TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Thin-Film Cascadable Amplifier 5 to 500 MHz

Technical Data

UTO/UTC 520 Series

Features

- **Frequency Range: 5 to 500 MHz**
- **OutputPower: +12.0 dBm**
- **5 Volt Supply**
- **Temperature Compensated**
- **Surface Mount Option**

Applications

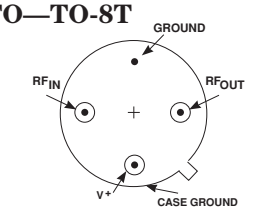
- **IF/RF Amplification**
- **Surface Mount Assembly**
- **High Efficiency or Battery Powered Systems**

Description

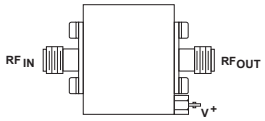
The 520 Series is a highly-efficient low-voltage unit for use where power considerations are important. Output choke coupling, resistive feedback and active bias combine to provide a low-noise medium-gain amplifier that is temperature compensated and relatively insensitive to bias voltage variations. Blocking capacitors couple the RF through the amplifier. The 520 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

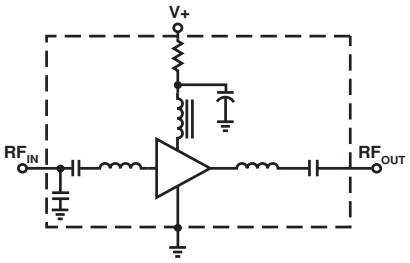
UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+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	108 mW
Junction Temperature Above Case Temperature	11°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	1,012,000 Hrs.

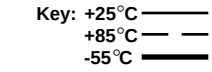
Weight: (typical) PPA—0.5 grams; UTO—2.1 grams; UTC—21.5 grams

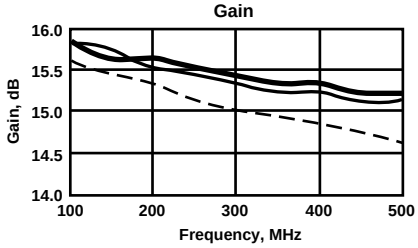
Electrical Specifications

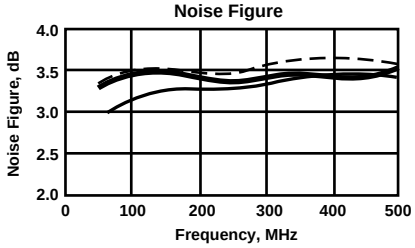
(Measured in 50 Ω system @ +5 VDC nominal unless otherwise noted)

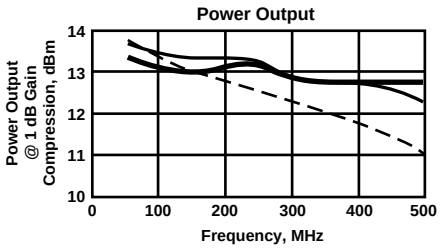
Symbol	Characteristic	Typical	Guaranteed Specifications		Unit
		T_C = 25°C	T_C = 0 to 50°C	T_C = –55 to +85°C	
BW	Frequency Range	5-900	5-500	5-500	MHz
GP	Small Signal Gain (Min.)	14.5	14.0	13.0	dB
—	Gain Flatness (Max.)	±0.2	±0.7	±1.0	dB
NF	Noise Figure (Max.)	3.5	4.5	5.0	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+13.0	+11.0	+10	dBm
—	Input VSWR (Max.)	<1.3:1	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	+22.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+21.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+30.0	—	—	dBm
I_D	DC Current	33	—	—	mA

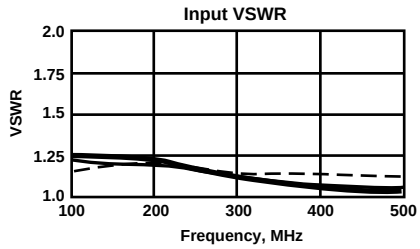
Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)

