TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Thin-Film Cascadable Amplifier 10 to 500 MHz

Technical Data

UTO/UTC 544 Series

Features

- **Frequency Range: 10 to 500 MHz**
- **High Dynamic Range**
- **Low Noise Figure: 2.5 dB**
- **Medium Output Power: +13.0 dBm (Typ)**
- **5 Volt Supply**
- **Temperature Compensated**
- **Surface Mount Option**

Applications

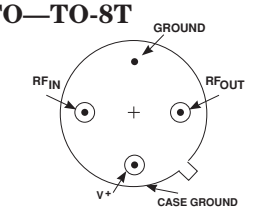
- **System Front Ends**
- **IF/RF Amplification**
- **Surface Mount Assembly**

Description

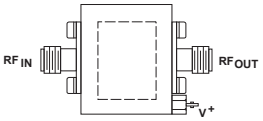
The 544 Series is a thin-film RF bipolar amplifier using lossless feedback for optimum noise figure and high dynamic range, and active bias to compensate for temperature and voltage variations. Internal blocking capacitors couple the RF through the amplifier. The 544 Series amplifiers are available in three packages: the surface mount PlanarPak PP-38 (.375 in. x .375 in.) case, the TO-8 hermetic case and the connectorized TC-1A case.

Pin Configuration

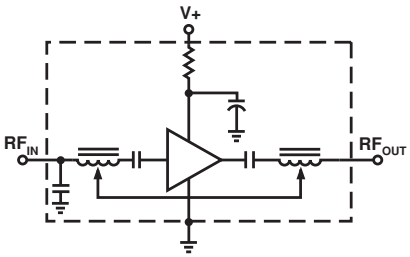
UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	–55 to +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	256 mW
Junction Temperature Above Case Temperature	27°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,137,000 Hrs.

Weight: (typical) PPA—0.5 grams; UTO—2.1 grams; UTC—21.5 grams

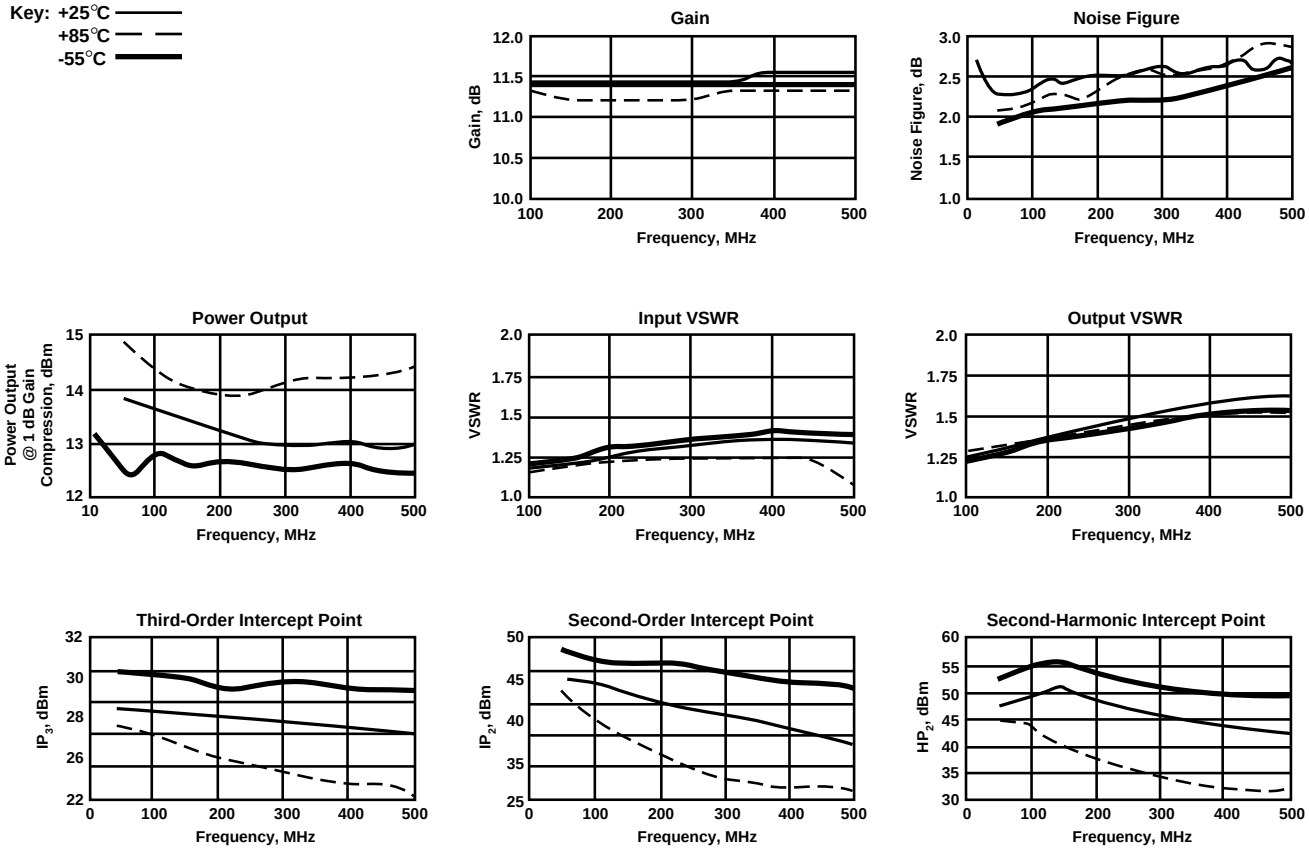
Electrical Specifications[1]

