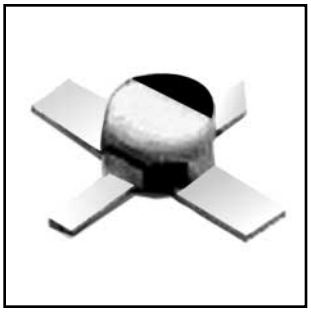
FHX04LG/LP, 05LG/LP, 06LG/LP

Super Low Noise HEMT

FEATURES

- Low Noise Figure: 0.75dB (Typ.)@f=12GHz (FHX04)
- High Associated Gain: 10.5dB (Typ.)@f=12GHz
- Lg ≤ 0.25µm, Wg = 200µm
- Gold Gate Metallization for High Reliability
- Cost Effective Ceramic Microstrip (SMT) Package
- Tape and Reel Packaging Available



DESCRIPTION

The FHX04LG/LP, FHX05LG/LP, FHX06LG/LP is a High Electron Mobility Transistor(HEMT) intended for general purpose, low noise and high gain amplifiers in the 2-18GHz frequency range.The devices are packaged in cost effective, low parasitic, hermetically sealed(LG) or epoxy-sealed(LP) metal-ceramic packages for high volume telecommunication, DBS, TVRO, VSAT or other low noise applications.

Fujitsu's stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATING (Ambient Temperature Ta=25°C)

Item		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	3.5	V
Gate-Source Voltage		V_{GS}	-3.0	V
Total Power Dissipation		P_{t*}	180	mW
Storage Temperature	FHX04/05/06LG	T_{stg}	-65 to +175	°C
	FHX04/05/06LP		-65 to +150	°C
Channel Temperature	FHX04/05/06LG	T_{ch}	175	°C
	FHX04/05/06LP		150	°C

***Note:** Mounted on Al_2O_3 board (30 x 30 x 0.65mm)

Fujitsu recommends the following conditions for the reliable operation of GaAs FETs:

1. The drain-source operating voltage (V_{DS}) should not exceed 2 volts.
2. The forward and reverse gate currents should not exceed 0.2 and -0.05 mA respectively with gate resistance of 4000Ω.
3. The operating channel temperature (T_{ch}) should not exceed 80°C.

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25°C)

Item		Symbol	Condition	Limit			Unit
				Min.	Typ.	Max.	
Saturated Drain Current		I_{DSS}	V_{DS} = 2V, V_{GS} =0V	15	30	60	mA
Transconductance		g_m	V_{DS} = 2V, I_{DS} =10mA	35	45	-	mS
Pinch-off Voltage		V_p	V_{DS} = 2V, I_{DS} =1mA	-0.2	-0.7	-1.5	V
Gate Source Breakdown Voltage		V_{GSO}	I_{GS} = -10µA	-3.0	-	-	V
Noise Figure	FHX04LG/LP	NF	V_{DS} = 2V, I_{DS} = 10mA, f = 12GHz	-	0.75	0.85	dB
Associated Gain		G_{as}		9.5	10.5	-	dB
Noise Figure	FHX05LG/LP	NF		-	0.9	0.11	dB
Associated Gain		G_{as}		9.5	10.5	-	dB
Noise Figure	FHX06LG/LP	NF		-	1.1	1.35	dB
Associated Gain		G_{as}		9.5	10.5	-	dB
Thermal Resistance		R_{th}	Channel to Case	-	300	400	°C/W

AVAILABLE CASE STYLES: LG/LP

Note: RF parameters for LG devices are measured on a sample basis as follows:

Lot qty.			Sample qty.	Accept/Reject
1200	or	less	125	(0,1)
1201	to	3200	200	(0,1)
3201	to	10000	315	(1,2)
10001	or	over	500	(1,2)

