



Thin-Film Cascadable Amplifier

10 to 400 MHz

Technical Data

UTO/UTC 443 Series

Features

- **Frequency Range: 10 to 400 MHz**
- **Low Current Drain: 10 mA (Typ)**
- **Output Power: +5.5 dBm (Typ)**
- **5 Volt Supply**
- **Temperature Compensated**

Applications

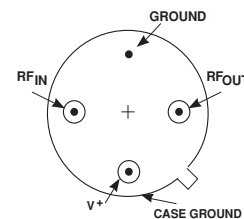
- **IF/RF Amplification**
- **Low Power Systems**

Description

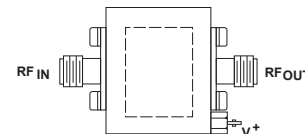
The 443 Series is a 5-volt bias medium-gain bipolar RF amplifier built on a thin-film substrate using output transformer coupling to increase efficiency. Blocking capacitors couple the RF through the amplifier. The 443 Series is available in either the TO-8 hermetic case or connected TC-1A package.

Pin Configuration

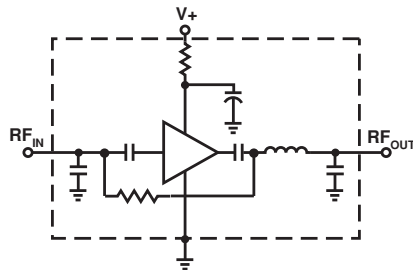
UTO—TO-8T



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	28 mW
Junction Temperature Above Case Temperature	3°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	629,500 Hrs.

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

Electrical Specifications

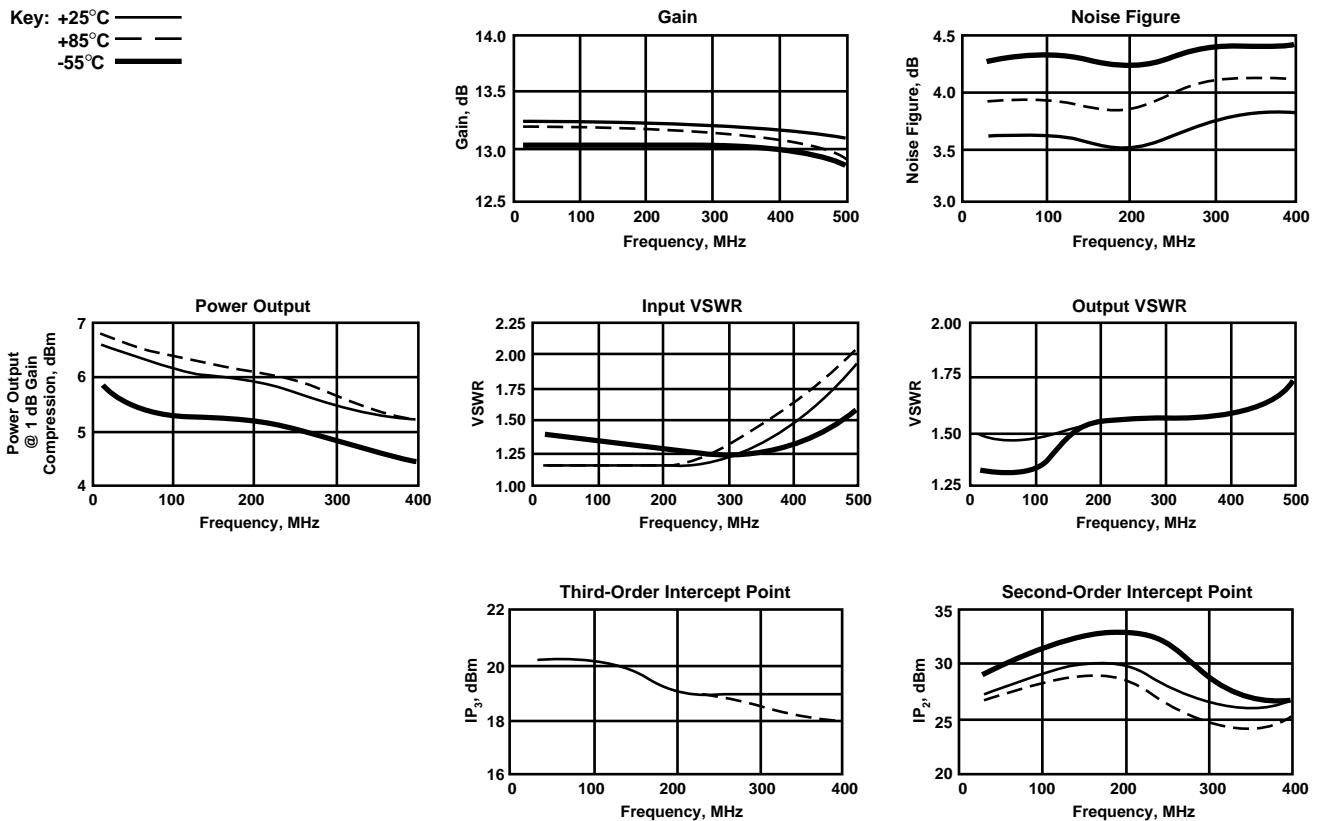
(Measured in 50 Ω system @ +5 VDC nominal unless otherwise noted)

