



Thin-Film Cascadable Amplifier Module 10 to 200 MHz

Technical Data

UTO/UTC 211 Series

Features

- **Frequency Range: 10 to 200 MHz**
- **Ultra Low Noise: 2.0 dB (Typ)**
- **Low Current Drain: 30 mA (Typ)**
- **Temperature Compensated**
- **Surface Mount Option**
- **High Dynamic Range**

Applications

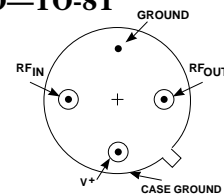
- **RF Front Ends**
- **IF Medical Systems**
- **Surface Mount Assembly**

Description

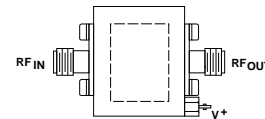
The 211 Series is a thin-film bipolar, medium-gain, low-noise, RF amplifier suitable for front end design. It utilizes lossless feedback circuitry for low power consumption and high dynamic range. Resistive feedback and active bias provide temperature compensation and increased immunity to bias voltage variations. The 211 Series is 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

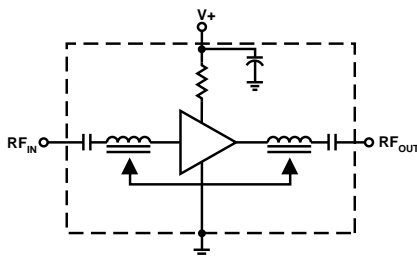
UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	17 Volts
Continuous RF Input Power	+17 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}	120°C/W
Active Transistor Power Dissipation	250 mW
Junction Temperature Above Case Temperature	30°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	604,000 Hrs.

