



Thin-Film Cascadable Amplifier 5 to 500 MHz

Technical Data

UTO/UTC 521 Series

Features

- **Frequency Range: 5 to 500 MHz**
- **High Gain: 30.0 dB (Typ)**

Applications

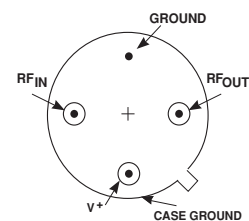
- **IF/RF Amplification**

Description

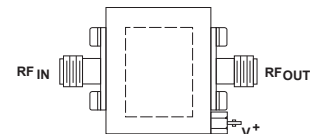
The 521 Series is a high-frequency, low-noise, medium gain amplifier. Active bias and resistive feedback assure stable operation on this two stage amplifier built on a thin-film substrate. The 521 Series is available in either the TO-8 hermetic case or connected TC-1A package.

Pin Configuration

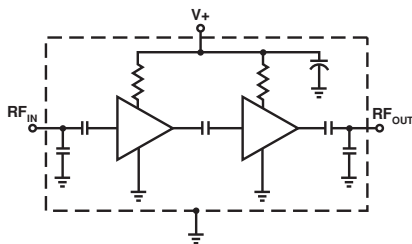
UTO—TO-8U



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}	105/75°C/W ²
Active Transistor Power Dissipation	16/92 mW ²
Junction Temperature Above Case Temperature	2/7°C ²
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	492,300 Hrs.

Notes:

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

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

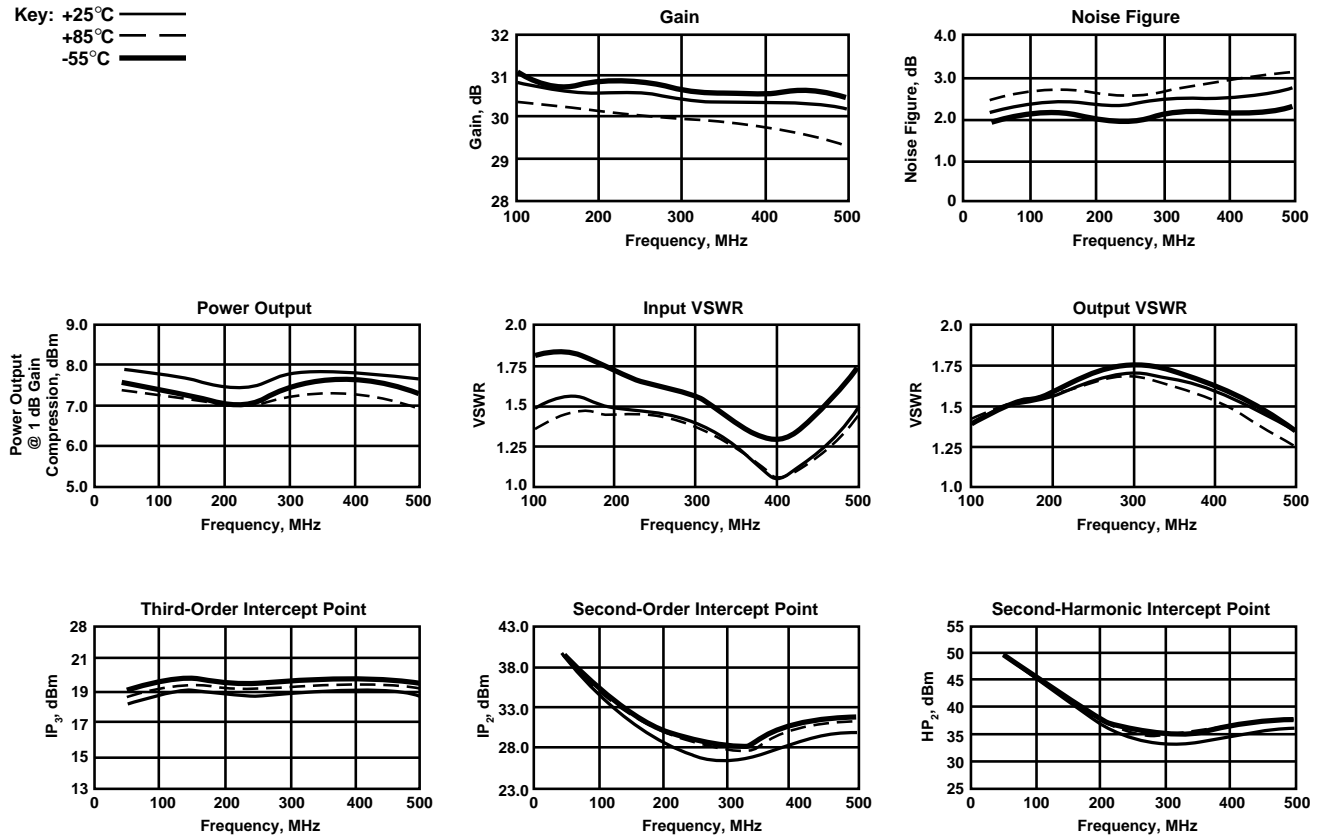
Electrical Specifications

(Measured in 50 Ω system @ +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	5-500	5-500	5-500	MHz
GP	Small Signal Gain (Min.)	30.0	27.0	27.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	3.0	4.0	4.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+7.0	+6.0	+5.5	dBm
—	Input VSWR (Max.)	<1.7:1	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	+18.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+25.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+32.0	—	—	dBm
I _D	DC Current	38	—	—	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

