



P-Channel JFETs

| | |
|------|--------|
| J174 | SST174 |
| J175 | SST175 |
| J176 | SST176 |
| J177 | SST177 |

| PRODUCT SUMMARY | | | | |
|-----------------|--------------------------|-----------------------------|------------------------------|--------------------------|
| Part Number | V _{GS(off)} (V) | r _{DS(on)} Max (Ω) | I _{D(off)} Typ (pA) | t _{ON} Typ (ns) |
| J/SST174 | 5 to 10 | 85 | -10 | 25 |
| J/SST175 | 3 to 6 | 125 | -10 | 25 |
| J/SST176 | 1 to 4 | 250 | -10 | 25 |
| J/SST177 | 0.8 to 2.25 | 300 | -10 | 25 |

FEATURES

- Low On-Resistance: J174 <85 Ω
- Fast Switching—t_{ON}: 25 ns
- Low Leakage: -10 pA
- Low Capacitance: 5 pF
- Low Insertion Loss

BENEFITS

- Low Error Voltage
- High-Speed Analog Circuit Performance
- Negligible “Off-Error,” Excellent Accuracy
- Good Frequency Response
- Eliminates Additional Buffering

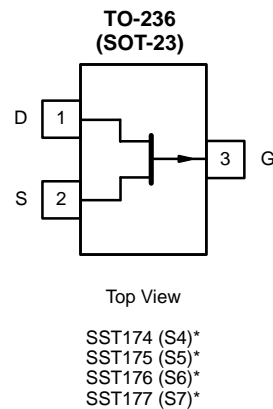
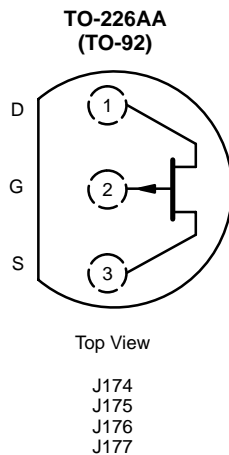
APPLICATIONS

- Analog Switches
- Choppers
- Sample-and-Hold
- Normally “On” Switches
- Current Limiters

DESCRIPTION

The J/SST174 series consists of p-channel analog switches designed to provide low on-resistance and fast switching. This series simplifies series-shunt switching applications when combined with the Siliconix J/SST111 series.

The TO-226AA (TO-92) plastic package provides a low-cost option, while the TO-236 (SOT-23) package provides surface-mount capability. Both the J and SST series are available in tape-and-reel for automated assembly (see Packaging Information).



*Marking Code for TO-236

For applications information see AN104.



Vishay Siliconix

ABSOLUTE MAXIMUM RATINGS

Gate-Drain Voltage 30 V
 Gate-Source Voltage 30 V
 Gate Current -50 mA
 Storage Temperature -55 to 150°C
 Operating Junction Temperature -55 to 150°C

Lead Temperature (1/16" from case for 10 sec.) 300°C
 Power Dissipation^a 350 mW

Notes
 a. Derate 2.8 mW/°C above 25°C

| SPECIFICATIONS FOR J/SST174 AND J/SST175 (T _A = 25°C UNLESS OTHERWISE NOTED) | | | | | | | | |
|---|----------------------|--|------------------|----------|------|----------|-----|------------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
| | | | | J/SST174 | | J/SST175 | | |
| | | | | Min | Max | Min | Max | |
| Static | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = 1 μA, V _{DS} = 0 V | 45 | 30 | | 30 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = -15 V, I _D = -10 nA | | 5 | 10 | 3 | 6 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = -15 V, V _{GS} = 0 V | | -20 | -135 | -7 | -70 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = 20 V, V _{DS} = 0 V T _A = 125°C | 0.01 5 | | 1 | | 1 | nA |
| Gate Operating Current | I _G | V _{DG} = -15 V, I _D = -1 mA | 0.01 | | | | | nA |
| Drain Cutoff Current | I _{D(off)} | V _{DS} = -15 V, V _{GS} = 10 V T _A = 125°C | -0.01 -5 | | -1 | | -1 | |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, V _{DS} = -0.1 V | | | 85 | | 125 | Ω |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = -1 mA, V _{DS} = 0 V | -0.7 | | | | | V |
| Dynamic | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = -15 V, I _D = -1 mA f = 1 kHz | 4.5 | | | | | mS |
| Common-Source Output Conductance | g _{os} | | 20 | | | | | μS |
| Drain-Source On-Resistance | r _{ds(on)} | V _{GS} = 0 V, I _D = 0 mA, f = 1 kHz | | | 85 | | 125 | Ω |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 0 V, V _{GS} = 0 V, f = 1 MHz | 20 | | | | | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | V _{DS} = 0 V, V _{GS} = 10 V f = 1 MHz | 5 | | | | | |
| Equivalent Input Noise Voltage | e _n | V _{DG} = -10 V, I _D = -1 mA f = 1 kHz | 20 | | | | | nV/ √Hz |
| Switching | | | | | | | | |
| Turn-On Time | t _{d(on)} | V _{GS(L)} = 0 V, V _{GS(H)} = 10 V See Switching Circuit | 10 | | | | | ns |
| | t _r | | 15 | | | | | |
| Turn-Off Time | t _{d(off)} | | 10 | | | | | |
| | t _f | | 20 | | | | | |

