FHX13LG,FHX14LG

Super Low Noise HEMT

FEATURES

- Low Noise Figure:0.45dB(Typ.)@f=12GHz(FHX13)
- High Associated Gain : 13.0dB(Typ.)@f=12GHz
- Lg ≤0.15μm, Wg=200μm
- Gold Gate Metallization for High Reliability
- Cost Effective Ceramic Microstrip (STM) Package
- Tape and Reel Packaging Available

DESCRIPTION

The FHX13LG,FHX14LG is a Super High Electron Mobility Transistor(SuperHEMT ™) Intended for general purpose, ultra-low noise and high gain amplifiers In the 2 to18GHz 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's stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATING (Case Temperature Tc=25deg.C)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	3.5	V
Gate-Source Voltage	V_{GS}	-3	V
Total Power Dissipation	P_{T*}	180.0	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 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(Tch) should not exceed 80deg.C.

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25deg.C)

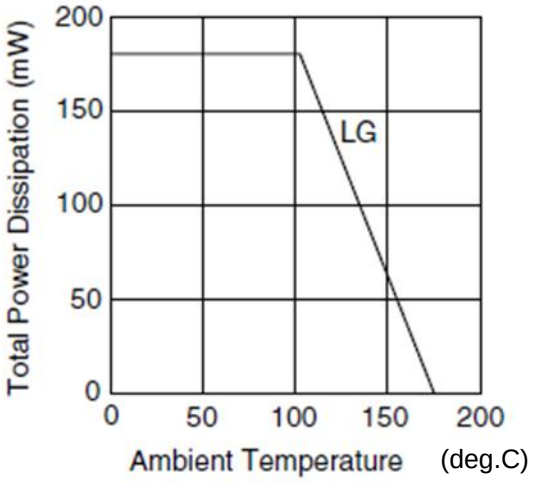
Item		Symbol	Test Conditions	Limit			Unit
				Min.	Typ.	Max.	
Saturated Drain Current		I_{DSS}	V_{DS}=2V, V_{GS}=0V	10	30	60	mA
Transconductance		g_m	V_{DS}=2V, I_{DS}=10mA	35	50	-	mS
Pinch-off Voltage		V_p	V_{DS}=2V, I_{DS}=1mA	-0.1	-0.7	-1.5	V
Gate Source Breakdown Voltage		V_{GSO}	I_{GS}=-10uA	-3.0	-	-	V
Noise Figure	FHX13LG	NF	V_{DS}=10V, I_{DS}=10mA, f=12GHz	-	0.45	0.50	dB
Associated Gain		Gas		11.0	13.0	-	dB
Noise Figure	FHX14LG	NF		-	0.55	0.60	dB
Associated Gain		Gas		11.0	13.0	-	dB
Thermal Resistance	R_{th}	R_{th}	Channel to Case	-	300	400	deg.C/W

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

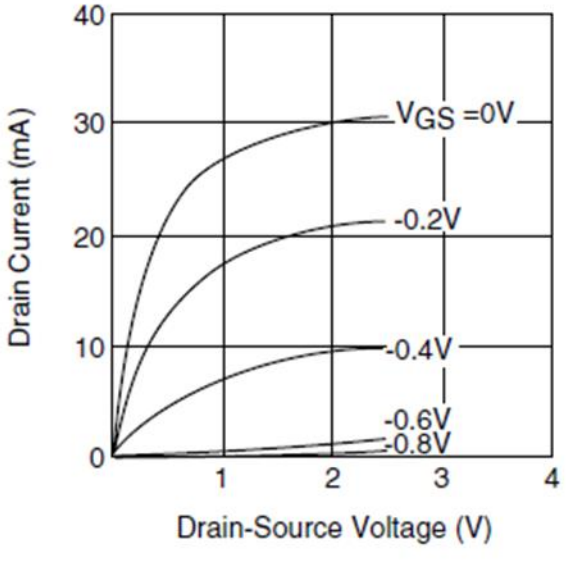
Lot Qty.	Sample Qty.	Accept/Reject
1200 or less	125	(0,1)
1201 to 3200	200	(0,1)
3201 to 10000	315	(1,2)
10001 or over	500	(1,2)

