HEWLETT PACKARD

Avantek Products

High Efficiency, Class A, 1 Watt Amplifier 10 to 1000 MHz

Technical Data

UTO/UTC-1065

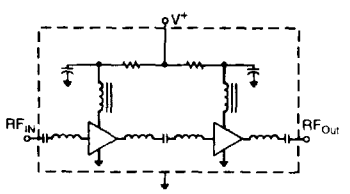
Features

- **1 Watt Output Power**
- **Low Current: 470 mA**
- **18 Volt Bias**
- **Guaranteed Performance -55 to +85°C**
- **Hermetic TO-3 Package**
- **SMA Connectored Case Option**

Applications

- **UHF/VHF Transmitters**
- **Communication Circuits**
- **Mobile Radio**
- **Bench Top**
- **Radar Systems**
- **ECM Systems**

Schematic

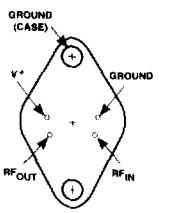


Description

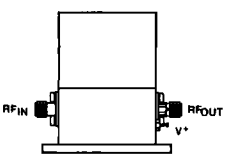
The UTO-1065 is a wideband, high efficiency, Class A, 1 watt amplifier, designed to provide broadband power for a wide variety of applications. The amplifier uses all silicon bipolar transistors to provide ultra reliable performance over the full military temperature range. Applications include bench top test sets, transmitter driver and output stages, and other applications that require high intercept points. Inputs and outputs are matched to 50 Ω for easy integration into new and existing systems. Available packaging for this unit is a hermetic TO-3 or the connectorized UCS-1P case.

Pin Configuration

UTO—TO-3



UTC—UCS-1P



(See Section 5 for detailed case drawings.)

Maximum Ratings

Parameter	Maximum
DC Voltage	20 Volts
Continuous RF Power (CW or Pulse)	+20 dBm
Operating Case Temperature Range UTO/UTC	-55 to +85°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature (T_C)	+85°C

Thermal Characteristics[1]

θ_{JC}	45°C/W, 45°C/W[2]
Active Transistor Power Dissipation	1.1 W, 1.45 W[2]
Junction Temperature Above Case Temperature	50°C, 65°C[2]

Notes:
1. For further information, see Reliability Screening, Section 6.
2. Values refer to first, second, and third stage transistors, respectively.

Weight: (typical) UTO — 14.5 grams; UTC — 281 grams

Electrical Specifications

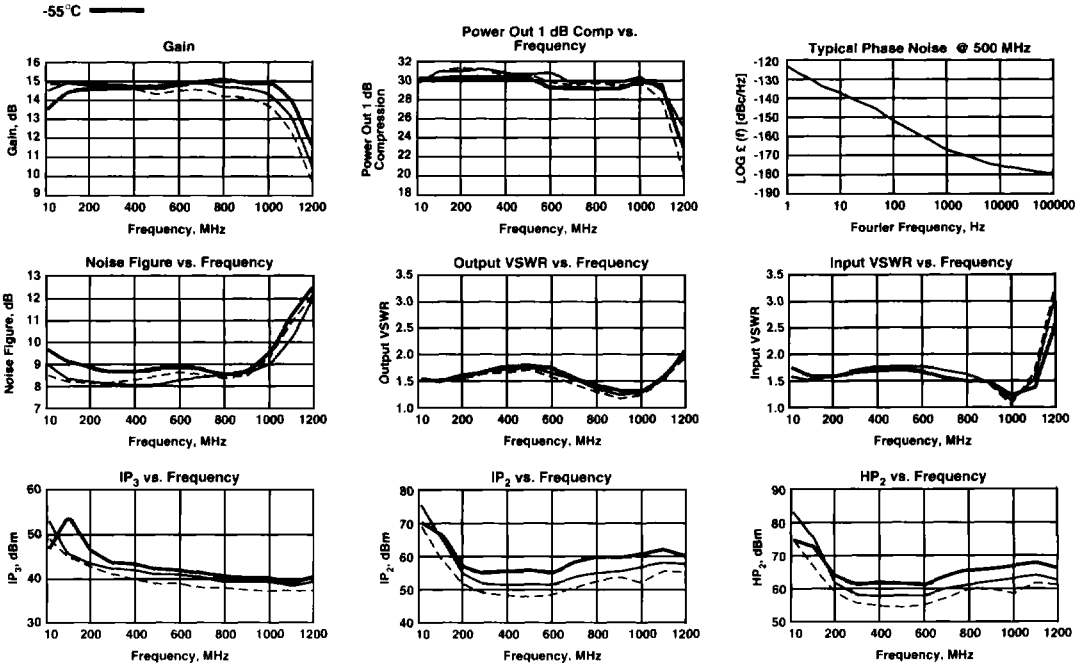
(Measured in 50 Ω system, V_{CC} = +18 V unless otherwise noted)

Symbol	Characteristic	Typical	Guaranteed Specifications		Unit
		T_C = 25°C	T_C = 0 to 50°C	T_C = -55 to +85°C[1]	
BW	Frequency Range	10-1000	10-1000	10-1000	MHz
GP	Small Signal Gain (Min.)	14.5	13.0	12.5	dB
—	Gain Flatness (Max.)	±0.5	±1.0	±1.0	dB
NF	Noise Figure (Max.)	9	10	11	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+30.0	+28.5	+28	dBm
VSWR	Input VSWR (Max.)	1.8	2.0	2.2	—
VSWR	Output VSWR (Max.)	1.8	2.0	2.2	—
IP_3	Two Tone 3rd Order Intercept Point	+40	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+58.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Pt.	+52.0	—	—	dBm
I_D	DC Current	470	—	—	mA
—	Phase Noise @ 500 MHz; 1 kHz Offset	-165	—	—	dBc/Hz

