TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Thin-Film Cascadable Amplifier 10 to 400 MHz

Technical Data

UTO/UTC 444 Series

Features

- **Frequency Range: 10 to 400 MHz**
- **Low Current Drain: 15 mA (Typ)**
- **Output Power: +8.7 dBm (Typ)**
- **Temperature Compensated**
- **5 Volt Supply**
- **High Efficiency**

Applications

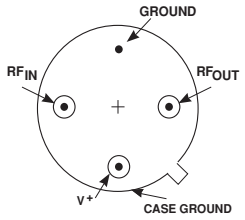
- **IF/RF Amplification**
- **Low Power Systems**

Description

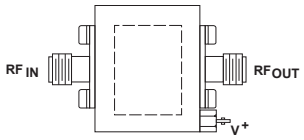
The 444 Series is a 5-volt, medium-gain bipolar RF amplifier built on a thin-film substrate using output transformer coupling to increase efficiency. Blocking capacitors couple the RF through the amplifier. The 444 Series is available in either the TO-8 hermetic case or connectored TC-1A package.

Pin Configuration

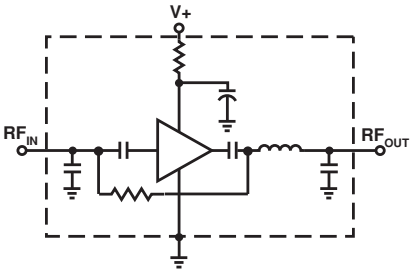
UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+10 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[1]

θ_{JC}	105°C/W
Active Transistor Power Dissipation	45 mW
Junction Temperature Above Case Temperature	5°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	627,400 Hrs.

