HEWLETT PACKARD

10-1500 MHz MEDIUM POWER T0-8 CASCADABLE AMPLIFIER

HAMP-1001
HAMP-1001TXV

TECHNICAL DATA APRIL 1985

Features

ULTRA WIDE 1 dB BANDWIDTH
5-2800 MHz

EXCEPTIONAL PHASE LINEARITY
0.5 Degree Deviation from 100 to 1500 MHz

LOW VARIATION OVER TEMPERATURE

HIGH OUTPUT POWER
12.5 dBm

EASILY CASCADABLE IN A 50 OHM SYSTEM

Description/Applications

The HAMP-1001 is a thin-film hybrid amplifier using bipolar transistors. The design uses resistive feedback which provides exceptional phase linearity and high performance over a wide temperature range and bandwidth. The internal bias network and coupling capacitors eliminate the need for external support circuitry.

This amplifier is ideal for IF, RF and high speed digital applications.

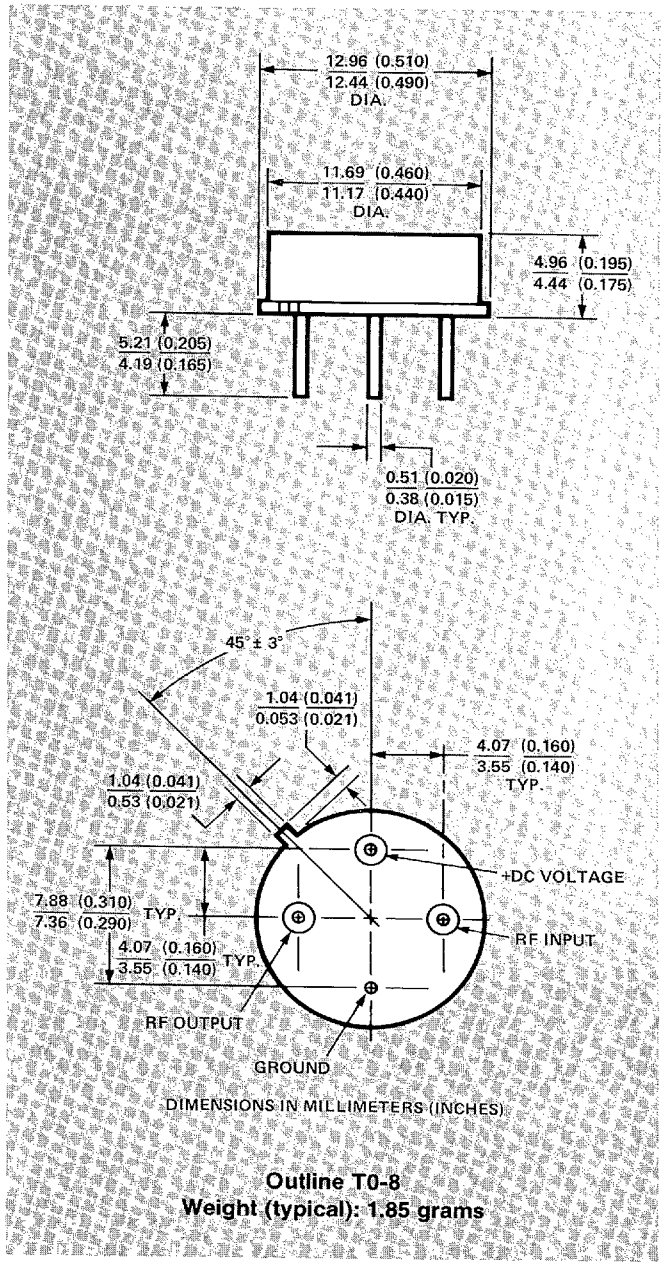
The HAMP-1001 is supplied in a standard rugged four leaded T0-8 hermetic package.

