

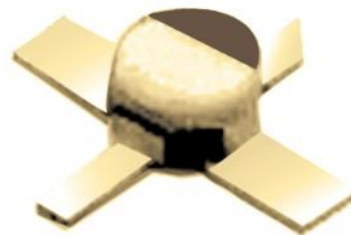
FEATURES

- Low Noise Figure: 1.2dB (Typ.)@f=12GHz
- High Associated Gain: 10.0dB (Typ.)@f=12GHz
- $L_g \leq 0.25\mu\text{m}$, $W_g = 280\mu\text{m}$
- Gold Gate Metallization for High Reliability
- Cost Effective Ceramic Microstrip (SMT) Package
- Tape and Reel Packaging Available

DESCRIPTION

The FHX35LG is a High Electron Mobility Transistor(HEMT) intended for general purpose, low noise and high gain amplifiers in the 2 to 18GHz frequency range. This device is 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.

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



ABSOLUTE MAXIMUM RATING (Ambient Temperature $T_a=25\text{deg.C}$)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	4.0	V
Gate-Source Voltage	V_{GS}	-3.0	V
Total Power Dissipation	P_{T*}	290	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 3 volts.
2. The forward and reverse gate currents should not exceed 0.2 and -0.075 mA respectively with gate resistance of 4000ohm.
3. The operating channel temperature (T_{ch}) should not exceed 80deg.C.

ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_a=25\text{deg.C}$)

Item	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	$V_{DS} = 2V$, $V_{GS} = 0V$	15	40	85	mA
Transconductance	g_m	$V_{DS} = 2V$, $I_{DS} = 10\text{mA}$	40	60	-	mS
Pinch-off Voltage	V_p	$V_{DS} = 2V$, $I_{DS} = 1\text{mA}$	-0.2	-1.0	-2.0	V
Gate Source Breakdown Voltage	V_{GSO}	$I_{GS} = -10\mu\text{A}$	-3.0	-	-	V
Noise Figure	NF	$V_{DS} = 3V$, $I_{DS} = 10\text{mA}$	-	1.2	1.6	dB
Associated Gain	G_{as}	$f = 12\text{GHz}$	8.5	10.0	-	dB
Thermal Resistance	R_{th}	Channel to Case	-	220	300	deg.C/W

AVAILABLE CASE STYLES:

LG

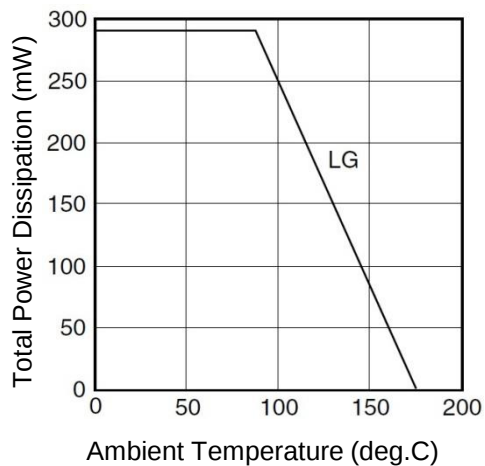
Note: RF parameters are measured on a sample basis as follows:

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)

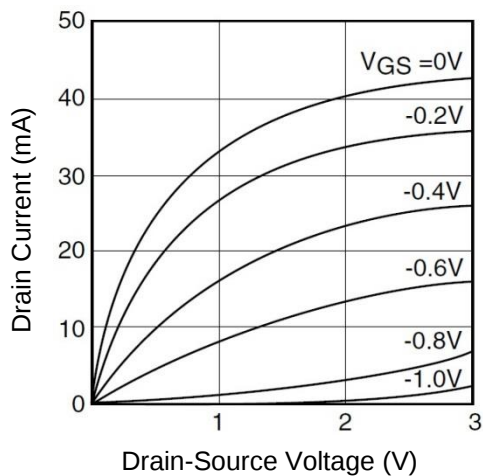
RoHS Compliance

Yes

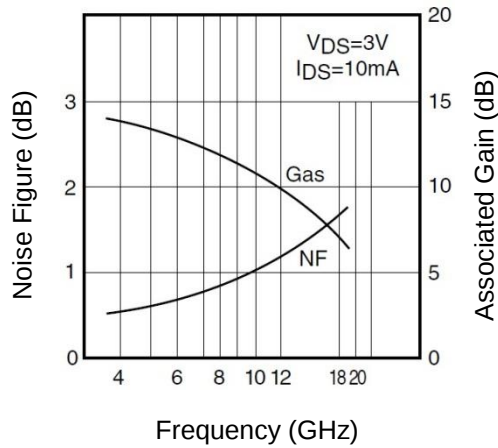
POWER DERATING CURVE



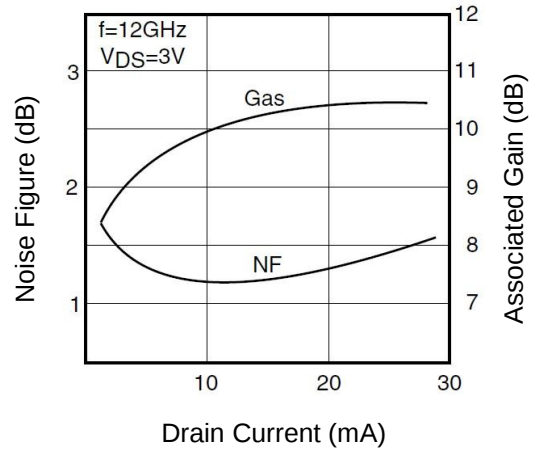
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



