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 (μS)	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

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

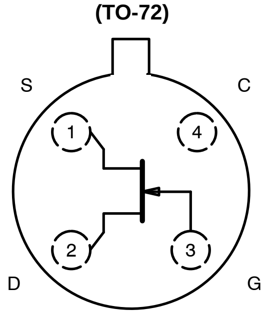
- High-Impedance Transducer Amplifiers
- Smoke Detector Input
- Infrared Detector Amplifier
- Precision Test Equipment

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.

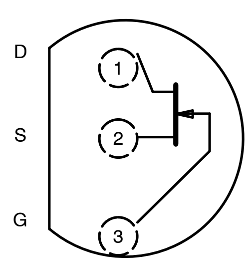
The hermetically sealed TO-206AF package allows full military processing per MIL-S-19500 (see Military Information). The TO-226A (TO-92) plastic package provides a low-cost option. The TO-236 (SOT-23) package provides surface-mount capability. Both the PN and SST series are available in tape-and-reel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

TO-206AF (TO-72)



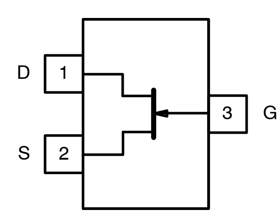
Top View
2N4117A
2N4118A
2N4119A

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

For applications information see AN105.

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

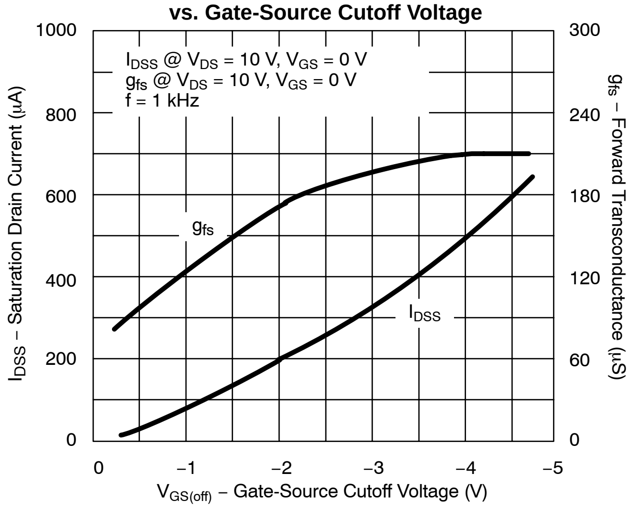
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions		Typ[a]	Limits 4117 Min	4117 Max	4118 Min	4118 Max	4119 Min	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	V
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	pA
		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[b]	I_G	V_{DG} = 15 V, I_D = 30 µA		−0.2							pA
Drain Cutoff Current[b]	$I_{D(off)}$	V_{DS} = 10 V, V_{GS} = −8 V		0.2							pA
Gate-Source Forward Voltage[b]	$V_{GS(F)}$	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}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz				3		5		10	µS
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							pF
Common-Source Reverse Transfer Capacitance	C_{rss}		2N/PN	0.3		1.5		1.5		1.5	pF
			SST	0.3							pF
Equivalent Input Noise Voltage[b]	$\bar{e}_n$	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz		15							nV⁄√Hz

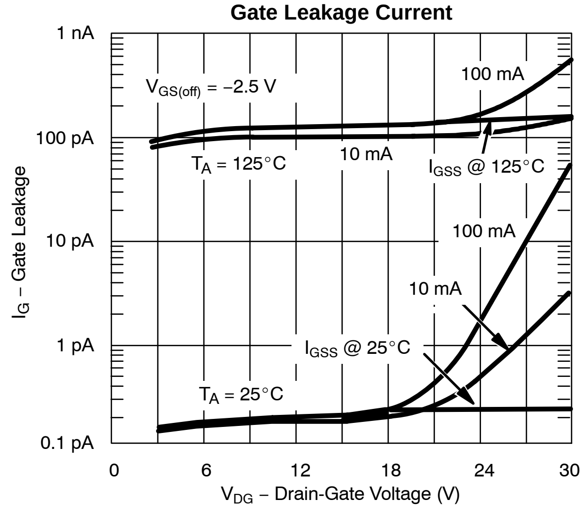
Notes
a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing. NT
b. This parameter not registered with JEDEC.

