2N/PN/SST4117A Series

N-Channel JFETs

2N4117A PN4117A SST4117
2N4118A PN4118A SST4118
2N4119A PN4119A SST4119

Product Summary

Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	g_{fs} Min (mS)	I_{DSS} Min (μA)
4117	–0.6 to –1.8	–40	70	30
4118	–1 to –3	–40	80	80
4119	–2 to –6	–40	100	200

PN/SST4119A, For applications information see AN105, page 1.

Features

- Ultra-Low Leakage: 0.2 pA
- Very Low Current/Voltage Operation
- Ultrahigh Input Impedance
- Low Noise

Benefits

- Insignificant Signal Loss/Error Voltage with High-Impedance Source
- Low Power Consumption (Battery)
- Maximum Signal Output, Low Noise
- High Sensitivity to Low-Level Signals

Applications

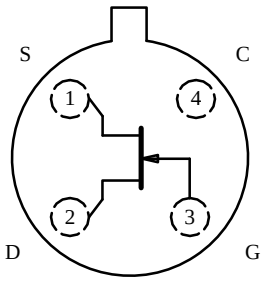
- High-Impedance Transducer Amplifiers
- Smoke Detector Input
- Infrared Detector Amplifier
- Precision Test Equipment

Description

The 2N/PN/SST4117A series of n-channel JFETs provide ultra-high input impedance. These devices are specified with a 1-pA limit and typically operate at 0.2 pA. This makes them perfect choices for use as high-impedance sensitive front-end amplifiers.

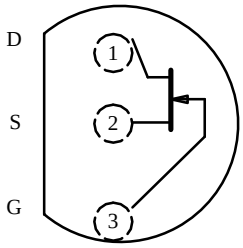
The hermetically sealed TO-206AF package allows full military processing per MIL-S-19500 (see Military Information). The TO-226A (TO-92) plastic package provides a low-cost option. The TO-236 (SOT-23) package provides surface-mount capability. Both the PN and SST series are available in tape-and-reel for automated assembly (see Packaging Information).

TO-206AF
(TO-72)



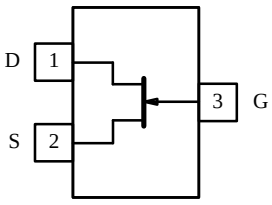
Top View
2N4117A
2N4118A
2N4119A

TO-226AA
(TO-92)



Top View
PN4117A
PN4118A
PN4119A

TO-236
(SOT-23)



Top View
SST4117 (T7)*
SST4118 (T8)*
SST4119 (T9)*

*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 #70239. Applications information may also be obtained via FaxBack, request document #9105.

Absolute Maximum Ratings

Gate-Source/Gate-Drain Voltage . . . . . –40V

Forward Gate Current . . . . . 50 mA

Storage Temperature : (2N Prefix) . . . . . –65 to 175°C
(PN, SST Prefix) . . . . . –55 to 150°C

Operating Junction Temperature :
(2N Prefix) . . . . . –55 to 175°C
(PN, SST Prefix) . . . . . –55 to 150°C

Lead Temperature ($^1/_{16}$" from case for 10 sec.) . . . . . 300°C

Power Dissipation (case 25°C) :
(2N Prefix)[a] . . . . . 300 mW
(PN, SST Prefix)[b] . . . . . 350 mW

Notes
a. Derate 2 mW/°C above 25°C
b. Derate 2.8 mW/°C above 25°C

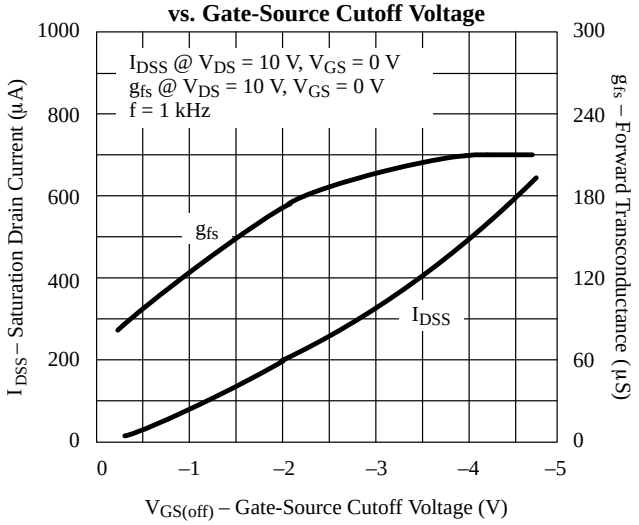
Specifications[a]

