



Thin-Film Cascadable Amplifier 5 to 200 MHz

Technical Data

UTO/UTC 250 Series

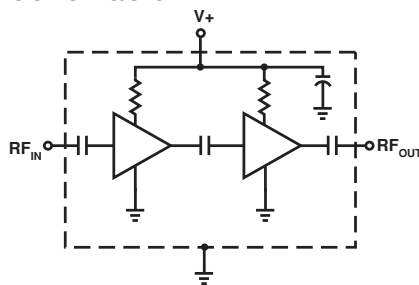
Features

- **Frequency Range: 5 to 200 MHz**
- **High Gain: 33.0 dB (Typ)**
- **Low Current Drain: 13 mA (Typ)**
- **Temperature Compensated**
- **5-Volt Supply**

Applications

- **High Gain IF/RF Amplification**
- **High Efficiency or Battery Powered Systems**

Schematic

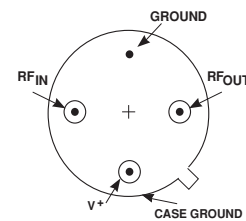


Description

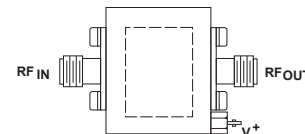
The 250 Series is a two-stage thin-film bipolar RF amplifier providing high gain and low power consumption. Blocking capacitors couple the RF through the amplifier. The 250 Series is available in either the TO-8 hermetic case or connected TC-1A package.

Pin Configuration

UTO—TO-8U



UTC—TC-1A



Maximum Ratings

Parameter	Maximum
DC Voltage	+12 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}	90/90°C/W ²
Active Transistor Power Dissipation	13/18 mW ²
Junction Temperature Above Case Temperature	1/2°C ²
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	974,800 Hrs.

Notes:

1. Values refer to first and second stages, respectively.

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

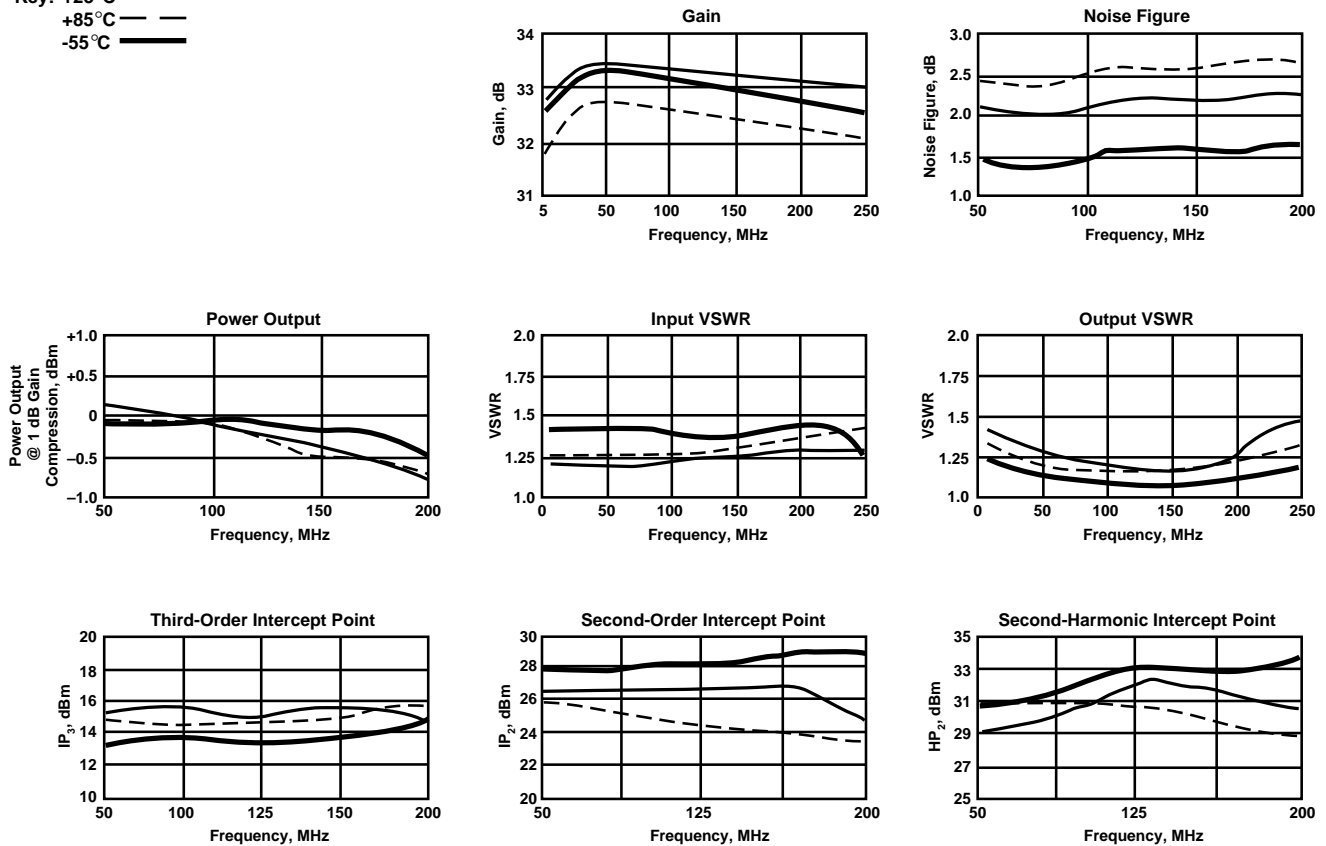
Electrical Specifications

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

Symbol	Characteristic	Typical $T_C = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_C = 0 \text{ to } 50^\circ\text{C}$	$T_C = -55 \text{ to } +85^\circ\text{C}$	
BW	Frequency Range	5-200	5-200	5-200	MHz
GP	Small Signal Gain (Min.)	33.0	30.0	29.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	2.5	4.0	5.0	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	-1.4	-3.0	-4.0	dBm
—	Input VSWR (Max.)	1.5:1	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	+14	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+25	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+30	—	—	dBm
I _D	DC Current	13	—	—	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 = 5.00 Volts

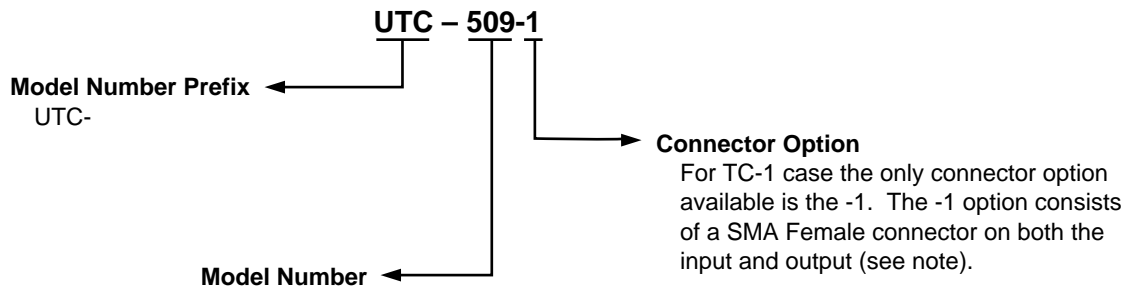
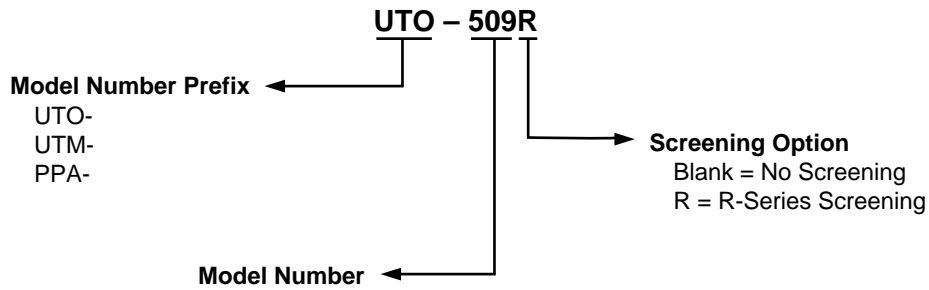
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.13	33.33	-31.08	-.63	.00	1.20	40.25
120.0	1.13	33.20	-35.74	1.12	.89	1.12	36.00
140.0	1.16	33.25	-43.90	-.61	.97	1.10	45.26
160.0	1.18	33.27	-49.65	.05	.84	1.13	43.12
180.0	1.26	33.16	-55.97	.15	.91	1.14	33.54
200.0	1.25	33.18	-62.70	-.14	.89	1.21	40.96
220.0	1.21	32.99	-68.84	.13	.87	1.24	42.47
240.0	1.23	32.87	-75.25	.14	.92	1.31	45.19
260.0	1.27	32.87	-82.04	-.21	.94	1.38	44.02
280.0	1.31	32.72	-88.86		.94	1.44	36.08
300.0	1.30	32.71	-95.62		.99	1.55	42.24
400.0	1.52	31.92	-132.74		1.06	2.32	45.41
500.0	1.81	29.98	-172.16		1.00	3.37	45.20
600.0	1.93	26.34	155.52		.74	3.43	47.63
700.0	1.88	22.49	134.35		.53	2.99	41.25
800.0	1.82	19.62	117.69		.00	2.60	38.98

