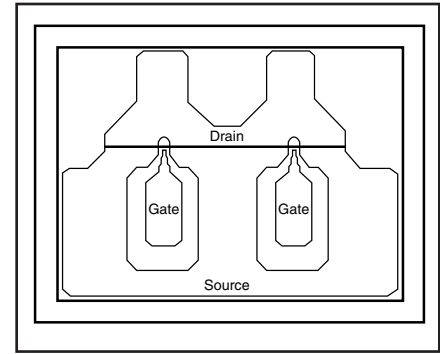


FEATURES

- 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

DESCRIPTION

The FHX35X is a High Electron Mobility Transistor(HEMT) intended for general purpose, low noise and high gain amplifiers in the 2-18GHz frequency range. This device is well suited for 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 $T_a=25^\circ\text{C}$)

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	$^\circ\text{C}$
Channel Temperature	T_{ch}	175	$^\circ\text{C}$

*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 3 volts.
2. The forward and reverse gate currents should not exceed 0.2 and -0.075 mA respectively with gate resistance of 4000 Ω .
3. The operating channel temperature (T_{ch}) should not exceed 80 $^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_a=25^\circ\text{C}$)

Item	Symbol	Test Conditions	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	$V_{DS} = 2\text{V}$, $V_{GS} = 0\text{V}$	15	40	85	mA
Transconductance	g_m	$V_{DS} = 2\text{V}$, $I_{DS} = 10\text{mA}$	40	60	-	mS
Pinch-off Voltage	V_p	$V_{DS} = 2\text{V}$, $I_{DS} = 1\text{mA}$	-0.2	-1.0	-2.0	V
Gate Source Breakdown Voltage	V_{GSO}	$I_{GS} = -10\mu\text{A}$	-3.0	-	-	V
Noise Figure	FHX35X	NF $V_{DS} = 3\text{V}$ $I_{DS} = 10\text{mA}$ $f = 12\text{GHz}$	-	1.2	1.6	dB
Associated Gain			G_{as}	8.5	10.0	-
Thermal Resistance	R_{th}	Channel to Case	-	155	200	$^\circ\text{C}/\text{W}$

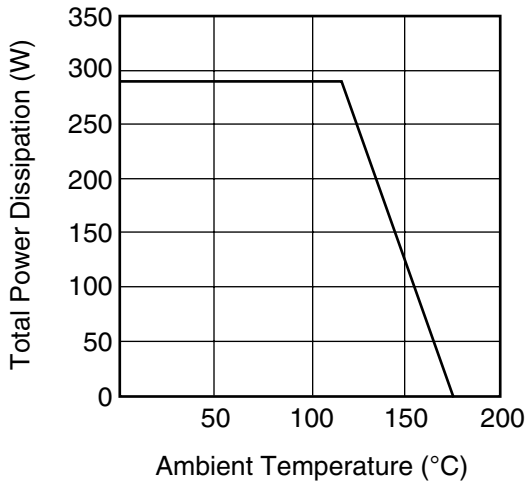
Note: RF parameter sample size 10pcs. criteria (accept/reject)=(2/3)

The chip must be enclosed in a hermetically sealed environment for optimum performance and reliability.

