



# Thin-Film Cascadable Amplifier

## 5 to 500 MHz

### Technical Data

### UTO/UTC 524 Series

#### Features

- **Frequency Range:** 5 to 500 MHz
- **High Gain:** 31.0 dB (Typ)
- **Medium Output Power:** +17.0 dB (Typ)
- **Temperature Compensated**

#### Applications

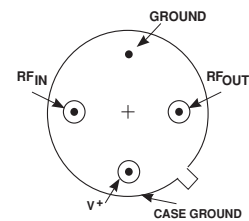
- **IF/RF Amplification**

#### Description

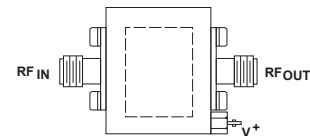
The 524 Series is a high-power, low-noise amplifier. This two-stage RF amplifier is built on a thin-film substrate and is compensated for temperature and bias variations, by using resistive feedback and active bias. Blocking capacitors couple the RF through the amplifier. The 524 Series is available in either the TO-8 hermetic case or connected TC-1A package.

#### Pin Configuration

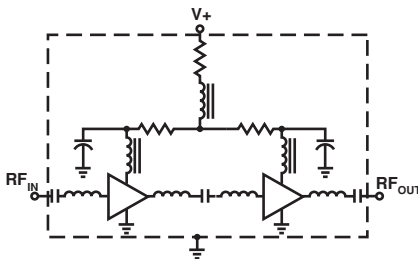
##### UTO—TO-8T



##### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +115°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+115°C

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

$\theta_{JC}$	105/75°C/W <sup>2</sup>
Active Transistor Power Dissipation	131/410 mW <sup>2</sup>
Junction Temperature Above Case Temperature	14/31°C <sup>2</sup>
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	538,800 Hrs.

Notes:

