FHX04LG, 05LG, 06LG

Super Low Noise HEMT

FEATURES

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

DESCRIPTION

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

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

ABSOLUTE MAXIMUM RATING (Ambient Temperature Ta=25deg.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	T_{stg}	-65 to +175	deg.C
Channel Temperature	T_{ch}	175	deg.C

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

Sumitomo Electric 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 4000ohm.
3. The operating channel temperature (T_{ch}) should not exceed 80deg.C.

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25deg.C)

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

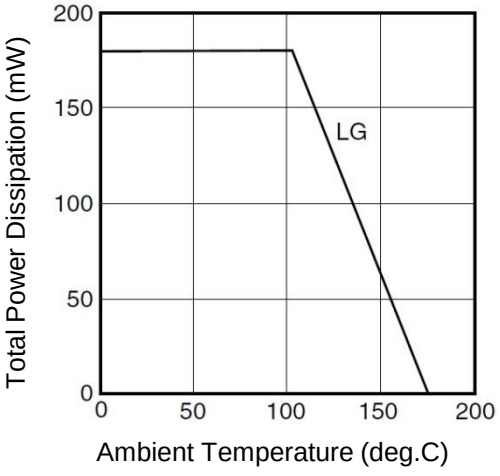
AVAILABLE CASE STYLES:	LG

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

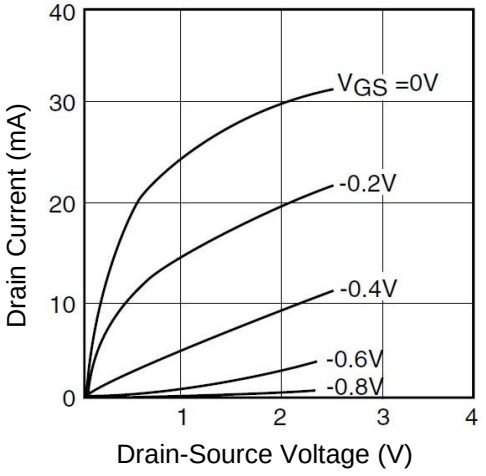
Lot qty.			Sample qty.	Accept/Reject
1200	or	less	125	(0, 1)
1201	to	3200	200	(0, 1)
3201	to	10000	315	(1, 2)
10001	or	over	500	(1, 2)

