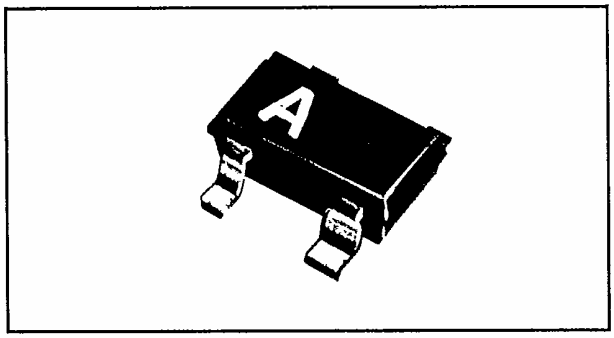
SONY **3SK147**

GaAs N-channel Dual-Gate MES FET

Description:

The 3SK147 is a GaAs N-channel Dual-Gate MES FET for low noise UHF amplifiers and mixers. Low noise, high gain characteristics and low operating voltage are accomplished by optimum mask pattern design. Simplified high frequency circuits adjustments are made possible by the miniaturized plastic molded package which contributes to reduce parasitic elements of the device.



Features:

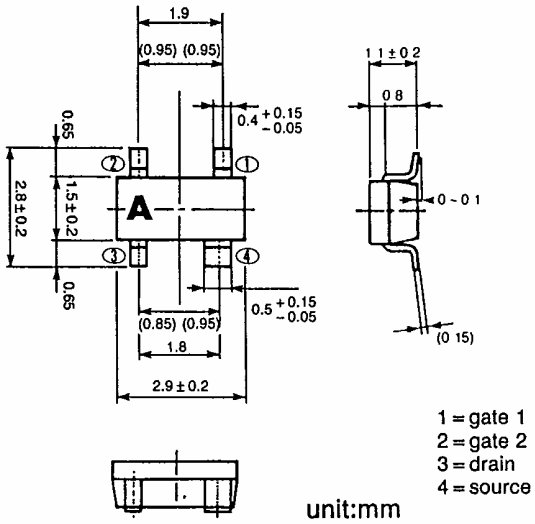
Low Operating Voltage
Low NF: NF = 1.2 dB (typ.) at 800MHz
High PG: PG = 22 dB (typ.) at 800 MHz
High Stability
Protection Diode Included

Applications:

- UHF T.V. Tuner, amplifier, mixer, oscillator.

Absolute Maximum Ratings: (Ta = 25°C)

• Drain to Source Voltage:	Vdsx	12	V
• Gate 1 to Source Voltage:	Vg1s	−5	V
• Gate 2 to Source Voltage:	Vg2s	−5	V
• Drain Current:	Id	55	mA
• Power Dissipation:	Pch	150	mW
• Channel Temperature:	Tch	+150	°C
• Storage Temperature:	Tstg	−55 ~ +150	°C

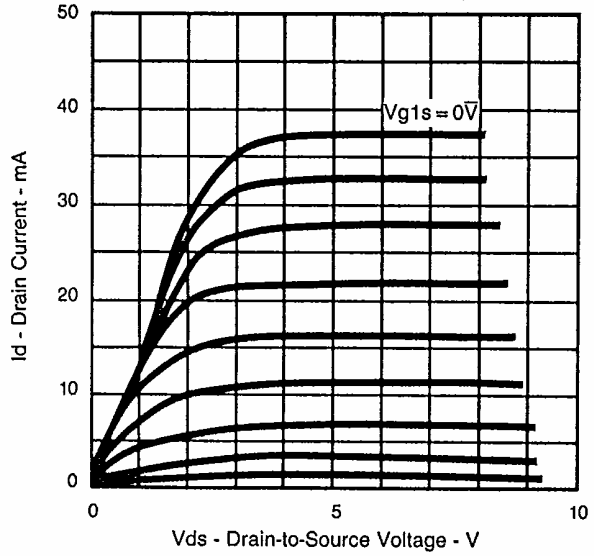


Electrical Characteristics: (Ta = 25°C)

