

SONY

SGM2016M/P

GaAs N-channel Dual-Gate MES FET

Description

The SGM2016M/P is an N-channel dual-gate GaAs MES FET for UHF-band low-noise amplification. This FET is suitable for a wide range of applications including UHF TV tuners, cellular radios, and DBS IF amplifiers.

Features

- Low voltage operation
- Low noise NF=1.2dB (typ.) at 900MHz
- High gain Ga=21dB (typ.) at 900MHz
- High stability
- Built-in gate protection diode

Application

UHF-band high-frequency amplifier, mixer, and oscillator

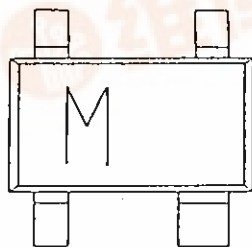
Structure

GaAs, N-channel, dual-gate metal semiconductor field-effect transistor

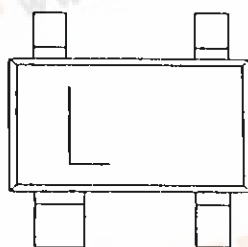
Absolute Maximum Ratings (Ta=25°C)

• Drain to source voltage	V _{DSX}	12	V
• Gate 1 to source voltage	V _{G1S}	-5	V
• Gate 2 to source voltage	V _{G2S}	-5	V
• Drain current	I _D	55	mA
• Allowable power dissipation	P _D	150	mW
• Channel temperature	T _{ch}	150	°C
• Storage temperature	T _{stg}	-55 to +150	°C

Marking



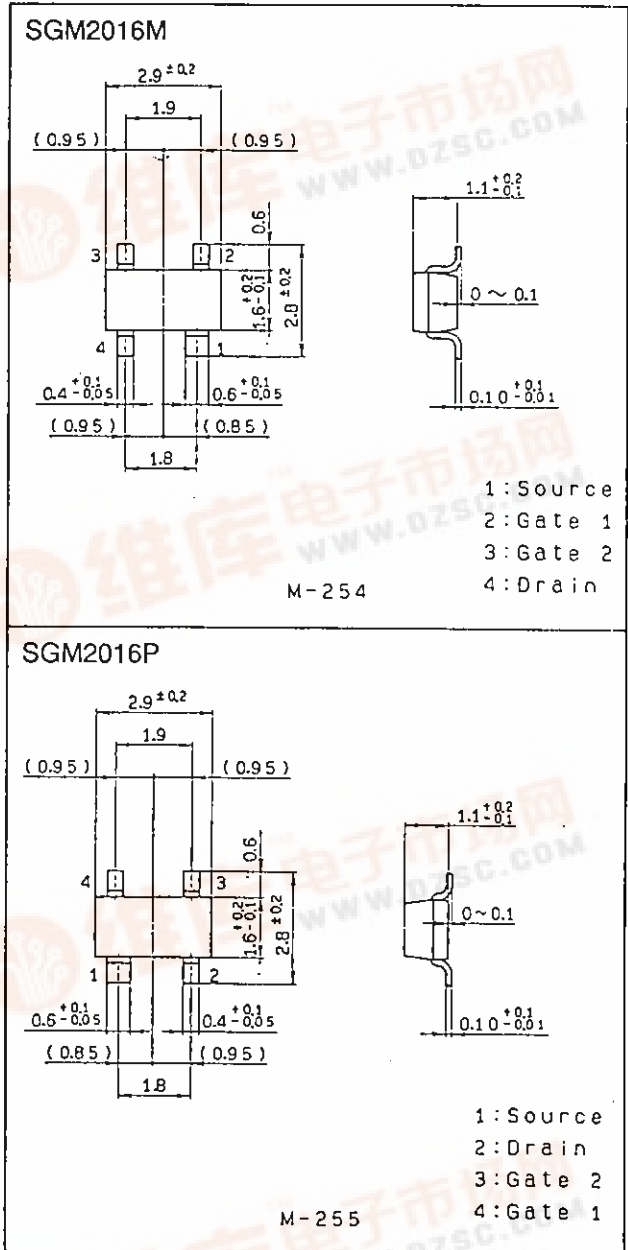
SGM2016M



SGM2016P

Package Outline

Unit : mm



Sony reserves the right to change products and specifications without prior notice. This information does not convey any license by any implication or otherwise under any patents or other right. Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

