P-HEMT

CFH 400

Preliminary Data Sheet

- Low noise figure and high associated gain for high IP3 receiver stages up to 4 GHz (F = 0.55 dB; G_A = 15.7 dB @ 3 V; 10 mA; f = 1.8 GHz)
- Suitable for PCS CDMA and UMTS applications
- Low cost miniature package P-SOT343-4-1
- L_G = 0.4 µm; W_G = 400 µm
- Tape and Reel packaging

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

SOT 343

Type	**Marking**	**Ordering Code** (taped)	**Package**[1)]
CFH 400	N4s	Q62702-G0116	P-SOT343-4-1

[1)] Dimensions see **Page 7**.

Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	5.5	V
Drain-gate voltage	V_{DG}	6.5	V
Gate-source voltage	V_{GS}	– 2.0	V
Drain current	I_D	80	mA
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	– 65 … + 150	°C
Total power dissipation (T_S = 110 °C)[1)]	P_{tot}	150	mW

[1)] T_S: Temperature measured at soldering point.

Thermal Resistance

Parameter	**Symbol**	**Value**	**Unit**
Channel-soldering point source	R_{thChS}	260	K/W

Electrical Characteristics

T_A = 25 °C, unless otherwise specified

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain-source saturation current	I_{DSS}	0	40	70	mA	V_{DS} = 3 V, V_{GS} = 0 V
Pinch-off voltage	$V_{GS(P)}$	– 0.7	– 0.25	0	V	V_{DS} = 3 V, I_D = 1 mA
Gate leakage current	I_G	–	–	40	µA	V_{DS} = 3 V, I_D = 15 mA
Transconductance	g_m	70	100	–	mS	V_{DS} = 3 V, I_D = 15 mA
Noise figure[1)]	F	–	0.55	–	dB	V_{DS} = 3 V, I_D = 10 mA, f = 1.8 GHz
		–	0.53	–	dB	V_{DS} = 3 V I_D = 15 mA f = 1.8 GHz
Associated gain[1)]	G_A	–	15.7	–	dB	V_{DS} = 3 V, I_D = 10 mA, f = 1.8 GHz
		–	16.2	–	dB	V_{DS} = 3 V, I_D = 15 mA, f = 1.8 GHz
IIP3[1)]	$IIP3$	–	6	–	dBm	V_{DS} = 3 V, I_D = 10 mA, f = 1.8 GHz
		–	8.5	–	dBm	V_{DS} = 3 V, I_D = 15 mA, f = 1.8 GHz

[1)] Parameters are measured for input impedance for minimum noise figure and output impedance for maximum gain.