(Measured in 50 Ω system @ +15 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	10-500	10-500	10-500	MHz
GP	Small Signal Gain (Min.)	11	10.0	9.0	dB
—	Gain Flatness (Max.)	±0.8	±1.0	±1.0	dB
NF	Noise Figure (Max.)	2.5	3.0	3.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+13.0	+12.0	+11.0	dBm
—	Input VSWR (Max.)	<1.5:1	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	+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	36	—	—	mA

Notes: 1. Both RF input and RF output pins are at DC ground – no blocking capacitor.

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



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

Numerical Readings **Bias = 15.00 Volts**

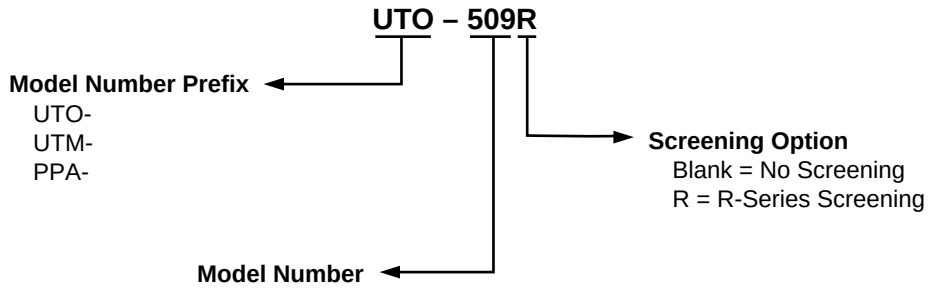
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.10	11.12	167.20	.04	.00	1.18	15.90
150.0	1.12	11.02	158.40	–.61	.48	1.22	16.04
200.0	1.14	10.99	149.73	–1.14	.47	1.27	16.23
250.0	1.17	10.93	141.47	1.26	.46	1.32	16.26
300.0	1.19	10.90	133.27	–1.32	.45	1.37	16.31
350.0	1.20	10.87	125.36	–1.10	.43	1.41	16.35
400.0	1.21	10.84	117.71	–.62	.42	1.44	16.31
450.0	1.20	10.80	110.24	.04	.42	1.46	16.34
500.0	1.19	10.74	102.57	.51	.42	1.47	16.39
600.0	1.16	10.62	87.22	1.43	.43	1.46	16.38
700.0	1.13	10.43	71.50	2.00	.44	1.42	16.34
800.0	1.18	10.28	55.07	1.85	.49	1.39	16.35
900.0	1.31	9.90	37.33	.38	.48	1.40	16.34
1000.0	1.50	9.48	20.34	–.32	.47	1.50	16.43