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

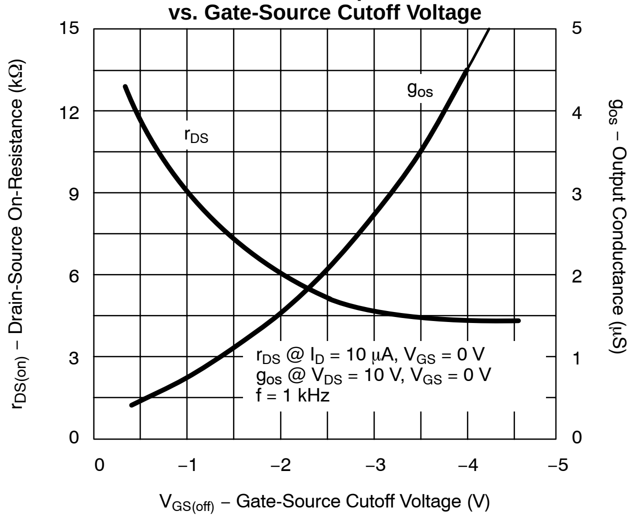
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



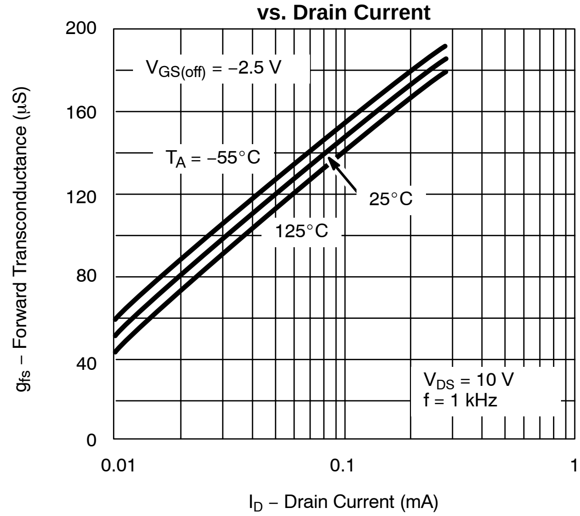
Gate Leakage Current



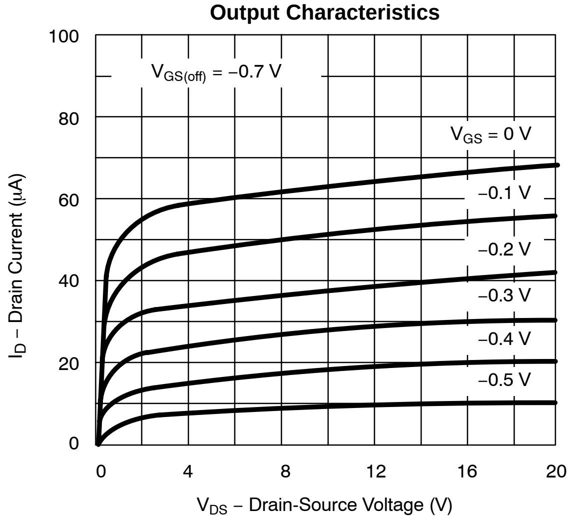
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



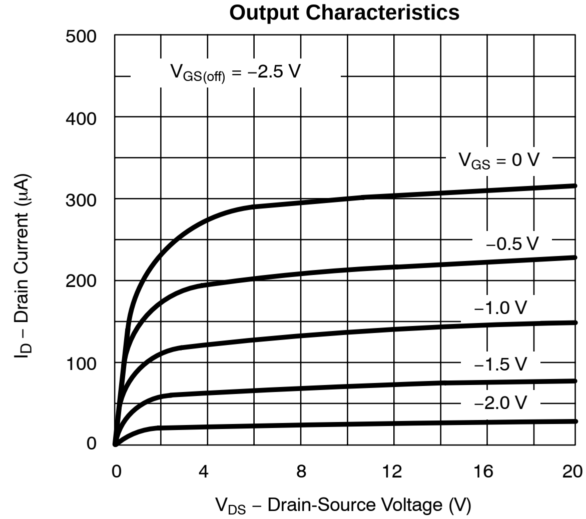
Common-Source Forward Transconductance vs. Drain Current