Parameter	Symbol	Test Conditions		Typ[b]	Limits 4117 Min	Limits 4117 Max	Limits 4118 Min	Limits 4118 Max	Limits 4119 Min	Limits 4119 Max	Unit
Static											
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = –1 µA , V_{DS} = 0 V		–70	–40		–40		–40		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 nA			–0.6	–1.8	–1	–3	–2	–6	
Saturation Drain Current	I_{DSS}	V_{DS} = 10 V, V_{GS} = 0 V			30	90	80	240	200	600	µA
Gate Reverse Current	I_{GSS}	V_{GS} = –20 V V_{DS} = 0 V	2N	–0.2		–1		–1		–1	pA
		V_{GS} = –20 V V_{DS} = 0 V T_A = 150°C	2N	–0.4		–2.5		–2.5		–2.5	nA
		V_{GS} = –10 V V_{DS} = 0 V	PN	–0.2		–1		–1		–1	pA
			SST	–0.2		–10		–10		–10	
		V_{GS} = –10 V V_{DS} = 0 V T_A = 100°C	PN/SST	–0.03		–2.5		–2.5		–2.5	nA
Gate Operating Current[c]	I_G	V_{DG} = 15 V, I_D = 30 µA		–0.2							pA
Drain Cutoff Current[c]	$I_{D(off)}$	V_{DS} = 10 V, V_{GS} = –8 V		0.2							
Gate-Source Forward Voltage[c]	$V_{GS(F)}$	I_G = 1 mA , V_{DS} = 0 V		0.7							V
Dynamic											
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 10 V, V_{GS} = 0 V f = 1 kHz			70	210	80	250	100	330	µS
Common-Source Output Conductance	g_{os}					3		5		10	
Common-Source Input Capacitance	C_{iss}	V_{DS} = 10 V V_{GS} = 0 V f = 1 MHz	2N/PN	1.2		3		3		3	pF
			SST	1.2							
Common-Source Reverse Transfer Capacitance	C_{rss}		2N/PN	0.3		1.5		1.5		1.5	
			SST	0.3							
Equivalent Input Noise Voltage[c]	$\bar{e}_n$	V_{DS} = 10 V, V_{GS} = 0 V f = 1 kHz		15							$nV/\sqrt{Hz}$

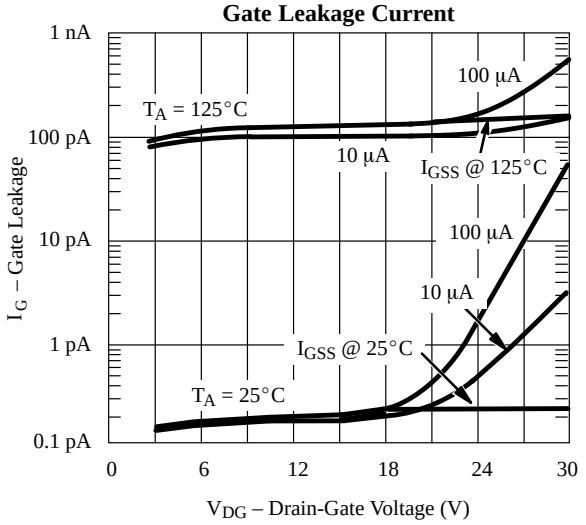
Notes
a. T_A = 25°C unless otherwise noted. NT
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. This parameter not registered with JEDEC.

Typical Characteristics

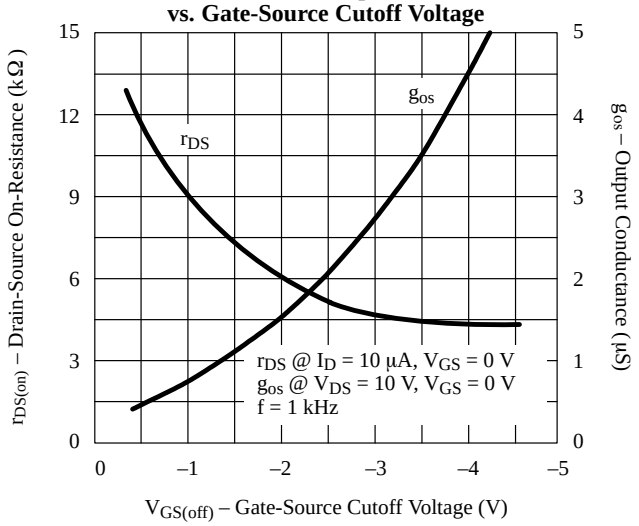
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



