575	-135.9	-609	-105.1	-26.457	-137.7	.806	-120.2
1300.00	.624	-139.6	-3.362	-116.9	-27.448	-147.4	.815	-130.0
1400.00	.660	-143.2	-6.063	-125.9	-28.277	-156.6	.827	-139.1
1500.00	.683	-147.3	-8.075	-136.5	-28.621	-167.8	.841	-146.6
1600.00	.708	-151.6	-9.429	-144.2	-29.211	-178.9	.858	-152.7
1700.00	.733	-154.9	-9.908	-153.8	-29.815	166.1	.874	-157.7
1800.00	.773	-157.2	-9.395	-168.5	-31.033	155.2	.898	-162.9
1900.00	.816	-160.5	-9.778	170.3	-32.541	151.5	.911	-168.1
2000.00	.848	-165.4	-10.473	146.1	-32.885	150.5	.907	-172.4