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.)	13.2	12.5	12.0	dB
—	Gain Flatness (Max.)	± 0.1	± 0.7	± 0.7	dB
NF	Noise Figure (Max.)	3.6	4.5	5.0	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+5.5	+4.5	+4.0	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	+19.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+25.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+32.0	—	—	dBm
I _D	DC Current	10	—	—	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

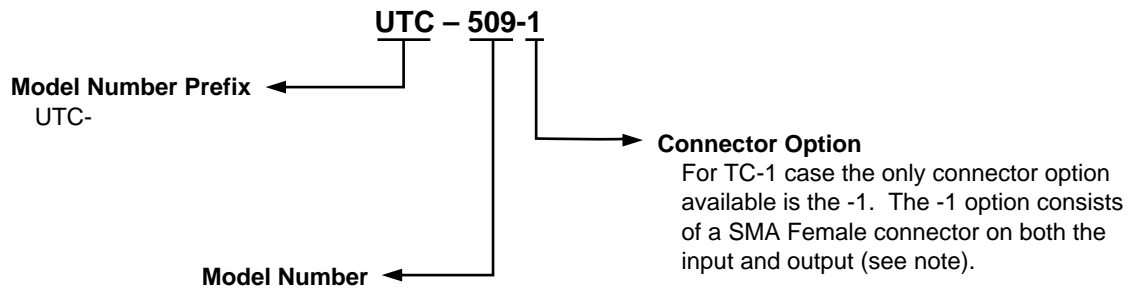
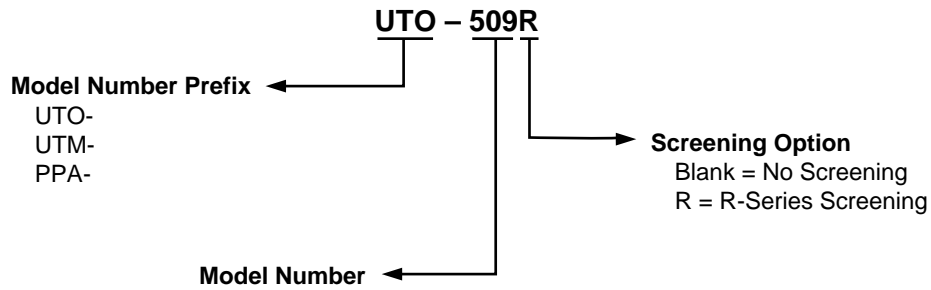
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.26	13.33	159.56	-.23	.00	1.50	19.51
200.0	1.18	13.30	138.13	.03	.59	1.52	19.55
300.0	1.20	13.27	117.02	.63	.61	1.58	19.66
400.0	1.38	13.28	94.25	-.43	.64	1.62	19.76
500.0	1.68	13.20	71.24		.67	1.67	19.78
600.0	2.03	12.61	46.30		.73	1.79	19.67
700.0	2.41	11.61	18.33		.76	2.09	19.87
800.0	2.64	10.23	-8.25		.72	2.65	20.21
900.0	2.71	8.25	-33.73		.64	3.38	20.87
1000.0	2.86	5.86	-54.40		.55	4.12	21.76
1100.0	3.11	3.43	-73.22		.49	4.97	22.62
1200.0	3.45	1.26	-89.61		.41	5.37	23.24
1300.0	3.87	-.94	-102.39		.34	5.60	23.90
1400.0	4.28	-3.11	-113.78		.36	5.87	24.48
1500.0	4.75	-4.86	-128.37		.36	6.33	24.82
1600.0	5.28	-6.14	-140.03		.32	6.46	25.45
1700.0	6.04	-7.32	-151.61		.35	7.06	25.87
1800.0	6.96	-8.15	-164.99		.38	7.66	26.80
1900.0	7.78	-9.43	-178.69		.40	8.34	27.79
2000.0	8.75	-10.45	166.01		.00	9.61	28.49

