TEMIC

Siliconix

J/SST/U308 Series

N-Channel JFETs

J308 SST308 U309
J309 SST309 U310
J310 SST310

Product Summary

Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	g_{fs} Min (mS)	I_{DSS} Min (mA)
J308	−1 to −6.5	−25	8	12
J309	−1 to −4	−25	10	12
J310	−2 to −6.5	−25	8	24
SST308	−1 to −6.5	−25	8	12
SST309	−1 to −4	−25	10	12
SST310	−2 to −6.5	−25	8	24
U309	−1 to −4	−25	10	12
U310	−2.5 to −6	−25	10	24

U310, For applications information see AN104, page 21.

Features

- Excellent High Frequency Gain: Gps 11.5 dB @ 450 MHz
- Very Low Noise: 2.7 dB @ 450 MHz
- Very Low Distortion
- High ac/dc Switch Off-Isolation

Benefits

- Wideband High Gain
- Very High System Sensitivity
- High Quality of Amplification
- High-Speed Switching Capability
- High Low-Level Signal Amplification

Applications

- High-Frequency Amplifier/Mixer
- Oscillator
- Sample-and-Hold
- Very Low Capacitance Switches

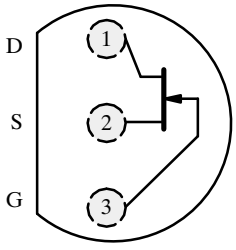
Description

The J/SST/U308 series offers superb amplification characteristics. Of special interest is its high-frequency performance. Even at 450 MHz, this series offers high power gain at low noise.

Low-cost J series TO-226AA (TO-92) packaging supports automated assembly with tape-and-reel options. The SST series TO-236 (SOT-23) package provides surface-mount capabilities and is available with tape-and-reel options. The U series hermetically-sealed TO-206AC (TO-52) package supports full military processing. (See Military and Packaging Information for further details.)

For similar dual products packaged in the TO-78, see the U430/431 data sheet.

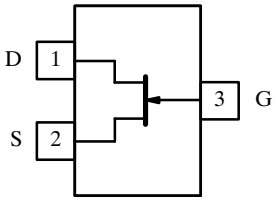
TO-226AA
(TO-92)



Top View

J308
J309
J310

TO-236
(SOT-23)

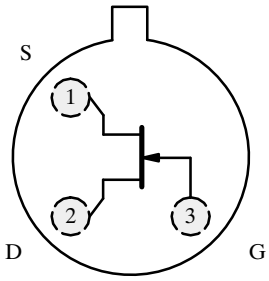


Top View

SST308 (Z8)*
SST309 (Z9)*
SST310 (Z0)*

*Marking Code for TO-236

TO-206AC
(TO-52)



Top View

U309
U310

J/SST/U308 Series

Absolute Maximum Ratings

Gate-Drain, Gate-Source Voltage . . . . . −25 V
Gate Current : (J/SST Prefixes) . . . . . 10 mA
(U Prefix) . . . . . 20 mA
Lead Temperature ($^1/_{16}$" from case for 10 sec.) . . . . . 300°C
Storage Temperature : (J/SST Prefixes) . . . . . −55 to 150°C
(U Prefix) . . . . . −65 to 175°C
Operating Junction Temperature . . . . . −55 to 150°C
Power Dissipation : (J/SST Prefixes)[a] . . . . . 350 mW
(U Prefix)[b] . . . . . 500 mW