Output Characteristics

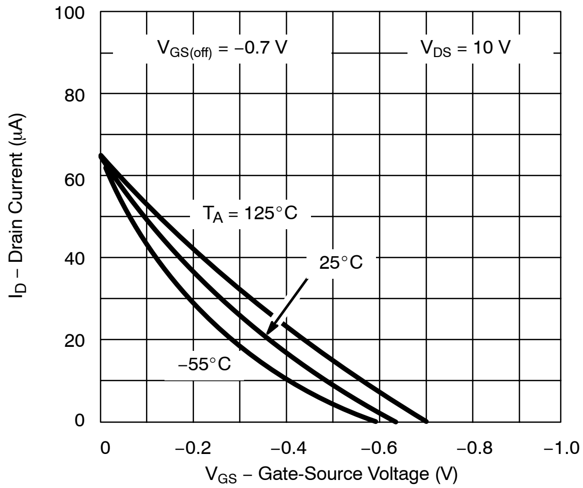


Output Characteristics

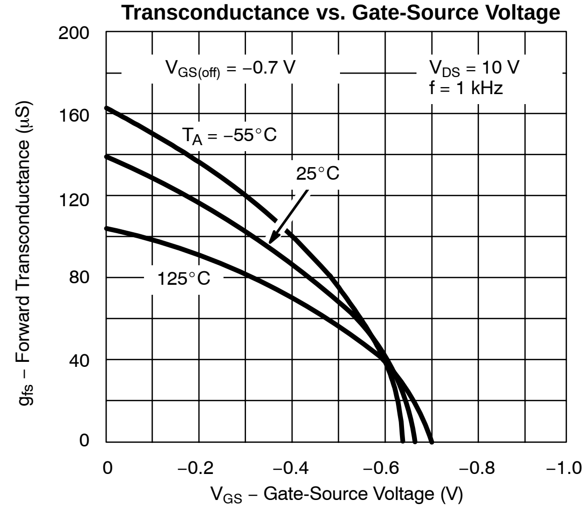


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

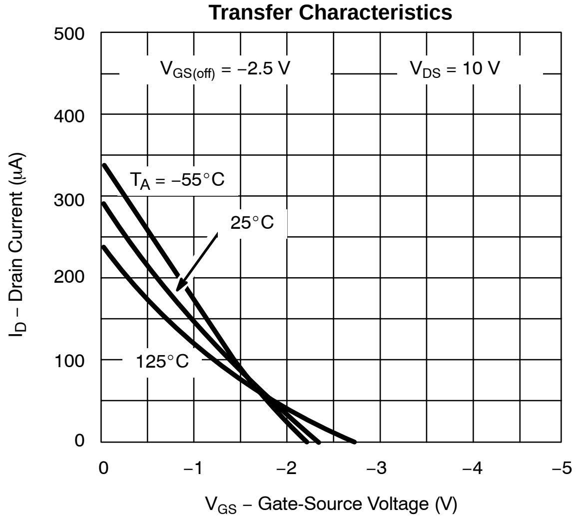
Transfer Characteristics



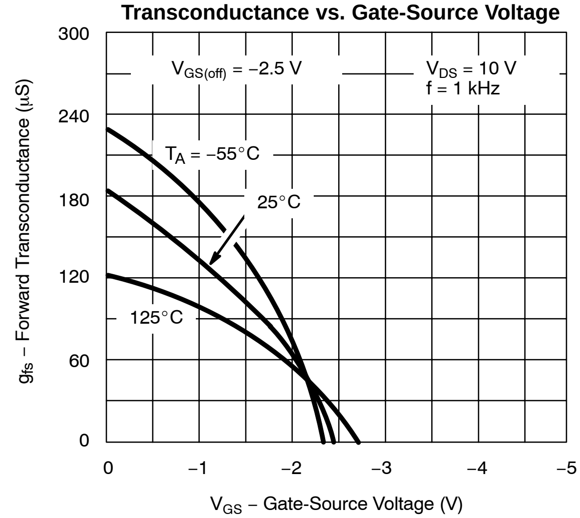
Transconductance vs. Gate-Source Voltage



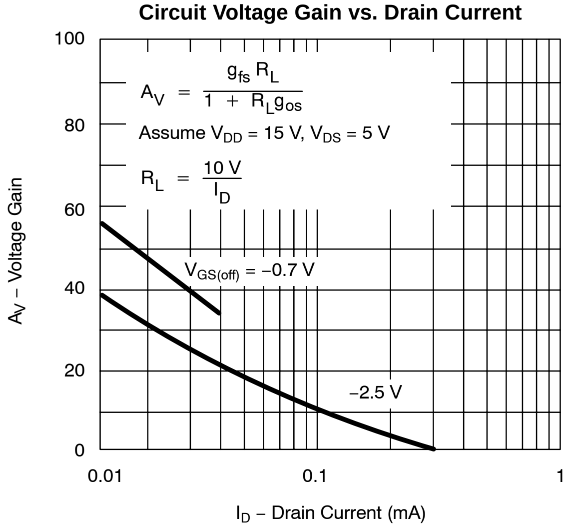
Transfer Characteristics



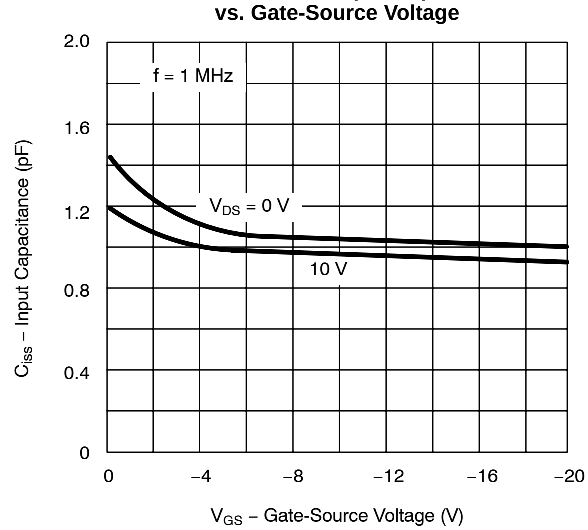
Transconductance vs. Gate-Source Voltage



