old No. / NEW NO.

SONY 3SK164/-M / SGM2006M/P

GaAs N-channel Dual Gate MES FET

Description

SGM2006M/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 TV tuners, cellular radios and DBS IF amplifiers.

Features

- Low voltage operation
- Low noise : NF = 1.2 dB (Typ.) at 800 MHz
- High gain : Ga = 22 dB (Typ.) at 800 MHz
- High stability
- Built-in gate-protection diode
- Standard SOT-143 package

Application

UHF band amplifier, mixer and oscillator

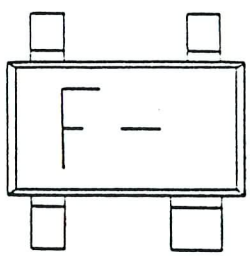
Structure

GaAs N-channel dual gate metal semiconductor field effect transistor

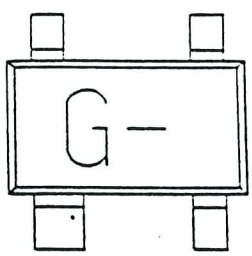
Absolute Maximum Ratings (Ta = 25°C)

• 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	Tch	150	°C
• Storage temperature	Tstg	−55 to +150	°C

Mark



SGM2006M

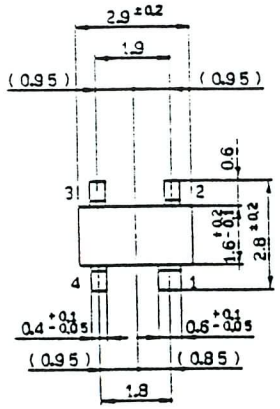


SGM2006P

Package Outline

Unit : mm

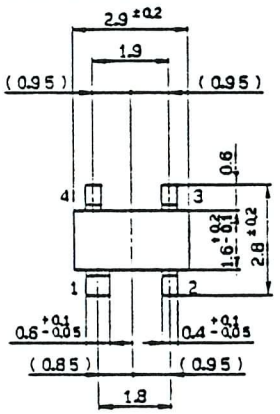
SGM2006M



1 : Source
2 : Gate 1
3 : Gate 2
4 : Drain

M-254

SGM2006P



1 : Source
2 : Drain
3 : Gate 2
4 : Gate 1

M-255

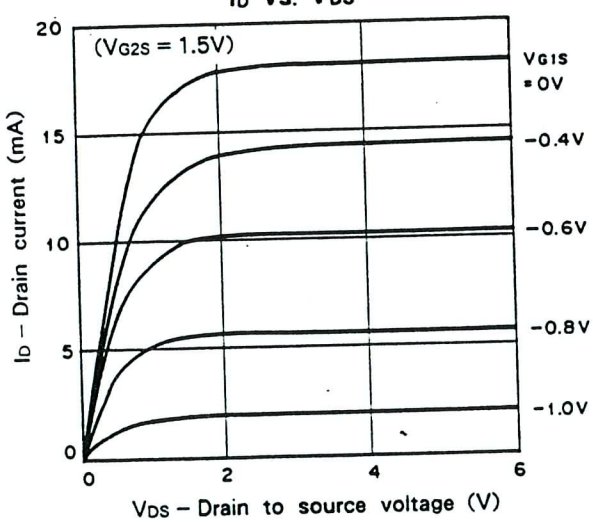
E88Z10-ST

Electrical Characteristics (Ta = 25 °C)

