



Thin-Film Cascadable Amplifier 10 to 500 MHz

Technical Data

UTO/UTC 505 Series

Features

- **Frequency Range:** 10 to 500 MHz
- **High Output Power:** +20.0 dBm (Typ)
- **Temperature Compensated**

Applications

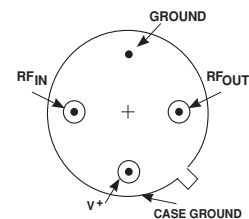
- **IF/RF Amplification**
- **Output Stage**

Description

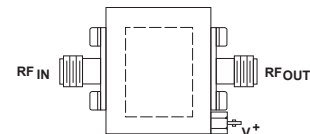
The 505 Series is a thin-film bipolar RF amplifier that uses resistive feedback and active bias. Input/output blocking capacitors couple the RF through the circuit and inductive tuning provides for low VSWR. The 505 Series is available in either the TO-8 hermetic case or connected TC-1A package.

Pin Configuration

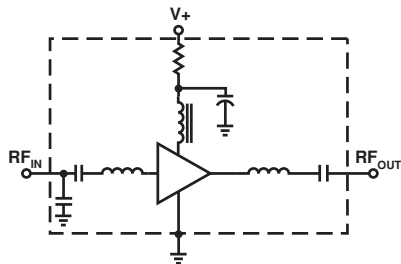
UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +125°C
Storage Temperature	-62 to +150°C
“R” Series Burn-In Temperature	+125°C

Thermal Characteristics¹

θ_{JC}	55°C/W
Active Transistor Power Dissipation	510 mW
Junction Temperature Above Case Temperature	28°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	991,900 Hrs.

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

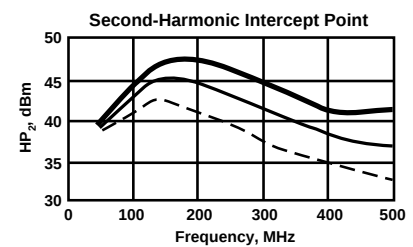
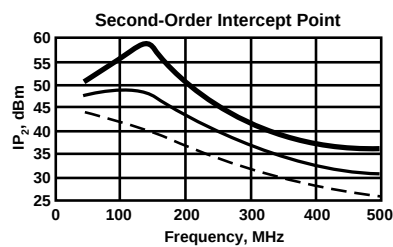
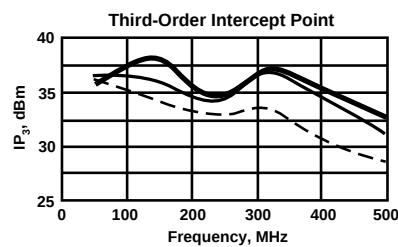
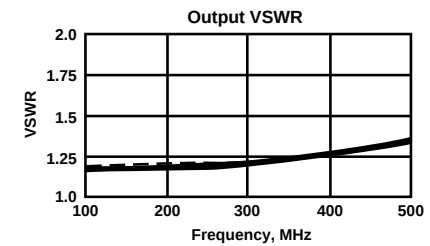
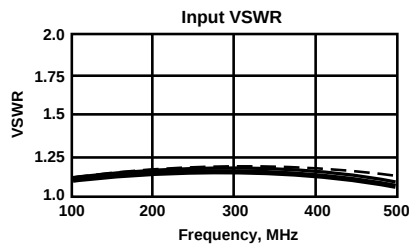
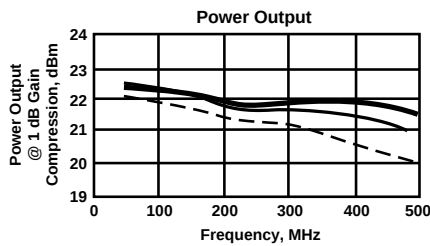
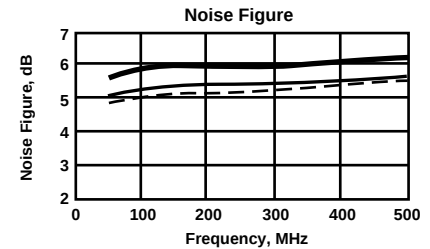
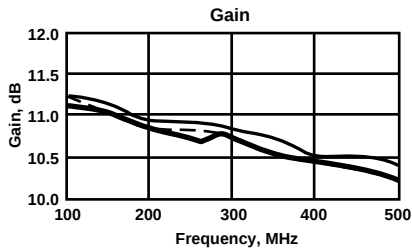
Electrical Specifications

(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	10-500	10-500	10-500	MHz
GP	Small Signal Gain (Min.)	10.5	9.0	9.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	6.0	7.0	7.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+20.0	+18.0	+18.0	dBm
—	Input VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.4:1	2.0:1	2.0:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+29.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+35.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+40.0	—	—	dBm
I _D	DC Current	100	—	—	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