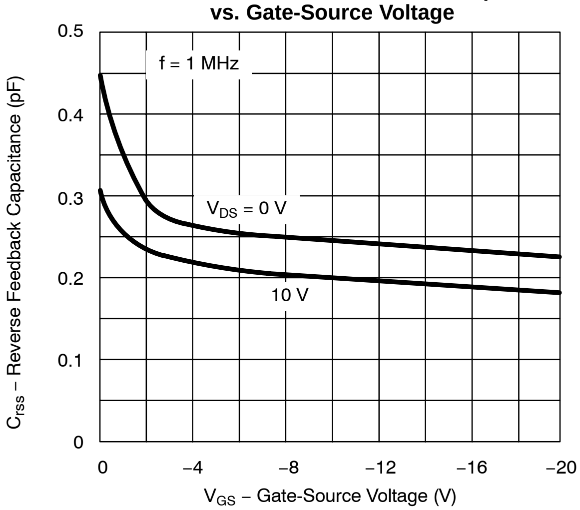
Circuit Voltage Gain vs. Drain Current



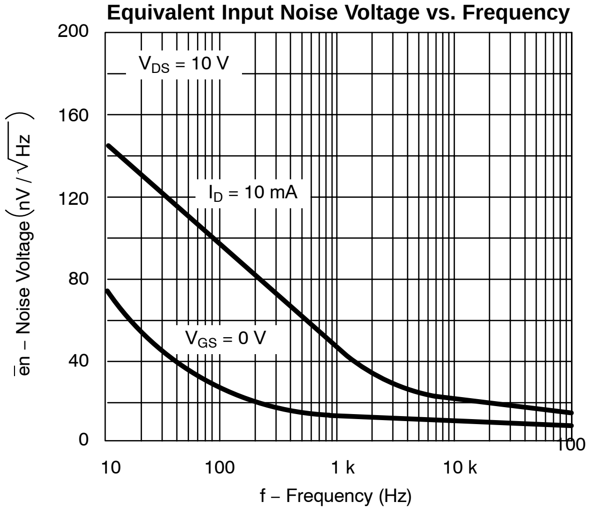
Common-Source Input Capacitance vs. Gate-Source Voltage



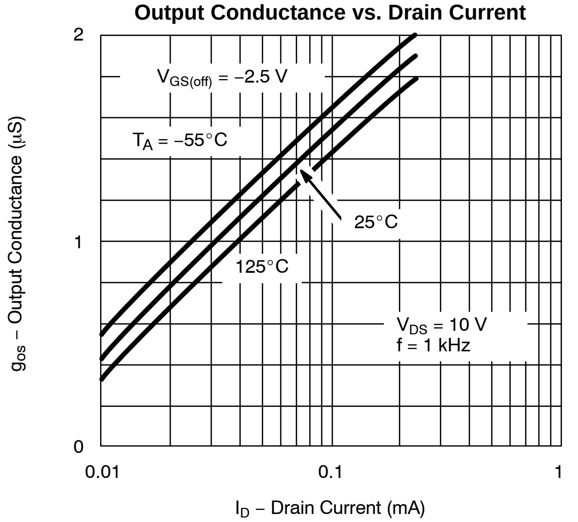
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)



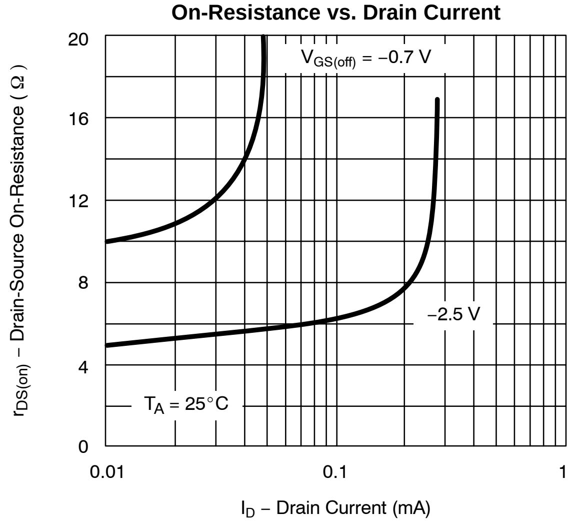
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current



On-Resistance vs. Drain Current

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