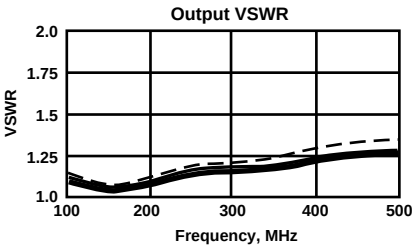


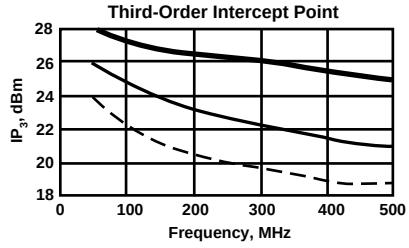


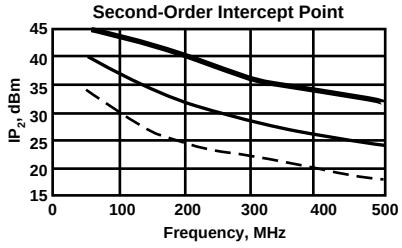


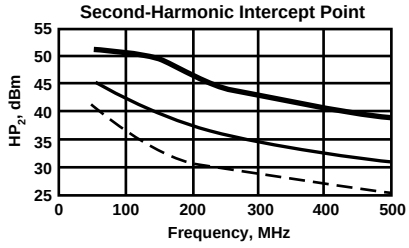












Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings **Bias = 5.00 Volts**

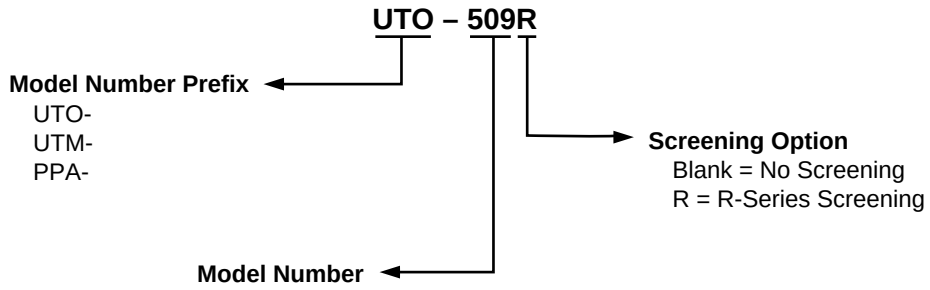
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.05	15.88	163.82	.55	.00	1.16	20.82
200.0	1.08	15.64	146.85	–.55	.45	1.17	19.74
300.0	1.08	15.48	131.42	–.12	.44	1.20	19.89
400.0	1.11	15.42	115.36	–.31	.43	1.21	20.09
500.0	1.11	15.44	100.25	.43	.42	1.24	19.82
600.0	1.10	15.44	85.10	—	.44	1.24	19.70
700.0	1.06	15.33	68.49	—	.49	1.23	19.25
800.0	1.07	15.18	49.52	—	.54	1.25	19.19
900.0	1.30	15.18	29.39	—	.57	1.32	19.14
1000.0	1.70	15.04	8.29	—	.62	1.49	19.05
1100.0	2.47	14.54	–14.96	—	.68	1.82	19.45
1200.0	4.29	13.49	–40.58	—	.72	2.29	19.94
1300.0	9.20	12.12	–66.49	—	.72	2.77	21.27
1400.0	29.86	9.86	–92.07	—	.68	3.31	22.51

