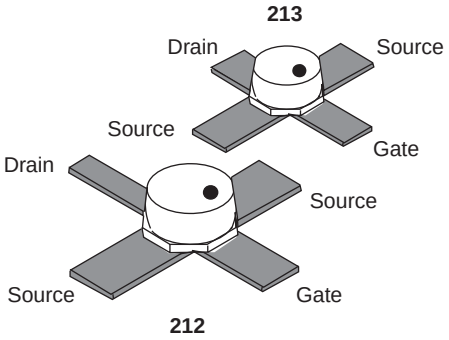
Low Noise/Medium Power GaAs MESFET Chips

AFM04P3-212, AFM04P3-213

Features

- Low Noise Figure, 0.6 dB @ 4 GHz
- 20 dBm Output Power @ 18 GHz
- High Associated Gain, 13 dB @ 4 GHz
- High Power Added Efficiency, 25%
- Broadband Operation, DC–26 GHz
- Available in Tape and Reel Packaging



Description

The AFM04P3-212, 213 are high performance power GaAs MESFET chips having a gate length of 0.25 µm and a total gate periphery of 400 µm. These devices have excellent gain and power performance through 26 GHz, making them suitable for a wide range of commercial and military applications in oscillator and amplifier circuits. They also have excellent noise performance and can be used in the first and second stage of low noise amplifier design. The AFM04P3 employs Ti/Pd/Au gate metallization and surface passivation to ensure a rugged, reliable part.

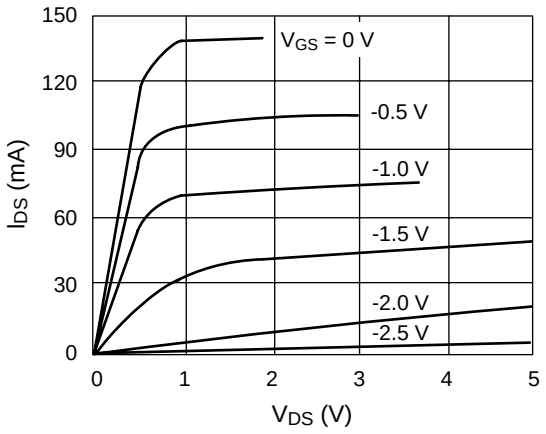
Absolute Maximum Ratings

Characteristic	Value
Drain to Source Voltage (V_{DS})	6 V
Gate to Source Voltage (V_{GS})	-4 V
Drain Current (I_{DS})	I_{DSS}
Gate Current (I_{GS})	1 mA
Total Power Dissipation (P_T)	700 mW
Storage Temperature (T_{ST})	-65 to +150°C
Channel Temperature (T_{CH})	175°C

Electrical Specifications at 25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Saturated Drain Current (I_{DSS})	V_{DS} = 2 V, V_{GS} = 0 V	90.0	140.0	190.0	mA
Transconductance (gm)		60.0	80.0		mS
Pinch-Off Voltage (V_P)	V_{DS} = 5 V, I_{DS} = 1 mA	1.0	3.0	5.0	-V
Gate to Drain Breakdown Voltage (V_{bgd})	I_{GD} = -400 µA	8.0	12.0		-V
Noise Figure (NF)	V_{DS} = 2 V, I_{DS} = 25 mA, F = 4 GHz		0.6		dB
Associated Gain (G_A)			13.8		dB
Output Power at 1 dB Compression ($P_{1\ dB}$)	V_{DS} = 5 V, I_{DS} = 70 mA, F = 18 GHz		20.0		dBm
Gain at 1 dB Compression ($G_{1\ dB}$)			9.0		dB
Power Added Efficiency (ηadd)			25.0		%

Typical Performance Data



I-V

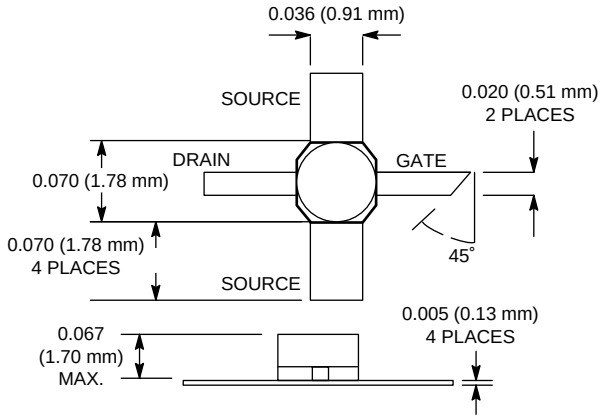
Typical Noise Parameters (V_{DS} = 2 V, I_{DS} = 25 mA)

