



Thin-Film Cascadable Amplifier 5 to 1500 MHz

Technical Data

UTO/UTC 1511 Series

Features

- **Frequency Range: 5 to 1500 MHz**
- **Noise Figure: 3.5 dB (Typ)**
- **Low Power Consumption**

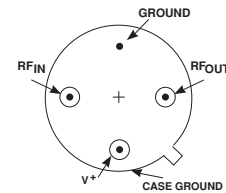
Applications

- **System Front End**
- **Low Power Systems**

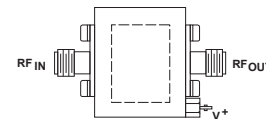
Description

The 1511 Series is a low-noise, wideband thin-film bipolar RF amplifier that incorporates resistive feedback and active bias to provide a stable and reliable gain stage. Inductively coupled input and output networks provide good VSWR under all conditions. The 1511 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

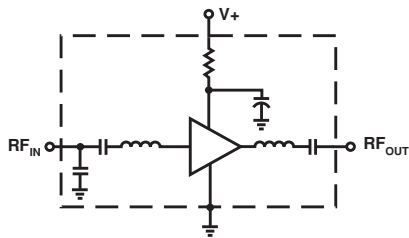
Pin Configuration UTO—TO-8U



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 Characteristics¹

θ_{JC}	105°C/W
Active Transistor Power Dissipation	43 mW
Junction Temperature Above Case Temperature	5°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,421,000 Hrs.

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

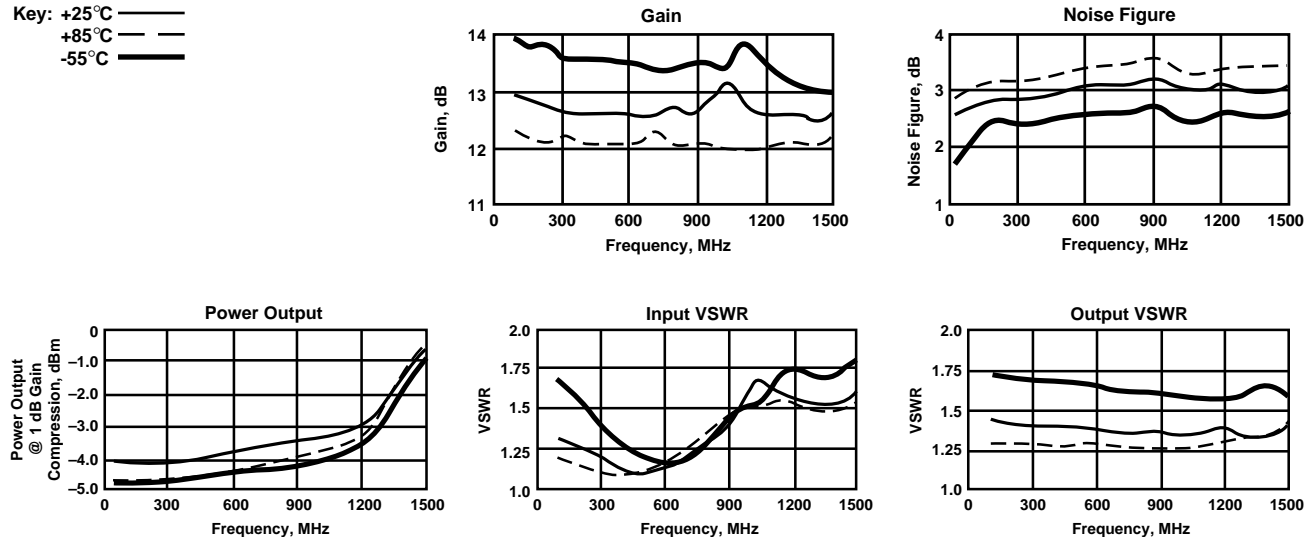
Electrical Specifications

(Measured in 50 Ω 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	5-1500	5-1500	5-1500	MHz
GP	Small Signal Gain (Min.)	12.5	10.0	10.0	dB
—	Gain Flatness (Max.)	± 0.5	± 0.5	± 1.0	dB
NF	Noise Figure (Max.)	3.5	4.5	5.0	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	-4.0	-9.0	-10.0	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_3	Two Tone 3rd Order Intercept Point	+1.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+10.0	—	—	dBm
HP_2	One Tone 2nd Order Intercept Point	+16.0	—	—	dBm
I_D	DC Current	7	—	—	mA