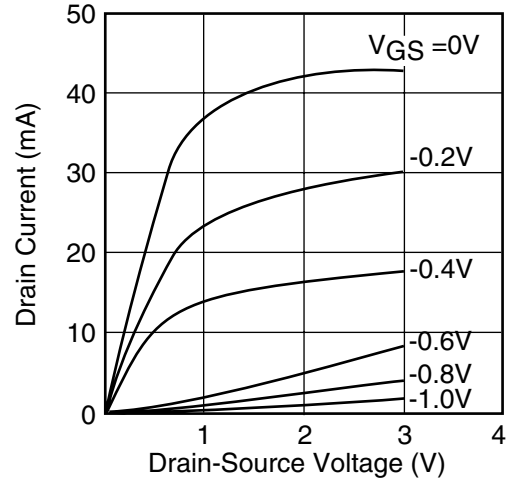
FHX35X

GaAs FET & HEMT Chips

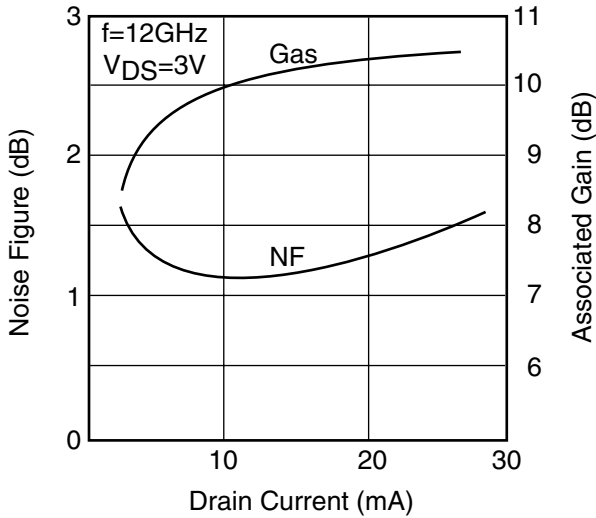
POWER DERATING CURVE



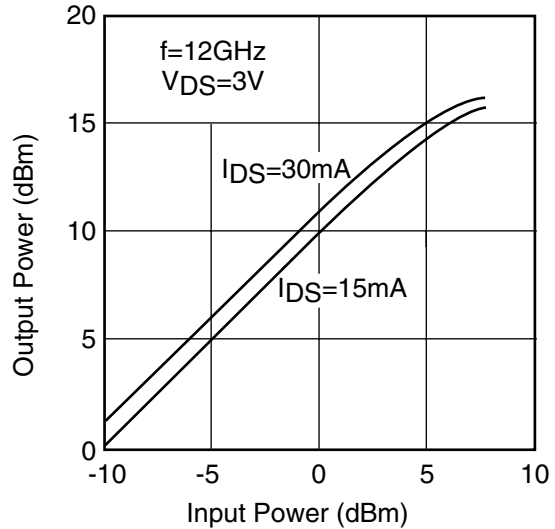
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



