RFMD
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FMA3008

2GHZ TO 20GHZ BROADBAND MMIC AMPLIFIER

Die: 2.35mm x 1.78mm

Product Description

The FMA3008 is a high performance 2GHz to 20GHz Gallium Arsenide monolithic travelling wave amplifier. It is suitable for use in broadband communication, instrumentation, and electronic warfare applications. The die is fabricated using the RFMD 0.25µm process. The amplifier is DC-blocked at both the input and output.

Features

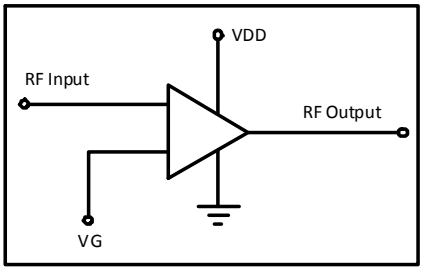
- 23dBm Output Power
- 11dB Gain
- Input Return Loss<-8dB
- Output Return Loss<-10dB

Applications

- Test Instrumentation
- Electronic Warfare
- Broadband Communication Infrastructure

Optimum Technology Matching® Applied

- ☐ GaAs HBT
- ☐ GaAs MESFET
- ☐ InGaP HBT
- ☐ SiGe BiCMOS
- ☐ Si BiCMOS
- ☐ SiGe HBT
- ☑ GaAs pHEMT
- ☐ Si CMOS
- ☐ Si BJT
- ☐ GaN HEMT
- ☐ InP HBT
- ☐ BiFET HBT
- ☐ LDMOS



Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Electrical Specifications[1, 2, 3]					
Small Signal Gain	9.5	11	11.5	dB	2GHz to 12GHz
	11	12	13.5	dB	12GHz to 20GHz
Input Return Loss		-10	-8	dB	2GHz to 20GHz
Output Return Loss		-15	-10	dB	2GHz to 20GHz
Reverse Isolation		<-30	-23	dB	2GHz to 20GHz
Output Power at 1dB Compression	18	23.5		dBm	2GHz
	16.5	23.5		dBm	10GHz
	16	20		dBm	20GHz
Noise Figure			8	dB	2GHz to 4.5GHz
		4.5	6.5	dB	4.5GHz to 20GHz
Drain Current	90	140	200	mA	For V_G=-0.28V
Drain Voltage		7.0		V	

Note: [1]$T_{AMBIENT}$=+25°C
[2]Device is biased at constant gate voltage, measured on wafer with Z_0=50Ω
[3]Measurement Conditions V_{G1}=-0.28V, V_{DD}=7V.

7628 Thorndike Road, Greensboro, NC 27409-9421 · For sales or technical support, contact RFMD at **(+1) 336-678-5570** or **sales-support@rfmd.com**.

Absolute Maximum Ratings

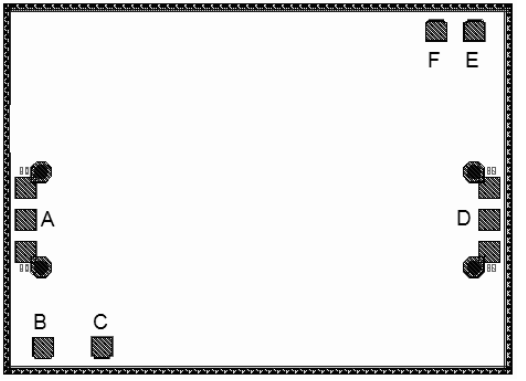
Parameter	Rating	Unit
Max Input Power (P_{IN})	+20	dBm
Gain Voltage (V_{G1})	-2	V
Drain Voltage (V_{DD})	+10	V
Total Power Dissipation (P_{TOT})	TBD	
Gain Compression (comp)	TBD	
Thermal Resistivity (ΘJC)	38	°C/W
Operating Temperature (T_{OPER})	-40 to 85	°C
Storage Temperature (T_{STG})	-55 to 150	°C

Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

Pad Layout



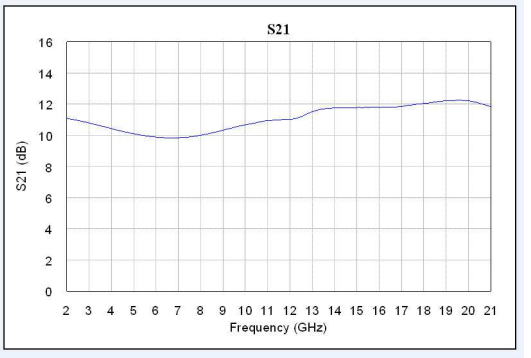
Pad	Name	Description	Pin Coordinates (μm)
A	RF IN	RF input	105, 713
B	GND	Ground	198, 126
C	VG	Gate voltage	461, 128
D	RF OUT	RF output	663, 713
E	GND	Ground	2170, 1580
F	VD	Drain voltage	1998, 1580

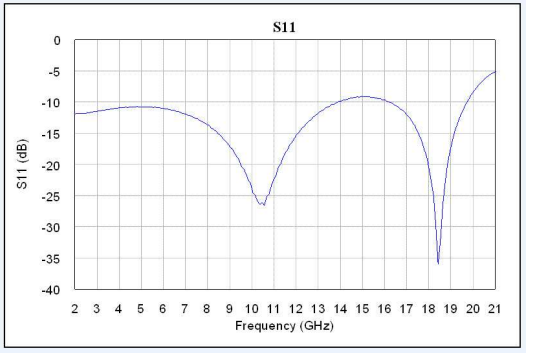
Note: Coordinates are referenced from the bottom left corner of the die to the center of bond pad opening.