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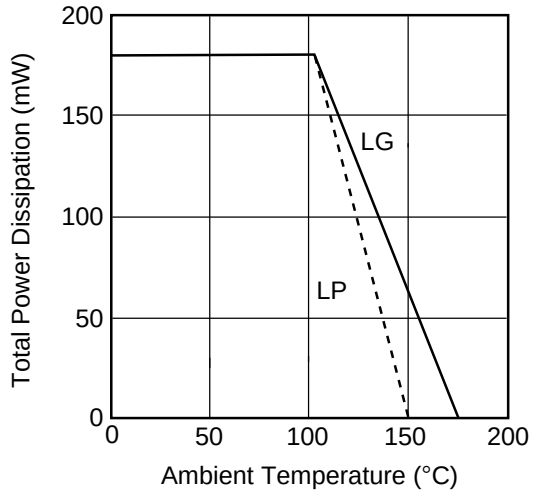
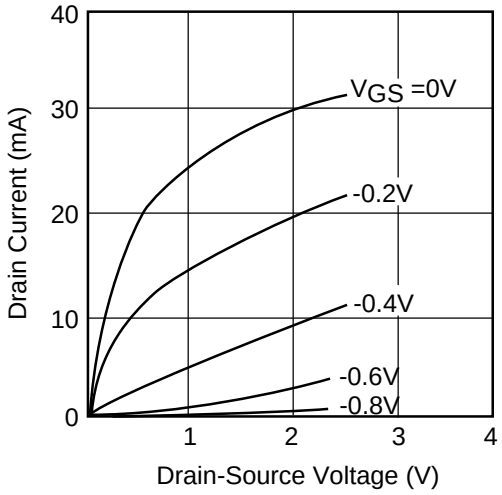
POWER DERATING CURVE