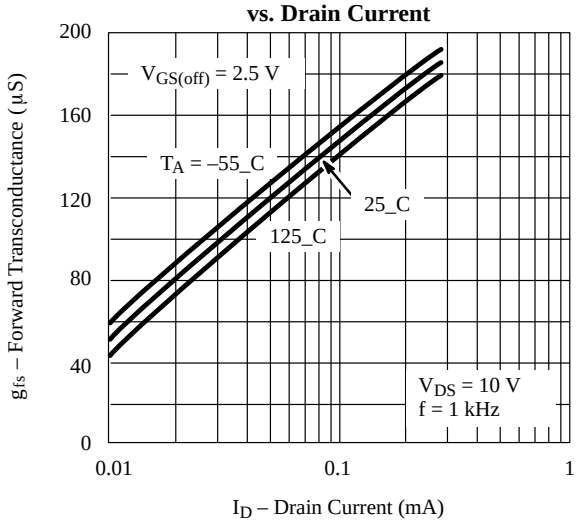
Gate Leakage Current



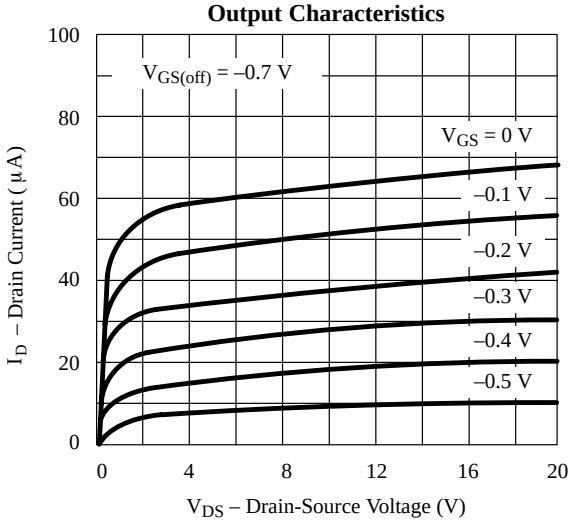
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



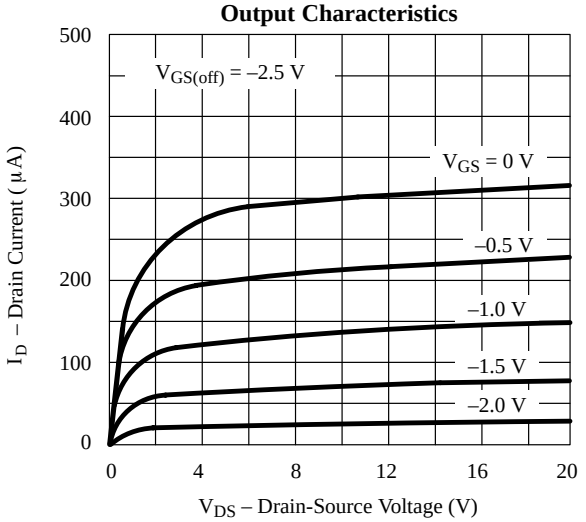
Common-Source Forward Transconductance vs. Drain Current



Output Characteristics

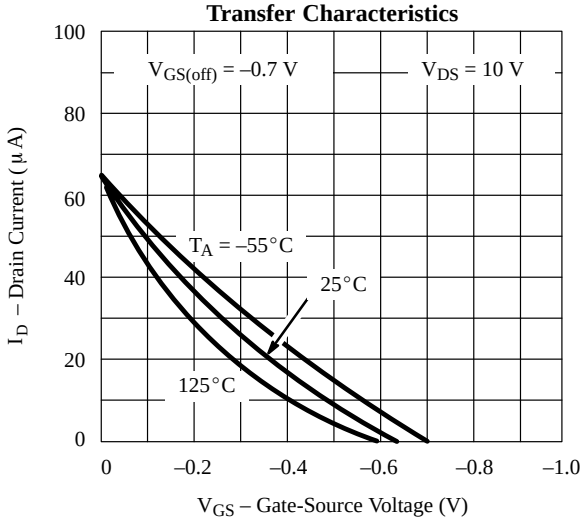


Output Characteristics

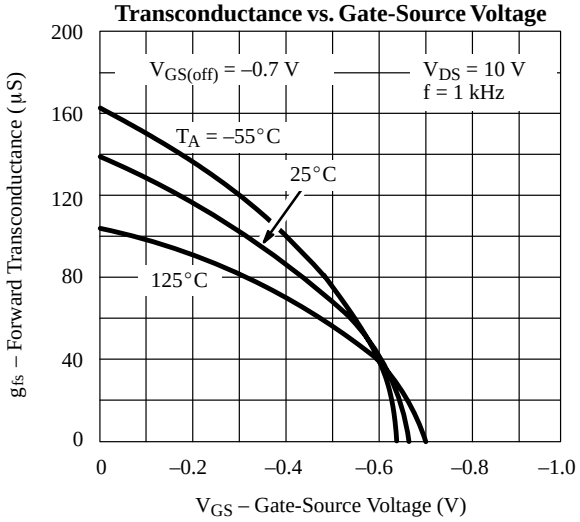


Typical Characteristics (Cont'd)

