

**P-Channel JFETs**

**J174     SST174**  
**J175     SST175**  
**J176     SST176**  
**J177     SST177**

**Product Summary**

Part Number	V <sub>GS(off)</sub> (V)	r <sub>DS(on)</sub> Max (Ω)	I <sub>D(off)</sub> Typ (pA)	t <sub>ON</sub> 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<sub>ON</sub>: 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

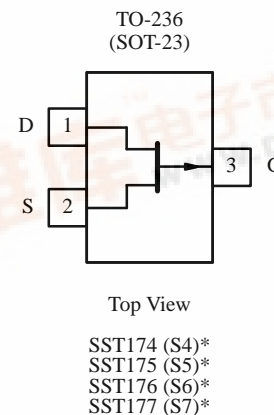
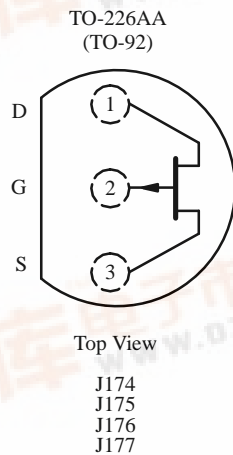
**Applications**

- 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



# J/SST174 Series

## Absolute Maximum Ratings

Gate-Drain Voltage	30 V	Lead Temperature ( <sup>1</sup> / <sub>16</sub> " from case for 10 sec.)	300°C
Gate-Source Voltage	30 V	Power Dissipation <sup>a</sup>	350 mW
Gate Current	-50 mA	Notes	
Storage Temperature	-55 to 150°C	a. Derate 2.8 mW/°C above 25°C	
Operating Junction Temperature	-55 to 150°C		

## Specifications<sup>a</sup> for J/SST174 and J/SST175

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

Notes

- T<sub>A</sub> = 25°C unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.

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**Specifications<sup>a</sup> for J/SST176 and J/SST177**