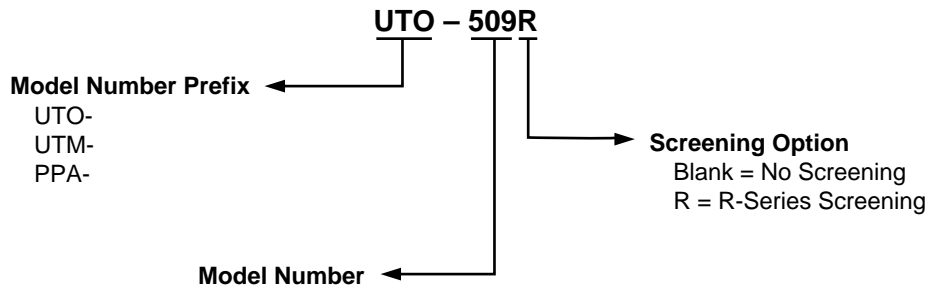
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.18	29.70	-40.33	-1.00	—	1.21	40.97
150.0	1.19	29.54	-60.48	-.30	1.14	1.20	44.03
200.0	1.17	29.46	-81.53	-.48	1.15	1.23	40.56
250.0	1.18	29.51	-102.04	-.14	1.10	1.26	42.06
300.0	1.17	29.47	-121.05	1.70	1.11	1.29	43.10
350.0	1.16	29.37	-141.86	1.75	1.17	1.31	45.12
400.0	1.14	29.31	-163.32	1.14	1.22	1.30	41.91
450.0	1.13	29.36	174.20	-.47	1.25	1.32	41.00
500.0	1.14	29.55	151.64	-2.17	1.27	1.40	39.90
550.0	1.20	29.55	128.62	—	1.37	1.52	38.51
600.0	1.40	29.46	102.45	—	1.53	1.80	40.82
650.0	1.85	29.09	73.62	—	1.67	2.29	44.57
700.0	2.62	28.35	42.43	—	1.68	3.14	40.06

LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters
Bias = 15.00 Volts

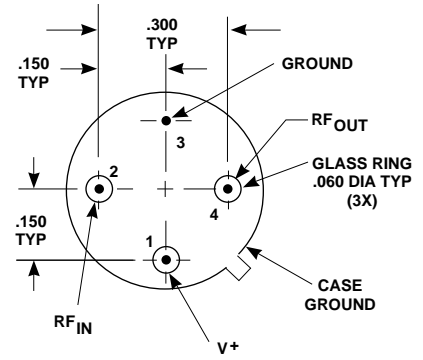
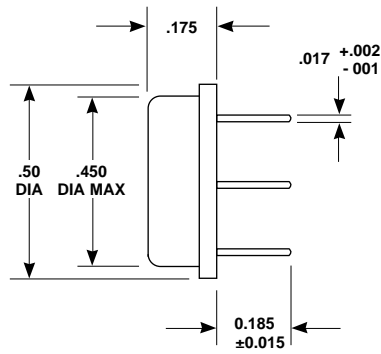
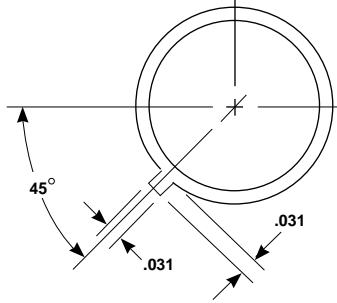
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.150	154.7	28.590	-42.4	-46.02	3.8	.186	.4
200.00	.135	131.6	28.251	-81.3	-44.44	-6.3	.176	-1.3
300.00	.123	105.4	28.358	-119.2	-43.10	-15.7	.155	-2.0
400.00	.106	85.5	28.368	-160.4	-43.10	-20.6	.115	2.1
500.00	.106	86.8	29.566	156.1	-41.94	-34.7	.062	40.2
600.00	.219	91.1	29.812	108.2	-40.92	-53.4	.164	100.8
700.00	.506	57.2	27.417	49.0	-40.92	-89.9	.423	84.8
800.00	.772	14.6	18.164	-9.4	-44.44	-131.8	.628	55.0
900.00	.886	-21.7	9.986	-57.7	-50.46	-157.5	.681	30.6
1000.00	.910	-47.2	5.417	-93.3	-60.00	161.1	.663	14.5

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

