



# Thin-Film Cascadable Amplifier 10 to 500 MHz

## Technical Data

### UTO/UTC 543 Series

#### Features

- **Frequency Range: 10 to 500 MHz**
- **High Dynamic Range**
- **Low Noise Figure: 2.5 dB**
- **Medium Output Power: +8.0 dBm (Typ)**
- **5 Volt Supply**
- **Temperature Compensated**
- **Surface Mount Option**

#### Applications

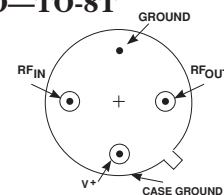
- **System Front Ends**
- **IF/RF Amplification**
- **Surface Mount Assembly**

#### Description

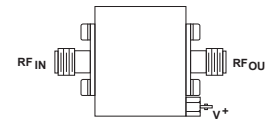
The 543 Series is a thin-film RF bipolar amplifier using lossless feedback for optimum noise figure and high dynamic range, and active bias to compensate for temperature and voltage variations. Internal blocking capacitors couple the RF through the amplifier. The 543 Series amplifiers are available in three packages: the surface mount PlanarPak PP-38 (.375 in. x .375 in.) case, the TO-8 hermetic case and the connectorized TC-1A case.

#### Pin Configuration

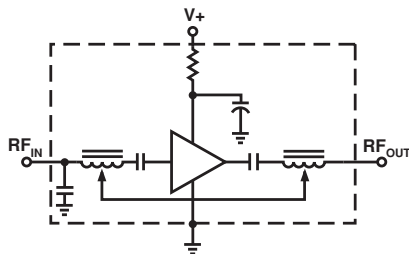
##### UTO—TO-8T



##### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +125°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+125°C

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

$\theta_{JC}$	105°C/W
Active Transistor Power Dissipation	176 mW
Junction Temperature Above Case Temperature	19°C
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	1,682,000 Hrs.

**Weight:** (typical) PPA—0.5 grams; UTO—2.1 grams; UTC—21.5 grams

## Electrical Specifications<sup>1</sup>

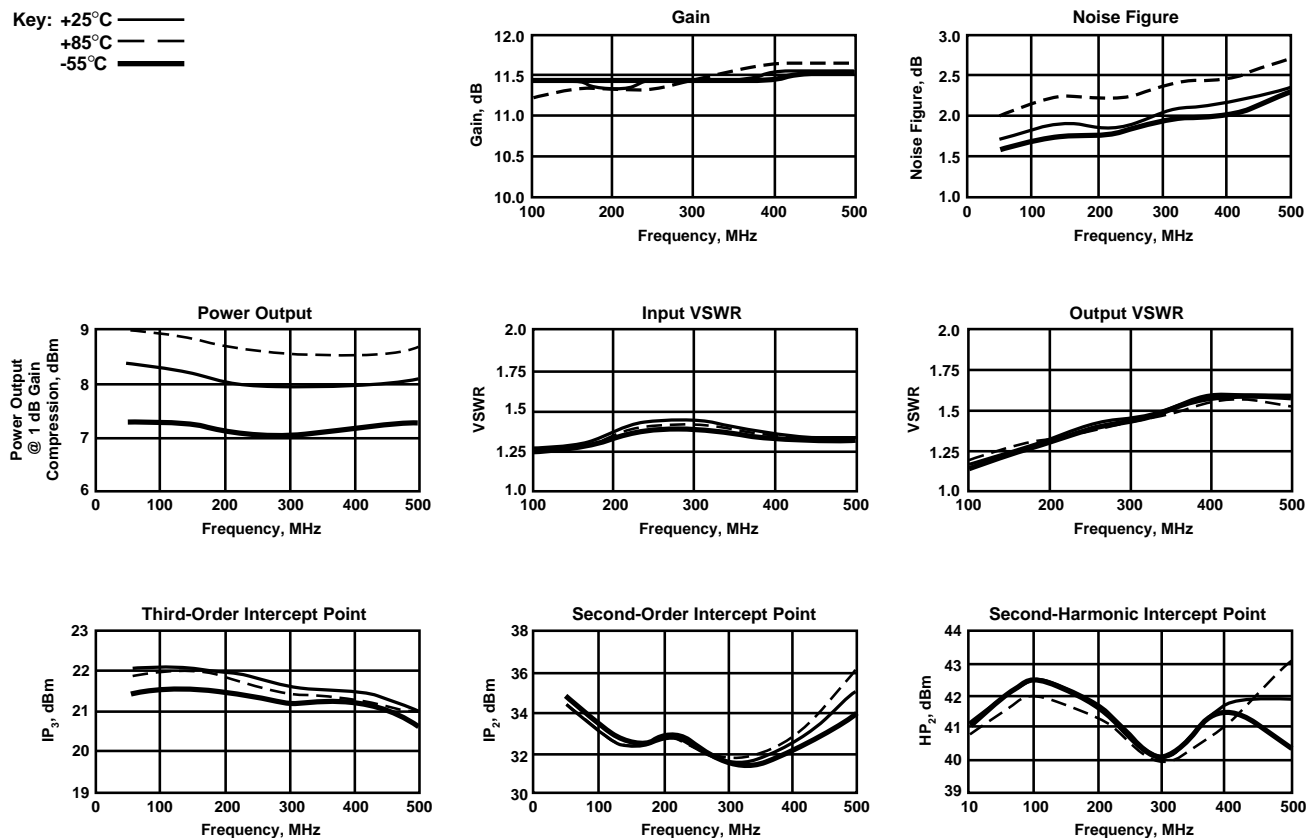
(Measured in 50  $\Omega$  system @ +15 VDC nominal unless otherwise noted)

