

P-Channel JFETs

Product Summary

Part Number	$V_{GS(off)}$ (V)	$r_{DS(on)}$ Max (Ω)	$I_{D(off)}$ Typ (pA)	t_{ON} Max (ns)
2N5114	5 to 10	75	-10	16
2N5115	3 to 6	100	-10	30
2N5116	1 to 4	150	-10	42

2N5116, For applications information see AN104, page 21.

Features

- Low On-Resistance: 2N5114 <75 Ω
- Fast Switching— t_{ON} : 16 ns
- High Off-Isolation— $I_{D(off)}$: -10 pA
- Low Capacitance: 6 pF
- Low Insertion Loss

Benefits

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

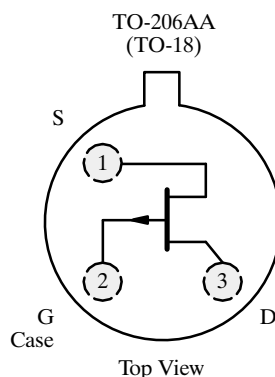
Applications

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

Description

The 2N5114 series consists of p-channel JFET analog switches designed to provide low on-resistance, good off-isolation, and fast switching. These JFETs are optimized for use in complementary switching applications with the Siliconix 2N4856A series.

The 2N5114 series is available with JAN, JANTX, or JANTXV level processing, (see 2N5114 JAN series data sheet).



Absolute Maximum Ratings

Gate-Drain Voltage	30 V
Gate-Source Voltage	30 V
Gate Current	-50 mA
Storage Temperature	-65 to 200°C
Operating Junction Temperature	-55 to 200°C

Lead Temperature ($1/16$ " from case for 10 sec.)	300°C
Power Dissipation ^a	500 mW

