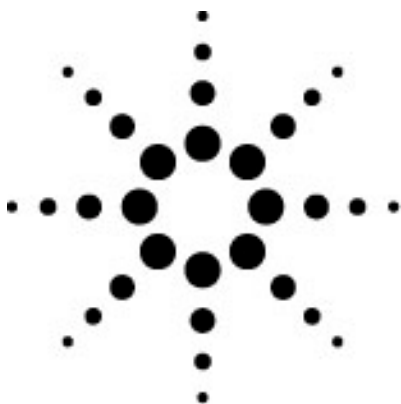


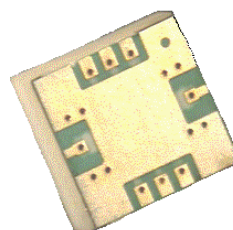


Preliminary Information

AMMP-6420

6-18 GHz 1W Power Amplifier

Data Sheet



Features

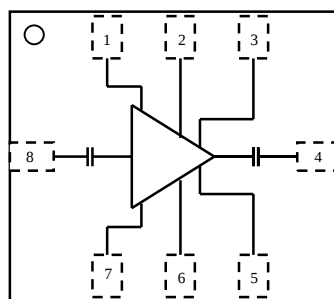
- 5x5mm Surface Mount Package
- Wide Frequency Range 6-18 GHz
- One Watt Output Power
- High Gain
- Partially Matched
- DC Supply Bias at 5V, -1V, 700 mA
- Integrated Output Power Detector

Applications

- Microwave Radio systems
- Satellite VSAT and DBS systems
- Commercial grade military
- 802.16 & 802.20 WiMax BWA systems
- WLL and MMDS loops

Description

Agilent's AMMP-6420 is a high gain amplifier in a surface mount package that operates from 6 to 18 GHz. It is a cost-effective alternative in commercial communications systems to discrete FET hybrid or MIC amplifiers. The MMIC has a partial input and output match to 50Ω (-5dB typical return loss) but can be easily externally matched by single element lossy or reactive means (inductor or capacitor) for 20% frequency coverage (or 100% coverage if used in a balance configuration with Lange coupler). The MMIC is unconditionally stable over all frequencies and bias conditions. Bias can be applied from either side. Gate voltage is set using the V_g pin to optimize for linear or saturated power amplification. A reference and output detector allows differential output power detection over 15 dB of range. It is fabricated in a PHEMT process to provide exceptional power and gain performance.