Absolute Maximum Ratings*

DC Voltage	30.0 V
Continuous RF Input Power	+15 dBm
Short Term RF Input Power (CW/1 Minute Duration)	+20 dBm
Max. Input Peak Power (3 Microsecond Pulse, One Single Pulse)	+27 dBm
Operating Case Temperature	−55° C to 125° C
Storage Temperature	−65° C to 150° C

*Operation in excess of any one of these conditions may result in permanent damage to this device.

MTTF: (Calculated, MIL-STD-217D): 1.2 x 10^7 Hours at Case Temperature +85° C.



Outline T0-8
Weight (typical): 1.85 grams

Electrical Specifications (Measured in 50 Ohm System at +15 V)

Characteristic	Typical at 25° C	Guaranteed 0-50° C	Guaranteed −55 — +85° C
Frequency Range (MHz)	10-1500	10-1500	10-1500
1 dB Bandwidth (MHz)	5-2800		
Gain Max. (dB)	6.8	7.2	7.3
Gain Min. (dB)	6.4	5.9	5.8
Gain Flatness Max. (dB)	±0.15	±0.5	±0.6
Maximum Deviation from Linear Phase 100-1500 MHz (°)	0.5		
Noise Figure Max. (dB)	6.7	7.5	8.0

Characteristic	Typical at 25° C	Guaranteed 0-50° C	Guaranteed −55 — +85° C
Power Output at 1 dB Compression Min. (dBm)	12.5	11.5	10.0
VSWR Input/Output Max.	1.7	2.0	2.0
Second Order Harmonic Intercept Point (dBm)	45.0		
Second Order Two Tone Intercept Point (dBm)	40.0		
Third Order Two Tone Intercept Point (dBm)	22.0		
DC Current (mA)	63.0		