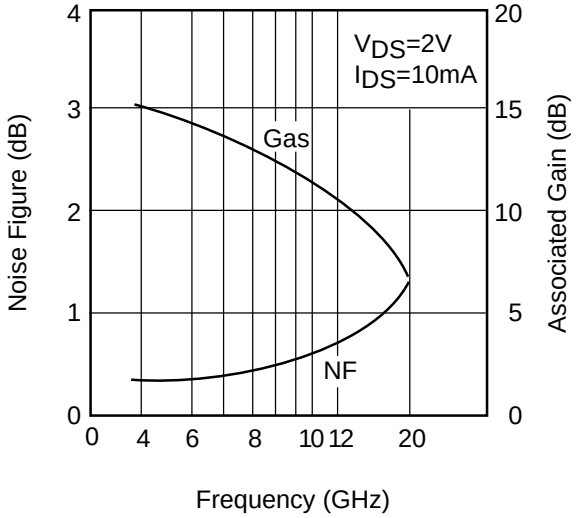


DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



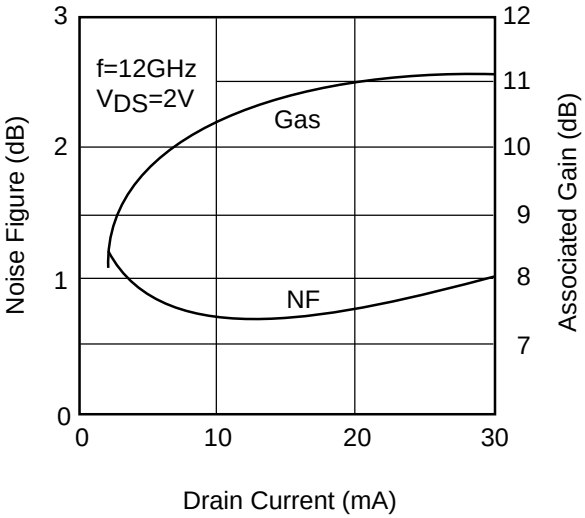
NF & Gas vs. FREQUENCY

FHX04LG/LP



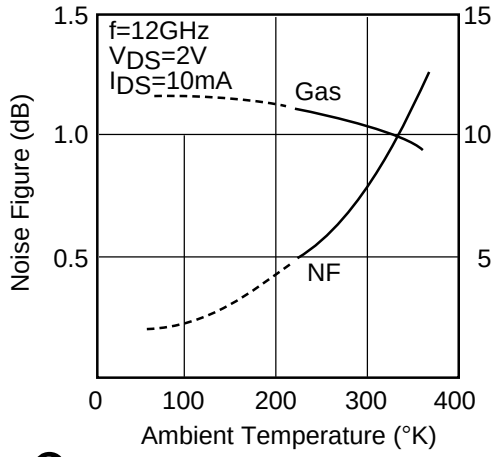
NF & Gas vs. I_{DS}

FHX04LG/LP

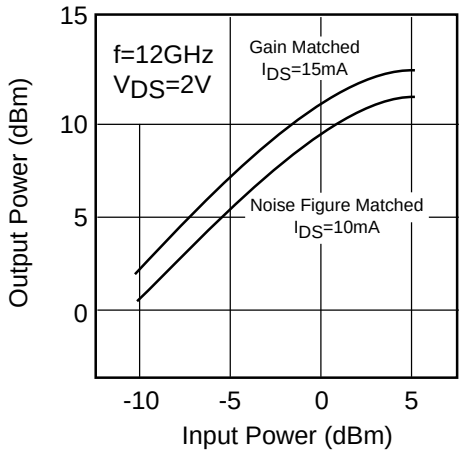


NF & Gas vs. TEMPERATURE

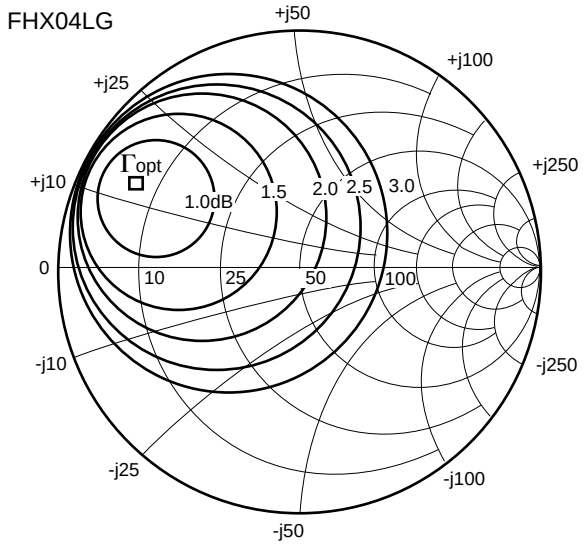
FHX04LG/LP



OUTPUT POWER vs. INPUT POWER



TYPICAL NOISE FIGURE CIRCLE



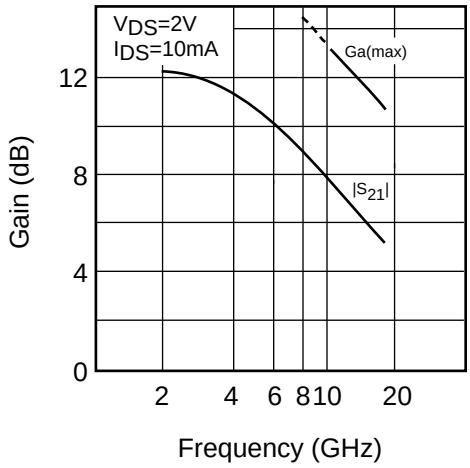
f=12GHz
V_{DS}=2V
I_{DS}=10mA

Γopt=0.72∠152°
Rn/50=0.04
NFmin=0.75dB

NOISE PARAMETERS
FHX04LG
V_{DS}=2V, I_{DS}=10MA

Freq. (GHz)	Γopt (MAG)	Γopt (ANG)	NFmin (dB)	Rn/50
2.0	0.99	29.0	0.33	0.43
4.0	0.97	53.0	0.35	0.30
6.0	0.93	77.0	0.45	0.20
8.0	0.87	101.0	0.55	0.12
10.0	0.80	127.0	0.66	0.07
12.0	0.72	152.0	0.75	0.04
14.0	0.63	178.0	0.88	0.03
16.0	0.53	-156.0	1.05	0.05
18.0	0.42	-129.0	1.30	0.09