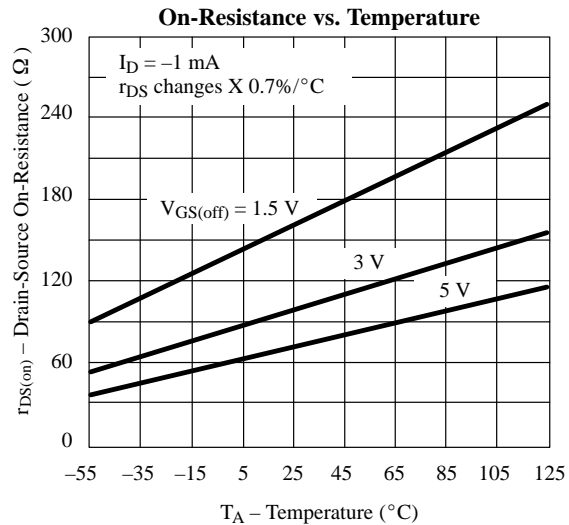
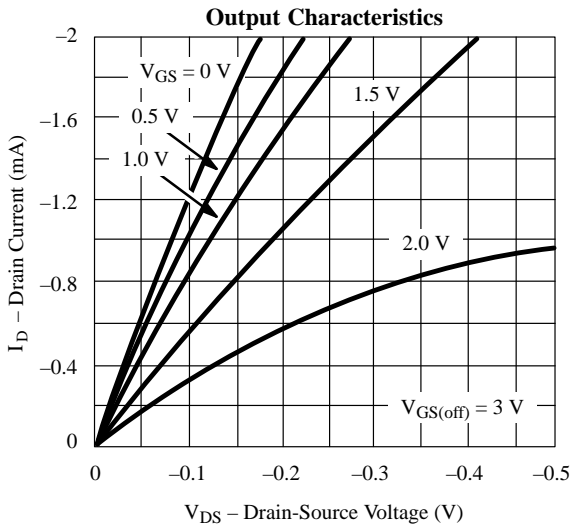
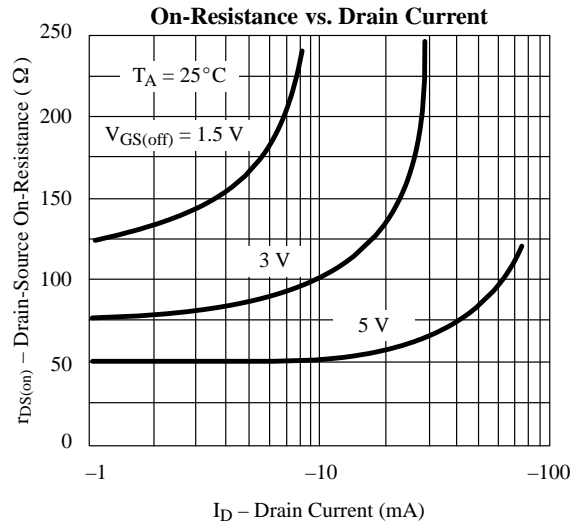
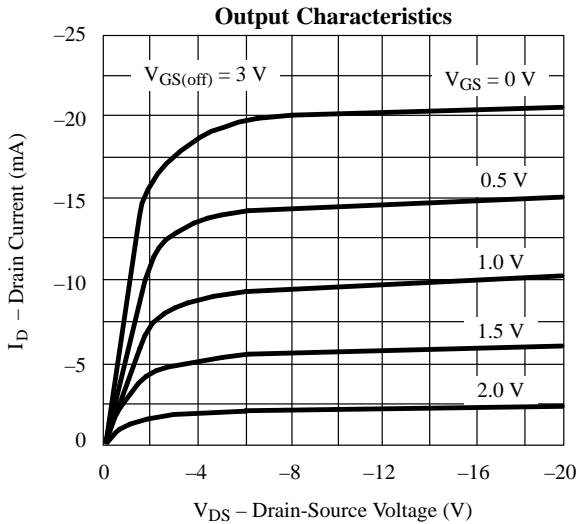
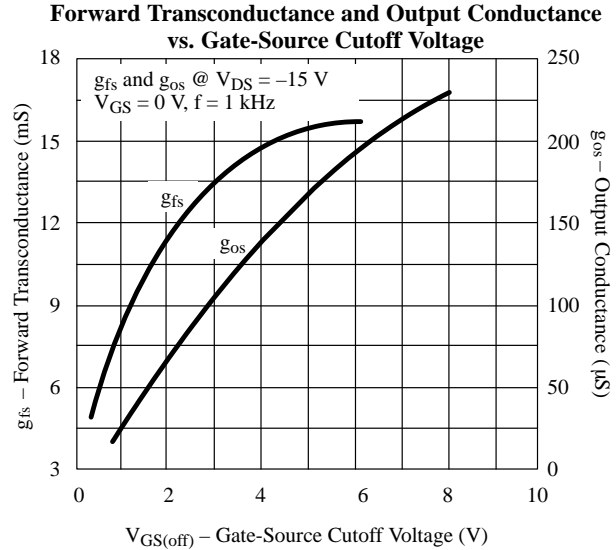
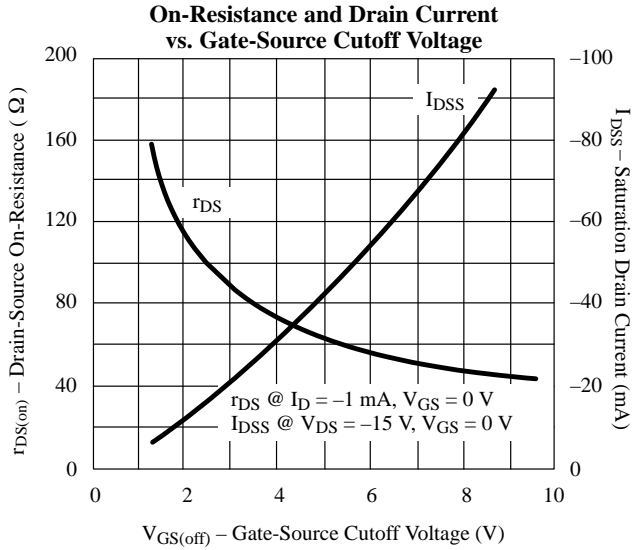
Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits				Unit
				J/SST176		J/SST177		
				Min	Max	Min	Max	
<b>Static</b>								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = 1 \mu A, V_{DS} = 0 V$	45	30		30		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = -15 V, I_D = -10 nA$		1	4	0.8	2.25	
Saturation Drain Current <sup>c</sup>	$I_{DSS}$	$V_{DS} = -15 V, V_{GS} = 0 V$		-2	-35	-1.5	-20	mA
Gate Reverse Current	$I_{GSS}$	$V_{GS} = 20 V, V_{DS} = 0 V$ $T_A = 125^\circ C$	0.01		1		1	nA
			5					
Gate Operating Current	$I_G$	$V_{DG} = -15 V, I_D = -1 mA$	0.01					
Drain Cutoff Current	$I_{D(off)}$	$V_{DS} = -15 V, V_{GS} = 10 V$ $T_A = 125^\circ C$	-0.01		-1		-1	nA
			-5					
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 0 V, V_{DS} = -0.1 V$			250		300	$\Omega$
Gate-Source Forward Voltage	$V_{GS(F)}$	$I_G = -1 mA, V_{DS} = 0 V$	-0.7					V
<b>Dynamic</b>								
Common-Source Forward Transconductance	$g_{fs}$	$V_{DS} = -15 V, I_D = -1 mA$ $f = 1 kHz$	4.5					mS
	$g_{os}$		20					$\mu S$
Drain-Source On-Resistance	$r_{ds(on)}$	$V_{GS} = 0 V, I_D = 0 mA, f = 1 kHz$			250		300	$\Omega$
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	$\bar{e}_n$	$V_{DG} = -10 V, I_D = -1 mA$ $f = 1 kHz$	20					$nV/\sqrt{Hz}$
<b>Switching</b>								
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