Notes

- a. Derate 3 mW/°C above 25°C

Specifications^a

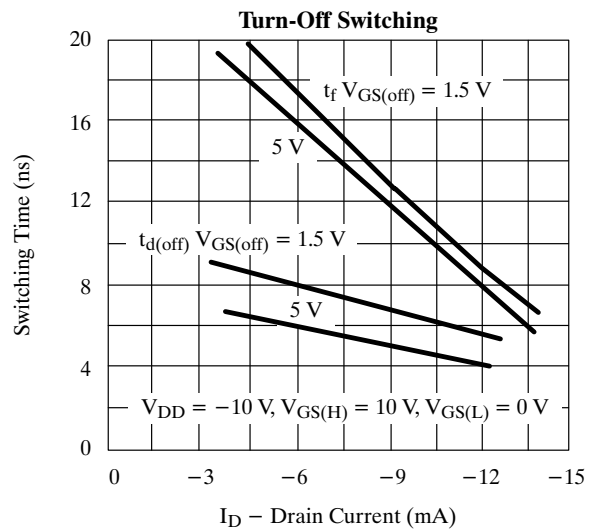
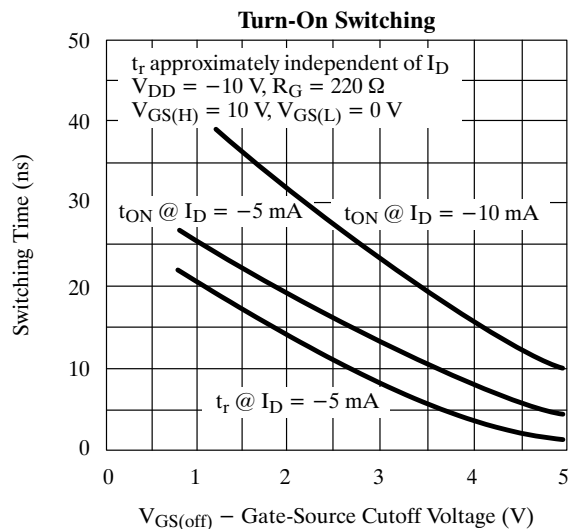
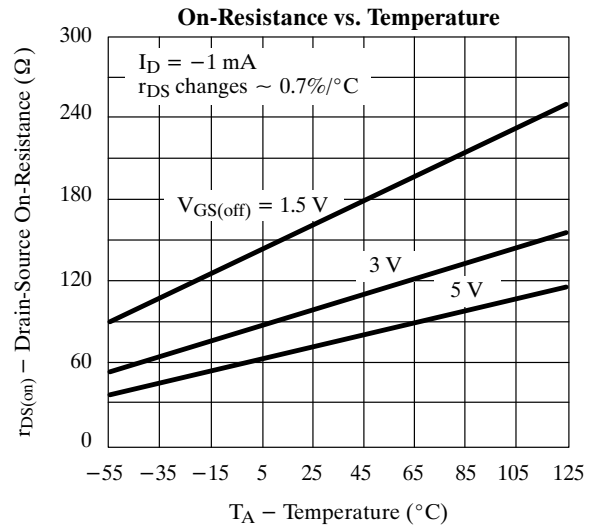
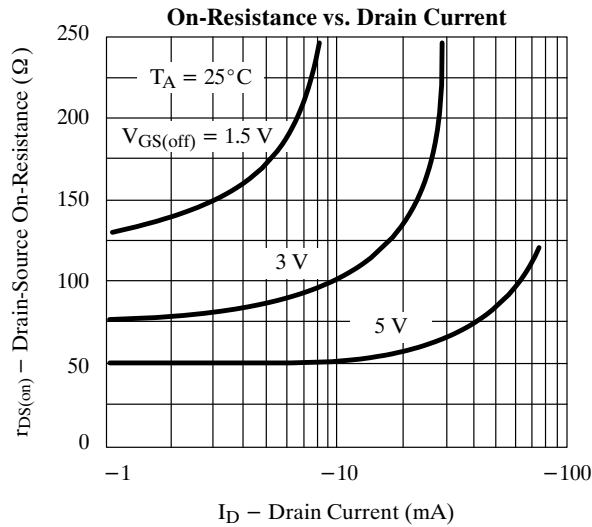
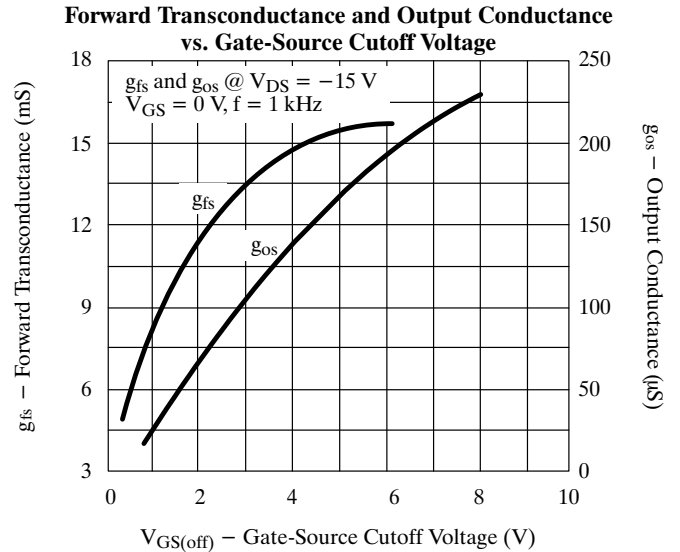
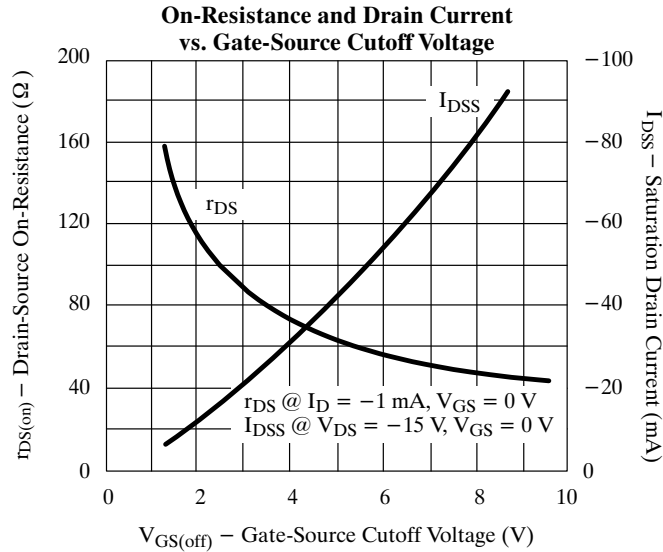
Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit		
				2N5114		2N5115		2N5116				
				Min	Max	Min	Max	Min	Max			
Static												
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = 1 \mu A, V_{DS} = 0 V$	45	30		30		30		V		
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = -15 V, I_D = -1 nA$		5	10	3	6	1	4			
Saturation Drain Current ^c	I_{DSS}	$V_{GS} = 0 V$	$V_{DS} = -18 V$		-30	-90					mA	
			$V_{DS} = -15 V$				-15	-60	-5	-25		
Gate Reverse Current	I_{GSS}	$V_{GS} = 20 V, V_{DS} = 0 V$		5		500		500		500	pA	
			$T_A = 150^\circ C$	0.01		1		1		1	μA	
Gate Operating Current ^d	I_G	$V_{DG} = -15 V, I_D = -1 mA$	-5									
Drain Cutoff Current	$I_{D(off)}$	$V_{DS} = -15 V$	$V_{GS} = 12 V$	-10		-500					pA	
			$V_{GS} = 7 V$	-10				-500				
			$V_{GS} = 5 V$	-10						-500		
		$V_{DS} = -15 V$ $T_A = 150^\circ C$	$V_{GS} = 12 V$	-0.02		-1						μA
			$V_{GS} = 7 V$	-0.02				-1				
