



**UTO/UTC/PPA 1021 Series  
Thin-Film Cascadable Amplifier  
5 to 1000 MHz**

T-74-09-01

**FEATURES**

- Frequency Range: 5 to 1000 MHz
- High Gain: 23.0 dB (Typ)
- Medium Output Power: +14.0 dBm (Typ)
- Temperature Compensated
- Surface Mount Option

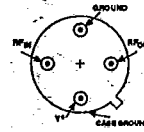
**APPLICATIONS**

- IF/RF Amplification
- Output Stage

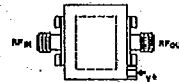
**DESCRIPTION**

The 1021 Series is a two-stage bipolar RF amplifier built on a thin-film substrate. Active bias and resistive feedback provide for stability over temperature and bias voltage variations. Input/output blocking capacitors couple the RF through the

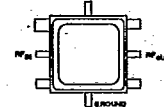
amplifier while a low VSWR is maintained through the use of inductive tuning. The 1021 Series amplifiers are available in three packages: the TO-8 hermetic case, the connected TC-1 package or the surface mount PlanarPak PP-38.



UTO—TO-8U, p. 16-48



UTC—TC-1, p. 16-42

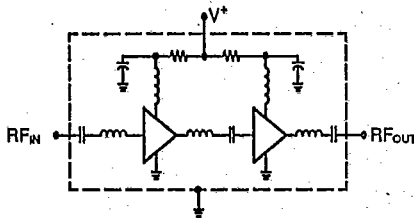


PPA—PP-38, p. 16-35

**ELECTRICAL SPECIFICATIONS** (Measured in a 50-ohm system; @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical T <sub>c</sub> = 25°C	Guaranteed Specifications		Unit
			T <sub>c</sub> = 0° to 50°C	T <sub>c</sub> = -55° to +85°C	
BW	Frequency Range	5-1000	5-1000	5-1000	MHz
GP	Small Signal Gain (Min.)	23.0	22.0	21.0	dB
—	Gain Flatness (Max.)	±0.7	±1.0	±1.0	dB
NF	Noise Figure (Max.)	3.8	4.5	5.0	dB
P <sub>1dB</sub>	Power Output @ +1 dB Compression (Min.)	+14.0	+12.0	+11.0	dBm
—	Input VSWR (Max.)	<1.8:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.8:1	2.0:1	2.0:1	—
IP <sub>3</sub>	Two Tone 3rd Order Intercept Point	+25.0	—	—	dBm
IP <sub>2</sub>	Two Tone 2nd Order Intercept Point	+30.0	—	—	dBm
HP <sub>2</sub>	One Tone 2nd Harmonic Intercept Point	+40.0	—	—	dBm
I <sub>b</sub>	DC Current	85	—	—	mA

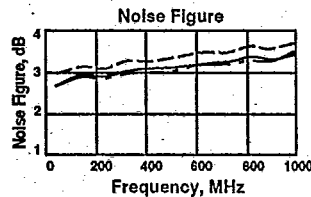
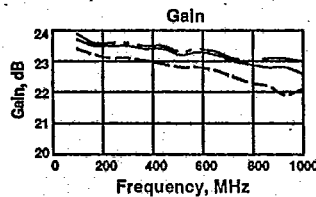
**SCHEMATIC**



**TYPICAL PERFORMANCE OVER TEMPERATURE**

(@ +15 VDC unless otherwise noted)

