# matched dual n-channel JFETs *designed for . . .*

Siliconix

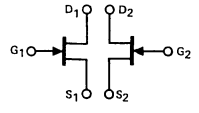
**Performance Curves NT**
**See Section 4**

- **Differential Amplifiers**
- **High Input Impedance Amplifiers**

BENEFITS

- Matching Characteristics Specified
- High Input Impedance
  $I_G$ = 1 pA Max (2N5906–9)

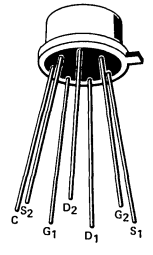
TO-78
*See Section 6*







Bottom View




## ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-to-Gate Voltage ..... ±80 V
Gate-Drain or Gate-Source Voltage ..... -40 V
Gate Current ..... 10 mA
Device Dissipation (Each Side), $T_A$ = 25°C
(Derate 3 mW/°C) ..... 367 mW
Total Device Dissipation, $T_A$ = 25°C
(Derate 4 mW/°C) ..... 500 mW
Storage Temperature Range ..... -65 to +200°C

## *ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

| | | Characteristic | | 2N5902-5 Min | 2N5902-5 Max | 2N5906-9 Min | 2N5906-9 Max | Unit | Test Conditions | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | STATIC | $I_{GSS}$ | Gate Reverse Current | | -5 | | -2 | pA | $V_{GS}$ = -20 V, $V_{DS}$ = 0 | |
| 2 | | | | | -10 | | -5 | nA | | 125°C |
| 3 | | $BV_{GSS}$ | Gate-Source Breakdown Voltage | -40 | | -40 | | V | $I_G$ = -1 μA, $V_{DS}$ = 0 | |
| 4 | | $V_{GS(off)}$ | Gate-Source Cutoff Voltage | -0.6 | -4.5 | -0.6 | -4.5 | | $V_{DS}$ = 10 V, $I_D$ = 1 nA | |
| 5 | | $V_{GS}$ | Gate Source Voltage | | -4 | | -4 | | | |
| 6 | | $I_G$ | Gate Operating Current | | -3 | | -1 | pA | $V_{DG}$ = 10 V, $I_D$ = 30 μA | |
| 7 | | | | | -3 | | -1 | nA | | 125°C |
| 8 | DYNAMIC | $I_{DSS}$ | Saturation Drain Current | 30 | 500 | 30 | 500 | μA | | |
| 9 | | $g_{fs}$ | Common-Source Forward Transconductance | 70 | 250 | 70 | 250 | μmho | $V_{DS}$ = 10 V, $V_{GS}$ = 0 | f = 1 kHz |
| 10 | | $g_{os}$ | Common-Source Output Conductance | | 5 | | 5 | | | |
| 11 | | $C_{iss}$ | Common-Source Input Capacitance | | 3 | | 3 | pF | | f = 1 MHz |
| 12 | | $C_{rss}$ | Common Source Reverse Transfer Capacitance | | 1.5 | | 1.5 | | | |
| 13 | | $g_{fs}$ | Common-Source Forward Transconductance | 50 | 150 | 50 | 150 | μmho | $V_{DG}$ = 10 V, $I_D$ = 30 μA | |
| 14 | | $g_{os}$ | Common-Source Output Conductance | | 1 | | 1 | | | f = 1 kHz |
| 15 | | $\bar{e}_n$ | Equivalent Short Circuit Input Noise Voltage | | 0.2 | | 0.1 | $\frac{\mu V}{\sqrt{Hz}}$ | $V_{DS}$ = 10 V, $V_{GS}$ = 0 | |
| 16 | | NF | Spot Noise Figure | | 3 | | 1 | dB | | f = 100 Hz, $R_G$ = 10 M |

| | | Characteristic | | 2N5902, 6 Min | 2N5902, 6 Max | 2N5903, 7 Min | 2N5903, 7 Max | 2N5904, 8 Min | 2N5904, 8 Max | 2N5905, 9 Min | 2N5905, 9 Max | Unit | Test Conditions | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | MATCHING | $\lvert I_{G1}-I_{G2}\rvert$ | Differential Gate Current | | 20 | | 20 | | 20 | | 20 | nA | $V_{DG}$ = 10 V, $I_D$ = 30 μA, $T_A$ = 125°C | 2N5902-5 |
| 18 | | | | | 0.2 | | 0.2 | | 0.2 | | 0.2 | | | 2N5906-9 |
| 19 | | $\frac{I_{DSS1}}{I_{DSS2}}$ | Saturation Drain Current Ratio (Note 1) | 0.95 | 1 | 0.95 | 1 | 0.95 | 1 | 0.95 | 1 | – | $V_{DS}$ = 10 V, $V_{GS}$ = 0 | |
| 20 | | $\frac{g_{fs1}}{g_{fs2}}$ | Transconductance Ratio (Note 1) | 0.97 | 1 | 0.97 | 1 | 0.95 | 1 | 0.95 | 1 | – | $V_{DG}$ = 10 V, $I_D$ = 30 μA | f = 1 kHz |
| 21 | | $\lvert V_{GS1}-V_{GS2}\rvert$ | Differential Gate-Source Voltage | | 5 | | 5 | | 10 | | 15 | mV | | |
| 22 | | $\frac{\Delta\lvert V_{GS1}-V_{GS2}\rvert}{\Delta T}$ | Gate-Source Voltage Differential Drift (Note 2) | | 5 | | 10 | | 20 | | 40 | μV/°C | | $T_A$ = 25°C, $T_B$ = 125°C |
| 23 | | | | | 5 | | 10 | | 20 | | 40 | | | $T_A$ = -55°C, $T_B$ = 25°C |
| 24 | | $\lvert g_{os1}-g_{os2}\rvert$ | Differential Output Conductance | | 0.2 | | 0.2 | | 0.2 | | 0.2 | μmho | | f = 1 kHz |

*JEDEC registered data

**NOTES:**
1. Assumes smaller value in numerator
2. Measured at end points, $T_A$ and $T_B$

3