P-Channel JFET

PRODUCT SUMMARY			
$V_{GS(off)}$ Max (V)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (pA)	t_{ON} Typ (ns)
5	150	–10	30

FEATURES

- Fast Switching—t_{ON}: 25 ns
- High Off-Isolation—$I_{D(off)}$: –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

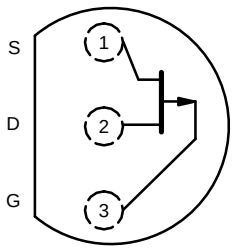
- Analog Switches
- Choppers
- Sample-and-Hold
- Normally “On” Switches
- Current Limiters

DESCRIPTION

The P1087 is a p-channel analog switch designed to provide low on-resistance and fast switching. This device is optimized for use in complementary switching applications with the Siliconix J/SST111 series.

The P1087 device is available in various lead forms and tape-and-reel for automated assembly (see Packaging Information).

TO-226AA
(TO-92)



Top View

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]

Parameter	Symbol	Test Conditions	Limits Min	Limits Typ[b]	Limits Max	Unit
Static						
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = 1 μA , V_{DS} = 0 V	30	45		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = –15 V, I_D = –1 μA			5	V
Saturation Drain Current[c]	I_{DSS}	V_{DS} = –20 V, V_{GS} = 0 V	–5			mA
Gate Reverse Current	I_{GSS}	V_{GS} = 15 V, V_{DS} = 0 V		0.01	2	nA
		T_A = 85°C		0.6		
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} = 12 V		–0.01		nA
		V_{DS} = –15 V, V_{GS} = 7 V		–0.01	–10	nA
		V_{DS} = –15 V, T_A = 85°C		–0.001	–0.5	μA
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 0 V, I_D = –1 mA			150	Ω
Gate-Source Forward Voltage	$V_{GS(F)}$	V_{DS} = 0 V, I_G = –1 mA		–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}	V_{DS} = –15 V, I_D = –1 mA, f = 1 kHz		20		μS
Drain-Source On-Resistance	$r_{ds(on)}$	V_{GS} = 0 V, I_D = 0 mA , f = 1 kHz			150	Ω
Common-Source Input Capacitance	C_{iss}	V_{DS} = –15 V, V_{GS} = 0 V, f = 1 MHz		20	45	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	V_{DS} = 0 V, V_{GS} = 10 V, f = 1 MHz		5	10	pF
Equivalent Input Noise Voltage	$\overline{e}_n$	V_{DG} = –10 V, I_D = –1 mA, f = 1 kHz		20		$\frac{nV}{\sqrt{Hz}}$
Switching						
Turn-On Time	$t_{d(on)}$	$V_{GS(L)}$ = 0 V, $V_{GS(H)}$ = 10 V, See Switching Circuit		10	15	ns
	t_r			15	75	ns
Turn-Off Time	$t_{d(off)}$			10	25	ns
	t_f			20	100	ns

Notes
a. T_A = 25°C unless otherwise noted.
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. Pulse test: PW ≤ 300 μs duty cycle 3%.

