



Thin-Film Cascadable Amplifier 10 to 400 MHz

Technical Data

UTO/UTC 444 Series

Features

- **Frequency Range: 10 to 400 MHz**
- **Low Current Drain: 15 mA (Typ)**
- **Output Power: +8.7 dBm (Typ)**
- **Temperature Compensated**
- **5 Volt Supply**
- **High Efficiency**

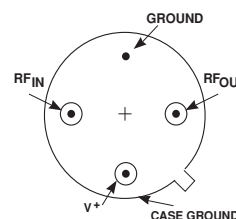
Applications

- **IF/RF Amplification**
- **Low Power Systems**

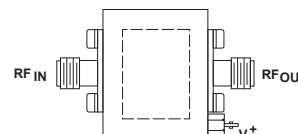
Description

The 444 Series is a 5-volt, medium-gain bipolar RF amplifier built on a thin-film substrate using output transformer coupling to increase efficiency. Blocking capacitors couple the RF through the amplifier. The 444 Series is available in either the TO-8 hermetic case or connected TC-1A package.

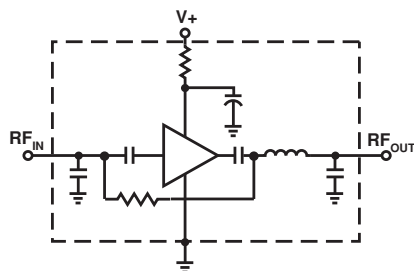
Pin Configuration UTO—TO-8T



UTC—TC-1A



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 Characteristics¹

θ_{JC}	105°C/W
Active Transistor Power Dissipation	45 mW
Junction Temperature Above Case Temperature	5°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	627,400 Hrs.

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

Electrical Specifications

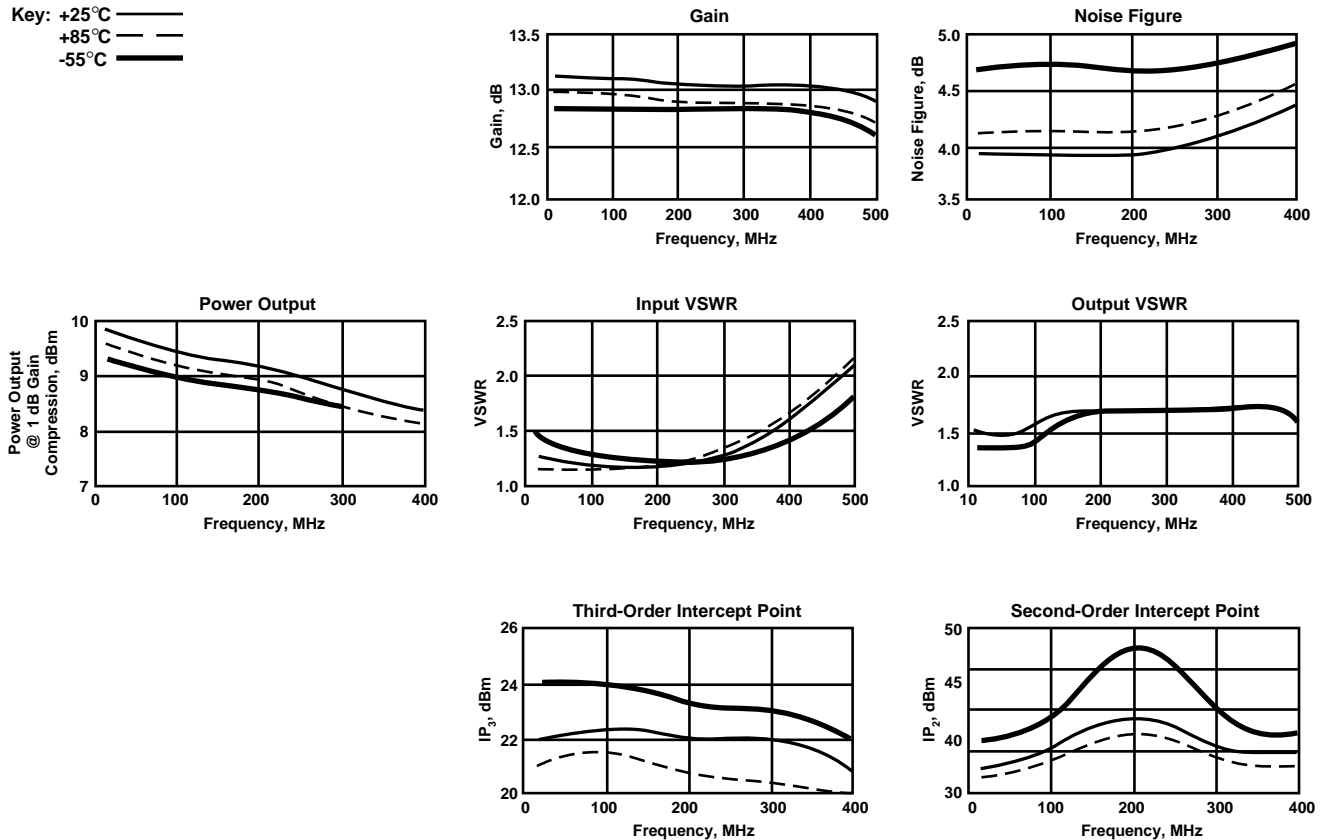
(Measured in 50 Ω system @ +5 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical $T_C = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_C = 0 \text{ to } 50^\circ\text{C}$	$T_C = -55 \text{ to } +85^\circ\text{C}$	
BW	Frequency Range	10-400	10-400	10-400	MHz
GP	Small Signal Gain (Min.)	13.0	12.5	12.0	dB
—	Gain Flatness (Max.)	± 0.1	± 0.7	± 0.7	dB
NF	Noise Figure (Max.)	4.0	5.0	5.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+8.7	+8.0	+7.5	dBm
—	Input VSWR (Max.)	1.4:1	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	+22.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+35.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+41.0	—	—	dBm
I _D	DC Current	15	—	—	mA

