



Thin-Film Cascadable Amplifier 5 to 1000 MHz

Technical Data

UTO/UTC 1012 Series

Features

- **Frequency Range: 5 to 1000 MHz**
- **Low Noise Figure: 2.5 dB (Typ)**
- **Medium Gain: 16.0 dB (Typ)**
- **Temperature Compensated**

Applications

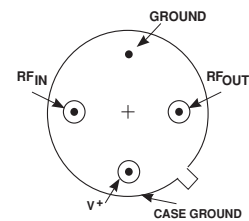
- **IF/RF Amplification**

Description

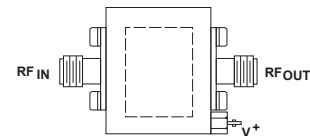
The 1012 Series is a wideband, general-purpose thin-film bipolar RF amplifier using resistive feedback and active bias for stability over temperature and bias verifications. Input and output blocking capacitors couple the RF through the amplifier while output inductance maintains a low VSWR. The 1012 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

Pin Configuration

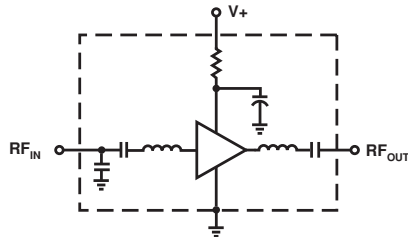
UTO—TO-8U



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	120 mW
Junction Temperature Above Case Temperature	13°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,253,000 Hrs.

