

# Thin-Film Cascadable Amplifier

## 2 to 1000 MHz

### Technical Data

#### UTO/UTC 1011 Series

#### Features

- **Frequency Range: 2 to 1000 MHz**
- **Low Noise Figure: 3.0 dB (Typ)**
- **Medium Gain: 14.5 dB (Typ)**
- **Temperature Compensated**
- **Low Supply Current**

#### Applications

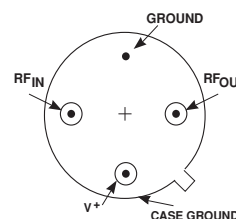
- **IF/RF Amplification**
- **Low Power Systems**

#### Description

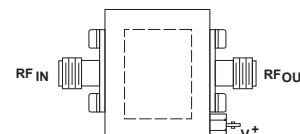
The 1011 Series is a wideband, general-purpose thin-film bipolar RF amplifier using resistive feedback and active bias for stability over temperature and bias verifications. Input and output blocking capacitors couple the RF through the amplifier while output inductance maintains a low VSWR. The 1011 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

#### Pin Configuration

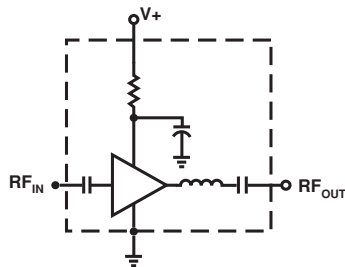
##### UTO—TO-8U



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

$\theta_{JC}$	105°C/W
Active Transistor Power Dissipation	44 mW
Junction Temperature Above Case Temperature	5°C
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	1,452,000 Hrs.

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

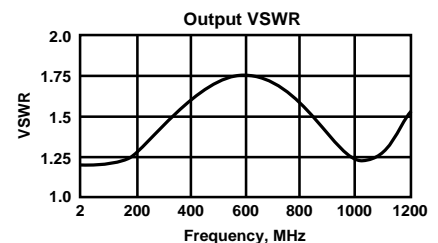
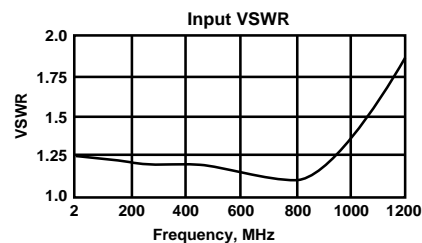
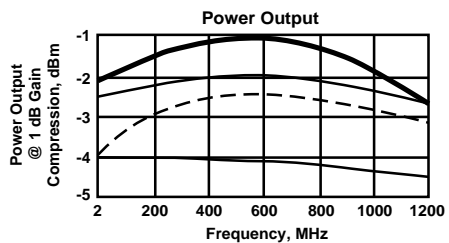
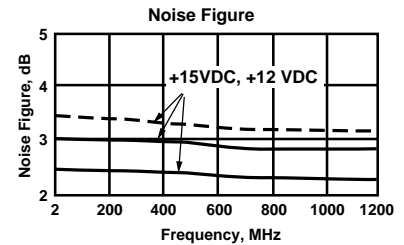
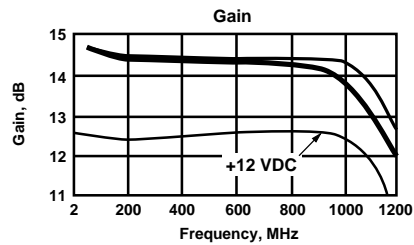
## Electrical Specifications