1. Values refer to first and second stages, respectively.

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

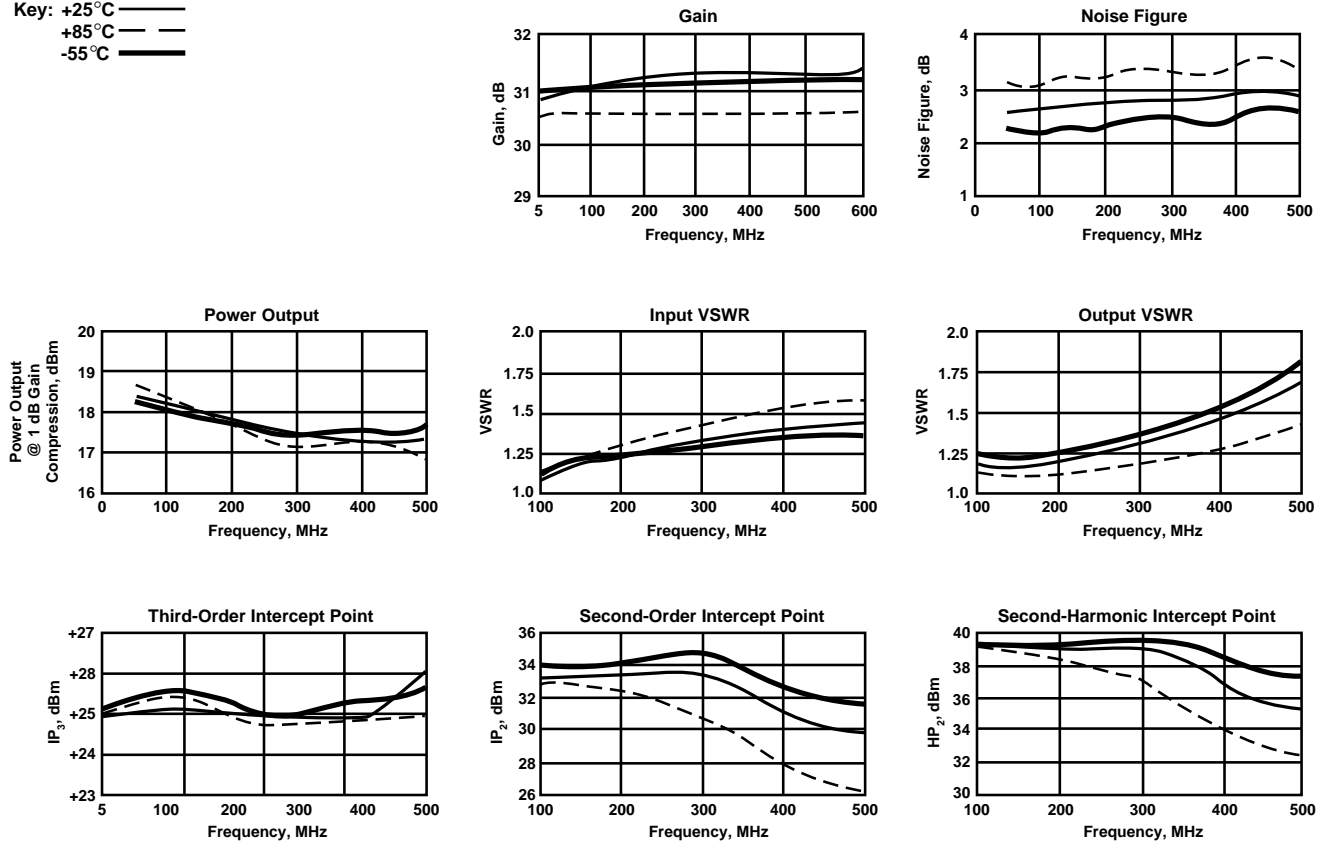
## Electrical Specifications

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

Symbol	Characteristic	Typical $T_C = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_C = 0$ to $50^\circ\text{C}$	$T_C = -55$ to $+85^\circ\text{C}$	
BW	Frequency Range	5-500	5-500	5-500	MHz
GP	Small Signal Gain (Min.)	31.0	30.0	30.0	dB
—	Gain Flatness (Max.)	$\pm 0.5$	$\pm 1.0$	$\pm 1.0$	dB
NF	Noise Figure (Max.)	3.0	4.0	4.0	dB
$P_{1dB}$	Power Output @ +1 dB Comp. (Min.)	+17.0	+14.0	+14.0	dBm
—	Input VSWR (Max.)	<1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.7:1	2.0:1	2.0:1	—
$IP_3$	Two Tone 3rd Order Intercept Point	+27.0	—	—	dBm
$IP_2$	Two Tone 2nd Order Intercept Point	+34.0	—	—	dBm
$HP_2$	One Tone 2nd Harmonic Intercept Point	+40.0	—	—	dBm
$I_D$	DC Current	70	—	—	mA

## Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key:  $+25^\circ\text{C}$  —  
 $+85^\circ\text{C}$  - - -  
 $-55^\circ\text{C}$  —