			$V_{GS} = 5 V$	-0.02						-1		
Drain-Source On-Voltage	$V_{DS(on)}$	$V_{GS} = 0 V$	$I_D = -15 mA$	-1.0		-1.3					V	
			$I_D = -7 mA$	-0.7				-0.8				
			$I_D = -3 mA$	-0.5						-0.6		
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 0 V, I_D = -1 mA$			75		100		150	Ω		
Gate-Source Forward Voltage	$V_{GS(F)}$	$I_G = -1 mA, V_{DS} = 0 V$	-0.7		-1		-1		-1	V		
Dynamic												
Common-Source Forward Transconductance ^d	g_{fs}	$V_{DS} = -15 V, I_D = -1 mA$ $f = 1 kHz$	4.5							mS		
Common-Source Output Conductance ^d	g_{os}		20							μS		
Drain-Source On-Resistance	$r_{ds(on)}$	$V_{GS} = 0 V, I_D = 0 mA, f = 1 kHz$			75		100		150	Ω		
Common-Source Input Capacitance	C_{iss}	$V_{DS} = -15 V, V_{GS} = 0 V$ $f = 1 MHz$	20		25		25		25	pF		
Common-Source Reverse Transfer Capacitance	C_{rss}	$V_{DS} = 0 V$ $f = 1 MHz$	$V_{GS} = 12 V$	5		7						
			$V_{GS} = 7 V$	6				7				
			$V_{GS} = 5 V$	6					7			
Equivalent Input Noise Voltage ^d	\bar{e}_n	$V_{DS} = 10 V, I_D = 10 mA$ $f = 1 kHz$	20							$\frac{nV}{\sqrt{Hz}}$		
Switching												
Turn-On Time	$t_{d(on)}$	See Switching Circuit			6		10		12	ns		
	t_r				10		20		30			
Turn-Off Time	$t_{d(off)}$				6		8		10			
	t_f				15		30		50			

