

SONY**3SK149**

GaAs N-channel Dual-Gate MES FET

Description:

The 3SK149 is a GaAs N-channel Dual-Gate MES FET for low noise UHF amplifiers. Low noise and high gain characteristics are accomplished by optimum mask pattern designing. Easier high frequency circuits adjustments are made possible by the miniaturized plastic molded package which contributes to reduce parasitic elements of the device.

Features:

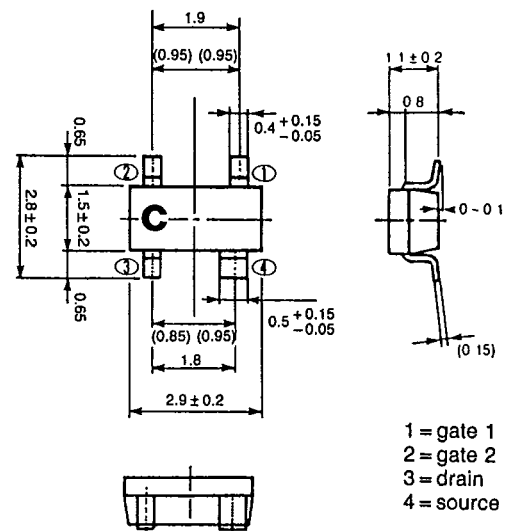
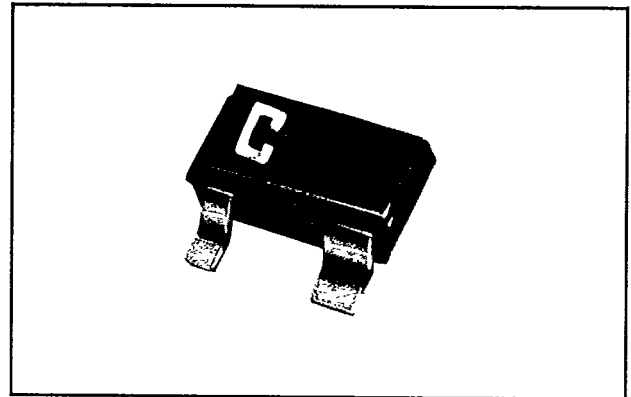
Low NF: NF = 1.2 dB (typ.) at 800 MHz
 High PG: PG = 20 dB (typ.) at 800 MHz
 High Stability

Applications:

- UHF Amplifier, oscillator.

Absolute Maximum Ratings: (Ta = 25°C)

• Drain to Source Voltage:	Vdsx	8	V
• Gate 1 to Source Voltage:	Vg1s	-6	V
• Gate 2 to Source Voltage:	Vg2s	-6	V
• Drain Current:	Id	80	mA
• Power Dissipation:	Pch	150	mW
• Channel Temperature:	Tch	+150	°C
• Storage Temperature:	Tstg	-55 ~ +150	°C