Notes
 a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
 b. Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.

PSCIA



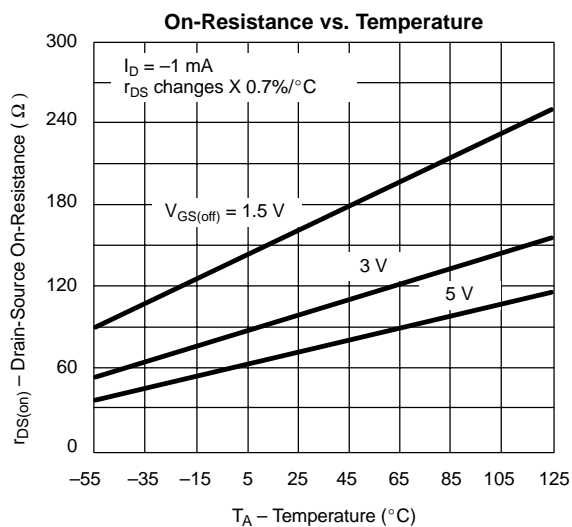
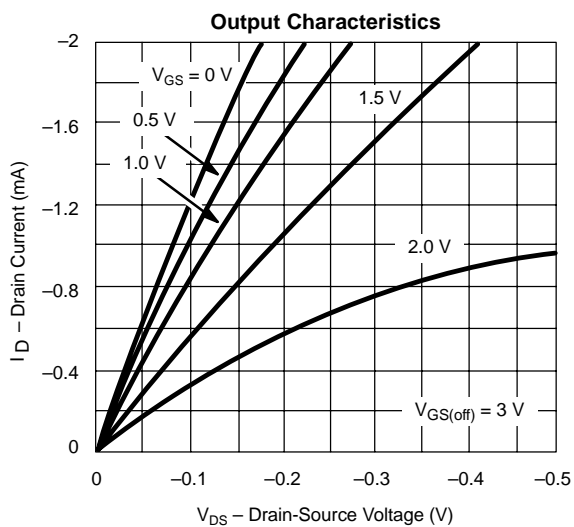
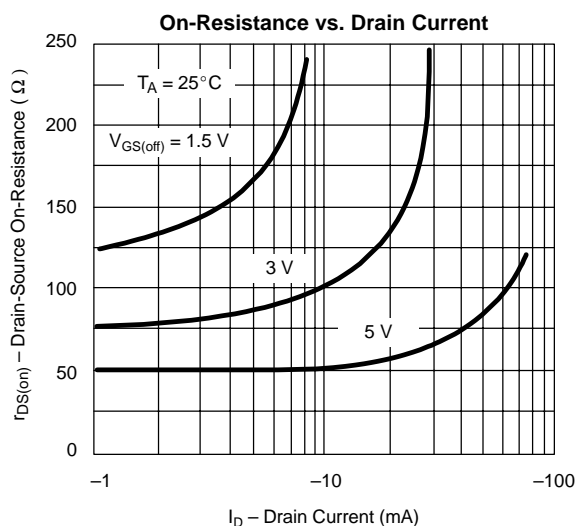
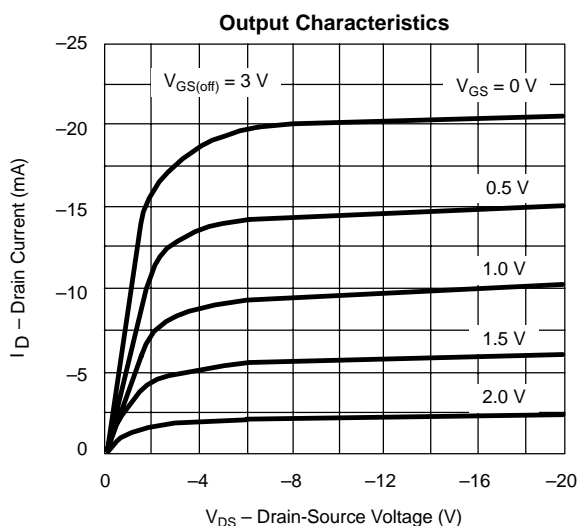
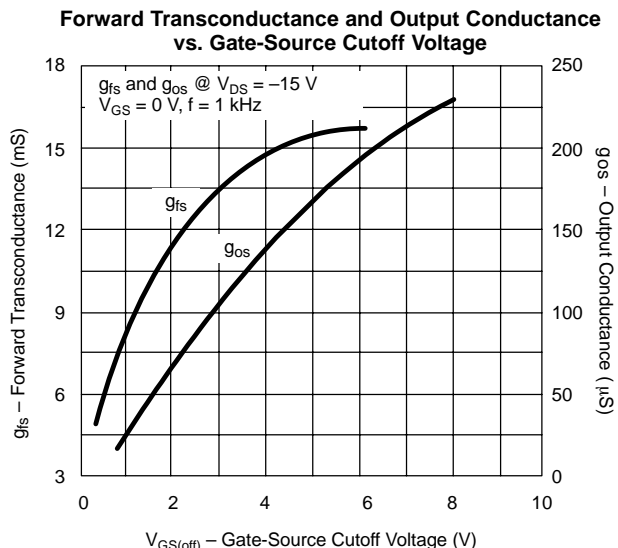
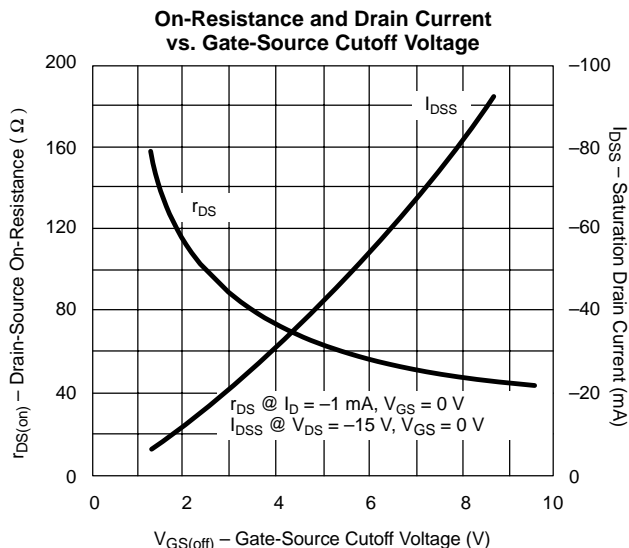
| SPECIFICATIONS FOR J/SST176 AND J/SST177 (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | | |
|--|----------------------|--|------------------|----------|-----|----------|------|------------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
| | | | | J/SST176 | | J/SST177 | | |
| | | | | Min | Max | Min | Max | |
| Static | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = 1 μA, V _{DS} = 0 V | 45 | 30 | | 30 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = -15 V, I _D = -10 nA | | 1 | 4 | 0.8 | 2.25 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = -15 V, V _{GS} = 0 V | | -2 | -35 | -1.5 | -20 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = 20 V, V _{DS} = 0 V T _A = 125 °C | 0.01 | | 1 | | 1 | nA |
| | | | 5 | | | | | |
| Gate Operating Current | I _G | V _{DG} = -15 V, I _D = -1 mA | 0.01 | | | | | nA |
