

M/A-COM Low Noise Amplifier

1.575 GHz

V5

AM50-0002

AM50-0002

Features

- Low Noise Figure: 1.15 dB
- High Gain: 27 dB
- Low Power Consumption: 5V, 20 mA
- High Dynamic Range
- Low Cost SOIC-8 Lead Package

Description

M/A-COM's AM50-0002 is a high performance GaAs MMIC low noise amplifier in a low cost SOIC 8 Lead surface mount plastic package. The AM50-0002 employs a monolithic 3-stage self-bias design and a simple external matching network to obtain minimum noise figure.

The AM50-0002 is ideally suited for use where low noise figure, high gain, high dynamic range and low power consumption are required. Typical applications include receiver front ends in the Global Positioning System (GPS) market, as well as standard gain blocks, buffer amps, driver amps, and IF amps in both fixed and portable systems.

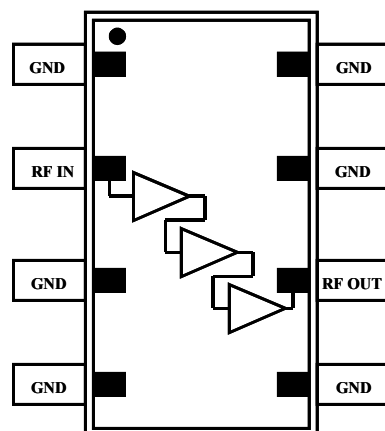
M/A-COM'S AM50-0002 is fabricated using a mature 0.5-micron gate length GaAs process. The process features full passivation for increased performance reliability.

Electrical Specifications:

$T_A = +25^\circ\text{C}$, $Z_0 = 50\ \Omega$, $V_{DD} = +5\text{V}$, $P_{IN} = -35\ \text{dBm}$, $F = 1.575\ \text{GHz}$

Parameter	Units	Min	Typ	Max
Gain	dB	25	27	29
Noise Figure	dB	-	1.15	1.4
Input VSWR		-	2.0:1	-
Output VSWR		-	1.5:1	-
Output P1dB Compression	dBm	-	1	-
Input IP ₃	dBm	-	-14	-
Reverse Isolation	dB	-	48	-
Bias Current	mA	15	20	25

Functional Diagram



Pin Configuration

PIN No.	PIN Name	Description
1	GND	Ground
2	RF _{IN}	RF Input
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	RF _{OUT}	RF Output, V _{DD}
7	GND	Ground
8	GND	Ground

Ordering Information

Part Number	Package
AM50-0002	SOIC-8 Lead Package
AM50-0002TR	Forward Tape and Reel, 1000 pcs
AM50-0002TR-3000	Forward Tape and Reel, 3000 pcs
AM50-0002SMB	Sample Test Board (Includes 5 Samples)

