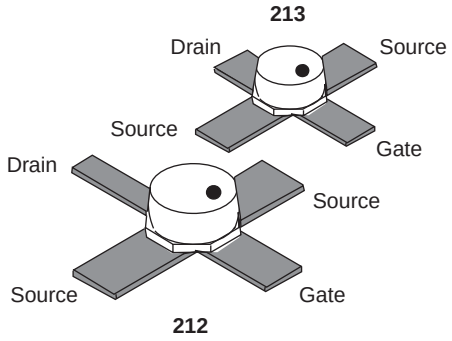
General Purpose Packaged PHEMT Chips

AFP02N8-212, AFP02N8-213

Features

- Low Noise Figure, 1.55 dB @ 4 GHz
- High Associated Gain, 13 dB @ 4 GHz
- High MAG, > 15 dB @ 4 GHz
- 0.7 μm Ti/Pd/Au Gates
- Passivated Surface
- Low Cost Metal Ceramic Package
- Available with Two Lead Lengths
- Available in Tape and Reel Packaging



Description

The AFP02N8-212, 213 are general purpose packaged PHEMT chips that have excellent gain and noise performance through X band, making them suitable for a wide range of commercial applications. The devices employ 0.7 μm Ti/Pd/Au gates and surface passivation to ensure a rugged, reliable part. Available in metal ceramic packages with a choice of two lead lengths. The components are also available in tape and reel and are ready for automatic insertion equipment.

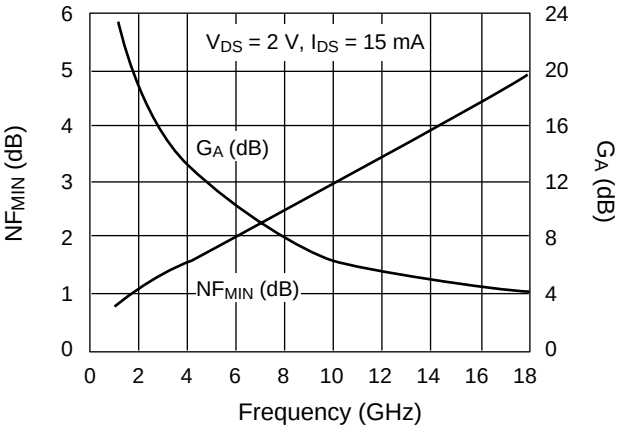
Absolute Maximum Ratings

Characteristic	Value
Drain to Source Voltage (V_{DS})	6 V
Gate to Source Voltage (V_{GS})	-3 V
Drain Current (I_{DS})	I_{DSS}
Gate Current (I_{GS})	10 μA
Total Power Dissipation (P_T)	300 mW
Storage Temperature (T_{ST})	-65 to +150°C
Channel Temperature (T_{CH})	175°C

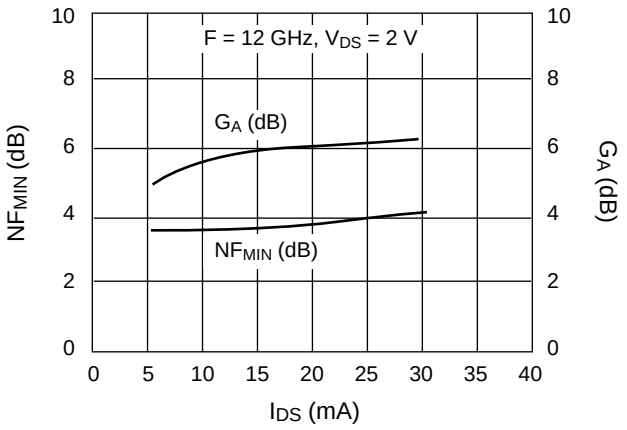
Electrical Specifications at 25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Saturated Drain Current (I_{DSS})	V_{DS} = 2 V, V_{GS} = 0 V	25.0	55.0	90.0	mA
Transconductance (gm)	V_{DS} = 2 V, I_{DS} = 15 mA	30.0	45.0		mS
Pinch-off Voltage (V_P)	V_{DS} = 2 V, I_{DS} = 0.3 mA	-0.4	-1.2	-2.0	V
Gate to Source Breakdown Voltage (V_{bgs})	I_{GS} = -200 μA	-6.0	8.0		V
Noise Figure (NF)	V_{DS} = 2 V, I_{DS} = 15 mA, F = 4 GHz		1.55	2.0	dB
Associated Gain (G_A)		12.0	13.2		dB

