

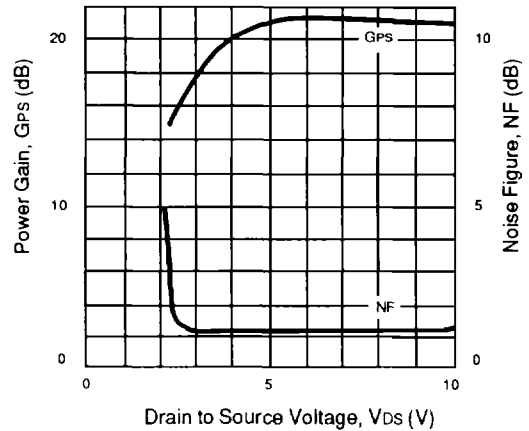
### FEATURES

- SUITABLE FOR USE AS RF AMPLIFIER AND MIXER IN UHF APPLICATIONS
- LOW CRSS: 0.02 pF (TYP)
- HIGH GPS: 20 dB (TYP) AT 900 MHz
- LOW NF: 1.1 dB TYP AT 900 MHz
- $L_{G1} = 1.0 \mu\text{m}$ ,  $L_{G2} = 1.5 \mu\text{m}$ ,  $W_G = 800 \mu\text{m}$
- ION IMPLANTATION
- AVAILABLE IN TAPE & REEL OR BULK

### DESCRIPTION

The NE253 is an 800  $\mu\text{m}$  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 a mini-mold (surface mount) package.

POWER GAIN AND NOISE FIGURE vs.  
DRAIN TO SOURCE VOLTAGE  
 $V_{GS} = 1 \text{ V}$ ,  $I_{DS} = 10 \text{ mA}$ ,  $f = 900 \text{ MHz}$



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

| PART NUMBER<br>PACKAGE OUTLINE |  |               | NE25339<br>39 |      |       |
|--------------------------------|--|---------------|---------------|------|-------|
| SYMBOL                         | PARAMETERS AND CONDITIONS  | UNITS         | MIN           | TYP  | MAX   |
| NF                             | Noise Figure at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 1 \text{ V}$ , $I_{DS} = 10 \text{ mA}$ , $f = 900 \text{ MHz}$                | dB            |               | 1.1  | 2.5   |
| GPS                            | Power Gain at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 1 \text{ V}$ , $I_{DS} = 10 \text{ mA}$ , $f = 900 \text{ MHz}$                  | dB            | 16            | 20   |       |
| BVDSX                          | Drain to Source Breakdown Voltage at $V_{G1S} = -4 \text{ V}$ , $V_{G2S} = 0$ , $I_{DS} = 20 \mu\text{A}$                          | V             | 10            |      |       |
| $I_{DSS}$                      | Saturated Drain Current at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 0 \text{ V}$ , $V_{G1S} = 0 \text{ V}$                              | mA            | 10            | 40   | 80    |
| $V_{G1S(OFF)}$                 | Gate 1 to Source Cutoff Voltage at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 0 \text{ V}$ , $I_D = 100 \mu\text{A}$                      | V             |               |      | -3.5  |
| $V_{G2S(OFF)}$                 | Gate 2 to Source Cutoff Voltage at $V_{DS} = 5 \text{ V}$ , $V_{G1S} = 0 \text{ V}$ , $I_D = 100 \mu\text{A}$                      | V             |               |      | -3.5  |
| $I_{G1SS}$                     | Gate 1 Reverse Current at $V_{DS} = 0$ , $V_{G1S} = -4 \text{ V}$ , $V_{G2S} = 0$  | $\mu\text{A}$ |               |      | 10    |
| $I_{G2SS}$                     | Gate 2 Reverse Current at $V_{DS} = 0$ , $V_{G2S} = -4 \text{ V}$ , $V_{G1S} = 0$  | $\mu\text{A}$ |               |      | 10    |
| $ Y_{FS} $                     | Forward Transfer Admittance at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 1 \text{ V}$ , $I_{DS} = 10 \text{ mA}$ , $f = 1.0 \text{ kHz}$ | mS            | 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            | 1.0           | 1.5  | 2.0   |
| CRSS                           | Reverse Transfer Capacitance at $V_{DS} = 5 \text{ V}$ , $V_{G2S} = 1 \text{ V}$ , $I_{DS} = 10 \text{ mA}$ , $f = 1 \text{ MHz}$  | pF            |               | 0.02 | 0.035 |

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25°C)

