

# Thin-Film Cascadable Amplifier 5 to 2000 MHz

## Technical Data

UTO/UTC 2052 Series

1

### Features

- Frequency Range: 5 to 2000 MHz
- 5 Volt Supply
- Low Supply Current: 18 mA (Typ)
- Temperature Compensated

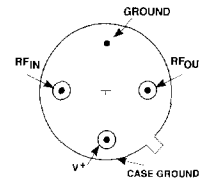
### Applications

- IF/RF Amplification
- 5 Volt Systems

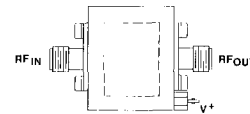
### Description

The 2052 Series is a thin-film bipolar RF amplifier that operates on 5-volt bias to provide medium output power. Resistive feedback and active bias assure temperature compensation and immunity to bias voltage variation. Input/output blocking capacitors couple RF through the amplifier, while a low VSWR is maintained through inductive tuning. The 2052 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1 package.

### Pin Configuration UTO—TO-8T

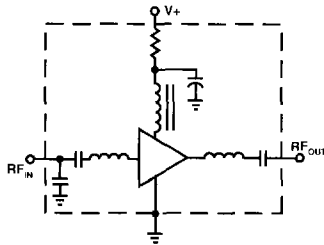


### UTC—TC-1



(See Section 5 for detailed case drawings.)

### Schematic



### Maximum Ratings

Parameter	Maximum
DC Voltage	+8.5 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 Characteristics<sup>1</sup>

Test Conditions	
$\theta_{JC}$	105°C/W
Active Transistor Power Dissipation	65 mW
Junction Temperature Above Case Temperature	7.0°C

Note 1: For further information, see Reliability Screening, Section 6.