| Drain Cutoff Current | I _{D(off)} | V _{DS} = -15 V, V _{GS} = 10 V T _A = 125 °C | -0.01 | | -1 | | -1 | nA |
| | | | -5 | | | | | |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, V _{DS} = -0.1 V | | | 250 | | 300 | Ω |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = -1 mA, V _{DS} = 0 V | -0.7 | | | | | V |
| Dynamic | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = -15 V, I _D = -1 mA f = 1 kHz | 4.5 | | | | | mS |
| Common-Source Output Conductance | g _{os} | | 20 | | | | | μS |
| Drain-Source On-Resistance | r _{ds(on)} | V _{GS} = 0 V, I _D = 0 mA, f = 1 kHz | | | 250 | | 300 | Ω |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 0 V, V _{GS} = 0 V, f = 1 MHz | 20 | | | | | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | V _{DS} = 0 V, V _{GS} = 10 V f = 1 MHz | 5 | | | | | |
| Equivalent Input Noise Voltage | e _n | V _{DG} = -10 V, I _D = -1 mA f = 1 kHz | 20 | | | | | nV/ √Hz |
| Switching | | | | | | | | |
| Turn-On Time | t _{d(on)} | V _{GS(L)} = 0 V, V _{GS(H)} = 10 V See Switching Circuit | 10 | | | | | ns |
| | t _r | | 15 | | | | | |
| Turn-Off Time | t _{d(off)} | | 10 | | | | | |
| | t _f | | 20 | | | | | |