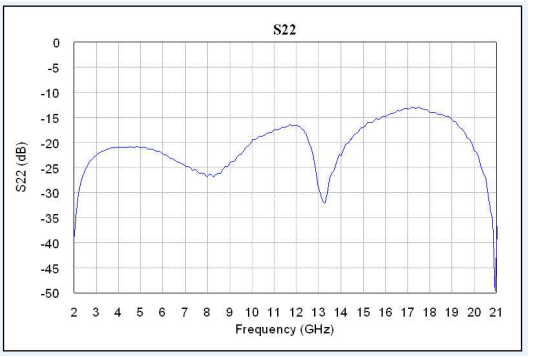
Die Size (μm)	Die Thickness (μm)	Min. Bond Pad Pitch (μm)	Min. Bond Pad Opening (μmxμm)
2350x1780	100	150	100x100

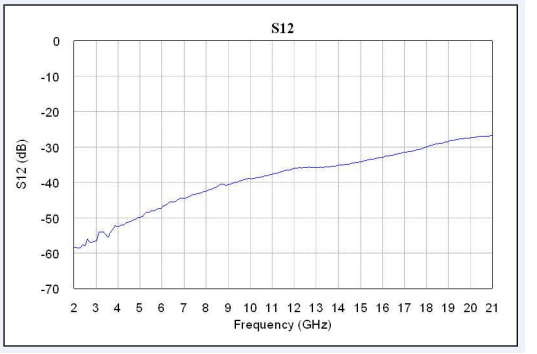
Typical Measured Performance On Wafer

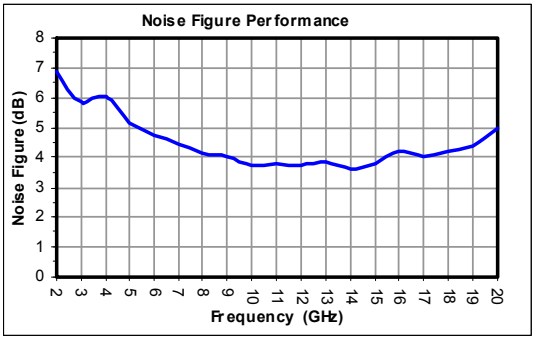
$T_{AMBIENT}$=25°C; (V_G=-0.28V, V_{DD}=7V)