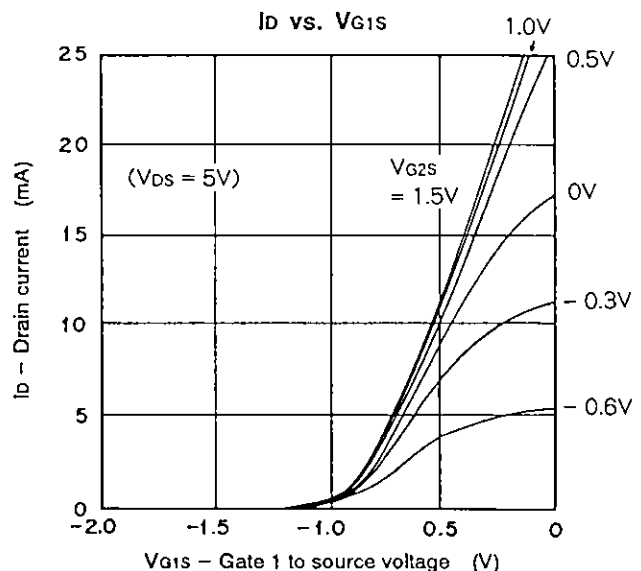
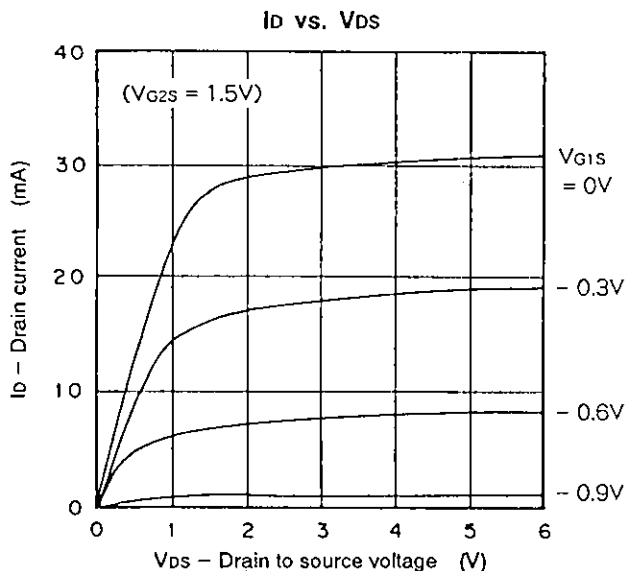


