



Thin-Film Cascadable Amplifier 10 to 500 MHz

Technical Data

UTO/UTC 561 Series

Features

- **Frequency Range: 10 to 500 MHz**
- **High Output Power: +27.0 dBm (Typ)**
- **Temperature Compensated**

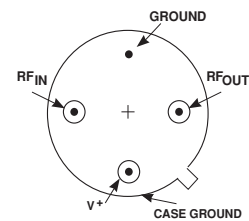
Applications

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

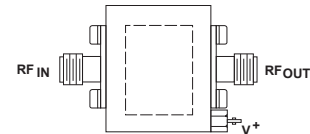
Description

The 561 Series is a thin-film RF bipolar amplifier that is protected against excessive high input power protected and stabilized for temperature and voltage variations. The RF input is transformer coupled and the output is coupled through blocking capacitors. The 561 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

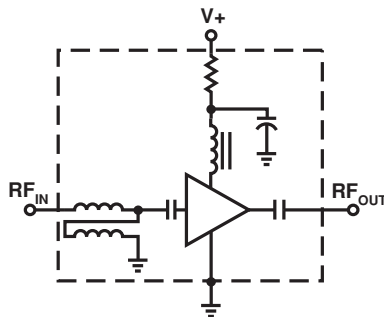
Pin Configuration UTO—TO-8T



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+16 Volts
Continuous RF Input Power	+18 dBm
Operating Case Temperature	-55 to +100°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+100°C

Thermal Characteristics¹

θ_{JC}	55°C/W
Active Transistor Power Dissipation	950 mW
Junction Temperature Above Case Temperature	52°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	452,800 Hrs.

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

Electrical Specifications

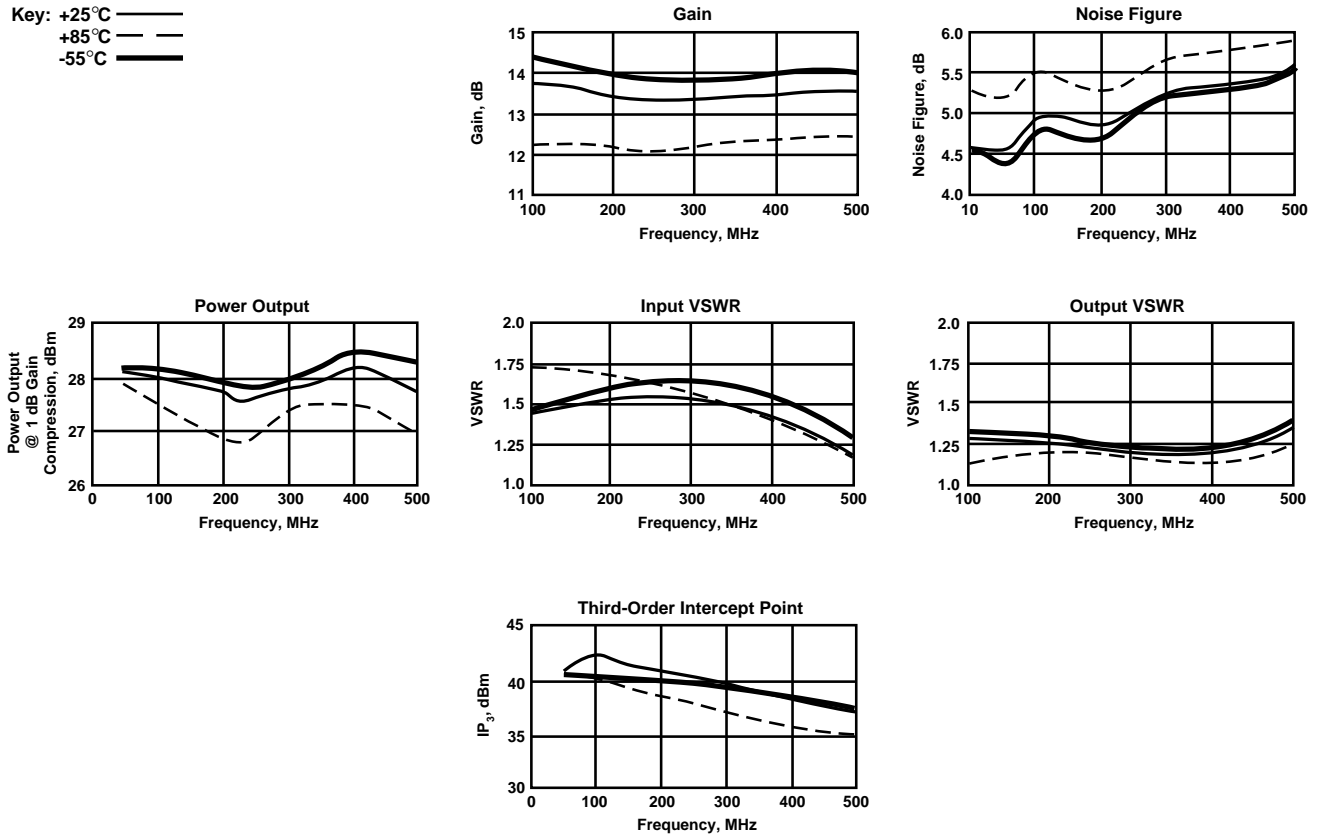
(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