Pin	Function
1	V _g
2	V _d
3	DET _o
4	RF Out
5	DET _R
6	V _d
7	V _g
8	RF In

PACKAGE
BASE
GND

AMMP-6420: DC & RF Specifications

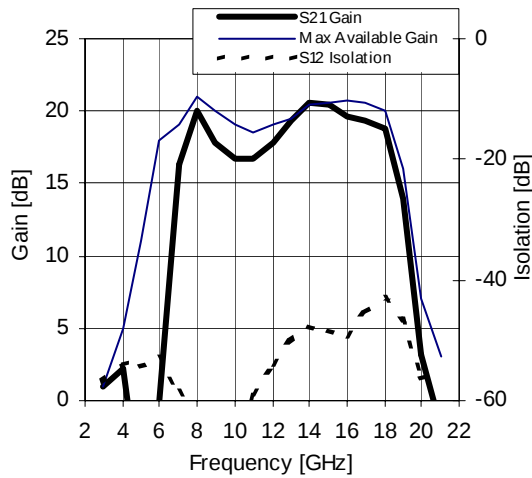
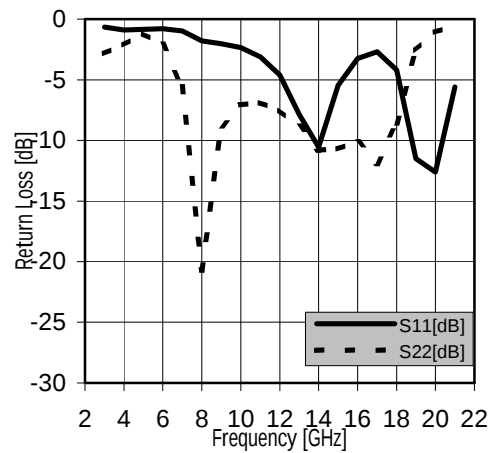
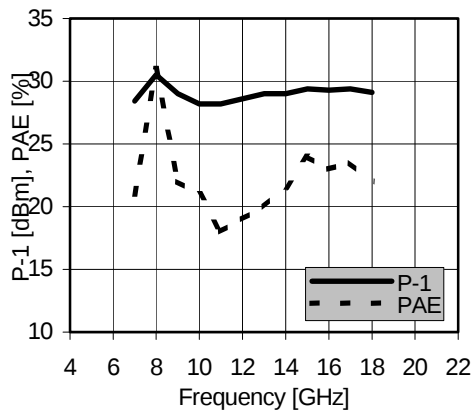
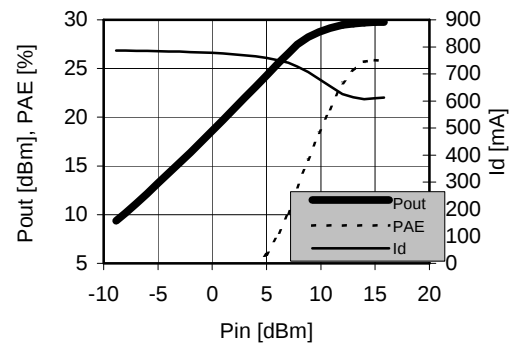
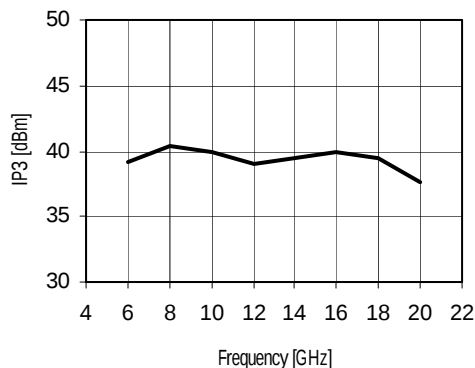
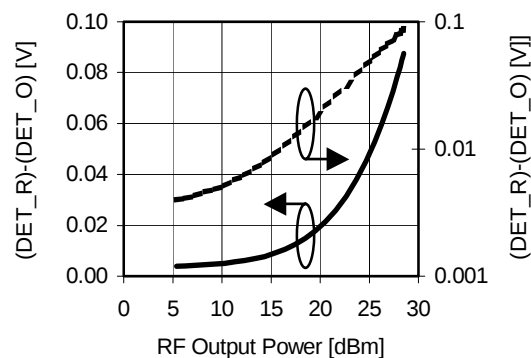
Sym	Parameters/Conditions	Typ.	Min/Max	
V _d	Drain Supply Voltage	V	5	
V _g	Gate Voltage	V	-0.8	
I _o	Drain Supply Current	mA	750	800
Gain	Small-signal Gain	dB	19	15
RL _{in}	Input Return Loss	dB	-5	
RL _{out}	Output Return Loss	dB	-5	
P-1dB	Power @ 1dB Gain Comp	dBm	29	27
Isol	Reverse Isolation	dB	-30	-25
OIP3	Output 3 rd Order Int Point	dBm	+39	
V _{def}	Power Detector Voltage	V/W	0.2	

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Revision Date: 4/28/04

Revision Number: 5.0



AMMP-6420 Typical Performances(T_A = 25°C, V_d = 5.0 V, I_D = 750 mA, Z_{in} = Z_{out} = 50 Ω)**Figure 1. Typical Gain and Reverse Isolation****Figure 2. Typical Input & Output Return Loss****Figure 3. Typical Output Power (P-1db) and PAE****Figure 4. Output Power, PAE, and Total Drain Current versus Input Power at 17GHz****Figure 5. Typical IP3 (Third Order Intercept)****Figure 6. Typical Detector voltage vs. Output Power**

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Typical Scattering Parameters^[1], ($T_A = 25^\circ\text{C}$, $V_d = 5.0\text{ V}$, $I_D = 750\text{ mA}$, $Z_{in} = Z_{out} = 50\ \Omega$)