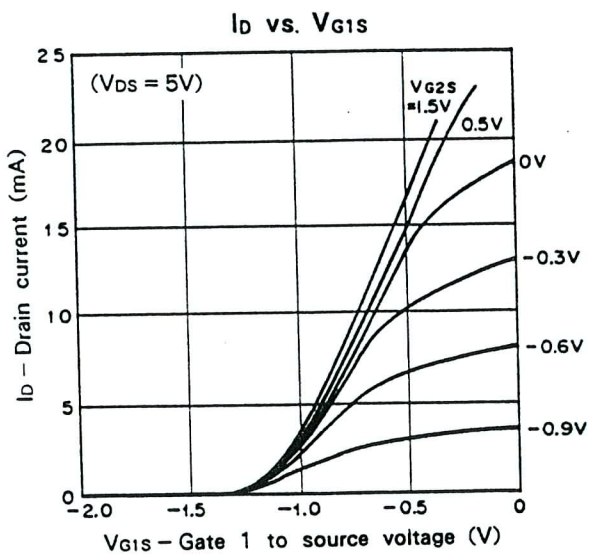
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain to source voltage	V_{DSX}	I_D = 20 µA V_{G1S} = 0V V_{G2S} = − 4.0V	11			V
Gate 1 cutoff current	I_{G1SS}	V_{G1S} = − 4.5V V_{G2S} = 0V V_{DS} = 0V			− 8	µA
Gate 2 cutoff current	I_{G2SS}	V_{G2S} = − 4.5V V_{G1S} = 0V V_{DS} = 0V			− 8	µA
Gate 2 to drain cutoff current	I_{G2DO}	V_{G2D} = − 12V			− 10	µA
Drain saturation current	I_{DSS}	V_{DS} = 5V V_{G1S} = 0V V_{G2S} = 0V	10		35	mA
Gate 1 cutoff voltage	V_{G1S} (OFF)	V_{DS} = 5V I_D = 100 µA V_{G2S} = 0V			− 2.5	V
Gate 2 cutoff voltage	V_{G2S} (OFF)	V_{DS} = 5V I_D = 100 µA V_{G1S} = 0V			− 2.5	V
Forward transfer admittance	gm	V_{DS} = 5V I_D = 10mA V_{G2S} = 1.5V f = 1KHz	20	26		mS
Input capacitance	Ciss	V_{DS} = 5V I_D = 10mA V_{G2S} = 1.5V f = 1MHz		1.1	3	pF
Reverse transfer capacitance	Crss			28	40	fF
Noise figure	NF	V_{DS} = 5V I_D = 10mA V_{G2S} = 1.5V f = 800MHz		1.2	2.0	dB
Associated gain	Ga		18	22		dB

Typical Characteristics (Ta = 25 °C)

