



# Thin-Film Cascadable Amplifier

## 10 to 400 MHz

### Technical Data

### UTO/UTC 442 Series

#### Features

- **Frequency Range:** 10 to 400 MHz
- **High Output Power:** +21.5 dBm (Typ)
- **High Dynamic Range**
- **Temperature Compensated**

#### Applications

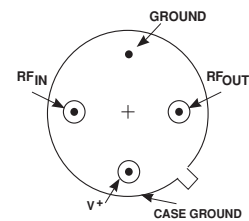
- **IF/RF Amplification**

#### Description

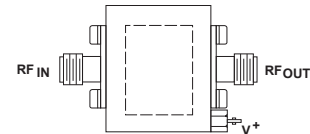
The 442 Series is a high-efficiency, medium-gain bipolar RF amplifier built on a thin-film substrate using output transformer coupling to increase efficiency. Blocking capacitors couple the RF through the amplifier. The 442 Series is available in either the TO-8 hermetic case or connected TC-1A package.

#### Pin Configuration

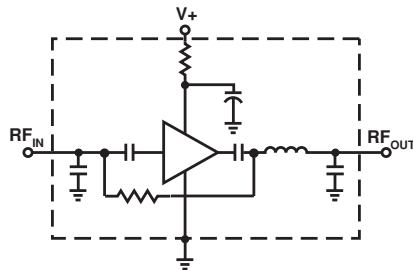
##### UTO—TO-8T



##### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+15 dBm
Operating Case Temperature	-55 to +100°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+100°C

#### Thermal Characteristics<sup>1</sup>

$\theta_{JC}$	75°C/W
Active Transistor Power Dissipation	560 mW
Junction Temperature Above Case Temperature	42°C
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	437,500 Hrs.

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

## Electrical Specifications

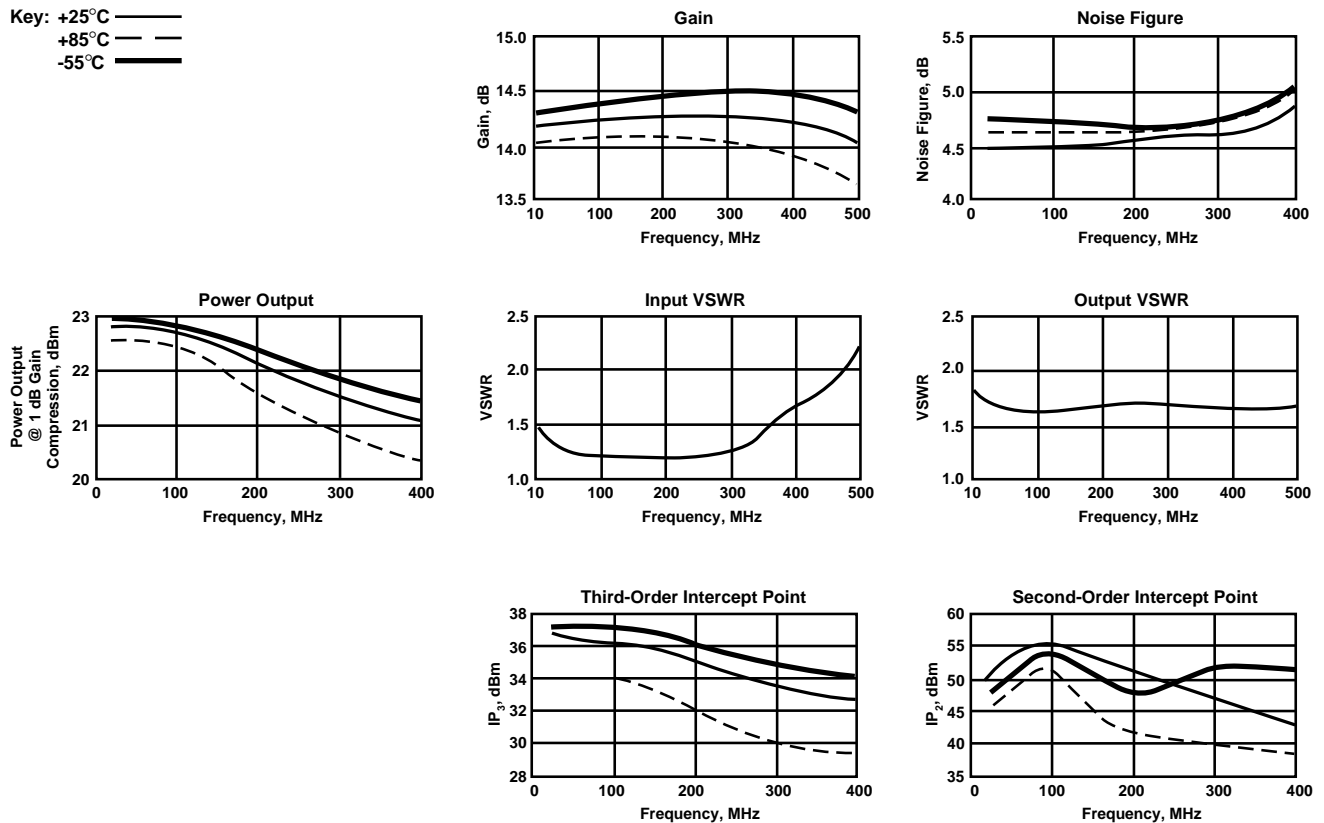
(Measured in 50  $\Omega$  system @ +15 VDC nominal unless otherwise noted)