NF & Gas vs. I_{DS}



OUTPUT POWER vs. INPUT POWER

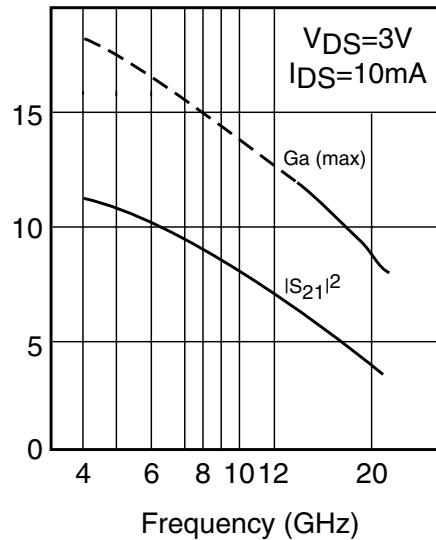


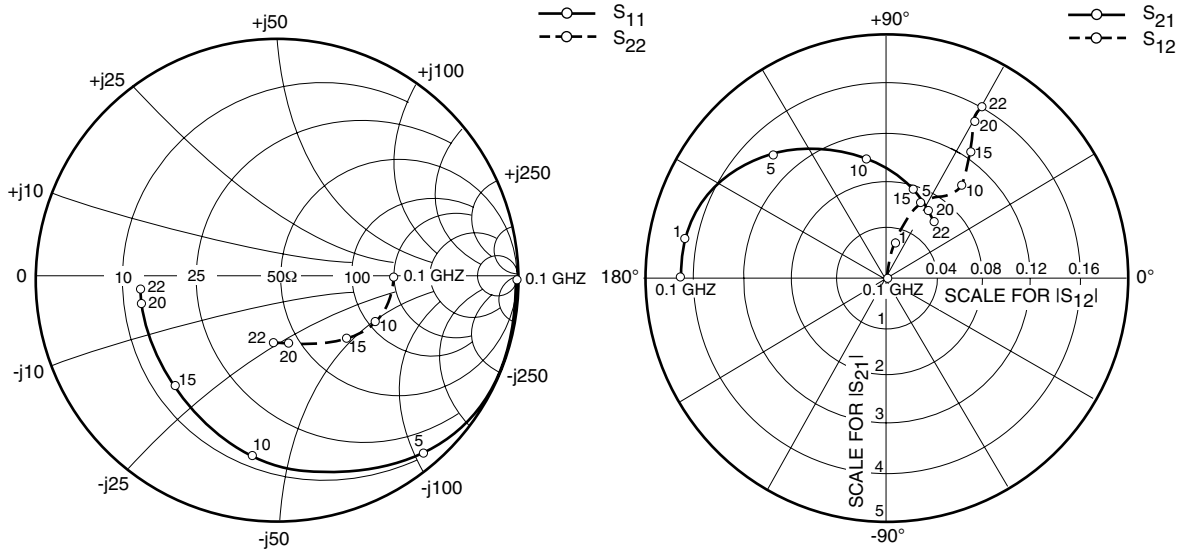
FHX35X NOISE PARAMETERS

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

Freq. (GHz)	Γ_{opt}		NFmin (dB)	Rn/50
	(MAG)	(ANG)		
2	0.81	20	0.40	0.67
4	0.77	39	0.50	0.56
6	0.74	57	0.68	0.46
8	0.71	78	0.86	0.37
10	0.69	92	1.03	0.29
12	0.67	109	1.20	0.22
14	0.65	124	1.38	0.17
16	0.64	139	1.54	0.13
18	0.63	153	1.70	0.10
20	0.62	165	1.88	0.08
22	0.62	177	2.05	0.07

