P-Channel JFETs

Product Summary

Part Number	$V_{GS(off)}$ Max (V)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (pA)	t_{ON} Typ (ns)
P1086	10	75	–10	25
P1087	5	150	–10	30

Features

- Low On-Resistance: P1086 <75 Ω
- 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

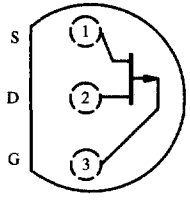
- Analog Switches
- Choppers
- Sample-and-Hold
- Normally "On" Switches
- Current Limiters

Description

The P1086/1087 are p-channel analog switches designed to provide low on-resistance and fast switching. These devices are optimized for use in complementary switching applications with the Siliconix J/SST111 series.

These devices are 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

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70259.

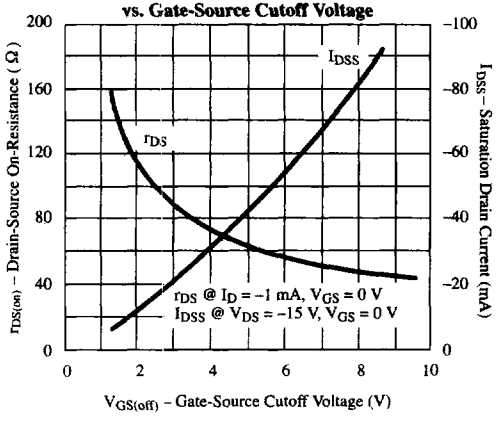
Specifications[a]

Parameter	Symbol	Test Conditions	Typ[b]	Limits P1086 Min	Limits P1086 Max	Limits P1087 Min	Limits P1087 Max	Unit
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 = –1 µA			10		5	V
Saturation Drain Current[c]	I_{DSS}	V_{DS} = –20 V, V_{GS} = 0 V		–10		–5		mA
Gate Reverse Current	I_{GSS}	V_{GS} = 15 V, V_{DS} = 0 V	0.01		2		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		–10			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		–0.5	µA
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 0 V, I_D = –1 mA			75		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			75		150	Ω
Common-Source Input Capacitance	C_{iss}	V_{DS} = –15 V, V_{GS} = 0 V, f = 1 MHz	20		45		45	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	V_{DS} = 0 V, V_{GS} = 10 V, f = 1 MHz	5		10		10	pF
Equivalent Input Noise Voltage	$\bar{e}_n$	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		15	ns
	t_r		15		20		75	ns
Turn-Off Time	$t_{d(off)}$		10		15		25	ns
	t_f		20		50		100	ns

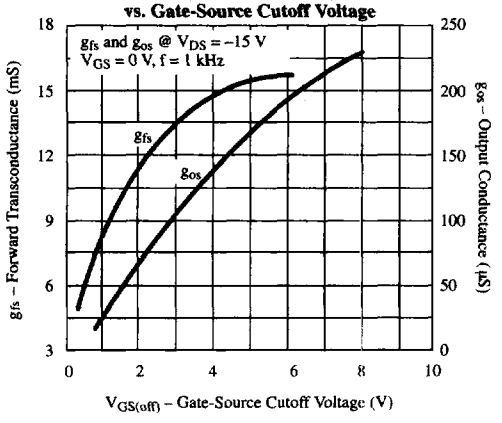
Notes
a. T_A = 25°C unless otherwise noted. PSCIA
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. Pulse test: PW ≤ 300 µs duty cycle 3%.

Typical Characteristics

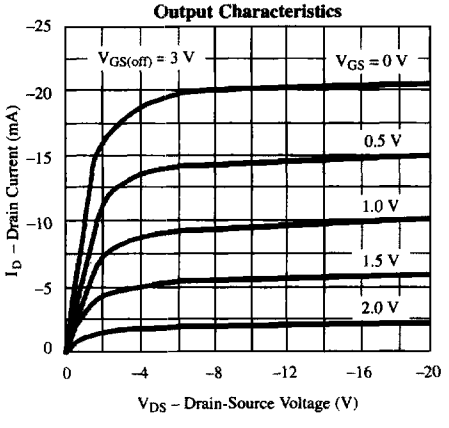
On-Resistance and Drain Current vs. Gate-Source Cutoff Voltage



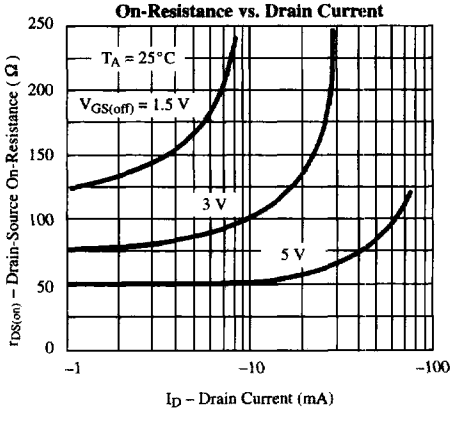
Forward Transconductance and Output Conductance vs. Gate-Source Cutoff Voltage