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

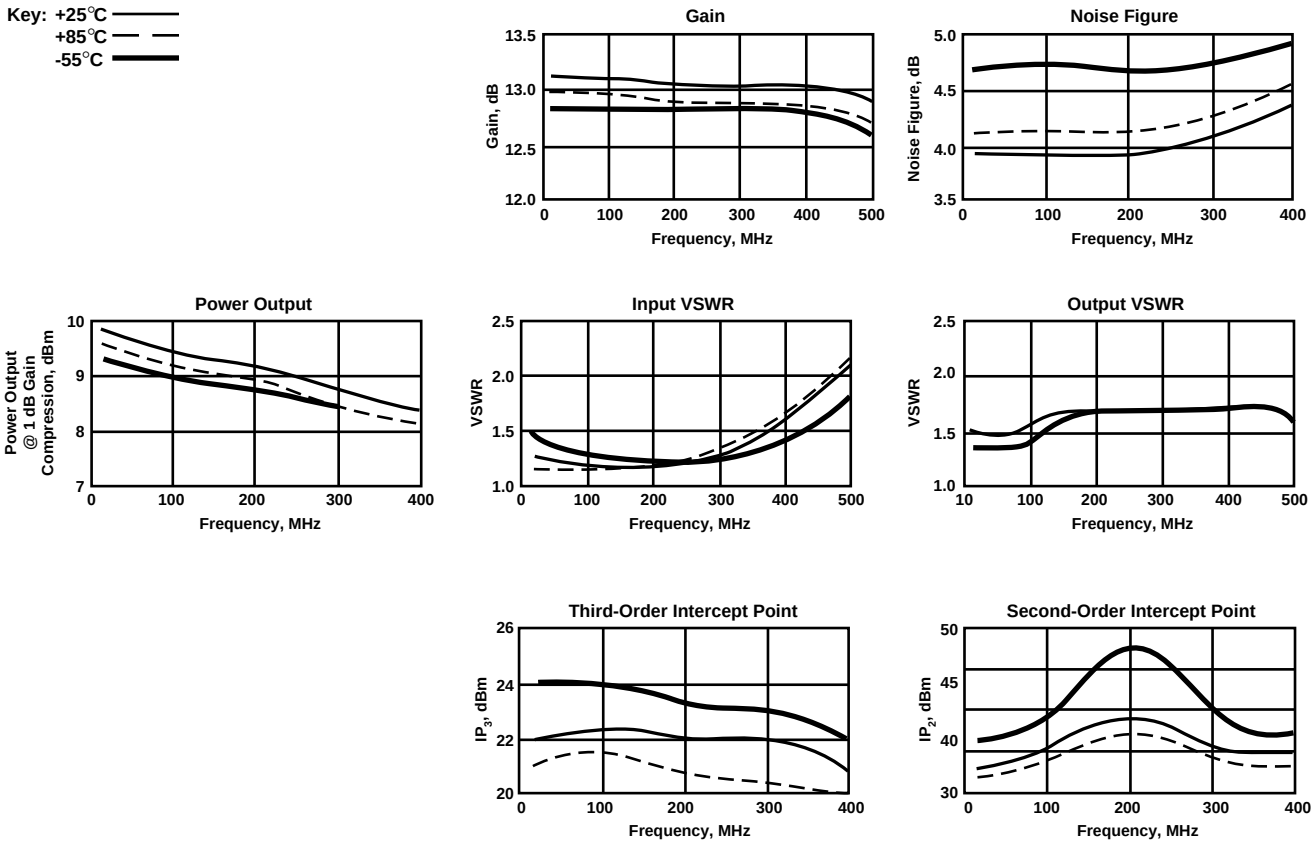
Electrical Specifications

(Measured in 50 Ω system @ +5 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical	Guaranteed Specifications		Unit
		T_C = 25°C	T_C = 0 to 50°C	T_C = –55 to +85°C	
BW	Frequency Range	10-400	10-400	10-400	MHz
GP	Small Signal Gain (Min.)	13.0	12.5	12.0	dB
—	Gain Flatness (Max.)	±0.1	±0.7	±0.7	dB
NF	Noise Figure (Max.)	4.0	5.0	5.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+8.7	+8.0	+7.5	dBm
—	Input VSWR (Max.)	1.4:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.6:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+22.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+35.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+41.0	—	—	dBm
I_D	DC Current	15	—	—	mA

Note: A portion of any DC voltage applied to the RF input pin will appear at the RF output pin (i.e., a resistive DC path exists between pins). There is no input or output blocking capacitor.

Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings **Bias = 5.00 Volts**

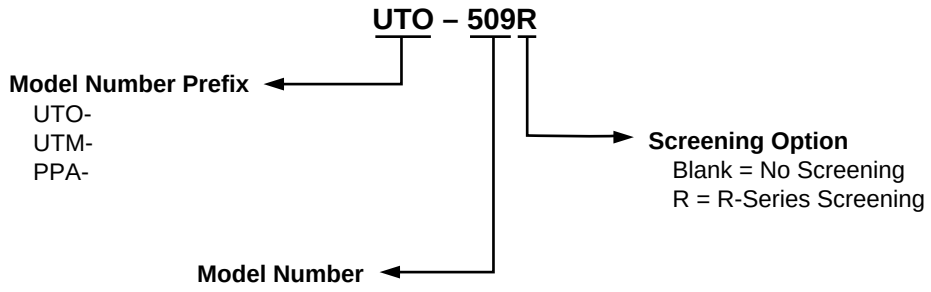
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.23	13.21	158.56	–.13	.00	1.52	19.61
200.0	1.12	13.15	136.10	–.06	.62	1.58	19.68
300.0	1.18	13.07	114.15	.54	.63	1.63	19.70
400.0	1.43	13.11	90.72	–.33	.66	1.62	19.74
500.0	1.82	13.08	66.71		.70	1.55	19.64
600.0	2.24	12.53	40.08		.79	1.52	19.57
700.0	2.62	11.55	9.86		.83	1.87	19.82
800.0	2.69	9.97	–19.52		.79	2.70	20.55
900.0	2.62	7.63	–46.67		.68	3.86	21.68
1000.0	2.72	4.89	–68.33		.56	5.30	23.00
1100.0	2.98	2.12	–86.69		.49	6.78	24.16
1200.0	3.37	–.42	–103.32		.41	7.60	25.07
1300.0	3.84	–2.78	–115.92		.33	8.44	25.95
1400.0	4.31	–4.90	–127.01		.34	9.73	26.75
1500.0	4.75	–6.75	–140.57		.35	11.01	27.17
1600.0	5.27	–8.04	–152.20		.33	11.64	27.88
1700.0	5.98	–9.04	–164.18		.37	13.42	28.60
1800.0	6.92	–9.76	–178.99		.40	14.82	29.79
1900.0	7.88	–10.70	166.69		.43	16.32	30.17
2000.0	8.68	–11.39	150.37		.00	18.63	30.27