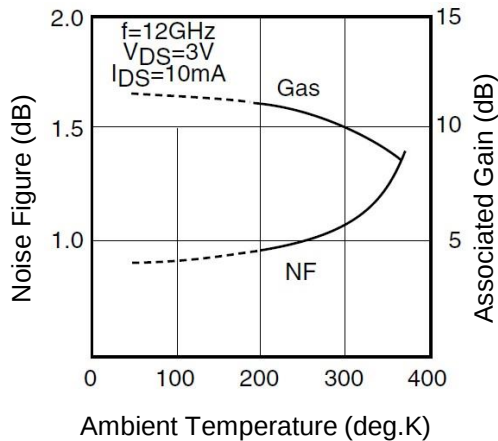
NF & G_{as} vs. FREQUENCY



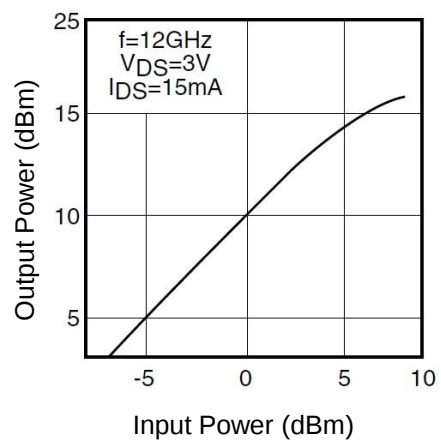
NF & G_{as} vs. I_{DS}



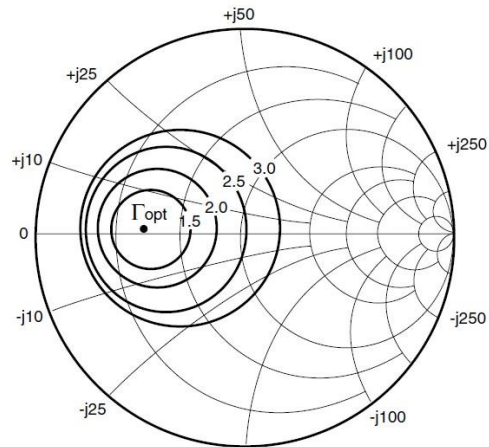
NF & G_{as} vs. TEMPERATURE



OUTPUT POWER vs. INPUT POWER



TYPICAL NOISE FIGURE CIRCLE



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

$\Gamma_{\text{opt}}=0.56 \angle 175^\circ$.
 $R_n/50=0.08$
 $NF_{\text{min}}=1.2\text{dB}$