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





S-PARAMETERS

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

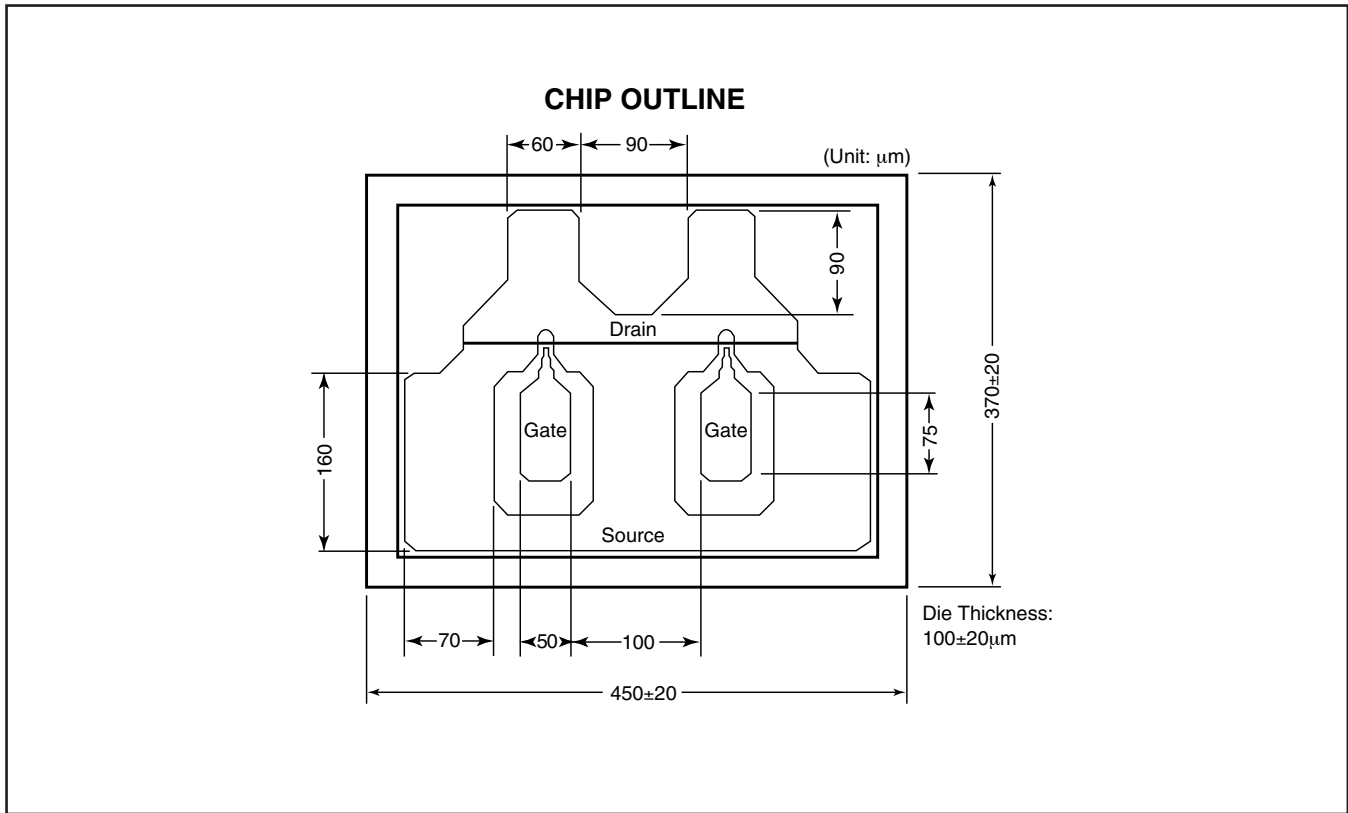
FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-1.3	4.235	178.9	0.002	89.4	0.506	-0.7
500	0.998	-6.7	4.227	174.7	0.009	86.8	0.505	-3.3
1000	0.993	-13.3	4.200	169.2	0.017	83.6	0.503	-6.7
2000	0.973	-26.3	4.097	159.2	0.033	77.5	0.493	-13.1
3000	0.943	-38.8	3.941	149.4	0.048	71.9	0.478	-19.2
4000	0.907	-50.6	3.752	140.3	0.060	67.0	0.460	-24.8
5000	0.869	-61.8	3.546	131.8	0.071	62.8	0.441	-29.9
6000	0.831	-72.2	3.337	123.9	0.080	59.4	0.422	-34.6
7000	0.795	-81.9	3.134	116.7	0.087	56.7	0.403	-38.8
8000	0.763	-91.0	2.943	110.1	0.093	54.6	0.386	-42.8
9000	0.734	-99.5	2.766	103.9	0.097	53.2	0.371	-46.5
10000	0.709	-107.5	2.604	98.2	0.102	52.3	0.357	-50.1
11000	0.688	-115.0	2.457	92.8	0.105	51.8	0.344	-53.6
12000	0.670	-122.0	2.323	87.8	0.109	51.8	0.333	-57.1
13000	0.655	-128.7	2.202	83.1	0.112	52.2	0.323	-60.7
14000	0.644	-135.0	2.093	78.6	0.116	52.8	0.314	-64.3
15000	0.634	-141.0	1.993	74.3	0.119	53.7	0.306	-68.0
16000	0.627	-146.7	1.903	70.2	0.124	54.7	0.300	-71.8
17000	0.622	-152.1	1.820	66.3	0.128	55.8	0.294	-75.8
18000	0.619	-157.3	1.744	62.6	0.134	56.9	0.289	-80.0
19000	0.618	-162.2	1.675	59.0	0.140	58.0	0.285	-84.3
20000	0.617	-167.0	1.610	55.5	0.146	59.0	0.282	-88.8
21000	0.618	-171.5	1.551	52.1	0.154	59.9	0.280	-93.5
22000	0.621	-175.8	1.495	48.8	0.162	60.6	0.279	-98.3

NOTE:* The data includes bonding wires.

n: number of wires Gate n=2 (0.3mm length, 20μm Dia Au wire)
 Drain n=2 (0.3mm length, 20μm Dia Au wire)
 Source n=4 (0.3mm length, 20μm Dia Au wire)

FHX35X

GaAs FET & HEMT Chips



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