Notes

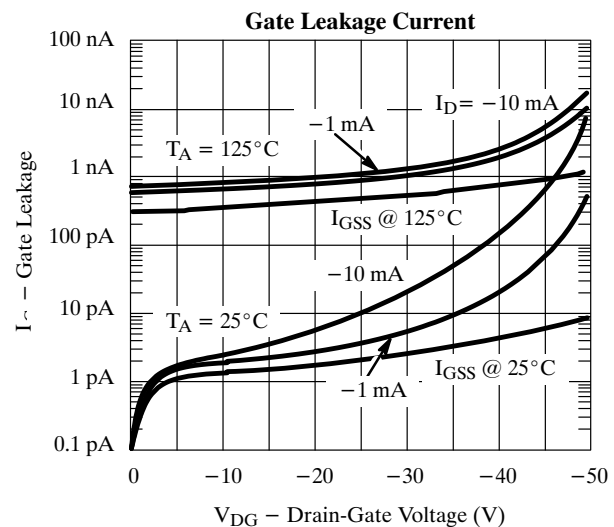
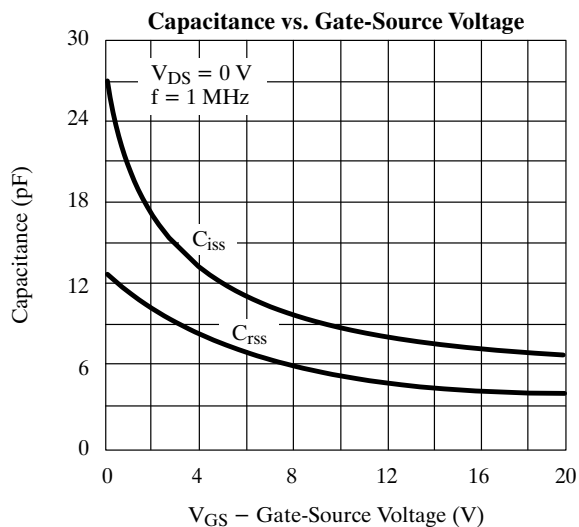
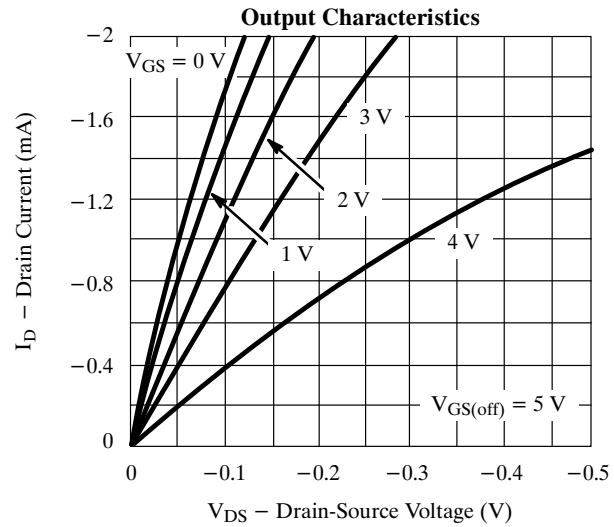
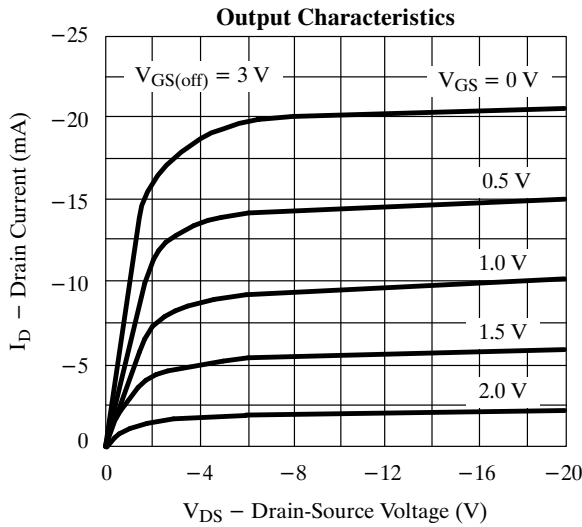
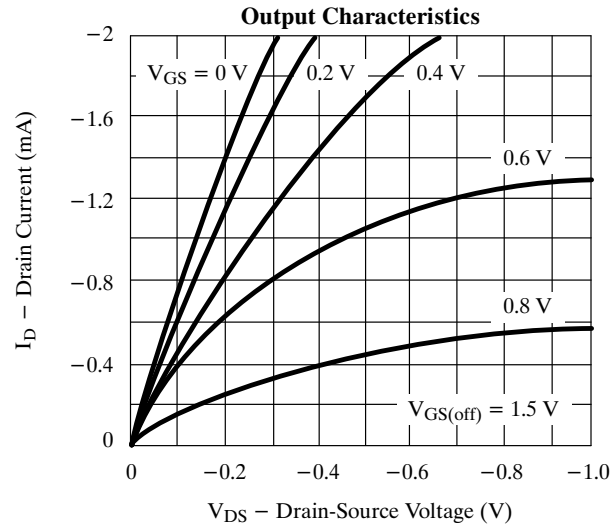
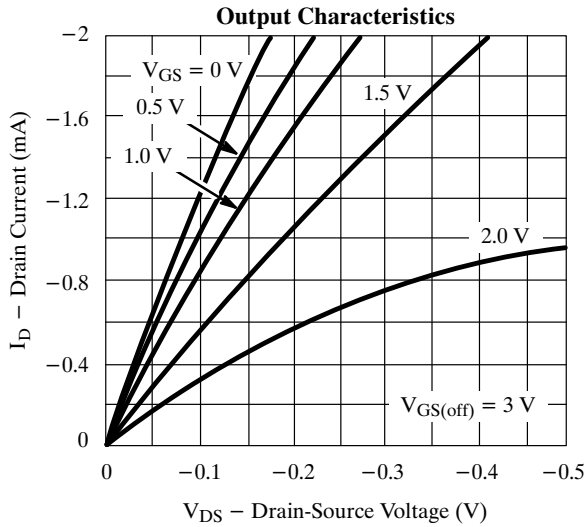
- $T_A = 25^\circ C$ unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: $PW \leq 300 \mu s$ duty cycle $\leq 3\%$.
- This parameter not registered with JEDEC.