Notes
a. Derate 2.8 mW/°C above 25°C
b. Derate 4 mW/°C above 25°C

Specifications[a] for J/SST308, J/SST309 and J/SST310

Parameter	Symbol	Test Conditions		Typ[b]	Limits J/SST308 Min	Limits J/SST308 Max	Limits J/SST309 Min	Limits J/SST309 Max	Limits J/SST310 Min	Limits J/SST310 Max	Unit
Static											
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = −1 µA , V_{DS} = 0 V		−35	−25		−25		−25		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 nA			−1	−6.5	−1	−4	−2	−6.5	
Saturation Drain Current[c]	I_{DSS}	V_{DS} = 10 V, V_{GS} = 0 V			12	60	12	30	24	60	mA
Gate Reverse Current	I_{GSS}	V_{GS} = −15 V, V_{DS} = 0 V		−0.002		−1		−1		−1	nA
			T_A = 125°C	−0.001		−1		−1		−1	µA
Gate Operating Current	I_G	V_{DG} = 9 V, I_D = 10 mA		−15							pA
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 0 V, I_D = 1 mA		35							Ω
Gate-Source Forward Voltage	$V_{GS(F)}$	I_G = 10 mA , V_{DS} = 0 V	J	0.7		1		1		1	V
Dynamic											
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 10 mA f = 1 kHz		14	8		10		8		mS
Common-Source Output Conductance	g_{os}			110		250		250		250	µS
Common-Source Input Capacitance	C_{iss}	V_{DS} = 10 V V_{GS} = −10 V f = 1 MHz	J	4		5		5		5	pF
			SST	4							
Common-Source Reverse Transfer Capacitance	C_{rss}		J	1.9		2.5		2.5		2.5	
			SST	1.9							
Equivalent Input Noise Voltage	$\bar{e}_n$	V_{DS} = 10 V, I_D = 10 mA f = 100 Hz		6							nV/√Hz
High Frequency											
Common-Gate Forward Transconductance	g_{fg}	V_{DS} = 10 V I_D = 10 mA	f = 105 MHz	15							mS
			f = 450 MHz	13							
Common-Gate Output Conductance	g_{og}		f = 105 MHz	0.16							
			f = 450 MHz	0.55							
Common-Gate Power Gain[d]	G_{pg}		f = 105 MHz	16							dB
			f = 450 MHz	11.5							
Noise Figure	NF		f = 105 MHz	1.5							
			f = 450 MHz	2.7							

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. Pulse test: PW ≤ 300 µs duty cycle ≤ 3%.
d. Gain (G_{pg}) measured at optimum input noise match.

NZB

Specifications[a] for U309 and U310

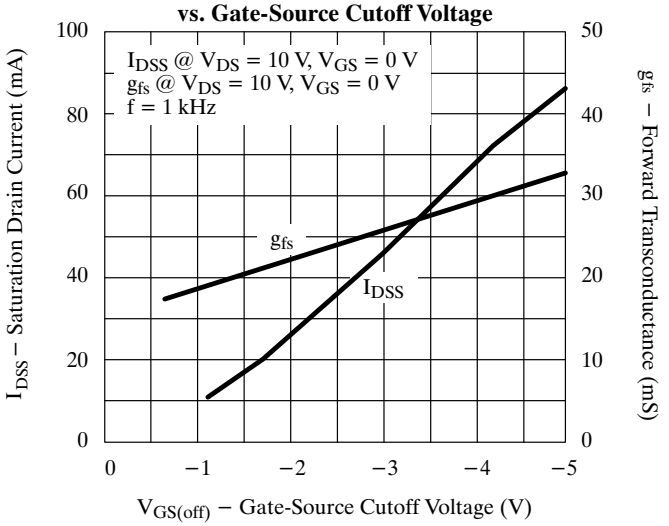
Parameter	Symbol	Test Conditions	Typ[b]	Limits 309 Min	Limits 309 Max	Limits 310 Min	Limits 310 Max	Unit
Static								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -1$ µA , $V_{DS} = 0$ V	−35	−25		−25		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 10$ V, $I_D = 1$ nA		−1	−4	−2.5	−6	V
Saturation Drain Current[c]	I_{DSS}	$V_{DS} = 10$ V, $V_{GS} = 0$ V		12	30	24	60	mA
Gate Reverse Current	I_{GSS}	$V_{GS} = -15$ V, $V_{DS} = 0$ V	−0.002		−0.15		−0.15	nA
		$T_A = 125°C$	−0.001		−0.15		−0.15	µA
Gate Operating Current	I_G	$V_{DG} = 9$ V, $I_D = 10$ mA	−15					pA
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 0$ V, $I_D = 1$ mA	35					Ω
Gate-Source Forward Voltage	$V_{GS(F)}$	$I_G = 10$ mA , $V_{DS} = 0$ V	0.7		1		1	V
Dynamic								
Common-Source Forward Transconductance	g_{fs}	$V_{DS} = 10$ V, $I_D = 10$ mA, f = 1 kHz	14	10		10		mS
Common-Source Output Conductance	g_{os}	$V_{DS} = 10$ V, $I_D = 10$ mA, f = 1 kHz	110		250		250	µS
Common-Source Input Capacitance	C_{iss}	$V_{DS} = 10$ V, $V_{GS} = -10$ V, f = 1 MHz	4		5		5	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	$V_{DS} = 10$ V, $V_{GS} = -10$ V, f = 1 MHz	1.9		2.5		2.5	pF
Equivalent Input Noise Voltage	$\bar{e}_n$	$V_{DS} = 10$ V, $I_D = 10$ mA, f = 100 Hz	6					$\frac{nV}{\sqrt{Hz}}$
High Frequency								
Common-Gate Forward Transconductance	g_{fg}	f = 105 MHz	15					mS
		f = 450 MHz	13					mS
Common-Gate Output Conductance	g_{og}	f = 105 MHz	0.16					mS
		f = 450 MHz	0.55					mS
Common-Gate Power Gain[d]	G_{pg}	$V_{DS} = 10$ V, $I_D = 10$ mA, f = 105 MHz	16	14		14		dB
		f = 450 MHz	11.5	10		10		dB
Noise Figure	NF	f = 105 MHz	1.5		2		2	dB
		f = 450 MHz	2.7		3.5		3.5	dB