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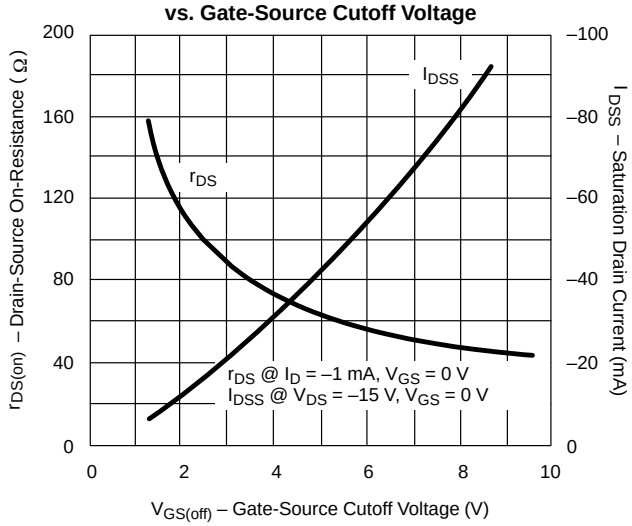
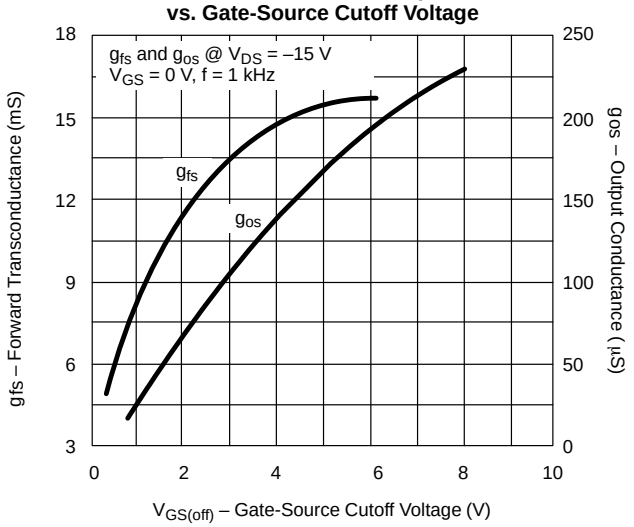
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

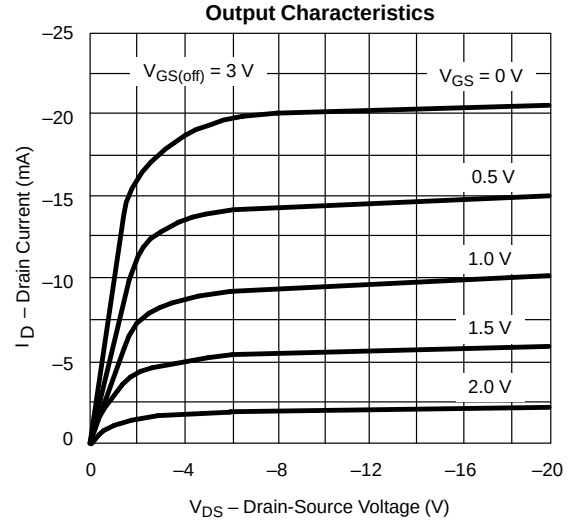
On-Resistance and Drain Current vs. Gate-Source Cutoff Voltage



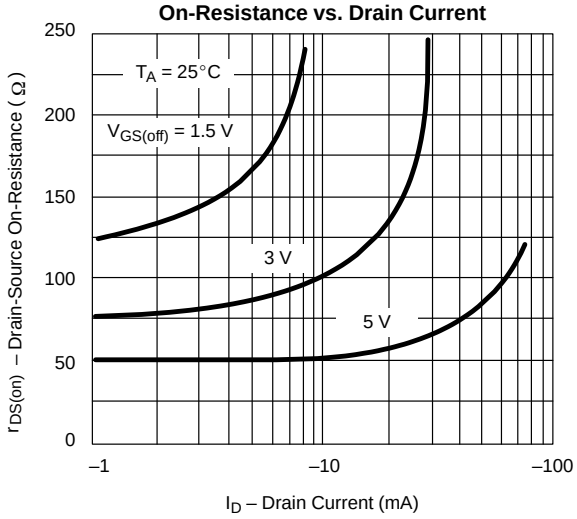
Forward Transconductance and Output Conductance vs. Gate-Source Cutoff Voltage



