

N-Channel JFETs

Product Summary

Part Number	$V_{GS(off)}$ (V)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (nA)	t_{ON} Typ (ns)
U290	-4 to -10	3	0.01	14
U291	-1.5 to -4.5	7	0.01	14

Features

- Low On-Resistance: U290 $<3 \Omega$
- Fast Switching— t_{ON} : 14 ns
- High Off-Isolation: Low $I_{D(off)}$
- Low Capacitance: 20 pF
- Low Insertion Loss

Benefits

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

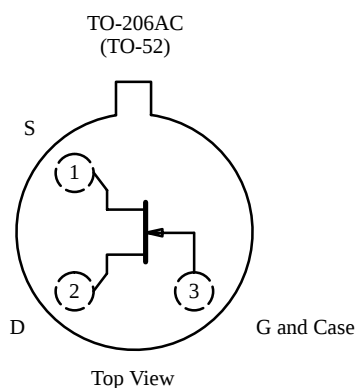
Applications

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

Description

The U290/291 are high performance JFET analog switches which offer ultra low on-resistance and fast switching. This series features the lowest on-resistance of any JFET in the industry today.

The TO-206AC (TO-52) hermetically sealed can makes this series suitable for military applications (see Military Information). For similar products in TO-226A (TO-92) packaging, see the J105/106/107 data sheet.



Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70235.

U290/291

Absolute Maximum Ratings

Gate-Drain, Gate-Source Voltage	−30 V	Operating Junction Temperature	−55 to 150°C
Gate Current	100 mA	Power Dissipation ^a	500 mW
Lead Temperature (1/16" from case for 10 sec.)	300°C	Notes	
Storage Temperature	−65 to 200°C	a. Derate 4 mW/°C above 25°C	

Specifications^a

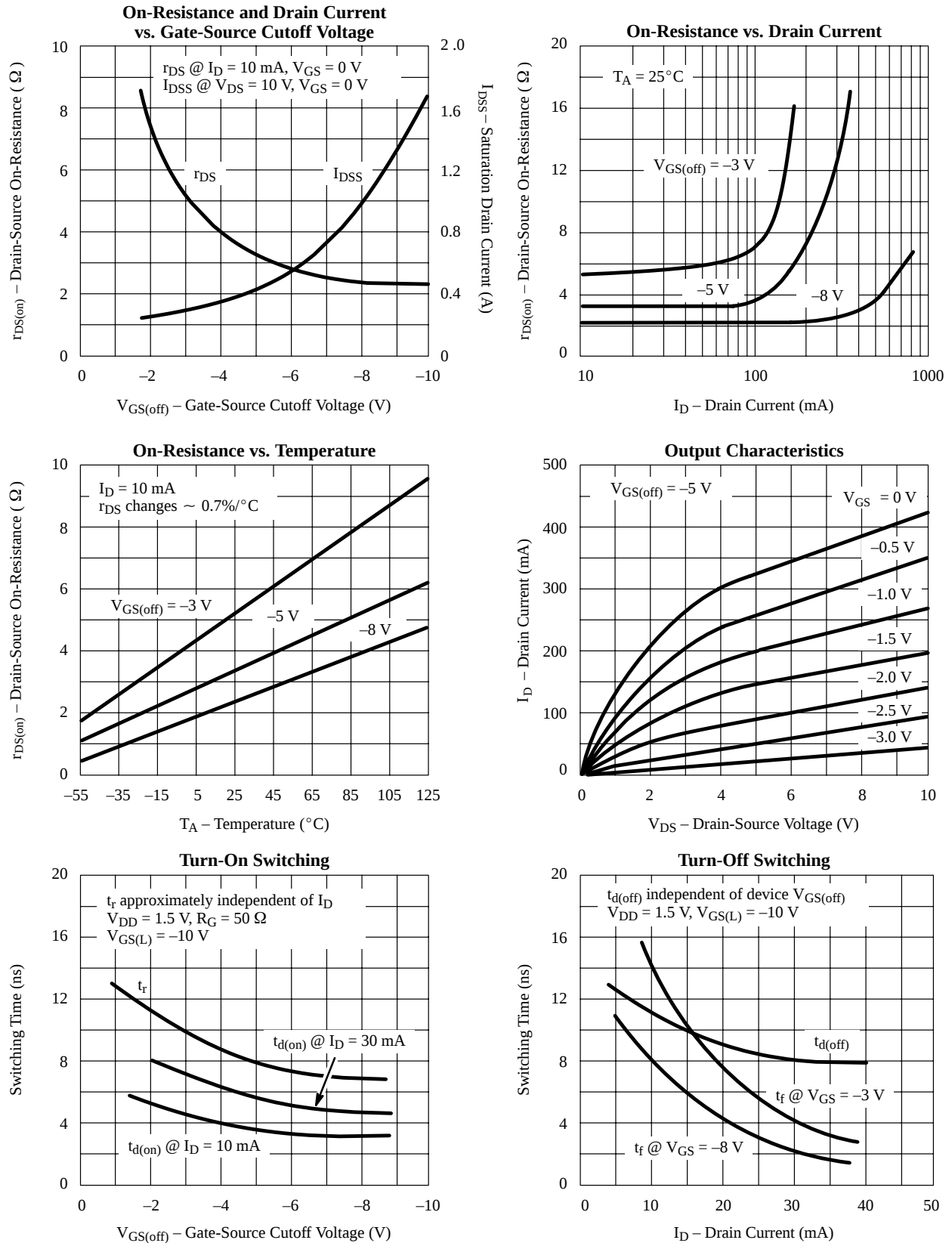
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				U290		U291		
				Min	Max	Min	Max	
Static								
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G = −1 μA , V _{DS} = 0 V	−35	−30		−30		V
Gate-Source Cutoff Voltage	V _{GS(off)}	V _{DS} = 15 V, I _D = 3 nA		−4	−10	−1.5	−4.5	
Saturation Drain Current ^c	I _{DSS}	V _{DS} = 10 V, V _{GS} = 0 V		500		200		mA
Gate Reverse Current	I _{GSS}	V _{GS} = −15 V, V _{DS} = 0 V	−0.02		−1		−1	nA
		T _A = 125°C	−0.01		−1		−1	μA
Gate Operating Current	I _G	V _{DG} = 10 V, I _D = 25 mA	−0.01					nA
Drain Cutoff Current	I _{D(off)}	V _{DS} = 5 V, V _{GS} =−10 V	0.01		1		1	
		T _A = 125°C	0.005		1		1	μA
Drain-Source On-Voltage	V _{DS(on)}	V _{GS} = 0 V, I _D = 10 mA			30		70	mV
Drain-Source On-Resistance	r _{DS(on)}				3		7	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} = 10 V, I _D = 25 mA f = 1 kHz	55					mS
Common-Source Output Conductance	g _{os}		5					
Drain-Source On-Resistance	r _{ds(on)}	V _{GS} = 0 V, I _D = 0 mA, f = 1 kHz			3		7	Ω
Common-Source Input Capacitance	C _{iss}	V _{DS} = 0 V, V _{GS} = 0 V, f = 1 MHz	120		160		160	pF
Common-Source Reverse Transfer Capacitance	C _{rss}	V _{DS} = 0 V, V _{GS} = −15 V f = 1 MHz	20		30		30	
Equivalent Input Noise Voltage	$\bar{e}_n$	V _{DS} = 10 V, I _D = 25 mA f = 1 kHz	3					nV/ √Hz
Switching								
Turn-On Time	t _{d(on)}	V _{DD} = 1.5 V, V _{GS(H)} = 0 V See Switching Circuit	6		15		15	ns
	t _r		8		20		20	
Turn-Off Time	t _{d(off)}		5		15		15	
	t _f		9		20		20	