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.)	13.0	11.0	10.0	dB
—	Gain Flatness (Max.)	± 0.3	± 0.7	± 1.0	dB
NF	Noise Figure (Max.)	5.5	9.0	9.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+27.0	+26.0	+25.5	dBm
—	Input VSWR (Max.)	<1.5:1	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	+39.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+51.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+57.0	—	—	dBm
I_D	DC Current	190	—	—	mA

Note: 1. RF input and output connected—no blocking capacitors.

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**

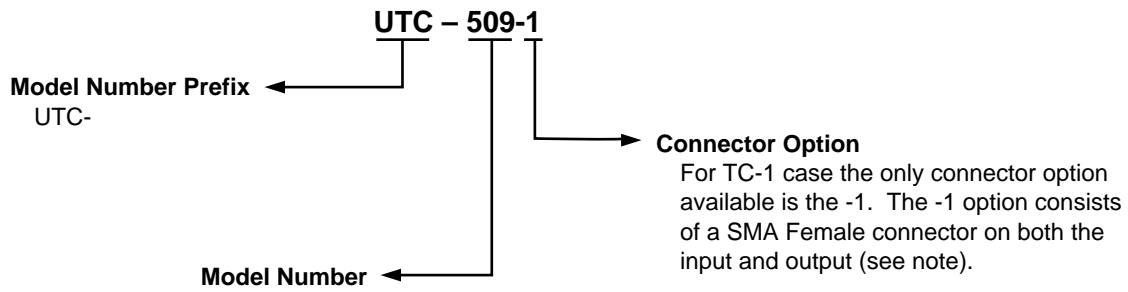
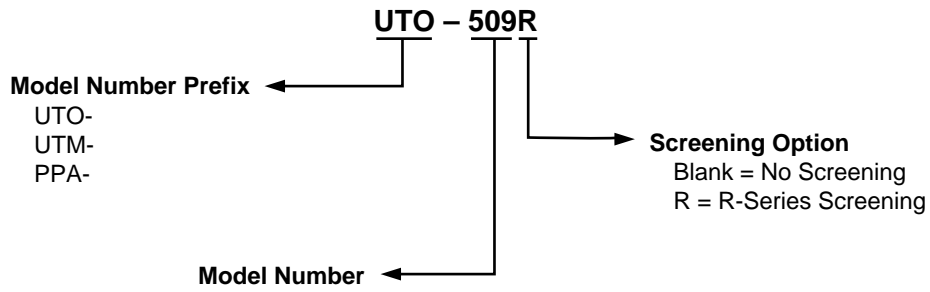
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.31	14.26	156.15	-1.77	.00	1.31	21.15
150.0	1.37	14.44	142.21	-1.49	.73	1.28	21.02
200.0	1.44	14.50	129.84	.34	.70	1.25	20.82
250.0	1.51	14.45	116.92	1.65	.75	1.21	20.60
300.0	1.57	14.45	102.98	1.92	.79	1.16	20.33
350.0	1.61	14.43	88.60	1.76	.82	1.10	20.01
400.0	1.61	14.32	73.57	.95	.85	1.06	19.65
450.0	1.54	14.14	57.83	-.54	.90	1.10	19.30
500.0	1.41	13.90	41.35	-2.81	.92	1.19	18.90
550.0	1.27	13.60	24.63	—	.95	1.34	18.47
600.0	1.16	13.16	7.01	—	1.00	1.55	18.09
650.0	1.33	12.64	-11.62	—	1.03	1.84	17.90
700.0	1.73	11.80	-30.17	—	1.07	2.26	17.93
750.0	2.42	10.57	-50.12	—	1.13	2.87	18.36
800.0	3.55	8.93	-70.82	—	1.16	3.48	19.42
850.0	5.17	6.63	-91.98	—	1.11	3.84	21.20
900.0	7.15	3.64	-110.84	—	1.01	3.88	23.75
950.0	8.82	.07	-128.38	—	.84	3.59	26.85
1000.0	9.44	-4.20	-141.06	—	.00	3.20	30.85