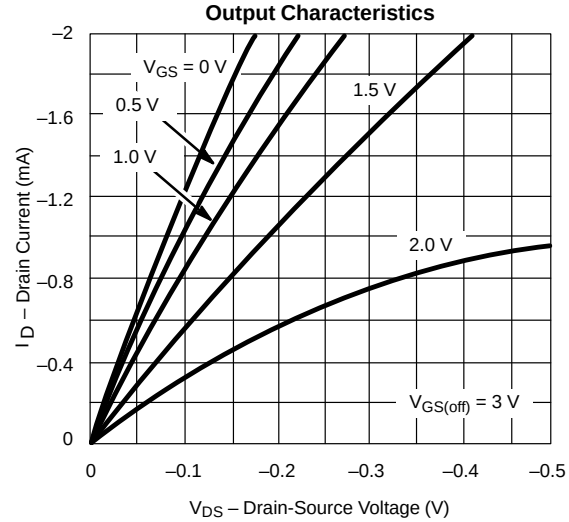
Output Characteristics



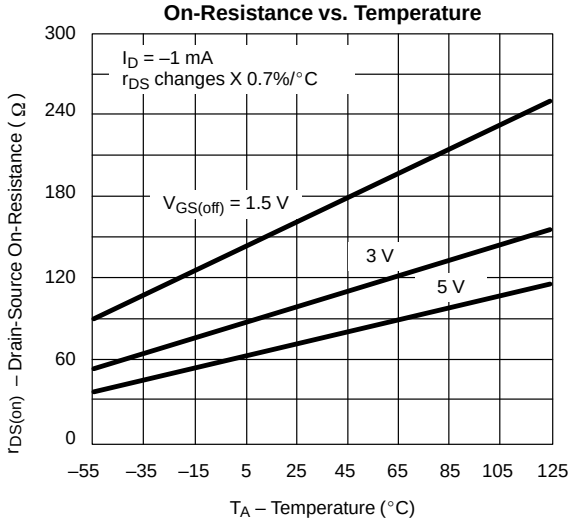
On-Resistance vs. Drain Current



Output Characteristics

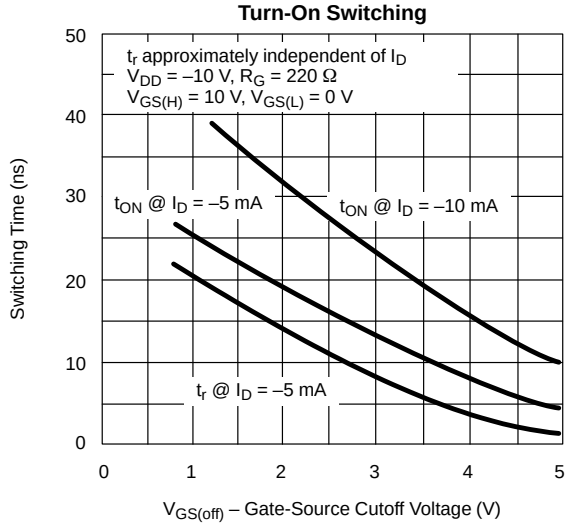


On-Resistance vs. Temperature

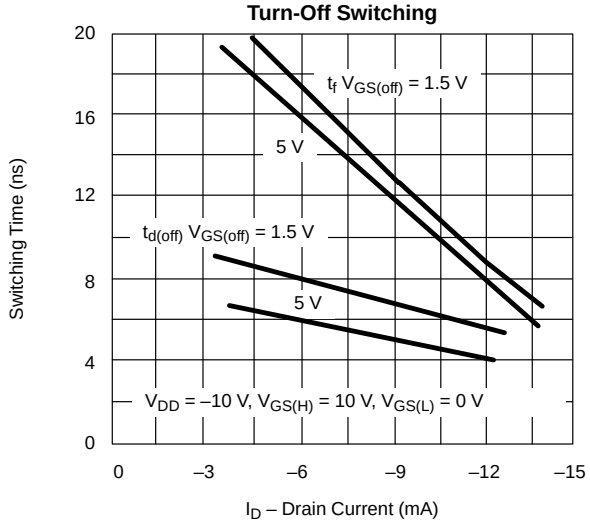


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

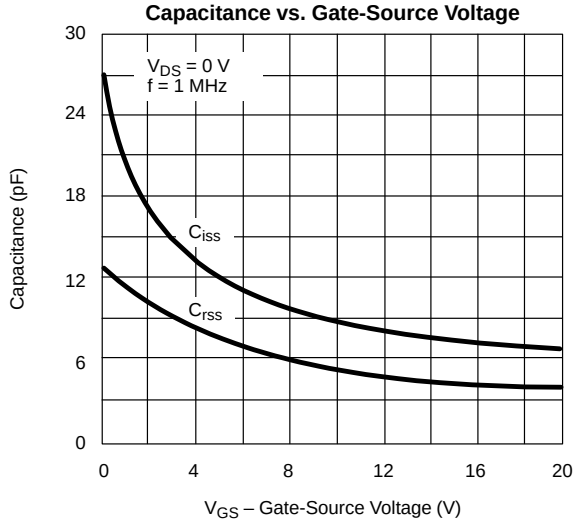
Turn-On Switching