Note: 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.

Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)

Key: +25°C —
+85°C —
-55°C —



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)**Numerical Readings****Bias = 5.00 Volts**

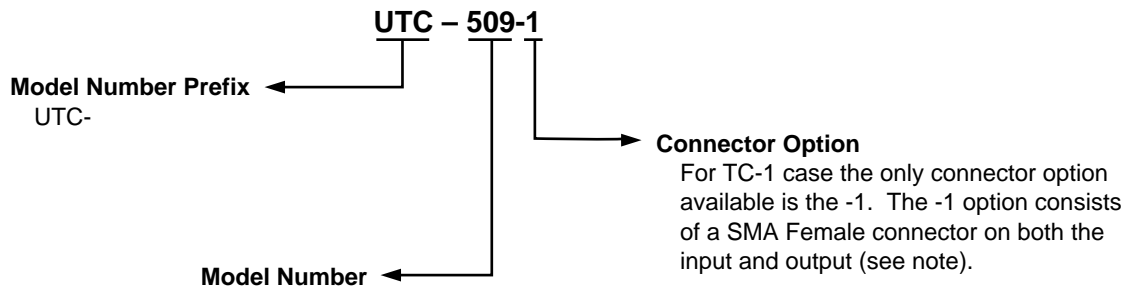
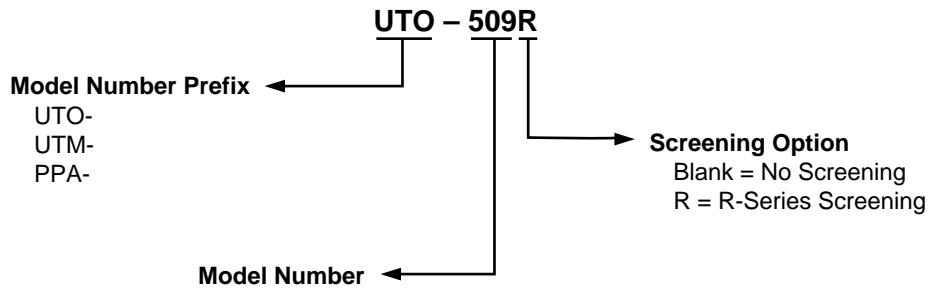
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.23	13.21	158.56	-.13	.00	1.52	19.61
200.0	1.12	13.15	136.10	-.06	.62	1.58	19.68
300.0	1.18	13.07	114.15	.54	.63	1.63	19.70
400.0	1.43	13.11	90.72	-.33	.66	1.62	19.74
500.0	1.82	13.08	66.71		.70	1.55	19.64
600.0	2.24	12.53	40.08		.79	1.52	19.57
700.0	2.62	11.55	9.86		.83	1.87	19.82
800.0	2.69	9.97	-19.52		.79	2.70	20.55
900.0	2.62	7.63	-46.67		.68	3.86	21.68
1000.0	2.72	4.89	-68.33		.56	5.30	23.00
1100.0	2.98	2.12	-86.69		.49	6.78	24.16
1200.0	3.37	-.42	-103.32		.41	7.60	25.07
1300.0	3.84	-2.78	-115.92		.33	8.44	25.95
1400.0	4.31	-4.90	-127.01		.34	9.73	26.75
1500.0	4.75	-6.75	-140.57		.35	11.01	27.17
1600.0	5.27	-8.04	-152.20		.33	11.64	27.88
1700.0	5.98	-9.04	-164.18		.37	13.42	28.60
1800.0	6.92	-9.76	-178.99		.40	14.82	29.79
1900.0	7.88	-10.70	166.69		.43	16.32	30.17
2000.0	8.68	-11.39	150.37		.00	18.63	30.27