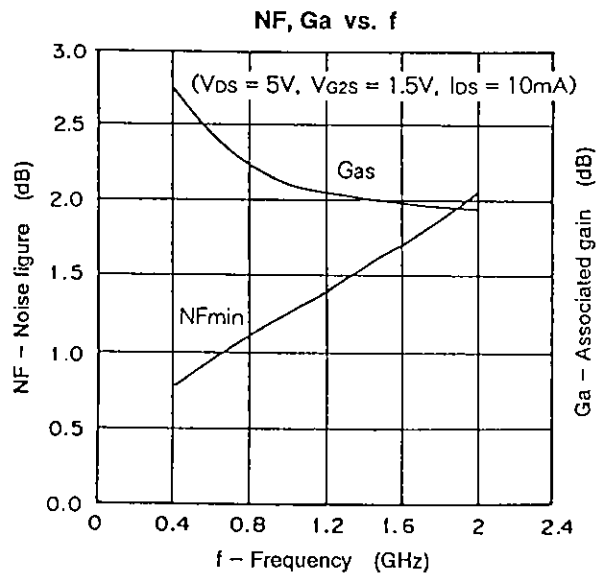
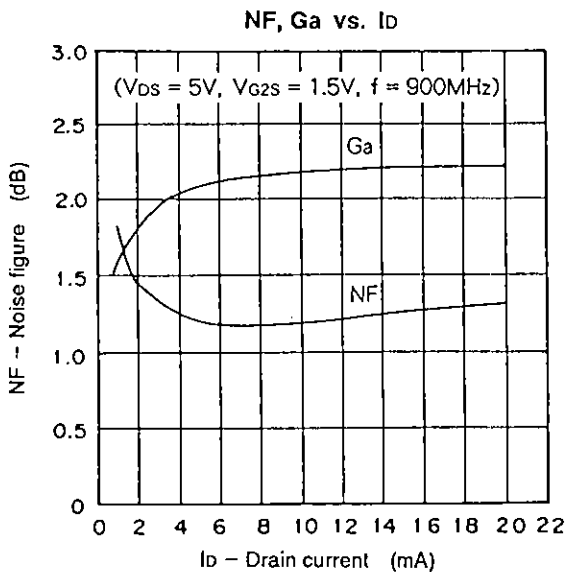
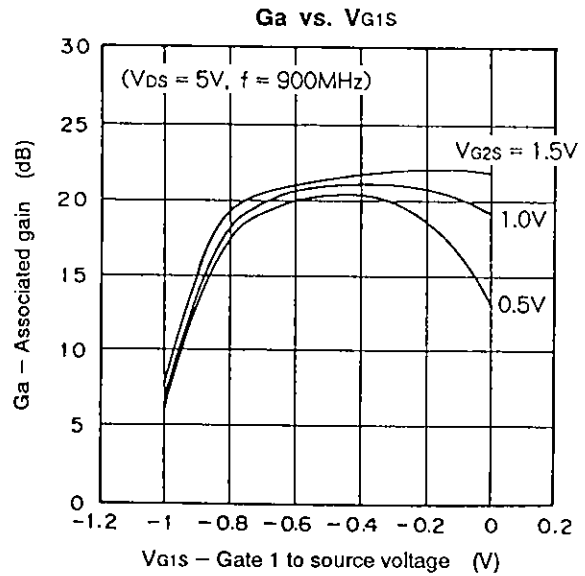
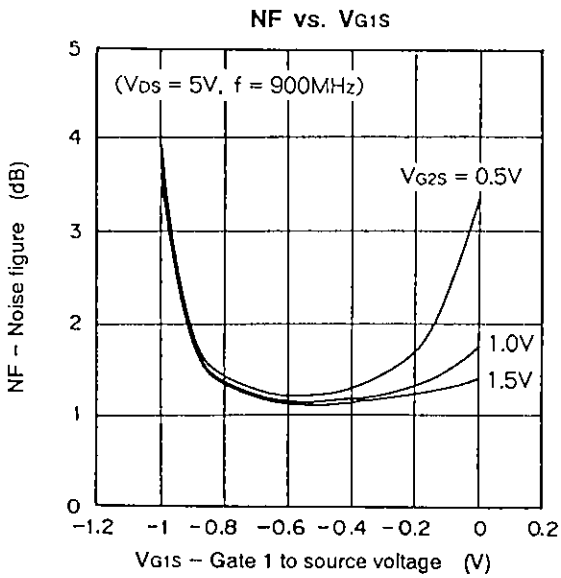
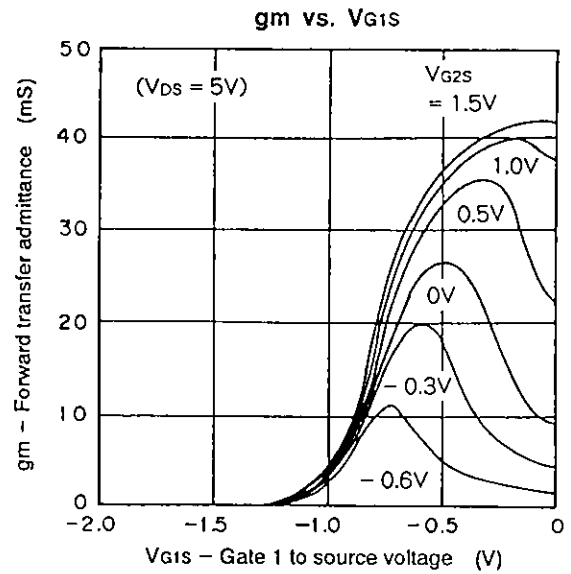
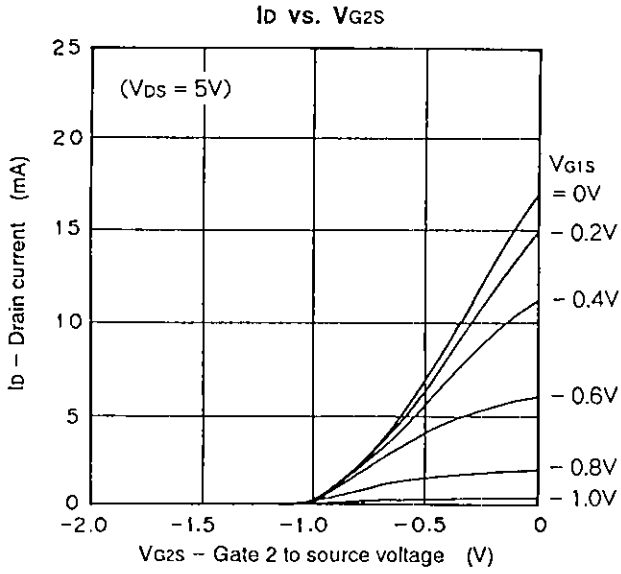
Electrical Characteristics

