CFH800

Data Sheet

Low-Noise, High-Linearity Packaged pHEMT FET

Product Description

The CFH800 is a high-linearity pHEMT FET that exhibits both a high intercept point and low noise figure. The device is suitable for front-end applications up to 4 GHz such as PCS CDMA and UMTS receivers, base stations LNAs, and WLAN front-ends. The device achieves a noise figure as low as 0.50 dB with 17 dB associated gain at 1.8 GHz. It is packaged in a low-cost miniature SC70 package.

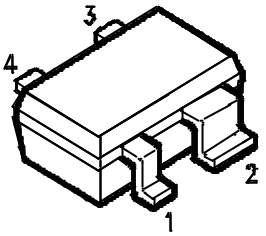
Features

- Low Noise figure and high associated gain for high IP3 receiver stages up to 4 GHz
- NF = 0.50dB; Ga = 17 dB @ 3V, 30 mA f = 1.8 GHz
- Low cost miniature package SC70
- L_G = 0.4µm; W_G = 800µm

Applications

- PCS CDMA and UMTS Receivers
- WLAN Multicarrier Receivers
- Basestations

Package Style



Pin assignment:
1 = gate
2 = source
3 = drain
4 = source

Low-Noise, High-Linearity Packaged pHEMT FET

Absolute Maximum Ratings

Symbol	Parameter	Absolute Maximum Value	Units
V_{DS}	Drain-Source Voltage	5.5	V
V_{DG}	Drain-Gate Voltage	6.5	V
V_{GS}	Gate-Source Voltage	-2.0	V
I_D	Drain Current	160	mA
T_{CH}	Channel Temperature	+150	°C
T_{SG}	Storage Temperature	-65 to +150	°C
P_{TOT}	Total Power Dissipation (T_S </= 80.7°C)[1]	350	mW

Thermal Resistance

R_{thChS}	Channel-soldering point source	198	K/W

Notes: 1) T_S: Temperature measured on the source lead at the soldering point to the PCB.

Electrical Specifications

Symbol	Parameter	Conditions	Min.	Typ/Nom	Max.	Units
I_{DSS}	Drain-Source Saturation Current	V_{DS} = 3V; V_{GS} = 0V	0	80	140	mA
V_{GS}	Pinch-off Voltage	V_{DS} = 3V; I_D = 1 mA	-0.7	-0.25	0	V
I_G	Gate Leakage Current	V_{DS} = 3V; I_D = 30 mA	-	-	10	µA
g_m	Transconductance	V_{DS} = 3V; I_D = 30 mA	140	200	-	mS
F	Noise Figure*	V_{DS} = 3V; I_D = 10 mA; f = 1.8 GHz	-	0.56	-	dB
		I_D = 30 mA	-	0.50	-	dB
G_a	Associated Gain	V_{DS} = 3V; I_D = 10 mA; f = 1.8 GHz	-	15.0	-	dB
		I_D = 30 mA	-	17.0	-	dB
IIP3	Input 3rd Order Intercept Point	V_{DS} = 3V; I_D = 10 mA; f = 1.8 GHz	-	8.5	-	dBm
		I_D = 30 mA	-	13.0	-	dBm

Note*: *Parameters are measured at input impedance for minimum noise figure and output impedance for maximum gain.*

Low-Noise, High-Linearity Packaged pHEMT FET

Electrical Characteristics, Continued:

Typical Common Source S – Parameters @ 3V; 10mA; Zo = 50Ohm

f[GHz]	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.2	0.9764	-21.1	11.3599	164.4	0.0306	78.0	0.6388	-18.8
0.3	0.9537	-31.4	11.0508	156.9	0.0408	74.4	0.6249	-28.1
0.4	0.9280	-41.2	10.6821	149.7	0.0511	67.6	0.6048	-37.0
0.5	0.9046	-51.5	10.3053	142.8	0.0621	57.4	0.5803	-45.5
0.6	0.8779	-60.6	9.8595	136.4	0.0718	53.5	0.5548	-53.7
0.7	0.8487	-69.4	9.4127	130.5	0.0787	50.7	0.5303	-61.2
0.8	0.8207	-77.9	8.9213	124.8	0.0864	47.8	0.5059	-68.8
0.9	0.7944	-85.9	8.4443	119.6	0.0898	43.3	0.4807	-75.6
1.0	0.7733	-93.8	8.0254	114.6	0.0970	38.5	0.4553	-82.4
1.1	0.7556	-100.9	7.6169	110.0	0.1001	36.1	0.4367	-88.6
1.2	0.7388	-107.4	7.2086	105.6	0.1036	32.6	0.4144	-95.2
1.3	0.7224	-114.3	6.8570	101.6	0.1064	30.4	0.3931	-100.9
1.4	0.7090	-120.5	6.4833	97.6	0.1077	27.7	0.3776	-107.0
1.5	0.6970	-126.7	6.1680	93.8	0.1110	26.3	0.3610	-113.2
1.6	0.6873	-132.1	5.8699	90.1	0.1132	23.8	0.3465	-118.7
1.7	0.6826	-137.2	5.5980	86.8	0.1143	21.7	0.3331	-125.0
1.8	0.6780	-142.3	5.3439	83.6	0.1136	20.0	0.3235	-131.2
1.9	0.6747	-147.1	5.0877	80.5	0.1171	18.4	0.3152	-137.1
2.0	0.6705	-151.5	4.8517	77.3	0.1170	16.7	0.3091	-143.0
2.1	0.6687	-155.9	4.6457	74.5	0.1180	14.7	0.3055	-148.8
2.2	0.6648	-159.7	4.4596	71.7	0.1176	13.6	0.3038	-154.4
2.3	0.6633	-163.7	4.2397	69.3	0.1201	12.8	0.3041	-159.8
2.4	0.6636	-167.2	4.0655	66.3	0.1196	11.3	0.3059	-165.1
2.5	0.6618	-170.7	3.9065	63.9	0.1186	9.7	0.3115	-170.0
3.0	0.6626	174.7	3.2259	52.6	0.1194	6.0	0.3471	172.3
3.5	0.6634	163.3	2.7350	42.6	0.1182	2.8	0.3849	163.0
4.0	0.6637	154.1	2.3874	34.0	0.1211	1.6	0.4140	159.0
4.5	0.6615	146.3	2.1249	25.7	0.1247	-2.0	0.4191	156.0
5.0	0.6560	138.9	1.9437	17.1	0.1292	-1.9	0.4021	151.9
5.5	0.6490	132.0	1.7984	8.7	0.1370	-3.3	0.3640	143.3
6.0	0.6724	123.6	1.6937	-1.6	0.1484	-8.7	0.3577	126.4

Typical Common Source Noise – Parameters @ 3V; 10mA; Zo = 50Ohm

f[GHz]	F_{min} [dB]	G_a [dB]	Mag (Γopt)	Phase(Γopt) [deg]	$R_n/50$
0.9	0.41	18.7	0.33	23	0.14
1.8	0.56	15.6	0.37	98	0.10
2.4	0.61	13.5	0.37	136	0.10
3.0	0.69	11.4	0.38	170	0.06

Low-Noise, High-Linearity Packaged pHEMT FET

Electrical Characteristics, Continued:

Typical Common Source S – Parameters @ 3V; 20mA; Zo = 50Ohm

f(GHz)	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S21 Ang	S22 Mag	S22 Ang
0.2	0.97	-26.4	15.6618	161.5	0.0225	69	0.5053	-25.5
0.3	0.9304	-38.8	15.0066	152.7	0.043	69.3	0.4925	-37.8
0.4	0.9055	-50.7	14.2231	144.5	0.0468	61.9	0.4777	-49.1
0.5	0.8667	-62.1	13.4264	136.8	0.0548	55.7	0.4509	-59.9
0.6	0.8335	-72.9	12.6226	130.1	0.0589	50.6	0.4315	-69.8
0.7	0.8024	-82.6	11.7525	124	0.0657	47.6	0.4109	-79.1
0.8	0.7698	-91.4	11.0016	118.1	0.0703	46.8	0.3917	-87.5
0.9	0.7481	-99.8	10.2456	113.1	0.0739	41.4	0.3752	-95.8
1.0	0.7282	-107.6	9.5923	108.4	0.0769	39.1	0.3585	-103.7
1.1	0.7065	-114.8	9.0001	104	0.0812	36.1	0.3447	-110.4
1.2	0.6999	-121.4	8.4315	99.8	0.0832	33.4	0.3326	-118
1.3	0.6836	-127.9	7.9521	96.1	0.0851	32.3	0.3213	-124.3
1.4	0.6747	-133.8	7.4751	92.4	0.0871	31.4	0.3146	-131.3
1.5	0.6652	-139.6	7.0467	88.9	0.0883	29.1	0.3075	-137.4
1.6	0.6616	-144.5	6.6648	85.7	0.0895	28	0.3018	-143.5
1.7	0.6589	-149.3	6.2995	82.6	0.0919	25.8	0.2981	-149.9
1.8	0.6606	-153.9	6.0058	79.6	0.0926	25	0.2969	-155.9
1.9	0.6572	-158	5.675	76.8	0.0934	23.6	0.298	-161.4
2.0	0.6553	-162.1	5.4067	74	0.0956	23.1	0.2999	-166.8
2.1	0.6559	-165.8	5.1498	71.4	0.0969	22.5	0.3023	-171.8
2.2	0.6546	-169.3	4.9192	69.1	0.0974	21.1	0.3083	-176.7
2.3	0.6563	-172.7	4.7035	66.6	0.0987	20.1	0.3132	178.9
2.4	0.6584	-175.9	4.4981	64.1	0.0986	18.8	0.3205	174.7
2.5	0.6613	-179.1	4.3034	61.9	0.1001	18.9	0.3279	171.1
3.0	0.6716	167.9	3.534	51.7	0.1041	16.5	0.3751	158.1
3.5	0.6771	157.4	2.9872	42.7	0.1082	14.4	0.4131	151.6
4.0	0.6779	148.6	2.6078	34.6	0.1156	12.4	0.435	148.7
4.5	0.6714	141.1	2.3249	26.7	0.1228	10.2	0.4349	145.9
5.0	0.6606	134.1	2.1238	18.7	0.1325	7.7	0.4123	141.3
5.5	0.655	127.7	1.9699	10.6	0.1451	5.5	0.3779	132
6.0	0.676	119.8	1.8452	0.2	0.1561	-0.7	0.3754	115.3