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

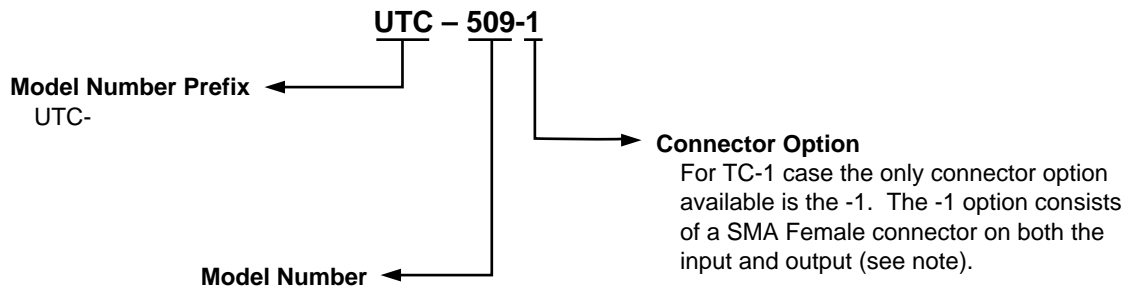
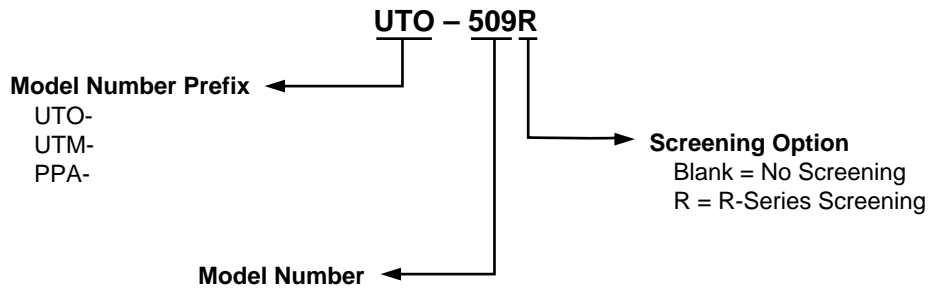
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.32	13.29	164.19	-1.70	—	1.33	18.08
200.0	1.31	13.42	147.04	-2.61	.40	1.36	18.08
300.0	1.30	13.31	132.72	-.72	.41	1.39	18.12
400.0	1.28	13.19	117.31	.08	.44	1.42	18.27
500.0	1.26	13.19	101.45	.45	.43	1.45	18.23
600.0	1.26	13.09	85.88	1.09	.45	1.48	18.43
700.0	1.25	13.18	70.14	1.57	.43	1.46	18.77
800.0	1.26	13.21	54.56	2.20	.44	1.44	18.89
900.0	1.29	13.21	38.15	2.00	.47	1.44	19.12
1000.0	1.34	13.31	21.65	1.71	.45	1.41	19.31
1100.0	1.41	13.34	4.29	.56	.48	1.40	19.56
1200.0	1.51	13.50	-12.07	.40	.45	1.39	19.96
1300.0	1.58	13.52	-28.52	.16	.48	1.40	20.28
1400.0	1.67	13.40	-46.35	-1.44	.53	1.40	20.58
1500.0	1.75	13.21	-66.43	-5.31	.57	1.39	20.91
1600.0	1.89	13.06	-88.23	—	.58	1.37	20.87
1700.0	2.11	12.76	-108.05	—	.56	1.33	20.98
1800.0	2.39	12.16	-128.34	—	.58	1.27	21.14
1900.0	2.85	11.35	-150.53	—	.00	1.21	21.41

Linearization Range: 100.0 to 1500.0 MHz

S-Parameters
Bias = 15.00 Volts

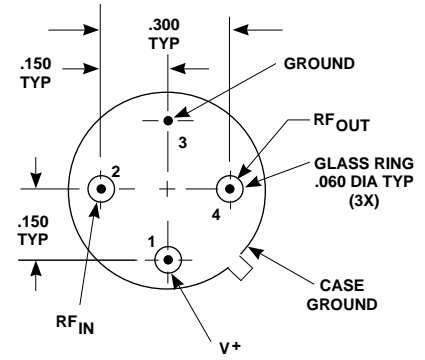
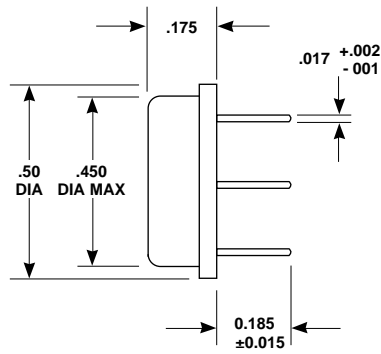
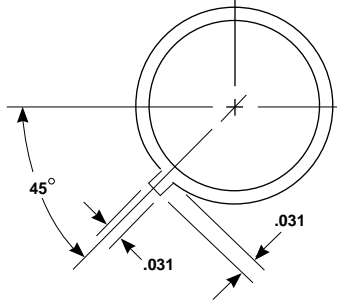
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.130	171.2	12.15	162.7	-17.08	-4.7	.147	158.7
200.00	.125	162.1	12.05	150.0	17.14	-10.9	.150	138.9
300.00	.117	150.7	12.05	134.8	-17.02	-17.5	.158	118.6
400.00	.104	139.8	11.93	119.4	-17.26	-23.4	.161	99.8
500.00	.090	127.7	12.05	105.6	-17.14	-31.1	.163	83.1
600.00	.072	115.8	12.02	91.5	-17.26	-37.2	.158	66.4
700.00	.053	98.9	12.09	76.4	-17.20	-43.3	.152	49.1
800.00	.031	77.0	12.12	62.4	-17.45	-50.4	.136	33.5
900.00	.017	24.8	12.23	46.6	-17.52	-58.3	.119	15.4
1000.00	.021	-58.9	12.28	31.9	-17.52	-64.5	.095	-7.1
1100.00	.036	-92.8	12.50	16.2	-17.79	-71.1	.073	-34.1
1200.00	.049	-120.5	12.44	.9	-17.99	-77.9	.058	-76.1
1300.00	.060	-150.7	12.55	-16.9	-18.13	-86.7	.065	-125.8
1400.00	.068	176.6	12.69	-33.4	-18.34	-91.7	.087	-159.2
1500.00	.086	136.6	12.58	-50.8	-18.56	-98.6	.113	175.4
1600.00	.125	99.7	12.38	-69.2	-18.86	-104.5	.133	157.9
1700.00	.187	67.8	12.25	-89.3	-18.86	-112.7	.143	141.8
1800.00	.271	42.6	11.76	-107.7	-19.01	-120.7	.142	129.0
1900.00	.361	20.9	11.09	-128.2	-19.17	-129.1	.128	120.7
2000.00	.456	.2	10.25	-147.6	-19.49	-137.7	.105	120.8