(Ta=25°C)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain cut-off current	I_{DSX}	$V_{DS}=12V$ $V_{G1S}=-4V$ $V_{G2S}=0V$			50	μA
Gate 1 to source current	I_{G1SS}	$V_{G1S}=-4.5V$ $V_{G2S}=0V$ $V_{DS}=0V$			-8	μA
Gate 2 to source current	I_{G2SS}	$V_{G2S}=-4.5V$ $V_{G1S}=0V$ $V_{DS}=0V$			-8	μA
Drain saturation current	I_{DSS}	$V_{DS}=5V$ $V_{G1S}=0V$ $V_{G2S}=0V$	10		35	mA
Gate 1 to source cut-off voltage	$V_{G1S} (OFF)$	$V_{DS}=5V$ $I_D=100 \mu A$ $V_{G2S}=0V$			-2.5	V
Gate 2 to source cut-off voltage	$V_{G2S} (OFF)$	$V_{DS}=5V$ $I_D=100 \mu A$ $V_{G1S}=0V$			-2.5	V
Forward transfer admittance	gm	$V_{DS}=5V$ $I_D=10mA$ $V_{G2S}=1.5V$ $f=1kHz$	20	30		mS
Input capacitance	C_{iss}	$V_{DS}=5V$ $I_D=10mA$ $V_{G2S}=1.5V$ $f=1MHz$		0.9	2.0	pF
Feedback capacitance	C_{rss}	$V_{DS}=5V$ $I_D=10mA$ $V_{G2S}=1.5V$ $f=1MHz$		25	40	fF
Noise figure	NF	$V_{DS}=5V$ $I_D=10mA$ $V_{G2S}=1.5V$		1.2	2.0	dB
NF associated gain	Ga	$V_{DS}=5V$ $I_D=10mA$ $V_{G2S}=1.5V$ $f=900MHz$	17	21		dB

Typical Characteristics (Ta=25°C)