Ga(max) AND $|S_{21}|$ vs. FREQUENCY
FHX04LG



NOISE PARAMETERS
FHX04LP
V_{DS}=2V, I_{DS}=10MA

Freq. (GHz)	Γopt (MAG)	Γopt (ANG)	NFmin (dB)	Rn/50
2.0	0.92	29.0	0.33	0.28
4.0	0.87	52.0	0.35	0.27
6.0	0.80	75.0	0.45	0.21
8.0	0.74	100.0	0.55	0.14
10.0	0.67	126.0	0.66	0.08
12.0	0.59	153.0	0.75	0.04
14.0	0.51	-178.0	0.88	0.04
16.0	0.42	-149.0	1.05	0.08
18.0	0.33	-118.0	1.30	0.14

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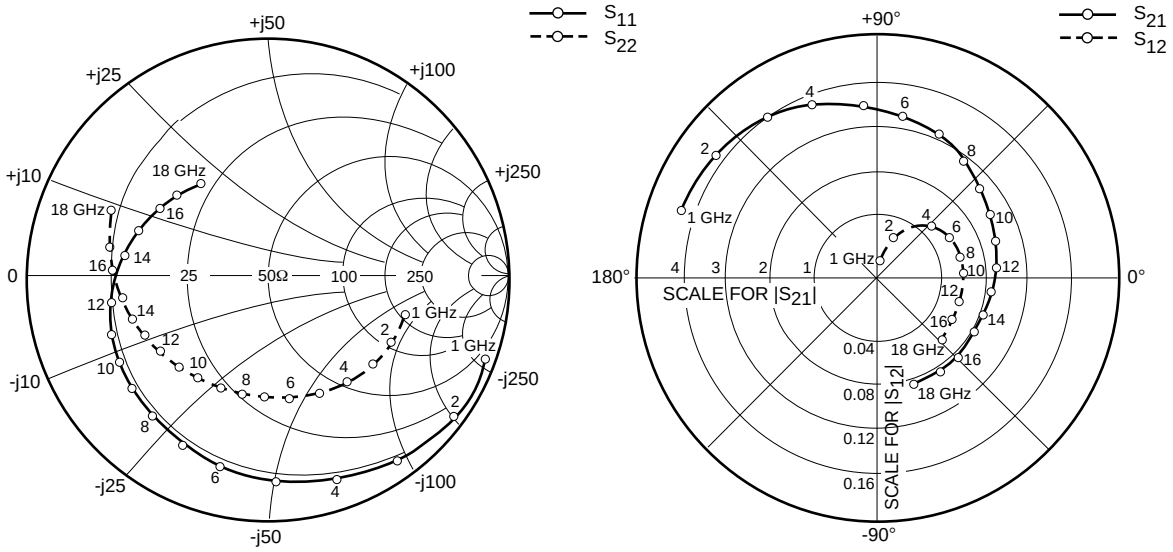
Super Low Noise HEMT



S-PARAMETERS

FHX04LG

V_{DS} = 2V, I_{DS} = 10mA

FREQUENCY	S11		S21		S12		S22	
(GHZ)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.990	-19.3	4.232	162.1	0.016	75.1	0.576	-14.3
2.0	0.965	-37.5	4.115	144.1	0.030	64.8	0.563	-28.1
3.0	0.928	-55.2	3.923	127.4	0.042	53.3	0.546	-41.2
4.0	0.886	-72.1	3.737	110.9	0.052	41.9	0.525	-54.4
5.0	0.844	-88.3	3.518	95.6	0.059	32.2	0.505	-67.6
6.0	0.804	-103.4	3.302	80.8	0.063	23.9	0.489	-80.7
7.0	0.771	-117.4	3.090	66.4	0.066	16.6	0.484	-93.0
8.0	0.741	-129.6	2.876	53.1	0.065	11.5	0.487	-104.5
9.0	0.717	-140.3	2.703	40.7	0.066	4.9	0.497	-115.1
10.0	0.695	-150.8	2.592	28.6	0.065	-0.3	0.503	-124.9
11.0	0.675	-161.2	2.476	16.4	0.064	-3.0	0.517	-135.7
12.0	0.650	-171.5	2.374	4.2	0.064	-6.4	0.534	-145.8
13.0	0.630	178.9	2.277	-7.8	0.063	-9.3	0.552	-156.1
14.0	0.607	170.2	2.176	-19.1	0.064	-12.5	0.585	-164.6
15.0	0.585	161.8	2.144	-30.7	0.065	-16.4	0.617	-171.7
16.0	0.557	151.8	2.151	-43.2	0.066	-22.2	0.642	177.8
17.0	0.522	140.9	2.142	-56.9	0.067	-29.4	0.673	169.5
18.0	0.480	128.4	2.136	-71.2	0.068	-39.2	0.694	159.7