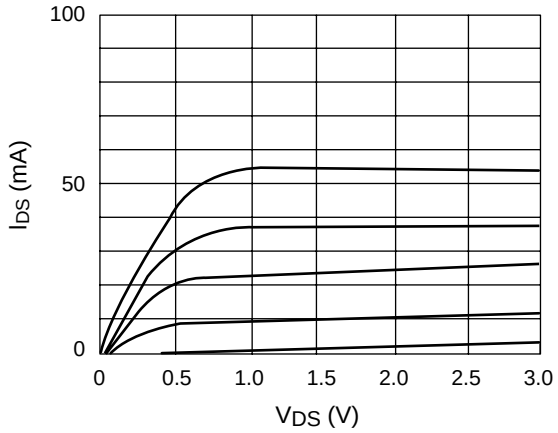
Typical Performance Data



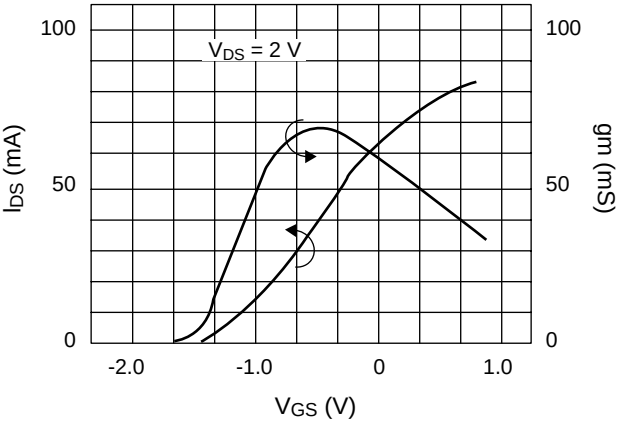
RF Minimum Noise Figure (NF_{MIN}) and Associated Gain (G_A) vs. Frequency (GHz)



RF Minimum Noise Figure (NF_{MIN}) and Associated Gain (G_A) vs. Drain Current (I_{DS})



DC Drain Current (I_{DS}) vs. Drain Voltage (V_{DS}) as a Function of Gate to Source Voltage (V_{GS})



DC Drain Current (I_{DS}) and Transconductance (gm) vs. Gate to Source Voltage (V_{GS})

Typical Noise Parameters (V_{DS} = 2 V, I_{DS} = 15 mA)

Freq. (GHz)	NF_{MIN} (dB)	Γ_{opt} Mag.	Γ_{opt} Ang.	$R_N/50$	G_A (dB)
1	0.75	0.84	25.40	0.12	23.50
2	1.10	0.72	50.20	0.23	18.00
4	1.55	0.54	99.00	0.23	13.20
6	2.00	0.43	145.40	0.15	10.20
8	2.50	0.39	-171.80	0.16	8.10
10	3.00	0.39	-133.60	0.32	6.51
12	3.50	0.43	-100.10	0.66	5.82
14	4.00	0.48	-71.10	1.16	5.20
16	4.50	0.55	-45.90	1.77	4.51
18	5.00	0.60	-23.30	2.38	4.10

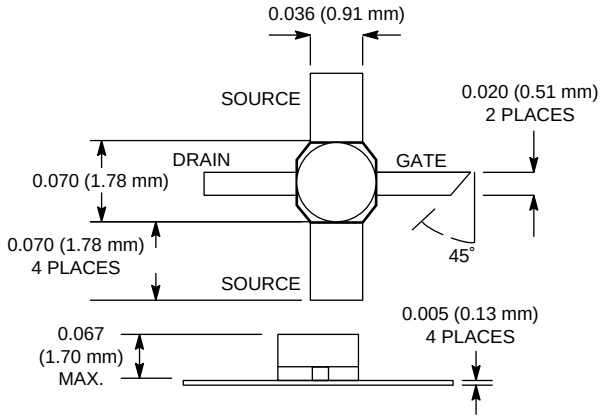
Typical S-Parameters (V_{DS} = 2 V, I_{DS} = 10 mA)