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	20-400	20-400	MHz
GP	Small Signal Gain (Min.)	14.0	13.0	12.5	dB
—	Gain Flatness (Max.)	$\pm 0.1$	$\pm 0.7$	$\pm 0.7$	dB
NF	Noise Figure (Max.)	4.7	5.5	6.0	dB
P <sub>1dB</sub>	Power Output @ +1 dB Comp. (Min.)	+21.5	+20.0	+19.0	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 <sub>3</sub>	Two Tone 3rd Order Intercept Point	+33.0	—	—	dBm
IP <sub>2</sub>	Two Tone 2nd Order Intercept Point	+47.0	—	—	dBm
HP <sub>2</sub>	One Tone 2nd Harmonic Intercept Point	+54.0	—	—	dBm
I <sub>D</sub>	DC Current	62	—	—	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 (@ +15 VDC unless otherwise noted)

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



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

**Numerical Readings**
**Bias = 15.00 Volts**

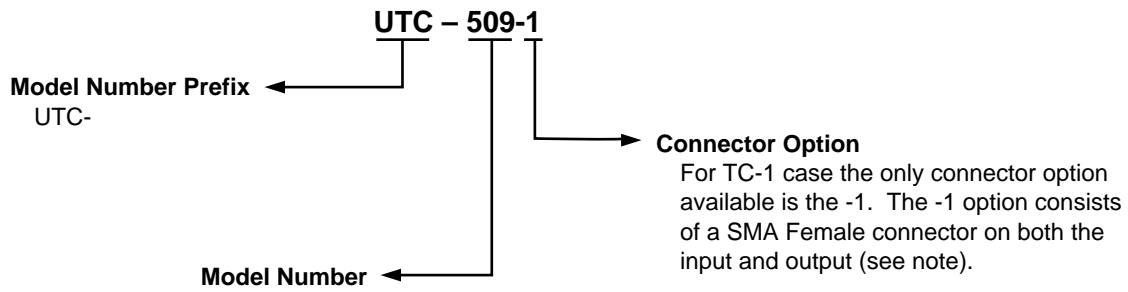
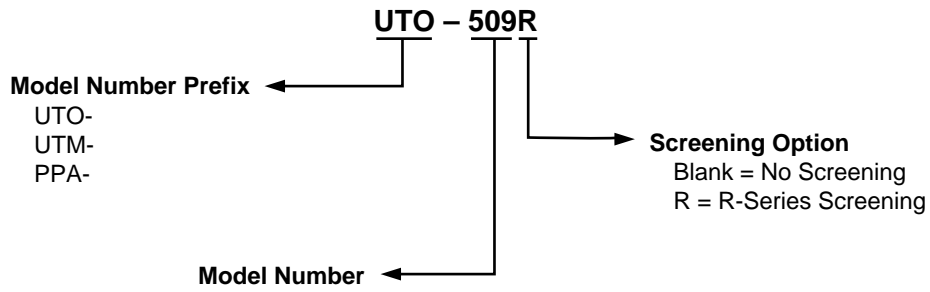
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.27	14.28	159.58	-.10	.00	1.56	20.19
200.0	1.16	14.24	135.61	-.18	.65	1.63	20.04
300.0	1.20	14.21	112.60	.69	.67	1.71	19.93
400.0	1.42	14.28	87.62	-.39	.71	1.70	19.54
500.0	1.79	14.16	61.81		.75	1.66	18.97
600.0	2.18	13.35	33.33		.81	1.84	18.74
700.0	2.38	12.00	3.35		.79	2.48	19.14
800.0	2.25	10.16	-23.81		.71	3.47	19.82
900.0	2.03	7.96	-47.93		.61	4.50	20.78
1000.0	1.92	5.67	-67.95		.53	5.61	21.60
1100.0	1.91	3.48	-86.21		.51	6.50	22.37
1200.0	2.05	1.57	-104.37		.48	6.85	22.92
1300.0	2.37	-.24	-120.63		.44	7.29	23.45
1400.0	2.83	-1.95	-136.35		.48	7.97	23.82
1500.0	3.37	-3.61	-155.27		.50	9.08	24.33
1600.0	3.90	-4.97	-172.42		.45	9.81	25.05
1700.0	4.35	-6.42	172.50		.43	12.30	25.83
1800.0	4.47	-7.58	158.80		.39	14.53	26.73
1900.0	4.26	-8.68	144.23		.37	16.73	27.88
2000.0	3.97	-9.10	129.81		.00	19.75	29.13