(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	2-1000	2-1000	2-1000	MHz
GP	Small Signal Gain (Min.)	14.5	14.0	13.5	dB
—	Gain Flatness (Max.)	$\pm 0.5$	$\pm 0.7$	$\pm 1.0$	dB
NF	Noise Figure (Max.)	3.0	3.5	4.0	dB
P <sub>1dB</sub>	Power Output @ +1 dB Comp. (Min.)	-2.0	-5.0	-6.0	dBm
—	Input VSWR (Max.)	<1.4:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<2.0:1	2.2:1	2.2:1	—
IP <sub>3</sub>	Two Tone 3rd Order Intercept Point	+10.0	—	—	dBm
IP <sub>2</sub>	Two Tone 2nd Order Intercept Point	+7.0	—	—	dBm
HP <sub>2</sub>	One Tone 2nd Harmonic Intercept Point	+13.0	—	—	dBm
I <sub>D</sub>	DC Current	8	—	—	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**

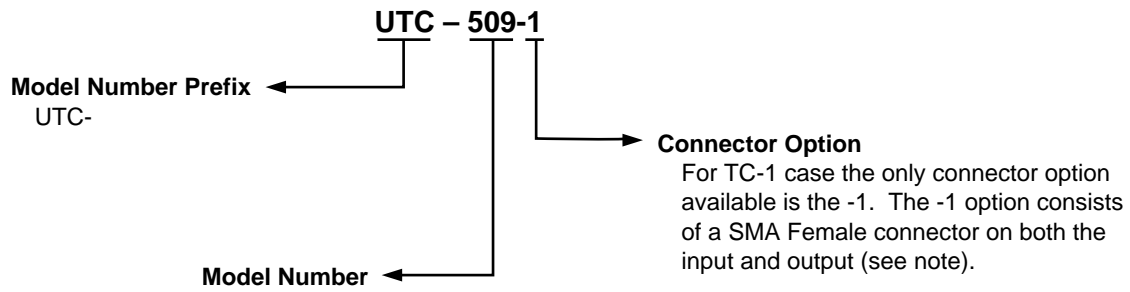
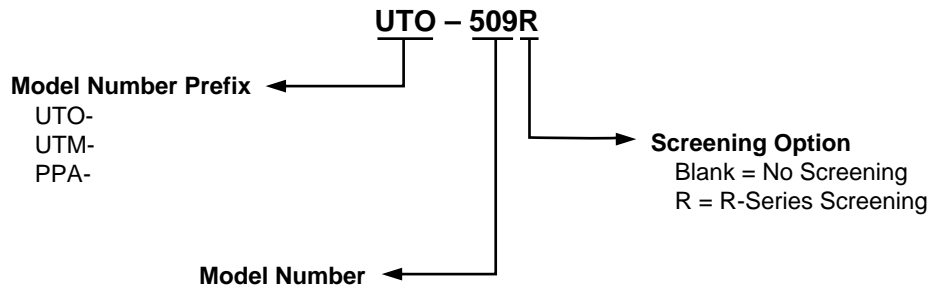
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.18	14.46	162.04	-8.68	.00	19.44	1.21
150.0	1.18	14.40	153.79	-7.54	.46	19.47	1.30
200.0	1.20	14.32	145.52	-6.40	.45	19.47	1.39
250.0	1.20	14.25	137.56	-4.94	.44	19.45	1.49
300.0	1.21	14.20	129.68	-3.44	.44	19.45	1.58
350.0	1.21	11.10	121.56	-2.15	.41	19.41	1.67
400.0	1.22	14.05	114.76	.45	.41	19.34	1.76
450.0	1.21	14.00	106.69	1.78	.45	19.27	1.83
500.0	1.21	14.00	98.59	3.07	.45	19.18	1.90
550.0	1.20	14.00	90.45	4.34	.46	19.05	1.96
600.0	1.19	14.05	82.00	5.30	.47	18.96	1.97
650.0	1.17	14.08	73.36	6.05	.48	18.88	1.97
700.0	1.15	14.14	64.55	6.65	.49	18.82	1.95
750.0	1.12	14.20	55.65	7.15	.50	18.78	1.91
800.0	1.11	14.26	46.42	7.32	.52	18.77	1.82
850.0	1.12	14.31	36.76	7.07	.54	18.77	1.70
900.0	1.17	14.33	26.89	6.61	.57	18.85	1.59
950.0	1.26	14.32	16.32	5.43	.60	18.98	1.44
1000.0	1.38	14.20	5.33	3.84	.62	19.29	1.31
1050.0	1.53	13.99	-5.94	1.98	.63	19.56	1.24
1100.0	1.70	13.64	-17.43	-.10	.64	20.03	1.29
1150.0	1.90	13.17	-28.87	-2.14	.63	20.55	1.47
1200.0	2.10	12.51	-40.24	-4.11	.62	21.14	1.72
1250.0	2.30	11.76	-51.16	-5.62	.58	21.64	2.00
1300.0	2.49	10.90	-61.05	-6.11	.53	22.14	2.31
1350.0	2.64	9.94	-70.29	-5.95	.49	22.53	2.68
1400.0	2.75	9.02	-78.82	-5.08	.45	22.75	3.06
1450.0	2.84	8.03	-86.65	-3.51	.42	22.82	3.38
1500.0	2.90	7.11	-93.80	-1.25	.00	22.84	3.71