Notes
a. $T_A = 25°C$ unless otherwise noted. NZB
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. Pulse test: PW ≤ 300 µs duty cycle ≤ 3%.
d. Gain (G_{pg}) measured at optimum input noise match.

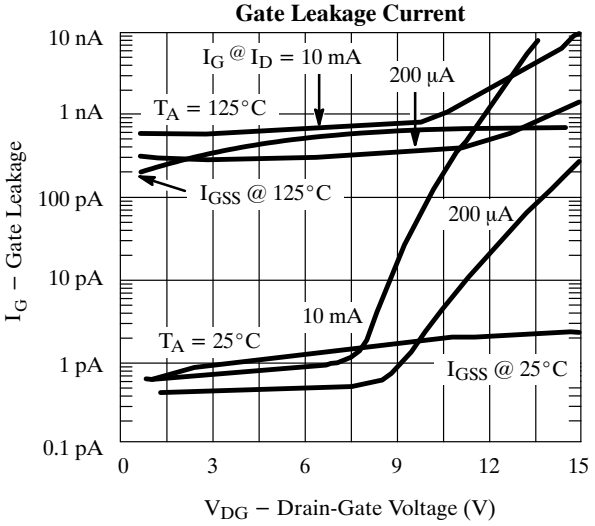
J/SST/U308 Series

Typical Characteristics

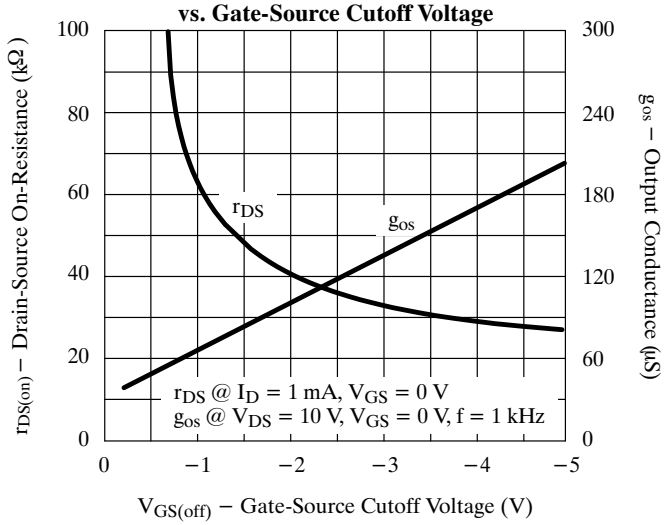
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