Note 1: UTO version only

Typical Performance Over Temperature (@ +18 VDC unless otherwise noted)

Key: +25°C ——— +85°C — — -55°C ———



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

S-Parameters and Numerical Readings **Bias = 18.00 Volts**

Freq.	S_{11}		S_{21}		S_{12}		S_{22}		GPDEL	PHASE
GHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang	(ns)	DEV (deg)
0.01	0.23	-167.6	14.43	24.0	-31.47	28.6	0.21	-168.04	—	—
0.02	0.21	-174.3	14.56	8.0	-31.27	13.6	0.21	-173.96	—	—
0.03	0.21	-176.2	14.64	0.5	-31.21	7.9	0.21	-176.53	—	—
0.04	0.20	-176.8	14.69	-4.8	-31.15	4.5	0.21	-177.98	—	—
0.05	0.20	-176.8	14.73	-9.3	-31.11	2.1	0.21	-179.07	1.04	-1.22
0.10	0.19	-173.7	14.82	-28.0	-30.99	-5.9	0.21	178.00	1.04	-3.02
0.15	0.20	-169.2	14.85	-45.0	-30.93	-11.9	0.22	175.45	.94	-3.04
0.20	0.21	-165.7	14.85	-61.5	-30.90	-17.6	0.23	172.23	.91	-2.53
0.25	0.22	-163.6	14.83	-77.8	-30.87	-22.9	0.24	168.04	.90	-1.83
0.30	0.24	-162.9	14.79	-93.9	-30.81	-28.3	0.25	162.72	.89	-.95
0.35	0.25	-163.2	14.75	-110.0	-30.75	-33.6	0.26	156.53	.88	-.03
0.40	0.27	-164.3	14.73	-126.1	-30.63	-39.2	0.27	149.52	.89	.90
0.45	0.27	-165.8	14.70	-142.3	-30.54	-44.9	0.27	141.89	.89	1.68
0.50	0.27	-167.1	14.58	-158.5	-30.51	-50.9	0.28	133.72	.89	2.54
0.55	0.28	-166.8	14.61	-173.4	-30.34	-56.0	0.27	121.84	.82	4.60
0.60	0.28	-168.4	14.77	170.1	-30.08	-62.0	0.25	111.47	.91	5.10
0.65	0.27	-169.4	14.87	152.8	-29.84	-69.0	0.23	100.32	.95	4.90
0.70	0.26	-169.7	14.92	135.1	-29.63	-76.4	0.21	89.00	.97	4.25
0.75	0.25	-169.2	14.93	116.8	-29.47	-84.3	0.18	78.29	1.00	3.08
0.80	0.24	-167.9	14.82	98.1	-29.42	-92.5	0.15	70.92	1.03	1.47
0.85	0.23	-169.2	14.68	80.0	-29.34	-99.1	0.13	63.66	.99	.46
0.90	0.20	-172.8	14.68	60.9	-28.97	-107.0	0.11	58.04	1.05	-1.61
0.95	0.15	-175.9	14.61	40.5	-28.73	-115.6	0.10	63.29	1.12	-4.97
1.00	0.08	-168.8	14.44	18.7	-28.26	-124.5	0.11	68.54	1.20	-9.75
1.05	0.06	-74.2	14.03	-4.6	-27.82	-136.2	0.15	68.18	1.27	—
1.10	0.19	-55.8	13.33	-28.7	-27.61	-149.6	0.21	58.79	1.33	—
1.15	0.34	-63.4	12.25	-53.3	-27.72	-164.2	0.27	44.89	1.36	—
1.20	0.50	-74.8	10.76	-77.4	-28.24	-178.9	0.33	30.30	1.35	—
1.25	0.62	-86.3	8.93	-100.1	-29.09	167.4	0.37	17.09	1.28	—
1.30	0.71	-96.8	6.89	-121.0	-30.17	155.1	0.40	6.11	1.18	—
1.35	0.78	-105.8	4.72	-140.3	-31.43	144.5	0.43	-2.53	1.09	—
1.40	0.83	-113.4	2.46	-158.5	-32.84	135.5	0.45	-9.11	1.02	—
1.45	0.86	-119.9	0.12	-175.9	-34.33	127.9	0.48	-14.40	.97	—
1.50	0.88	-125.6	-2.36	167.6	-35.91	122.1	0.52	-19.09	.91	—
1.60	0.90	-135.0	-7.93	138.1	-39.25	117.0	0.61	-28.62	—	—
1.70	0.92	-142.7	-14.24	116.6	-42.04	119.9	0.69	-38.97	—	—
1.80	0.92	-149.2	-20.81	103.5	-44.01	130.1	0.74	-48.41	—	—
1.90	0.92	-154.8	-27.95	102.2	-45.35	145.6	0.78	-56.35	—	—
2.00	0.91	-160.0	-34.42	121.0	-42.61	152.0	0.82	-63.47	—	—
2.10	0.90	-164.8	-37.72	171.1	-42.97	154.4	0.84	-69.19	—	—
2.20	0.90	-169.6	-33.97	-166.3	-42.38	157.9	0.86	-73.89	—	—
2.30	0.89	-174.4	-31.37	-164.2	-41.61	158.9	0.87	-77.93	—	—
2.40	0.87	-179.8	-29.37	-167.3	-40.63	158.9	0.87	-81.15	—	—
2.50	0.86	174.2	-27.95	-175.7	-39.74	156.8	0.87	-83.77	—	—

Linearization Range: .050 to 1.000 GHz