

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

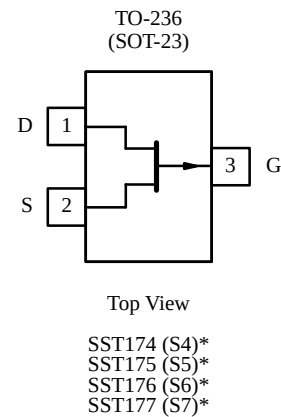
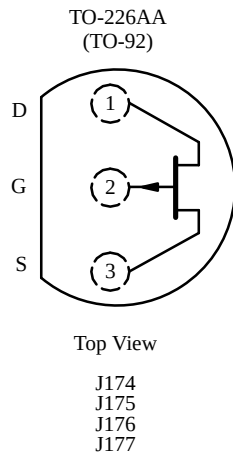
Applications

- 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

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70257. Applications information may also be obtained via FaxBack, request document #70597.

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^a for J/SST174 and J/SST175

Parameter	Symbol	Test Conditions	Typ ^b	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 ^c	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	0.01		1		1	nA
		T _A = 125°C	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	−0.01		−1		−1	
		T _A = 125°C	−5					
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. $T_A = 25^\circ C$ 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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Specifications^a for J/SST176 and J/SST177

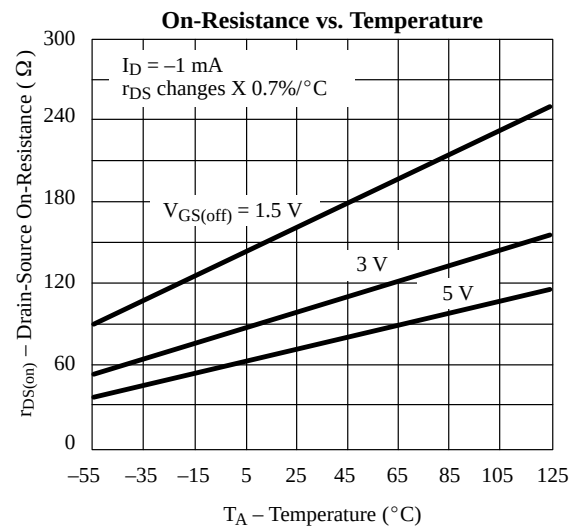
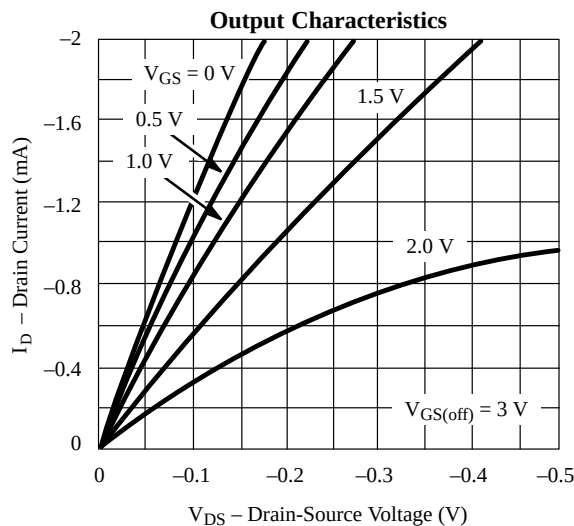
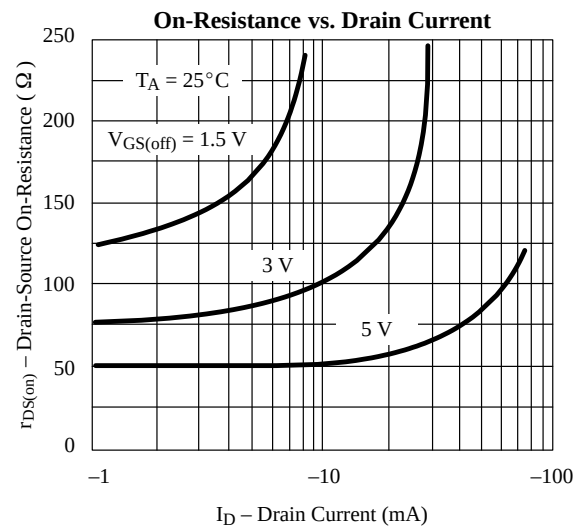
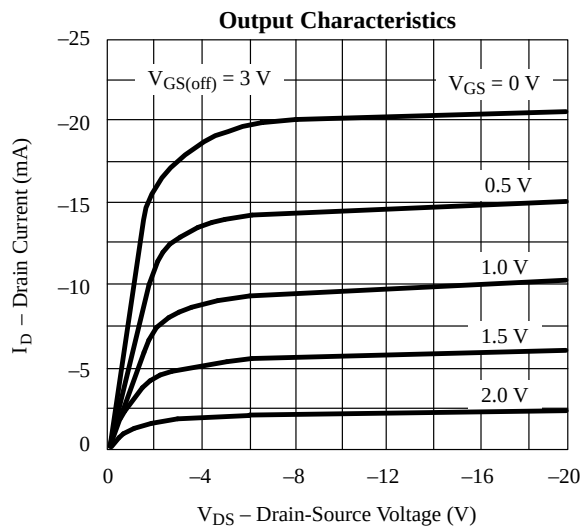
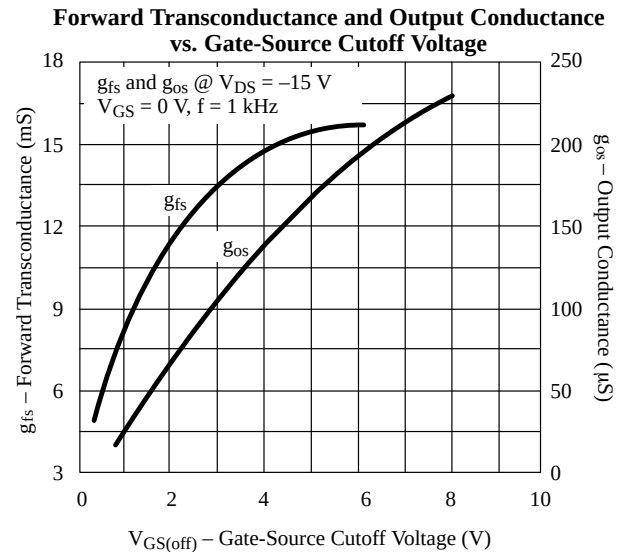
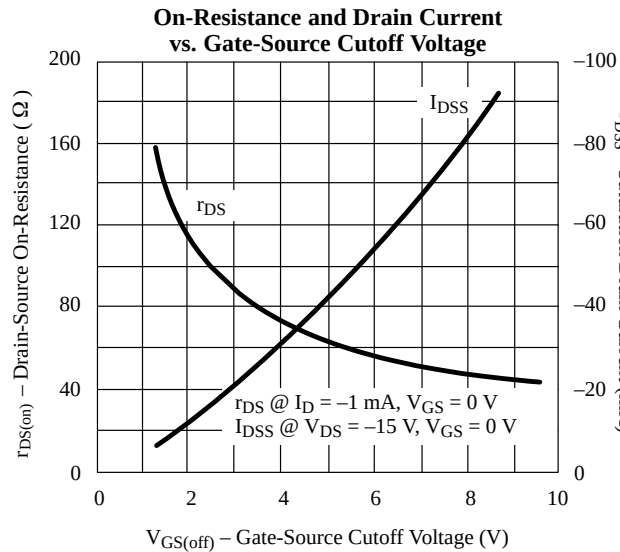
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				J/SST176		J/SST177		
				Min	Max	Min	Max	
Static								
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G = 1 μA , V _{DS} = 0 V	45	30		30		V
Gate-Source Cutoff Voltage	V _{GS(off)}	V _{DS} = −15 V, I _D = −10 nA		1	4	0.8	2.25	
Saturation Drain Current ^c	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 5		1		1	nA
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°C	−0.01 −5		−1		−1	
Drain-Source On-Resistance	r _{DS(on)}	V _{GS} = 0 V, V _{DS} = −0.1 V			250		300	
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	$\bar{e}_n$	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