RoHS Compliance	Yes

POWER DERATING CURVE

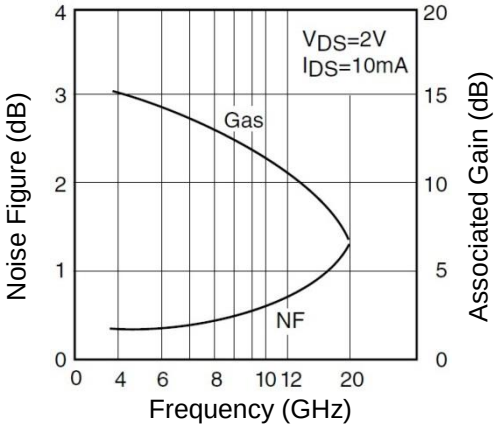


DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



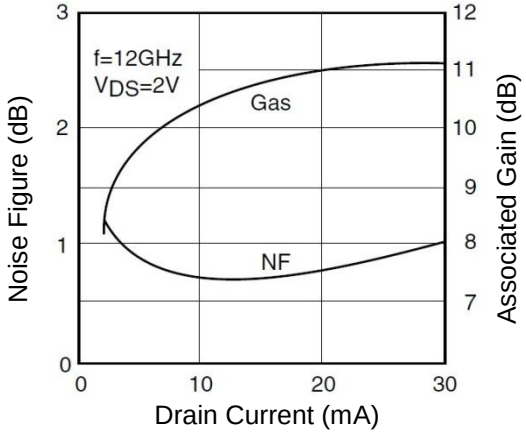
NF & G_{as} vs. FREQUENCY

FHX04LG



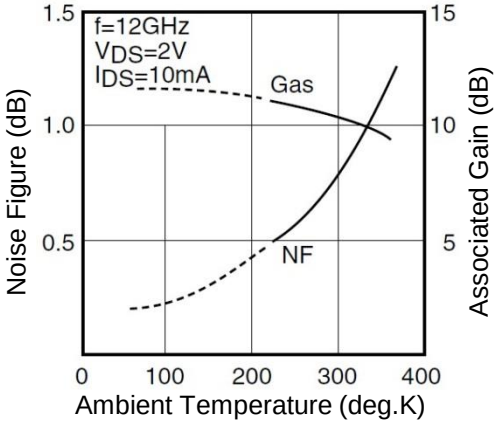
NF & G_{as} vs. I_{DS}

FHX04LG

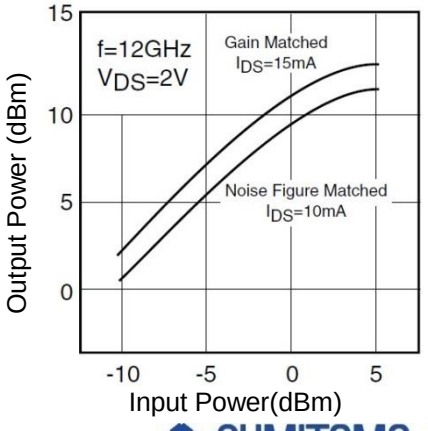


NF & G_{as} vs. TEMPERATURE

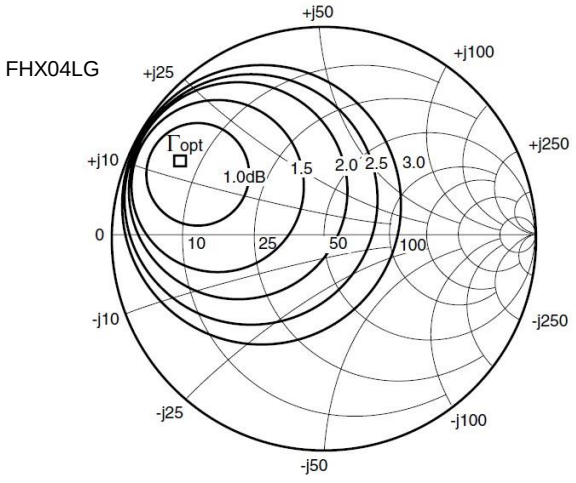
FHX04LG



OUTPUT POWER vs. INPUT POWER



TYPICAL NOISE FIGURE CIRCLE

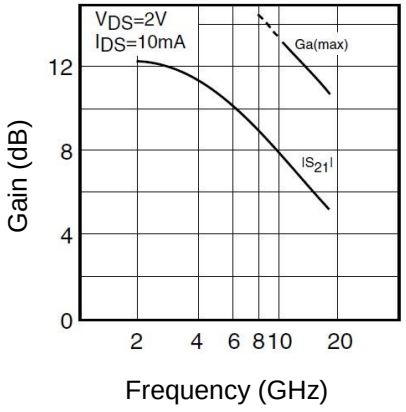


f=12GHz
V_{DS}=2V
I_{DS}=10mA

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

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

FHX04LG

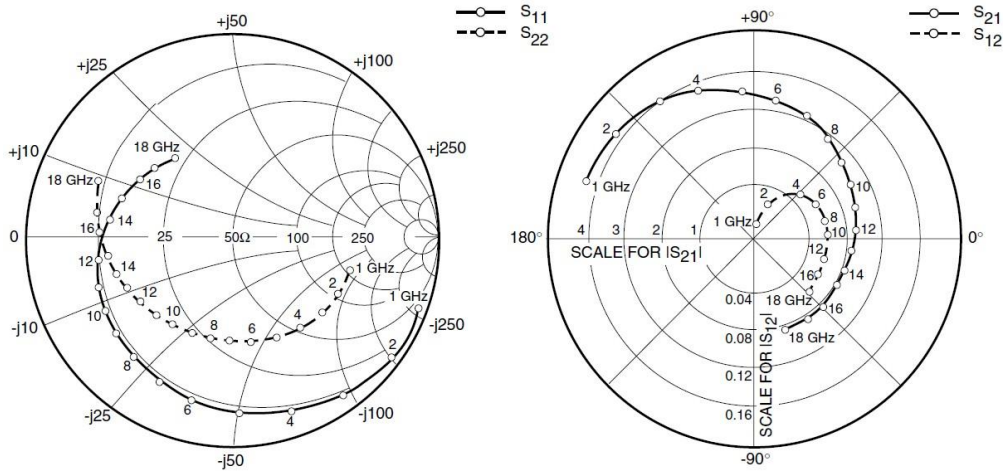


NOISE PARAMETERS

FHX04LG

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

Freq. (GHz)	Γ opt (MAG)	Γ opt (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



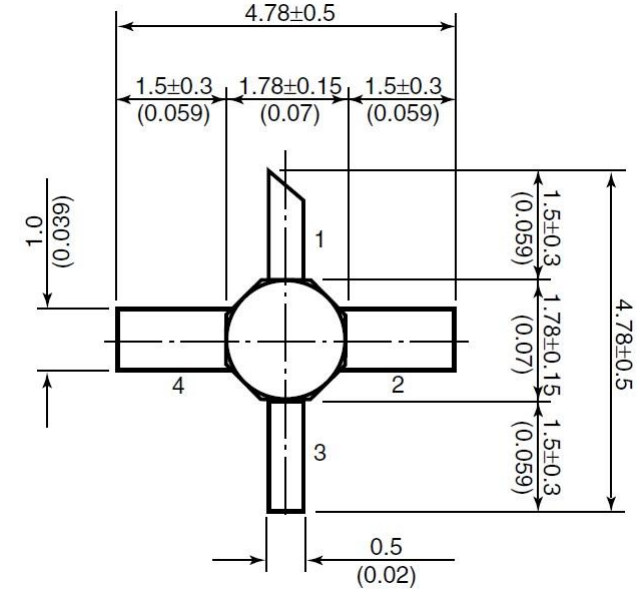
S-PARAMETERS
FHX04LG

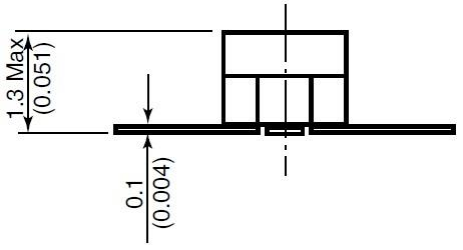
V_{DS} = 2V, I_{DS} = 10mA

Freq	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

Case Style "LG"

Metal-Ceramic Package





Gold Plated Leads

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

Unit: mm (inches)

CAUTION

Sumitomo Electric Device Innovations, Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

・Do not put these products into the mouth.

・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.