



# Thin-Film Cascadable Amplifier 5 to 500 MHz

## Technical Data

### UTO/UTC 558 Series

#### Features

- **Frequency Range: 5 to 500 MHz**
- **High Gain: 28.0 dB**
- **5-Volt System**
- **Temperature Compensated**

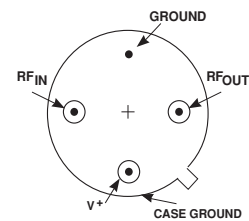
#### Applications

- **IF/RF Amplification**

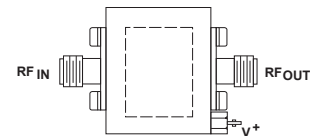
#### Description

The 558 Series is a two-stage thin-film bipolar RF amplifier that operates on 5-volt bias to provide efficiency, high gain and relatively low noise figure. Resistive feedback and active bias provide temperature compensation and increased immunity to bias voltage variations. Internal blocking capacitors couple the RF through the amplifier. The 558 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

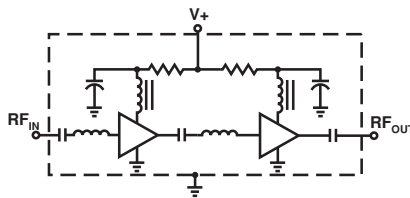
#### Pin Configuration UTO—TO-8T



#### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	+9 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 Characteristics<sup>1</sup>

$\theta_{JC}$	105/75°C/W <sup>2</sup>
Active Transistor Power Dissipation	48/228 mW <sup>2</sup>
Junction Temperature Above Case Temperature	5/17°C <sup>2</sup>
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	572,300 Hrs.

Notes:

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

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

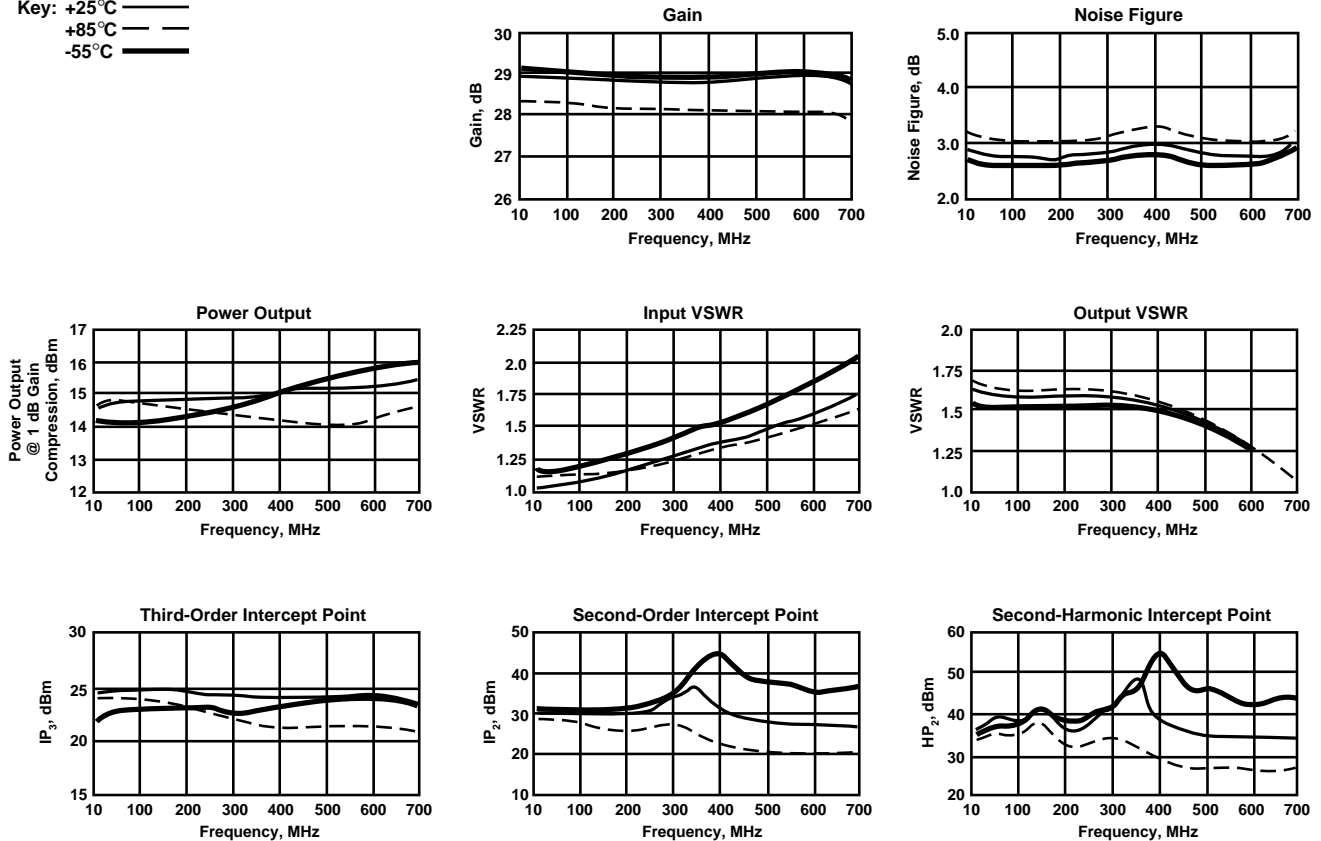
## Electrical Specifications

(Measured in 50  $\Omega$  system @ +5 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.)	29.5	28.0	27.0	dB
—	Gain Flatness (Max.)	$\pm 0.2$	$\pm 0.7$	$\pm 0.7$	dB
NF	Noise Figure (Max.)	2.7	3.2	3.6	dB
$P_{1dB}$	Power Output @ +1 dB Comp. (Min.)	+14.5	+13.5	+13.0	dBm
—	Input VSWR (Max.)	<1.5:1	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	+23.0	—	—	dBm
$IP_2$	Two Tone 2nd Order Intercept Point	+26.0	—	—	dBm
$HP_2$	One Tone 2nd Harmonic Intercept Point	+33.0	—	—	dBm
$I_D$	DC Current	70	—	—	mA

## Typical Performance Over Temperature (@ +5 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)

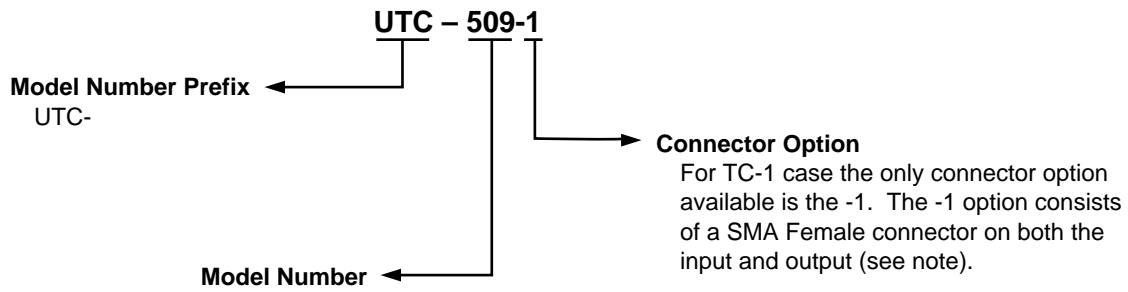
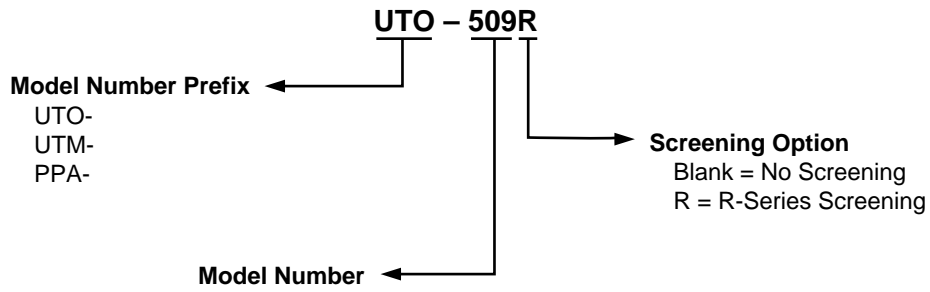
**S-Parameters, Magnitudes and Angles**
**Bias = 5.00 Volts**

