



# Thin-Film Cascadable Amplifier Module 20 to 200 MHz

## Technical Data

### UTO/UTC 222 Series

#### Features

- **Frequency Range: 20 to 200 MHz**
- **High Gain: 29.5 dB (Typ)**
- **Low Noise: 2.9 dB (Typ)**
- **High Dynamic Range**
- **Temperature Compensated**
- **High Efficiency**

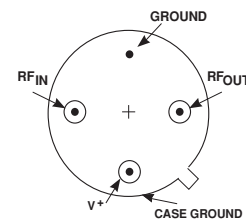
#### Applications

- **High Gain IF Stages**

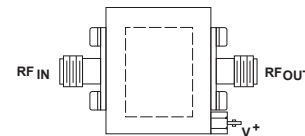
#### Description

The 222 Series is a thin-film, high gain, low-noise, RF cascade amplifier suitable for a variety of signal processing applications. Output transformer coupling substrate provides high efficiency at low currents. Blocking capacitors couple the RF through the amplifier. The 222 Series is available in either the TO-8 hermetic case or connected TC-1A package.

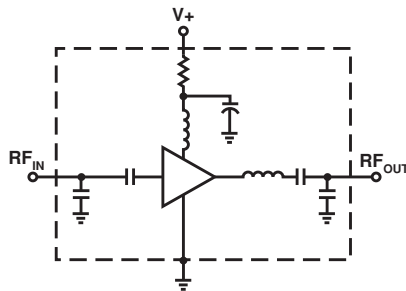
#### Pin Configuration UTO—TO-8T



#### UTC—TC-1A



#### Schematic



#### Maximum Ratings

Parameter	Maximum
DC Voltage	17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +115°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+115°C

#### Thermal Characteristics<sup>1</sup>

$\theta_{JC}$	87/87°C/W <sup>2</sup>
Active Transistor Power Dissipation	123/410 mW <sup>2</sup>
Junction Temperature Above Case Temperature	11/36°C <sup>2</sup>
MTBF (MIL-HDBK-217E, $A_{UF}$ @ 90°C)	568,100 Hrs.

Notes:

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

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

## Electrical Specifications

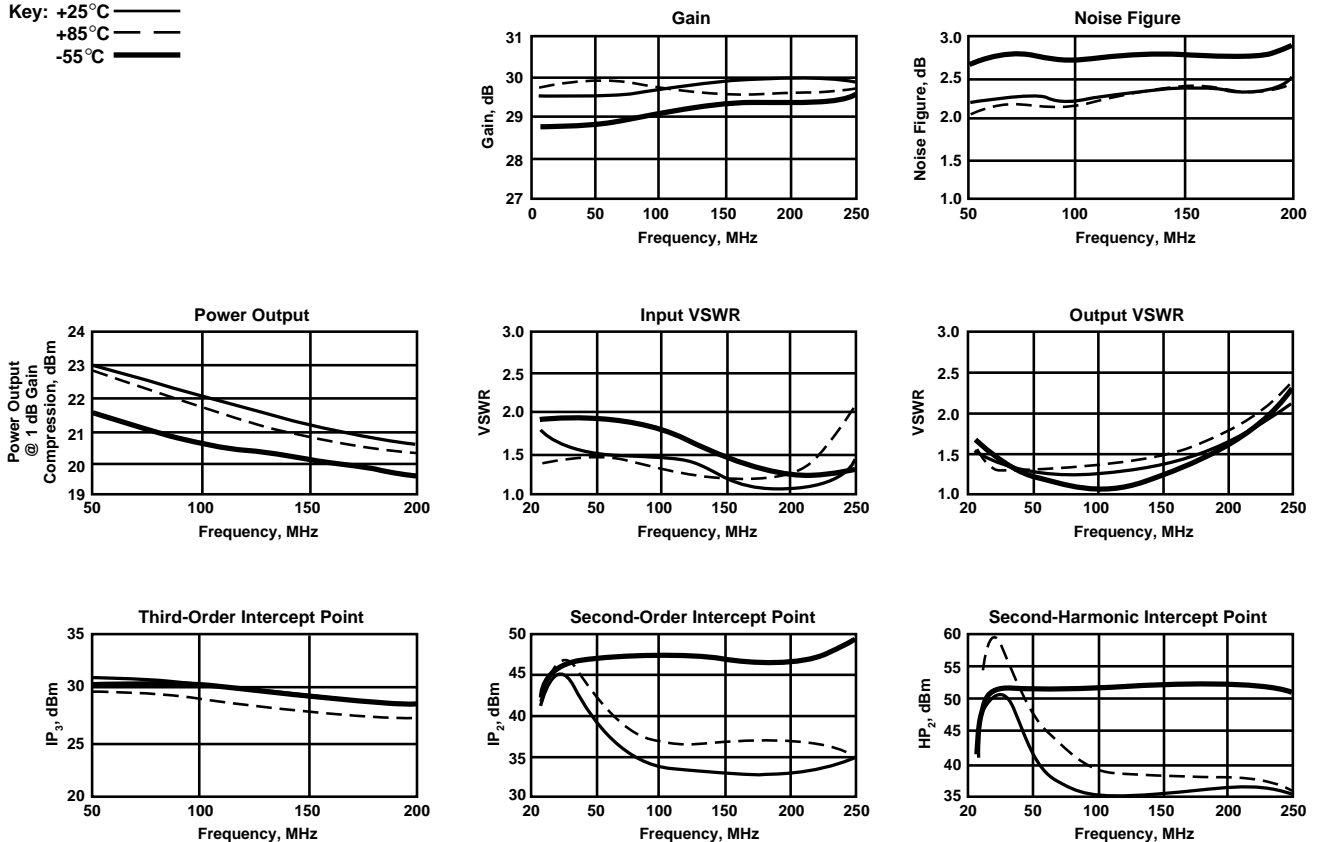
(Measured in 50  $\Omega$  system @ +15 VDC nominal unless otherwise noted)

