2N/PN/SST4117A Series

TEMIC
Semiconductors

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

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

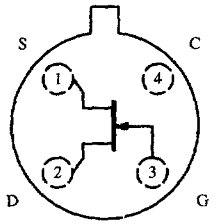
- High-Impedance Transducer Amplifiers
- Smoke Detector Input
- Infrared Detector Amplifier
- Precision Test Equipment

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.

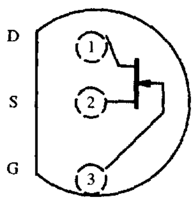
The hermetically sealed TO-206AF package allows full military processing per MIL-S-19500 (see Military Information). The TO-226A (TO-92) plastic package provides a low-cost option. The TO-236 (SOT-23) package provides surface-mount capability. Both the PN and SST series are available in tape-and-reel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

TO-206AF
(TO-72)



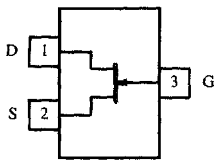
Top View
2N4117A
2N4118A
2N4119A

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 #70598.

2N/PN/SST4117A Series

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						Unit
					4117		4118		4119		
					Min	Max	Min	Max	Min	Max	
Static											
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -1\ \mu A$, $V_{DS} = 0$ 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 $T_A = 150°C$		–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, $I_D = 30\ \mu A$		–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/ √Hz

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

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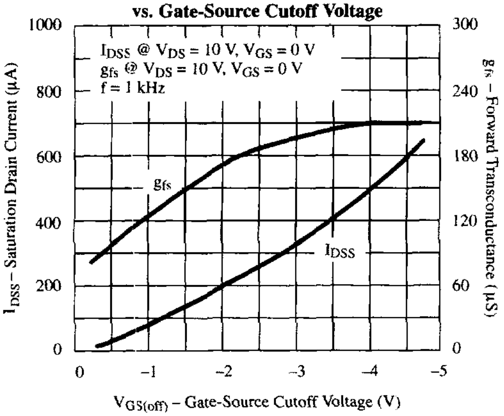
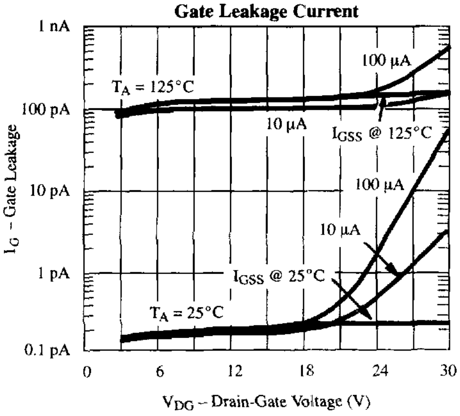
Typical Characteristics

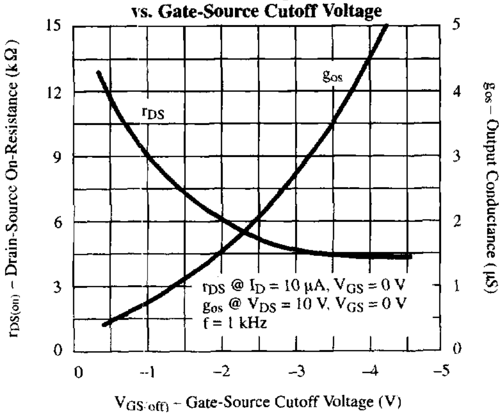
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