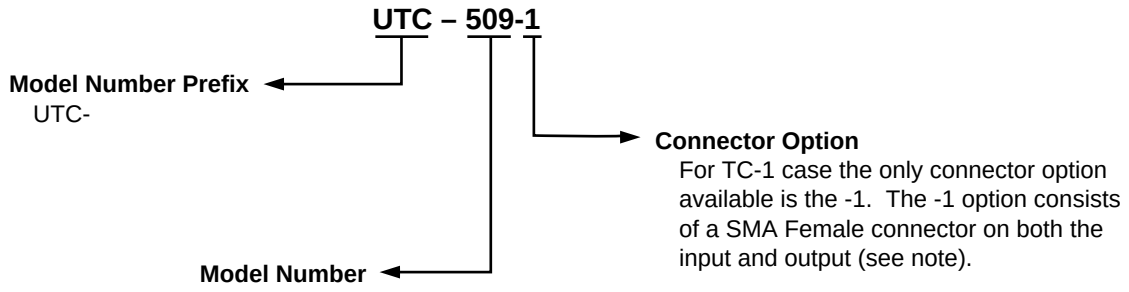
LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters **Bias = 15.00 Volts**

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.048	159.9	11.112	166.3	–16.053	169.6	.082	143.7
150.00	.053	124.4	11.047	157.5	–15.251	161.5	.097	121.4
200.00	.064	100.5	10.930	148.7	–16.193	153.2	.119	104.8
250.00	.078	79.2	10.879	140.1	–16.290	147.2	.136	93.9
300.00	.087	65.7	10.850	131.8	–16.454	139.9	.151	84.7
350.00	.092	53.7	10.843	123.7	–16.448	133.8	.166	77.6
400.00	.090	40.2	10.815	115.8	–16.342	127.1	.176	71.3
450.00	.089	24.2	10.799	108.1	–16.299	121.3	.182	65.9
500.00	.084	11.3	10.726	100.1	–16.311	115.3	.185	60.7
600.00	.066	–26.9	10.634	84.4	–16.394	103.4	.183	55.4
700.00	.063	–82.5	10.462	68.1	–16.372	91.5	.172	54.5
800.00	.096	–136.7	10.254	51.4	–16.351	79.1	.166	59.7
900.00	.152	–171.1	9.915	33.1	–16.413	66.8	.177	68.4
1000.00	.214	167.5	9.489	15.7	–16.533	55.0	.206	75.2
1100.00	.169	147.5	8.913	–1.8	–16.714	41.9	.253	77.0
1200.00	.312	132.1	8.318	–18.7	–16.960	29.8	.300	75.4
1300.00	.346	118.1	7.581	–34.8	–17.323	17.3	.345	71.6
1400.00	.360	106.8	6.796	–50.8	–17.746	6.1	.382	67.0
1500.00	.370	96.9	6.015	–66.7	–18.275	–5.8	.416	62.9