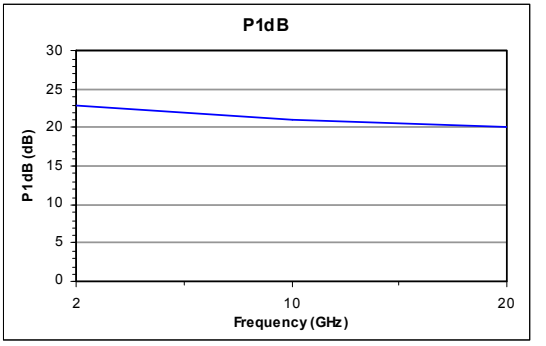






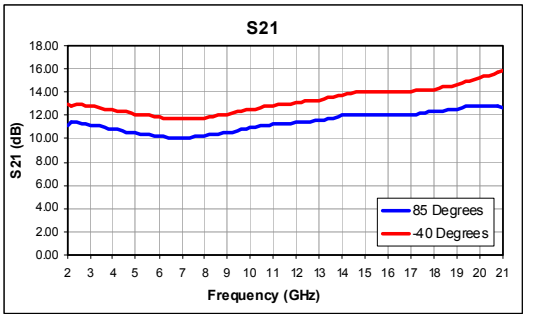


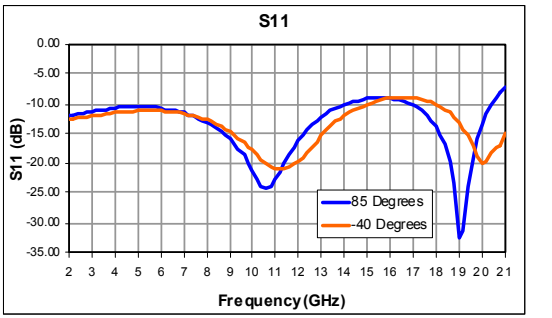


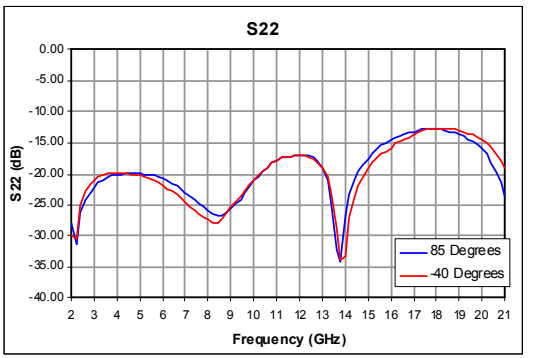


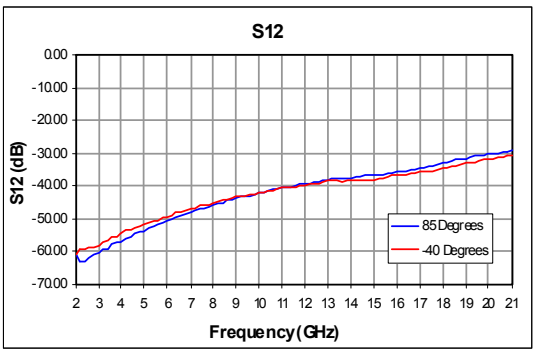
Typical Measured Performance On Wafer

$T_{AMBIENT}$=-40°C to +85°C; (V_G=-0.28V, V_{DD}=7V)









S-Parameters
V_G=-0.28V, V_{DD}=7V

	S11		S21		S12		S22	
Frequency	Mag	Angle	Mag	Angle	Mag	Angle	Mag	Angle
2.0	-11.92	-135.75	11.125	155.69	-58.366	-96.183	-39.883	74.14
2.1	-11.779	-139.89	11.063	151.96	-58.358	-109.33	-34.485	1.8525
2.2	-11.832	-142.46	11.034	148.49	-58.621	-115.25	-30.356	-16.793
2.3	-11.83	-144.82	11.011	145.15	-58.525	-116.57	-28.134	-25.683
2.4	-11.768	-146.66	10.987	141.94	-57.588	-118.51	-26.514	-31.399
2.5	-11.764	-148.67	10.95	138.76	-57.948	-111.3	-25.452	-36.829
2.6	-11.671	-150.78	10.926	135.7	-56.071	-107.4	-24.507	-41.028
2.7	-11.633	-152.27	10.888	132.69	-56.849	-121.92	-23.725	-44.838
2.8	-11.575	-154.45	10.853	129.78	-56.881	-121.58	-23.308	-48.168
2.9	-11.472	-155.88	10.821	126.93	-56.692	-129.45	-22.815	-51.113
3.0	-11.463	-157.75	10.78	124.14	-56.482	-129.32	-22.461	-54.892
3.1	-11.383	-159.69	10.753	121.36	-54.095	-136.44	-22.042	-56.354
3.2	-11.324	-161.3	10.714	118.68	-54.035	-136.02	-21.819	-59.594
3.3	-11.281	-163.28	10.672	115.97	-54.092	-129.66	-21.687	-61.975
3.4	-11.173	-164.99	10.632	113.34	-54.739	-136.99	-21.445	-64.503
3.6	-11.157	-166.47	10.596	110.72	-55.646	-141.39	-21.246	-66.785
3.7	-11.117	-168.53	10.567	108.16	-54.148	-140.79	-21.147	-69.058
3.8	-11.046	-170.01	10.528	105.64	-53.405	-144.52	-20.997	-71.533
3.9	-11.028	-171.98	10.486	103.11	-52.173	-143.92	-21.045	-74.603
4.0	-10.934	-173.85	10.447	100.66	-52.504	-148.46	-20.973	-77.178
4.1	-10.914	-175.34	10.41	98.167	-52.386	-149.49	-21.012	-79.526
4.2	-10.896	-177.39	10.366	95.752	-52.004	-158.75	-20.939	-81.697
4.3	-10.807	-178.86	10.33	93.411	-51.962	-154.65	-20.898	-84.623
4.4	-10.848	179.33	10.302	91.021	-51.294	-157.11	-21.023	-86.459
4.5	-10.783	177.28	10.262	88.65	-51.248	-160.37	-20.853	-89.008
4.6	-10.769	175.83	10.224	86.376	-51	-165.62	-20.9	-91.564
4.7	-10.788	173.78	10.194	84.031	-50.662	-164.97	-20.948	-93.613
4.8	-10.709	172.13	10.159	81.733	-50.437	-169.85	-20.862	-95.374
4.9	-10.758	170.56	10.131	79.461	-49.911	-168.44	-20.912	-98.457
5.0	-10.761	168.39	10.1	77.229	-49.926	-170.98	-21.032	-99.922
5.1	-10.74	166.98	10.073	74.967	-49.624	-171.99	-20.977	-101.42
5.2	-10.797	164.84	10.044	72.736	-48.831	-176.2	-21.032	-103.95
5.3	-10.748	162.93	10.01	70.578	-48.352	-177.75	-21.299	-104.69
5.4	-10.808	161.5	9.9905	68.383	-48.496	-179.85	-21.287	-105.78
5.5	-10.84	159.08	9.9669	66.176	-47.975	177.99	-21.418	-107.56
5.6	-10.824	157.46	9.9483	64.044	-48.068	175.94	-21.621	-109.45
5.8	-10.935	155.52	9.9278	61.892	-47.667	173.48	-21.809	-109.81
5.9	-10.923	153.22	9.9069	59.743	-47.346	174.12	-21.788	-111.89
6.0	-10.984	151.85	9.8957	57.59	-47.418	171.49	-22.22	-113.26
6.1	-11.065	149.57	9.8803	55.476	-46.629	168.62	-22.431	-114.26