Typical Common Source S-Parameters

@ 3 V; 10 mA; Z_O = 50 Ω

f [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.2	0.9818	– 6.3	8.2506	174.6	0.0128	110.7	0.7321	– 5.3
0.3	0.9947	– 11.8	8.3347	170.2	0.0198	91.2	0.7148	– 10.4
0.4	0.9826	– 17.9	8.166	164.2	0.0288	95	0.7114	– 15.5
0.5	0.9696	– 23.8	8.1183	159.5	0.041	72	0.6999	– 20.6
0.6	0.9525	– 30.1	8.0562	154.2	0.0512	71.1	0.6835	– 26.1
0.7	0.9312	– 36	7.9081	149.9	0.0596	66.2	0.6651	– 30.8
0.8	0.9159	– 41.8	7.7814	144.7	0.0666	62.8	0.6434	– 36
0.9	0.8956	– 47.6	7.6295	140	0.0724	58.3	0.6203	– 41.1
1	0.8702	– 52.9	7.4436	135	0.0799	55.5	0.5925	– 46.3
1.1	0.8444	– 58.7	7.2593	130.8	0.0889	51.7	0.574	– 51.8
1.2	0.8144	– 64.8	7.0517	126.4	0.0938	50.1	0.5488	– 57.4
1.3	0.7919	– 70.7	6.8482	121.8	0.0994	45.4	0.5257	– 62.9
1.4	0.7663	– 76	6.7195	117.8	0.1056	42.3	0.5006	– 68.4
1.5	0.7438	– 81.9	6.4735	114	0.1097	40.4	0.477	– 73.9
1.6	0.7208	– 87	6.2591	109.9	0.1124	37.2	0.4587	– 79.1
1.7	0.6956	– 92	6.0662	106.2	0.1158	33.9	0.4444	– 85
1.8	0.6788	– 97.3	5.8346	102.3	0.1195	31.6	0.4217	– 90.5
1.9	0.6579	– 102.6	5.6395	98.9	0.1225	30.6	0.4055	– 95.2
2	0.6396	– 107.5	5.4822	95.5	0.1248	27	0.3913	– 101.5
2.1	0.6214	– 111.8	5.3077	92.2	0.1245	24.7	0.3843	– 106.5
2.2	0.6048	– 116.9	5.0469	89	0.1274	23.4	0.3738	– 111.7
2.3	0.5949	– 121	4.8822	86.2	0.1306	21.4	0.3663	– 117.1
2.4	0.5831	– 125.4	4.7575	83.1	0.1313	19.1	0.3644	– 121
2.5	0.5724	– 129.4	4.607	80.5	0.1323	18	0.355	– 126.8
3	0.5315	– 147.8	3.9289	67.4	0.1364	11.5	0.3447	– 145.9
3.5	0.5065	– 163.5	3.4181	56	0.1396	7	0.3463	– 159.9

Typical Common Source S-Parameters (cont'd)
@ 3 V; 10 mA; Z_O = 50 Ω

f [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
4	0.4948	– 176.1	3.0368	45.5	0.1397	1.6	0.3449	– 171.5
4.5	0.4889	171.3	2.7496	35.3	0.1439	– 1.8	0.3429	178
5	0.491	159.7	2.5187	25.1	0.1494	– 5.7	0.3405	166.8

Typical Common Source Noise Parameters
@ 3 V; 10 mA; Z_O = 50 Ω

f	F_{min}	G_A	Γ_{opt} [deg]		R_N/50
GHz	dB	dB	MAG	Phase	Ω
0.9	0.42	19.9	0.73	13	0.20
1.8	0.55	15.7	0.57	35	0.16
2.4	0.60	13.7	0.45	51	0.17
3.0	0.67	12.7	0.35	72	0.13
4.0	0.70	10.7	0.33	107	0.10