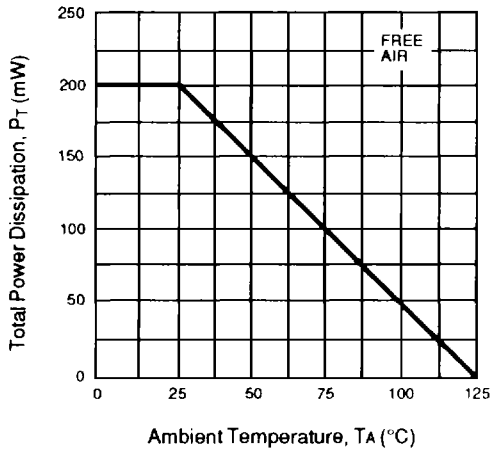
| SYMBOLS          | PARAMETERS               | UNITS | RATINGS     |
|------------------|--------------------------|-------|-------------|
| V <sub>DSX</sub> | Drain to Source Voltage  | V     | 10          |
| V <sub>G1S</sub> | Gate 1 to Source Voltage | V     | -4.5        |
| V <sub>G2S</sub> | Gate 2 to Source Voltage | V     | -4.5        |
| I <sub>D</sub>   | Drain Current            | mA    | 80          |
| T <sub>CH</sub>  | Channel Temperature      | °C    | 125         |
| T <sub>STG</sub> | Storage Temperature      | °C    | -55 to +125 |
| P <sub>T</sub>   | Total Power Dissipation  | mW    | 200         |

Note:

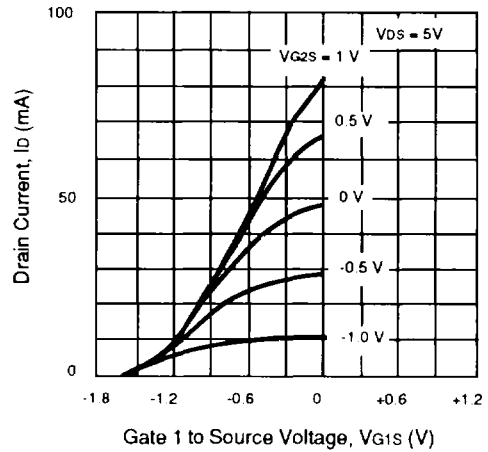
1. Operation in excess of any one of these parameters may result in permanent damage.

**TYPICAL PERFORMANCE CURVES** (T<sub>A</sub> = 25°C)

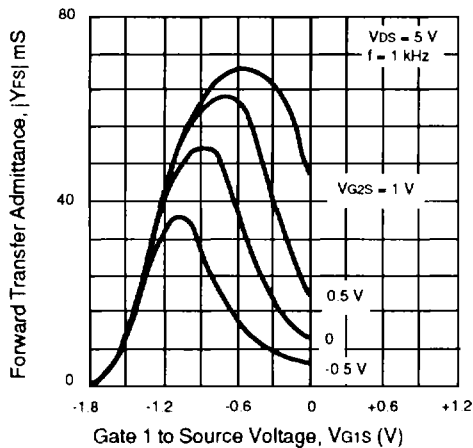
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



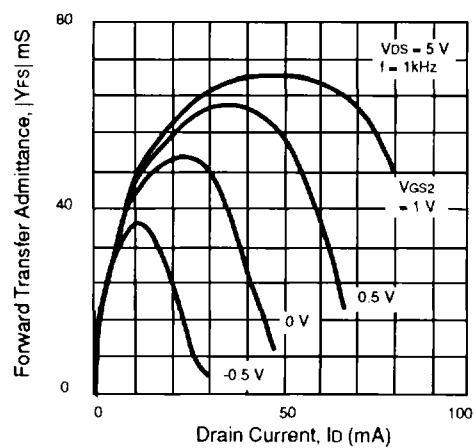
**DRAIN CURRENT vs. GATE 1 TO SOURCE VOLTAGE**



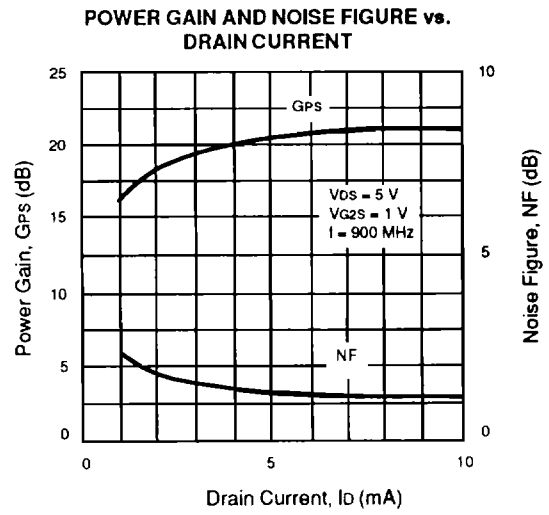
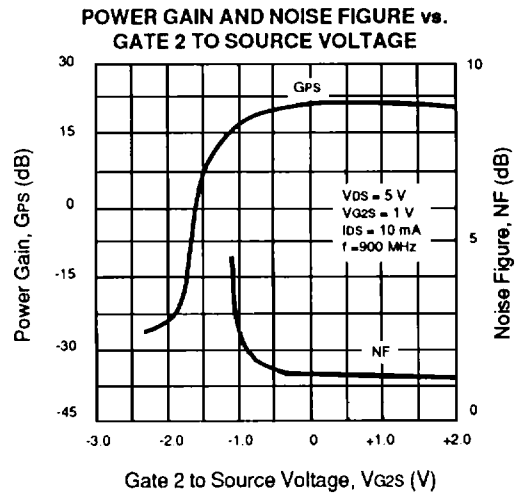
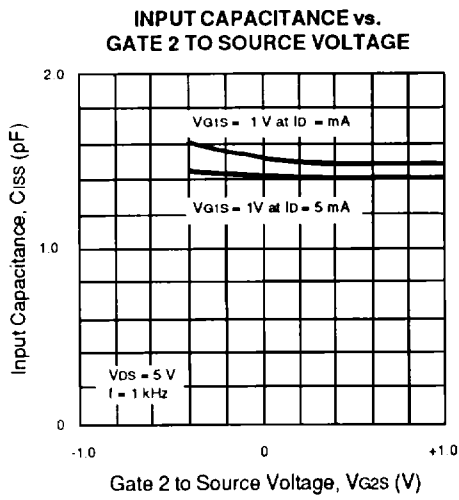
**FORWARD TRANSFER ADMITTANCE vs. GATE 1 TO SOURCE VOLTAGE**