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

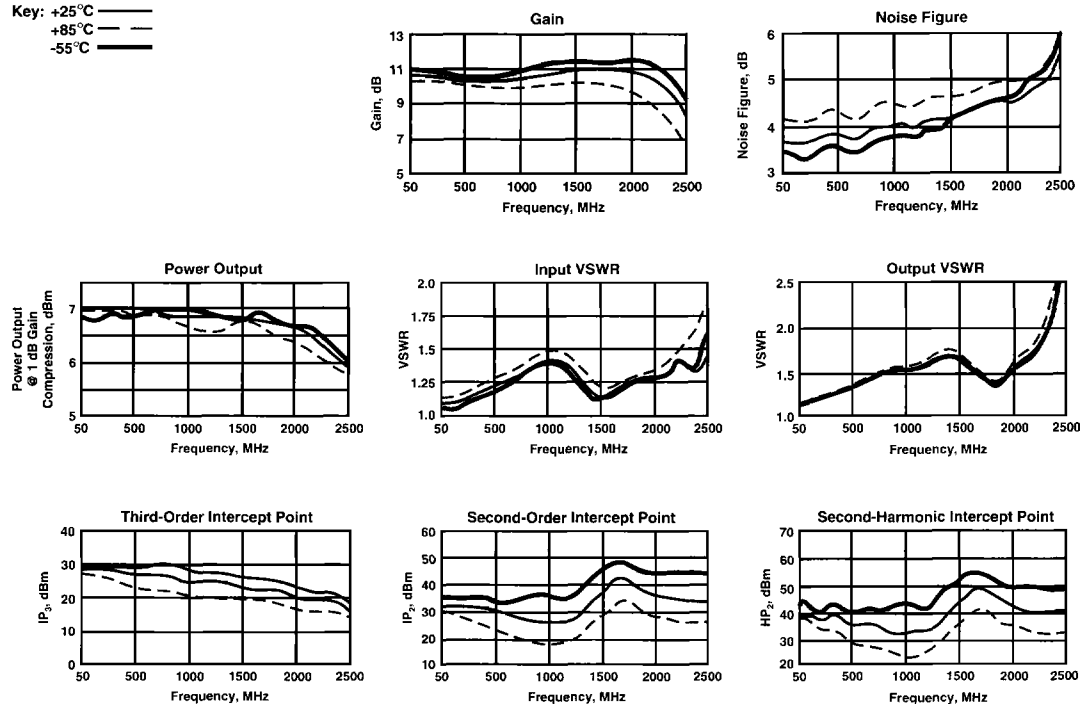
## Electrical Specifications

(Measured in 50  $\Omega$  system @ +5 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical $T_c = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_c = 0$ to $50^\circ\text{C}$	$T_c = -55$ to $+85^\circ\text{C}$	
BW	Frequency Range	5-2000	5-2000	5-2000	MHz
GP	Small Signal Gain (Min.)	10.0	9.0	8.0	dB
—	Gain Flatness (Max.)	$\pm 0.2$	$\pm 0.7$	$\pm 1.0$	dB
NF	Noise Figure (Max.)	4.5	5.0	5.5	dB
$P_{1dB}$	Power Output @ +1 dB Comp. (Min.)	+7.0	+5.5	+4.5	dBm
—	Input VSWR (Max.)	1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.7:1	2.0:1	2.0:1	—
$IP_3$	Two Tone 3rd Order Intercept Point	+16.0	—	—	dBm
$IP_2$	Two Tone 2nd Order Intercept Point	+28.0	—	—	dBm
$HP_2$	One Tone 2nd Harmonic Intercept Point	+33.0	—	—	dBm
$I_D$	DC Current	18.0	—	—	mA

## Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)

Key:  $+25^\circ\text{C}$  —  
 $+85^\circ\text{C}$  - - -  
 $-55^\circ\text{C}$  —