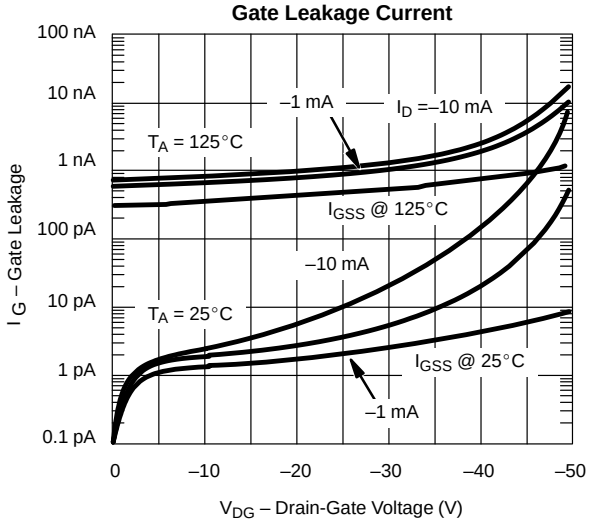
Turn-Off Switching



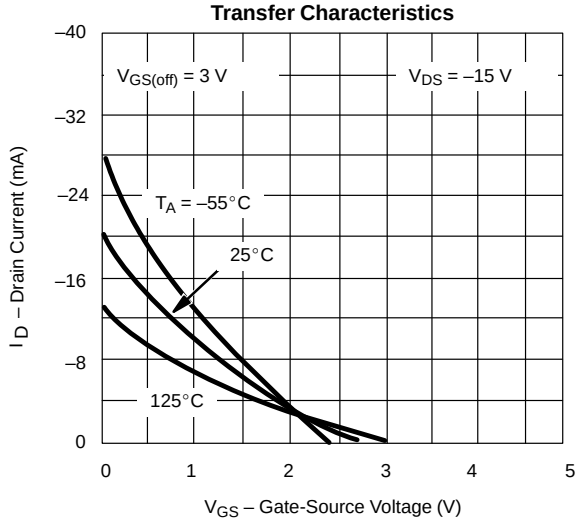
Capacitance vs. Gate-Source Voltage



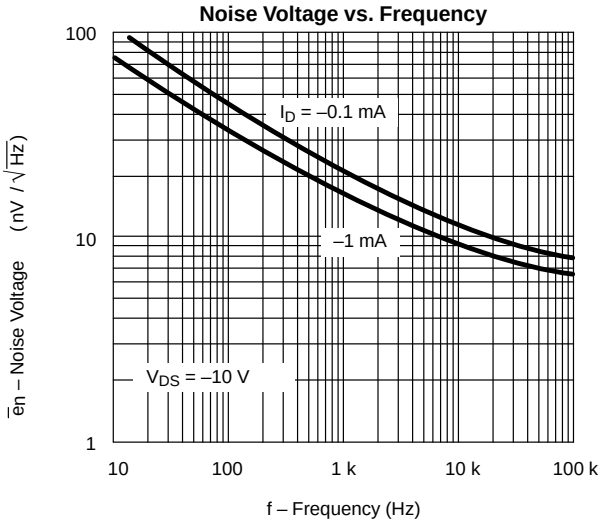
Gate Leakage Current



Transfer Characteristics



Noise Voltage vs. Frequency



SWITCHING TIME TEST CIRCUIT	
V_{DD}	–6 V
V_{GG}	12 V
R_L*	1800 Ω
R_G*	220 Ω
$I_{D(on)}$	–3 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