Notes

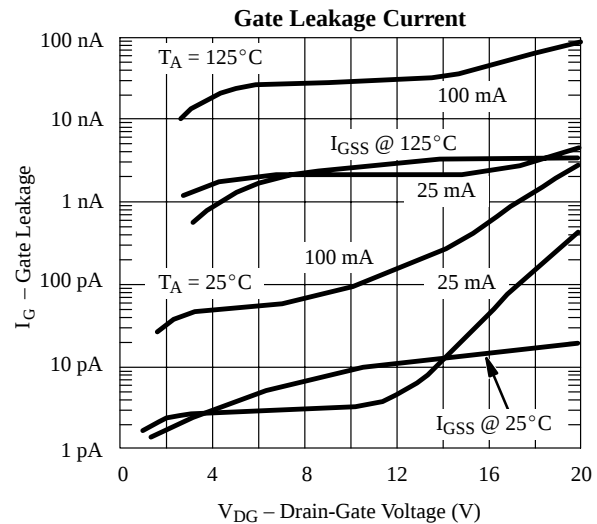
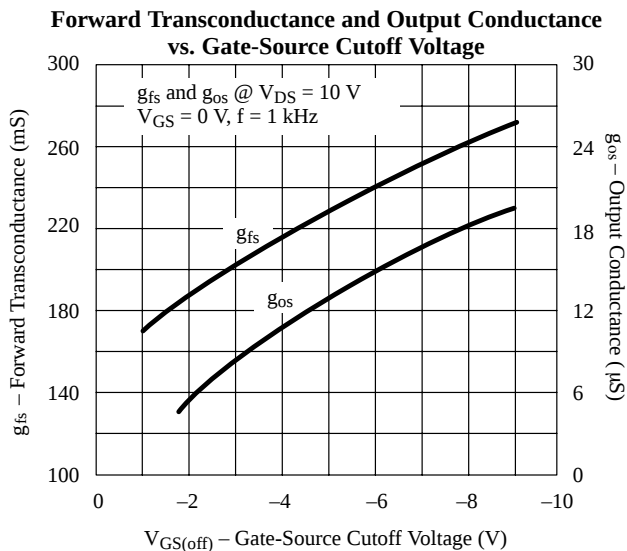
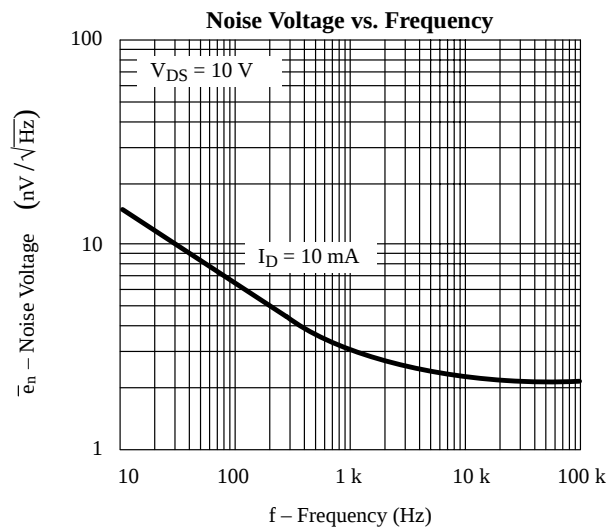
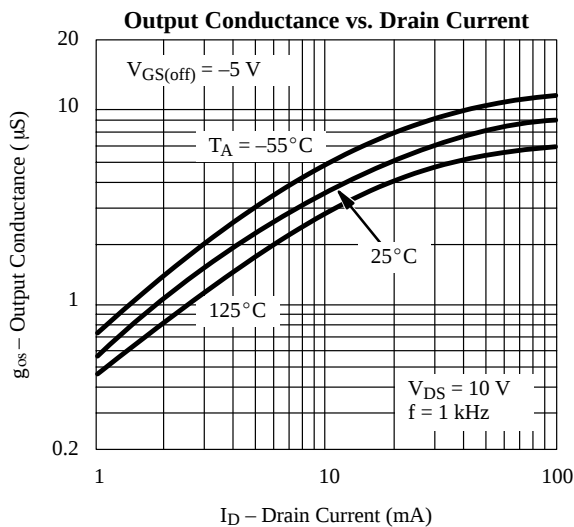
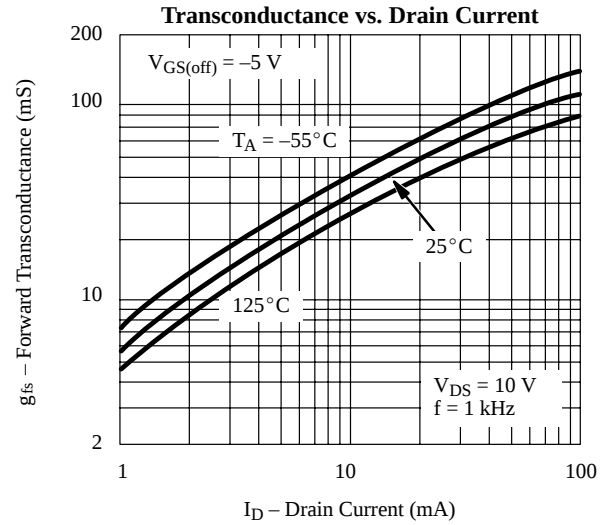
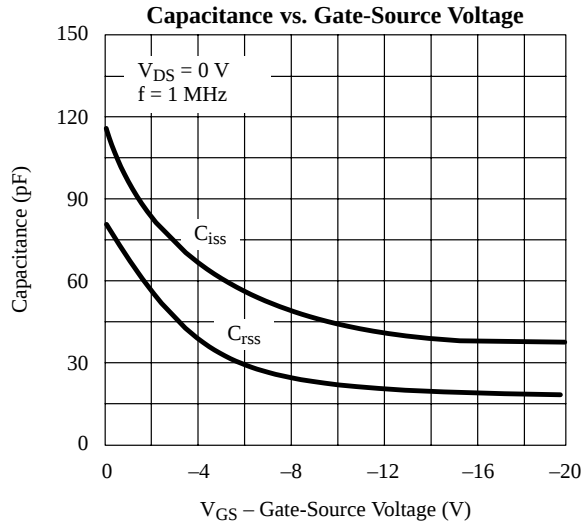
- $T_A = 25^\circ C$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300 \mu s$ duty cycle $\leq 3\%$.