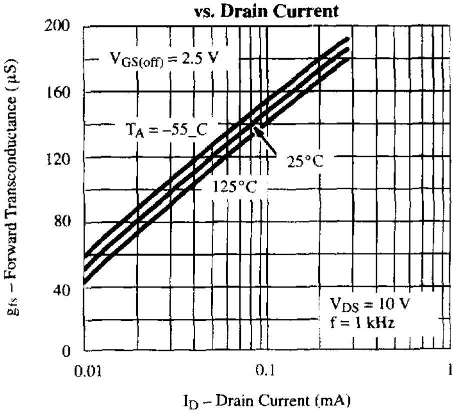
Gate Leakage Current



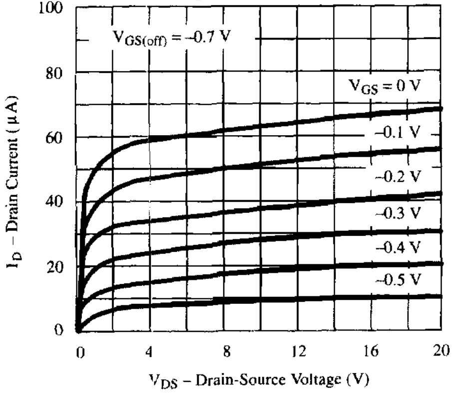
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



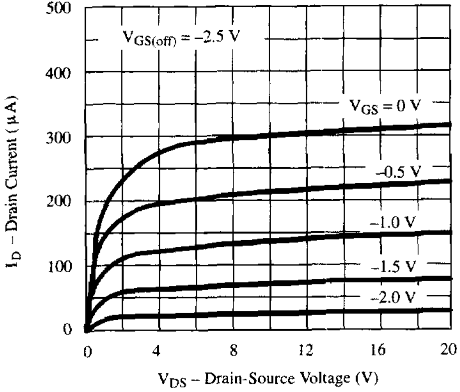
Common-Source Forward Transconductance vs. Drain Current



Output Characteristics

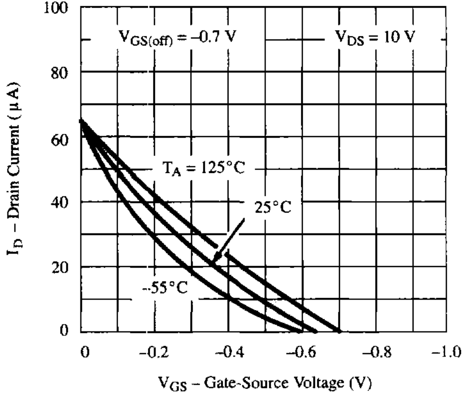


Output Characteristics

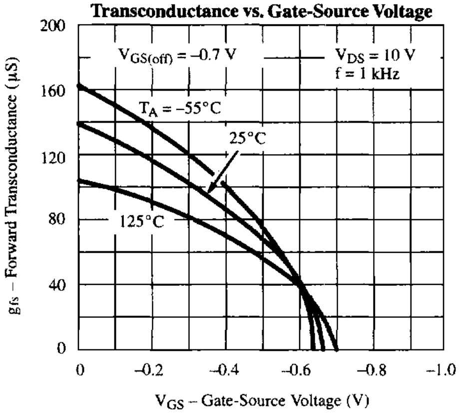


Typical Characteristics (Cont'd)

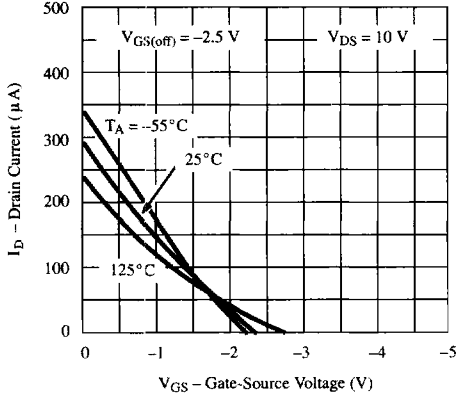
Transfer Characteristics



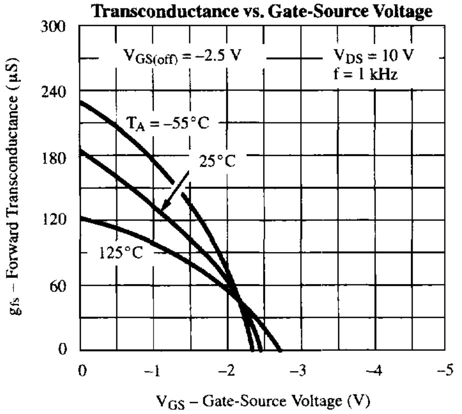
Transconductance vs. Gate-Source Voltage