Typical Performance

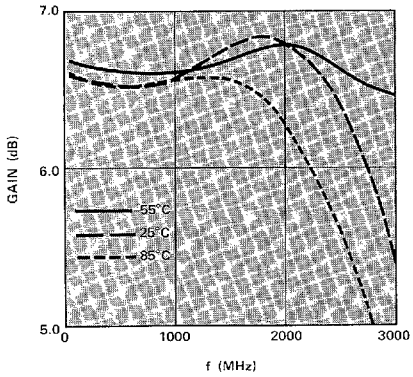


Figure 1. Gain at Three Temperatures

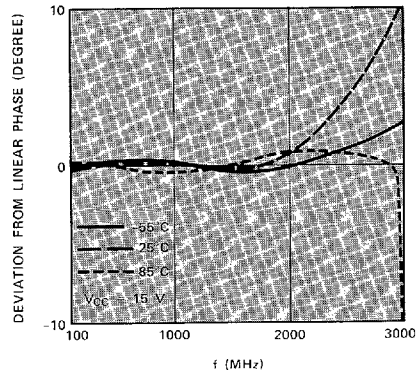


Figure 2. Phase at Three Temperatures

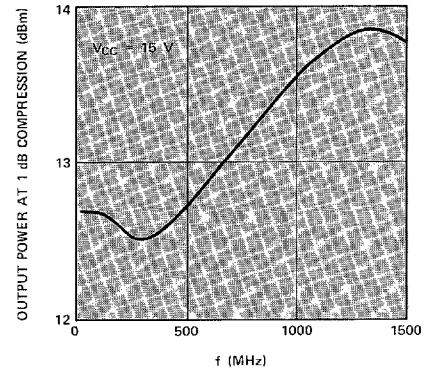


Figure 3. P_{1dB} at 25° C

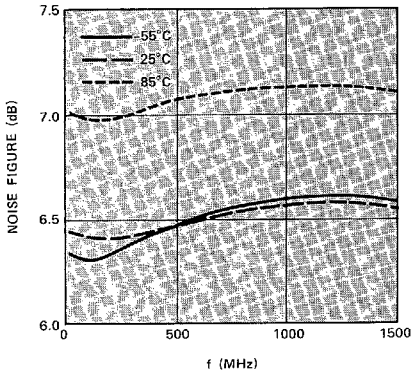


Figure 4. Noise Figure at Three Temperatures

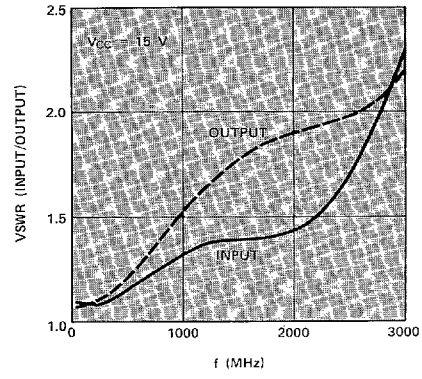


Figure 5. Input/Output VSWR at 25° C

Typical S-Parameters at 25°C

Frequency (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
100	0.028	171	2.15	173	0.135	−1	0.035	−122
200	0.031	−127	2.13	168	0.130	1	0.043	−108
300	0.041	−114	2.13	162	0.132	3	0.063	−110
400	0.059	−113	2.12	155	0.133	3	0.080	−105
500	0.069	−112	2.12	148	0.133	4	0.101	−109
600	0.082	−110	2.12	143	0.135	5	0.124	−109
700	0.098	−113	2.12	137	0.136	6	0.142	−109
800	0.109	−114	2.11	131	0.139	6	0.160	−113
900	0.122	−116	2.11	125	0.141	7	0.182	−116
1000	0.133	−121	2.14	119	0.144	8	0.201	−119
1100	0.141	−123	2.15	113	0.147	8	0.221	−124
1200	0.152	−128	2.14	106	0.151	8	0.236	−129
1300	0.156	−135	2.17	100	0.151	8	0.252	−133
1400	0.163	−141	2.16	95	0.158	9	0.262	−138
1500	0.170	−149	2.18	89	0.163	9	0.270	−144
1600	0.168	156	2.17	83	0.167	9	0.281	−151
1700	0.171	−167	2.20	77	0.171	8	0.292	−158
1800	0.172	−178	2.20	70	0.179	7	0.299	−167
1900	0.174	170	2.18	63	0.184	7	0.302	−173
2000	0.177	156	2.21	57	0.192	6	0.303	178
2100	0.183	141	2.15	50	0.202	3	0.314	166
2200	0.198	126	2.17	43	0.204	2	0.316	157
2300	0.215	110	2.16	37	0.212	1	0.313	144
2400	0.231	96	2.10	31	0.221	−2	0.324	131
2500	0.259	81	2.11	23	0.224	−5	0.326	119
2600	0.286	67	2.01	17	0.226	−8	0.329	104
2700	0.316	56	2.04	9	0.230	−10	0.342	91
2800	0.350	44	1.94	3	0.238	−13	0.346	80
2900	0.377	32	1.91	−4	0.240	−16	0.356	67
3000	0.391	23	1.84	−13	0.236	−19	0.386	59