unit:mm

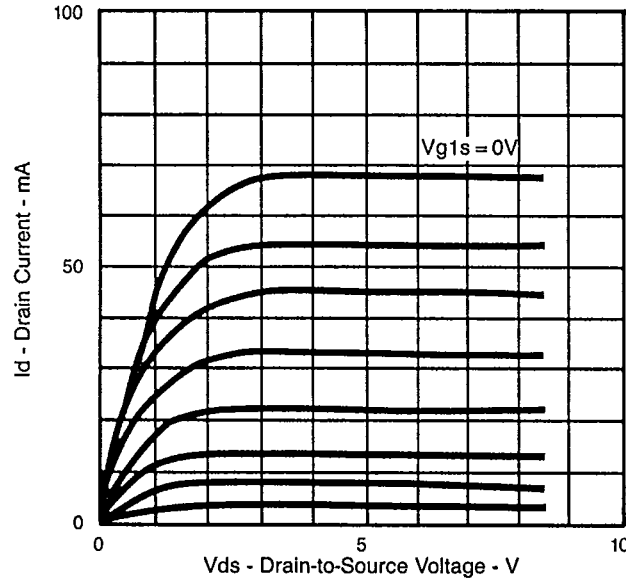
Electrical Characteristics: (Ta = 25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain to Source Voltage	Vdsx	Id = 100μA Vg1s = 0V Vg2s = -5V	8			V
Gate 1 Cutoff Current	Ig1ss	Vg1s = -5V Vg2s = 0V Vds = 0V	-10			μA
Gate 2 Cutoff Current	Ig2ss	Vg2s = -5V Vg1s = 0V Vds = 0V	-10			μA
Drain Saturation Current	Idss	Vds = 5V Vg1s = 0V Vg2s = 0V	30		80	mA
Gate 1 Pinchoff Voltage	Vp1	Vds = 5V Id = 100μA Vg2s = 0V	-4		-1	V
Gate 2 Pinchoff Voltage	Vp2	Vds = 5V Id = 100μA Vg1s = 0V	-4		-1	V
Transconductance	gm	Vds = 5V Id = 10mA Vg2s = 1.5V f = 1KHz	25	40		mS
Input Capacitance	Ciss	Vds = 5V Id = 10mA Vg2s = 1.5V f = 1MHz		1.3	2.0	PF
Feedback Capacitance	Crss			25	40	fF
Power Gain	PG	Vds = 5V Id = 10mA Vg2s = 1.5V f = 800MHz	18	20		dB
Noise Figure	NF			1.2	2.0	dB

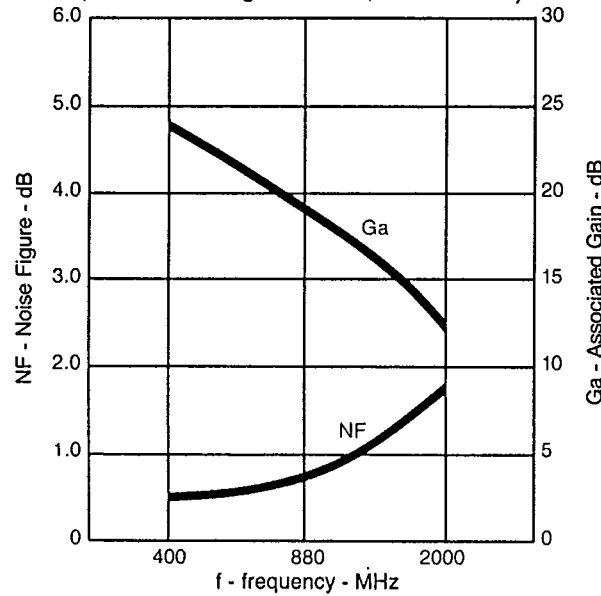
The specifications are subject to change without notice.

3SK149

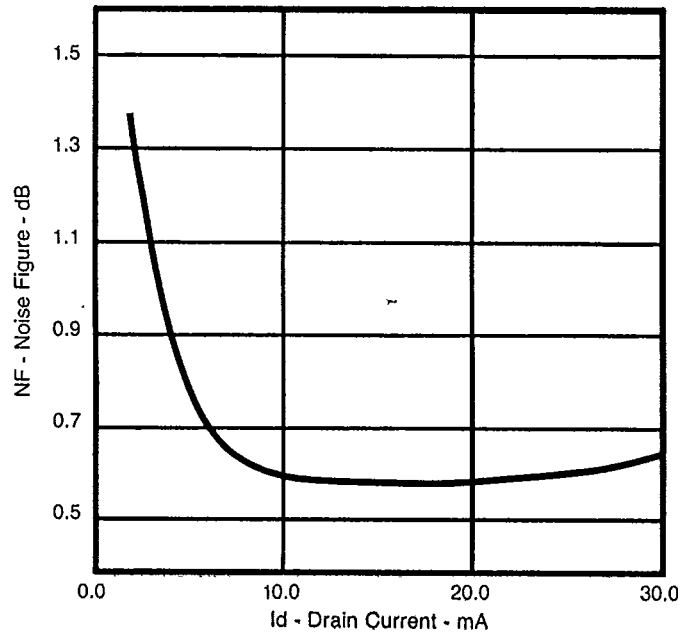
Output Characteristics: ($T_a = 25^\circ\text{C}$, $V_{g2s} = 1.5\text{V}$, $V_{g1s} = -0.5\text{V/step}$)