Freq. (GHz)	S_{11}		S_{21}		S_{12}		S_{22}		k	S_{21} (dB)	MAG/ MSG (dB)
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.			
2	0.907	-62.79	3.464	127.20	0.064	50.72	0.668	-34.68	0.28	10.79	17.33
3	0.838	-90.38	3.023	105.25	0.081	34.37	0.624	-48.83	0.41	9.61	15.72
4	0.783	-111.85	2.621	86.99	0.089	21.93	0.597	-60.61	0.56	8.37	14.69
5	0.736	-130.94	2.336	71.00	0.940	11.76	0.578	-69.70	0.71	7.37	13.95
6	0.678	-148.78	2.121	57.32	0.097	4.01	0.541	-75.33	0.93	6.53	13.40
7	0.646	-169.88	1.963	41.01	0.100	-6.30	0.529	-85.97	1.05	5.86	11.60
8	0.623	170.99	1.757	25.78	0.094	-16.83	0.498	-96.93	1.35	4.90	9.21
9	0.608	156.18	1.586	13.51	0.085	-22.69	0.478	-106.72	1.72	4.01	7.77
10	0.588	144.21	1.507	2.06	0.082	-21.86	0.489	-116.05	1.88	3.56	7.23
11	0.575	128.33	1.460	-10.69	0.087	-23.31	0.478	-125.41	1.88	3.29	6.85
12	0.585	105.80	1.400	-24.70	0.092	-27.09	0.448	-131.83	1.87	2.92	6.45
13	0.609	88.23	1.286	-38.34	0.092	-31.27	0.412	-143.23	2.02	2.19	5.68
14	0.638	80.34	1.209	-49.37	0.099	-31.92	0.413	-159.92	1.85	1.65	5.54
15	0.647	70.32	1.154	-61.37	0.108	-36.23	0.433	-175.05	1.68	1.24	5.48
16	0.634	57.45	1.114	-74.60	0.117	-42.67	0.457	170.14	1.60	0.94	5.24
17	0.644	43.29	1.058	-87.78	0.126	-50.03	0.440	154.96	1.58	0.49	4.77
18	0.676	29.15	0.988	-100.88	0.133	-58.17	0.410	138.93	1.55	-0.11	4.33

Typical S-Parameters (V_{DS} = 2 V, I_{DS} = 30 mA)

Freq. (GHz)	S_{11}		S_{21}		S_{12}		S_{22}		k	S_{21} (dB)	MAG/ MSG (dB)
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.			
2	0.897	-67.62	3.880	124.82	0.056	52.03	0.532	-35.74	0.35	11.78	18.41
3	0.827	-96.33	3.324	102.91	0.070	37.48	0.496	-49.61	0.51	10.43	16.77
4	0.774	-118.37	2.849	84.93	0.077	26.85	0.477	-60.94	0.68	9.09	15.68
5	0.730	-137.87	2.514	69.09	0.083	18.48	0.465	-69.52	0.84	8.01	14.81
6	0.676	-156.27	2.270	55.39	0.087	12.39	0.436	-74.37	1.07	7.12	12.53
7	0.651	-177.55	2.079	39.24	0.091	3.17	0.428	-84.64	1.18	6.36	11.02
8	0.634	163.71	1.850	24.48	0.088	-5.10	0.401	-95.45	1.46	5.34	9.22
9	0.622	149.23	1.669	12.62	0.083	-8.69	0.384	-105.44	1.77	4.45	7.93
10	0.603	137.25	1.582	1.26	0.087	-7.85	0.396	-114.72	1.81	3.98	7.39
11	0.595	121.36	1.526	-11.54	0.096	-11.14	0.385	-123.78	1.74	3.67	7.02
12	0.611	99.49	1.450	-25.54	0.105	-17.16	0.355	-129.74	1.66	3.23	6.64
13	0.636	82.95	1.324	-38.78	0.108	-23.35	0.316	-141.03	1.75	2.44	5.87
14	0.666	75.34	1.247	-49.46	0.117	-26.77	0.314	-158.74	1.58	1.92	5.79
15	0.673	65.30	1.193	-61.23	0.128	-32.92	0.335	-175.09	1.45	1.53	5.72
16	0.660	52.28	1.152	-74.33	0.138	-41.04	0.359	169.60	1.41	1.23	5.42
17	0.672	38.51	1.087	-87.24	0.146	-49.76	0.340	153.84	1.41	0.73	4.91
18	0.705	25.05	1.014	-99.87	0.152	-58.48	0.308	136.82	1.39	0.12	4.53

212


0.036 (0.91 mm)
SOURCE
0.020 (0.51 mm)
2 PLACES
DRAIN
GATE
0.070 (1.78 mm)
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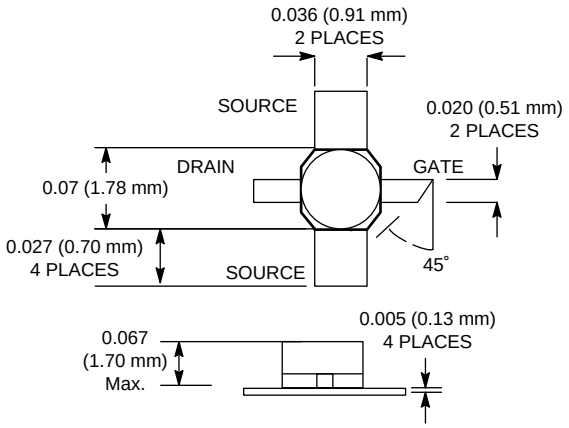
4 PLACES
45˚
SOURCE
0.005 (0.13 mm)
4 PLACES
0.067
(1.70 mm)
MAX.

213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