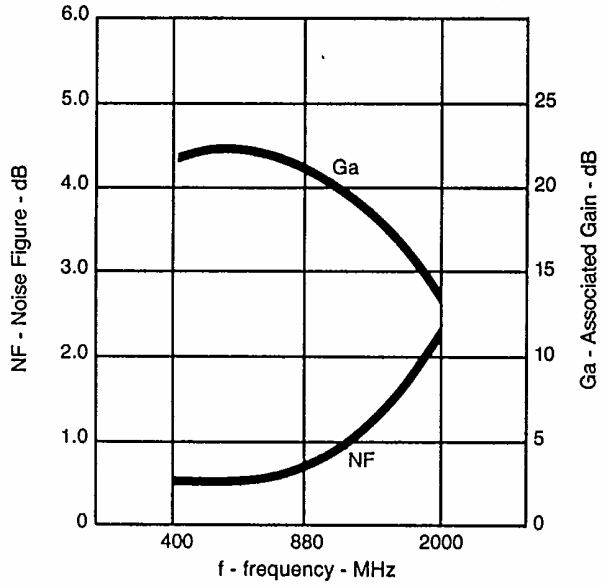
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain to Source Voltage	Vdsx	Id = 20μA Vg1s = 0V Vg2s = −4V	11			V
Gate 1 Cutoff Current	Ig1ss	Vg1s = −4.5V Vg2s = 0V Vds = 0V	−8			μA
Gate 2 Cuttoff Current	Ig2ss	Vg2s = −4.5V Vg1s = 0V Vds = 0V	−8			μA
Drain Saturation Current	Idss	Vds = 5V Vg1s = 0V Vg2s = 0V	10		50	mA
Gate 1 Pinchoff Voltage	Vp1	Vds = 5V Id = 100μA Vg2s = 0V	−2.5			V
Gate 2 Pinchoff Voltage	Vp2	Vds = 5V Id = 100μA Vg1s = 0V	−2.5			V
Transconductance	gm	Vds = 5V Id = 10mA Vg2s = 1.5V f = 1KHz	20	26		mS
Input Capacitance	Ciss	Vds = 5V Id = 10mA Vg2s = 1.5V f = 1MHz		1.1	3	PF
Feedback Capacitance	Crss			28	40	fF
Power Gain	PG	Vds = 5V Id = 10mA Vg2s = 1.5V f = 800MHz	18	22		dB
Noise Figure	NF			1.2	2.0	dB

The specifications are subject to change without notice.

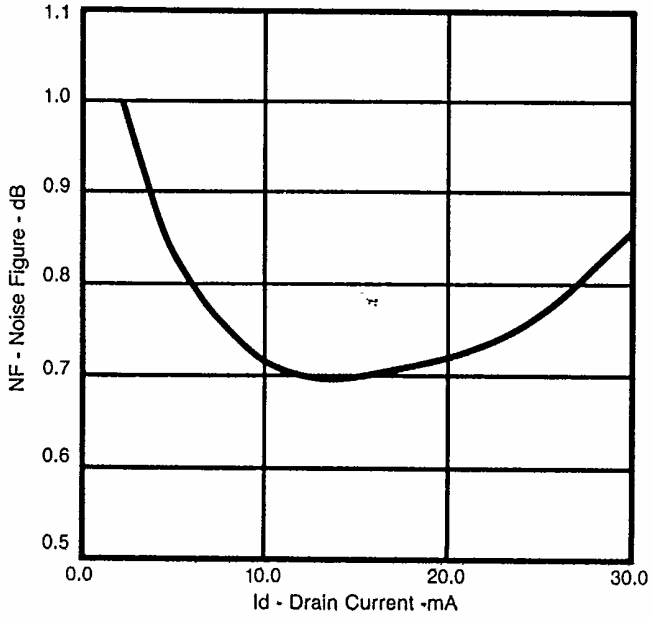
Output Characteristics: (Ta = 25°C, Vg2s = 1.5V, Vg1s = −0.2Vstep)



NF, Ga Frequency Dependence: (Vds = 5.0V, Vg2s = 1.5V, Ids = 10mA)



NF-Id Characteristics: (Vds = 5.0V, Vg2s = 1.5V, Frequency at 450MHz)



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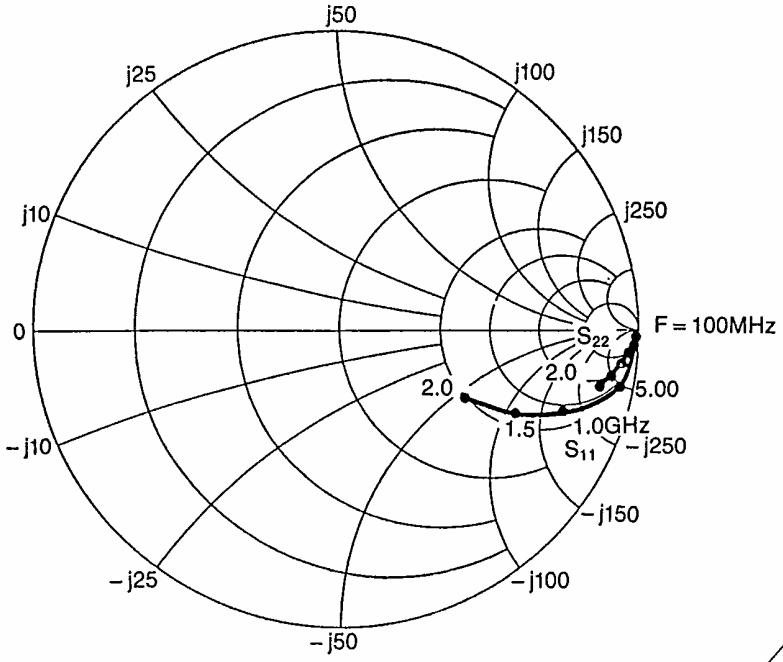
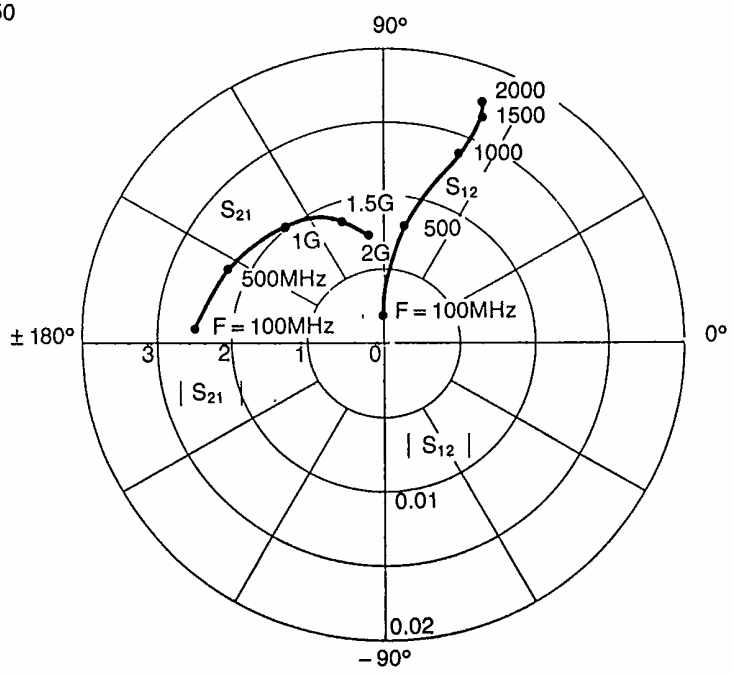
S-Parameters vs. Frequency Characteristics: (Vds = 5V, Vg2s = 1.5V, Id = 10mA)



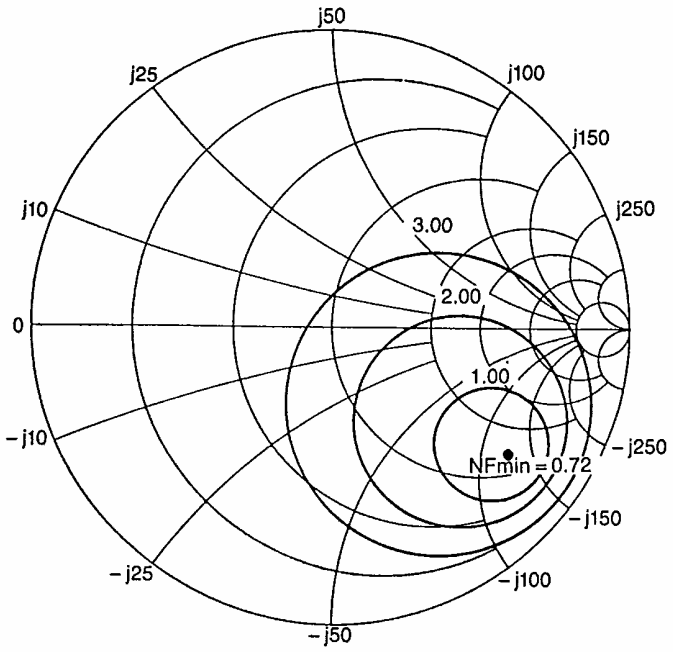


S-Parameter Data of FET 3SK147 (50.0 Ohm reference)

Frequency MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	.996	-4.29	2.463	174.58	0.0017	90.33	.969	-1.24
200	.991	-8.41	2.429	167.53	0.0032	82.30	.970	-2.71
300	.992	-12.08	2.423	161.43	0.0042	85.75	.981	-5.05
400	.967	-16.21	2.415	160.18	0.0072	85.39	.962	-5.36
500	.944	-19.67	2.288	154.96	0.0080	79.42	.961	-6.27
600	.920	-23.29	2.275	147.32	0.0097	77.89	.964	-7.75
700	.892	-26.72	2.233	144.80	0.0111	74.26	.954	-8.54
800	.865	-29.98	2.128	140.64	0.0117	75.69	.952	-10.22
900	.836	-32.83	2.018	133.59	0.0125	71.74	.940	-10.92
1000	.807	-35.39	2.079	128.17	0.0139	68.31	.940	-12.55
1200	.736	-40.18	1.874	123.16	0.0162	69.28	.932	-15.15
1400	.672	-44.73	1.845	114.38	0.0174	64.55	.919	-17.33
1600	.615	-48.21	1.676	108.69	0.0173	68.24	.915	-18.83
1800	.547	-50.41	1.655	102.68	0.0179	66.81	.908	-19.93
2000	.471	-53.14	1.435	95.70	0.0178	68.29	.892	-21.04

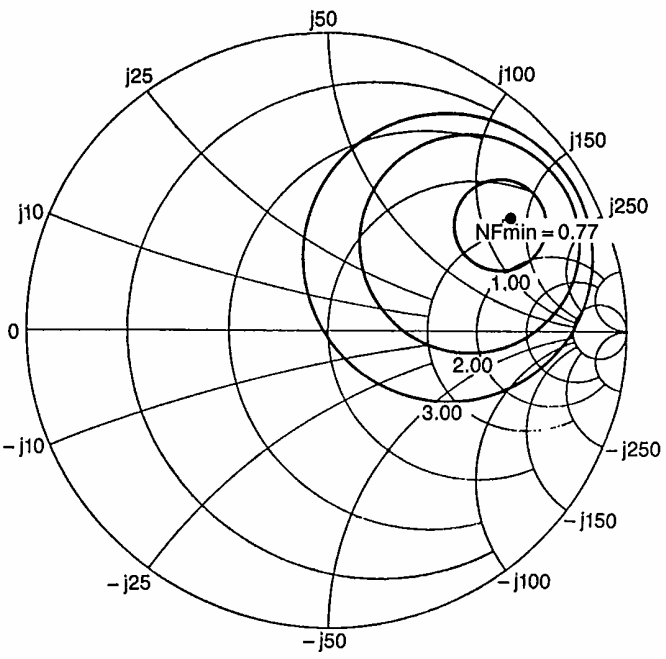
Noise Figure Characteristics: (Vds = 5.0V, Vg2s = 1.5V, Ids = 10mA)

at 450MHz



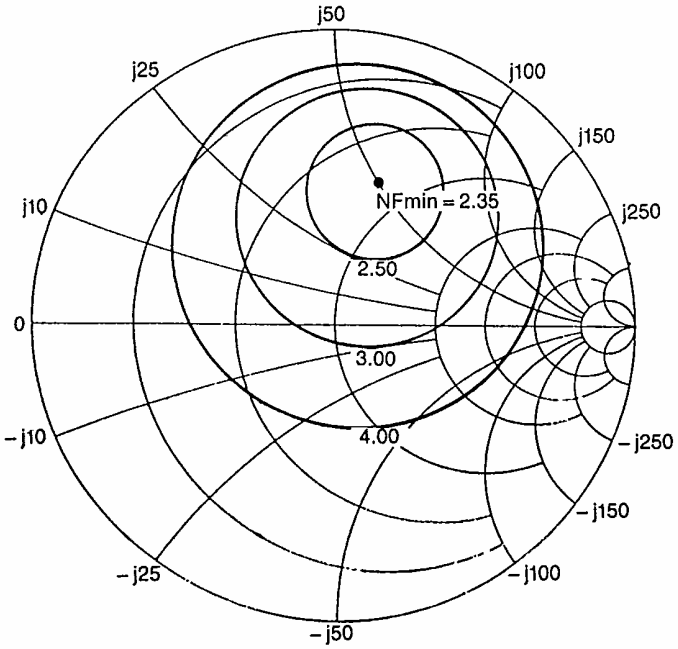
Vds = 5.0V
Vg2s = 1.5V
Ids = 10mA
Frequency 450 MHz
NF min 0.72 dB
Ga 20.57 dB
Gamma (S); Mag 0.730 Ang -35.46°
Gamma (L); Mag 0.833 Ang -46.85°

at 880MHz



Vds = 5.0V
Vg2s = 1.5V
Ids = 10mA
Frequency 880 MHz
NF min 0.77 dB
Ga 20.57 dB
Gamma (S); Mag 0.725 Ang 32.68°

at 2000MHz



Frequency (MHz)	Ga (dB)	NF (dB)	Gamma- S		Gamma- L	
			(Mag.)	(Ang.)	(Mag.)	(Ang.)
400	21.69	0.60	0.747	-78.04°	0.912	-76.72°
450	20.57	0.72	0.730	-35.46°	0.833	-46.85°
500	22.03	0.71	0.813	4.63°	0.560	-5.95°
880	20.75	0.77	0.725	32.68°		
2000	13.38	2.35	0.510	73.32°		

Vds = 5.0V
Vg2s = 1.5V
Ids = 10mA
Frequency 2000 MHz
NF min 2.35 dB
Ga 13.38 dB
Gamma (S); Mag 0.510 Ang 73.32°

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