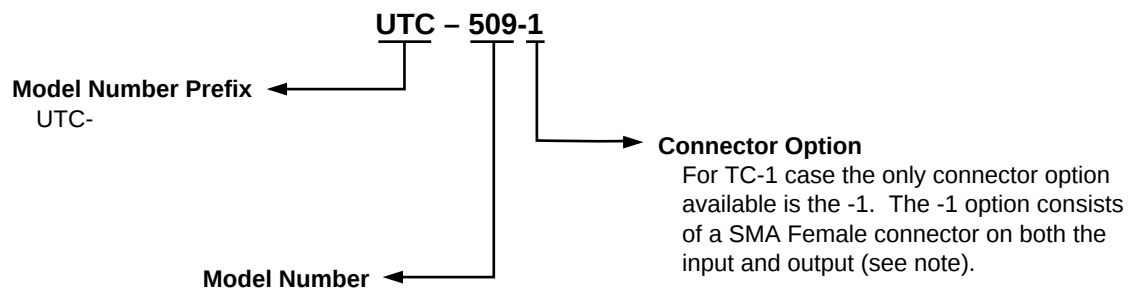
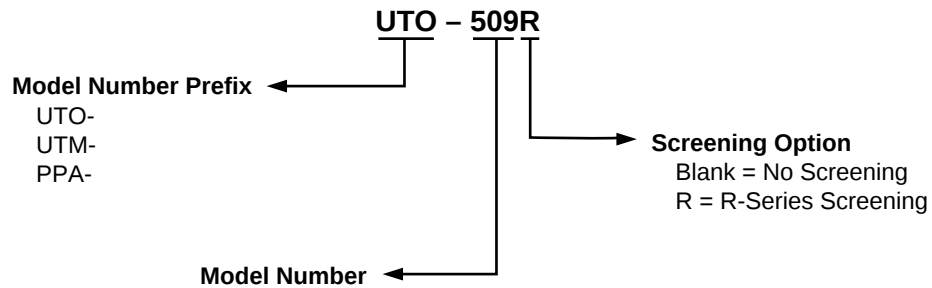
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.33	11.14	160.33	.57	.00	17.56	1.24
150.0	1.32	11.07	150.09	.18	.57	17.54	1.25
200.0	1.33	11.00	139.79	-.24	.56	17.48	1.27
250.0	1.32	10.96	129.83	-.35	.55	17.43	1.28
300.0	1.32	10.95	119.84	-.46	.55	17.40	1.31
350.0	1.30	10.89	110.06	-.39	.53	17.35	1.35
400.0	1.28	10.86	100.67	.07	.53	17.23	1.39
450.0	1.24	10.81	91.06	.33	.54	17.17	1.45
500.0	1.20	10.76	81.16	.30	.55	17.13	1.52
550.0	1.15	10.72	71.31	—	.56	17.07	1.62
600.0	1.11	10.67	61.13	—	.58	17.03	1.75
650.0	1.11	10.67	50.55	—	.60	17.01	1.89
700.0	1.18	10.64	39.60	—	.61	17.01	2.06
750.0	1.30	10.67	28.71	—	.66	17.01	2.29
800.0	1.48	10.67	15.96	—	.75	17.16	2.58
850.0	1.76	10.65	1.87	—	.83	17.43	2.85
900.0	2.22	10.50	-13.96	—	.93	17.83	3.09
950.0	3.02	10.05	-31.74	—	1.00	18.50	3.24
1000.0	4.37	9.08	-49.80	—	.96	19.44	3.21
1050.0	6.27	7.59	-66.42	—	.85	20.58	3.02
1100.0	8.39	5.80	-80.45	—	.71	21.65	2.82
1150.0	10.47	3.85	-91.94	—	.57	22.71	2.70
1200.0	12.33	1.96	-101.07	—	.49	23.68	2.63

LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters
Bias = 15.00 Volts

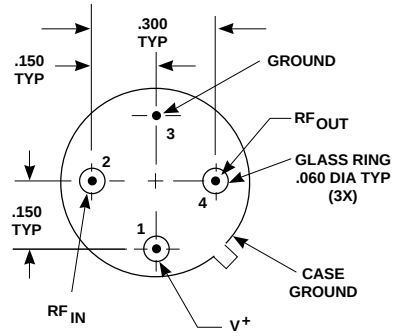
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.127	-169.7	11.118	162.9	-17.619	-5.6	.110	178.7
200.00	.132	-166.8	10.999	145.5	-17.550	-12.7	.116	-175.5
300.00	.133	-167.8	10.923	128.4	-17.466	-19.9	.134	-172.3
400.00	.122	-173.7	10.849	111.9	-17.325	-27.5	.163	-171.5
500.00	.096	174.0	10.748	95.5	-17.183	-36.5	.207	-173.6
600.00	.059	139.1	10.659	78.5	-17.103	-46.7	.266	-179.8
700.00	.077	61.9	10.632	59.7	-17.025	-58.5	.347	171.4
800.00	.182	30.4	10.678	38.9	-17.208	-71.0	.434	159.1
900.00	.366	13.5	10.502	12.1	-17.924	-87.1	.505	142.4
1000.00	.620	-7.8	9.113	-20.5	-19.481	-103.5	.516	123.9

Product Options



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

Technical drawing of a mechanical part. It features a circular cross-section with a center point. A line extends from the center at a 45-degree angle to the horizontal. A dimension of .031 is indicated for the thickness of the part at the end of this line. Another dimension of .031 is shown for the thickness of the part at the base of the 45-degree line.



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

TC-1A