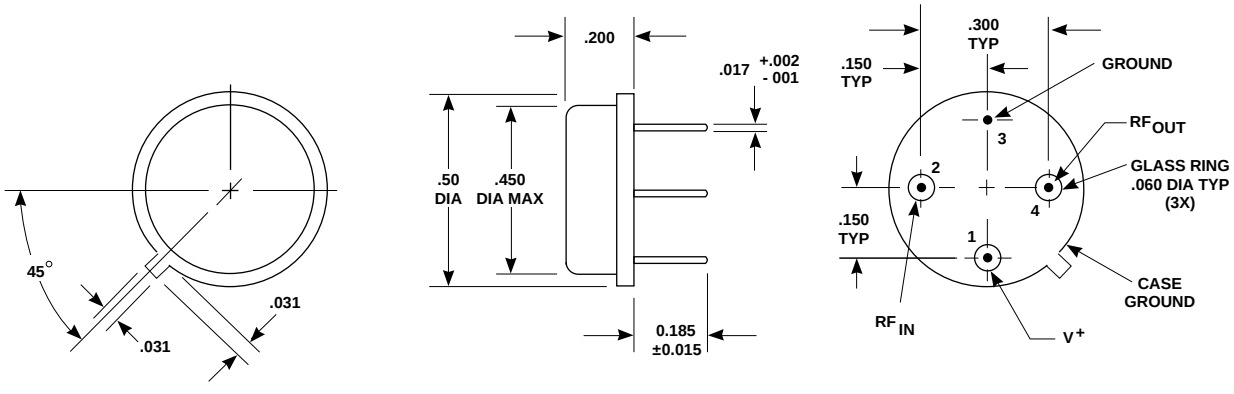
Product Options





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

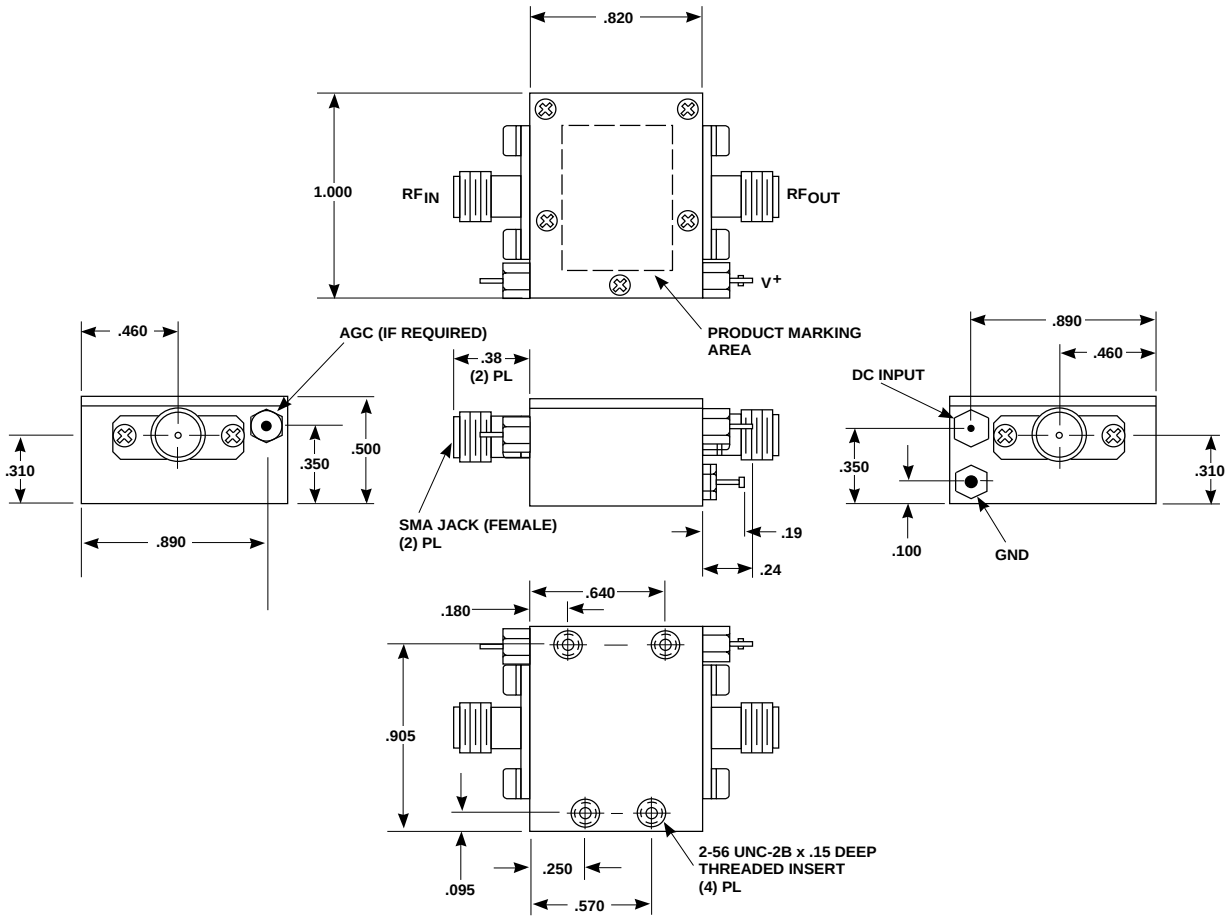
Case Drawings
TO-8T



APPROXIMATE WEIGHT 2.1 GRAMS

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

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

Contact Teledyne Microwave Solutions:
650-691-9800
650-962-6845 fax

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