CASE STYLE	**LG**
RoHS Compliance	**Yes**

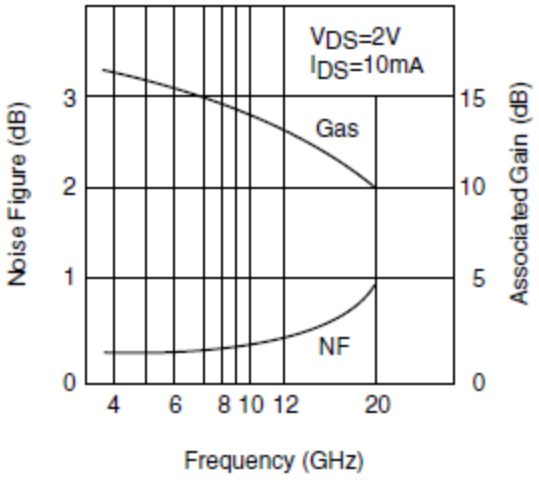
POWER DERATING CURVE



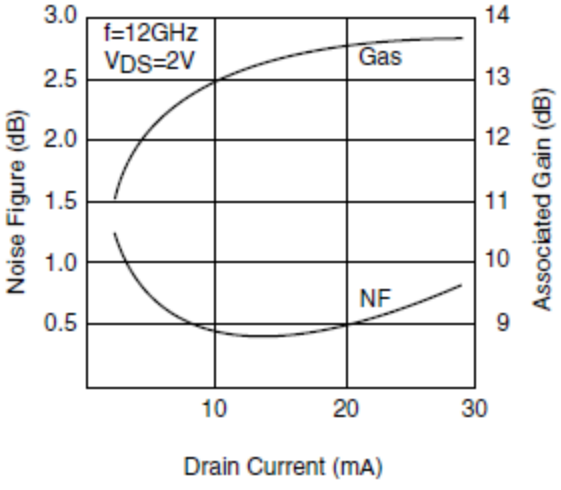
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