NVA

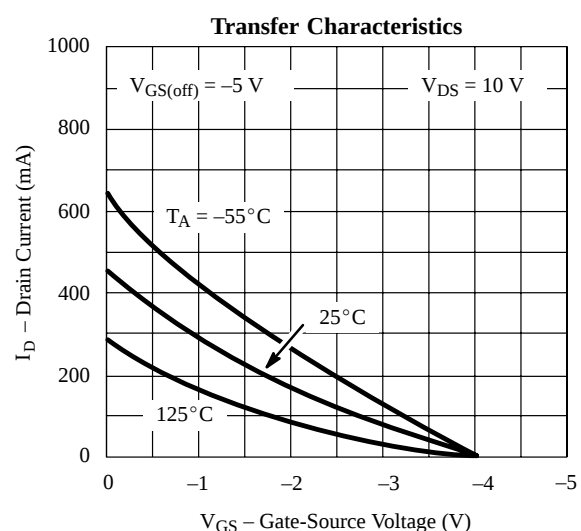
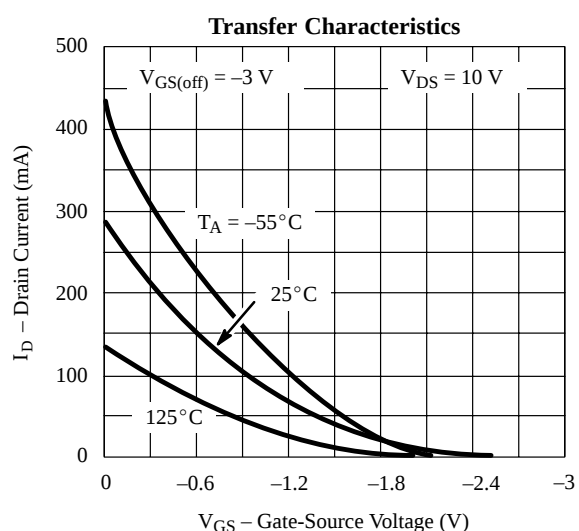
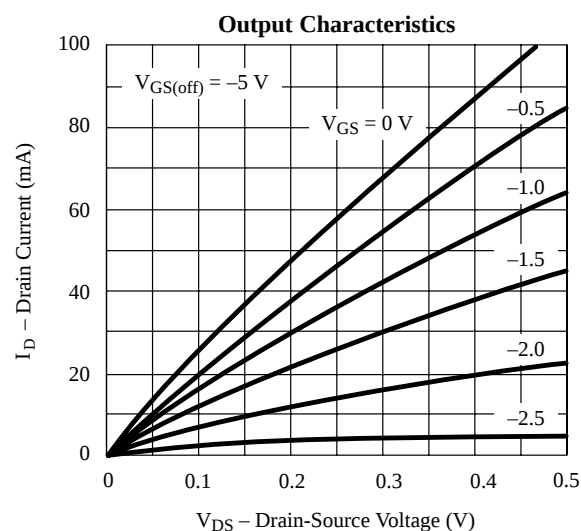
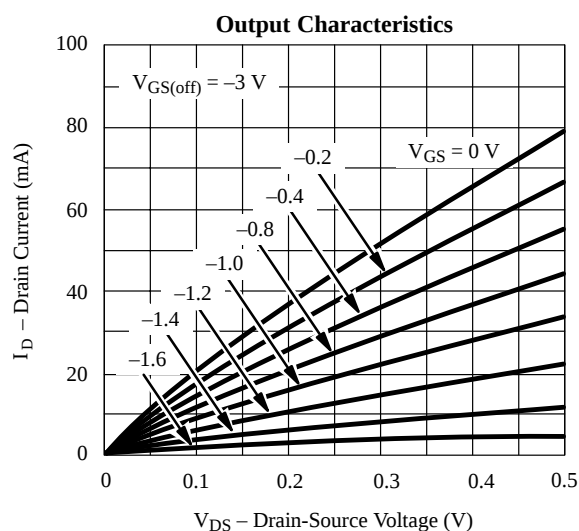
Typical Characteristics



Typical Characteristics (Cont'd)



Typical Characteristics (Cont'd)



Switching Time Test Circuit

	U290	U291
V_{DD}	1.5 V	1.5 V
R_L^*	50 Ω	50 Ω
$I_{D(on)}$	30 mA	30 mA
$V_{GS(L)}$	-12 V	-7 V

*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.