LINEARIZATION RANGE: 100.0 to 200.0 MHz

S-Parameters
Bias = 5.00 Volts

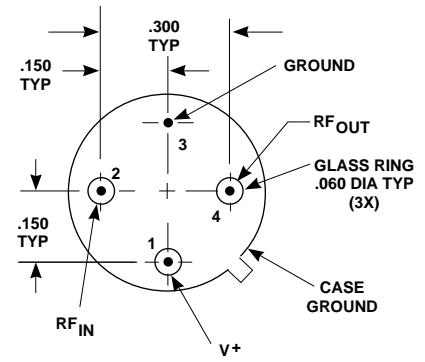
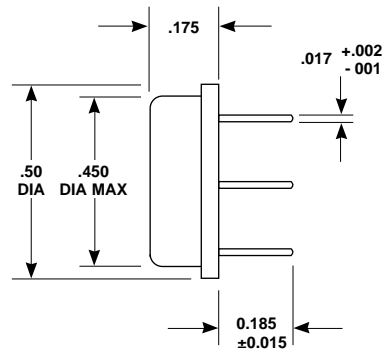
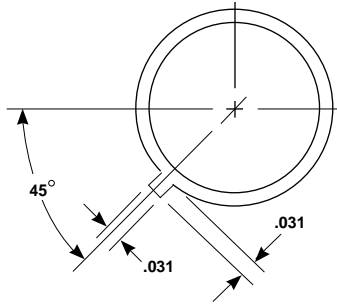
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.108	147.9	33.146	-31.0	-46.374	135.9	.039	-142.6
150.00	.085	126.4	33.095	-46.9	-38.261	48.6	.059	-118.1
200.00	.128	103.8	32.990	-61.9	-37.389	47.9	.097	-172.4
250.00	.116	70.4	32.736	-78.1	-41.684	23.8	.141	170.4
300.00	.138	45.2	32.584	-95.6	-45.391	-31.3	.217	146.8
400.00	.232	-8.0	31.862	-132.7	-45.308	42.4	.396	106.0
500.00	.315	-62.8	29.920	-172.5	-43.993	-37.3	.546	64.1
600.00	.337	-105.1	26.304	155.3	-69.103	140.9	.551	28.7
700.00	.316	-132.3	22.407	134.2	-44.944	109.1	.501	5.6
800.00	.302	-143.8	19.569	117.6	-38.947	103.9	.451	-6.6
900.00	.326	-149.4	17.191	100.2	-37.571	81.9	.438	-10.8
1000.00	.409	-158.5	14.732	79.3	-36.765	76.6	.475	-16.0
1100.00	.465	-176.0	11.304	56.6	-41.182	80.0	.519	-23.8
1200.00	.510	167.8	7.386	39.5	-44.597	75.6	.531	-32.2
1300.00	.519	153.4	2.577	29.7	-41.102	114.3	.532	-39.7
1400.00	.516	139.5	-2.830	26.3	-40.331	110.9	.532	-45.6
1500.00	.500	127.9	-8.145	34.7	-37.673	126.1	.536	-50.0

Product Options



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

Case Drawings TO-8U



APPROXIMATE WEIGHT 2.1 GRAMS

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

TC-1A