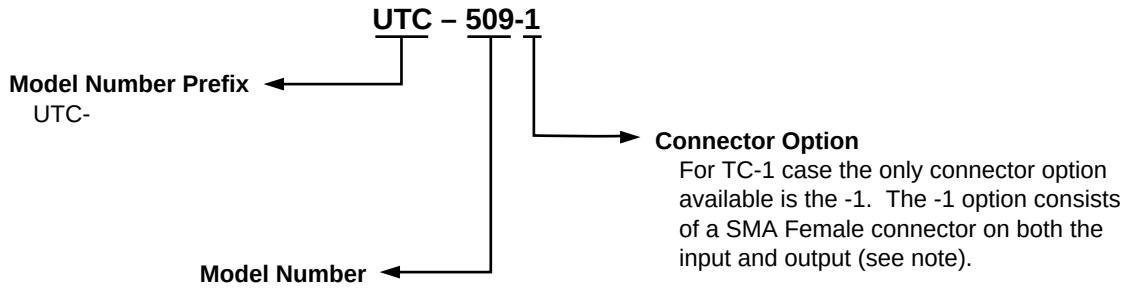
LINEARIZATION RANGE: 100.0 to 500.0 MHz

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	.017	–110.2	15.784	166.0	–19.897	–4.6	.084	9.2
200.00	.024	–74.9	15.645	150.4	–19.967	–9.8	.099	3.3
300.00	.040	–79.9	15.527	135.9	–19.833	–15.1	.111	–7.3
400.00	.055	–85.1	15.433	121.2	–19.866	–20.8	.121	–21.9
500.00	.058	97.0	15.443	107.7	–19.691	–27.0	.125	–38.3
600.00	.054	–98.1	15.392	94.0	–19.634	–31.7	.127	–59.4
700.00	.036	–87.9	15.247	78.5	–19.392	–37.3	.120	–88.8
800.00	.037	–15.1	15.200	60.4	–19.238	–45.3	.122	–132.2
900.00	.108	3.7	15.345	41.3	–18.958	–54.2	.159	179.3
1000.00	.225	–6.3	15.210	19.3	–18.894	–66.3	.240	134.1
1100.00	.376	–22.7	14.695	–5.5	–19.105	–81.4	.368	95.7
1200.00	.537	–42.2	13.294	–31.6	–19.936	–93.7	.484	62.6
1300.00	.655	–60.7	11.020	–56.7	–21.578	–107.8	.554	32.2
1400.00	.733	–77.1	7.779	–81.2	–23.721	–119.3	.586	6.9
1500.00	.776	–89.7	4.409	–101.3	–25.143	–123.6	.588	–13.5
1600.00	.793	–99.8	.829	–116.6	–27.134	–128.0	.570	–30.3
1700.00	.793	–108.2	–3.026	–130.0	–28.339	–128.6	.566	–44.5
1800.00	.792	–115.5	–7.425	–140.9	–29.546	–126.0	.564	–55.4
1900.00	.797	–122.2	–13.994	–147.4	–29.889	–129.9	.562	–65.1
2000.00	.806	–127.7	–23.981	–117.9	–30.912	–134.1	.568	–74.8