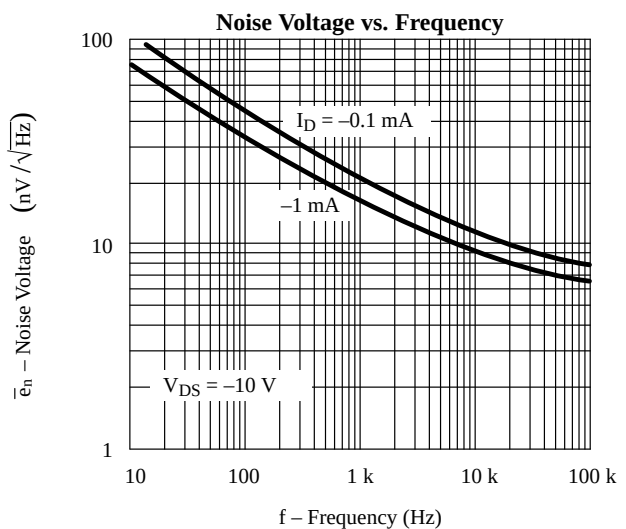
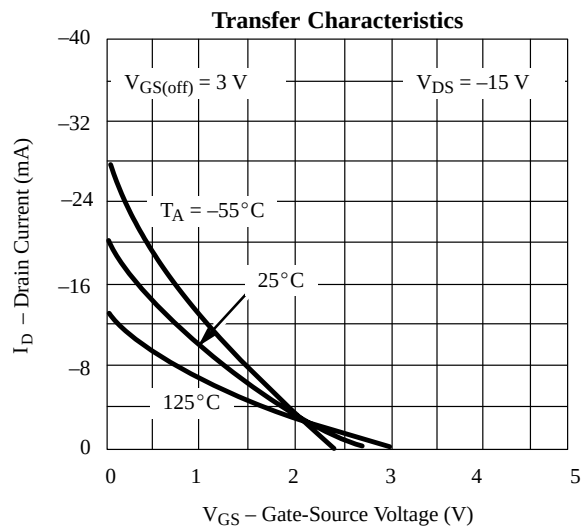
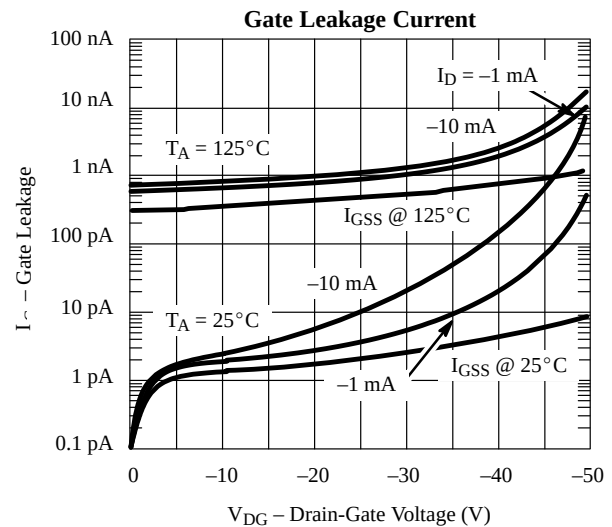
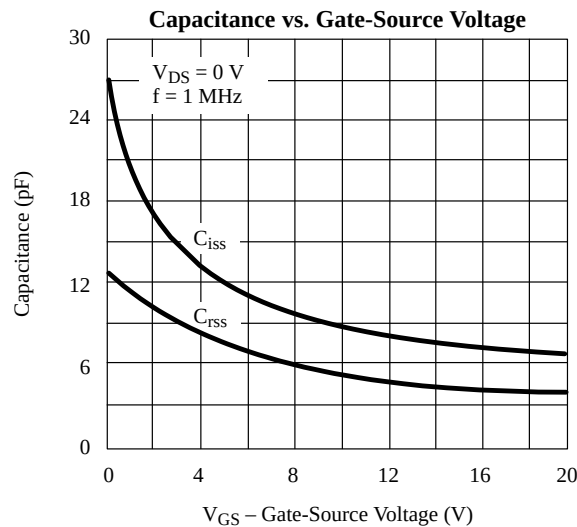
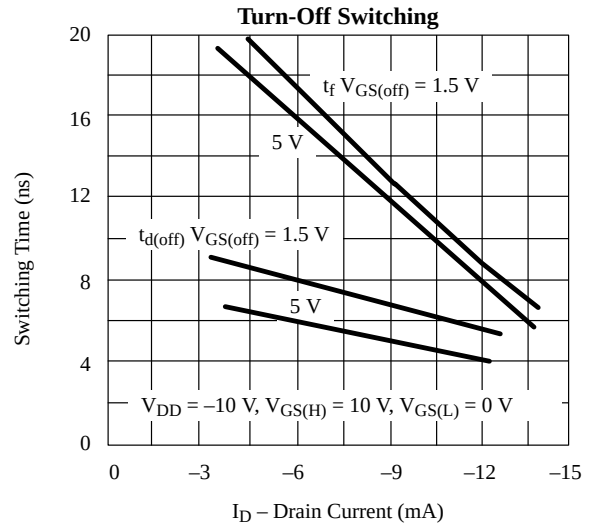
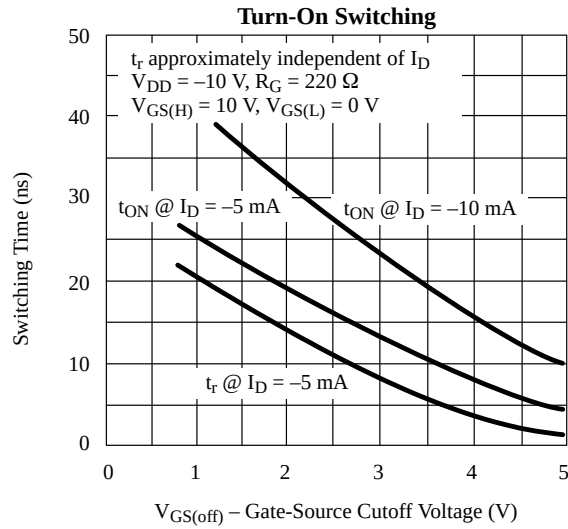
- $T_A = 25^\circ C$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300 \mu s$ duty cycle $\leq 3\%$.

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Typical Characteristics



Typical Characteristics (Cont'd)



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.