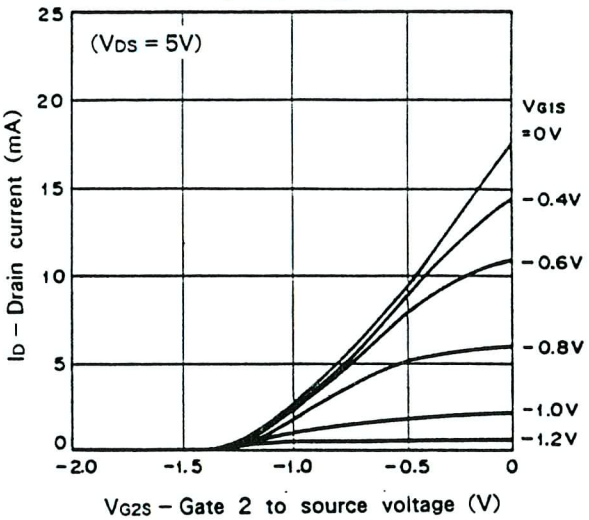
I_D vs. V_{DS}



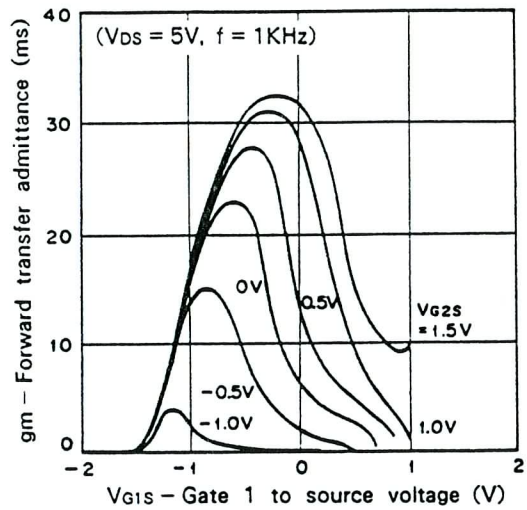
I_D vs. V_{G1S}



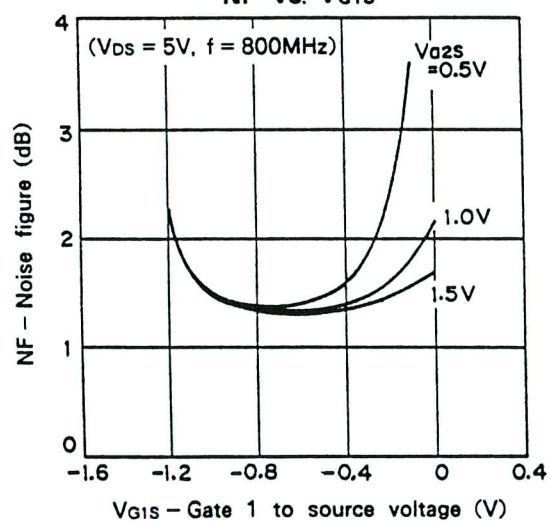
I_D vs. V_{G2S}



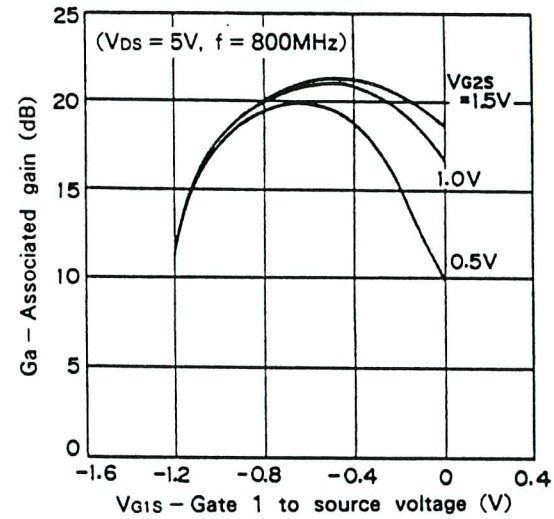
gm vs. V_{G1S}



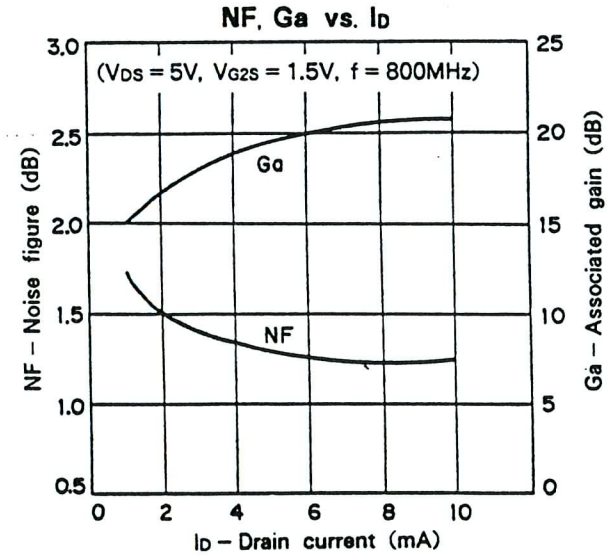
NF vs. V_{G1S}



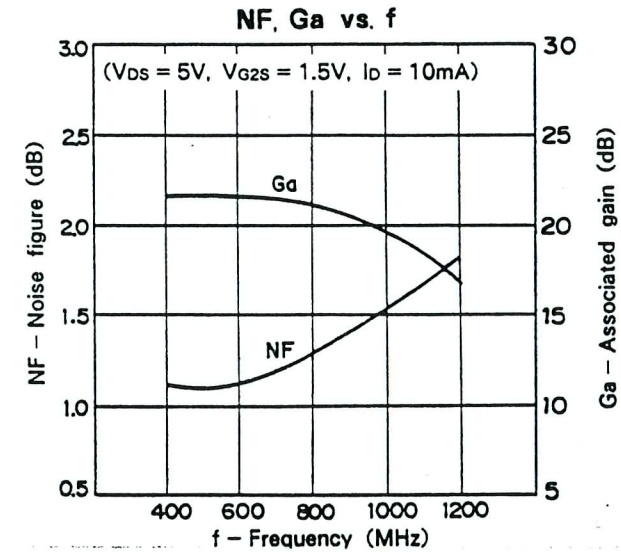
Ga vs. V_{G1S}



NF, Ga vs. I_D

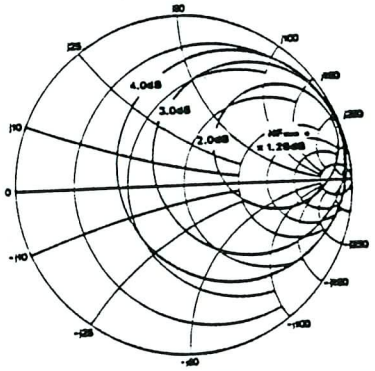


NF, Ga vs. f



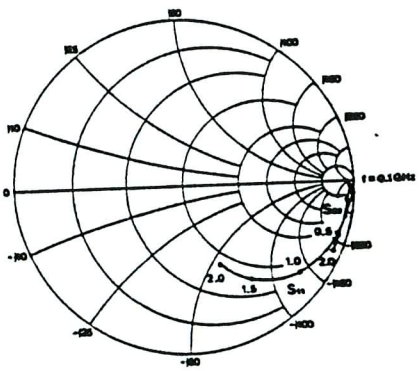
Noise Figure Characteristics (V_{DS} = 5V, V_{G2S} = 1.5V, I_D = 10 mA)

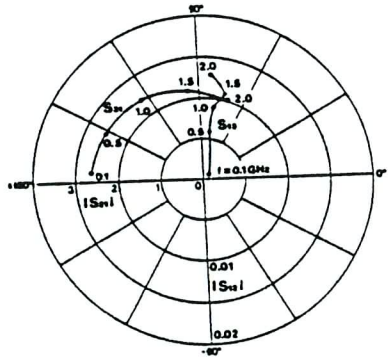
at 800 MHz



f (MHz)	Ga (dB)	NFmin (dB)	NF50 (dB)	Rn (Ω)	Γ (S) MAG	Γ (S) ANG	Γ (L) MAG	Γ (L) ANG
600	21.2	1.23	2.59	29.1	.823	18.9°	.824	3.1°
800	20.8	1.26	2.59	29.2	.804	20.4°	.896	5.8°
1000	19.5	1.57	2.78	37.7	.750	24.2°	.865	3.9°

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





f (MHz)	S11 MAG	S11 ANG	S21 MAG	S21 ANG	S12 MAG	S12 ANG	S22 MAG	S22 ANG
100	1.00	− 4.0°	2.63	174°	.001	50.9°	.976	− 1.6°