Notes

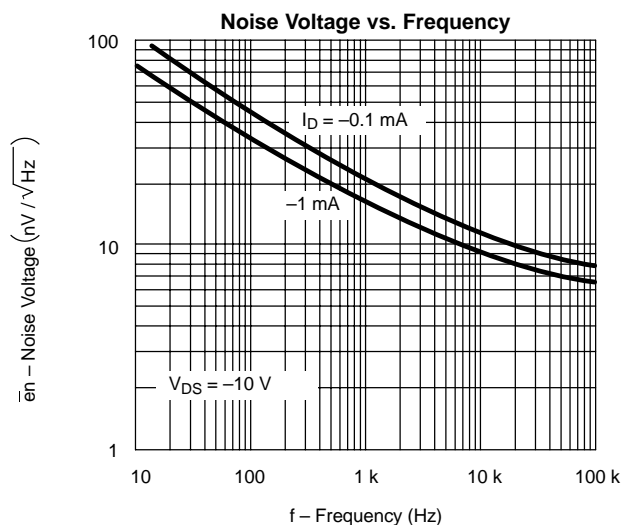
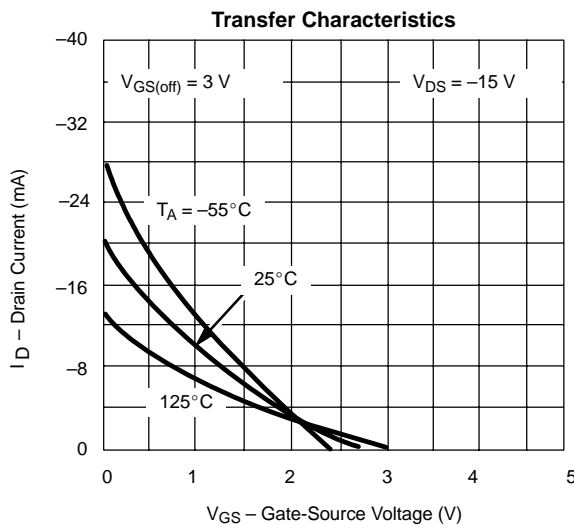
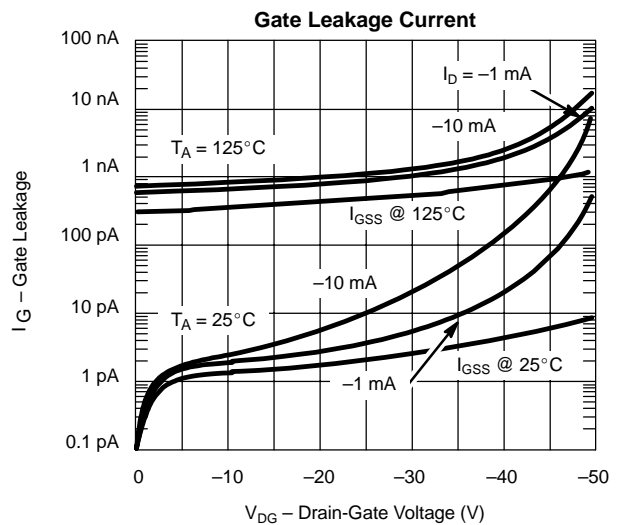
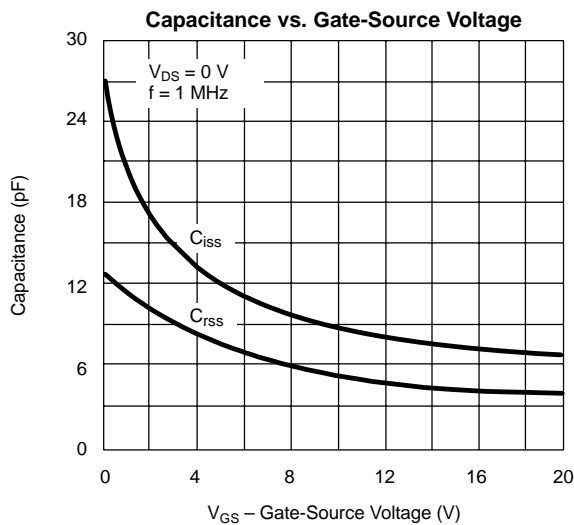
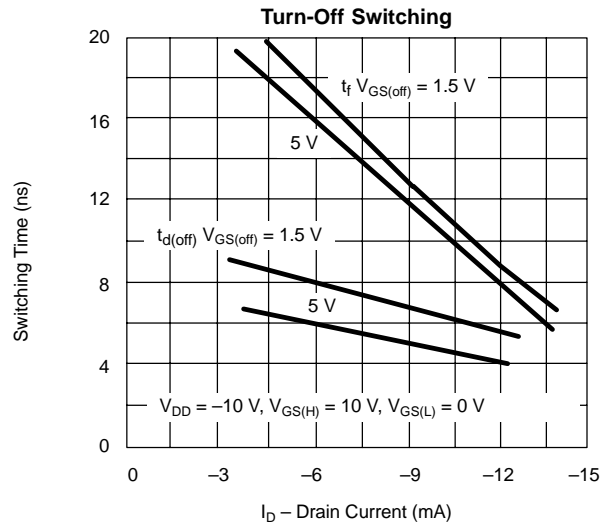
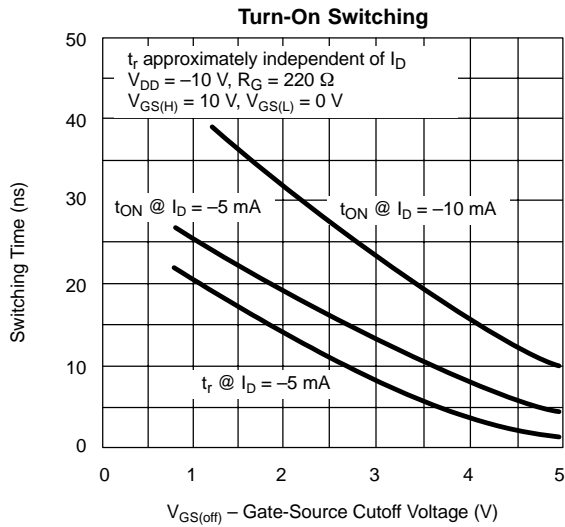
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.