NF, Ga Frequency Dependence: ($V_{ds} = 10\text{V}$, $V_{g2s} = 1.5\text{V}$, $I_{ds} = 10\text{mA}$)

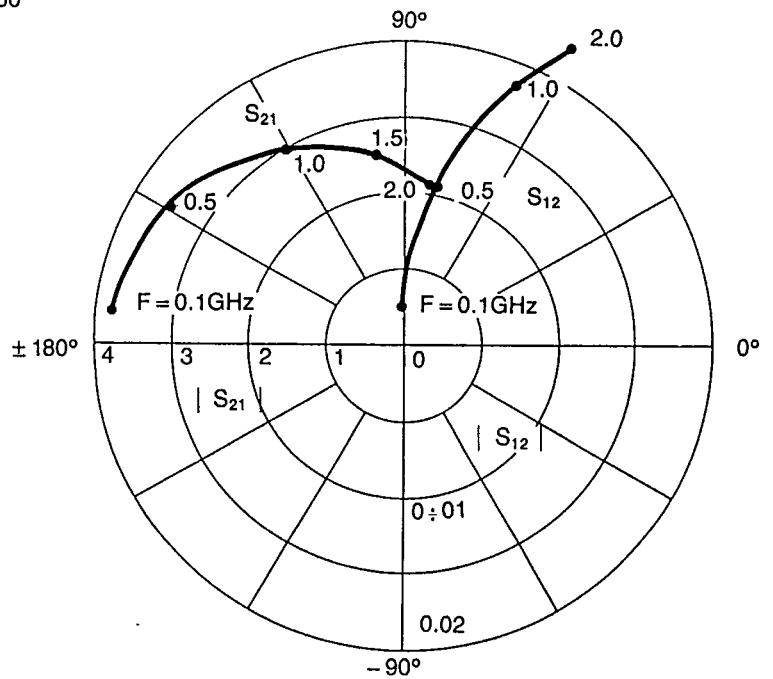
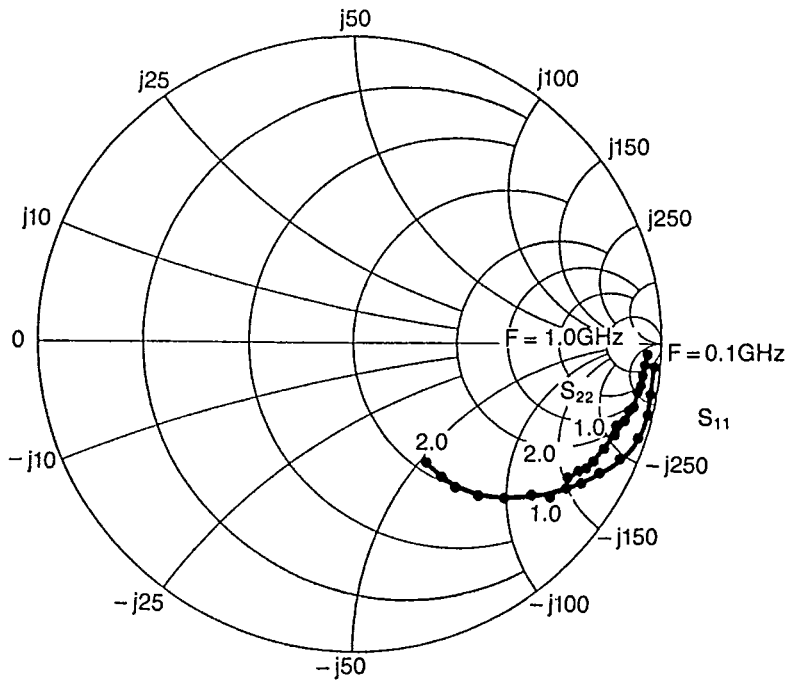