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	10-500	10-500	10-500	MHz
GP	Small Signal Gain (Min.)	11.0	10.0	9.0	dB
—	Gain Flatness (Max.)	$\pm 0.5$	$\pm 1.0$	$\pm 1.0$	dB
NF	Noise Figure (Max.)	2.5	2.5 <sup>2</sup>	3.0 <sup>2</sup>	dB
P <sub>1dB</sub>	Power Output @ +1 dB Comp. (Min.)	+8.0	+6.0	+6.0	dBm
—	Input VSWR (Max.)	<1.7:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.7:1	2.0:1	2.0:1	—
IP <sub>3</sub>	Two Tone 3rd Order Intercept Point	+22.0	—	—	dBm
IP <sub>2</sub>	Two Tone 2nd Order Intercept Point	+30.0	—	—	dBm
HP <sub>2</sub>	One Tone 2nd Harmonic Intercept Point	+36.0	—	—	dBm
I <sub>D</sub>	DC Current	25	—	—	mA

Notes: 1. Both RF input and RF output pins are at DC ground – no blocking capacitor.  
2. PPA, Noise Figure = 2.7 dB from 0°–50°C and 3.2 from 55° to +85°C.

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

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



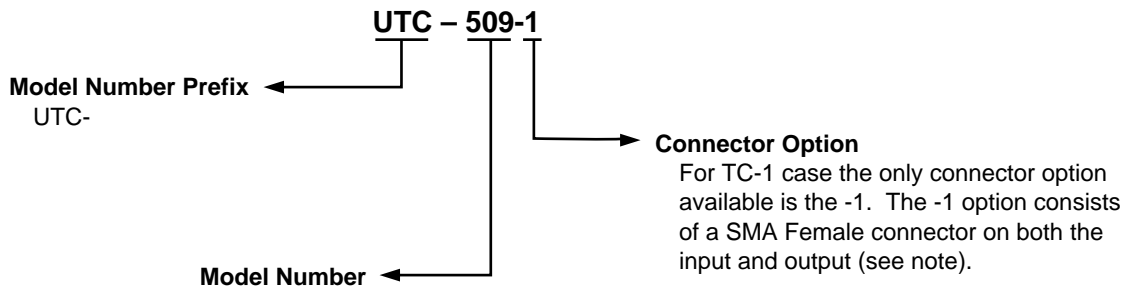
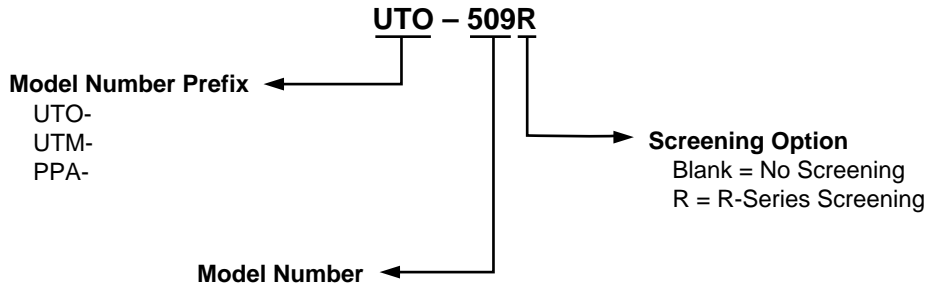
**Automatic Network Analyzer Measurements** (Typical production unit @ +25°C ambient)**Numerical Readings****Bias = 15.00 Volts**

FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.06	10.81	167.92	1.37	.00	1.15	16.41
150.0	1.11	10.70	159.48	.66	.46	1.21	16.15
200.0	1.16	10.69	151.41	.32	.44	1.27	16.26
250.0	1.22	10.64	143.51	.15	.44	1.33	16.45
300.0	1.25	10.64	135.73	.10	.43	1.39	16.56
350.0	1.29	10.64	128.09	.20	.42	1.42	16.47
400.0	1.31	10.62	120.64	.48	.41	1.45	16.47
450.0	1.32	10.61	113.38	.94	.41	1.46	16.45
500.0	1.32	10.58	105.83	1.12	.42	1.45	16.45
600.0	1.28	10.50	90.55	1.31	.43	1.38	16.38
700.0	1.23	10.29	74.82	1.03	.47	1.25	16.30
800.0	1.22	10.04	57.48	-.83	.46	1.12	16.23
900.0	1.33	9.54	40.71	-2.14	.47	1.20	16.24
1000.0	1.51	8.91	24.20	-3.19	.45	1.46	16.38
1100.0	1.76	8.07	8.33	-3.59	.42	1.80	16.71
1200.0	2.01	7.15	-6.40	-2.87	.39	2.20	17.09
1300.0	2.26	6.20	-19.73	-.72	.35	2.59	17.60

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

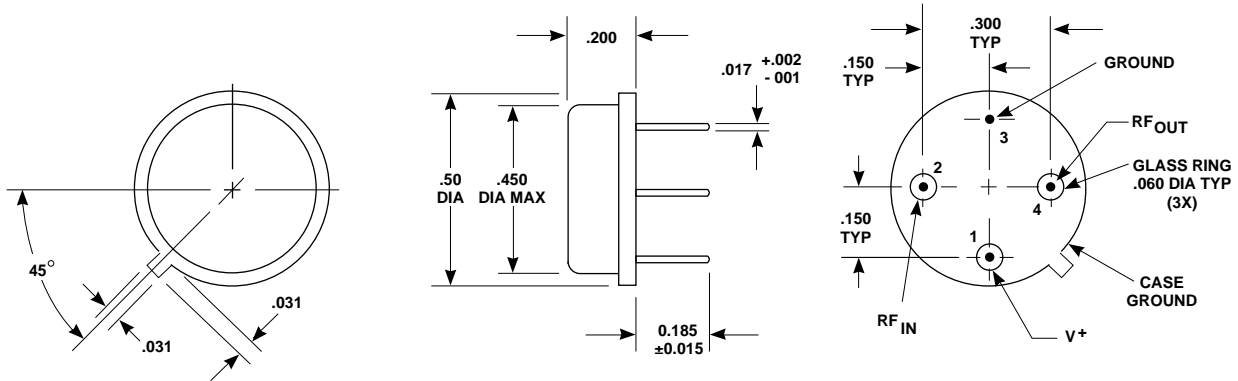
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.028	140.0	10.745	166.8	-16.327	169.3	.066	127.9
150.00	.052	99.1	10.702	158.7	-16.326	160.9	.091	103.5
200.00	.075	85.1	10.607	150.4	-16.398	154.0	.119	86.8
250.00	.098	73.2	10.577	142.2	-16.462	147.3	.141	77.3
300.00	.116	68.0	10.562	134.3	-16.635	140.4	.157	67.2
350.00	.128	61.6	10.579	126.5	-16.542	134.0	.171	59.8
400.00	.133	55.3	10.584	118.9	-16.381	127.6	.179	52.0
450.00	.135	49.6	10.596	111.4	-16.481	122.1	.180	45.2
500.00	.133	46.2	10.547	103.5	-16.410	115.8	.179	38.3
550.00	.126	44.6	10.553	95.9	-16.430	109.7	.166	32.2
600.00	.115	43.7	10.506	87.9	-16.397	103.5	.151	27.2
700.00	.097	53.8	10.317	71.7	-16.316	91.5	.102	23.0
800.00	.097	78.2	10.040	53.9	-16.298	78.3	.052	57.1
900.00	.147	93.7	9.561	36.7	-16.346	65.2	.100	111.9
1000.00	.207	93.7	8.920	19.7	-16.525	53.0	.193	113.2
1100.00	.278	86.8	8.052	3.4	-16.737	39.8	.286	104.1
1200.00	.328	76.7	7.211	-11.7	-17.171	27.7	.371	94.5
1300.00	.378	70.0	6.278	-25.3	-17.517	16.1	.437	84.8

## 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

