

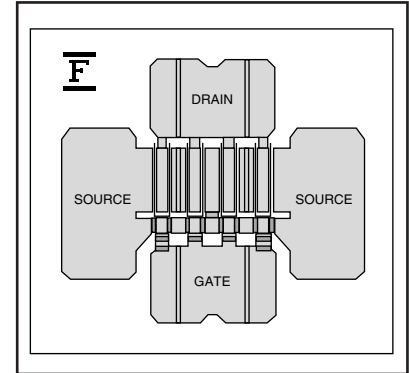
### FEATURES

- Medium Power Output:  $P_{1dB}=24.5dBm(Typ.)@8.0GHz$
- High Power Gain:  $G_{1dB}=10dB(Typ.)@8.0GHz$
- Proven Reliability

### DESCRIPTION

The FSX027X is a general purpose GaAs FET designed for medium power applications up to 12GHz. These devices have a wide dynamic range and are suitable for use in medium power, wide band, linear drive amplifiers or oscillators.

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



### ABSOLUTE MAXIMUM RATINGS (Ambient Temperature $T_a = 25^\circ C$ )

Parameter	Symbol	Condition	Rating	Unit
Drain-Source Voltage	$V_{DS}$		12	V
Gate-Source Voltage	$V_{GS}$		-5	V
Total Power Dissipation	$P_T$	$T_C = 25^\circ C$	1.5	W
Storage Temperature	$T_{STG}$		-65 to 175	$^\circ C$
Channel Temperature	$T_{CH}$		175	$^\circ C$

Fujitsu recommends the following conditions for the reliable operation of GaAs FETs:

1. The drain-source operating voltage ( $V_{DS}$ ) should not exceed 8 volts.
2. The forward and reverse gate currents should not exceed 1.4 and -0.2 mA respectively with gate resistance of 1000 $\Omega$ .
3. The operating channel temperature ( $T_{ch}$ ) should not exceed 145 $^\circ C$ .

### ELECTRICAL CHARACTERISTICS (Ambient Temperature $T_a=25^\circ C$ )

Item	Symbol	Test Conditions	Limit			Unit	
			Min.	Typ.	Max.		
Saturated Drain Current	$I_{DSS}$	$V_{DS} = 3V, V_{GS} = 0V$	70	110	150	mA	
Transconductance	$g_m$	$V_{DS} = 3V, I_{DS} = 54mA$	-	100	-	mS	
Pinch-off Voltage	$V_p$	$V_{DS} = 3V, I_{DS} = 5.4mA$	-0.7	-1.2	-1.7	V	
Gate Source Breakdown Voltage	$V_{GSO}$	$I_{GS} = -5.4\mu A$	-5.0	-	-	V	
Noise Figure	NF	$V_{DS} = 3V, I_{DS} = 30mA$ $f = 8GHz$	-	2.5	-	dB	
Associated Gain	$G_{as}$		-	9.5	-	dB	
Output Power at 1 dB G.C.P.	$P_{1dB}$	$V_{DS} = 8V,$ $I_{DS} = 0.7I_{DSS}$	$f = 4GHz$	-	24.5	-	dBm
			$f = 8GHz$	23.5	24.5	-	dBm
			$f = 12GHz$	-	23.5	-	dBm
Power Gain at 1 dB G.C.P.	$G_{1dB}$	$V_{DS} = 8V,$ $I_{DS} = 0.7I_{DSS}$	$f = 4GHz$	-	14.0	-	dB
			$f = 8GHz$	9.0	10.0	-	dB
			$f = 12GHz$	-	6.5	-	dB
Thermal Resistance	$R_{th}$	Channel to Case	-	70	100	$^\circ C/W$	