NF-Id Characteristics: ($V_{ds} = 5.0\text{V}$, $V_{g2s} = 1.5\text{V}$, Frequency at 450MHz)



3SK149

S-Parameter vs. Frequency Characteristics: (Vds = 5V, Vg2s = 1.5V, Id = 10mA)

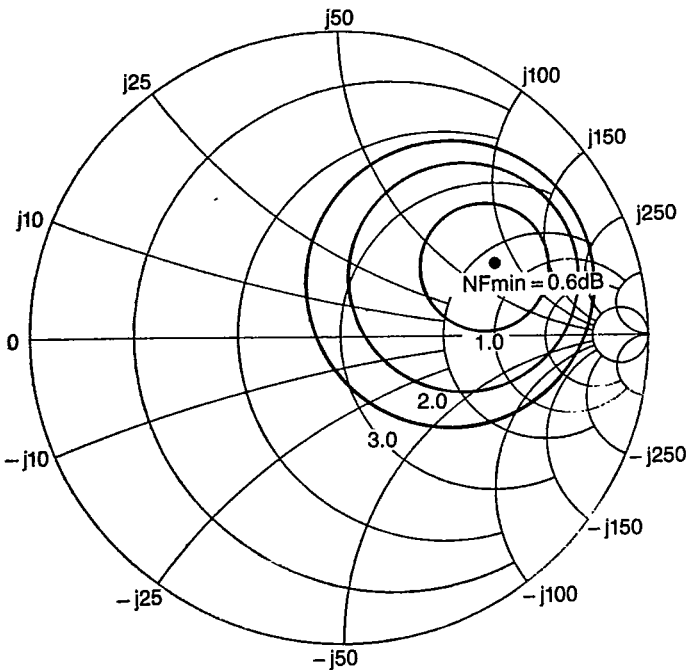


S-Parameter Data of FET 3SK149 (50.0 Ohm reference)

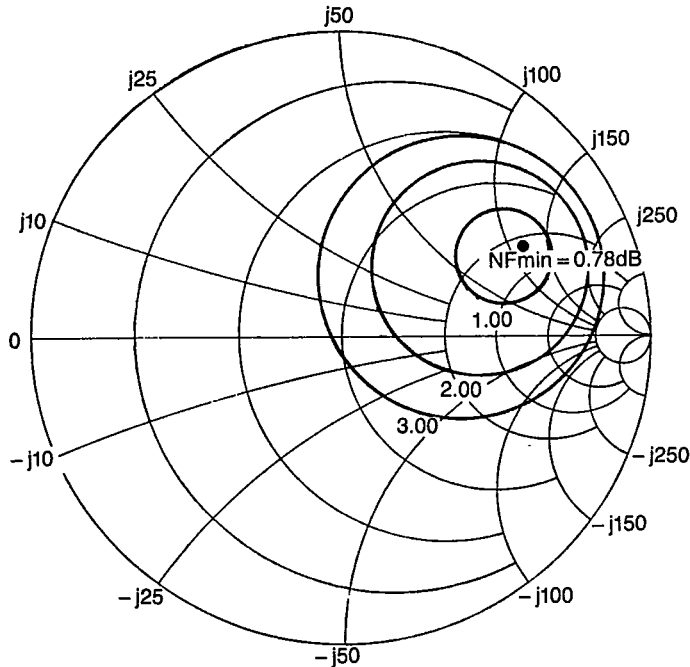
Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	.997	-4.90	3.815	173.47	0.0025	90.83	.941	-1.80
200	.991	-9.59	3.745	165.74	0.0041	86.98	.939	-4.18
300	.998	-13.04	3.672	161.43	0.0095	84.23	.979	-9.40
400	.959	-18.65	3.647	155.81	0.0105	82.44	.928	-8.23
500	.933	-22.47	3.471	149.90	0.0110	76.78	.925	-9.44
600	.904	-26.50	3.400	141.51	0.0134	76.78	.926	-11.85
700	.873	-30.25	3.311	137.92	0.0153	72.93	.913	-12.87
800	.844	-33.71	3.173	132.54	0.0160	73.56	.912	-15.33
900	.814	-36.72	3.002	125.45	0.0172	69.08	.896	-16.30
1000	.780	-39.35	3.058	120.39	0.0189	66.18	.897	-18.80
1200	.707	-44.48	2.741	112.87	0.0217	65.07	.882	-22.55
1400	.641	-49.20	2.636	103.06	0.0246	60.53	.868	-25.75
1600	.587	-52.59	2.412	95.81	0.0236	61.71	.863	-28.06
1800	.520	-54.29	2.357	88.93	0.0245	62.06	.855	-29.88
2000	.452	-57.35	2.145	80.33	0.0239	60.92	.834	-31.69