NOISE PARAMETERS

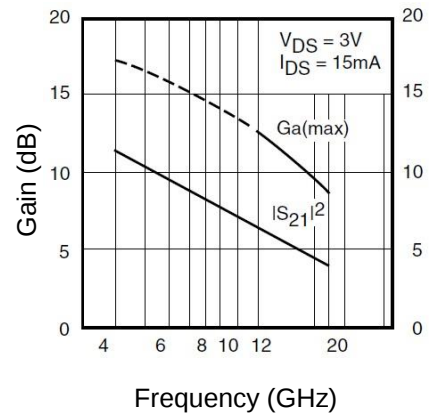
FHX35LG

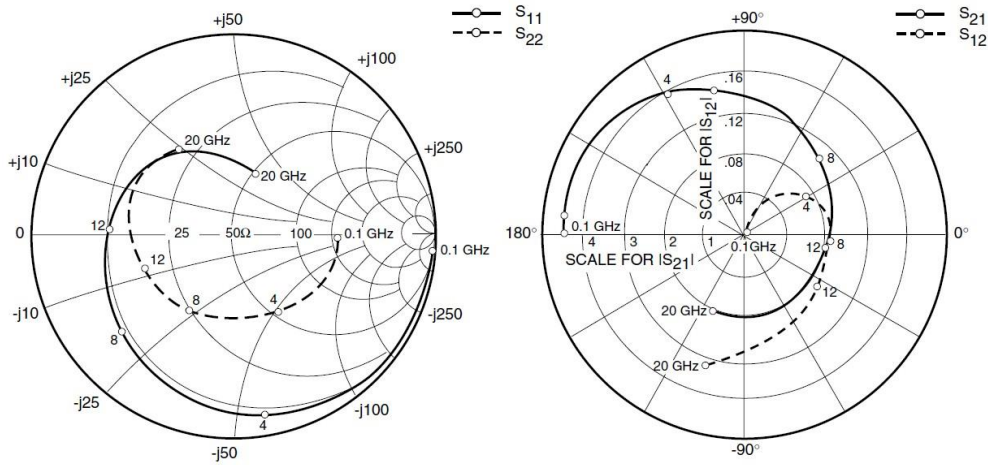
$$V_{DS} = 3V, I_{DS} = 10mA$$

Freq. (GHz)	Γ opt		NFmin (dB)	Rn/50
	(MAG)	(ANG)		
2	0.81	32	0.40	0.58
4	0.74	63	0.50	0.42
6	0.69	93	0.68	0.30
8	0.64	127	0.86	0.20
10	0.60	148	1.03	0.12
12	0.56	175	1.20	0.08
14	0.53	-162	1.38	0.08
16	0.50	-139	1.54	0.10
18	0.48	-117	1.70	0.14

G_a(max) AND |S₂₁|² vs. FREQUENCY

FHX35LG





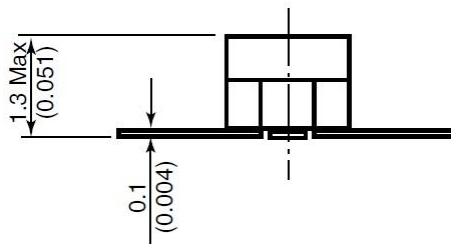
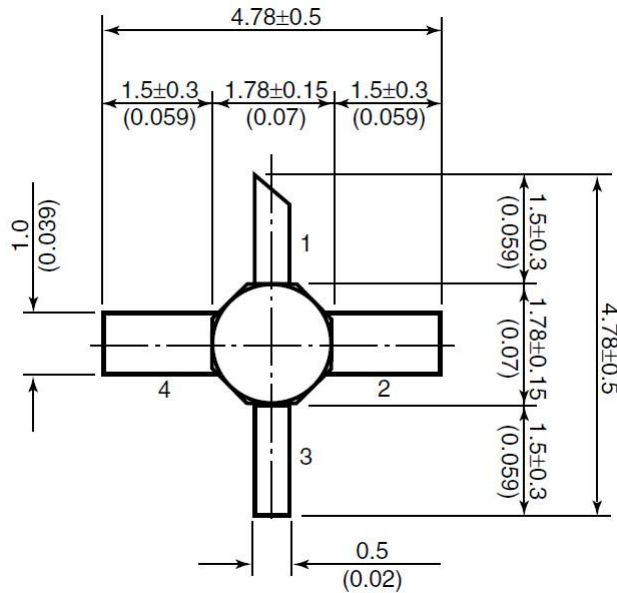
S-PARAMETERS

$V_{DS} = 3V$, $I_{DS} = 10mA$

Freq (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.996	-3.5	4.576	177.2	0.002	81.2	0.516	-2.5
500	0.994	-12.1	4.548	169.0	0.012	79.3	0.517	-10.2
1000	0.982	-23.5	4.471	158.5	0.023	73.1	0.513	-19.9
2000	0.950	-44.7	4.304	139.3	0.043	57.9	0.498	-38.0
3000	0.912	-64.6	4.026	121.0	0.059	44.6	0.483	-54.9
4000	0.867	-84.0	3.742	103.1	0.071	31.8	0.462	-71.9
5000	0.821	-101.6	3.436	86.6	0.079	20.0	0.446	-87.6
6000	0.783	-117.5	3.132	71.6	0.085	9.8	0.439	-102.2
7000	0.757	-130.9	2.881	57.9	0.087	0.9	0.441	-115.3
8000	0.738	-142.8	2.659	45.0	0.088	-7.1	0.452	-126.7
9000	0.726	-153.8	2.497	32.4	0.090	-15.3	0.468	-136.9
10000	0.707	-164.5	2.347	20.2	0.092	-21.7	0.480	-146.1
11000	0.680	-174.1	2.206	8.4	0.090	-27.8	0.494	-156.0
12000	0.654	176.1	2.101	-3.4	0.090	-35.5	0.503	-164.8
13000	0.638	166.0	2.035	-15.1	0.091	-42.6	0.514	-173.8
14000	0.626	157.1	2.003	-26.2	0.093	-49.6	0.537	178.4
15000	0.607	147.8	1.975	-37.6	0.094	-55.8	0.559	171.0
16000	0.565	138.4	1.917	-50.1	0.097	-64.7	0.564	162.7
17000	0.528	127.2	1.924	-62.9	0.102	-73.3	0.567	154.4
18000	0.484	112.8	1.966	-77.1	0.109	-86.2	0.572	142.7
19000	0.421	93.5	1.932	-91.7	0.116	-96.2	0.581	133.1
20000	0.380	74.2	1.991	-107.4	0.127	-110.9	0.547	124.3

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.