

p-channel JFETs designed for . . .



J174 J175 J176 J177

- Analog Switches
- Choppers
- Commutators

Performance Curves PS
See Section 4

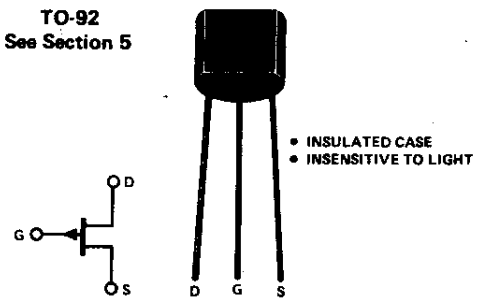
BENEFITS

- Low Cost
- Simplifies Series-Shunt Switching when Combined with J113, its N-Channel Complement
- Low Insertion Loss
 $R_{DS(on)} < 85 \Omega$ (J174)
- No Offset or Error Voltages Generated by Closed Switch
Purely Resistive
High Isolation Resistance from Driver
- Short Sample and Hold Aperture Time
 $C_{sg(off)} < 5.5 \text{ pF}$
 $C_{dg(off)} < 5.5 \text{ pF}$
- Fast Switching
 $t_{d(on)} + t_r = 7 \text{ ns Typical}$

ABSOLUTE MAXIMUM RATINGS (25°C)

| | |
|---|---------------|
| Gate-Drain or Gate-Source Voltage (Note 1) | 30 V |
| Gate Current | 50 mA |
| Total Device Dissipation (25°C Free-Air Temperature) | 350 mW |
| Power Derating (to +125°C) | 3.5 mW/°C |
| Storage Temperature Range | -55 to +125°C |
| Operating Temperature Range | -55 to +125°C |
| Lead Temperature (1/16" from case for 10 seconds) | 300°C |

TO-92
See Section 5



ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

| Characteristics | J174 | | | J175 | | | J176 | | | J177 | | | Unit | Test Conditions |
|--|------|-----|------|------|-----|-----|------|-----|-----|------|-----|------|----------|---|
| | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | | |
| 1 I_{GSS} Gate Reverse Current (Note 2) | | | 1 | | | 1 | | | 1 | | | 1 | nA | $V_{DS} = 0, V_{GS} = -20 \text{ V}$ |
| 2 $V_{GS(off)}$ Gate-Source Cutoff Voltage | 5 | | 10 | 3 | | 6 | 1 | | 4 | 0.8 | | 2.25 | V | $V_{DS} = -15 \text{ V}, I_D = -10 \text{ nA}$ |
| 3 BV_{GSS} Gate-Source Breakdown Voltage | 30 | | | 30 | | | 30 | | | | | 30 | | $V_{DS} = 0, I_G = 1 \mu\text{A}$ |
| 4 I_{DSS} Saturation Drain Current (Note 3) | -20 | | -100 | -7 | | -60 | -2 | | -25 | -1.5 | | -20 | mA | $V_{DS} = -15 \text{ V}, V_{GS} = 0$ |
| 5 $I_{D(off)}$ Drain Cutoff Current (Note 2) | | | -1 | | | -1 | | | -1 | | | -1 | nA | $V_{DS} = -15 \text{ V}, V_{GS} = -10 \text{ V}$ |
| 6 $r_{DS(on)}$ Drain-Source ON Resistance | | | 85 | | | 125 | | | 250 | | | 300 | Ω | $V_{GS} = 0, V_{DS} = -0.1 \text{ V}$ |
| 7 $C_{dg(off)}$ Drain-Gate OFF Capacitance | | 5.5 | | | 5.5 | | | 5.5 | | | 5.5 | | pF | $V_{DS} = 0, V_{GS} = 10 \text{ V}$ $V_{DS} = V_{GS} = 0$ $f = 1 \text{ MHz}$ |
| 8 $C_{sg(off)}$ Source-Gate OFF Capacitance | | 5.5 | | | 5.5 | | | 5.5 | | | 5.5 | | | |
| 9 $C_{dg(on)} + C_{sg(on)}$ Drain-Gate Plus Source-Gate ON Capacitance | | 40 | | | 40 | | | 40 | | | 40 | | | |
| 10 $t_{d(on)}$ Turn On Delay Time | | 2 | | | 5 | | | 15 | | | 20 | | ns | Switching Time Test Conditions J174 J175 J176 J177 $V_{DD} = -10 \text{ V} \quad -6 \text{ V} \quad -6 \text{ V} \quad -6 \text{ V}$ $V_{GS(off)} = 12 \text{ V} \quad 8 \text{ V} \quad 6 \text{ V} \quad 3 \text{ V}$ $R_L = 560 \Omega \quad 1.2 \text{ K}\Omega \quad 5.6 \text{ K}\Omega \quad 10 \text{ K}\Omega$ $V_{GS(on)} = 0 \text{ V} \quad 0 \text{ V} \quad 0 \text{ V} \quad 0 \text{ V}$ |
| 11 t_r Rise Time | | 5 | | | 10 | | | 20 | | | 25 | | | |
| 12 $t_{d(off)}$ Turn Off Delay Time | | 5 | | | 10 | | | 15 | | | 20 | | | |
| 13 t_f Fall Time | | 10 | | | 20 | | | 20 | | | 25 | | | |

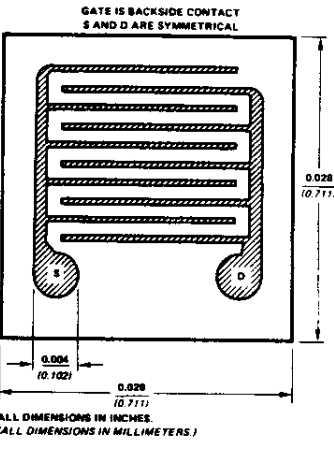
NOTES:

1. Geometry is symmetrical. Units may be operated with source and drain leads interchanged.

2. Approximately doubles for every 10°C increase in T_A . PS

3. Pulse test duration = 300 μs ; duty cycle $\leq 3\%$.

3



p-channel JFET designed for . . .