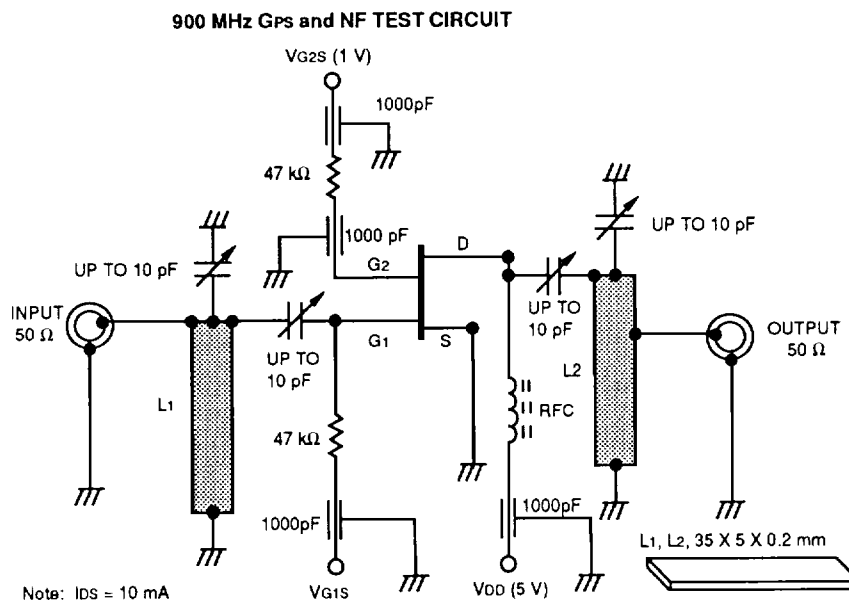
**FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT**



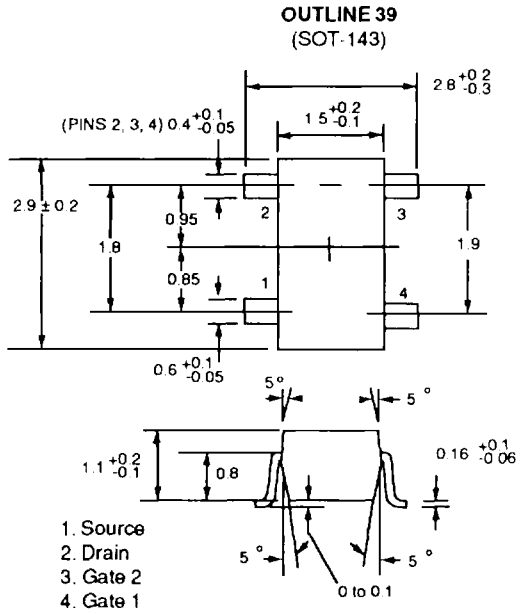
TYPICAL PERFORMANCE CURVES (TA = 25°C)



TEST CIRCUIT DIAGRAM



**OUTLINE DIMENSIONS** (Units in mm)



**ORDERING INFORMATION**

| PART NUMBER  | AVAILABILITY   | IDSS RANGE (mA) | MARKING |
|--------------|----------------|-----------------|---------|
| NE25339      | Bulk up to 3 K | 10 - 80         | -       |
| NE25339-T1   | 3K/Reel        | 10 - 80         | -       |
| NE25339U76   | Bulk up to 3K  | 10 - 25         | U76     |
| NE25339T1U76 | 3K/Reel        | 10 - 25         | U76     |
| NE25339U77   | Bulk up to 3K  | 20 - 35         | U77     |
| NE25339T1U77 | 3K/Reel        | 20 - 35         | U77     |
| NE25339U78   | Bulk up to 3K  | 30 - 50         | U78     |
| NE25339T1U78 | 3K/Reel        | 30 - 50         | U78     |
| NE25339U79   | Bulk up to 3K  | 45 - 80         | U79     |
| NE25339T1U79 | 3K/Reel        | 45 - 80         | U79     |