S-Parameters
V_G=-0.28V, V_{DD}=7V (continued)

6.2	-11.077	147.84	9.8656	53.359	-46.479	167.46	-22.444	-115.98
6.3	-11.226	146.04	9.8593	51.248	-46.024	163.02	-22.994	-118.13
6.4	-11.278	143.73	9.8484	49.162	-45.509	161.53	-23.245	-117.88
6.5	-11.338	142.22	9.8452	47.078	-45.663	156.83	-23.335	-118.54
6.6	-11.488	139.89	9.8378	44.955	-45.389	157.01	-23.816	-121.17
6.7	-11.517	137.85	9.8332	42.876	-44.852	154.2	-23.966	-119.83
6.8	-11.719	136.26	9.8339	40.813	-44.538	151.06	-24.175	-119.32
6.9	-11.825	133.56	9.8425	38.729	-44.395	147.94	-24.395	-121.62
7.0	-11.9	132.07	9.8505	36.62	-44.438	146.63	-24.744	-119.42
7.1	-12.118	129.47	9.8559	34.556	-44.353	142.71	-24.789	-119.5
7.2	-12.171	127.07	9.8594	32.469	-44.014	139.64	-25.012	-120.23
7.3	-12.356	125.52	9.8812	30.361	-43.589	138.31	-25.611	-117.76
7.4	-12.571	122.69	9.8909	28.297	-43.458	137.23	-25.375	-116.5
7.5	-12.638	120.77	9.9059	26.212	-43.319	134.11	-25.772	-117.1
7.6	-12.959	118.5	9.9283	24.078	-43.159	132.43	-26.253	-113.56
7.7	-13.078	115.56	9.9411	21.986	-43.096	129.15	-26.146	-110.8
7.8	-13.274	114.08	9.9668	19.931	-42.649	128.11	-26.22	-111.2
8.0	-13.583	111.09	9.9884	17.766	-42.568	126.25	-26.855	-106.13
8.1	-13.724	108.9	10.021	15.657	-42.353	124.04	-26.39	-103.21
8.2	-14.137	106.87	10.055	13.518	-41.969	120.62	-26.41	-101.84
8.3	-14.365	103.39	10.087	11.361	-41.839	120.53	-26.901	-99.813
8.4	-14.635	101.73	10.117	9.1514	-41.549	118.25	-26.357	-93.469
8.5	-15.035	98.611	10.158	6.9232	-41.312	115.05	-26.221	-93.109
8.6	-15.291	95.289	10.186	4.7463	-40.835	112.87	-26.256	-89.388
8.7	-15.792	94.077	10.219	2.5285	-40.527	107.82	-25.361	-81.643
8.8	-16.141	89.86	10.255	0.3007	-40.591	104.38	-24.771	-84.105
8.9	-16.505	87.666	10.296	-1.9435	-40.841	101.95	-24.87	-85.045
9.0	-17.157	83.552	10.33	-4.2286	-40.636	100.79	-24.116	-83.22
9.1	-17.417	79.671	10.368	-6.5073	-40.475	98.258	-23.733	-86.273
9.2	-18.068	77.399	10.41	-8.7534	-40.232	96.191	-23.715	-83.987
9.3	-18.733	72.04	10.441	-11.098	-40.024	94.601	-22.989	-84.04
9.4	-19.214	68.899	10.48	-13.472	-39.917	91.93	-22.482	-85.566
9.5	-20.247	64.17	10.525	-15.733	-39.623	88.519	-22.269	-85.457
9.6	-20.662	57.974	10.558	-18.059	-39.401	87.057	-21.688	-84.522
9.7	-21.459	54.907	10.595	-20.529	-39.182	84.673	-20.928	-87.411
9.8	-22.484	45.582	10.627	-22.932	-39.032	80.942	-20.611	-88.924
9.9	-23.042	39.875	10.658	-25.258	-38.82	78.366	-20.182	-88.473
10.0	-24.516	30.965	10.689	-27.676	-39.015	76.683	-19.379	-91.083
10.2	-24.923	18.189	10.721	-30.107	-38.933	74.194	-19.434	-93.933
10.3	-25.865	9.738	10.747	-32.483	-38.709	71.3	-19.063	-94.624
10.4	-26.395	-9.1791	10.774	-34.905	-38.692	69.663	-18.679	-96.416
10.5	-26.119	-19.054	10.804	-37.332	-38.493	67.51	-18.706	-100.35
10.6	-26.531	-37.191	10.838	-39.721	-38.428	65.445	-18.547	-99.136
10.7	-25.104	-50.169	10.868	-42.188	-38.14	63.538	-18.179	-101.5
10.8	-24.763	-60.871	10.897	-44.712	-38.109	60.404	-18.041	-104.8