Typical Common Source Noise – Parameters @ 3V; 20mA; Zo = 50Ohm

f[GHz]	F_{min} [dB]	G_a [dB]	Mag (Γopt)	Phase(Γopt) [deg]	$R_n/50$
0.9	0.39	20.4	.28	36	0.11
1.8	0.52	16.5	0.36	115	0.09
2.4	0.57	16.5	0.38	115	0.08
3.0	0.69	12	0.40	175	0.06

Low-Noise, High-Linearity Packaged pHEMT FET

Electrical Characteristics, Continued:

Typical Common Source S – Parameters @ 3V; 30mA; Zo = 50Ohm

f (GHz)	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.2	0.9669	-28.9	17.9930	159.6	0.0174	67.9	0.4392	-30.3
0.3	0.9203	-42.8	17.0430	150.4	0.0319	65.5	0.4304	-43.7
0.4	0.8853	-55.3	15.9826	141.9	0.0400	63.6	0.4126	-56.6
0.5	0.8484	-67.5	14.9623	133.8	0.0494	56.2	0.3904	-67.9
0.6	0.8124	-78.6	13.8074	127.2	0.0515	50.4	0.3798	-79.4
0.7	0.7788	-88.5	12.8368	121.0	0.0594	46.3	0.3593	-89.4
0.8	0.7488	-97.2	11.9013	115.3	0.0629	46.0	0.3485	-98.7
0.9	0.7250	-105.9	11.0245	110.4	0.0669	43.0	0.3380	-107.0
1.0	0.7055	-113.8	10.2779	105.5	0.0700	39.6	0.3250	-115.2
1.1	0.6900	-120.9	9.5436	101.5	0.0727	38.4	0.3185	-122.1
1.2	0.6796	-127.1	8.9289	97.3	0.0745	36.1	0.3091	-129.7
1.3	0.6702	-133.9	8.3778	93.7	0.0768	35.3	0.3022	-136.0
1.4	0.6631	-139.3	7.8532	90.4	0.0783	32.8	0.3003	-142.6
1.5	0.6546	-144.9	7.4009	87.0	0.0789	32.1	0.2986	-148.7
1.6	0.6512	-149.3	6.9723	83.7	0.0809	31.0	0.2958	-154.4
1.7	0.6510	-153.9	6.5873	81.0	0.0834	29.6	0.2941	-160.6
1.8	0.6506	-158.1	6.2652	78.0	0.0857	28.8	0.2968	-166.1
1.9	0.6495	-162.6	5.9403	75.5	0.0865	28.0	0.3000	-171.4
2.0	0.6504	-166.1	5.6561	72.7	0.0880	27.5	0.3043	-176.1
2.1	0.6502	-169.7	5.3547	70.3	0.0895	26.8	0.3101	179.7
2.2	0.6525	-173.0	5.1154	67.9	0.0903	24.5	0.3179	175.0
2.3	0.6543	-176.2	4.8797	65.8	0.0924	24.6	0.3231	171.4
2.4	0.6575	-179.4	4.6765	63.3	0.0918	23.7	0.3323	167.5
2.5	0.6583	177.7	4.4697	61.1	0.0948	23.5	0.3424	164.4
3.0	0.6720	165.4	3.6516	51.3	0.1004	21.1	0.3889	153.4
3.5	0.6819	155.3	3.0959	42.9	0.1054	19.5	0.4268	147.5
4.0	0.6828	146.7	2.6987	35.0	0.1141	17.3	0.4485	145.0
4.5	0.6761	139.2	2.4100	27.3	0.1232	14.7	0.4434	142.3
5.0	0.6671	132.3	2.2025	19.3	0.1322	11.7	0.4200	137.4
5.5	0.6552	126.1	2.0466	11.3	0.1461	7.9	0.3857	127.9
6.0	0.6756	118.5	1.9062	1.0	0.1601	2.0	0.3879	111.5