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

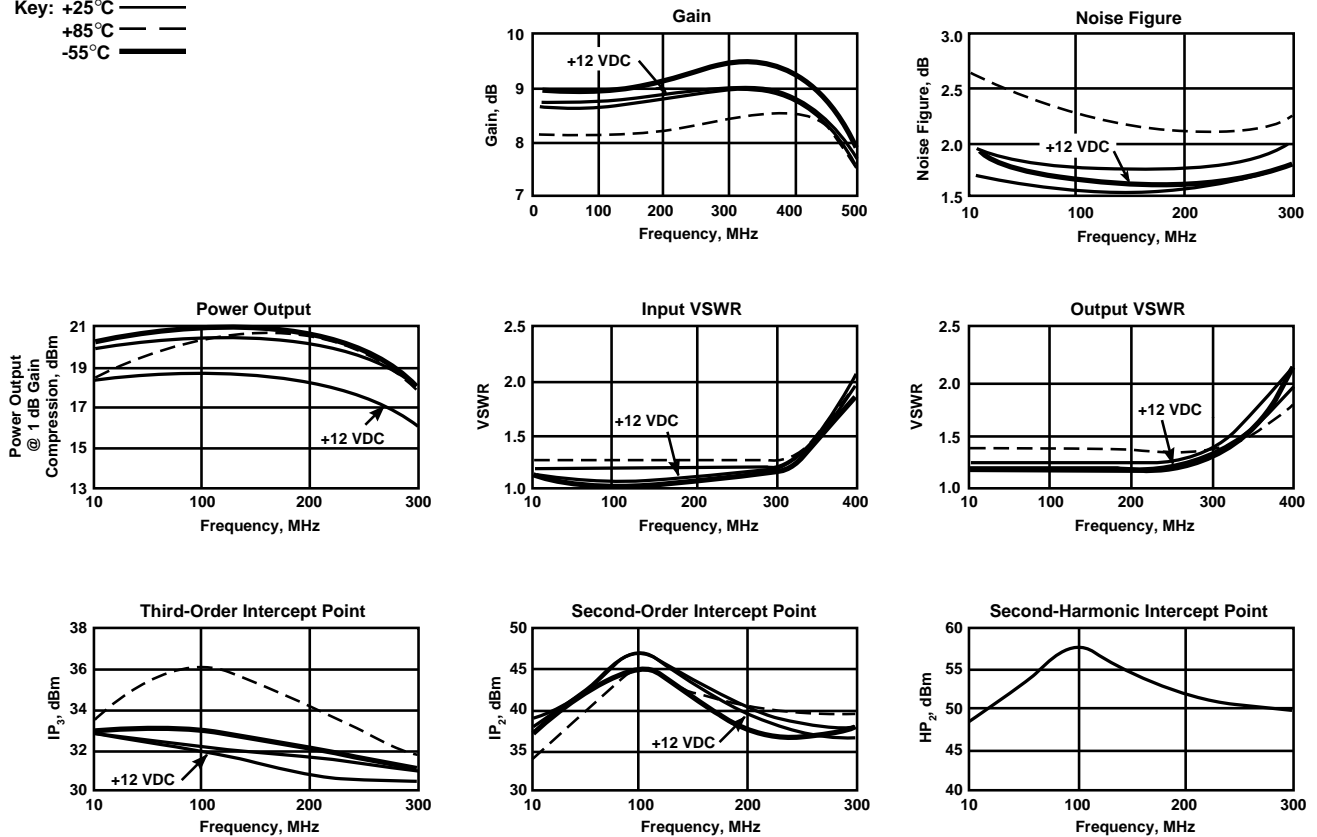
Electrical Specifications

(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	10-200	10-200	10-200	MHz
GP	Small Signal Gain (Min.)	8.5	7.5	7.5	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	2.0	2.7	3.0	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+20.0	+17.0	16.0	dBm
—	Input VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.3:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+31.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+45.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+51.0	—	—	dBm
I_D	DC Current	30	—	—	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

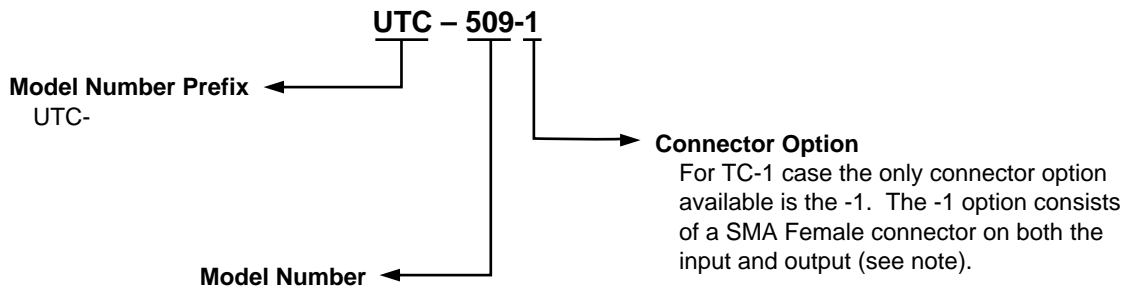
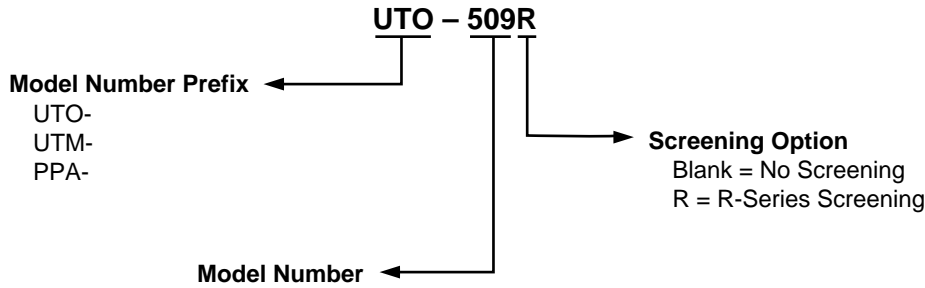
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.11	8.58	-17.31	-.89	.00	1.25	11.43
120.0	1.11	8.63	-20.98	-.42	.52	1.24	11.48
140.0	1.11	8.65	-24.84	-.14	.55	1.24	11.61
160.0	1.11	8.68	-28.96	-.12	.50	1.24	11.71
180.0	1.10	8.72	-32.09	.87	.50	1.24	11.77
200.0	1.09	8.75	-36.20	.89	.58	1.23	11.94
220.0	1.08	8.81	-40.52	.70	.58	1.23	11.99
240.0	1.07	8.85	-44.62	.73	.61	1.24	12.21
260.0	1.08	8.89	-49.23	.25	.66	1.25	12.40
280.0	1.12	8.94	-54.14	-.52	.69	1.26	12.63
300.0	1.18	8.96	-59.11	-1.35	.75	1.30	12.89
400.0	1.94	8.87	-88.75		.89	1.82	14.80
500.0	4.24	7.32	-121.94		.88	3.25	19.03
600.0	9.41	4.25	-148.67		.63	5.57	26.37
700.0	18.23	.59	-167.70		.45	7.59	35.31
800.0	28.35	-2.64	178.14		.33	8.80	42.12
900.0	42.46	-5.62	166.62		.31	9.68	44.61
1000.0	54.08	-8.68	157.69		.00	9.86	35.60