LINEARIZATION RANGE: 100.0 to 400.0 MHz

S-Parameters**Bias = 5.00 Volts**

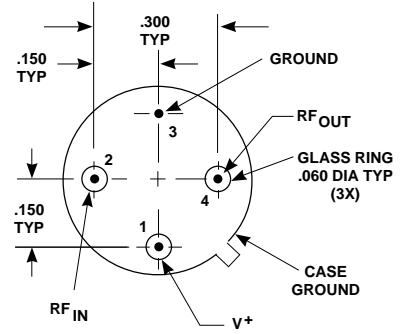
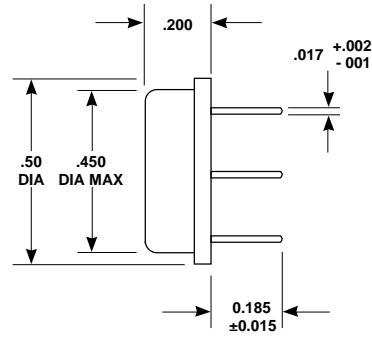
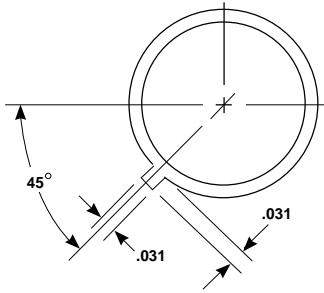
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.097	176.5	13.245	158.2	-19.608	-10.6	.210	-178.7
200.00	.051	-160.6	13.121	135.8	-19.683	-20.6	.226	177.2
300.00	.083	-92.2	13.093	113.7	-19.702	-30.0	.237	166.1
400.00	.183	-88.6	13.094	90.1	-19.735	-41.7	.232	146.1
500.00	.293	-98.5	13.050	65.9	-19.637	-52.8	.206	112.5
600.00	.383	-110.7	12.514	39.0	-19.570	-65.4	.202	55.7
700.00	.439	-124.2	11.506	8.3	-19.819	-80.1	.299	-7.1
800.00	.446	-133.3	9.892	-21.1	-20.547	-96.4	.459	-48.5
900.00	.437	-137.2	7.498	-48.5	-21.677	-111.4	.591	-77.9
1000.00	.452	-137.4	4.719	-69.1	-23.003	-123.1	.685	-98.7
1100.00	.486	-137.3	1.823	-87.6	-24.159	-132.2	.748	-114.4
1200.00	.533	-138.4	-.632	-103.5	-25.070	-142.2	.789	-126.1
1300.00	.581	-140.2	-3.045	-115.8	-25.951	-151.8	.803	-135.9
1400.00	.619	-143.4	-5.335	-125.9	-26.754	-161.1	.818	-145.2
1500.00	.645	-146.9	-7.067	-138.2	-27.170	-173.3	.837	-152.7
1600.00	.674	-150.7	-8.197	-148.6	-27.877	176.4	.855	-158.6
1700.00	.708	-153.9	-8.787	-160.8	-28.595	163.8	.871	-163.9
1800.00	.751	-156.9	-6.753	-176.8	-29.788	157.4	.894	-169.3
1900.00	.786	-160.7	-9.644	164.0	-30.169	152.5	.898	-174.3
2000.00	.806	-165.7	-10.704	143.5	-30.272	144.5	.899	-178.2

Product Options



Note: R-Series screening is not available in the TC-1 case as the case is non-hermetic.

**Case Drawings
TO-8T**



APPROXIMATE WEIGHT 2.1 GRAMS

- NOTES (UNLESS OTHERWISE SPECIFIED):**
 1. DIMENSIONS ARE SPECIFIED IN INCHES
 2. TOLERANCES: xx ± .02
 xxx ± .010

TC-1A