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

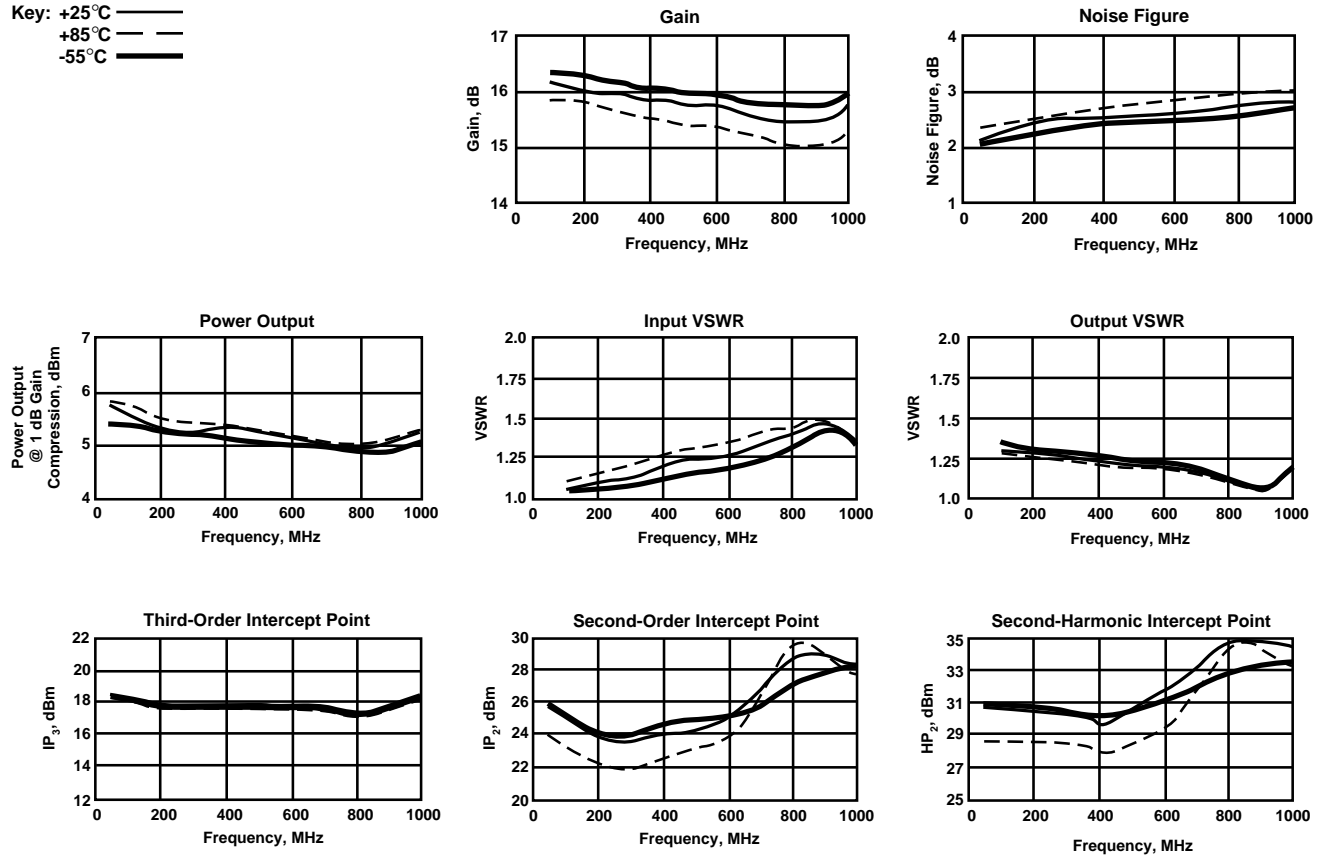
Electrical Specifications

(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	5-1000	5-1000	5-1000	MHz
GP	Small Signal Gain (Min.)	16.0	15.0	14.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	2.5	4.0	4.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+5.0	+4.0	+3.0	dBm
—	Input VSWR (Max.)	<1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+17.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+23.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+30.0	—	—	dBm
I _D	DC Current	18	—	—	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)

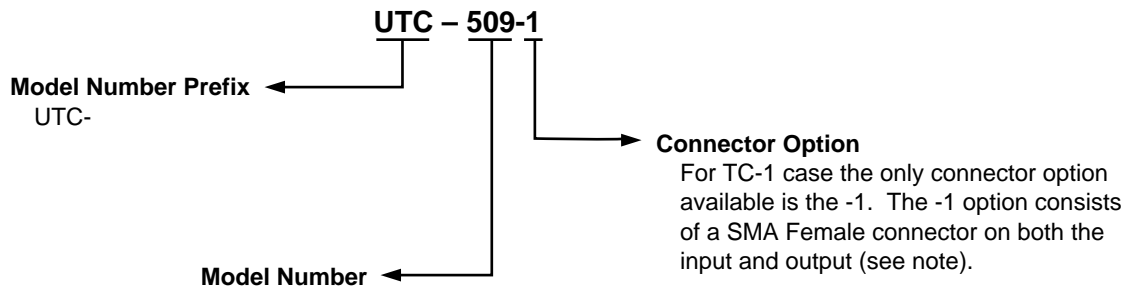
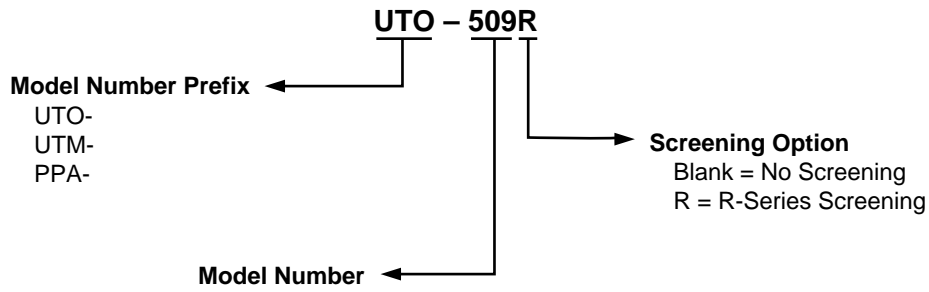
Numerical Readings
Bias = 15.00 Volts

FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.13	17.03	167.43	-.46	.00	1.20	22.33
150.0	1.13	17.09	161.48	-.77	.31	1.18	22.45
200.0	1.13	17.07	156.10	-.50	.30	1.18	22.27
250.0	1.14	16.96	150.74	-.21	.30	1.17	22.48
300.0	1.15	16.92	145.33	.01	.30	1.16	22.71
350.0	1.16	16.85	140.01	.34	.30	1.15	22.83
400.0	1.18	16.77	134.47	.44	.31	1.14	22.80
450.0	1.18	16.65	128.96	.57	.32	1.13	22.90
500.0	1.21	16.56	122.97	.22	.31	1.11	22.98
550.0	1.23	16.46	117.72	.61	.31	1.11	23.28
600.0	1.25	16.40	111.81	.36	.34	1.11	23.64
650.0	1.28	16.43	105.60	-.20	.32	1.11	23.65
700.0	1.31	16.47	100.30	.12	.30	1.13	23.99
750.0	1.36	16.46	94.95	.42	.30	1.15	24.23
800.0	1.41	16.43	89.51	.62	.31	1.18	24.53
850.0	1.48	16.44	83.70	.44	.32	1.22	24.86
900.0	1.56	16.46	77.85	.24	.34	1.26	25.12
950.0	1.66	16.48	71.46	-.50	.37	1.31	25.58
1000.0	1.80	16.56	64.54	-1.79	.39	1.37	26.02
1100.0	2.21	16.66	49.98	—	.45	1.53	27.19
1200.0	2.86	16.58	32.77	—	.45	1.75	29.35
1300.0	3.76	15.87	15.05	—	.54	2.02	31.86
1400.0	4.67	14.55	-3.57	—	.50	2.33	34.08
1500.0	5.17	12.72	-19.84	—	.37	2.51	32.48

S-Parameters
Bias = 15.00 Volts

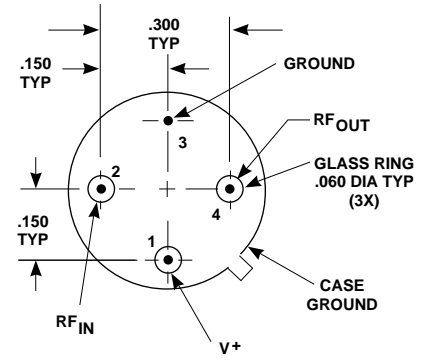
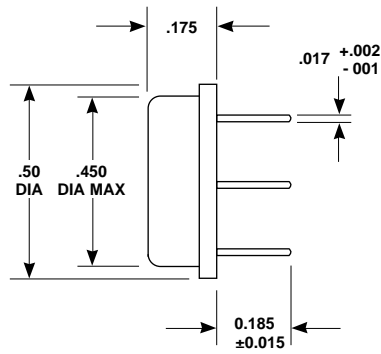
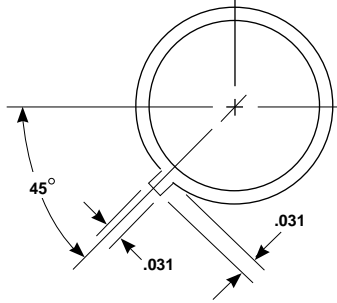
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.026	-12.0	17.090	167.5	-22.180	-6.5	.092	170.5
150.00	.044	-32.5	17.084	162.0	-22.099	-5.8	.084	167.5
200.00	.053	-40.0	17.019	155.9	-22.274	-6.5	.084	163.5
250.00	.056	-45.1	16.964	149.8	-22.317	-10.2	.076	160.0
300.00	.063	-46.5	16.966	144.1	-22.559	-13.1	.074	156.3
350.00	.073	-49.2	16.942	138.5	-22.669	-14.3	.071	156.6
400.00	.083	-51.1	16.905	133.2	-22.774	-16.8	.066	156.4
450.00	.094	-52.9	16.796	127.8	-22.946	-20.0	.063	155.7
500.00	.106	-55.4	16.727	122.4	-23.142	-21.5	.059	161.0
550.00	.116	-57.0	16.677	117.0	-23.342	-23.5	.058	165.8
600.00	.128	-59.8	16.629	111.6	-23.378	-27.1	.056	175.4
650.00	.142	-61.9	16.580	106.2	-23.704	-28.8	.056	-175.4
700.00	.158	-64.5	16.568	100.8	-23.711	-31.0	.062	-167.8
750.00	.173	-67.2	16.551	95.2	-24.059	-33.2	.072	-160.4
800.00	.192	-71.0	16.516	89.4	-24.432	-35.6	.084	-153.9
850.00	.211	-75.9	16.532	83.3	-24.883	-38.3	.100	-150.7
900.00	.237	-80.5	16.560	77.4	-24.993	-40.4	.118	-149.5
950.00	.263	-86.0	16.573	70.9	-25.518	-41.7	.138	-149.5
1000.00	.295	-92.2	16.595	64.1	-25.979	-44.5	.160	-150.5
1100.00	.379	-107.1	16.633	49.1	-27.098	-49.3	.212	-154.6
1200.00	.479	-124.6	16.531	32.3	-29.122	-50.7	.277	-161.5
1300.00	.572	-144.6	15.908	13.6	-31.710	-44.2	.343	-172.6
1400.00	.642	-165.5	14.638	-3.7	-33.189	-26.2	.398	174.3
1500.00	.674	176.0	12.896	-17.6	-32.245	-5.5	.432	160.8