S-Parameters
V_G=-0.28V, V_{DD}=7V (continued)

10.9	-23.369	-73.94	10.923	-47.162	-37.894	58.705	-18.06	-106.01
11.0	-22.394	-78.518	10.935	-49.631	-37.74	56.763	-17.576	-108.65
11.1	-21.756	-88.022	10.954	-52.179	-37.487	53.894	-17.477	-113.41
11.2	-20.441	-93.686	10.964	-54.646	-37.428	52.585	-17.467	-116.34
11.3	-19.933	-98.588	10.979	-57.104	-37.225	50.04	-17.114	-118.87
11.4	-18.903	-105.2	10.987	-59.578	-37.017	47.357	-16.914	-124.3
11.5	-18.137	-107.32	10.997	-62.003	-36.796	44.58	-17.008	-128.36
11.6	-17.633	-112.84	11.004	-64.51	-36.598	42.37	-16.749	-131.29
11.7	-16.772	-116.41	11.006	-66.858	-36.491	39.12	-16.424	-136.92
11.8	-16.4	-119.57	11.01	-69.221	-36.487	36.916	-16.677	-142.23
11.9	-15.763	-124.84	11.018	-71.593	-36.106	34.198	-16.537	-146
12.0	-15.168	-126.42	11.027	-73.8	-36.054	31.076	-16.513	-152.31
12.1	-14.839	-130.61	11.049	-76.076	-35.934	28.379	-16.86	-160.45
12.2	-14.209	-133.92	11.078	-78.405	-35.909	24.965	-17.286	-165.06
12.3	-13.935	-136.1	11.121	-80.566	-35.92	21.914	-17.642	-173.78
12.5	-13.545	-140.61	11.168	-82.834	-35.779	19.026	-18.502	177.52
12.6	-13.076	-142.71	11.236	-85.225	-35.912	16.771	-20	169.4
12.7	-12.882	-145.8	11.297	-87.629	-35.676	13.893	-21.05	162.14
12.8	-12.386	-148.96	11.375	-90.138	-35.815	11.761	-22.72	147.51
12.9	-12.14	-150.59	11.448	-92.762	-35.803	9.5146	-25.448	133.13
13.0	-11.905	-154.54	11.505	-95.48	-35.78	6.854	-28.768	122.33
13.1	-11.511	-156.58	11.562	-98.101	-35.821	5.2842	-30.193	96.983
13.2	-11.368	-159.29	11.609	-100.96	-35.712	2.3088	-31.696	52.403
13.3	-11.017	-162.68	11.644	-103.79	-35.813	1.3092	-32.235	17.546
13.4	-10.816	-164.36	11.681	-106.5	-35.718	-0.83995	-30.187	-0.05554
13.5	-10.715	-167.64	11.696	-109.3	-35.613	-2.9056	-27.154	-13.267
13.6	-10.401	-170.18	11.715	-112.15	-35.666	-5.2606	-26.129	-31.62
13.7	-10.355	-172.24	11.736	-114.85	-35.502	-6.9811	-25.45	-35.464
13.8	-10.13	-175.76	11.743	-117.66	-35.5	-9.6699	-23.991	-40.525
13.9	-9.9123	-177.54	11.751	-120.4	-35.349	-11.481	-22.536	-50.395
14.0	-9.8982	179.61	11.76	-123.11	-35.168	-12.315	-22.587	-54.484
14.1	-9.6744	176.97	11.764	-125.85	-35.128	-13.767	-21.409	-56.402
14.2	-9.6137	174.86	11.774	-128.65	-35.071	-16.74	-20.32	-61.688
14.3	-9.527	171.52	11.781	-131.35	-34.964	-18.141	-20.146	-67.438
14.4	-9.3527	169.46	11.773	-134.08	-34.933	-20.549	-19.427	-66.252
14.5	-9.3452	166.66	11.782	-136.85	-34.723	-22.514	-18.604	-70.392
14.7	-9.2211	163.89	11.776	-139.51	-34.556	-24.867	-18.233	-74.094
14.8	-9.1782	162.34	11.789	-142.21	-34.461	-25.414	-17.983	-73.65
14.9	-9.1875	158.87	11.782	-144.99	-34.357	-28.238	-17.172	-76.435
15.0	-9.071	156.87	11.786	-147.6	-34.109	-31.278	-17.024	-79.302
15.1	-9.1502	154.42	11.793	-150.38	-34.14	-33.302	-16.808	-80.268
15.2	-9.1098	151.35	11.786	-153.09	-33.883	-34.932	-16.114	-81.811
15.3	-9.1225	149.67	11.787	-155.72	-33.758	-37.395	-16.053	-85.343
15.4	-9.2406	146.73	11.797	-158.51	-33.616	-39.767	-15.999	-85.709
15.5	-9.2123	144	11.788	-161.19	-33.413	-41.125	-15.608	-87.172

S-Parameters
V_G=-0.28V, V_{DD}=7V (continued)