Typical Common Source S-Parameters

@ 3 V; 15 mA; Z_O = 50 Ω

f [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.2	0.9995	– 4.3	9.9975	174.5	0.0168	128.9	0.6751	– 6.1
0.3	0.9933	– 13.3	10.0492	168.8	0.02	93.3	0.6764	– 11.2
0.4	0.9788	– 20.1	9.8365	163	0.0259	84.5	0.67	– 16.9
0.5	0.9604	– 26.7	9.7307	157.4	0.038	71.5	0.6521	– 23.4
0.6	0.9348	– 33.6	9.6242	151.7	0.047	68.3	0.6349	– 28.9
0.7	0.9115	– 40.1	9.412	147.2	0.0503	65.5	0.6091	– 34.2
0.8	0.8924	– 46.6	9.1204	141.8	0.0596	60.5	0.5844	– 40.2
0.9	0.8721	– 52.6	8.9181	136.5	0.0715	56.7	0.5641	– 45.9
1	0.8457	– 59	8.569	131.6	0.0769	52.3	0.5325	– 51.9
1.1	0.8144	– 65.1	8.3702	127.2	0.0817	49.6	0.5124	– 57.4
1.2	0.788	– 71.2	8.0757	122.3	0.0869	46	0.4814	– 62.7
1.3	0.7555	– 77.2	7.821	117.9	0.0903	44.2	0.4603	– 69.1
1.4	0.7317	– 83.5	7.548	114.3	0.0971	41.1	0.4369	– 74.5
1.5	0.7136	– 89.2	7.2741	110.1	0.1005	37.8	0.4155	– 80.9
1.6	0.6862	– 94.7	6.9825	106.5	0.1027	37.1	0.3947	– 86.4
1.7	0.6595	– 100.1	6.69	103	0.1054	34.3	0.3836	– 93.2
1.8	0.6437	– 105.3	6.4121	98.9	0.108	31.8	0.368	– 99
1.9	0.6195	– 110.4	6.1979	95.4	0.1108	29.3	0.351	– 104.6
2	0.6053	– 115.3	5.9347	92.5	0.1135	28.8	0.3428	– 110
2.1	0.5946	– 120.1	5.7644	89.3	0.1144	26.5	0.334	– 116.1
2.2	0.5814	– 124.6	5.5403	86	0.1146	24.6	0.3294	– 121.3
2.3	0.5675	– 129	5.3237	83.2	0.1167	23.6	0.3265	– 125.8
2.4	0.5583	– 133.5	5.1687	80.5	0.1179	22.6	0.3213	– 130.9
2.5	0.5487	– 137.4	4.918	78	0.1177	20.9	0.3168	– 135.6
3	0.5182	– 155.5	4.2195	65.3	0.125	15.1	0.3195	– 154.7
3.5	0.4985	– 170.8	3.6443	54.2	0.1279	10.8	0.3212	– 168.6

Typical Common Source S-Parameters (cont'd)
@ 3 V; 15 mA; Z_O = 50 Ω

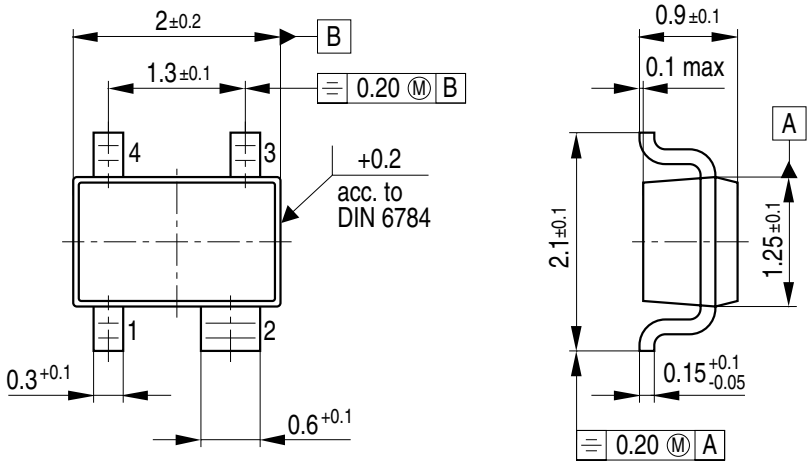
f [GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
4	0.4876	176.6	3.2225	44.4	0.1328	6.9	0.3248	– 178.3
4.5	0.4873	165.8	2.9196	34.6	0.1377	3.3	0.3252	171.5
5	0.4795	153.7	2.6297	24.4	0.1436	0.5	0.3221	159.9

Typical Common Source Noise Parameters
@ 3 V; 15 mA; Z_O = 50 Ω

f	F_{min}	G_A	Γ_{opt} [deg]		R_N/50
GHz	dB	dB	MAG	Phase	Ω
0.9	0.40	20.4	0.74	13	0.18
1.8	0.53	16.2	0.57	30	0.15
2.4	0.58	14.3	0.39	52	0.14
3.0	0.63	13.0	0.31	78	0.12
4.0	0.68	11.0	0.29	109	0.10

Package Outlines

P-SOT343-4-1
(Small Outline Transistor)



Pin assignment:
1 = Gate
2 = Source
3 = Drain
4 = Source

GPS05605

Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm