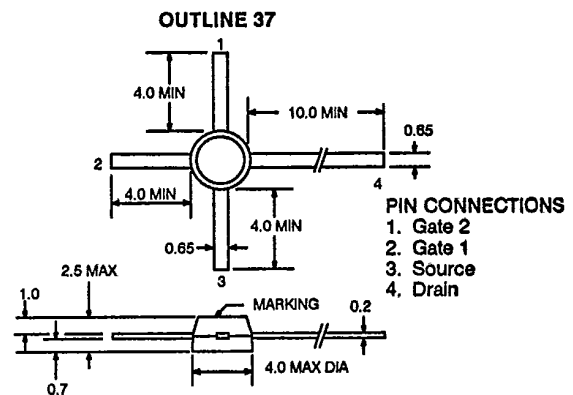


NEC[®]**GENERAL PURPOSE
DUAL-GATE GaAs MESFET****NE25137
NE25139****FEATURES**

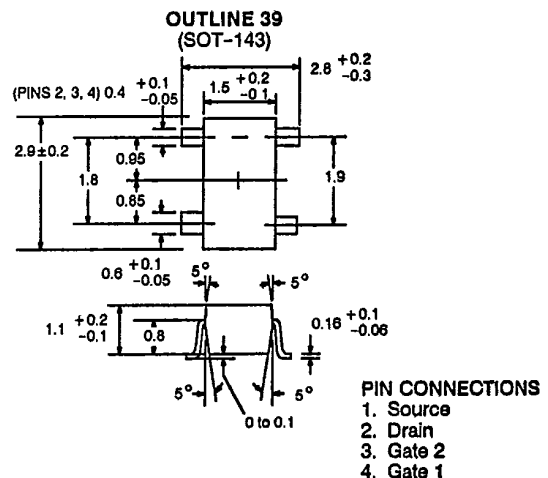
- SUITABLE FOR USE AS RF AMPLIFIER IN UHF TUNER
- LOW C_{rss} : 0.02 pF (TYP)
- HIGH G_{ps} : 20 dB (TYP) AT 900 MHz
- LOW NF: 1.1 dB TYP AT 900 MHz
- GATE WIDTH: $W_G = 400$ MICRONS
- ION IMPLANTATION
- AVAILABLE IN TAPE & REEL OR BULK

DESCRIPTION AND APPLICATIONS

The NE251 is a dual gate GaAs FET designed to provide flexibility in its application as a mixer, AGC amplifier, or low noise amplifier. As an example, by shorting the second gate to the source, higher gain can be realized than with single gate MESFETs. This device is available in disk-mold and mini-mold (surface mount).

OUTLINE DIMENSIONS (Units in mm)**ABSOLUTE MAXIMUM RATINGS (TA = 25°C)**

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{DSX}	Drain to Source Voltage	V	13
V_{G1S}	Gate 1 to Source Voltage	V	-4.5
V_{G2S}	Gate 2 to Source Voltage	V	-4.5
I_D	Drain Current	mA	40
P_r	Total Power Dissipation	mW	200
T_{CH}	Channel Temperature	°C	125
T_{STG}	Storage Temperature	°C	-55 to +125



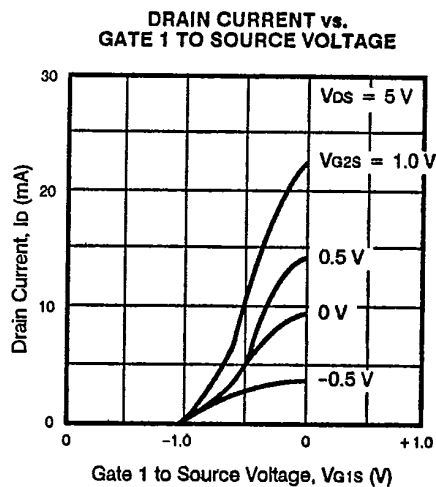
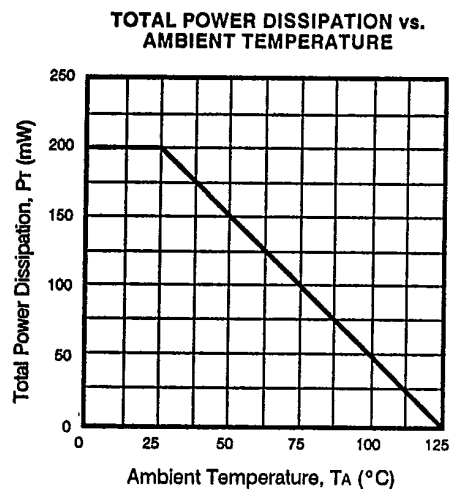
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

PART NUMBERS PACKAGE OUTLINE			NE25137, NE25139 37, 39		
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
BV_{DSX}	Drain to Source Breakdown Voltage at $V_{G1S} = -4\text{ V}$, $V_{G2S} = 0\text{ V}$, $I_D = 10\text{ }\mu\text{A}$	V	13		
I_{DSS}	Drain Current at $V_{DS} = 5\text{ V}$, $V_{G2S} = 0\text{ V}$, $V_{G1S} = 0\text{ V}$	mA	5	20	40
$V_{G1S}(\text{OFF})$	Gate 1 to Source Cutoff Voltage at $V_{DS} = 5\text{ V}$, $V_{G2S} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$	V	-3.5		
$V_{G2S}(\text{OFF})$	Gate 2 to Source Cutoff Voltage at $V_{DS} = 5\text{ V}$, $V_{G1S} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$	V	-3.5		
I_{G1SS}	Gate 1 Reverse Current at $V_{DS} = 0$, $V_{G1S} = -4\text{ V}$, $V_{G2S} = 0$	μA			10
I_{G2SS}	Gate 2 Reverse Current at $V_{DS} = 0$, $V_{G2S} = -4\text{ V}$, $V_{G1S} = 0$	μA			10
$ Y_{fs} $	Forward Transfer Admittance at $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$, $f = 1.0\text{ kHz}$	mS	18	25	35
C_{iss}	Input Capacitance at $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ MHz}$	pF	0.5	1.0	1.5
C_{rss}	Reverse Transfer Capacitance at $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ MHz}$	pF		0.02	0.03
G_{PS}	Power Gain at $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$, $f = 900\text{ MHz}$	dB	16	20	
NF	Noise Figure at $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$, $f = 900\text{ MHz}$	dB		1.1	2.5

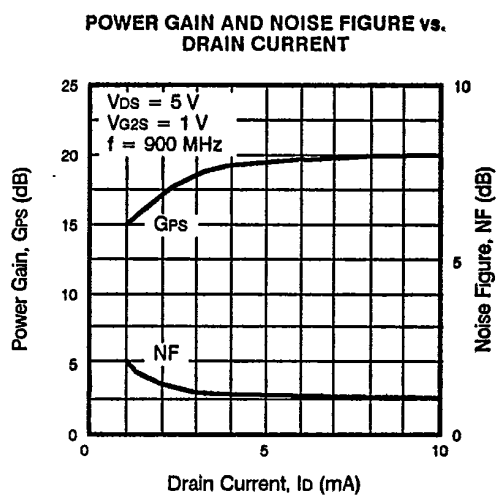
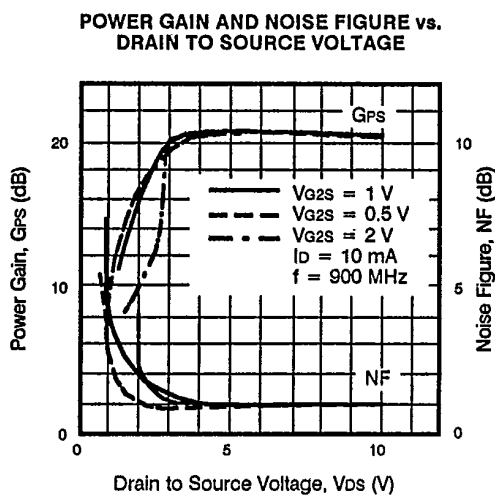
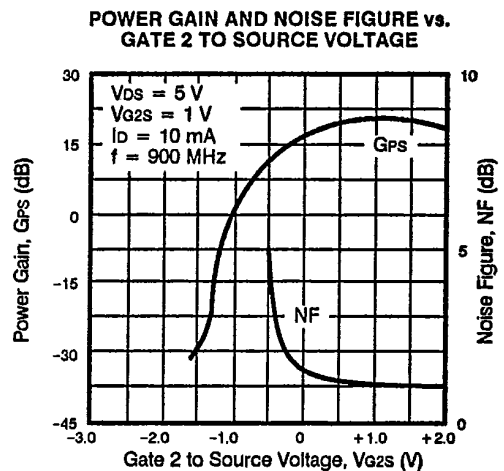
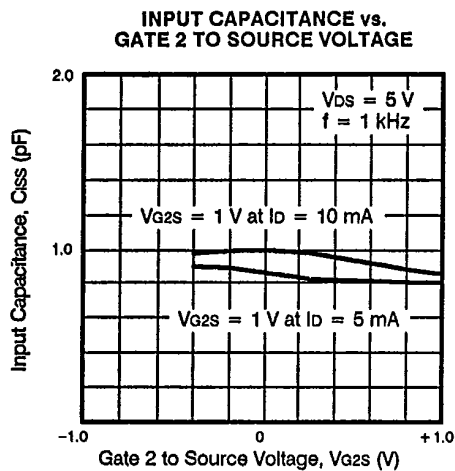
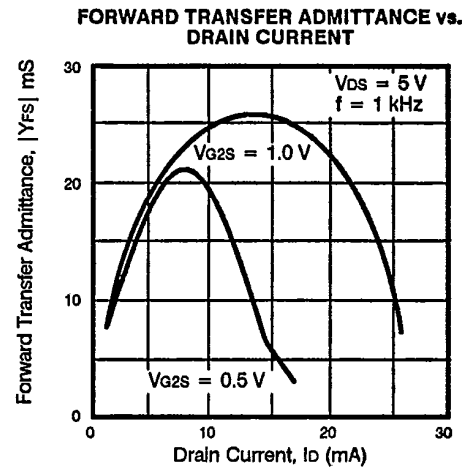
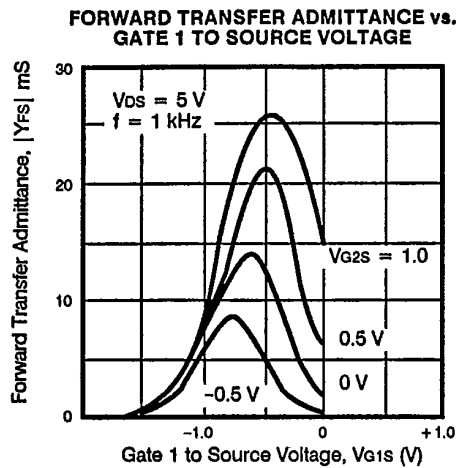
IDSS CLASSIFICATION (Units in mA)

I_{DSS}	5 TO 15	10 TO 25	20 TO 35	30 TO 40
NE25137 Marking	N	M	L	K
NE25139 Marking	U71	U72	U73	U74

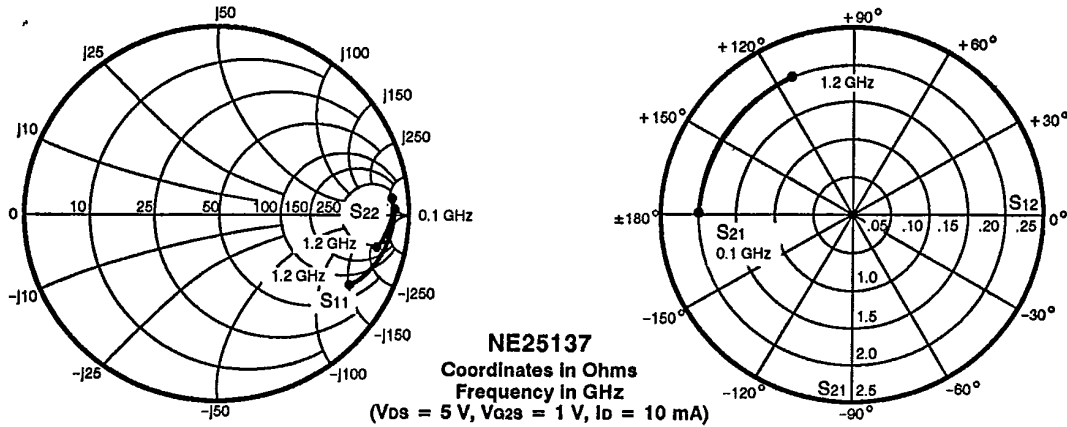
3

TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



TYPICAL SCATTERING PARAMETERS

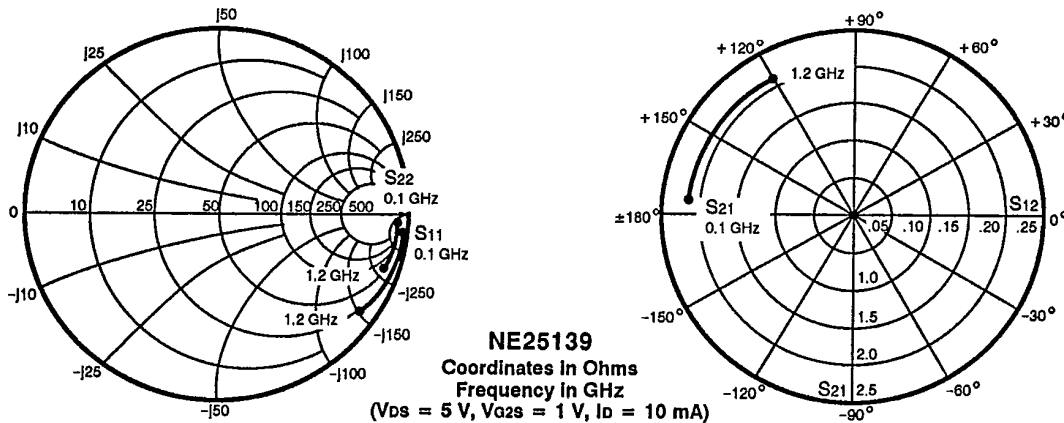


S-MAGN AND ANGLES:

 $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$

FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.99	-3	2.10	177	.001	87	.97	-2
200	.99	-6	2.14	170	.001	86	.98	-4
300	.99	-9	2.09	163	.001	86	.98	-4
400	.98	-13	2.07	158	.002	85	.97	-6
500	.97	-15	2.12	157	.002	85	.98	-6
600	.95	-19	2.12	148	.003	84	.96	-9
700	.96	-20	2.07	144	.003	82	.98	-8
800	.93	-25	2.08	138	.004	81	.95	-11
900	.93	-26	2.16	136	.004	81	.98	-11
1000	.88	-30	2.12	126	.005	80	.95	-15
1100	.90	-31	2.15	123	.005	80	.98	-14
1200	.85	-35	2.19	116	.005	79	.95	-18



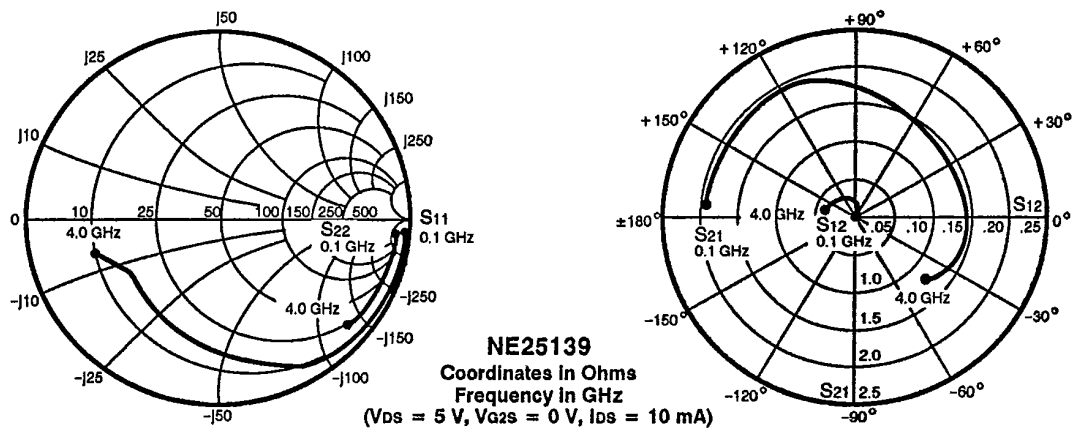
S-MAGN AND ANGLES:

 $V_{DS} = 5\text{ V}$, $V_{G2S} = 1\text{ V}$, $I_D = 10\text{ mA}$

FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
100	.99	-3	2.36	177	.001	87	.97	-1
200	.99	-7	2.39	169	.001	85	.98	-3
300	.99	-9	2.31	164	.002	82	.98	-3
400	.98	-13	2.23	160	.002	82	.97	-6
500	.97	-16	2.42	158	.003	81	.99	-6
600	.97	-19	2.30	150	.003	81	.96	-8
700	.96	-22	2.33	146	.004	80	.99	-9
800	.95	-25	2.23	142	.005	79	.96	-9
900	.94	-29	2.45	137	.005	79	.99	-13
1000	.92	-29	2.30	131	.006	78	.97	-11
1100	.91	-35	2.35	126	.006	78	.98	-15
1200	.88	-35	2.37	124	.006	78	.99	-13

TYPICAL SCATTERING PARAMETERS



S-MAGN AND ANGLES:

$V_{ds} = 5\text{ V}$, $V_{g2s} = 0\text{ V}$, $I_{ds} = 10\text{ mA}$

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂		k	Gma dB
100	1.0	-4	1.96	174	0.001	87	0.96	-1	-0.03	29.0
200	1.0	-8	1.92	169	0.001	85	0.96	-2	0.15	31.2
400	0.99	-15	1.91	158	0.001	82	0.95	-3	1.30	27.3
600	0.97	-23	1.90	148	0.002	81	0.94	-3	1.75	22.3
900	0.94	-35	1.90	132	0.004	80	0.94	-4	2.18	18.2
1000	0.92	-39	1.90	126	0.004	79	0.94	-5	2.35	17.2
1500	0.82	-61	1.88	99	0.006	78	0.94	-6	3.22	14.8
2000	0.69	-86	1.52	71	0.008	95	0.95	-9	2.97	14.6
2500	0.60	-110	1.41	45	0.012	118	0.96	-12	1.41	17.0
3000	0.51	-131	1.39	19	0.023	153	0.97	-18	0.43	17.8
3500	0.51	-147	1.37	-6	0.039	162	0.97	-27	0.08	15.45
4000	0.63	-167	1.20	-47	0.042	157	0.96	-42	0.01	14.56

NE76084 TYPICAL NOISE PARAMETERS²

($V_{ds} = 5\text{ V}$, $V_{g2s} = 0\text{ V}$, $I_{ds} = 10\text{ mA}$)

FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		Rn/50
			(MAG)	(ANG)	
0.5	0.9	18.5	0.9	18	1.9
0.9	1.2	16.0	0.82	28	1.2
1.5	1.5	14.6	0.71	45	0.9
2.0	1.9	12.5	0.55	75	0.67
3.0	2.5	11.0	0.34	116	0.5
4.0	3.3	9.5	0.25	154	0.4