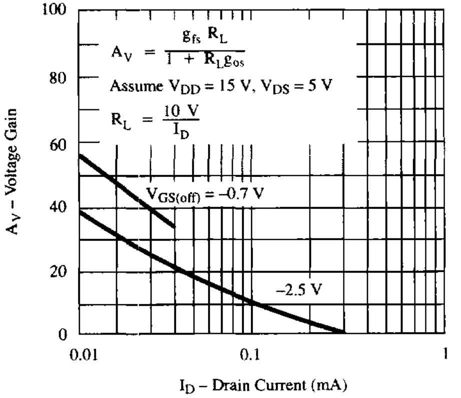
Transfer Characteristics



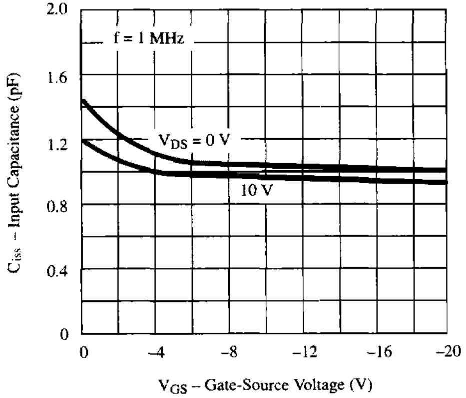
Transconductance vs. Gate-Source Voltage



Circuit Voltage Gain vs. Drain Current

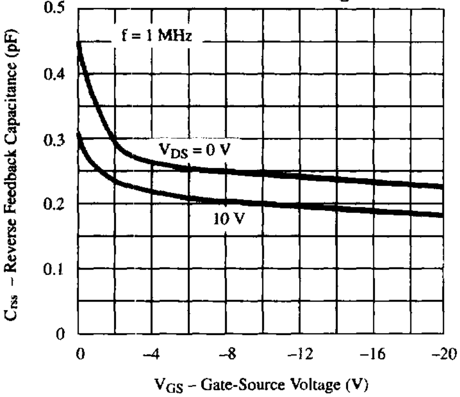


Common-Source Input Capacitance vs. Gate-Source Voltage

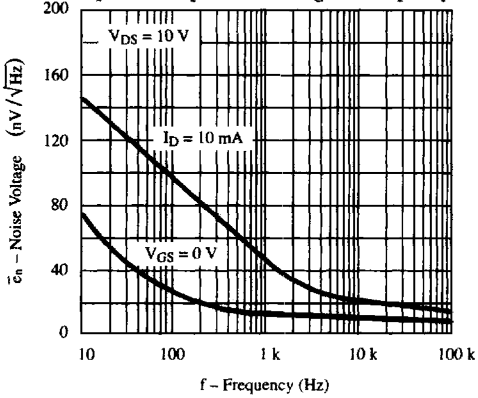


Typical Characteristics (Cont'd)

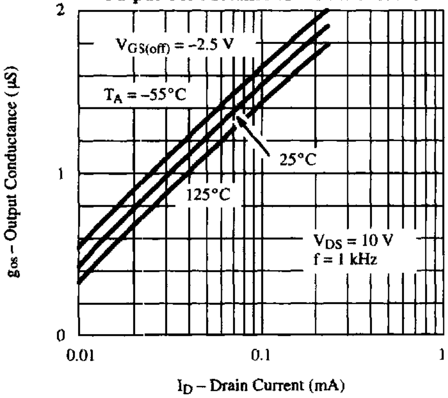
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current



On-Resistance vs. Drain Current