Product Options



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

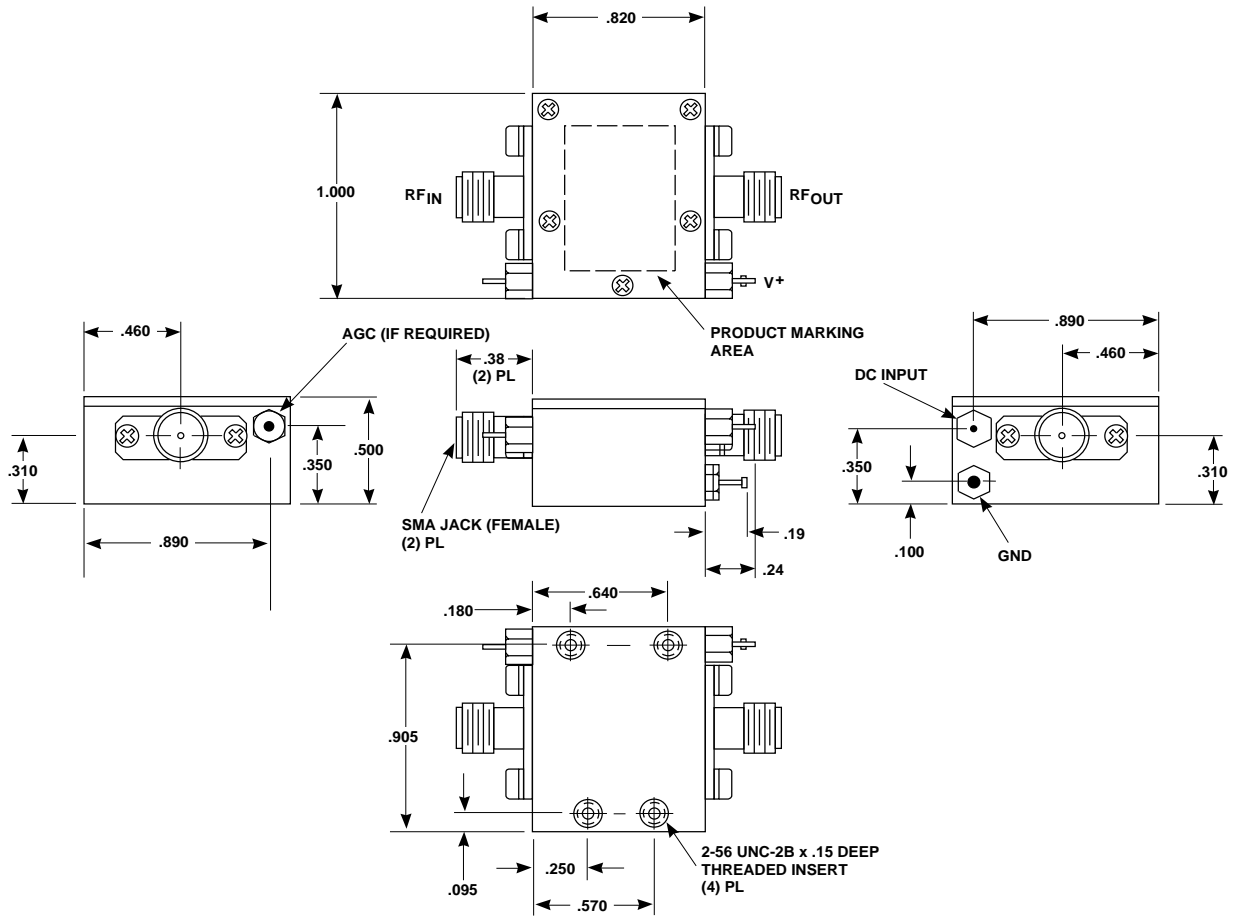
**Case Drawings
TO-8U**



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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