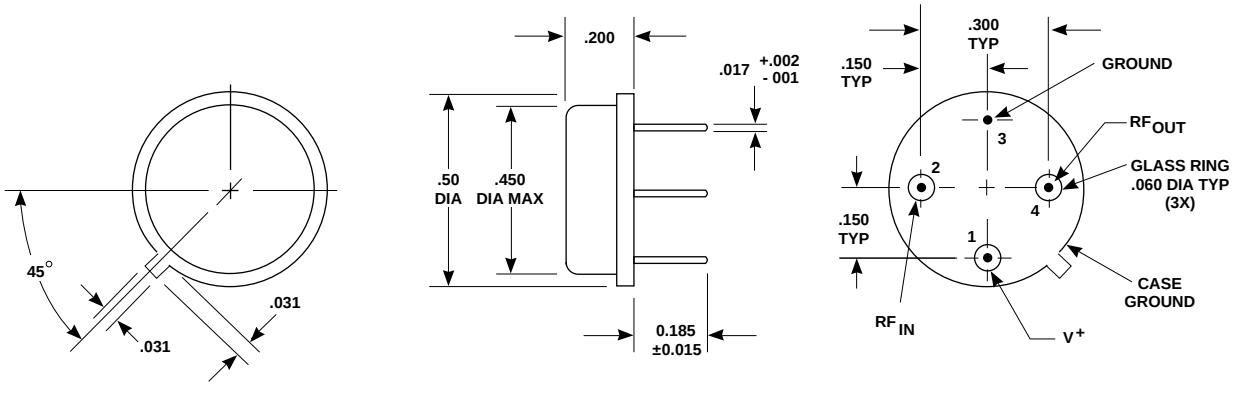
Product Options





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

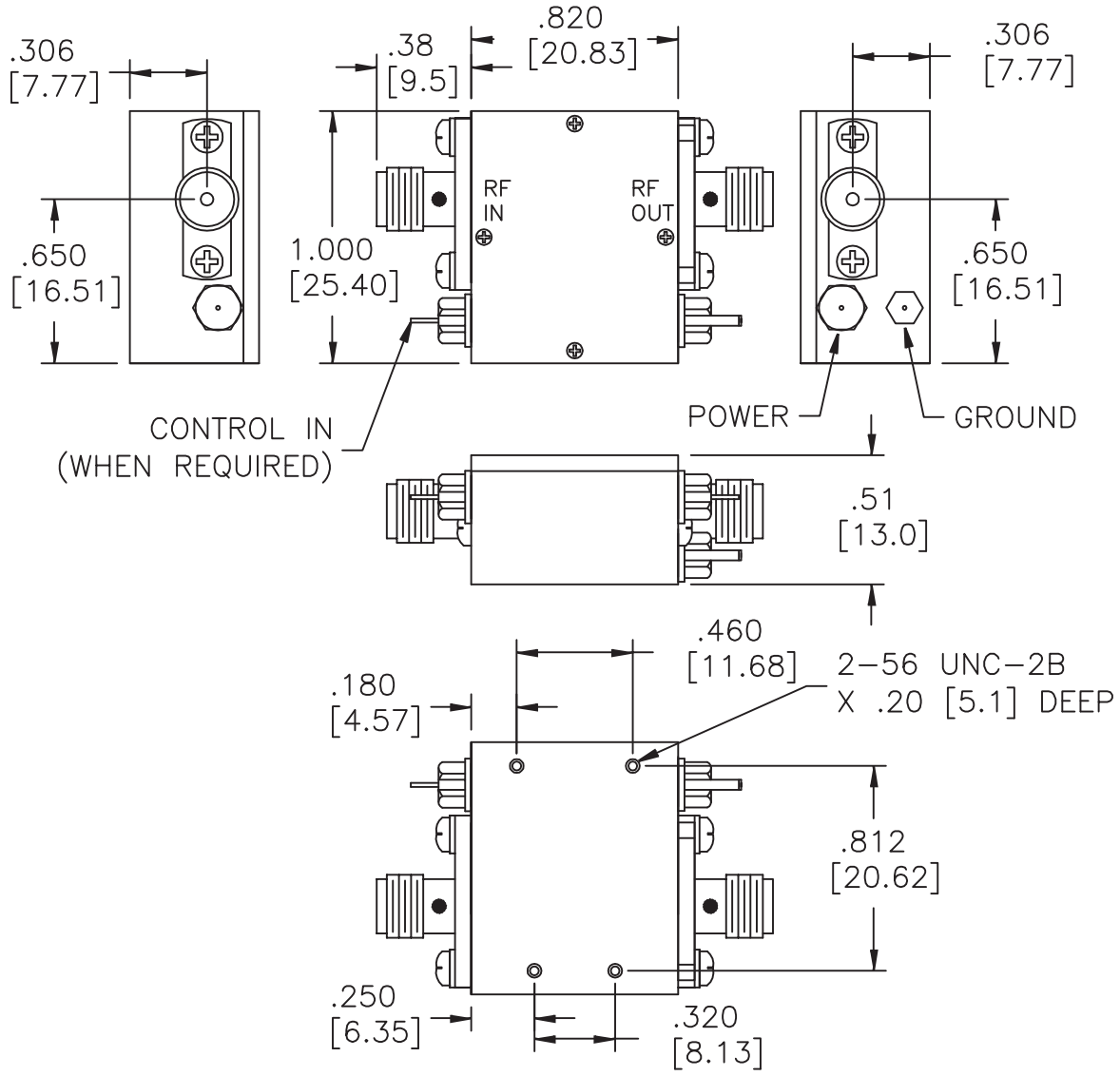
Case Drawings
TO-8T



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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