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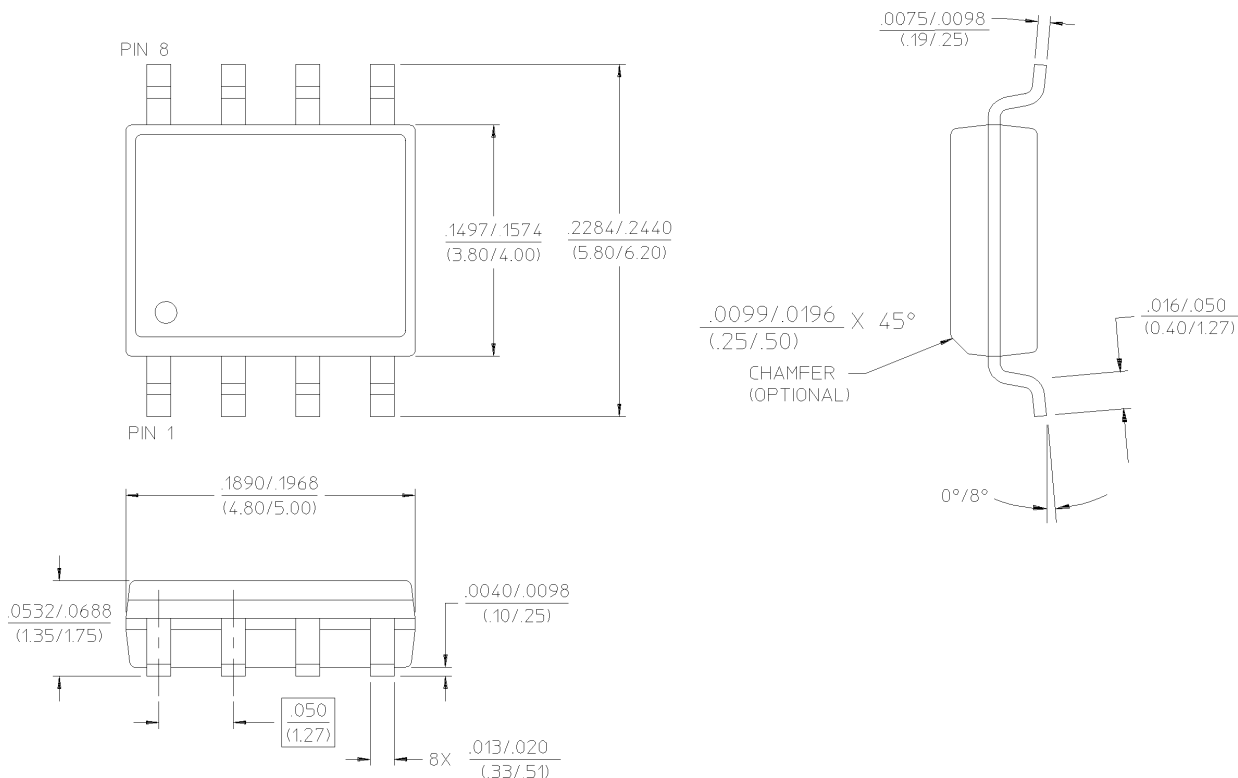
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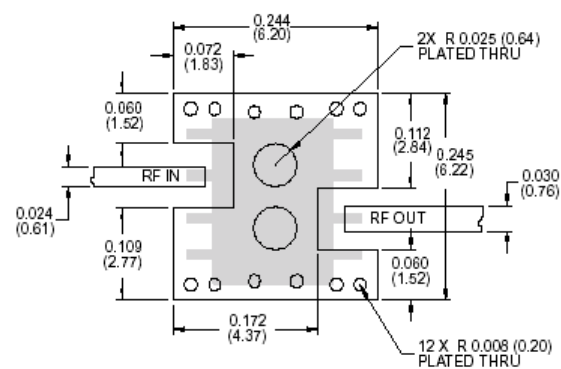
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SOIC-8



Recommended PCB Configuration



FR-4 circuit board, thickness = 0.016 inches (0.41)

Absolute Maximum Ratings¹

Parameter	Absolute Maximum
V _{DD}	+10 VDC
Input Power	+17 dBm
Channel Temperature ²	+150 °C
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

1. Operation of this device outside these limits may cause permanent damage.
2. Typical thermal resistance (θ_{jc}) = +165 °C/W