3

Noise Figure Characteristics: (Vds = 5.0V, Vg2s = 1.5V, Ids = 10mA)
 at 450MHz at 880MHz

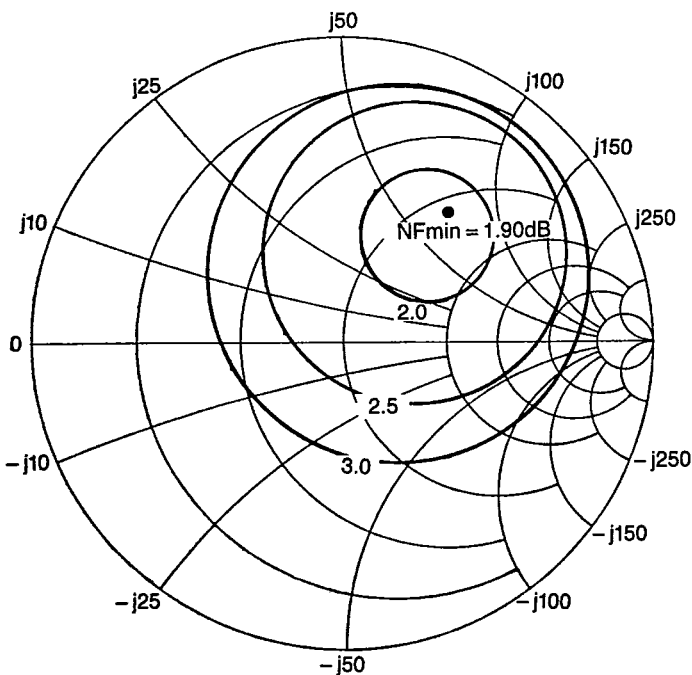


Vds = 5.0V
 Vg2s = 1.5V
 Ids = 10mA
 Frequency 450 MHz
 NF min 0.60 dB
 Ga 23.02 dB
 Gamma (S); Mag 0.559 Ang 26.73°



Vds = 5.0V
 Vg2s = 1.5V
 Ids = 10mA
 Frequency 880 MHz
 NF min 0.78 dB
 Ga 19.25 dB
 Gamma (S); Mag 0.616, Ang 26.89°

at 2000MHz



Frequency (MHz)	Ga (dB)	NF (dB)	Gamma- S		Gamma- L	
			(Mag.)	(Ang.)	(Mag.)	(Ang.)
400	24.31	0.51	0.689	21.39°	0.902	14.07°
450	23.02	0.60	0.559	26.73°	0.894	16.93°
500	22.43	0.66	0.690	19.49°	0.894	17.93°
880	19.25	0.78	0.616	26.87°		
2000	12.90	1.90	0.542	51.14°		

Vds = 5.0V
 Vg2s = 1.5V
 Ids = 10mA
 Frequency 2000 MHz
 NF min 1.90 dB
 Ga 12.90 dB
 Gamma (S); Mag 0.542, Ang 51.14°