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S-PARAMETERS
FHX04LP
V_{DS} = 2V, I_{DS} = 10mA

FREQUENCY	S11		S21		S12		S22	
(GHZ)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.0	0.989	-18.4	4.127	161.1	0.017	77.7	0.576	-15.6
2.0	0.966	-35.7	4.045	144.6	0.033	63.1	0.561	-27.6
3.0	0.928	-52.7	3.923	130.1	0.047	52.7	0.539	-39.8
4.0	0.885	-69.7	3.763	114.1	0.060	41.5	0.513	-52.2
5.0	0.834	-86.1	3.590	98.6	0.068	30.8	0.484	-65.4
6.0	0.790	-102.1	3.397	84.4	0.075	21.7	0.458	-78.4
7.0	0.774	-117.2	3.174	69.6	0.080	12.9	0.442	-91.4
8.0	0.707	-130.8	2.970	57.4	0.082	5.6	0.434	-102.3
9.0	0.674	-143.0	2.781	46.0	0.085	-1.3	0.430	-113.3
10.0	0.647	-154.8	2.655	33.3	0.085	-7.8	0.431	-124.7
11.0	0.614	-166.8	2.529	21.6	0.087	-13.2	0.422	-135.6
12.0	0.590	-179.0	2.421	9.6	0.090	-19.3	0.429	-145.9
13.0	0.563	169.5	2.293	-1.9	0.091	-23.8	0.444	-155.8
14.0	0.544	159.2	2.205	-11.6	0.091	-27.9	0.456	-163.9
15.0	0.524	148.0	2.172	-22.8	0.098	-34.6	0.458	-174.2
16.0	0.500	136.1	2.160	-34.8	0.102	-41.3	0.471	178.7
17.0	0.472	121.6	2.121	-48.1	0.110	-49.8	0.484	170.3
18.0	0.441	107.5	2.048	-60.8	0.113	-57.6	0.500	161.3

FHX04LG/LP, 05LG/LP, 06LG/LP

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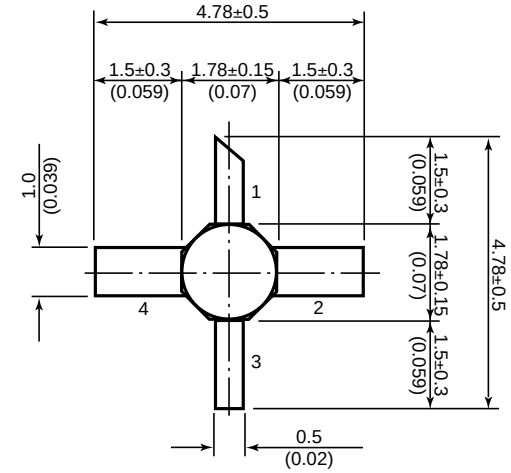
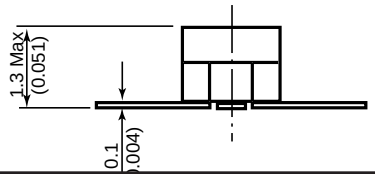
Case Style "LG/LP"

Metal-Ceramic Hermetic Package





Gold Plated Leads

1. **Gate**
2. **Source**
3. **Drain**
4. **Source**

Unit: mm(inches)

For further information please contact:

FUJITSU COMPOUND SEMICONDUCTOR, INC.
2355 Zanker Rd.
San Jose, CA 95131-1138, U.S.A.
Phone: (408) 232-9500
FAX: (408) 428-9111
www.fcsi.fujitsu.com

FUJITSU MICROELECTRONICS, LTD.
Compound Semiconductor Division
Network House
Norreys Drive
Maidenhead, Berkshire SL6 4FJ
Phone:+44 (0)1628 504800
FAX:+44 (0)1628 504888

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- **Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.**
- **Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.**

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