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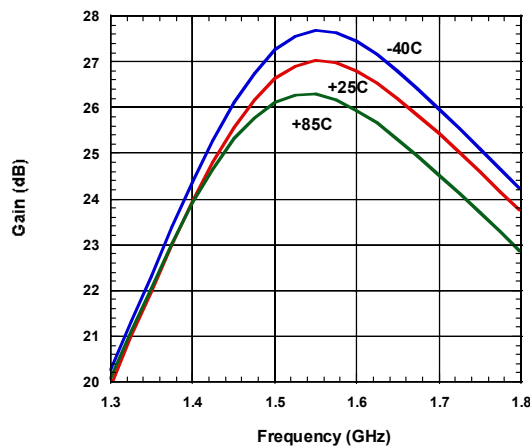
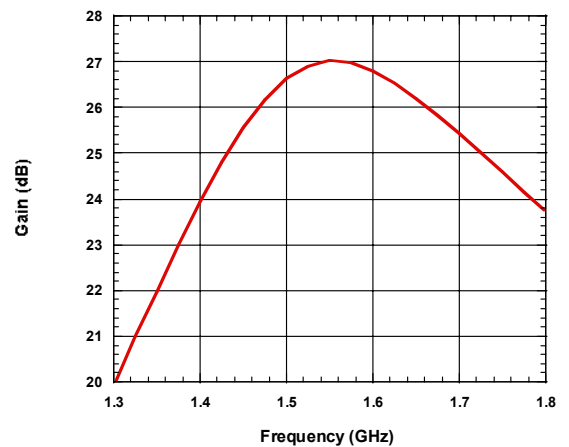
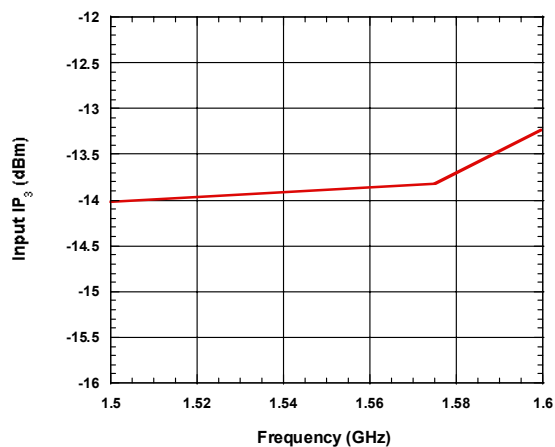
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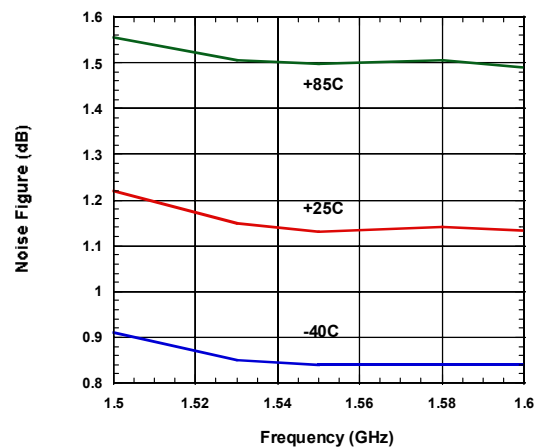
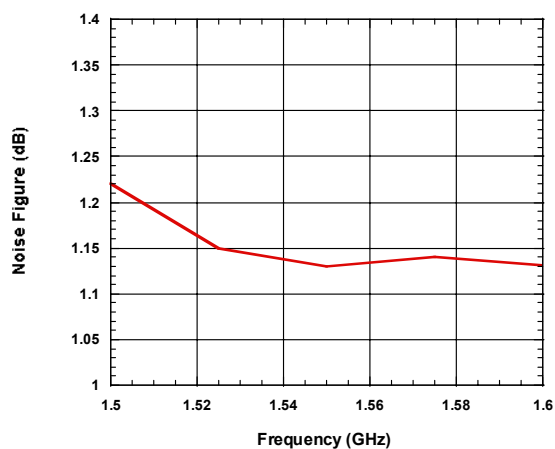
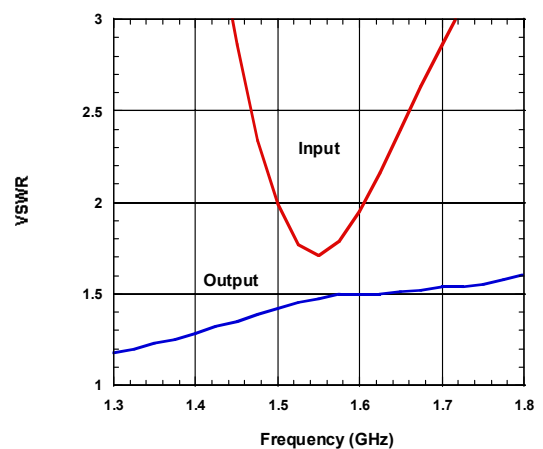
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Typical Performance