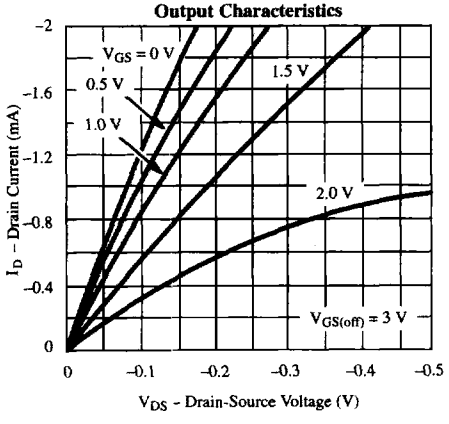
Output Characteristics



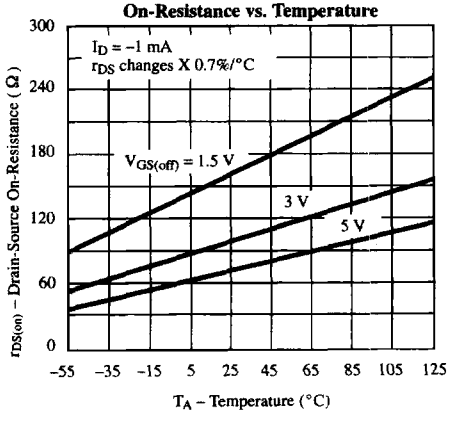
On-Resistance vs. Drain Current



Output Characteristics

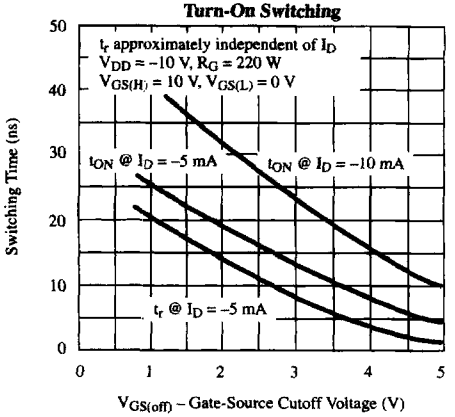


On-Resistance vs. Temperature

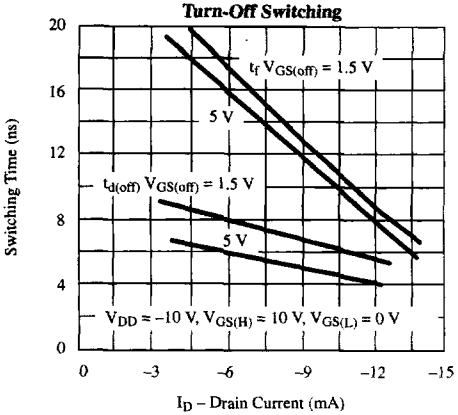


Typical Characteristics (Cont'd)

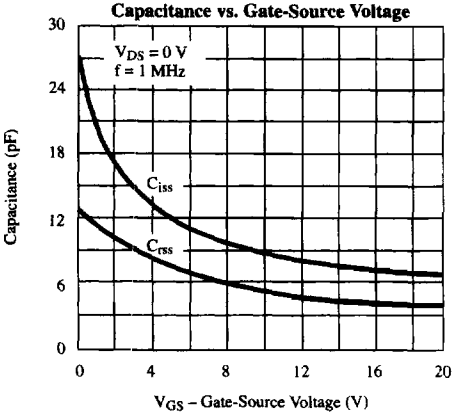
Turn-On Switching



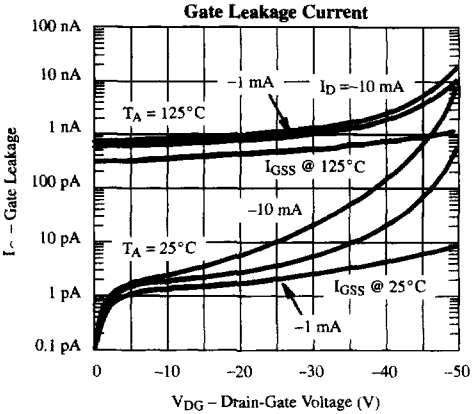
Turn-Off Switching



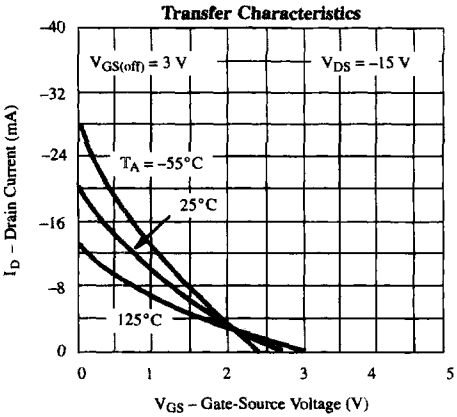
Capacitance vs. Gate-Source Voltage



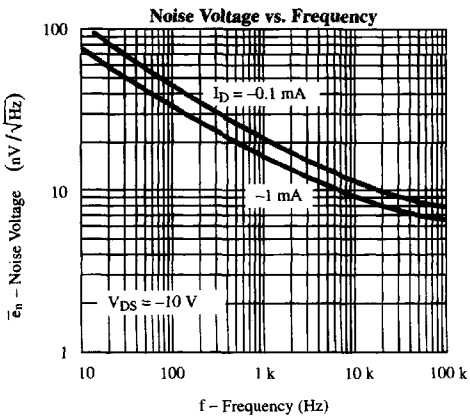
Gate Leakage Current



Transfer Characteristics



Noise Voltage vs. Frequency



Switching Time Test Circuit

	P1086	P1087
V_{DD}	–6 V	–6 V
V_{GG}	20 V	12 V
R_L*	910 Ω	1800 Ω
R_G*	100 Ω	220 Ω
$I_{D(on)}$	–15 mA	–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