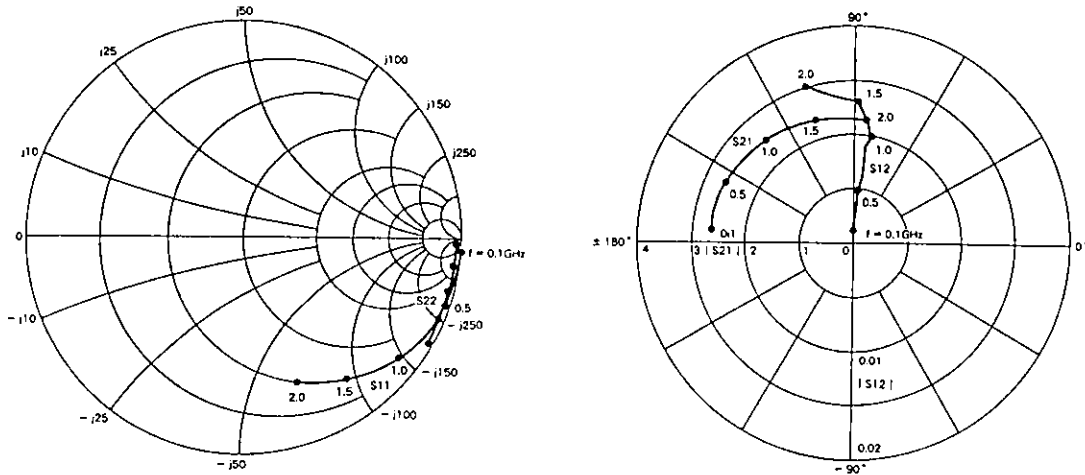




Noise Figure Characteristics ($V_{DS}=5V, V_{G2S}=1.5V, I_D=10mA$)

f (MHz)	NF min (dB)	Gamma Optimum		Rn (Ω)	Ga (dB)	f (MHz)	NF min (dB)	Gamma Optimum		Rn (Ω)	Ga (dB)
		MAG	ANG					MAG	ANG		
200	0.75	0.92	6.4°	40.2	30.5	1200	1.41	0.66	29.3°	35.4	20.1
300	0.81	0.89	9.3°	39.8	28.7	1300	1.48	0.64	31.3°	34.9	19.9
400	0.87	0.85	11.9°	39.3	27.2	1400	1.56	0.62	33.5°	34.4	19.7
500	0.94	0.82	14.4°	38.9	25.8	1500	1.63	0.60	35.7°	33.8	19.7
600	1.00	0.79	16.8°	38.4	24.5	1600	1.70	0.59	38.1°	33.3	19.8
700	1.07	0.77	19.0°	37.9	23.4	1700	1.78	0.57	40.6°	32.7	20.0
800	1.13	0.74	21.1°	37.4	22.5	1800	1.85	0.55	43.4°	32.2	20.4
900	1.20	0.72	23.2°	36.9	21.7	1900	1.93	0.54	46.3°	31.6	20.9
1000	1.27	0.70	25.2°	36.4	21.0	2000	2.01	0.52	49.4°	31.0	21.4
1100	1.34	0.68	27.2°	35.9	20.5						

S-parameters vs. Frequency Characteristics ($V_{DS}=5V, V_{G2S}=1.5V, I_D=10mA$)



f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	-3.7°	2.633	175.1°	.001	92.3°	.974	-1.4°
200	1.000	-7.3°	2.629	170.0°	.002	88.0°	.972	-2.8°
300	.992	-11.1°	2.615	165.0°	.004	86.6°	.977	-4.5°
400	.985	-14.8°	2.603	159.8°	.004	82.1°	.974	-6.0°
500	.977	-18.4°	2.594	154.8°	.005	88.3°	.969	-7.4°
600	.964	-22.2°	2.576	149.9°	.007	83.1°	.972	-8.8°
700	.952	-25.8°	2.557	145.0°	.008	83.0°	.971	-10.3°
800	.940	-29.4°	2.541	139.9°	.009	82.7°	.970	-11.7°
900	.922	-32.9°	2.524	135.5°	.009	83.7°	.966	-13.1°
1000	.905	-36.4°	2.484	130.3°	.010	79.9°	.970	-14.4°
1100	.890	-39.7°	2.460	125.6°	.012	86.3°	.965	-16.1°
1200	.870	-43.2°	2.437	121.0°	.012	83.8°	.968	-17.4°
1300	.851	-46.6°	2.425	116.6°	.012	80.8°	.967	-18.7°
1400	.833	-50.1°	2.403	111.8°	.012	85.4°	.969	-20.1°
1500	.813	-53.2°	2.381	107.3°	.013	88.2°	.969	-21.5°
1600	.791	-56.3°	2.345	102.8°	.013	86.8°	.969	-23.1°
1700	.772	-59.5°	2.333	98.1°	.013	90.3°	.970	-24.6°
1800	.751	-62.6°	2.309	93.5°	.014	93.3°	.971	-25.9°
1900	.733	-65.6°	2.289	89.1°	.014	102.7°	.975	-27.6°
2000	.716	-68.6°	2.281	84.4°	.015	107.5°	.979	-29.1°