Gain vs. Frequency over Temperature

Gain vs. Frequency, $T_A = +25^\circ\text{C}$ Input IP_3 vs. Frequency, $T_A = +25^\circ\text{C}$ 

Noise Figure vs. Frequency over Temperature

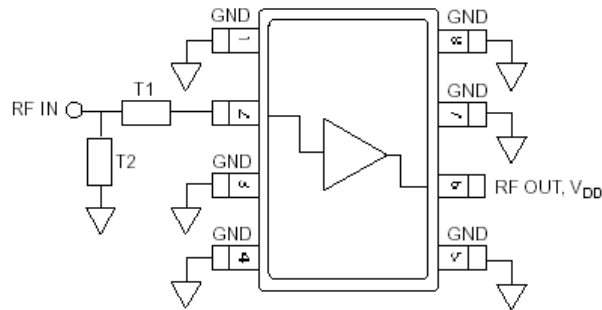
Noise Figure vs. Frequency, $T_A = +25^\circ\text{C}$ VSWR vs. Frequency, $T_A = +25^\circ\text{C}$ 

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Application Schematic



Frequency = 1.575 GHz		
	Impedance	Electrical Length
T1	57.2 Ω	36.0°
T2	82.7 Ω	16.2°

1. Pins 1, 3, 4, 5, 7, and 8 must be RF and DC grounded as shown.
2. Pin 2 is the RF input and must be connected to the simple matching network shown.
3. Pin 6 is the RF output, V_{DD} is also applied on Pin 6.

S-Parameters

FREQ (GHz)	S11 (MAG)	S11 (ANG)	S21 (MAG)	S21 (ANG)	S12 (MAG)	S12 (ANG)	S22 (MAG)	S22 (ANG)
0.75	0.921	-30.81	2.509	25.55	0.00148	8.86	0.166	-177.94
0.80	0.913	-32.28	2.819	22.22	0.00130	8.34	0.160	178.21
0.85	0.910	-33.76	3.187	18.24	0.00129	2.77	0.154	174.64
0.90	0.907	-35.75	3.593	13.38	0.00121	21.43	0.148	172.18
0.95	0.909	-37.74	4.061	8.14	0.00102	4.10	0.140	169.61
1.00	0.901	-39.48	4.562	2.42	0.00107	7.73	0.134	167.83
1.05	0.892	-41.10	5.138	-3.96	0.00106	6.05	0.125	166.68
1.10	0.898	-43.16	5.787	-10.74	0.00083	1.77	0.116	166.54
1.15	0.902	-45.17	6.477	-18.10	0.00066	-6.72	0.108	169.20
1.20	0.899	-47.10	7.253	-26.07	0.00065	-31.71	0.099	172.34
1.25	0.896	-49.30	8.079	-34.70	0.00055	-24.54	0.095	179.35
1.30	0.894	-51.27	8.956	-43.79	0.00041	-29.08	0.094	-170.96
1.35	0.894	-54.18	9.894	-53.69	0.00028	-63.69	0.102	-161.31
1.40	0.892	-56.58	10.808	-64.44	0.00053	-134.67	0.119	-153.00
1.45	0.885	-59.28	11.727	-75.73	0.00070	-137.52	0.145	-149.06
1.50	0.873	-62.30	12.525	-87.83	0.00115	-157.96	0.178	-148.14
1.55	0.857	-65.21	13.091	-100.40	0.00154	-162.50	0.214	-150.19
1.60	0.832	-67.38	13.498	-113.16	0.00208	-173.25	0.252	-154.73
1.65	0.810	-69.51	13.577	-126.00	0.00253	-178.80	0.289	-160.02
1.70	0.782	-71.55	13.373	-138.81	0.00294	173.91	0.322	-166.25
1.75	0.760	-73.07	12.964	-150.86	0.00347	167.10	0.351	-172.30
1.80	0.739	-74.16	12.390	-162.47	0.00382	162.87	0.375	-178.46
1.85	0.724	-75.18	11.688	-173.46	0.00423	155.47	0.394	175.75
1.90	0.712	-75.70	10.981	176.38	0.00474	150.99	0.409	170.19
1.95	0.699	-77.01	10.218	166.80	0.00498	148.83	0.423	165.01
2.00	0.699	-77.56	9.495	157.89	0.00544	146.02	0.432	160.40
2.05	0.692	-78.24	8.807	149.48	0.00565	142.63	0.440	155.71
2.10	0.690	-79.57	8.163	141.76	0.00600	139.72	0.448	151.79
2.15	0.688	-80.62	7.551	134.45	0.00640	136.31	0.454	147.76
2.20	0.690	-81.76	6.996	127.26	0.00673	135.38	0.459	144.08
2.25	0.689	-83.14	6.477	120.81	0.00681	132.88	0.464	140.70
2.30	0.691	-84.63	6.005	114.57	0.00740	131.06	0.467	137.31
2.35	0.691	-86.09	5.576	108.60	0.00754	129.17	0.472	134.28
2.40	0.693	-87.58	5.181	102.95	0.00793	126.95	0.475	131.15
2.45	0.693	-89.37	4.811	97.37	0.00831	126.73	0.478	128.24
2.50	0.697	-90.85	4.483	92.22	0.00854	125.02	0.481	125.56