LINEARIZATION RANGE: 100.0 to 400.0 MHz

S-Parameters
Bias = 5.00 Volts

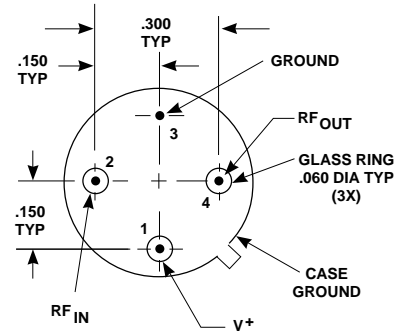
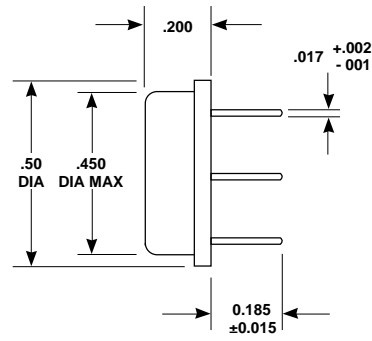
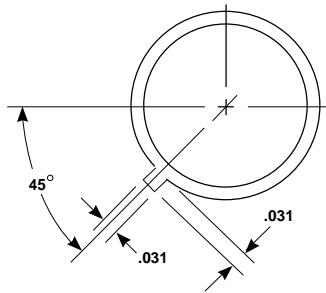
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.113	-178.4	13.376	159.1	-19.514	-9.0	.202	176.7
200.00	.074	-159.9	13.283	137.8	-19.547	-18.0	.208	168.9
300.00	.083	-113.2	13.294	116.6	-19.662	-27.0	.220	155.8
400.00	.156	-98.1	13.298	93.7	-19.761	-37.3	.233	134.1
500.00	.251	-102.4	13.217	70.5	-19.781	46.8	.244	104.2
600.00	.340	-110.3	12.641	45.2	-19.667	-57.6	.279	63.8
700.00	.407	-120.9	11.615	16.7	-19.873	-68.6	.347	19.7
800.00	.441	-129.0	10.216	-10.0	-20.212	-82.3	.450	-17.6
900.00	.457	-134.9	8.200	-35.9	-20.867	-95.3	.543	-47.8
1000.00	.478	-137.8	5.766	-56.3	-21.759	-106.3	.615	-69.9
1100.00	.506	-139.2	3.166	-74.8	-22.616	-115.8	.662	-87.6
1200.00	.542	-140.7	1.043	-90.7	-23.245	-125.9	.705	-100.6
1300.00	.584	-142.7	-1.207	-103.4	-23.899	-134.8	.716	-111.3
1400.00	.618	-145.5	-3.466	-114.4	-24.481	-145.7	.723	-121.3
1500.00	.646	-148.6	-5.154	-127.9	-24.823	-157.5	.729	-129.7
1600.00	.681	-152.1	-6.435	-138.9	-25.447	-168.5	.744	-136.3
1700.00	.717	-155.9	-7.396	-151.3	-25.868	178.7	.762	-141.0
1800.00	.756	-159.2	-7.860	-164.6	-26.804	168.6	.786	-146.0
1900.00	.785	-162.9	-9.016	179.1	-27.794	160.5	.812	-150.9
2000.00	.806	-167.3	-10.304	161.3	-28.487	153.3	.824	-155.0

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 \pm .02
 xxx \pm .010

TC-1A

