



Thin-Film Cascadable Amplifier 5 to 1000 MHz

Technical Data

UTO/UTC 1033 Series

Features

- **Frequency Range: 5 to 1000 MHz**
- **Output Power: 16.0 dBm (Typ)**
- **Medium Gain: 11.0 dB (Typ)**
- **Temperature Compensated**

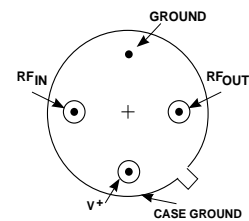
Applications

- **IF/RF Amplification**
- **Output Stage**

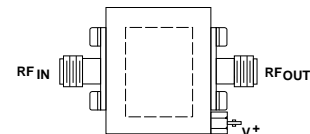
Description

The 1033 Series is a general-purpose, high-performance thin-film RF amplifier with resistive feedback and active bias circuits for temperature compensation and increased immunity to bias voltage variations. Low VSWR is maintained by inductive tuning while the RF is coupled through the amplifier by internal blocking capacitors. The 1033 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

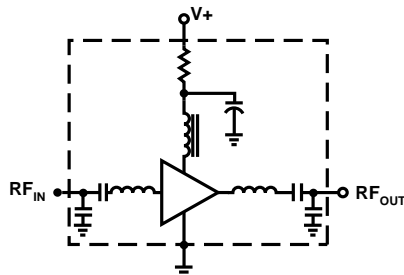
Pin Configuration UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +115°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+115°C

Thermal Characteristics¹

θ_{JC}	75°C/W
Active Transistor Power Dissipation	400 mW
Junction Temperature Above Case Temperature	30°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,291,000 Hrs.

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

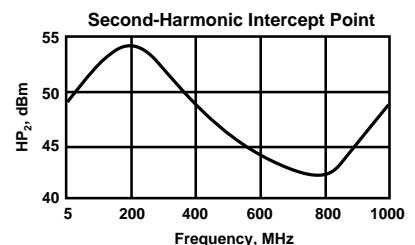
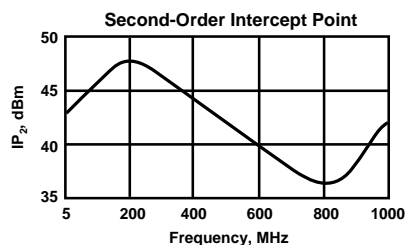
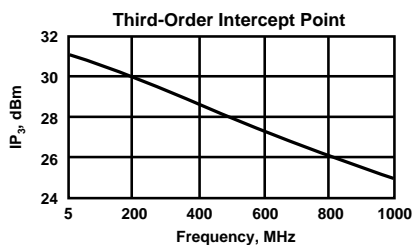
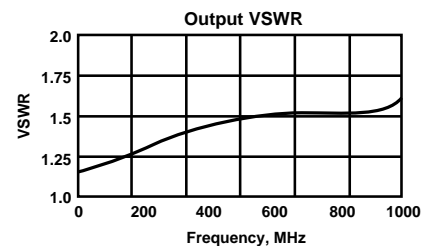
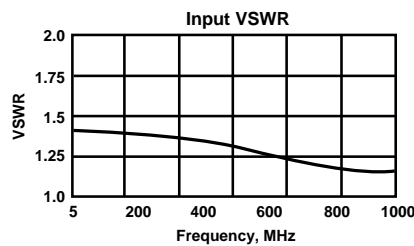
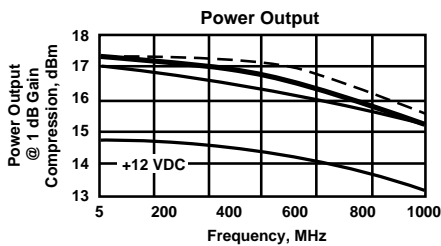
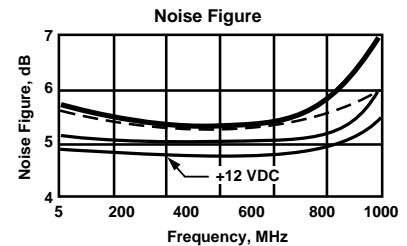
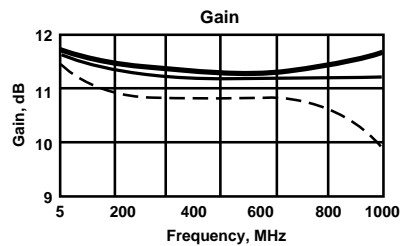
Electrical Specifications