15.6	-9.3598	141.91	11.798	-163.83	-33.408	-43.596	-15.223	-91.749
15.7	-9.4119	138.36	11.799	-166.65	-33.231	-46.338	-15.492	-92.824
15.8	-9.4212	136.29	11.793	-169.35	-33.041	-49.095	-14.943	-94.354
15.9	-9.6492	133.53	11.796	-172.06	-32.938	-50.705	-14.744	-98.386
16.0	-9.6518	130.42	11.791	-174.82	-32.964	-54.012	-14.783	-101.11
16.1	-9.8591	128.09	11.804	-177.43	-32.606	-55.258	-14.487	-100.83
16.2	-10.04	124.44	11.798	179.77	-32.598	-58.445	-14.21	-105.93
16.3	-10.126	122.03	11.794	177.03	-32.472	-59.598	-14.206	-108.68
16.4	-10.436	119.4	11.805	174.31	-32.351	-62.872	-14.009	-109.73
16.5	-10.573	116.29	11.8	171.66	-32.238	-65.669	-13.555	-112.37
16.6	-10.851	114.32	11.816	168.93	-31.997	-67.589	-13.707	-116.07
16.7	-11.195	110.9	11.823	166.17	-31.856	-70.082	-13.478	-116.38
16.9	-11.392	108.19	11.832	163.44	-31.739	-72.972	-13.239	-118.4
17.0	-11.844	105.37	11.853	160.74	-31.556	-75.386	-13.27	-122.22
17.1	-12.202	101.73	11.87	157.91	-31.484	-78.049	-13.292	-122.55
17.2	-12.663	99.604	11.887	155.1	-31.394	-79.95	-13.021	-125.5
17.3	-13.311	95.915	11.92	152.26	-31.358	-83.44	-13.045	-128.19
17.4	-13.837	92.766	11.936	149.47	-31.167	-85.415	-13.235	-129.46
17.5	-14.623	90.469	11.958	146.51	-30.993	-87.948	-12.969	-131.38
17.6	-15.449	86.204	11.977	143.58	-30.761	-90.237	-13.191	-134.99
17.7	-16.281	84.341	12.001	140.68	-30.701	-92.613	-13.346	-137.02
17.8	-17.659	82.143	12.02	137.78	-30.404	-94.808	-13.447	-138.36
17.9	-18.59	78.5	12.034	134.68	-30.276	-97.654	-13.514	-143.82
18.0	-20.555	78.938	12.056	131.82	-30.003	-100.74	-14.032	-145.45
18.1	-22.699	75.977	12.067	128.84	-29.74	-103.76	-14.05	-146.45
18.2	-24.916	79.375	12.078	125.67	-29.553	-107.05	-13.94	-152.34
18.3	-29.708	89.299	12.103	122.77	-29.4	-110.15	-14.297	-153.85
18.4	-35.974	118.27	12.123	119.75	-29.146	-113.28	-14.425	-154.16
18.5	-32.09	-171.7	12.143	116.57	-29.064	-116.16	-14.359	-157.84
18.6	-26.47	-148.54	12.172	113.42	-28.928	-120.11	-14.651	-161.77
18.7	-23.012	-146.54	12.191	110.25	-28.879	-123.5	-14.816	-161.41
18.8	-20.079	-146.85	12.2	106.94	-28.704	-126.08	-14.796	-164.79
18.9	-18.094	-147.55	12.219	103.69	-28.571	-130.16	-15.264	-167.8
19.1	-16.415	-151.12	12.232	100.42	-28.32	-132.96	-15.749	-167.86
19.2	-14.887	-153.16	12.23	97.087	-28.255	-136.07	-15.824	-169.9
19.3	-13.843	-156.59	12.246	93.763	-28.081	-139.85	-16.57	-174.07
19.4	-12.739	-160.43	12.245	90.4	-27.931	-143.46	-17.039	-173.75
19.5	-11.841	-162.95	12.251	87.066	-27.793	-147.14	-17.426	-175.05
19.6	-11.099	-167.41	12.251	83.579	-27.716	-150.56	-18.066	179.12
19.7	-10.255	-170.81	12.248	80.148	-27.629	-154.6	-19.07	-179.61
19.8	-9.6868	-174.2	12.239	76.622	-27.546	-158.33	-19.404	176.61
19.9	-9.049	-178.24	12.229	73.048	-27.574	-162.16	-20.03	172.78
20.0	-8.4472	178.44	12.219	69.492	-27.437	-166.13	-21.677	170.23

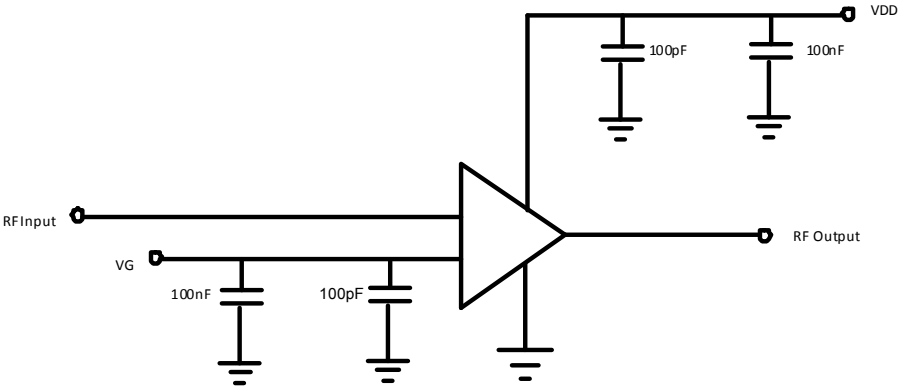
S-Parameters
V_G=-0.28V, V_{DD}=7V (continued)