Typical Common Source Noise – Parameters @ 3V; 30mA; Zo = 50Ohm

f[GHz]	F_{min} [dB]	G_a [dB]	Mag (Γopt)	Phase(Γopt) [deg]	$R_n/50$
0.9	0.38	21.1	0.30	45	0.09
1.8	0.52	16.8	0.39	125	0.08
2.4	0.56	14.0	0.42	145	0.07
3.0	0.65	12.2	0.43	179	0.06

Low-Noise, High-Linearity Packaged pHEMT FET

Electrical Characteristics, Continued:

Typical Common Source S – Parameters @ 3V; 50mA; Zo = 50Ohm

f (GHz)	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
0.2	0.9618	-31.8	20.7005	157.5	0.0272	66.8	0.4251	-32.8
0.3	0.9123	-46.7	19.2937	147.6	0.0335	67.8	0.4062	-48.0
0.4	0.8623	-61.3	17.8753	138.7	0.0401	63.0	0.3901	-62.1
0.5	0.8209	-73.8	16.5593	130.3	0.0465	55.7	0.3701	-74.0
0.6	0.7833	-84.7	15.1321	123.7	0.0496	52.5	0.3510	-86.1
0.7	0.7540	-94.8	13.8973	117.6	0.0570	47.4	0.3383	-96.1
0.8	0.7222	-104.4	12.8242	111.9	0.0567	44.7	0.3261	-104.9
0.9	0.7025	-112.6	11.7778	107.2	0.0609	42.2	0.3144	-113.9
1.0	0.6843	-120.5	10.9063	102.5	0.0623	40.0	0.3046	-121.4
1.1	0.6726	-127.1	10.1004	98.7	0.0642	39.6	0.2982	-128.6
1.2	0.6621	-133.0	9.3923	94.9	0.0673	37.8	0.2922	-136.3
1.3	0.6553	-140.0	8.8089	91.4	0.0687	35.9	0.2854	-142.4
1.4	0.6489	-144.7	8.2247	88.2	0.0713	35.5	0.2854	-148.4
1.5	0.6433	-150.2	7.7393	84.8	0.0744	34.0	0.2829	-154.8
1.6	0.6419	-154.6	7.2883	81.9	0.0744	34.5	0.2826	-159.9
1.7	0.6418	-158.8	6.8740	79.3	0.0764	32.4	0.2828	-166.2
1.8	0.6426	-163.0	6.5328	76.1	0.0783	32.5	0.2869	-171.2
1.9	0.6424	-166.9	6.1717	73.8	0.0810	29.8	0.2890	-176.1
2.0	0.6455	-170.4	5.8627	71.2	0.0805	30.7	0.2951	179.8
2.1	0.6455	-173.4	5.5567	68.9	0.0813	29.6	0.3020	175.1
2.2	0.6473	-176.7	5.3144	66.7	0.0826	28.8	0.3093	171.0
2.3	0.6511	-179.4	5.0604	64.5	0.0843	29.5	0.3172	167.7
2.4	0.6536	177.8	4.8340	62.2	0.0867	28.1	0.3246	164.5
2.5	0.6579	174.5	4.6309	60.0	0.0886	27.0	0.3347	161.5
3.0	0.6734	163.0	3.7797	50.5	0.0955	25.6	0.3818	151.2
3.5	0.6863	153.1	3.2101	42.1	0.1022	23.3	0.4207	146.2
4.0	0.6863	145.1	2.7931	34.6	0.1117	21.0	0.4399	143.7
4.5	0.6807	137.6	2.4953	26.9	0.1220	18.3	0.4376	141.3
5.0	0.6694	130.6	2.2740	18.9	0.1325	14.8	0.4142	136.6
5.5	0.6559	124.8	2.1046	11.1	0.1471	11.9	0.3767	127.1
6.0	0.6760	117.4	1.9666	0.8	0.1588	4.3	0.3798	110.9