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

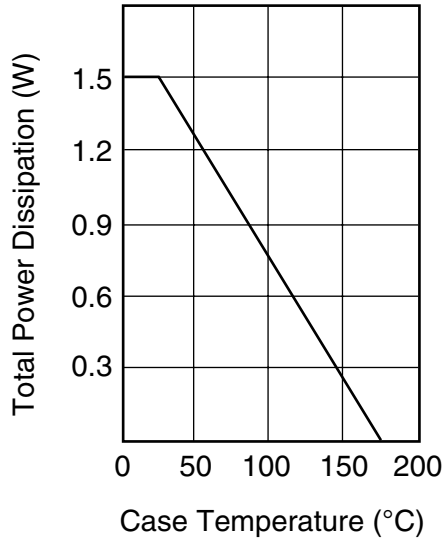
G.C.P.: Gain Compression Point

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

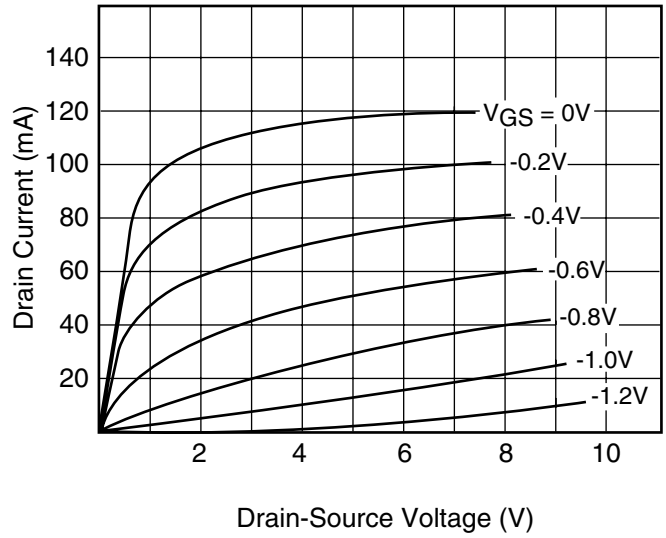
# FSX027X

## GaAs FET & HEMT Chips

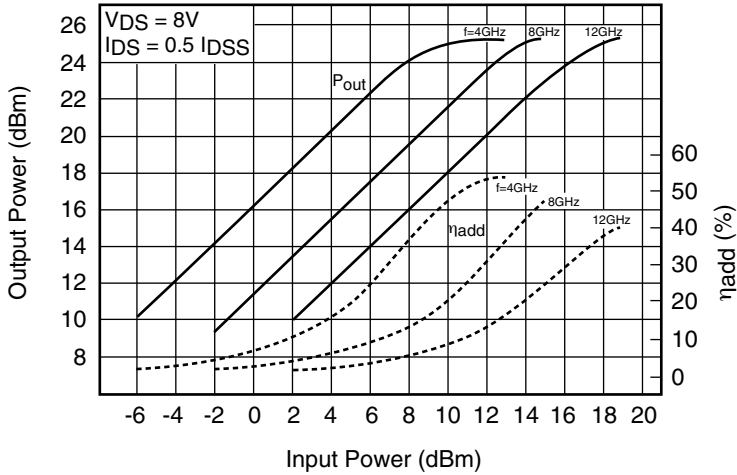
**POWER DERATING CURVE**



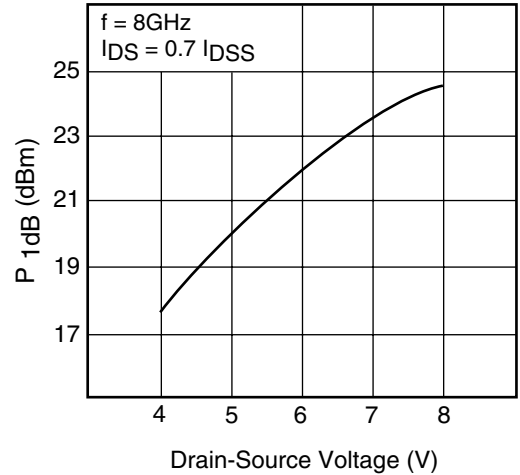
**DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE**



**OUTPUT POWER vs. INPUT POWER**



**P 1dB vs. VDS**



### S-PARAMETERS

$V_{DS} = 8V, I_{DS} = 75mA$

FREQUENCY (MHZ)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1000	.981	-41.2	7.117	153.2	.023	67.6	.633	-14.9
2000	.946	-75.2	6.065	130.8	.040	50.3	.588	-26.6
3000	.913	-100.3	5.015	113.3	.050	37.4	.548	-35.2
4000	.882	-118.9	4.168	99.4	.055	28.8	.523	-42.1
5000	.877	-132.7	3.520	87.9	.058	22.2	.506	-48.4
6000	.867	-143.6	3.026	77.9	.060	17.3	.498	-54.7
7000	.860	-152.5	2.644	69.0	.062	13.6	.499	-60.9
8000	.854	-159.9	2.336	60.9	.063	10.2	.504	-67.1
9000	.849	-166.3	2.089	53.1	.064	7.0	.515	-73.4
10000	.845	-172.0	1.887	45.8	.065	4.4	.524	-79.0
11000	.841	-177.2	1.716	36.7	.065	2.1	.539	-84.7
12000	.837	178.3	1.569	32.0	.065	0.0	.550	-90.3
13000	.834	174.1	1.441	25.4	.066	-1.0	.561	-95.7
14000	.829	169.8	1.332	18.9	.067	-3.5	.574	-101.2
15000	.826	166.1	1.238	12.6	.067	-5.4	.589	-106.8
16000	.824	162.7	1.155	6.6	.068	-6.1	.603	-112.5
17000	.817	159.3	1.074	.4	.069	-9.1	.623	-118.0
18000	.813	155.9	1.001	-5.5	.068	-10.4	.642	-123.1
19000	.814	152.8	.543	-11.3	.069	-11.2	.657	-127.9
20000	.811	150.1	.888	-16.9	.069	-13.4	.672	-132.7

NOTE:\* The data includes bonding wires.