Freq [GHz]	S11			S21			S12			S22		
	dB	Mag	Phase	dB	Mag	Phase	dB	Mag	Phase	dB	Mag	Phase
1	-0.87	0.91	-54.11	-22.86	0.07	-38.55	-85.33	0.0001	169.56	-0.50	0.94	-57.01
1.5	-1.45	0.85	-77.52	-29.09	0.04	-78.78	-80.94	0.0001	-175.18	-0.48	0.95	-83.04
2	-2.05	0.79	-98.38	-38.89	0.01	-86.10	-800.00	0.0000	0.00	-0.48	0.95	-107.24
2.5	-2.60	0.74	-117.02	-52.07	0.00	-13.41	-74.51	0.0002	82.70	-0.53	0.94	-129.93
3	-3.13	0.70	-133.84	-40.04	0.01	132.81	-95.11	0.0000	-5.03	-0.59	0.93	-151.46
3.5	-3.63	0.66	-149.08	-25.57	0.05	137.83	-95.24	0.0000	-70.69	-0.79	0.91	-172.69
4	-4.16	0.62	-162.85	-14.78	0.18	122.75	-79.98	0.0001	160.38	-1.18	0.87	165.39
4.5	-4.71	0.58	-174.89	-5.24	0.55	96.22	-80.18	0.0001	-76.68	-1.99	0.80	141.75
5	-5.29	0.54	175.16	3.44	1.49	56.13	-74.19	0.0002	-71.45	-3.83	0.64	114.07
5.5	-5.73	0.52	167.60	10.58	3.38	0.78	-68.60	0.0004	-155.78	-8.60	0.37	77.29
6	-5.85	0.51	161.58	14.63	5.39	-64.52	-63.48	0.0007	161.36	-24.98	0.06	-87.52
6.5	-5.65	0.52	155.54	15.64	6.05	-123.83	-62.90	0.0007	110.41	-8.61	0.37	-165.36
7	-5.19	0.55	148.54	15.42	5.90	-171.25	-62.76	0.0007	64.88	-5.31	0.54	165.39
7.5	-4.68	0.58	139.87	15.06	5.66	149.79	-61.90	0.0008	21.69	-4.11	0.62	143.61
8	-4.25	0.61	130.07	14.92	5.57	115.92	-61.14	0.0009	-15.34	-3.72	0.65	125.20
8.5	-3.96	0.63	119.80	15.07	5.67	84.71	-61.19	0.0009	-53.65	-3.80	0.65	108.20
9	-3.79	0.65	109.47	15.48	5.94	54.35	-59.70	0.0010	-84.79	-4.23	0.61	92.39
9.5	-3.70	0.65	99.32	16.07	6.36	23.93	-57.70	0.0013	-118.53	-5.08	0.56	77.76
10	-3.65	0.66	89.33	16.76	6.88	-7.01	-55.71	0.0016	-148.81	-6.27	0.49	64.46
10.5	-3.61	0.66	79.50	17.47	7.47	-38.42	-54.00	0.0020	179.69	-7.79	0.41	52.94
11	-3.55	0.66	69.50	18.24	8.16	-70.18	-51.89	0.0025	150.91	-9.71	0.33	43.04
11.5	-3.44	0.67	58.76	19.13	9.05	-102.74	-50.21	0.0031	120.36	-12.29	0.24	32.52
12	-3.37	0.68	46.60	20.22	10.26	-137.44	-48.36	0.0038	89.71	-17.94	0.13	20.35
12.5	-3.45	0.67	32.92	21.28	11.59	-176.87	-47.00	0.0045	57.43	-23.00	0.07	162.57
13	-3.85	0.64	13.79	21.40	11.75	142.33	-44.15	0.0062	30.43	-9.62	0.33	135.14
13.5	-5.88	0.51	0.42	21.48	11.86	99.76	-43.54	0.0067	-17.97	-5.26	0.55	106.88
14	-7.35	0.43	-5.47	20.42	10.50	57.22	-44.62	0.0059	-59.39	-3.42	0.67	80.19
14.5	-8.02	0.40	-11.98	19.04	8.95	20.45	-45.60	0.0052	-92.99	-2.93	0.71	56.91
15	-8.42	0.38	-22.81	17.91	7.86	-12.89	-46.42	0.0048	-124.14	-3.03	0.71	36.82
15.5	-9.02	0.35	-38.63	17.16	7.21	-45.24	-46.76	0.0046	-155.91	-3.50	0.67	18.44
16	-9.99	0.32	-59.66	16.76	6.89	-78.40	-46.65	0.0047	172.05	-4.24	0.61	0.84
16.5	-11.32	0.27	-88.81	16.62	6.78	-113.79	-46.21	0.0049	135.75	-5.30	0.54	-16.80
17	-12.58	0.23	-129.48	16.57	6.74	-152.21	-45.93	0.0051	97.60	-6.89	0.45	-35.36
17.5	-12.37	0.24	-178.96	16.45	6.64	165.77	-45.34	0.0054	54.57	-9.41	0.34	-55.07
18	-10.42	0.30	135.67	16.04	6.34	119.59	-45.72	0.0052	9.79	-14.81	0.18	-71.02
18.5	-8.13	0.39	98.32	15.07	5.67	69.37	-46.75	0.0046	-42.66	-21.32	0.09	-2.67
19	-6.44	0.48	64.76	13.21	4.58	16.14	-49.85	0.0032	-99.91	-10.63	0.29	-0.14
19.5	-5.54	0.53	32.49	10.33	3.29	-37.14	-54.54	0.0019	-174.42	-6.40	0.48	-35.36
20	-5.33	0.54	-0.33	6.65	2.15	-88.56	-54.97	0.0018	100.12	-4.59	0.59	-73.82
20.5	-5.63	0.52	-37.08	2.37	1.31	-138.35	-52.19	0.0025	36.40	-3.75	0.65	-110.91
21	-6.21	0.49	-81.51	-2.59	0.74	172.10	-51.29	0.0027	-8.72	-3.30	0.68	-145.06
21.5	-6.54	0.47	-133.73	-8.62	0.37	123.31	-51.19	0.0028	-48.36	-2.95	0.71	-175.67
22	-6.04	0.50	176.00	-16.11	0.16	77.94	-52.06	0.0025	-86.25	-2.57	0.74	158.19
22.5	-5.17	0.55	136.35	-25.54	0.05	38.87	-55.52	0.0017	-123.07	-2.27	0.77	135.92
23	-4.42	0.60	107.30	-38.98	0.01	25.37	-59.02	0.0011	-141.45	-1.99	0.80	116.67
23.5	-3.84	0.64	85.86	-42.63	0.01	95.60	-64.94	0.0006	-153.62	-1.77	0.82	100.50
24	-3.39	0.68	68.76	-40.35	0.01	72.97	-76.41	0.0002	-154.09	-1.57	0.83	86.10
24.5	-3.03	0.71	54.55	-42.31	0.01	37.28	-72.38	0.0002	-115.43	-1.39	0.85	73.34
25	-2.78	0.73	42.25	-45.89	0.01	6.70	-77.30	0.0001	-145.84	-1.25	0.87	62.16
25.5	-2.61	0.74	31.43	-49.21	0.00	-19.68	-69.79	0.0003	-11.93	-1.16	0.88	51.84

