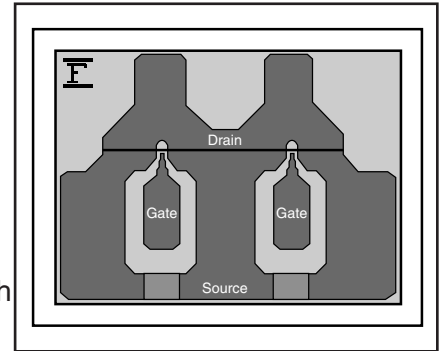


FEATURES

- Low Noise Figure: 0.55dB (Typ.)@f=12GHz
- High Associated Gain: 12.0dB (Typ.)@f=12GHz
- $L_g \leq 0.15\mu\text{m}$, $W_g = 280\mu\text{m}$
- Gold Gate Metallization for High Reliability

DESCRIPTION

The FHX45X is a Super High Electron Mobility Transistor (SuperHEMT™) intended for general purpose, ultra-low noise and high gain amplifiers in the 2-18GHz frequency range. The 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}	3.5	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 2 volts.
2. The forward and reverse gate currents should not exceed 0.1 and -0.075 mA respectively with gate resistance of 4000 Ω .
3. The operating channel temperature (T_{ch}) should not exceed 80 $^\circ\text{C}$.

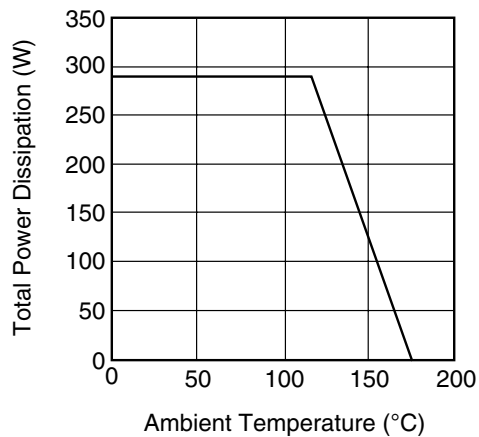
ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_a=25^\circ\text{C}$)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	$V_{DS} = 2\text{V}$, $V_{GS} = 0\text{V}$	10	40	85	mA
Transconductance	g_m	$V_{DS} = 2\text{V}$, $I_{DS} = 10\text{mA}$	45	65	-	mS
Pinch-off Voltage	V_p	$V_{DS} = 2\text{V}$, $I_{DS} = 1\text{mA}$	-0.1	-1.0	-2.0	V
Gate Source Breakdown Voltage	V_{GSO}	$I_{GS} = -10\mu\text{A}$	-3.0	-	-	V
Noise Figure	NF	$V_{DS} = 2\text{V}$, $I_{DS} = 10\text{mA}$, $f = 12\text{GHz}$	-	0.55	0.65	dB
Associated Gain	G_{as}		10.0	12.0	-	dB
Thermal Resistance	R_{th}	Channel to Case	-	155	200	$^\circ\text{C/W}$

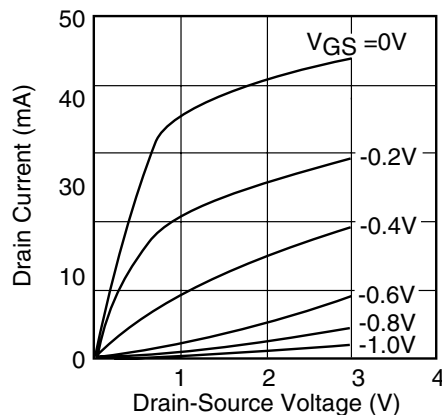
Note: RF parameter sample size 10pcs. criteria (accept/reject)=(2/3)

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

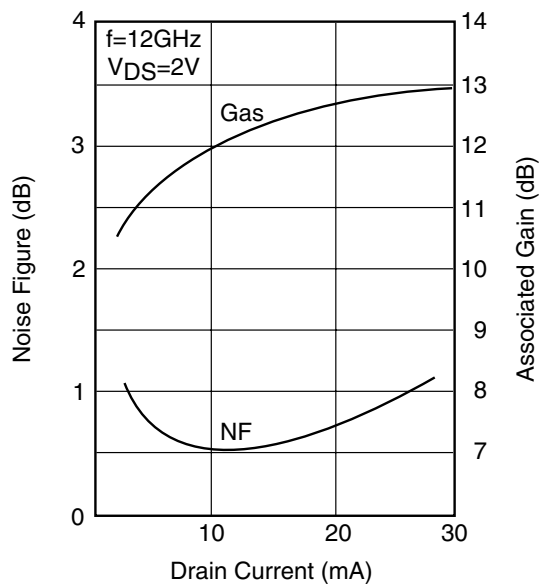
POWER DERATING CURVE



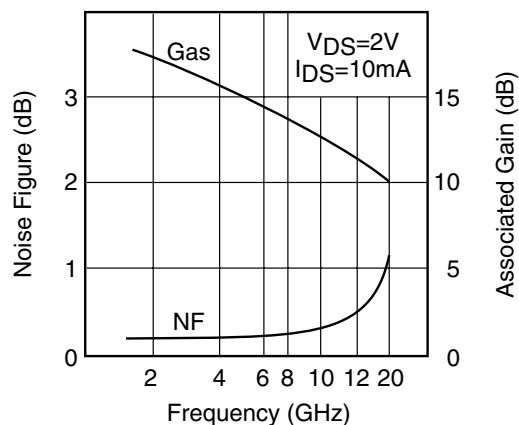
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



NF & Gas vs. I_{DS}



NF & Gas vs. Frequency

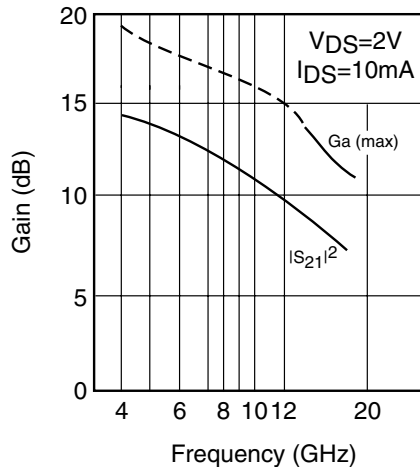


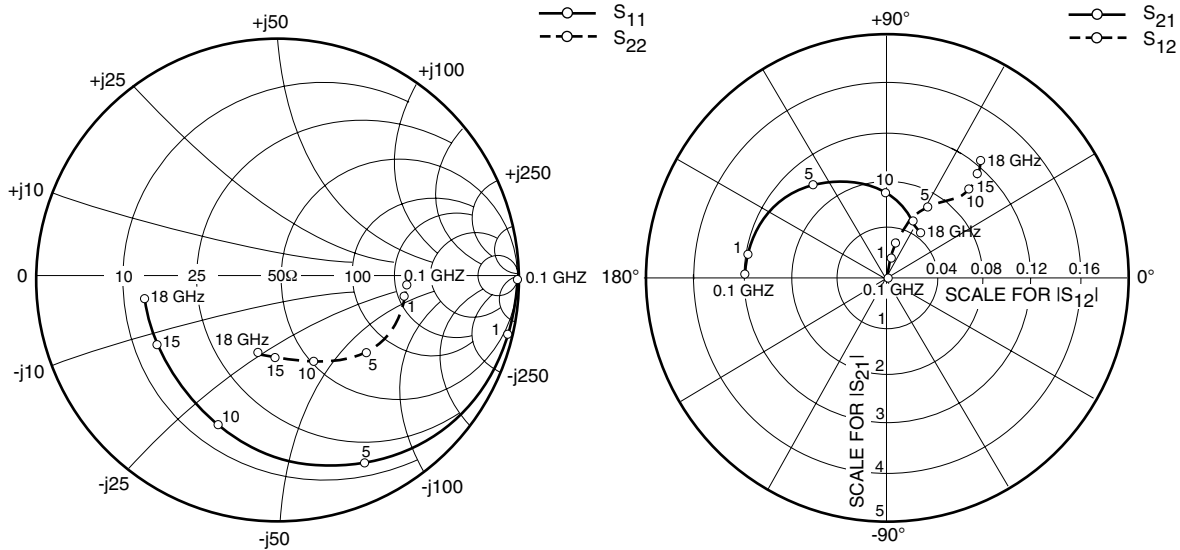
FHX45X NOISE PARAMETERS

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

Freq. (GHz)	Γ_{opt} (MAG) (ANG)		NFmin (dB)	Rn/50
2	0.83	12.7	0.28	0.21
4	0.72	28.2	0.30	0.19
6	0.65	45.2	0.34	0.17
8	0.62	62.6	0.39	0.15
10	0.61	79.4	0.47	0.13
12	0.60	94.5	0.55	0.11
14	0.58	106.7	0.67	0.10
16	0.55	115.0	0.81	0.09
18	0.47	118.4	1.00	0.09

Ga (max) & |S₂₁|² vs. FREQUENCY





S-PARAMETERS

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

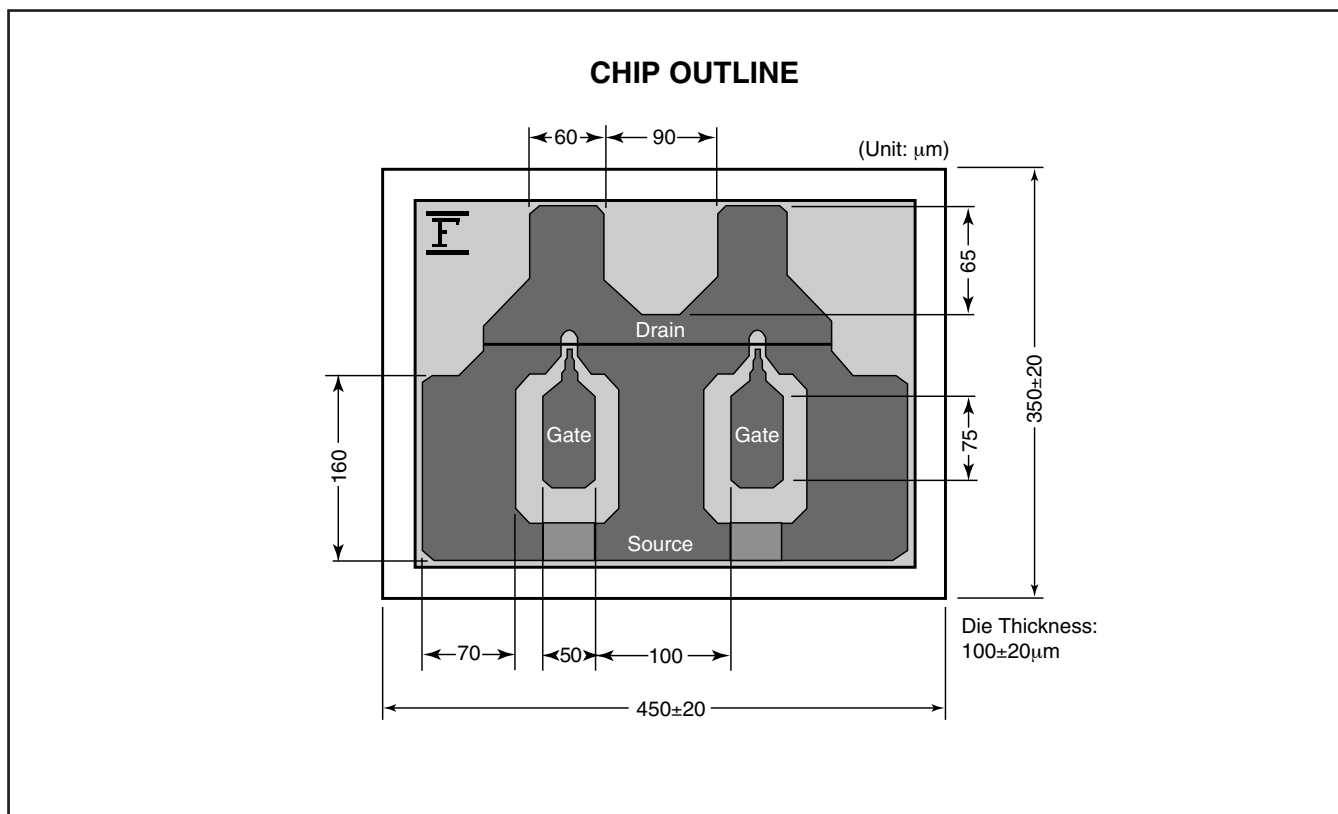
FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-1.4	6.039	178.9	.002	89.3	.533	-0.9
500	0.998	-6.8	6.025	174.4	.009	86.4	.531	-4.6
1000	0.991	-13.6	5.981	168.8	.017	82.8	.528	-9.2
2000	0.966	-27.0	5.818	157.8	.033	75.9	.516	-18.0
3000	0.928	-39.9	5.572	147.4	.048	69.6	.497	-26.4
4000	0.883	-52.1	5.277	137.7	.060	64.1	.475	-34.2
5000	0.835	-63.6	4.959	128.8	.070	59.3	.452	-41.4
6000	0.788	-74.5	4.640	120.5	.078	55.4	.430	-48.0
7000	0.744	-84.8	4.333	112.9	.085	52.3	.408	-54.0
8000	0.705	-94.5	4.046	105.8	.090	49.9	.389	-59.6
9000	0.671	-103.8	3.782	99.3	.094	48.1	.372	-64.9
10000	0.642	-112.7	3.542	93.2	.097	46.9	.358	-70.0
11000	0.618	-121.1	3.324	87.5	.100	46.2	.346	-74.9
12000	0.599	-129.3	3.126	82.1	.103	46.0	.336	-79.7
13000	0.584	-137.1	2.948	77.0	.106	46.2	.329	-84.4
14000	0.573	-144.6	2.786	72.1	.109	46.7	.323	-89.0
15000	0.566	-151.7	2.639	67.4	.112	47.3	.319	-93.7
16000	0.561	-158.5	2.504	62.9	.116	48.2	.317	-98.4
17000	0.560	-165.1	2.382	58.5	.120	49.1	.317	-103.1
18000	0.562	-171.3	2.268	54.3	.125	50.0	.318	-107.8

NOTE:* The data includes bonding wires.

n: number of wires Gate n=2 (0.3mm length, 25μm Dia Au wire)
 Drain n=2 (0.3mm length, 25μm Dia Au wire)
 Source n=4 (0.3mm length, 25μm Dia Au wire)

FHX45X

GaAs FET & HEMT Chips



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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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Printed in U.S.A. FCSI0598M200

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