200	.996	− 8.0°	2.62	168°	.002	84.7°	.975	− 2.8°
300	.985	− 12.3°	2.61	163°	.004	85.8°	.971	− 4.0°
400	.968	− 16.0°	2.57	157°	.004	77.0°	.968	− 5.2°
500	.953	− 19.9°	2.55	152°	.006	80.2°	.965	− 6.4°
600	.933	− 24.1°	2.53	146°	.006	84.4°	.966	− 7.8°
700	.916	− 27.6°	2.51	141°	.007	75.3°	.964	− 8.7°
800	.895	− 31.5°	2.49	135°	.008	77.9°	.963	− 9.9°
900	.872	− 35.1°	2.47	130°	.009	77.1°	.962	− 11.3°
1000	.844	− 38.8°	2.45	125°	.009	79.8°	.961	− 12.3°
1100	.819	− 42.1°	2.42	119°	.010	72.3°	.959	− 13.6°
1200	.778	− 44.8°	2.36	114°	.010	75.4°	.955	− 15.0°
1300	.747	− 48.9°	2.33	108°	.010	76.0°	.953	− 16.5°
1400	.713	− 52.4°	2.29	103°	.011	80.0°	.950	− 17.7°
1500	.679	− 55.7°	2.24	97.1°	.011	74.2°	.945	− 19.1°
1600	.646	− 58.6°	2.18	92.1°	.011	70.0°	.939	− 19.7°
1700	.616	− 61.5°	2.14	87.4°	.012	76.5°	.946	− 20.9°
1800	.589	− 63.8°	2.12	82.0°	.012	83.6°	.949	− 22.1°
1900	.552	− 65.7°	2.09	76.8°	.012	81.7°	.953	− 23.7°
2000	.517	− 66.8°	2.06	71.3°	.013	83.4°	.956	− 25.4°