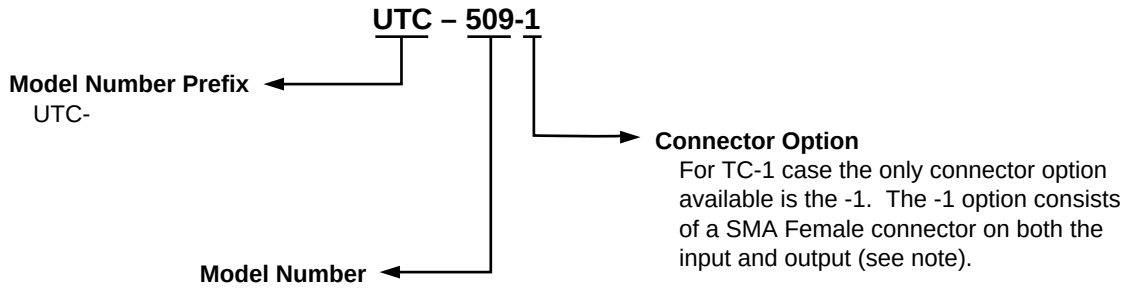
LINEARIZATION RANGE: 100.0 to 400.0 MHz

S-Parameters **Bias = 5.00 Volts**

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.097	176.5	13.245	158.2	–19.608	–10.6	.210	–178.7
200.00	.051	–160.6	13.121	135.8	–19.683	–20.6	.226	177.2
300.00	.083	–92.2	13.093	113.7	–19.702	–30.0	.237	166.1
400.00	.183	–88.6	13.094	90.1	–19.735	–41.7	.232	146.1
500.00	.293	–98.5	13.050	65.9	–19.637	–52.8	.206	112.5
600.00	.383	–110.7	12.514	39.0	–19.570	–65.4	.202	55.7
700.00	.439	–124.2	11.506	8.3	–19.819	–80.1	.299	–7.1
800.00	.446	–133.3	9.892	–21.1	–20.547	–96.4	.459	–48.5
900.00	.437	–137.2	7.498	–48.5	–21.677	–111.4	.591	–77.9
1000.00	.452	–137.4	4.719	–69.1	–23.003	–123.1	.685	–98.7
1100.00	.486	–137.3	1.823	–87.6	–24.159	–132.2	.748	–114.4
1200.00	.533	–138.4	–.632	–103.5	–25.070	–142.2	.789	–126.1
1300.00	.581	–140.2	–3.045	–115.8	–25.951	–151.8	.803	–135.9
1400.00	.619	–143.4	–5.335	–125.9	–26.754	–161.1	.818	–145.2
1500.00	.645	–146.9	–7.067	–138.2	–27.170	–173.3	.837	–152.7
1600.00	.674	–150.7	–8.197	–148.6	–27.877	176.4	.855	–158.6
1700.00	.708	–153.9	–8.787	–160.8	–28.595	163.8	.871	–163.9
1800.00	.751	–156.9	–6.753	–176.8	–29.788	157.4	.894	–169.3
1900.00	.786	–160.7	–9.644	164.0	–30.169	152.5	.898	–174.3
2000.00	.806	–165.7	–10.704	143.5	–30.272	144.5	.899	–178.2