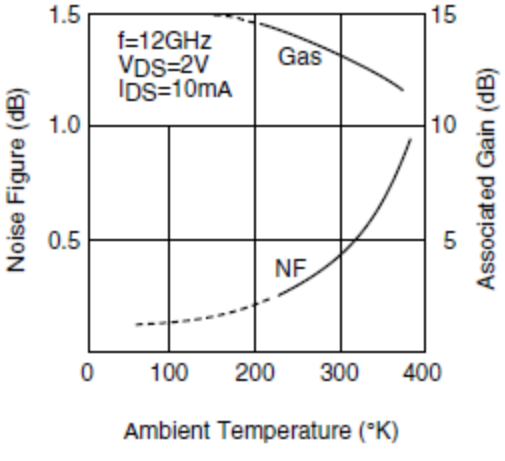
NF & Gas vs. FREQUENCY
FHX13LG



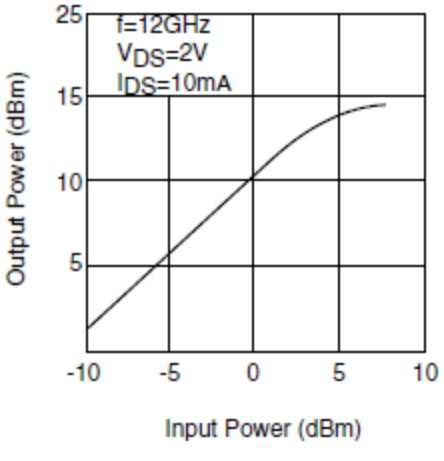
NF & Gas vs. IDS
FHX13LG



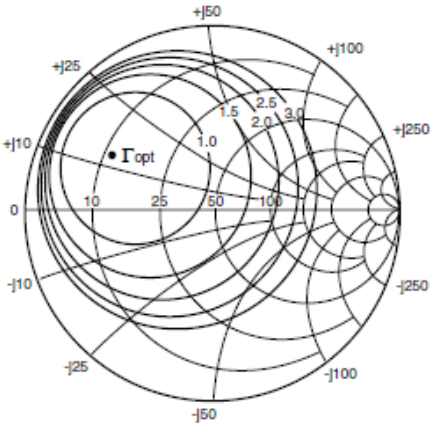
NF & Gas vs. TEMPERATURE
FHX13LG



OUTPUT POWER vs. INPUT POWER
FHX13LG



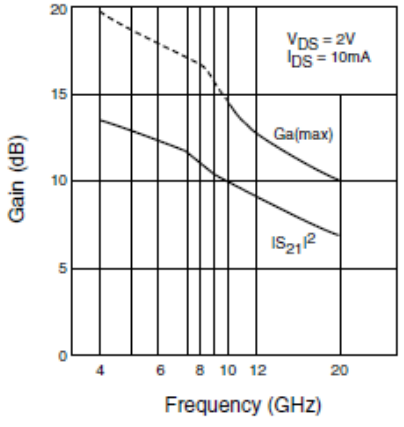
TYPICAL NOISE FIGURE CIRCLE
FHX13LG



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

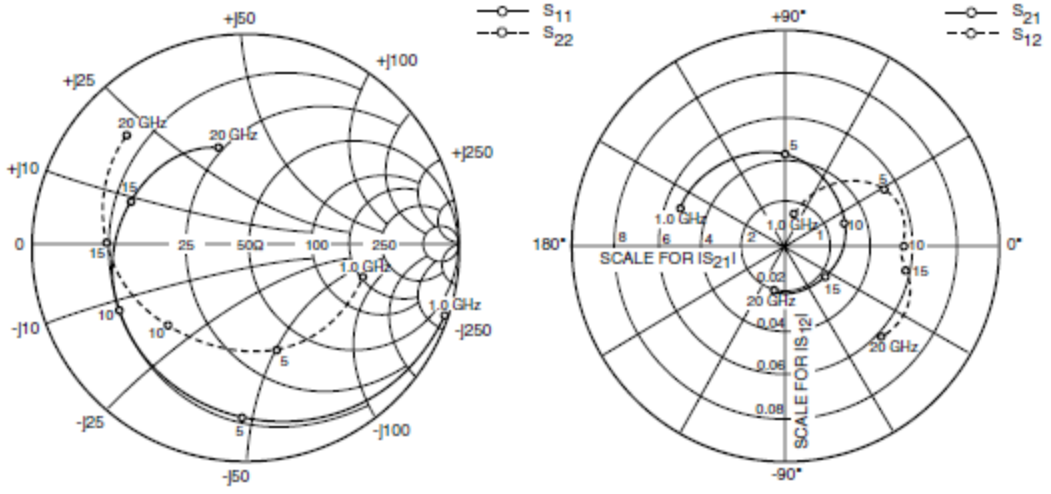
Γopt = 0.61∠150°
Rn/50 = 0.04
NFmin = 0.45dB

Ga(max) & $|S_{21}|^2$ vs. FREQUENCY



NOISE PARAMETERS
FHX13LG
V_{DS}=2V, I_{DS}=10mA

Freq. (GHz)	Γopt (MAG)	Γopt (ANG)	NFmin (dB)	Rn/50
2	0.96	29	0.33	0.22
4	0.92	57	0.34	0.20
6	0.86	83	0.35	0.15
8	0.79	107	0.37	0.11
10	0.71	129	0.40	0.07
12	0.61	150	0.45	0.04
14	0.50	168	0.53	0.04
16	0.38	-175	0.63	0.06
18	0.24	-161	0.83	0.10

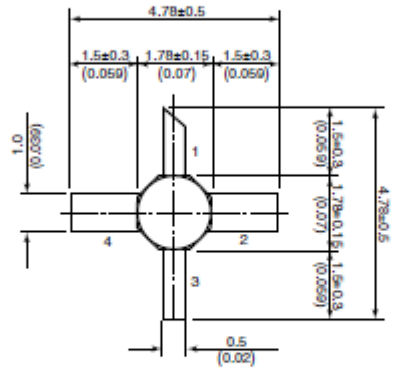


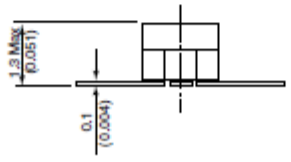
S-PARAMETERS
FHX13/14LG
V_{DS} = 2V, I_{DS} = 10mA

FREQUENCY	S11		S21		S12		S22	
(MHZ)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000	0.988	-20.0	5.327	160.1	0.015	75.7	0.574	-16.3
2000	0.956	-39.5	5.133	141.0	0.028	63.3	0.560	-32.1
3000	0.908	-58.1	4.851	123.0	0.039	50.1	0.539	-47.3
4000	0.862	-75.5	4.534	105.9	0.048	39.0	0.522	-62.0
5000	0.811	-91.6	4.213	89.7	0.053	29.3	0.502	-75.6
6000	0.763	-107.1	3.886	74.4	0.056	21.0	0.488	-89.6
7000	0.727	-121.1	3.582	60.0	0.057	13.2	0.487	-103.0
8000	0.701	-133.3	3.300	46.4	0.056	7.9	0.498	-114.9
9000	0.682	-144.1	3.078	33.8	0.055	3.5	0.515	-125.0
10000	0.659	-154.2	2.899	21.4	0.055	-0.0	0.531	-134.4
11000	0.636	-164.4	2.748	9.3	0.054	-2.6	0.544	-144.0
12000	0.618	-175.4	2.593	-3.3	0.054	-5.2	0.561	-155.1
13000	0.608	175.5	2.466	-14.8	0.054	-5.7	0.590	-164.0
14000	0.596	166.6	2.366	-26.6	0.055	-7.8	0.619	-172.4
15000	0.585	158.3	2.279	-38.3	0.056	-9.7	0.654	-179.7
16000	0.564	148.8	2.244	-50.7	0.058	-12.8	0.677	172.6
17000	0.543	138.2	2.217	-63.6	0.061	-17.6	0.701	163.4
18000	0.525	127.3	2.185	-77.1	0.063	-24.7	0.727	154.1
19000	0.506	116.2	2.143	-91.4	0.063	-33.1	0.748	143.6
20000	0.470	106.5	2.089	-105.4	0.061	-43.7	0.763	137.2

Case Style "LG"

Metal-Ceramic Hermetic Package





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

Unit: mm(inches)

CAUTION

This product contains **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.