LINEARIZATION RANGE: 100.0 to 500.0 MHz

S-Parameters**Bias = 15.00 Volts**

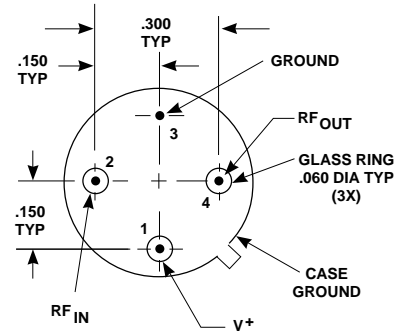
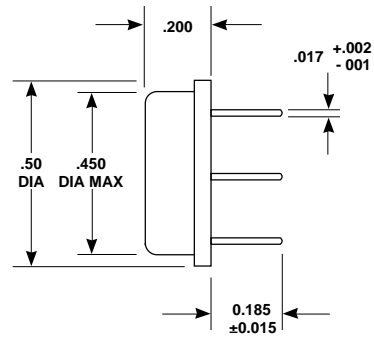
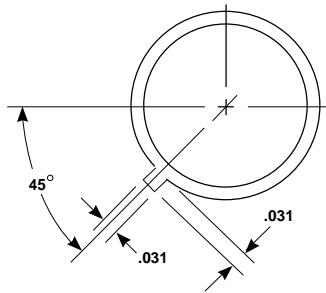
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.136	129.5	12.878	157.7	-20.685	-4.5	.076	154.9
150.00	.159	105.8	12.832	144.4	-20.716	-8.0	.063	160.0
200.00	.177	87.6	12.815	132.8	-20.703	-12.3	.092	159.2
250.00	.190	74.1	12.726	121.5	-20.721	-15.8	.098	153.6
300.00	.196	63.4	12.692	109.6	-20.691	-18.8	.100	149.2
350.00	.194	55.1	12.719	97.6	-20.639	-22.6	.095	144.3
400.00	.184	50.0	12.706	84.3	-20.526	-26.0	.083	140.6
450.00	.170	49.3	12.601	71.1	-20.391	-29.8	.065	140.9
500.00	.163	53.1	12.451	57.8	-20.247	-32.6	.045	150.6
550.00	.168	59.6	12.214	43.6	-20.018	-37.0	.031	-176.4
600.00	.185	64.5	11.903	29.6	-19.715	-41.6	.042	-132.0
650.00	.208	66.5	11.503	15.4	-19.446	-45.6	.068	-114.0
700.00	.227	66.9	11.121	2.0	-19.231	-51.5	.101	-106.0
800.00	.237	67.2	10.077	-24.4	-18.634	-65.8	.198	-100.1
900.00	.238	82.1	9.117	-54.7	-18.163	-85.2	.360	-108.4
1000.00	.381	99.9	7.407	-91.1	-18.489	-113.8	.554	-132.2