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
.005	.03	141.3	28.7	21.8	-37.3	21.9	.25	172.18
.010	.01	68.3	28.8	8.2	37.2	10.3	.23	176.01
.020	.01	3.3	28.7	-1	37.2	4.5	.23	176.31
.030	.01	-25.2	28.7	-4.8	-37.2	2.3	.23	175.85
.040	.01	-44.0	28.7	-8.6	37.2	.3	.22	175.25
.050	.02	-56.6	28.7	-12.0	-37.2	-4	.22	174.53
.100	.03	-93.0	28.7	-27.2	-37.2	-5.5	.22	170.91
.150	.05	-114.6	28.6	-41.5	-37.3	-8.4	.22	167.12
.200	.07	-130.1	28.6	-55.6	-37.3	10.4	.22	162.93
.250	.00	-143.0	28.6	-69.6	-37.3	-13.9	.23	158.31
.300	.11	-153.6	28.5	-83.5	-37.4	-16.4	.23	153.27
.350	.14	-164.1	28.5	-97.6	37.3	-19.2	.22	147.15
.400	.16	-174.6	28.6	-111.9	-37.4	-21.8	.21	139.73
.450	.17	174.5	28.6	-126.4	-37.4	-23.8	.20	131.54
.500	.19	162.9	28.6	-141.4	-37.5	26.3	.17	122.52
.550	.21	150.6	28.7	-156.9	-37.5	-29.8	.15	113.09
.600	.23	137.9	28.7	-173.1	-37.5	-33.4	.11	103.82
.650	.25	125.1	28.7	169.9	-37.4	-36.4	.08	98.50
.700	.27	112.6	28.6	151.9	-37.6	-40.4	.04	118.83
.750	.29	100.8	28.3	133.0	-37.8	42.8	.05	-169.85
.800	.28	89.8	27.8	113.3	-38.2	-46.8	.11	-163.55
.850	.26	80.6	27.0	93.5	-38.7	-48.8	.18	-172.30
.900	.23	74.2	25.9	74.3	-39.0	-50.2	.24	176.85
.950	.19	71.9	24.5	56.4	-39.3	-49.5	.29	166.35
1.000	.15	74.8	23.0	40.0	-39.4	48.1	.33	157.12
1.500	.23	63.5	8.2	-66.6	-37.3	-72.1	.22	75.12
2.000	.35	23.8	-1.9	-135.1	-35.3	-93.3	.22	-23.14
3.000	.87	-24.4	-23.4	156.3	-33.5	103.1	.31	-170.17

FREQUENCY MHz	GROUP DELAY ns	PHASE DEGREES
.050	.87	.48
.075	.87	-.09
.100	.82	-.27
.125	.81	-.34
.150	.79	-.31
.175	.78	-.23
.200	.78	-.09
.225	.79	-.08
.250	.78	.03
.275	.78	.19
.300	.77	.29
.325	.78	.40
.350	.80	.32
.375	.79	.28
.400	.80	.29
.425	.80	.15
.450	.81	-.04
.475	.82	-.31
.500	.83	-.66

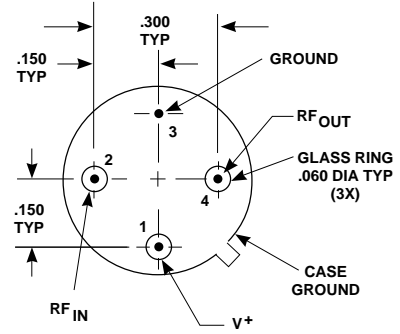
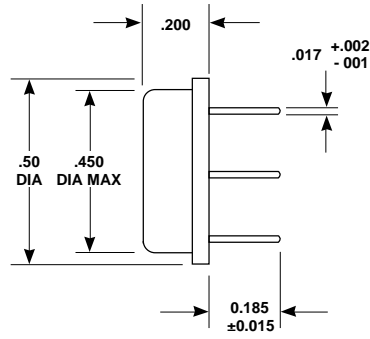
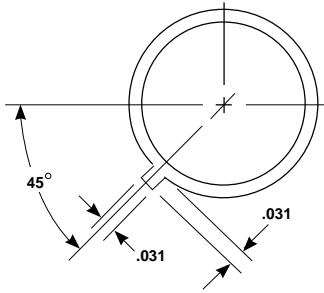
LINEARIZATION RANGE: .05 to .50 GHz