Freq. (GHz)	NF_{MIN} (dB)	Γ_{opt}		R_N (Normalized)	G_A (dB)
		Mag.	Ang.		
2	0.32	0.840	22.0	0.32	15.81
3	0.43	0.816	39.9	0.30	14.75
4	0.54	0.760	55.1	0.28	13.85
5	0.62	0.707	71.0	0.25	13.04
6	0.71	0.658	87.6	0.20	12.31
7	0.81	0.613	104.8	0.16	11.66
8	0.90	0.573	122.5	0.11	11.09
9	1.00	0.538	140.5	0.08	10.58
10	1.09	0.509	158.8	0.06	10.13
11	1.19	0.488	177.3	0.05	9.74
12	1.28	0.473	-164.2	0.06	9.39

Typical S-Parameters (V_{DS} = 5 V, I_{DS} = 75 mA)

Freq. (GHz)	S_{11}		S_{21}		S_{12}		S_{22}		MAG/ MSG (dB)
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	
2	0.889	-52.589	5.318	130.730	0.025	60.396	0.603	-38.675	23.226
3	0.846	-73.729	4.630	107.339	0.032	43.999	0.547	-55.205	21.552
4	0.839	-93.128	4.202	94.408	0.035	47.172	0.442	-58.792	20.739
5	0.845	-114.624	4.052	72.773	0.039	33.811	0.442	-71.114	20.126
6	0.840	-138.378	3.858	53.962	0.043	26.985	0.433	-87.725	19.554
7	0.721	-161.239	3.642	36.964	0.046	24.957	0.459	-102.826	18.966
8	0.708	176.151	3.365	21.074	0.051	26.565	0.444	-115.757	18.196
9	0.726	155.765	3.020	8.127	0.052	25.272	0.367	-124.557	15.515
10	0.662	141.259	2.841	-7.015	0.061	22.692	0.379	-139.923	13.767
11	0.627	127.290	2.606	-22.373	0.067	17.602	0.364	-155.126	12.218
12	0.647	104.509	2.340	-40.840	0.078	7.397	0.313	-168.618	11.224
13	0.664	91.536	2.295	-54.578	0.098	3.156	0.353	160.641	12.045
14	0.757	76.937	2.271	-73.712	0.125	-14.059	0.464	138.233	12.603
15	0.854	59.140	2.151	-91.255	0.138	-29.083	0.480	121.701	11.912
16	0.877	41.254	2.030	-108.970	0.156	-44.222	0.477	102.016	11.136
17	0.817	22.517	1.775	-124.675	0.153	-58.620	0.510	74.410	10.633
18	0.854	8.149	1.516	-138.209	0.148	-66.477	0.532	52.097	10.094
19	0.829	0.211	1.387	-150.773	0.159	-79.718	0.667	43.603	9.418
20	0.808	-6.381	1.295	-163.174	0.158	-90.627	0.750	36.702	9.137
21	0.868	-25.384	1.311	177.989	0.177	-106.327	0.642	24.887	8.692
22	0.842	-44.086	1.290	158.446	0.190	-124.276	0.654	-3.077	8.319
23	0.892	-65.418	1.195	137.339	0.186	-140.906	0.721	-31.972	8.090
24	1.003	-85.660	1.138	120.757	0.182	-154.898	0.755	-40.865	7.956
25	0.913	-102.209	1.071	101.362	0.183	-171.299	0.714	-57.178	7.671
26	0.810	-125.908	0.925	76.234	0.152	167.541	0.630	-89.282	7.853

212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45˚
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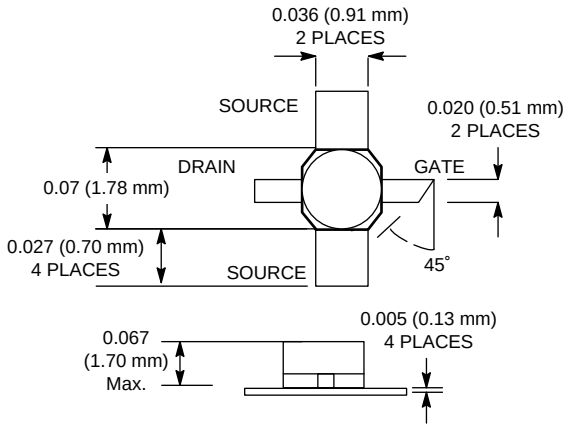
(1.70 mm)
MAX.

213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