KEY: +25°C ———  
+85°C - - - - -  
-55°C - · - · - ·



**MAXIMUM RATINGS**

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

**THERMAL CHARACTERISTICS\***

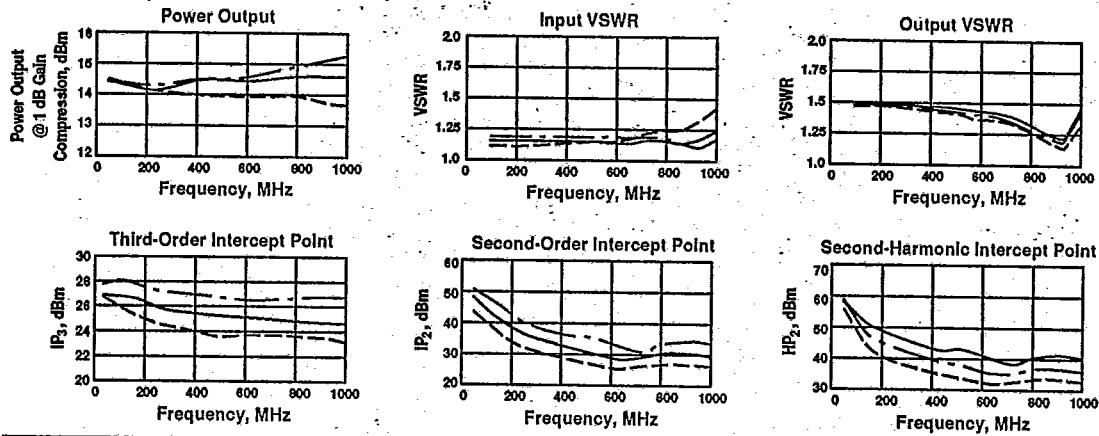
θ <sub>JC</sub>	105/75°C/W
Active Transistor Power Dissipation	230/460 mW
Junction Temperature Above Case Temperature	24/34°C
MTBF (MIL-HDBK-217E, A <sub>UP</sub> @ 90°C)	575,400 Hrs.

\*For further information, see High Reliability section, p. 17-2.

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

TYPICAL PERFORMANCE OVER TEMPERATURE (continued)

T-74-09-01



AUTOMATIC NETWORK ANALYZER MEASUREMENTS (Typical production unit @ +25°C ambient)

NUMERICAL READINGS

BIAS = 15.00 VOLTS

FREQ MHz	VSWR IN	GAIN dB	PHASE DEG	PHASE DEV	GPDEL ns	VSWR OUT	ISOL dB
100.0	1.23	23.92	-19.76	-1.86	.00	1.46	39.57
200.0	1.29	23.86	-38.37	-.30	.53	1.47	38.06
300.0	1.32	23.81	-58.28	-.05	.55	1.50	36.34
400.0	1.33	23.86	-77.78	.60	.56	1.53	38.86
500.0	1.33	24.06	-97.55	.99	.63	1.57	39.30
600.0	1.33	24.08	-117.37	1.32	.66	1.62	40.29
700.0	1.37	24.08	-137.82	1.02	.58	1.69	41.20
800.0	1.46	23.88	-158.85	.17	.59	1.75	42.65
900.0	1.60	23.79	179.93	-.87	.57	1.80	44.65
1000.0	1.75	23.77	158.44	-2.20	.60	1.80	46.55
1100.0	1.92	23.69	137.08	—	.63	1.74	47.79
1200.0	2.05	23.50	113.77	—	.67	1.67	45.26
1300.0	1.94	22.61	89.77	—	.61	1.41	44.27
1400.0	1.81	21.46	68.99	—	.55	1.32	43.97
1500.0	1.75	20.55	50.19	—	.52	1.29	45.01

LINEARIZATION RANGE: 100.0 to 1000.0 MHz

S-PARAMETERS

BIAS = 15.00 VOLTS

FREQ 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
100.0	.185	146.0	23.784	-18.6	-38.957	6.3	.127	171.9
200.0	.196	121.9	23.853	-36.4	-38.320	-7.7	.130	172.8
300.0	.208	101.8	23.911	-55.6	-38.914	-13.9	.144	166.8
400.0	.217	82.3	24.117	-74.8	-38.946	-21.9	.157	156.7
500.0	.214	60.7	24.500	-94.9	-39.187	-30.0	.174	142.7
600.0	.204	33.0	24.667	-115.4	-40.060	-39.4	.194	126.6
700.0	.203	-1.5	24.741	-137.0	-41.302	-46.9	.214	110.3
800.0	.218	-37.0	24.566	-159.8	-43.007	-53.4	.235	94.0
900.0	.249	-67.7	24.395	177.3	-44.784	-64.5	.249	79.7
1000.0	.277	-93.1	24.053	154.6	-47.587	-41.4	.248	65.2
1100.0	.297	-116.5	23.828	132.8	-47.857	-23.1	.227	45.2
1200.0	.299	-143.5	23.064	109.9	-44.830	-21.8	.181	31.5
1300.0	.255	-172.2	21.912	87.4	-43.135	-30.0	.137	18.9
1400.0	.204	158.6	20.568	68.2	-42.697	-40.6	.110	6.5
1500.0	.169	127.2	19.516	50.7	-42.957	-43.3	.108	-9.7