n: number of wires

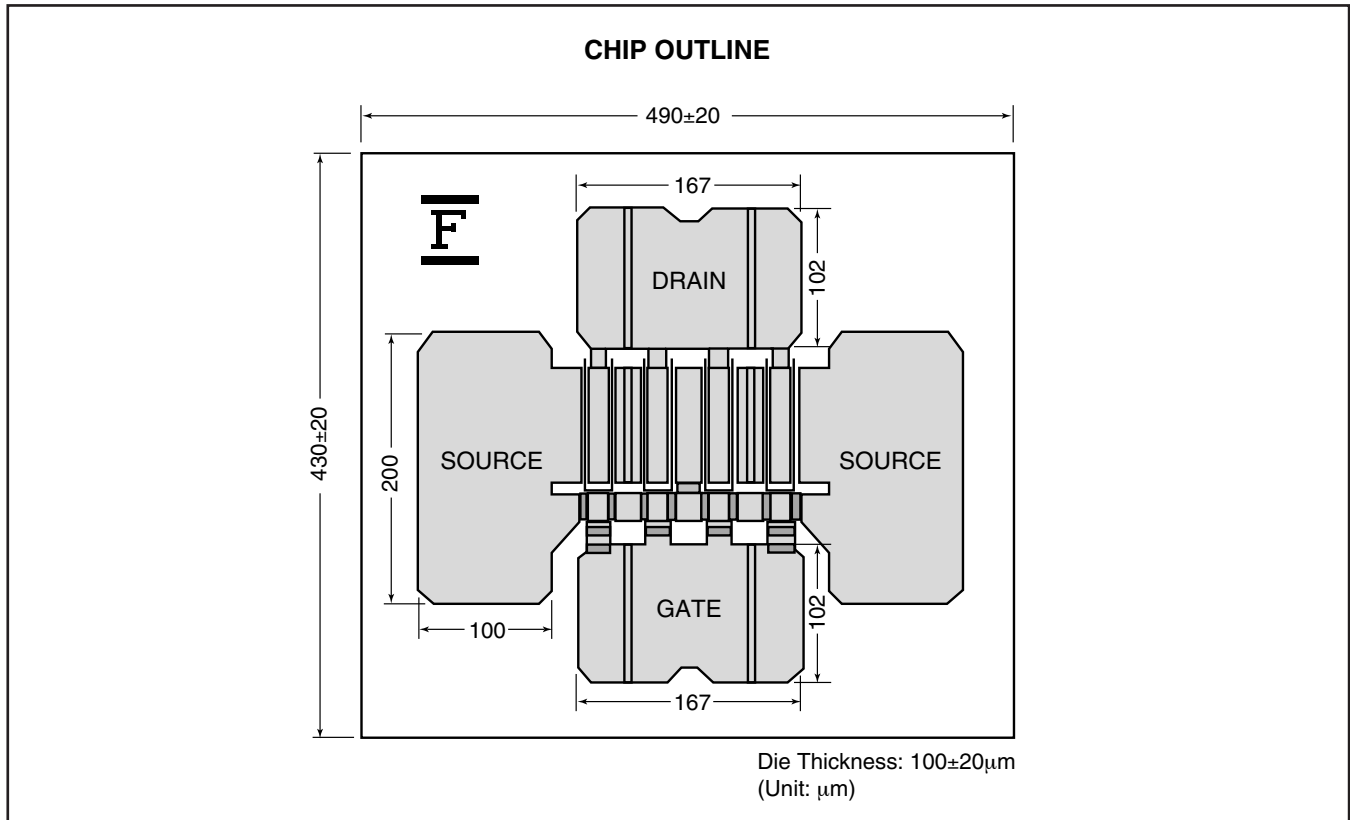
Gate n=1 (0.2mm length, 25µm Dia Au wire)

Drain n=1 (0.2mm length, 25µm Dia Au wire)

Source n=4 (0.2mm length, 25µm Dia Au wire)

# FSX027X

## GaAs FET & HEMT Chips



**For further information please contact:**

**FUJITSU COMPOUND SEMICONDUCTOR, INC.**

2355 Zanker Rd.  
San Jose, CA 95131-1138, U.S.A.  
Phone: (408) 232-9500  
FAX: (408) 428-9111  
www.fcsi.fujitsu.com

**FUJITSU MICROELECTRONICS, LTD.**

Compound Semiconductor Division  
Network House  
Norreys Drive  
Maidenhead, Berkshire SL6 4FJ  
Phone: +44 (0)1628 504800  
FAX: +44 (0)1628 504888

**CAUTION**

Fujitsu Compound Semiconductor 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.

Fujitsu Limited reserves the right to change products and specifications without notice. The information does not convey any license under rights of Fujitsu Limited or others.

© 1998 FUJITSU COMPOUND SEMICONDUCTOR, INC.  
Printed in U.S.A. FCSI0598M200