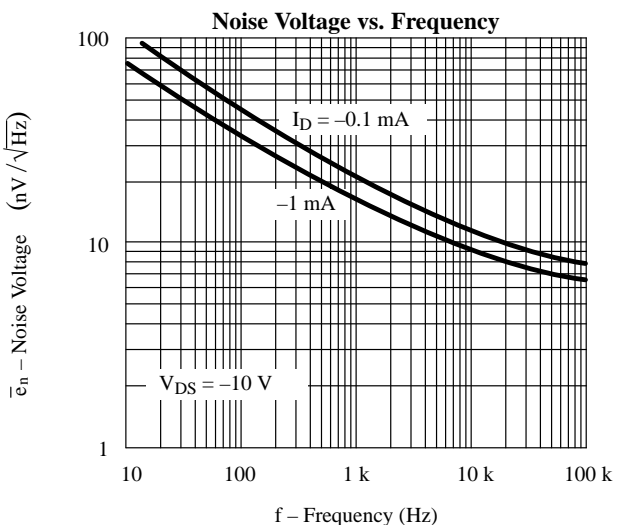
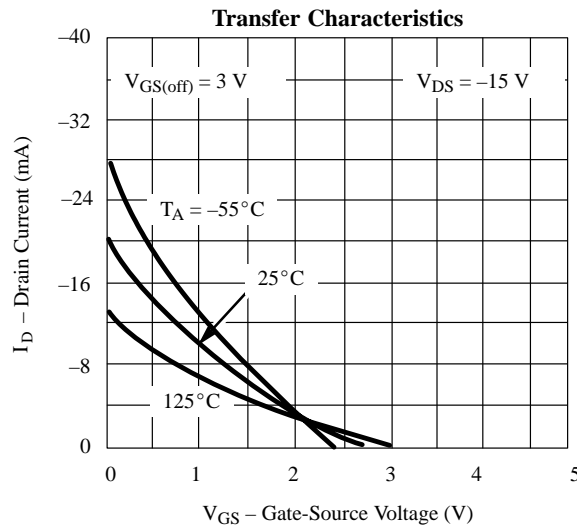
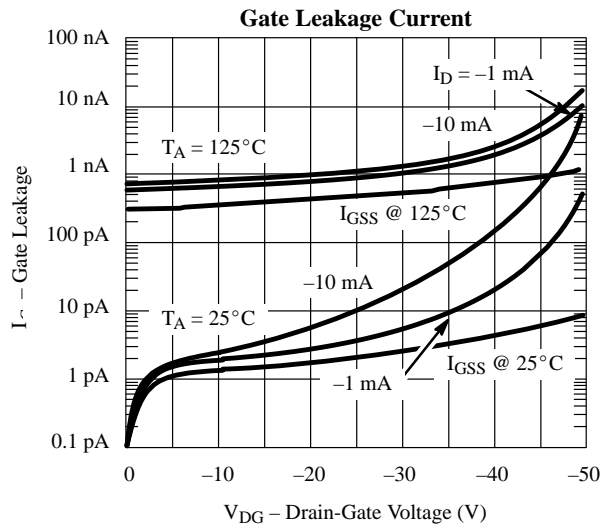
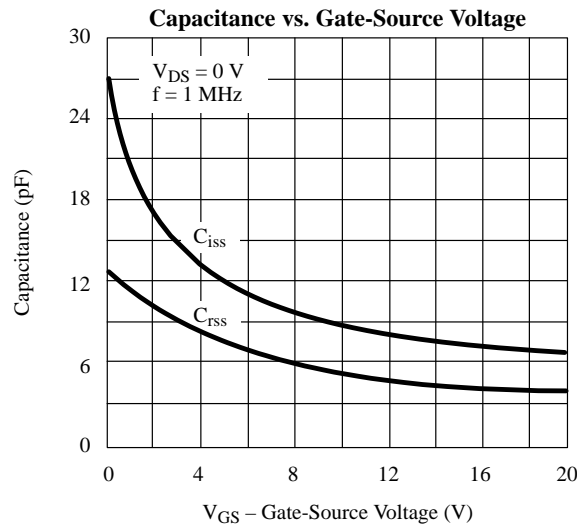
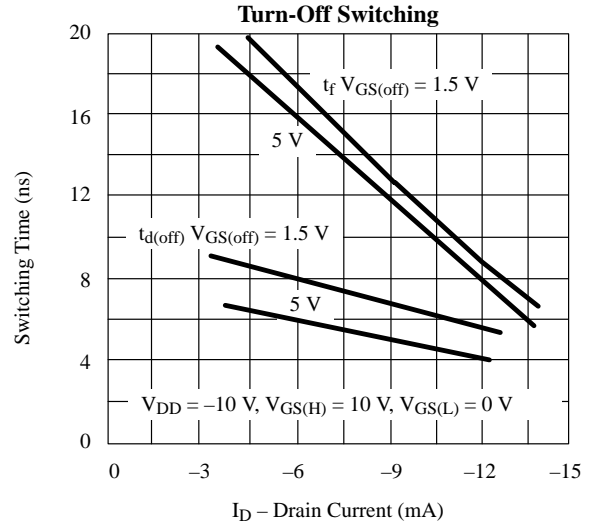
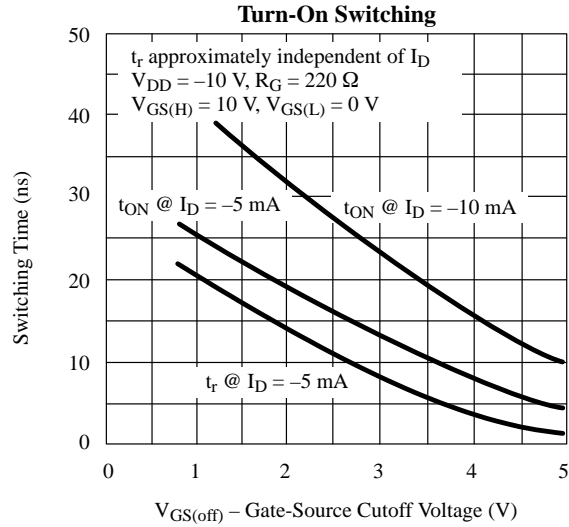
- a.  $T_A = 25^\circ C$  unless otherwise noted.
- b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- c. Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 3\%$ .

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## Typical Characteristics



## Typical Characteristics (Cont'd)



# J/SST174 Series

## Switching Time Test Circuit

	174	175	176	177
V <sub>DD</sub>	-10 V	-6 V	-6 V	-6 V
V <sub>GG</sub>	20 V	12 V	8 V	5 V
R <sub>L</sub> *	560 Ω	750 Ω	1800 Ω	5600 Ω
R <sub>G</sub> *	100 Ω	220 Ω	390 Ω	390 Ω
I <sub>D(on)</sub>	-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 MΩ  
Input Capacitance 1.5 pF

See Typical Characteristics curves for changes.