LINEARIZATION RANGE: 100.0 to 1000.0 MHz

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

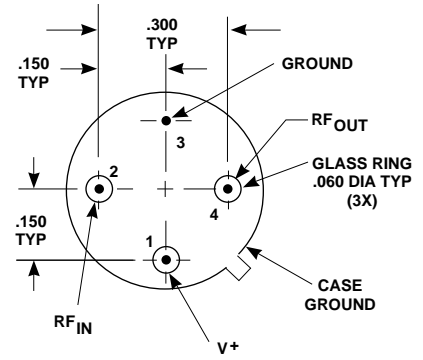
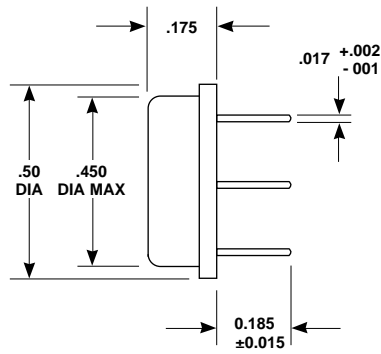
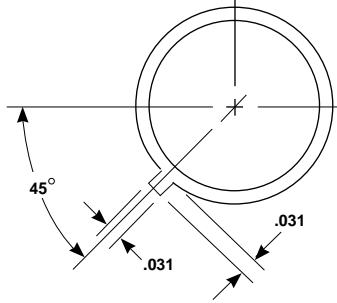
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.097	-175.5	14.689	162.7	-19.747	-6.8	.108	119.5
200.00	.105	179.1	14.499	145.7	-19.718	-13.0	.173	85.9
300.00	.108	175.2	14.425	128.7	-19.394	-19.7	.231	66.4
400.00	.111	171.2	14.395	112.7	-19.471	-26.6	.279	50.9
500.00	.106	165.6	14.327	96.9	-19.247	-34.4	.312	35.6
600.00	.097	161.7	14.327	80.9	-19.051	-42.4	.331	20.8
700.00	.078	160.3	14.335	64.0	-18.834	-51.3	.324	4.6
800.00	.058	-176.3	14.402	45.9	-18.793	-61.3	.292	-14.4
900.00	.073	-135.6	14.415	25.8	-18.669	-72.6	.228	-39.2
1000.00	.151	-126.6	14.222	3.7	-19.053	-84.8	.134	-82.7
1100.00	.251	-137.8	13.582	-20.1	-19.685	-95.2	.124	179.0
1200.00	.350	-153.0	12.409	-43.1	-20.714	-105.0	.259	124.3
1300.00	.415	-169.2	10.704	-63.7	-21.525	-110.5	.399	95.9
1400.00	.451	177.7	8.849	-82.6	-22.087	-114.7	.503	74.5
1500.00	.468	165.7	7.090	-97.4	-22.175	-118.8	.583	58.1