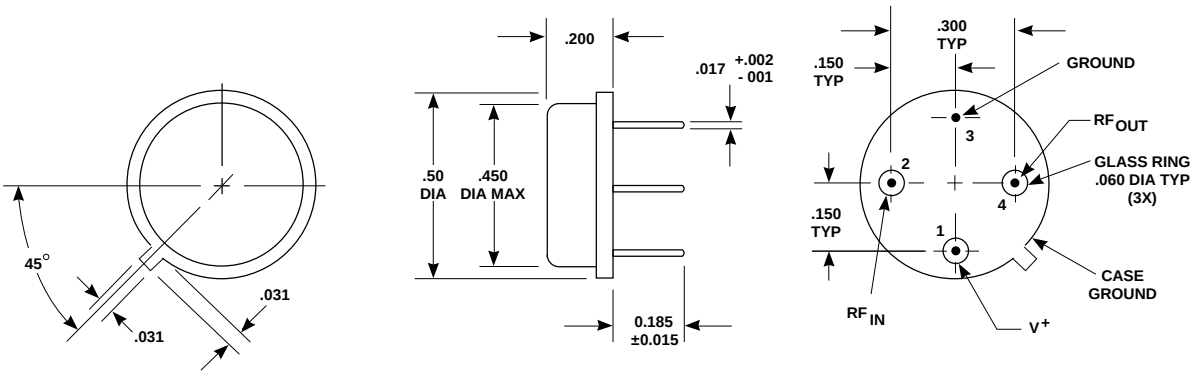
Product Options





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

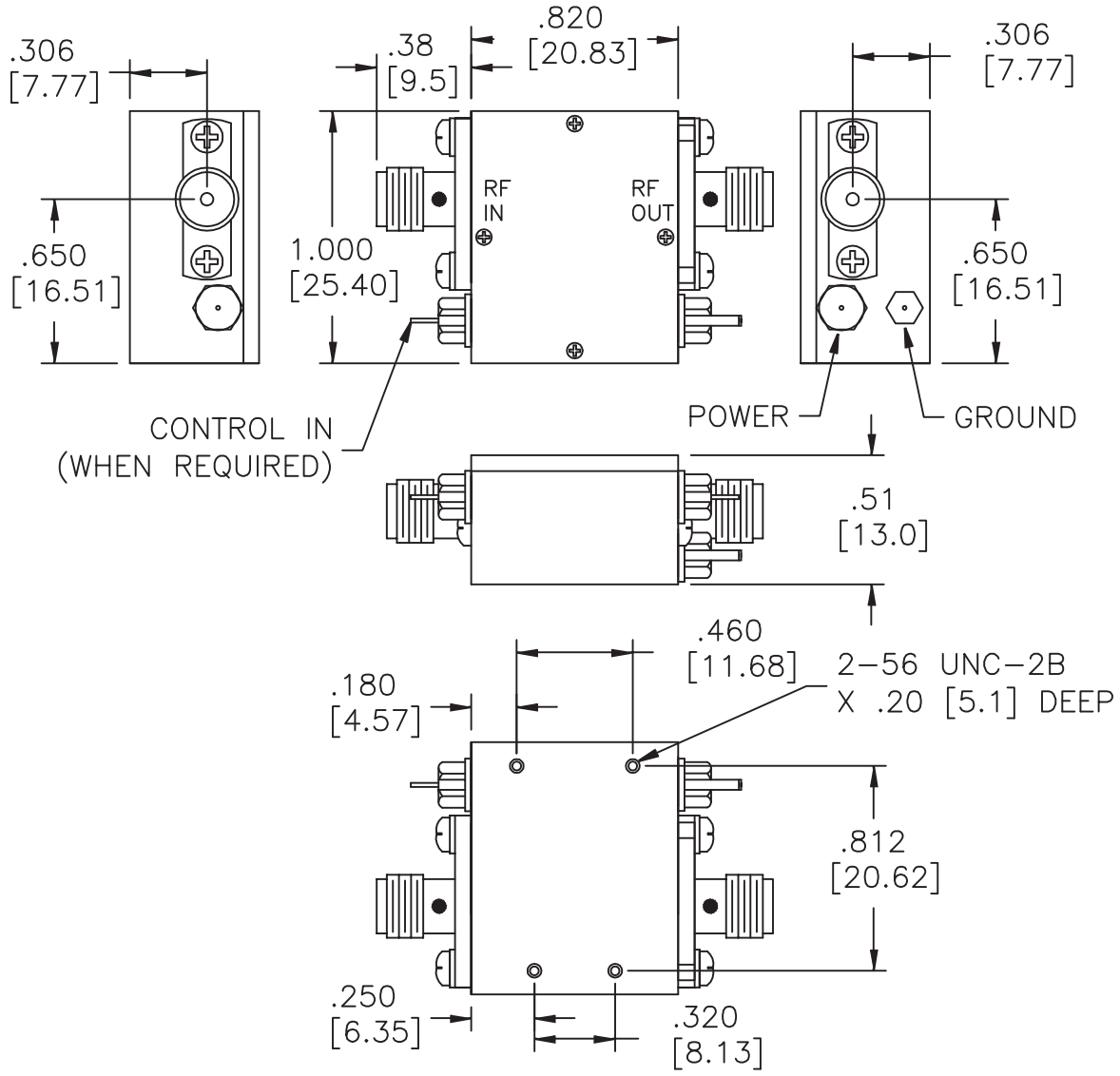
Case Drawings
TO-8T



APPROXIMATE WEIGHT 2.1 GRAMS

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

TC-1A



THIRD ANGLE PROJECTION

INCH [MM]

.XX = ±.02 [.5]
.XXX = ±.010 [.25]

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