LINEARIZATION RANGE: 100.0 to 200.0 MHz

S-Parameters
Bias = 15.00 Volts

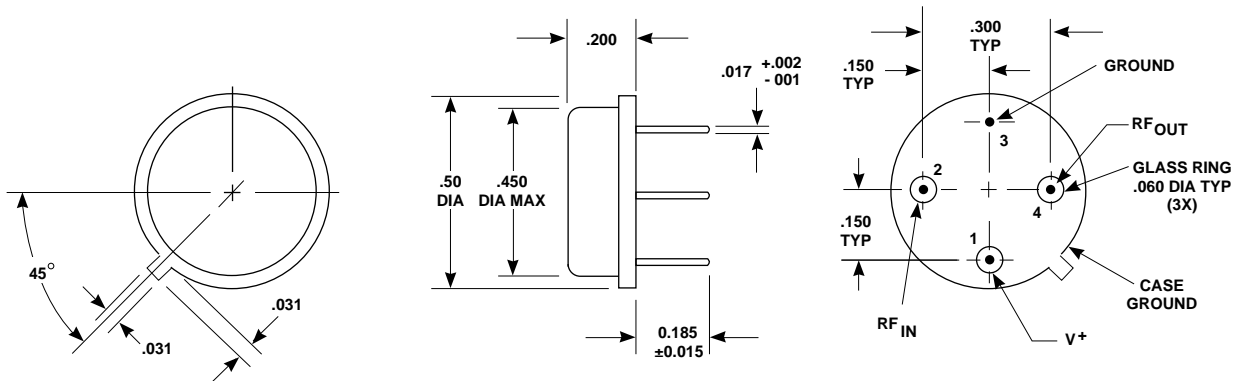
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.050	76.5	8.598	-17.3	-11.351	-15.1	.106	135.2
120.00	.053	71.3	8.661	-21.1	-11.420	-18.9	.106	131.4
140.00	.053	69.4	9.671	-24.9	-11.506	-22.5	.107	129.7
160.00	.051	68.6	8.720	-28.8	-11.658	-26.1	.107	125.6
180.00	.047	70.4	8.767	-32.2	-11.753	-29.9	.106	123.2
200.00	.043	75.3	8.819	36.3	-11.884	-33.5	.104	123.0
220.00	.036	94.0	8.839	-40.5	-12.030	-37.6	.103	124.2
240.00	.031	106.8	8.882	-44.8	-12.203	-41.3	.105	127.6
260.00	.038	138.1	8.922	-49.3	-12.355	-45.6	.111	131.6
280.00	.055	154.5	8.975	-54.1	-12.578	-50.2	.119	137.1
300.00	.083	160.4	9.008	-59.2	-12.859	-54.5	.133	141.7
400.00	.324	145.0	8.888	-88.9	-14.795	-80.8	.295	144.8
500.00	.621	112.8	7.324	-121.8	-19.034	-107.2	.534	120.3
600.00	.813	81.9	4.218	-148.3	-26.501	-124.8	.700	92.5
700.00	.900	59.2	.594	-167.3	-35.447	-117.1	.775	69.6
800.00	.942	41.9	-2.592	178.4	-41.899	-101.8	.799	52.6
900.00	.959	27.8	-5.632	167.1	-44.633	-166.4	.812	39.2
1000.00	.965	14.2	-8.691	158.3	-35.760	149.7	.815	28.0

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