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Noise Figures

FREQ	Fmin[dB]	MAG	ANG	rn
0.750	0.8052	0.8697	26.5001	0.7376
0.800	0.7869	0.8620	27.9959	0.6796
0.850	0.7699	0.8544	29.5150	0.6303
0.900	0.7572	0.8467	31.0675	0.5897
0.950	0.7467	0.8390	32.6540	0.5551
1.000	0.7397	0.8312	34.2760	0.5259
1.050	0.7351	0.8234	35.9319	0.5007
1.100	0.7333	0.8154	37.6196	0.4788
1.150	0.7333	0.8072	39.3353	0.4593
1.200	0.7348	0.7990	41.0771	0.4418
1.250	0.7383	0.7906	42.8431	0.4260
1.300	0.7432	0.7821	44.6308	0.4114
1.350	0.7491	0.7735	46.4387	0.3977
1.400	0.7563	0.7647	48.2651	0.3850
1.450	0.7645	0.7559	50.1090	0.3730
1.500	0.7734	0.7469	51.9696	0.3615
1.550	0.7834	0.7378	53.8492	0.3506
1.600	0.7943	0.7287	55.7432	0.3402
1.650	0.8057	0.7195	57.6514	0.3301
1.700	0.8180	0.7102	59.5725	0.3204
1.750	0.8312	0.7007	61.5065	0.3111
1.800	0.8450	0.6912	63.4539	0.3020
1.850	0.8596	0.6817	65.4128	0.2933
1.900	0.8748	0.6721	67.3846	0.2849
1.950	0.8910	0.6625	69.3678	0.2768
2.000	0.9079	0.6529	71.3635	0.2689
2.050	0.9254	0.6432	73.3575	0.2614
2.100	0.9437	0.6335	75.3681	0.2541
2.150	0.9631	0.6239	77.3914	0.2471
2.200	0.9833	0.6143	79.4309	0.2403
2.250	1.0050	0.6050	81.4808	0.2340
2.300	1.0277	0.5957	83.5485	0.2278
2.350	1.0516	0.5866	85.6304	0.2219
2.400	1.0768	0.5777	87.7262	0.2163
2.450	1.1035	0.5689	89.8387	0.2109
2.500	1.1317	0.5604	91.9643	0.2058

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