- Analog Switches
- Commutators
- Choppers
- Integrator Reset Switch

| TYPE | PACKAGE |
|--------|---------|
| Single | TO-18 |
| Single | TO-92 |
| Single | TO-106 |
| Single | Chip |

BENEFITS:

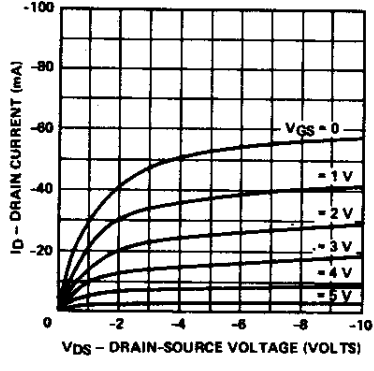
- Low Insertion Loss in Switching Systems
 $R_{ON} < 75 \Omega$ (2N5114)
- Short Sample and Hold Aperture Time
 $C_{rss} < 7 \text{ pF}$
- High Off-Isolation $I_{D(off)} < 500 \text{ pA}$

PRINCIPAL DEVICES

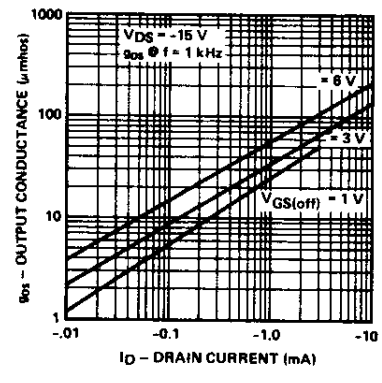
2N5018-19, 2N5114-16, U304-6
J174-7, J270-1
E174-7, E270-1, P1086E-7E
2N5018CHP-19CHP, 2N5114CHP-16CHP,
U304CHP-6CHP, E174CHP-7CHP,
E270CHP-1CHP, P1086ECHP-7ECHP

PERFORMANCE CURVES (25°C unless otherwise noted)

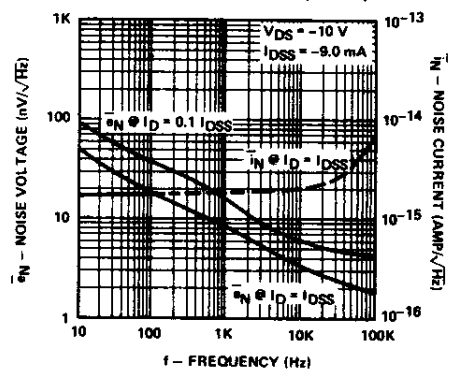
Output Characteristic



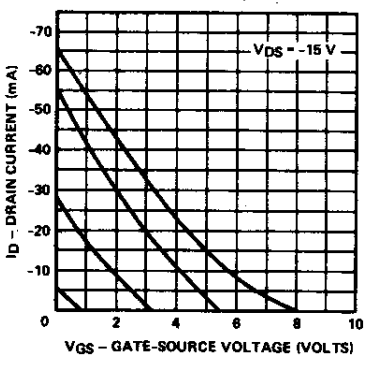
Common-Source Output Conductance vs Drain Current



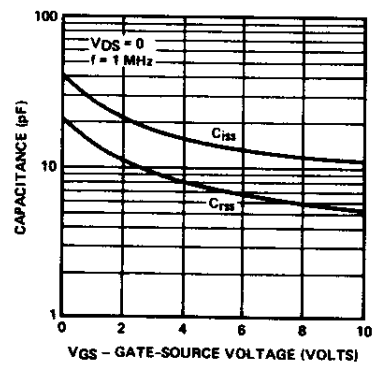
Equivalent Input Noise Voltage and Noise Current vs Frequency



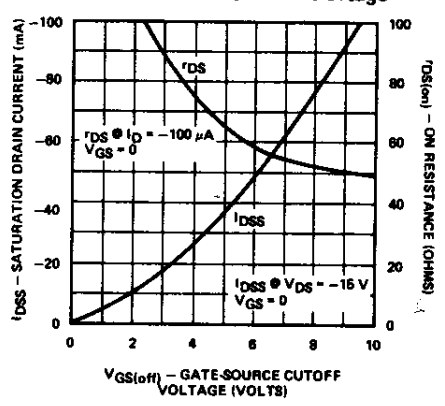
Transfer Characteristics



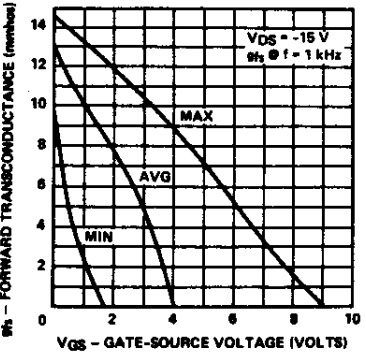
Common-Source Capacitance vs Gate-Source Voltage



Saturation Drain Current and Drain-Source ON Resistance vs. Gate-Source Cutoff Voltage



Transconductance Characteristics



Gate Operating Current vs Drain-Gate Voltage