PSCIA

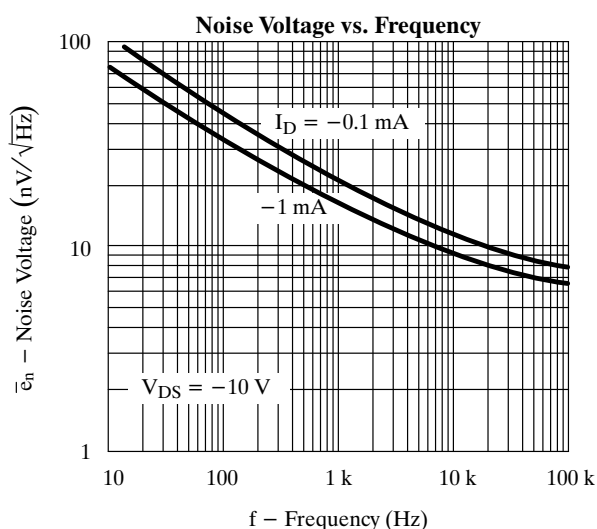
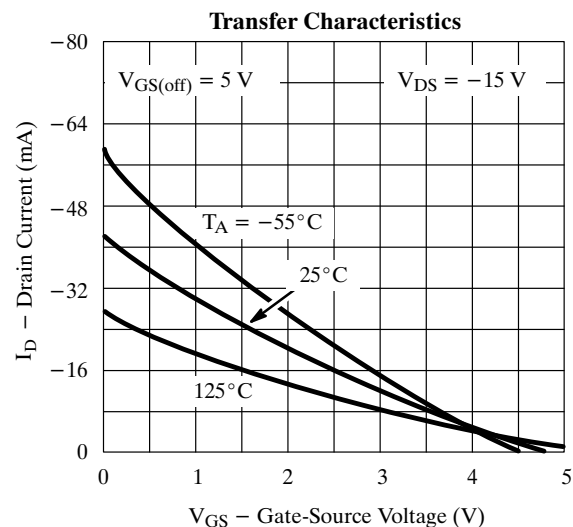
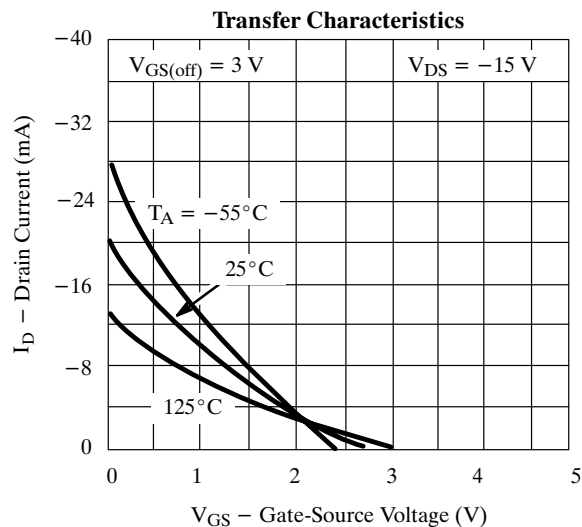
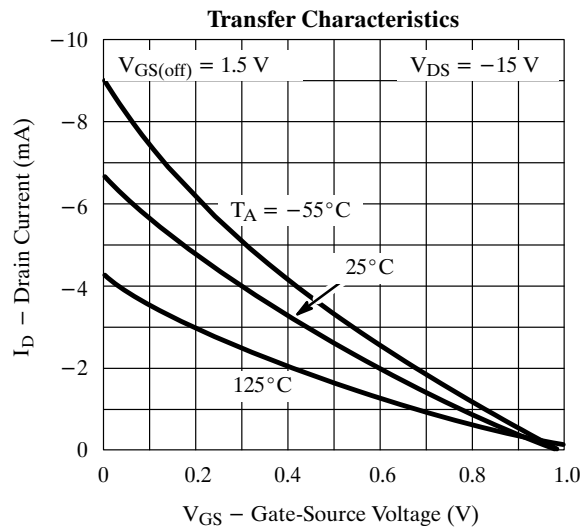
Typical Characteristics



Typical Characteristics (Cont'd)



Typical Characteristics (Cont'd)



Switching Time Test Circuit

	2N5114	2N5115	2N5116
V_{DD}	-10 V	-6 V	-6 V
V_{GG}	20 V	12 V	8 V
R_L^*	430 Ω	910 Ω	2 k Ω
R_G^*	100 Ω	220 Ω	390 Ω
$I_{D(on)}$	-15 mA	-7 mA	-3 mA
$V_{GS(H)}$	0 V	0 V	0 V
$V_{GS(L)}$	-11 V	-7 V	-5 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.