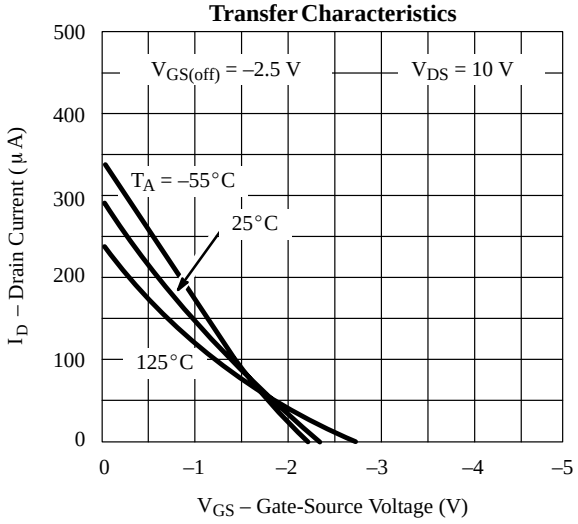
Transfer Characteristics



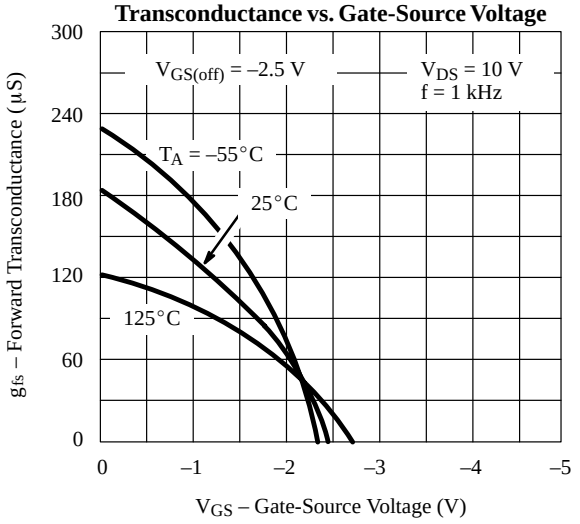
Transconductance vs. Gate-Source Voltage



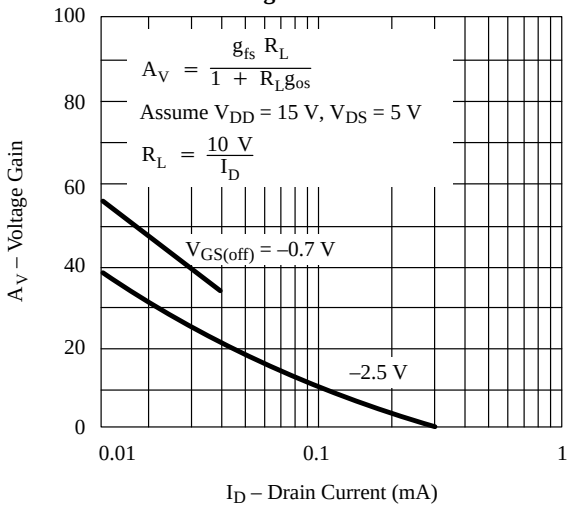
Transfer Characteristics



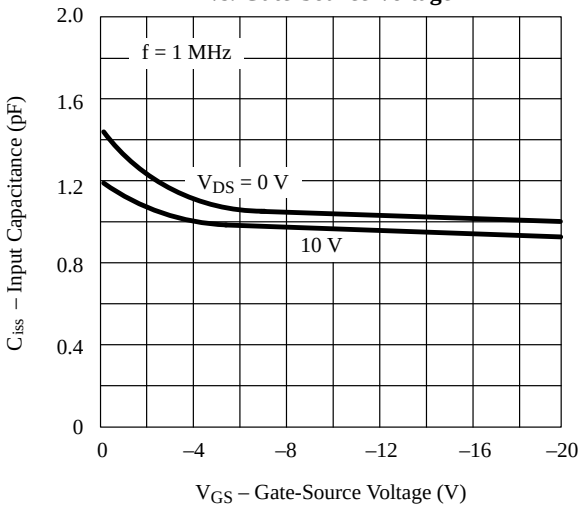
Transconductance vs. Gate-Source Voltage