	S11		S21		S12		S22	
Frequency	Mag	Angle	Mag	Angle	Mag	Angle	Mag	Angle
14.4	-9.353	169.46	11.773	-134.08	-34.933	-20.549	-19.427	-66.252
14.5	-9.345	166.66	11.782	-136.85	-34.723	-22.514	-18.604	-70.392
14.7	-9.221	163.89	11.776	-139.51	-34.556	-24.867	-18.233	-74.094
14.8	-9.178	162.34	11.789	-142.21	-34.461	-25.414	-17.983	-73.65
14.9	-9.188	158.87	11.782	-144.99	-34.357	-28.238	-17.172	-76.435
15.0	-9.071	156.87	11.786	-147.6	-34.109	-31.278	-17.024	-79.302
15.1	-9.15	154.42	11.793	-150.38	-34.14	-33.302	-16.808	-80.268
15.2	-9.11	151.35	11.786	-153.09	-33.883	-34.932	-16.114	-81.811
15.3	-9.123	149.67	11.787	-155.72	-33.758	-37.395	-16.053	-85.343
15.4	-9.241	146.73	11.797	-158.51	-33.616	-39.767	-15.999	-85.709
15.5	-9.212	144	11.788	-161.19	-33.413	-41.125	-15.608	-87.172
15.6	-9.36	141.91	11.798	-163.83	-33.408	-43.596	-15.223	-91.749
15.7	-9.412	138.36	11.799	-166.65	-33.231	-46.338	-15.492	-92.824
15.8	-9.421	136.29	11.793	-169.35	-33.041	-49.095	-14.943	-94.354
15.9	-9.649	133.53	11.796	-172.06	-32.938	-50.705	-14.744	-98.386
16.0	-9.652	130.42	11.791	-174.82	-32.964	-54.012	-14.783	-101.11
16.1	-9.859	128.09	11.804	-177.43	-32.606	-55.258	-14.487	-100.83
16.2	-10.04	124.44	11.798	179.77	-32.598	-58.445	-14.21	-105.93
16.3	-10.13	122.03	11.794	177.03	-32.472	-59.598	-14.206	-108.68
16.4	-10.44	119.4	11.805	174.31	-32.351	-62.872	-14.009	-109.73
16.5	-10.57	116.29	11.8	171.66	-32.238	-65.669	-13.555	-112.37
16.6	-10.85	114.32	11.816	168.93	-31.997	-67.589	-13.707	-116.07
16.7	-11.2	110.9	11.823	166.17	-31.856	-70.082	-13.478	-116.38
16.9	-11.39	108.19	11.832	163.44	-31.739	-72.972	-13.239	-118.4
17.0	-11.84	105.37	11.853	160.74	-31.556	-75.386	-13.27	-122.22
17.1	-12.2	101.73	11.87	157.91	-31.484	-78.049	-13.292	-122.55

S-Parameters
V_G=-0.28V, V_{DD}=7V (continued)