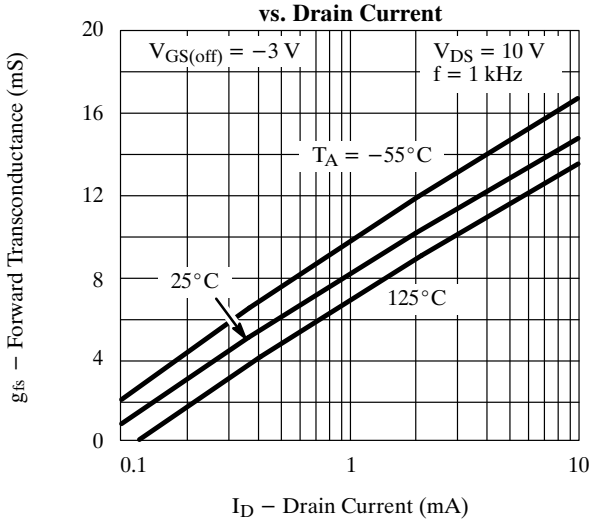
Gate Leakage Current



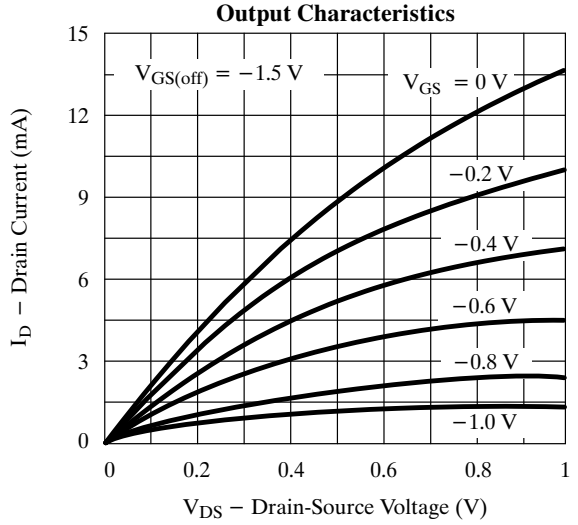
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



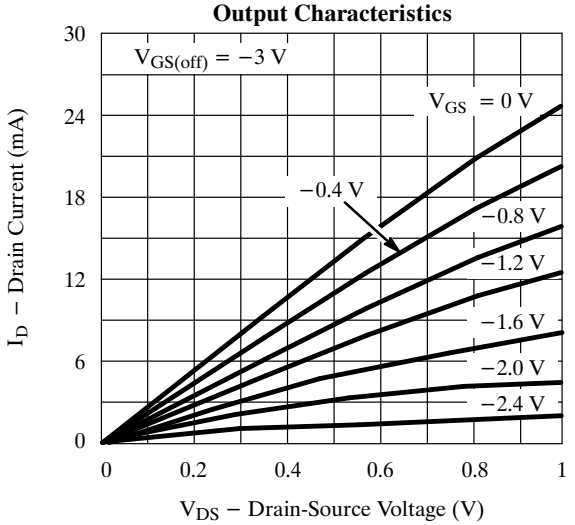
Common-Source Forward Transconductance vs. Drain Current



Output Characteristics

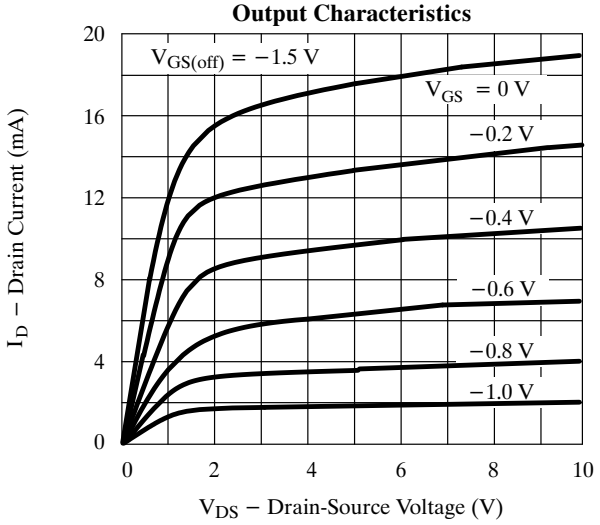


Output Characteristics

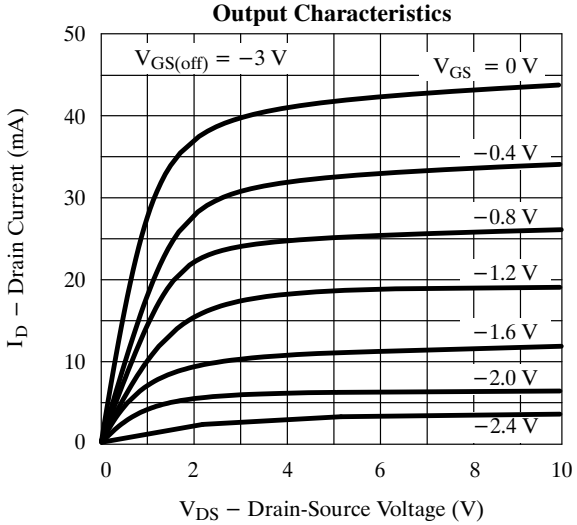


Typical Characteristics (Cont'd)