Product Options



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

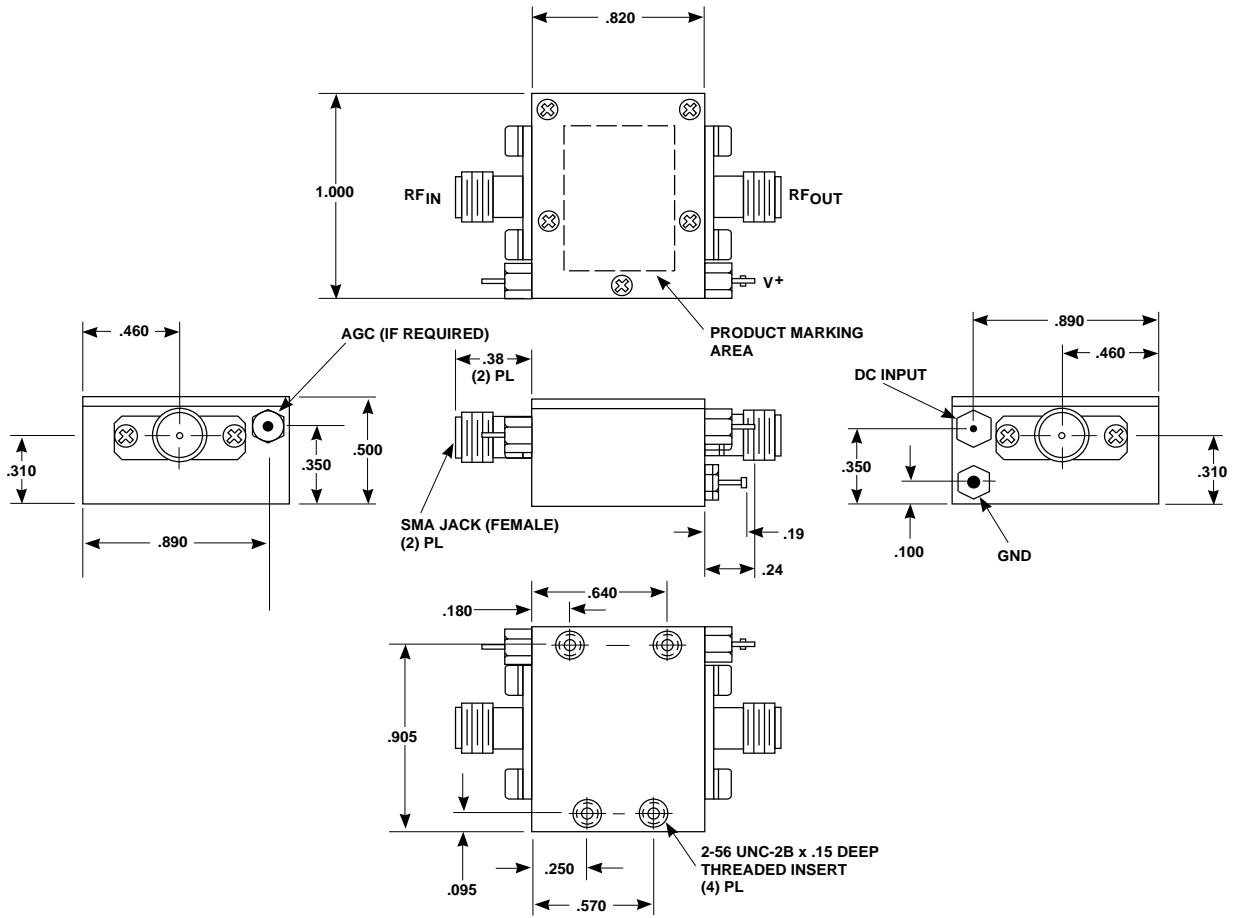
**Case Drawings
TO-8U**



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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