Typical Performance Parameters at 25°C

Frequency (MHz)	Linear Phase Deviation (deg.)	Relative Phase (deg.)	Gain Deviation (dB)	Gain Absolute (dB)	Group Delay (ns)	Input VSWR	Output VSWR
10				6.60		1.20	1.30
100	0.48	0	0.04	6.63	0.18	1.06	1.07
200	−0.55	−5	−0.05	6.55	0.14	1.06	1.09
300	−0.73	−11	−0.03	6.56	0.16	1.09	1.13
400	0.29	−18	−0.05	6.54	0.20	1.12	1.17
500	0.73	−24	−0.06	6.54	0.18	1.15	1.22
600	−0.04	−30	−0.08	6.51	0.15	1.18	1.28
700	0.10	−36	−0.08	6.52	0.17	1.22	1.33
800	0.21	−42	−0.10	6.50	0.17	1.25	1.38
900	−0.38	−47	−0.10	6.50	0.15	1.28	1.44
1000	0.40	−53	0.02	6.62	0.17	1.31	1.50
1100	−0.18	−60	0.05	6.65	0.17	1.33	1.57
1200	0.36	−66	0.03	6.63	0.18	1.36	1.62
1300	0.41	−72	0.12	6.72	0.17	1.37	1.67
1400	−0.20	−78	0.09	6.68	0.15	1.39	1.71
1500	−0.10	−84	0.19	6.79	0.17	1.41	1.74
1600	0.04	−90	0.14	6.73	0.17	1.40	1.78
1700	0.10	−96	0.24	6.84	0.16	1.41	1.83
1800	0.63	−103	0.23	6.83	0.19	1.41	1.85
1900	1.83	−110	0.18	6.78	0.20	1.42	1.86
2000	1.55	−116	0.30	6.90	0.16	1.43	1.87
2100	2.22	−123	0.06	6.65	0.19	1.45	1.91
2200	2.82	−129	0.15	6.74	0.18	1.49	1.92
2300	3.26	−136	0.08	6.67	0.18	1.55	1.91
2400	3.41	−142	−0.14	6.45	0.17	1.60	1.96
2500	4.90	149	−0.12	6.48	0.21	1.70	1.97
2600	5.52	−156	−0.54	6.86	0.19	1.80	1.98
2700	6.98	−163	−0.40	7.20	0.21	1.93	2.04
2800	6.59	−169	−0.82	5.78	0.16	2.08	2.06
2900	8.48	−177	−0.99	5.61	0.22	2.21	2.10
3000	11.29	−186	−1.28	5.32	0.25	2.29	2.26

HIGH RELIABILITY AMPLIFIER PRODUCTS
HAMP-1001TXV

Since the advantages of products tested to well established reliability screening standards can be of significant value to reliability oriented customers, HP makes available products with Hi-Rel screening and testing patterned after MIL-STD-883, Method 5004.2 latest revision.

The table below depicts the screening program for this family of amplifiers.

100% SCREENING PROGRAM

Screening Test/Inspection	MIL-STD-883 Test Method	Conditions/Comments
1. Internal Visual Inspection (PreCap)	2017	
2. High Temperature Storage (Stabilization Bake)	1008	Condition B T = 125° C, t = 24 hours
3. Temperature Cycling	1010	Condition B −55° to 125° C
4. Constant Acceleration	2001	Condition B 20 kg's, Y1 Direction
5. Pre Burn-in Electrical	—	Per Applicable Device Specification
6. Burn-in	1015	t = 168 hours Tc = 80% of Rated Case Temp and 80% of Rated Bias Conditions
7. Post Burn-in Electrical (PDA ≤10%)	—	Per Applicable Device Specification
8. Hermeticity Tests (Fine and Gross)	1014	Conditions A and C
9. Final Electrical Tests	—	Per Applicable Device Specification
10. External Visual Inspection	2009	

Note: Additional tests, screens and qualification testings (e.g.: X-ray, PIND, Extended Burn-in, Group A, B, C and D) are available on request.

Ordering Information

Add suffix TXV to standard part number.

Example: Standard Product HAMP-1001
Hi-Rel Product HAMP-1001TXV

74674

For more information call your local HP sales office listed in the telephone directory white pages. Ask for the Components Department. Or write to Hewlett-Packard: **U.S.A.** — P.O. Box 10301, Palo Alto, CA 94303-0890. **Europe** — P.O. Box 999 1180 AZ Amstelveen, The Netherlands, **Canada** — 6877 Goreway Drive, Mississauga, L4V 1M8, Ontario. **Japan** — Yokogawa-Hewlett-Packard Ltd., 3-29-21, Takaido-Higashi, Suginami-ku, Tokyo 168. **Elsewhere** in the world, write to Hewlett-Packard Intercontinental, 3495 Deer Creek Road, Palo Alto, CA 94304.

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