(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.)	11.0	10.0	9.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	5.5	6.5	7.0	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+16.0	+14.0	+13.0	dBm
—	Input VSWR (Max.)	<1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.5:1	2.0:1	2.0:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+28.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+40.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+46.0	—	—	dBm
I _D	DC Current	48	—	—	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

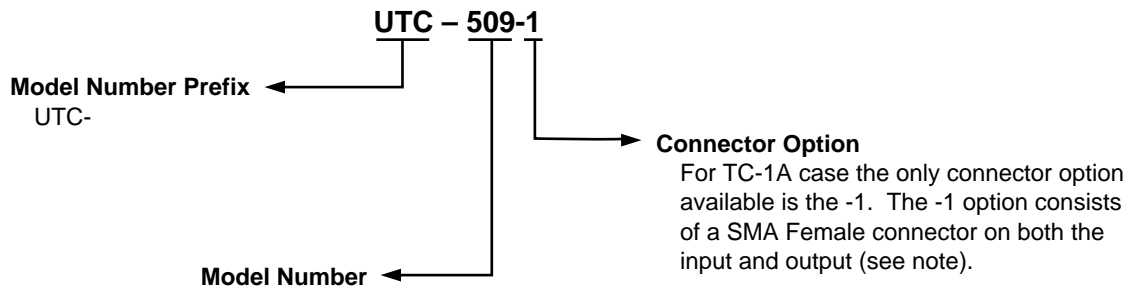
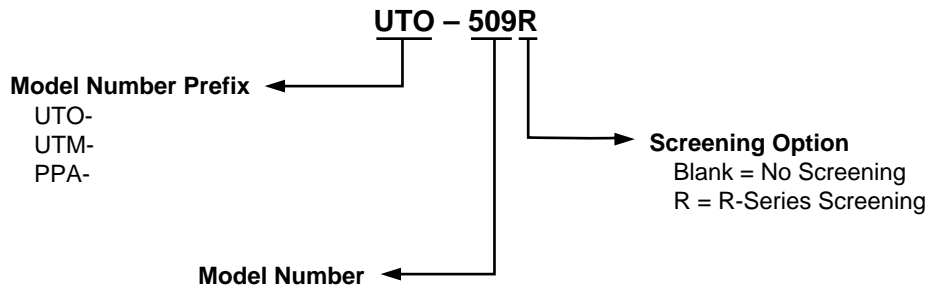
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.39	10.53	166.21	-3.05	.00	1.24	16.18
200.0	1.37	10.45	151.69	-3.03	.39	1.27	16.14
300.0	1.36	10.42	137.51	-2.69	.40	1.32	16.20
400.0	1.35	10.44	123.83	-1.85	.36	1.36	16.23
500.0	1.34	10.43	110.55	-.60	.37	1.41	16.29
600.0	1.32	10.40	97.76	1.13	.36	1.44	16.33
700.0	1.28	10.38	84.54	2.43	.35	1.48	16.37
800.0	1.25	10.43	71.73	4.15	.38	1.50	16.34
900.0	1.22	10.49	57.96	4.91	.40	1.53	16.36
1000.0	1.20	10.56	43.42	4.89	.41	1.55	16.44
1100.0	1.20	10.66	27.99	4.00	.44	1.59	16.57
1200.0	1.23	10.75	11.66	2.21	.47	1.64	16.77
1300.0	1.30	10.81	-5.93	-.84	.51	1.71	17.08
1400.0	1.44	10.69	-24.70	-5.09	.54	1.79	17.45
1500.0	1.67	10.22	-44.90	-10.77	.58	1.90	17.83
1600.0	2.02	9.33	-65.69	—	.55	1.93	18.14
1700.0	2.52	8.08	-84.19	—	.47	1.91	18.28

LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters
Bias = 15.00 Volts

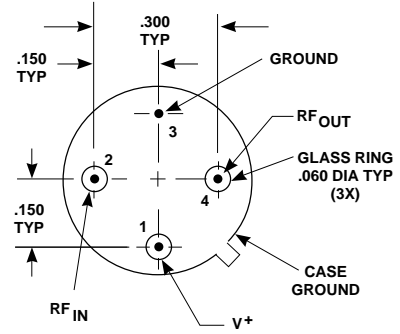
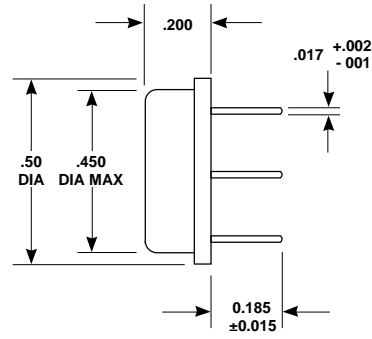
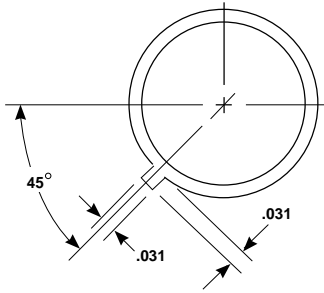
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.104	-169.6	10.846	165.1	-15.973	-5.7	.066	134.5
200.00	.113	-168.3	10.700	152.6	-16.157	-12.1	.083	108.2
300.00	.126	-169.6	10.665	138.5	-16.038	-17.7	.105	87.8
400.00	.136	-172.6	10.579	123.5	-16.236	-23.8	.128	71.6
500.00	.147	-178.1	10.561	110.8	-16.090	-30.5	.146	57.8
600.00	.148	176.4	10.430	97.3	-16.184	-37.1	.161	42.7
700.00	.147	170.0	10.411	83.6	-16.148	-41.7	.176	28.9
800.00	.138	162.6	10.377	70.3	-16.223	-48.8	.182	16.4
900.00	.125	154.9	10.456	56.1	-16.076	-56.0	.191	1.1
1000.00	.106	145.3	10.447	42.6	-15.991	-61.7	.198	15.5
1100.00	.081	133.5	10.636	28.2	-16.097	-68.4	.207	-32.0
1200.00	.052	115.6	10.642	12.9	-16.178	-75.4	.221	-49.7
1300.00	.037	68.9	10.752	4.1	-16.290	-83.9	.241	-70.1
1400.00	.069	13.0	10.790	21.2	-16.441	-90.4	.265	-90.1
1500.00	.115	-8.4	10.467	40.4	-16.762	-96.8	.295	-112.3
1600.00	.199	-24.1	9.750	60.4	-17.071	-102.6	.323	-135.6
1700.00	.302	-39.3	8.771	80.3	-17.036	-108.2	.335	-157.2
1800.00	.402	-52.3	7.209	96.1	-17.036	-115.2	.336	-178.6
1900.00	.494	-87.3	5.523	-110.3	-16.990	-122.3	.329	163.1
2000.00	.565	-79.3	3.904	122.7	-17.141	-129.0	.314	148.4