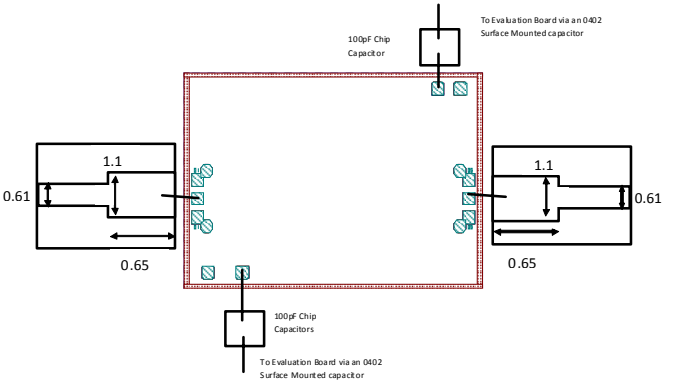
	S11		S21		S12		S22	
Frequency	Mag	Angle	Mag	Angle	Mag	Angle	Mag	Angle
17.2	-12.66	99.604	11.887	155.1	-31.394	-79.95	-13.021	-125.5
17.3	-13.31	95.915	11.92	152.26	-31.358	-83.44	-13.045	-128.19
17.4	-13.84	92.766	11.936	149.47	-31.167	-85.415	-13.235	-129.46
17.5	-14.62	90.469	11.958	146.51	-30.993	-87.948	-12.969	-131.38
17.6	-15.45	86.204	11.977	143.58	-30.761	-90.237	-13.191	-134.99
17.7	-16.28	84.341	12.001	140.68	-30.701	-92.613	-13.346	-137.02
17.8	-17.66	82.143	12.02	137.78	-30.404	-94.808	-13.447	-138.36
17.9	-18.59	78.5	12.034	134.68	-30.276	-97.654	-13.514	-143.82
18.0	-20.56	78.938	12.056	131.82	-30.003	-100.74	-14.032	-145.45
18.1	-22.7	75.977	12.067	128.84	-29.74	-103.76	-14.05	-146.45
18.2	-24.92	79.375	12.078	125.67	-29.553	-107.05	-13.94	-152.34
18.3	-29.71	89.299	12.103	122.77	-29.4	-110.15	-14.297	-153.85
18.4	-35.97	118.27	12.123	119.75	-29.146	-113.28	-14.425	-154.16
18.5	-32.09	-171.7	12.143	116.57	-29.064	-116.16	-14.359	-157.84
18.6	-26.47	-148.54	12.172	113.42	-28.928	-120.11	-14.651	-161.77
18.7	-23.01	-146.54	12.191	110.25	-28.879	-123.5	-14.816	-161.41
18.8	-20.08	-146.85	12.2	106.94	-28.704	-126.08	-14.796	-164.79
18.9	-18.09	-147.55	12.219	103.69	-28.571	-130.16	-15.264	-167.8
19.1	-16.42	-151.12	12.232	100.42	-28.32	-132.96	-15.749	-167.86
19.2	-14.89	-153.16	12.23	97.087	-28.255	-136.07	-15.824	-169.9
19.3	-13.84	-156.59	12.246	93.763	-28.081	-139.85	-16.57	-174.07
19.4	-12.74	-160.43	12.245	90.4	-27.931	-143.46	-17.039	-173.75
19.5	-11.84	-162.95	12.251	87.066	-27.793	-147.14	-17.426	-175.05
19.6	-11.1	-167.41	12.251	83.579	-27.716	-150.56	-18.066	179.12
19.7	-10.26	-170.81	12.248	80.148	-27.629	-154.6	-19.07	-179.61
19.8	-9.687	-174.2	12.239	76.622	-27.546	-158.33	-19.404	176.61
19.9	-9.049	-178.24	12.229	73.048	-27.574	-162.16	-20.03	172.78
20.0	-8.447	178.44	12.219	69.492	-27.437	-166.13	-21.677	170.23

Biasing Circuit Schematic



Assembly Diagram

Dimensions in millimeters.



Substrate: Alumina, Thickness: 635µm, Transformer impedance: 36Ω, Electrical length 21° at 10GHz

It is recommended that the RF connections be made using two bond wires 25µm in diameter and a maximum length of 300µm. Optimum input and output return loss can be achieved, to compensate for bond wire length, with the addition of a microstrip transformer as shown above.

Bill of Materials

All RF tracks should be 50Ω characteristic material.		
Capacitor	100pF	Chip Capacitor
Capacitor	100pF	0402

Preferred Assembly Instructions

GaAs devices are fragile and should be handled with great care. Specially designed collets should be used where possible.

The back of the die is metalized and the recommended mounting method is by the use of conductive epoxy. Epoxy should be applied to the attachment surface uniformly and sparingly to avoid encroachment of epoxy on to the top face of the die, and ideally should not exceed half the chip height. For automated dispense Ablestick LMISR4 is recommended, and for manual dispense Ablestick 84-1 LMI or 84-1 LMIT are recommended. These should be cured at a temperature of 150 °C for 1 hour in an oven especially set aside for epoxy curing only. If possible the curing oven should be flushed with dry nitrogen. The gold-tin (80% Au 20% Sn) eutectic die attach has a melting point of approximately 280 °C but the absolute temperature being used depends on the leadframe material used and the particular application. The maximum time at used should be kept to a minimum.

This part has gold (Au) bond pads requiring the use of gold (99.99% pure) bondwire. It is recommended that 25.4µm diameter gold wire be used. Recommended lead bond technique is thermocompression wedge bonding with 0.001" (25µm) diameter wire. Bond force, time stage temperature, and ultrasonics are all critical parameters and the settings are dependent on the setup and application being used. Ultrasonic or thermosonic bonding is not recommended.

Bonds should be made from the die first and then to the mounting substrate or package. The physical length of the bondwires should be minimized especially when making RF or ground connections.

Handling Precautions

To avoid damage to the devices, care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing.

ESD/MSL Rating

These devices should be treated as Class 0 (0V to 250V) using the human body model as defined in JEDEC Standard No. 22-A114. Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263. This is an unpackaged part and therefore no MSL rating applies.

Application Notes and Design Data

Application Notes and design data including S-parameters and noise parameters are available on request and at www.rfmd.com.

Reliability

An MTTF of 4.2 million hours at a channel temperature of 150 °C is achieved for the process used to manufacture this device.

Disclaimers

This product is not designed for use in any space-based or life-sustaining/supporting equipment.

Ordering Information

Quantity	Ordering Code
Standard order quantity (waffle pack)	FMA3008-000
Small quantity (25)	FMA3008-000SQ
Sample quantity (3)	FMA3008-000S3