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	20-200	20-200	20-200	MHz
GP	Small Signal Gain (Min.)	29.5	28.0	27.0	dB
—	Gain Flatness (Max.)	$\pm 0.3$	$\pm 0.7$	$\pm 1.0$	dB
NF	Noise Figure (Max.)	2.9	3.6	4.5	dB
$P_{1dB}$	Power Output @ +1 dB Comp. (Min.)	+21.0	+18.0 <sup>1</sup>	+17.0 <sup>2</sup>	dBm
—	Input VSWR (Max.)	1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.8:1	2.0:1	2.0:1	—
$IP_3$	Two Tone 3rd Order Intercept Point	+28.0	—	—	dBm
$IP_2$	Two Tone 2nd Order Intercept Point	+34.0	—	—	dBm
$HP_2$	One Tone 2nd Harmonic Intercept Point	+36.0	—	—	dBm
$I_D$	DC Current	47	—	—	mA

Notes: 1. Power Out 20 to 100 MHz = +20.0  
2. Power Out 20 to 100 MHz = +19.0

## Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———  
+85°C - - - -  
-55°C ———



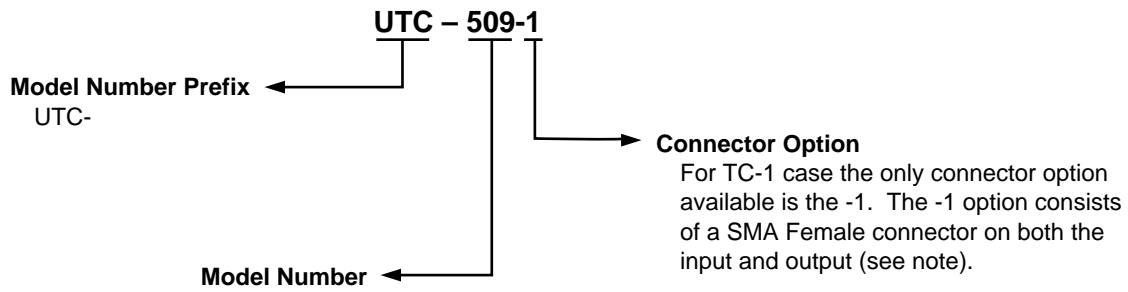
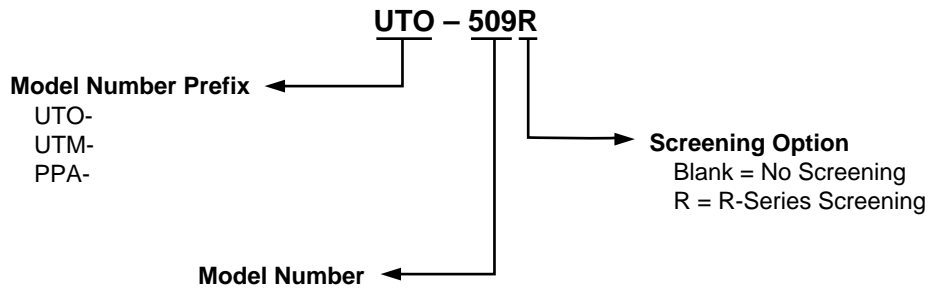
**Automatic Network Analyzer Measurements** (Typical production unit @ +25°C ambient)**Numerical Readings****Bias = 15.00 Volts**

FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.44	29.47	152.06	.00	.00	1.23	-29.47
200.0	1.03	29.84	116.24	.00	1.07	1.56	-29.84
300.0	1.80	28.89	74.68		1.09	2.97	-28.89

**S-Parameters****Bias = 15.00 Volts, Current = 47.00 mA**

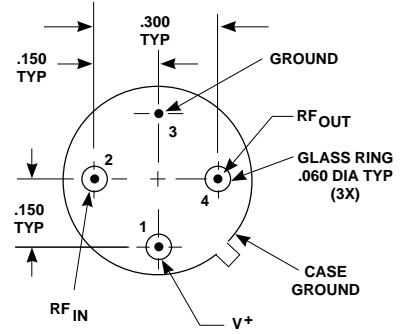
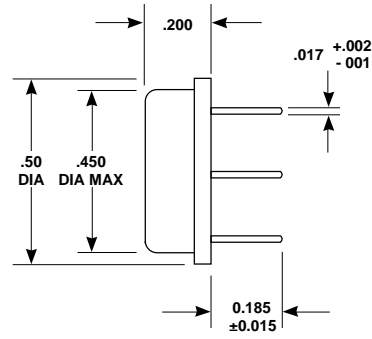
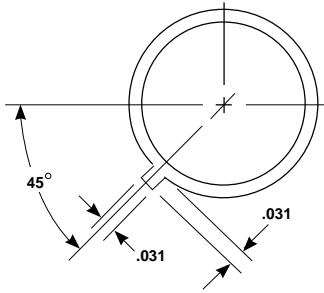
FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.178	160.7	29.553	151.9	-34.660	-21.5	.114	96.6
200.00	.015	3.7	29.832	116.0	-34.933	-41.3	.221	22.2
300.00	.292	-78.7	28.874	74.6	-36.727	-73.4	.494	-87.3
400.00	.493	-109.3	26.267	38.0	-39.855	-97.8	.667	-133.1
500.00	.579	-128.4	22.825	10.2	-45.535	-114.5	.722	-167.1
600.00	.612	-139.7	19.592	-13.4	-53.626	-122.6	.716	163.4
700.00	.662	-148.2	15.363	-27.5	-54.137	100.0	.584	132.7
800.00	.622	-156.0	14.581	-38.6	-44.844	-1.9	.512	122.9
900.00	.595	-159.0	12.450	-58.9	-43.508	-35.6	.491	96.1
1000.00	.580	-160.2	9.873	-78.5	-42.982	-51.0	.451	65.2
1100.00	.572	-160.7	7.187	-95.9	-42.690	-81.0	.414	32.6
1200.00	.568	-159.0	4.041	-110.8	-40.950	-99.6	.408	-1.1
1300.00	.595	-157.6	.257	-123.5	-40.114	-120.8	.432	-31.6
1400.00	.619	-156.7	-4.008	-131.5	-39.620	-138.1	.467	-55.6
1500.00	.657	-156.2	-8.115	-127.7	-39.040	-153.8	.509	-76.8

## 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