Circuit Voltage Gain vs. Drain Current

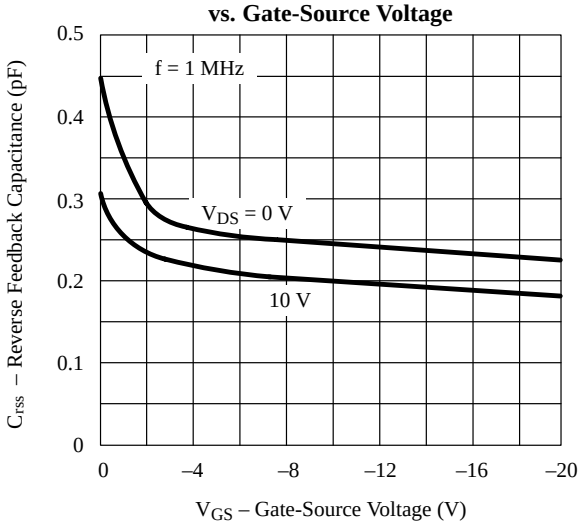


Common-Source Input Capacitance vs. Gate-Source Voltage

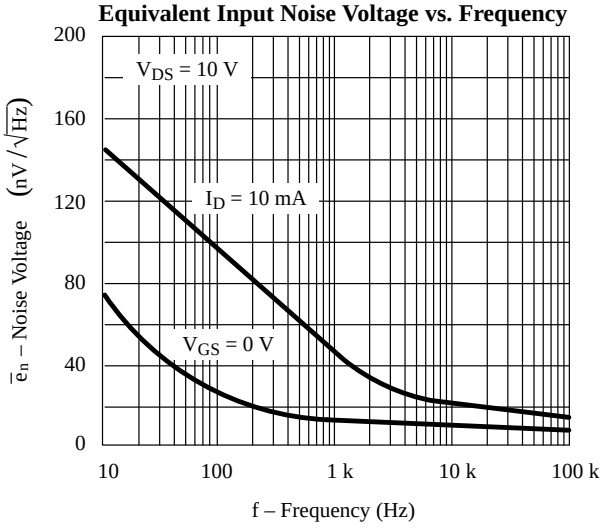


Typical Characteristics (Cont'd)

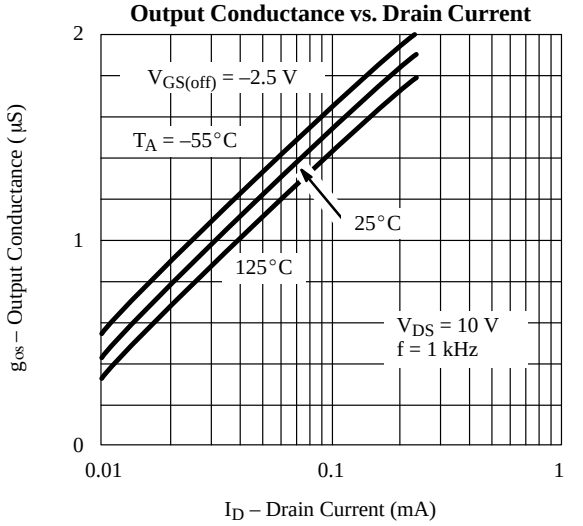
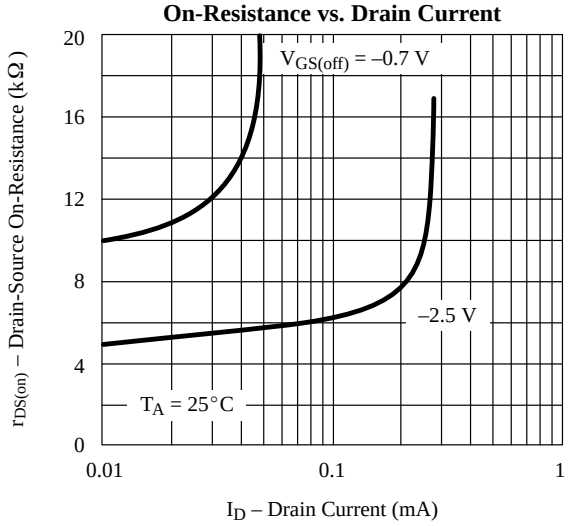
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current



On-Resistance vs. Drain Current