

Avantek Products

Thin-Film Cascadable Amplifier 20 to 1000 MHz

Technical Data

UTO/UTC/PPA 1044 Series

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Features

- **Frequency Range:** 20 to 1000 MHz
- **High Dynamic Range**
- **Low Noise Figure:** 2.5 dB (Typ)
- **Medium Power Output:** +13.0 dBm (Typ)
- **Temperature Compensated**
- **Surface Mount Option**

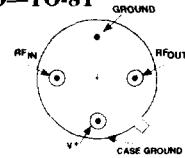
Applications

- **Wideband RF System Front End**

Description

The 1044 Series is a high power thin-film bipolar RF amplifier using lossless feedback for low noise, high dynamic range and efficient operation; and active bias circuits to assure good temperature compensation and increased immunity to bias voltage variations. The 1044 Series amplifiers are available in three packages: the surface mount PlanarPak PP-38 (.375 in. x .375 in.) case, the TO-8 hermetic case and the connectorized TC-1 case.

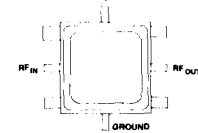
Pin Configuration UTO—TO-8T



UTC—TC-1

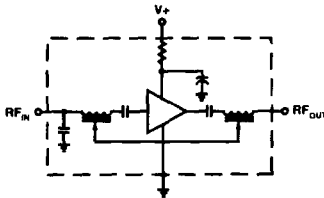


PPA—PP-38



(See Section 5 for detailed case drawings.)

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°C/W
Active Transistor Power Dissipation	256 mW
Junction Temperature Above Case Temperature	27°C
MTBF (MIL-HDBK-217E, A_{1TF} @ 90°C)	955,100 Hrs.

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

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

Electrical Specifications¹

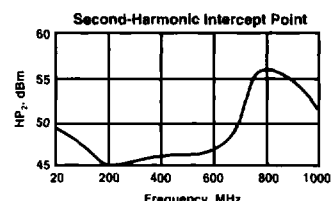
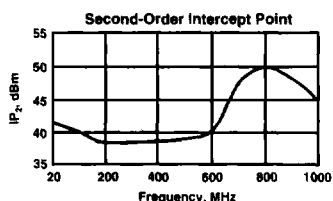
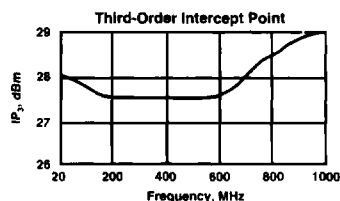
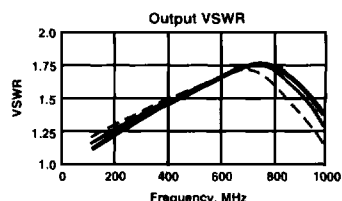
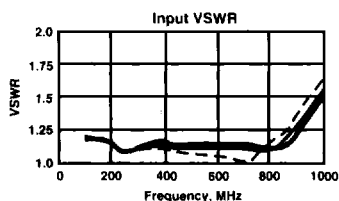
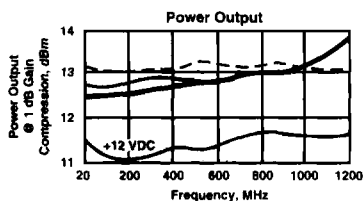
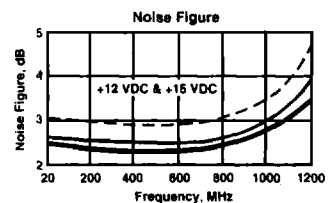
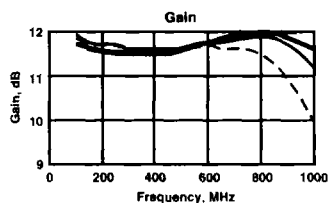
(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical $T_c = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_c = 0$ to 50°C	$T_c = -55$ to $+85^\circ\text{C}$	
BW	Frequency Range	20-1000	20-1000	20-1000	MHz
GP	Small Signal Gain (Min.)	11.0	10.0	9.0	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	2.5	4.5	5.0	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.) ²	+13.0	+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 ₃	Two Tone 3rd Order Intercept Point	+25.0	+22.0	+21.0	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+35.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+46.0	—	—	dBm
I _D	DC Current	35	—	—	mA

Notes: 1. Both RF input and RF output pins are at DC ground — no blocking capacitor/PPA-1044 = Preliminary.
2. PPA-1044, Power Output = 12 dBm (typ) @ 25°C, 11.5 dBm from 0° to 50°C and 11.0 dBm from -55° to +85°C.

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	1.13	11.12	168.56	-2.87	.00	1.17	16.40
200.0	1.20	11.02	152.79	-2.76	.43	1.28	16.39
300.0	1.27	11.01	137.45	-1.73	.41	1.41	16.56
400.0	1.31	11.04	123.61	-.21	.39	1.49	16.64
500.0	1.30	11.12	109.58	1.63	.39	1.54	16.66
600.0	1.24	11.19	95.25	3.19	.41	1.52	16.52
700.0	1.18	11.21	80.12	3.78	.43	1.45	16.47
800.0	1.02	11.24	63.73	3.42	.47	1.35	16.44
900.0	1.23	11.04	46.58	2.14	.50	1.30	16.33
1000.0	1.51	10.69	28.83	.28	.52	1.40	16.44



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	.063	154.8	11.090	167.6	-16.592	169.3	.077	141.1
150.00	.075	120.6	11.053	159.7	-16.417	161.1	.096	114.7
200.00	.089	101.4	10.958	151.8	-16.537	152.8	.124	100.4
250.00	.108	85.3	10.930	143.9	-16.541	146.0	.145	88.3
300.00	.123	75.5	10.946	136.4	-16.639	139.5	.164	79.6
350.00	.130	65.9	10.980	129.0	-16.626	132.6	.182	71.7
400.00	.134	56.4	11.016	121.7	-16.607	126.4	.193	65.0
450.00	.132	46.7	11.073	114.7	-16.601	120.6	.201	58.7
500.00	.127	39.5	11.084	107.2	-16.583	114.3	.207	53.1
550.00	.114	32.6	11.157	100.1	-16.585	108.4	.204	48.6
600.00	.096	24.7	11.202	92.6	-16.565	102.1	.199	44.9
650.00	.075	18.2	11.221	84.7	-16.503	96.5	.189	41.8
700.00	.046	15.5	11.228	76.9	-16.470	90.3	.176	40.5
750.00	.011	28.3	11.254	68.7	-16.407	84.4	.160	41.8
800.00	.028	156.2	11.233	60.2	-16.406	77.7	.144	46.0
850.00	.072	153.9	11.183	51.5	-16.434	71.0	.135	53.9
900.00	.123	147.5	11.062	42.5	-16.370	64.7	.136	65.3
950.00	.173	140.7	10.896	33.2	-16.366	58.1	.148	75.0
1000.00	.220	133.4	10.691	24.3	-16.460	51.8	.174	82.9
1050.00	.269	123.8	10.378	14.5	-16.543	45.4	.212	85.8
1100.00	.316	116.2	10.038	5.5	-16.648	38.8	.251	86.3
1200.00	.390	101.4	9.272	-11.7	-17.028	26.0	.326	82.0
1300.00	.449	87.8	8.368	-27.1	-17.369	14.3	.393	74.7
1400.00	.486	75.0	7.393	-41.8	-17.792	3.8	.445	67.0
1500.00	.511	64.0	6.429	-55.2	-18.261	-6.5	.484	60.0