## Product Options



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

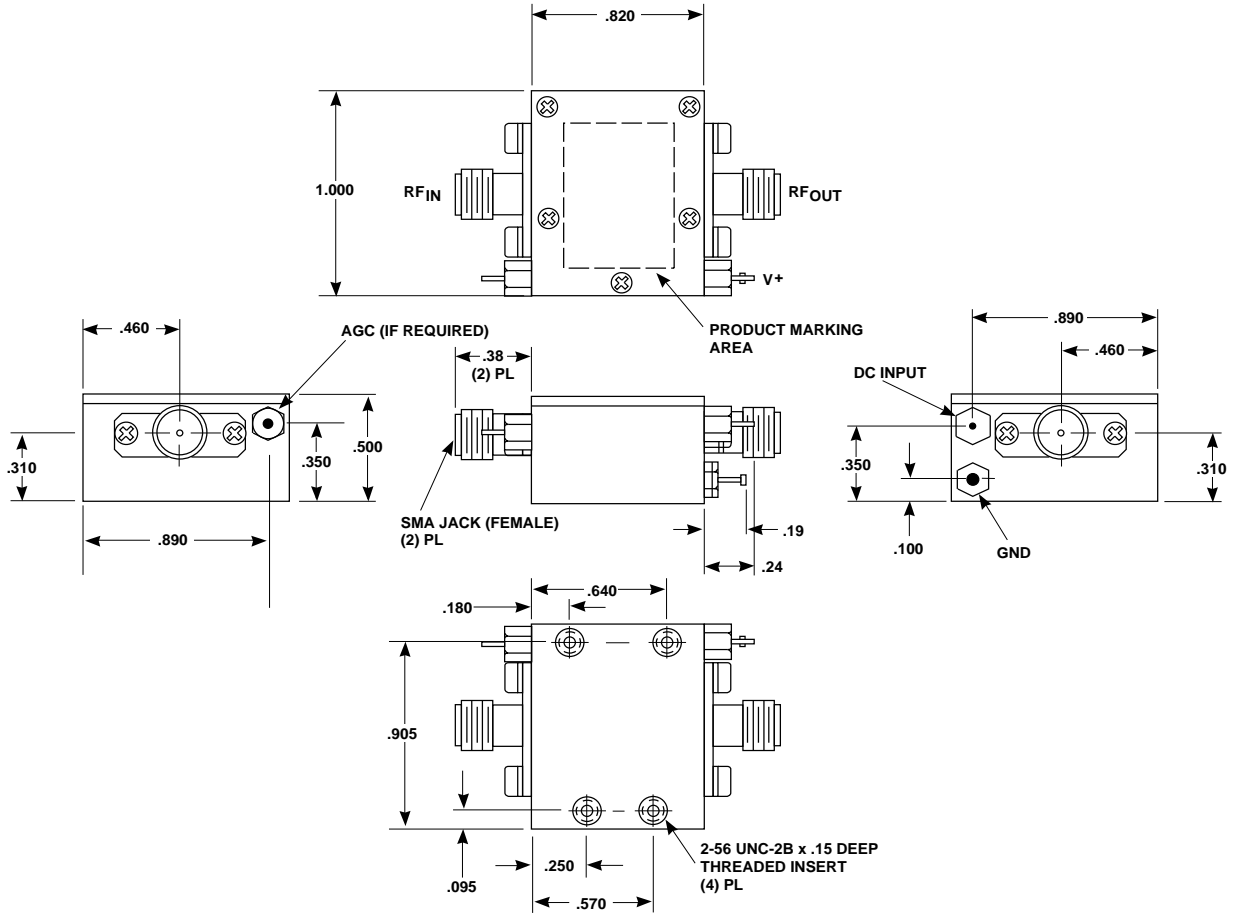
**Case Drawings  
TO-8T**



APPROXIMATE WEIGHT 2.1 GRAMS

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

# Case Drawings TC-1



TYPICAL WEIGHT WITH CONNECTORS = 21.5 GRAMS

- NOTES: 1. THE TC-1 CASE IS A NON-HERMETIC CASE.  
2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1 CASE IS THE -1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.

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

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