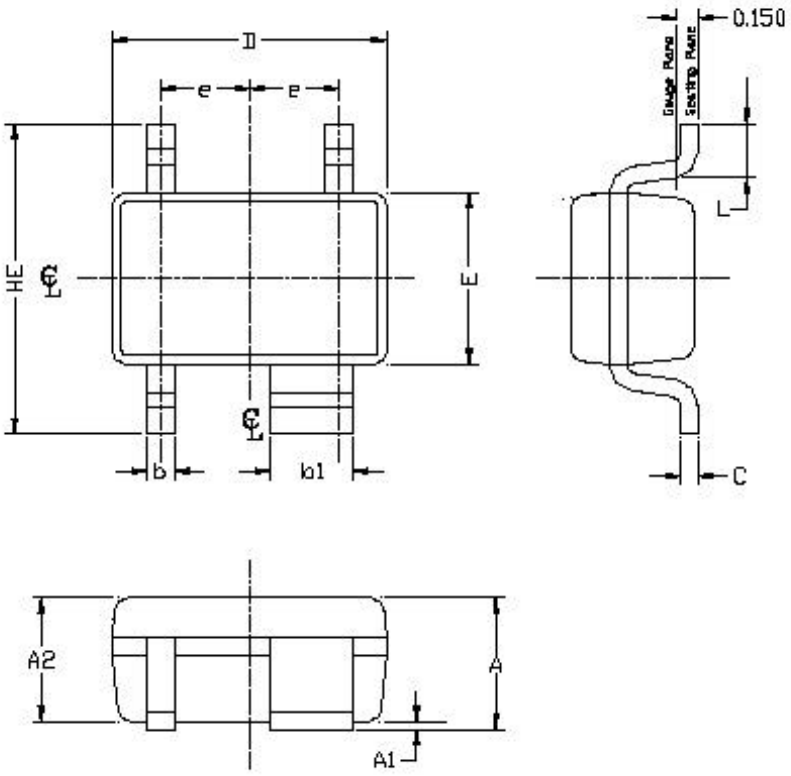
Typical Common Source Noise – Parameters @ 3V; 50mA; Zo = 50Ohm

f[GHz]	F_{min} [dB]	G_a [dB]	Mag (Γopt)	Phase(Γopt) [deg]	$R_n/50$
0.9	0.44	21.3	0.32	44	0.08
1.8	0.53	16.9	0.45	122	0.07
2.4	0.59	14.1	0.47	144	0.07
3.0	0.69	12.3	0.44	178	0.06

Low-Noise, High-Linearity Packaged pHEMT FET

Packaging and Ordering Information

SC70 4 LEAD



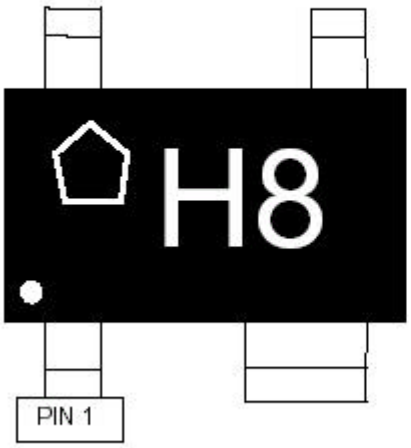
SYMBOL	MIN	MAX
E	1.15	1.35
D	1.85	2.25
HE	1.80	2.40
A	0.80	1.10
A2	0.80	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.25	0.40
b1	0.55	0.70
c	0.10	0.18
L	0.26	0.46

Pin assignment:

1 = gate
2 = source
3 = drain
4 = source

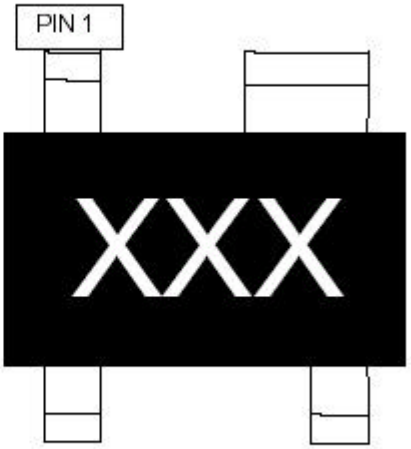
Low-Noise, High-Linearity Packaged pHEMT FET

TOP MARK



Top; Line 1: TriQuint Logo and "H8"

BOTTOM MARK



Bottom: Last 3 char of Lot Number

Ordering Code (taped): CFH800

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

Additional Information [1]

1 For latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

Web: www.triquint.com **Tel: (503) 615-9000**

Email: info_wireless@tqs.com **Fax: (503) 615-8902**

For technical questions and additional information on specific applications:

Email: info_wireless@tqs.com