LINEARIZATION RANGE: 100.0 to 400.0 MHz

**S-Parameters**
**Bias = 15.00 Volts**

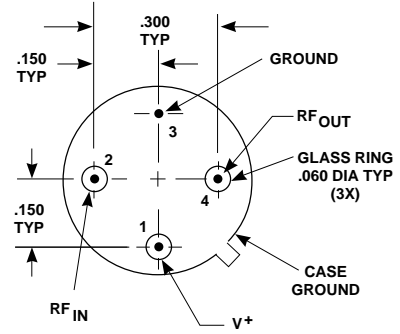
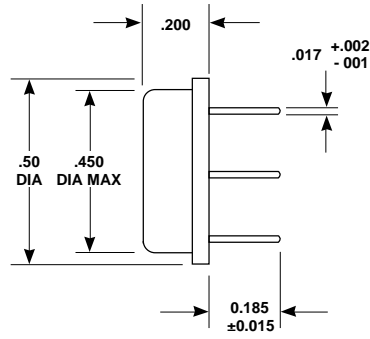
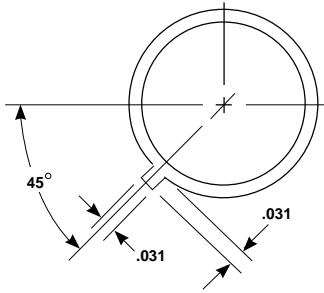
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.114	-174.4	14.267	159.5	-20.192	-6.4	.222	174.1
200.00	.078	-161.1	14.200	135.7	-20.036	-15.1	.236	168.9
300.00	.088	-110.1	14.200	112.5	-19.930	-24.0	.259	153.6
400.00	.173	-97.4	14.267	87.7	-19.535	-33.5	.255	122.8
500.00	.278	-107.8	14.108	62.4	-18.969	-45.4	.248	77.1
600.00	.375	-123.5	13.328	34.0	-18.737	-60.1	.301	17.3
700.00	.423	-137.5	12.030	4.4	-19.137	-76.4	.424	-30.4
800.00	.399	-148.3	10.245	-22.9	-19.818	-91.6	.548	-64.2
900.00	.347	-154.1	8.040	-47.3	-20.776	-104.6	.635	-87.7
1000.00	.316	-152.4	5.730	-67.1	-21.600	-115.9	.699	-104.6
1100.00	.320	-145.6	3.545	-85.6	-22.371	-126.0	.734	-116.7
1200.00	.358	-138.1	1.649	-104.1	-22.915	-137.3	.746	-127.0
1300.00	.410	-134.2	-.234	-119.9	-23.449	-149.5	.759	-135.9
1400.00	.480	-135.5	-1.931	-135.2	-23.823	-162.5	.780	-143.1
1500.00	.547	-140.3	-3.591	-154.4	-24.334	-177.1	.799	-148.7
1600.00	.601	-146.6	-4.917	-171.5	-25.052	168.4	.819	-154.1
1700.00	.631	-154.6	-6.355	173.5	-25.826	153.1	.852	-158.7
1800.00	.640	-161.5	-7.511	157.7	-26.731	140.7	.869	-163.1
1900.00	.631	-166.7	-8.626	144.9	-27.885	128.4	.887	-188.0
2000.00	.604	-171.7	-9.017	130.7	-29.130	117.6	.905	-172.5

## 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