Product Options



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

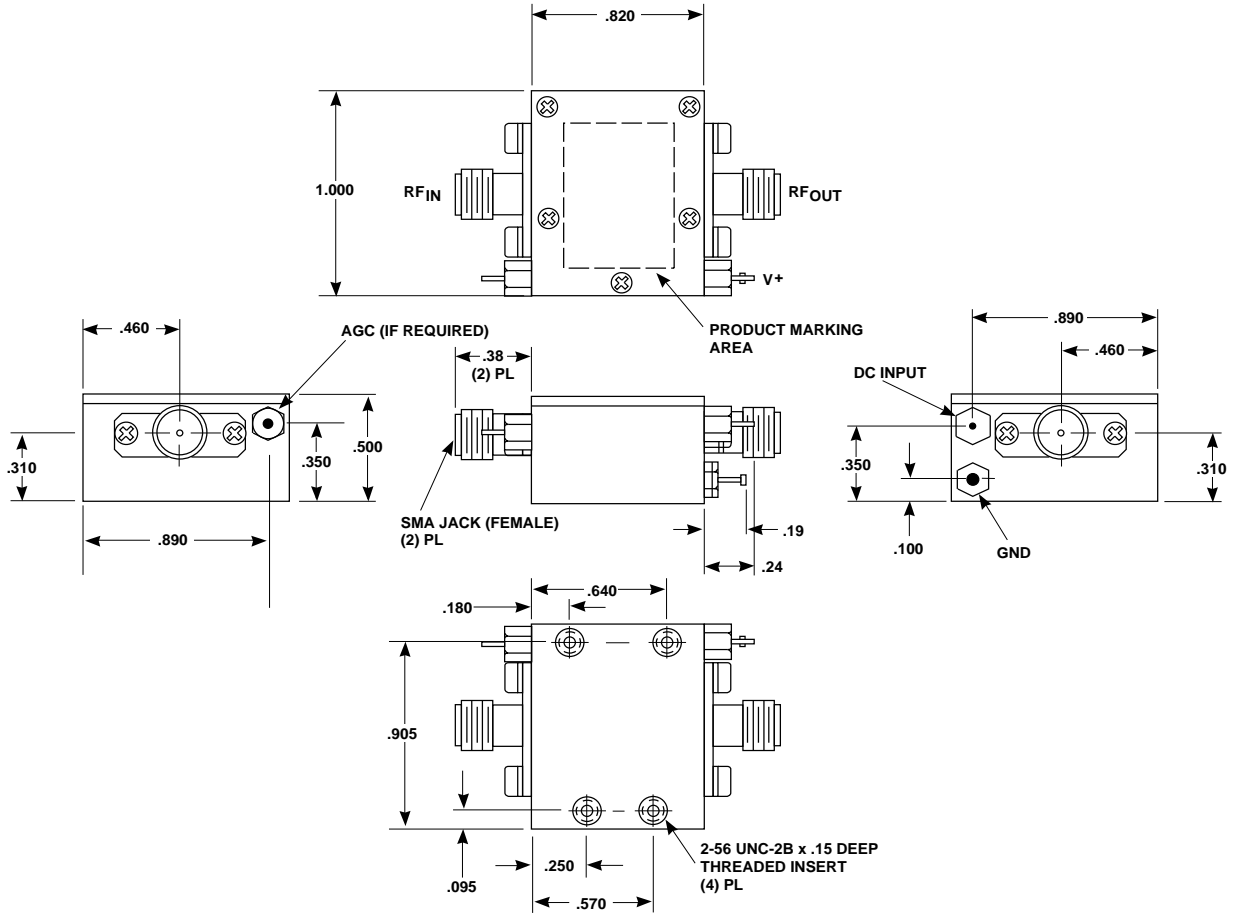
Case Drawings TO-8T



APPROXIMATE WEIGHT 2.1 GRAMS

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

Case Drawings TC-1



TYPICAL WEIGHT WITH CONNECTORS = 21.5 GRAMS

- NOTES: 1. THE TC-1 CASE IS A NON-HERMETIC CASE.
 2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1 CASE IS THE -1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.

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

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