Product Options



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

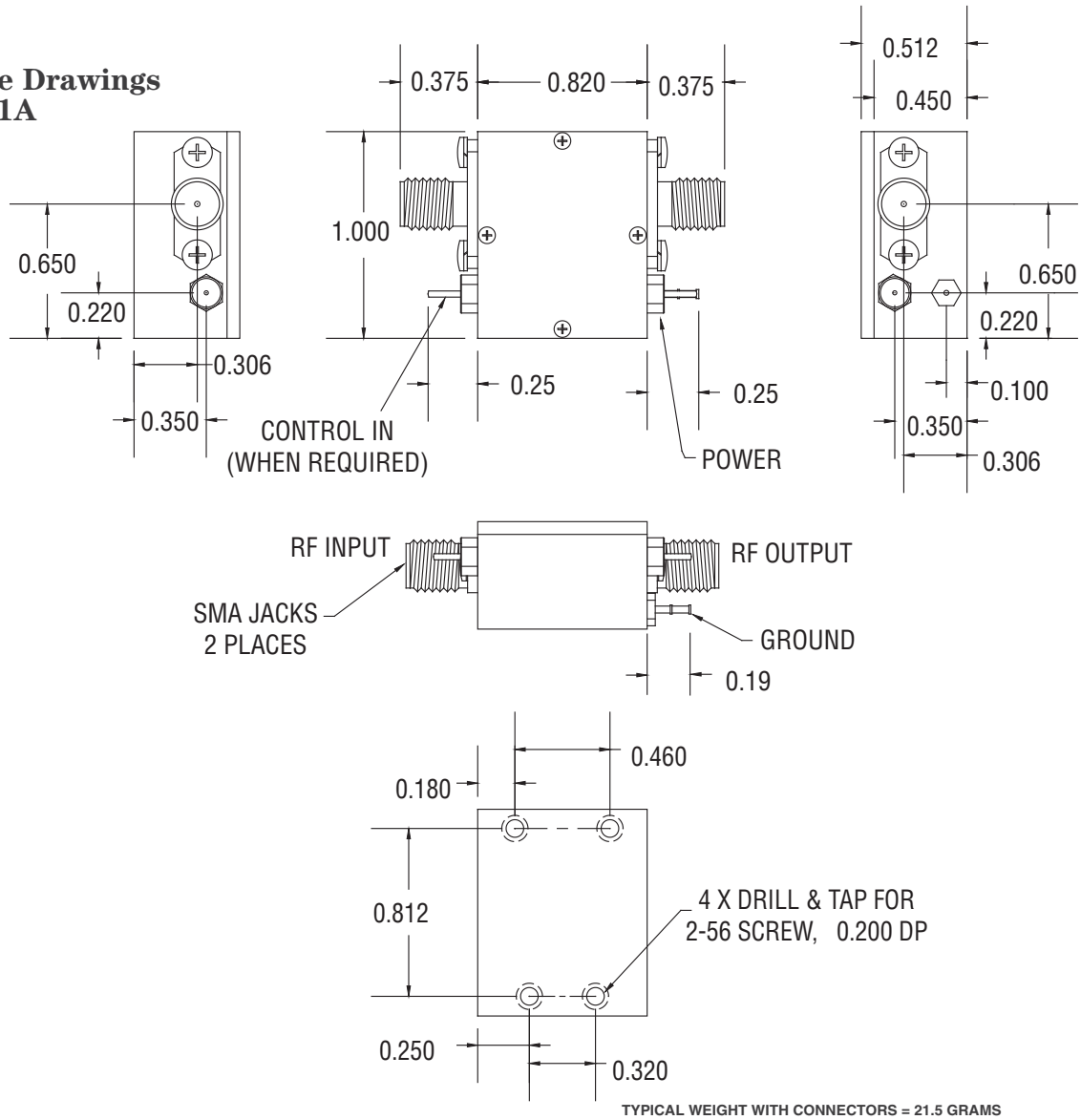
**Case Drawings
TO-8T**



APPROXIMATE WEIGHT 2.1 GRAMS

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

**Case Drawings
TC-1A**



NOTES: 1. THE TC-1A CASE IS A NON-HERMETIC CASE.
2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1A 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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