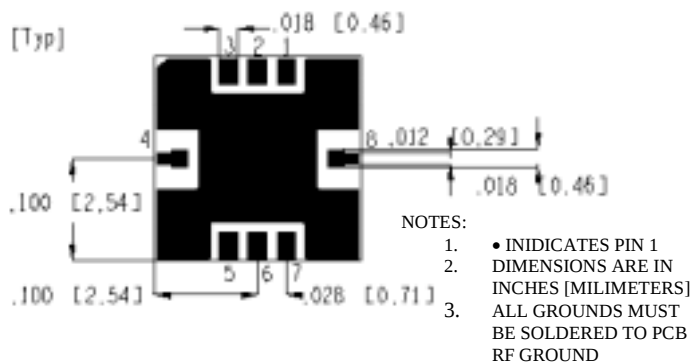
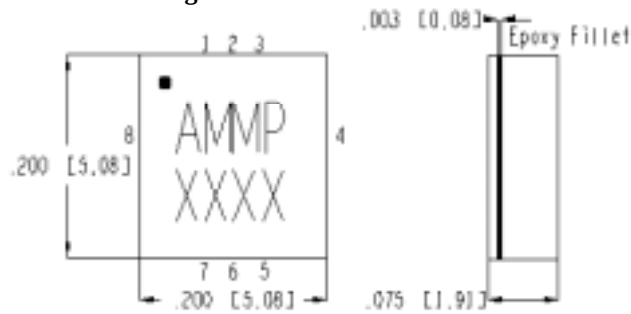
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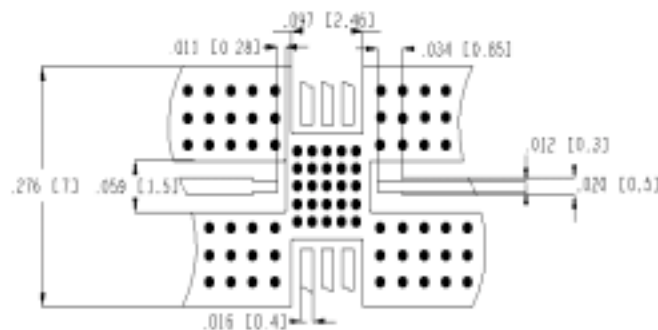
Revision Number: 5.0



Outline Drawing

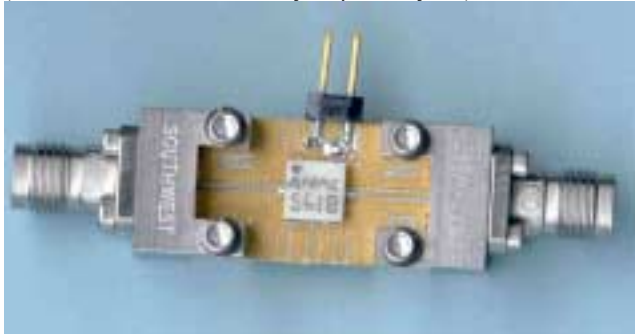


Suggested PCB Material and Land Pattern



Evaluation Test Circuit (Demo Board)

(Available to customer on qualified request)



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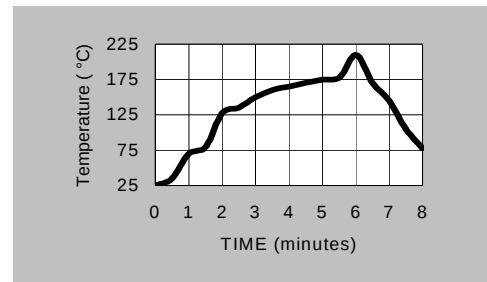
Recommended SMT Attachment

The AMMP Packaged Devices are compatible with high volume surface mount PCB assembly processes.

The PCB material and mounting pattern, as defined in the data sheet, optimizes RF performance and is strongly recommended. An electronic drawing of the land pattern is available from www.agilent.com/view/rf or upon request from Agilent Application Engineering.

Manual Assembly for Prototypes

1. Follow ESD precautions while handling packages.
2. Handling should be along the edges with tweezers or from topside if using a vacuum collet.
3. Recommended attachment is solder paste. Please see recommended solder reflow profile. Conductive epoxy is not recommended. Hand soldering is not recommended.
4. Apply solder paste using either a stencil printer or dot placement. The volume of solder paste will be dependent on PCB and component layout and should be controlled to ensure consistent mechanical and electrical performance. **Excessive solder will degrade RF performance.**
5. Follow solder paste and vendor's recommendations when developing a solder reflow profile. A standard profile will have a steady ramp up from room temperature to the pre-heat temperature to avoid damage due to thermal shock.
6. Packages have been qualified to withstand a peak temperature of 235°C for 15 seconds. Verify that the profile will not expose device beyond these limits.
7. Clean off flux per vendor's recommendations.
8. Clean the module with Acetone. Rinse with alcohol. Allow the module to fully dry before testing.



Recommended solder reflow profile

For product information and a complete list of Agilent contacts and distributors, please go to our website:

www.agilent.com/semiconductors

E-mail: SemiconductorSupport@agilent.com

Data subject to change.

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