**Automatic Network Analyzer Measurements** (Typical production unit @ +25°C ambient)

**S-Parameters and Numerical Readings**

**Bias = 5.00 Volts**

FREQ GHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>		GPDEL ns	PHASE DEG
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang		
.005	.09	-61.2	10.2	-170.5	-15.3	11.4	.10	48.53		
.010	.06	-40.9	10.1	-176.6	-15.4	4.7	.08	23.40		
.020	.05	-28.5	10.1	-179.8	-15.4	1.0	.07	15.24		
.050	.05	-28.8	10.1	174.5	-15.4	-3.5	.08	13.08	.39	-4.24
.100	.05	-41.5	10.1	167.5	-15.4	-8.7	.08	15.42	.39	-4.46
.150	.06	-55.0	10.1	160.8	-15.4	-13.5	.09	17.97	.37	-4.25
.200	.06	-67.2	10.1	154.3	-15.4	-18.1	.10	19.89	.36	-3.94
.250	.07	-78.2	10.0	147.9	-15.5	-22.7	.11	20.94	.35	-3.61
.300	.07	-89.0	10.0	141.5	-15.5	-27.2	.12	21.01	.35	-3.51
.350	.08	-98.7	10.0	135.2	-15.6	-31.6	.13	20.30	.35	-2.53
.400	.09	-107.5	10.0	128.8	-15.6	-36.1	.14	18.99	.35	-2.04
.450	.09	-115.6	10.0	122.5	-15.6	-40.5	.15	16.97	.35	-1.53
.500	.10	-123.3	9.9	116.3	-15.7	-44.8	.16	14.41	.35	-.96
.550	.11	-130.8	9.9	110.0	-15.7	-49.2	.16	11.38	.35	-.38
.600	.11	-138.2	9.9	103.8	-15.8	-53.5	.17	8.03	.35	.20
.650	.12	-145.4	9.9	97.5	-15.8	-57.8	.18	4.34	.35	.81
.700	.12	-152.5	9.9	91.3	-15.8	-62.1	.19	.35	.65	1.39
.750	.13	-159.6	9.9	85.0	-15.9	-66.4	.20	-3.85	.35	1.90
.800	.13	-166.7	9.9	78.7	-15.9	-70.7	.20	-8.28	.35	2.46
.850	.14	-173.8	10.0	72.3	-15.9	-75.0	.21	-13.01	.35	2.96
.900	.14	179.2	10.0	66.0	-15.9	-79.3	.21	-17.91	.35	3.47
.950	.14	171.9	10.0	59.6	-16.0	-83.7	.21	-22.96	.36	3.90
1.000	.14	164.6	10.0	53.1	-16.0	-88.0	.22	-28.22	.36	4.27
1.050	.14	157.2	10.1	46.8	-16.0	-92.4	.22	-33.68	.36	4.59
1.100	.14	149.5	10.1	40.1	-16.0	-96.9	.22	-39.43	.36	4.87
1.150	.13	141.6	10.2	33.4	-16.0	-101.4	.22	-45.38	.37	5.07
1.200	.13	133.2	10.2	26.7	-16.0	-106.0	.22	-51.47	.38	5.12
1.250	.13	124.3	10.3	19.8	-16.0	-110.6	.21	-57.88	.38	5.07
1.300	.12	114.8	10.4	12.8	-15.9	-115.3	.21	-64.71	.39	4.89
1.350	.11	104.1	10.5	5.7	-15.9	-120.1	.21	-71.65	.39	4.68
1.400	.11	92.2	10.5	-1.5	-15.9	-124.9	.20	-78.91	.40	4.23
1.450	.10	78.7	10.6	-8.0	-15.9	-129.9	.20	-86.64	.41	3.64
1.500	.08	63.2	10.6	-16.6	-15.9	-134.9	.19	-94.79	.43	2.81
1.550	.08	45.0	10.7	-24.4	-15.9	-140.0	.18	103.26	.43	1.84
1.600	.08	24.8	10.7	-32.5	-15.9	-145.2	.18	-112.45	.45	.63
1.650	.07	2.4	10.7	-40.3	-16.0	-150.4	.17	-122.53	.44	-.40
1.700	.07	-19.5	10.6	-48.3	-16.0	-155.5	.17	-133.39	.44	-1.50
1.750	.07	-39.1	10.6	-56.2	-16.0	-160.7	.17	-145.35	.44	-2.59
1.800	.08	-55.1	10.5	-64.2	-15.9	-166.1	.18	-158.70	.44	-3.74
1.850	.08	-68.5	10.5	-72.2	-15.9	-171.5	.18	-172.81	.45	-4.88
1.900	.09	-78.9	10.5	-80.6	-15.9	-177.3	.19	172.90	.46	-6.50
1.950	.10	-87.9	10.4	-89.1	-15.9	176.7	.21	158.52	.47	-8.17
2.000	.10	-95.1	10.4	-97.8	-15.9	170.4	.22	144.56	.49	-10.08
2.050	.10	-103.5	10.3	-106.8	-15.9	164.0	.25	131.65	.50	
2.100	.10	-109.5	10.2	-116.1	-15.9	157.3	.27	119.45	.52	
2.150	.10	-114.3	10.1	-125.6	-16.0	150.5	.30	107.91	.53	
2.200	.08	-116.5	9.3	-135.3	-16.1	143.4	.33	97.27	.54	
2.250	.08	-114.1	9.6	-145.2	-16.3	136.2	.37	87.23	.55	
2.300	.07	-105.6	9.4	-155.2	-16.5	128.8	.41	77.80	.56	
2.350	.07	-90.0	9.0	-165.5	-16.7	121.3	.45	68.49	.57	
2.400	.09	-73.8	8.6	-175.8	-17.0	113.6	.49	59.72	.58	
2.450	.12	-65.0	8.2	173.8	-17.4	106.0	.53	51.20	.58	
2.500	.16	-63.2	7.6	163.5	-17.9	98.3	.57	42.86	.57	
3.000	.64	-121.8	-1.5	76.0	-25.6	38.2	.82	-27.25	.49	

LINEARIZATION RANGE: .050 to 2.000 GHz