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

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

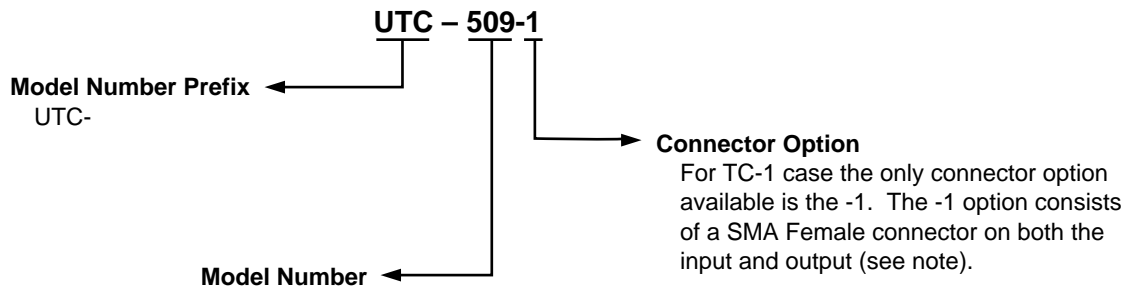
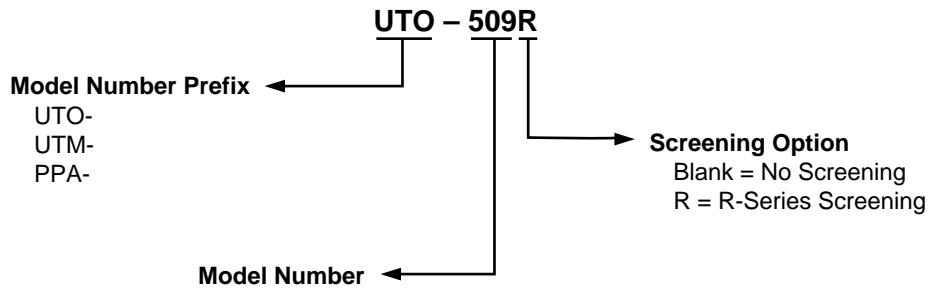
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.25	31.46	-20.38	.10	.00	1.05	40.57
150.0	1.34	31.51	-32.57	-.23	.66	1.04	39.54
200.0	1.42	31.44	-44.01	.19	.65	1.04	40.12
250.0	1.48	31.38	-56.01	.05	.67	1.04	40.34
300.0	1.52	31.38	-67.96	-.03	.66	1.03	39.95
350.0	1.54	31.34	-79.78	.00	.66	1.03	39.95
400.0	1.53	31.35	-91.84	-.20	.66	1.05	39.79
450.0	1.52	31.39	-103.59	-.09	.65	1.08	40.15
500.0	1.49	31.37	-115.14	.21	.65	1.11	40.04
550.0	1.46	31.33	-126.91	—	.67	1.15	40.03
600.0	1.46	31.27	-139.17	—	.69	1.20	40.47
650.0	1.46	31.23	-151.74	—	.72	1.24	40.26
700.0	1.53	31.22	-164.94	—	.76	1.30	40.74
750.0	1.66	31.13	-179.01	—	.81	1.34	40.68
800.0	1.86	31.04	-165.76	—	.86	1.36	40.68
850.0	2.18	30.81	149.93	—	.91	1.38	40.41
900.0	2.58	30.32	133.10	—	.94	1.36	39.58
950.0	3.04	29.59	116.05	—	.90	1.31	39.11
1000.0	3.48	28.52	100.77	—	.79	1.26	38.54

LINEARIZATION RANGE: 100.0 to 500.0 MHz

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

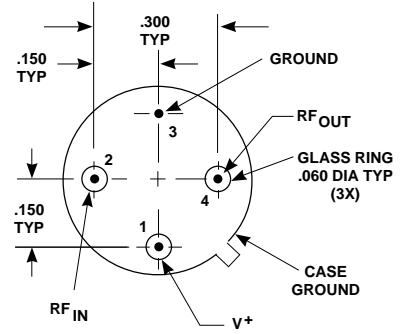
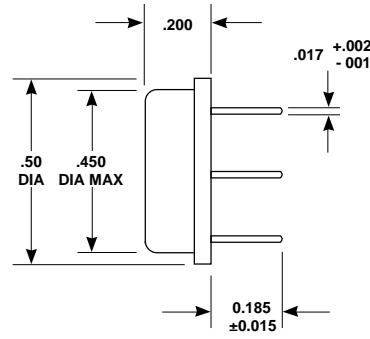
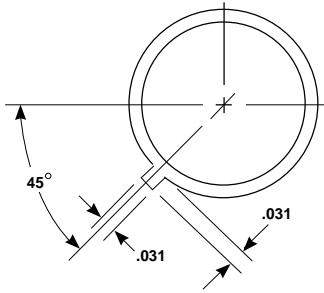
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.116	90.4	31.304	-20.6	-41.203	-2.1	.035	-11.8
200.00	.179	67.3	31.292	-43.6	-39.699	-4.1	.040	-55.7
300.00	.209	47.6	31.294	-67.4	-39.988	-14.8	.031	-109.3
400.00	.209	25.9	31.400	-91.4	-40.334	-25.1	.042	168.3
500.00	.186	-2.9	31.539	-115.2	-40.886	-29.3	.091	128.7
600.00	.166	-47.8	31.555	-140.4	-41.566	-33.0	.146	107.4
700.00	.193	-108.2	31.508	-168.0	-42.063	-37.1	.190	87.6
800.00	.296	-163.8	31.091	160.4	-41.981	-37.6	.203	65.3
900.00	.423	149.7	29.882	127.5	-40.913	-38.9	.177	46.8
1000.00	.515	112.6	27.794	98.0	-39.580	-50.7	.129	42.4

## 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