## Product Options



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

**Case Drawings  
TO-8U**

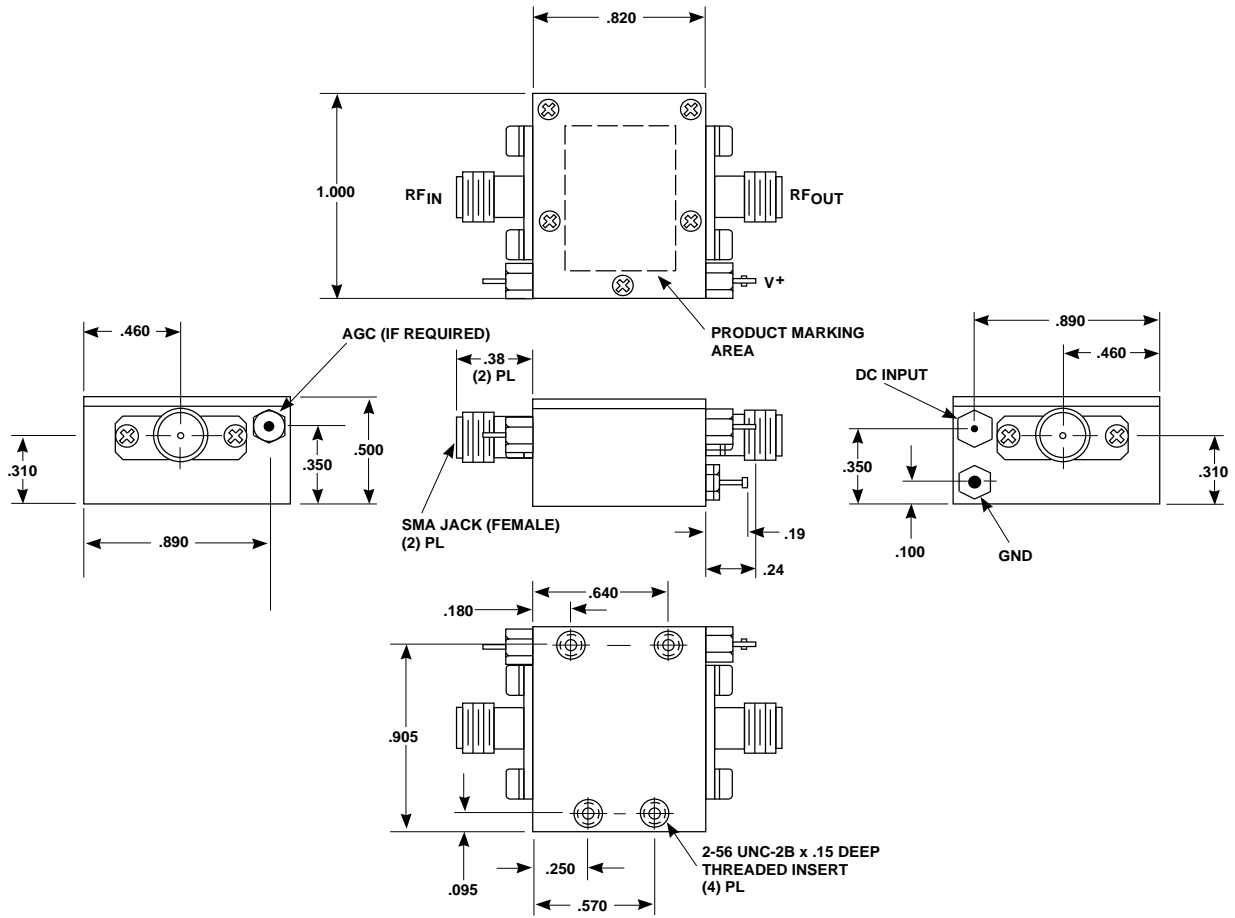


APPROXIMATE WEIGHT 2.1 GRAMS

**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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