PSCIA

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



| SWITCHING TIME TEST CIRCUIT | | | | |
|-----------------------------|--------------|--------------|---------------|---------------|
| | 174 | 175 | 176 | 177 |
| V_{DD} | -10 V | -6 V | -6 V | -6 V |
| V_{GG} | 20 V | 12 V | 8 V | 5 V |
| R_L^* | 560 Ω | 750 Ω | 1800 Ω | 5600 Ω |
| R_G^* | 100 Ω | 220 Ω | 390 Ω | 390 Ω |
| $I_{D(on)}$ | -15 mA | -7 mA | -3 mA | -1 mA |

*Non-inductive

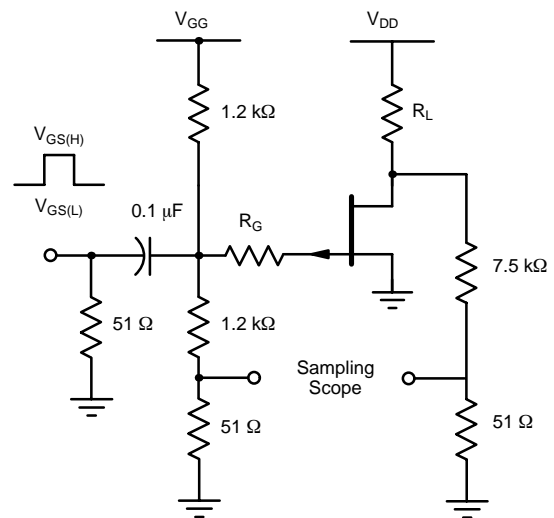
INPUT PULSE

Rise Time < 1 ns
 Fall Time < 1 ns
 Pulse Width 100 ns
 PRF 1 MHz

SAMPLING SCOPE

Rise Time 0.4 ns
 Input Resistance 10 M Ω
 Input Capacitance 1.5 pF

See Typical Characteristics curves for changes.





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