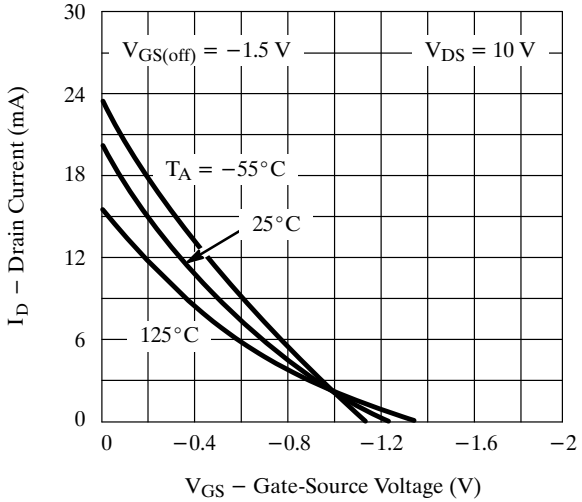
Output Characteristics



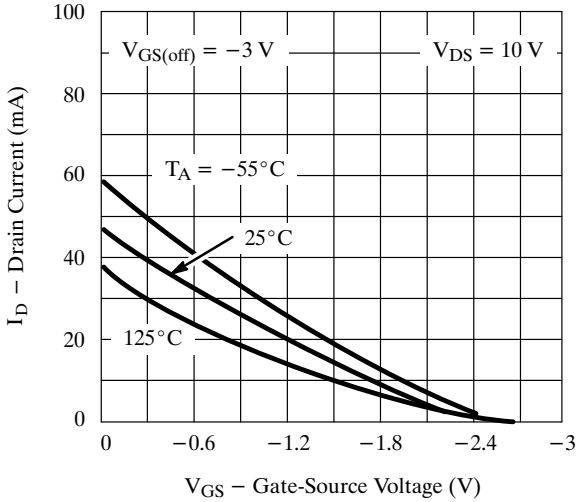
Output Characteristics



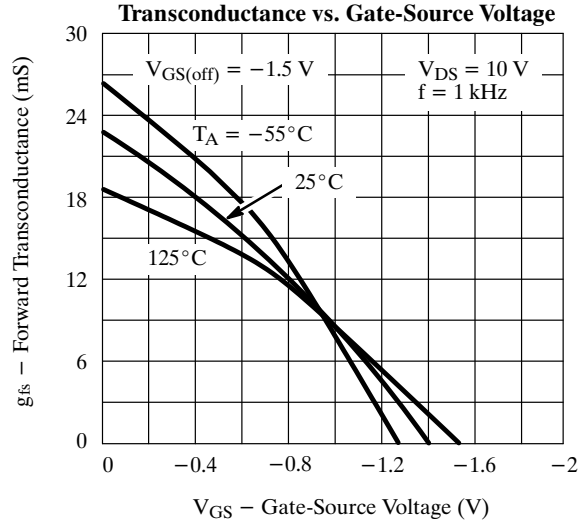
Transfer Characteristics



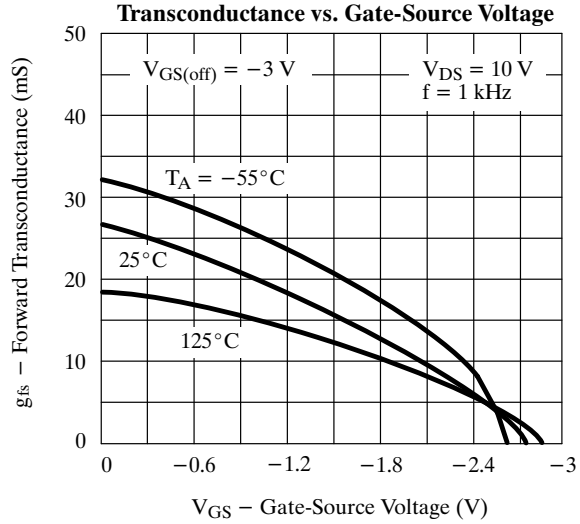
Transfer Characteristics



Transconductance vs. Gate-Source Voltage



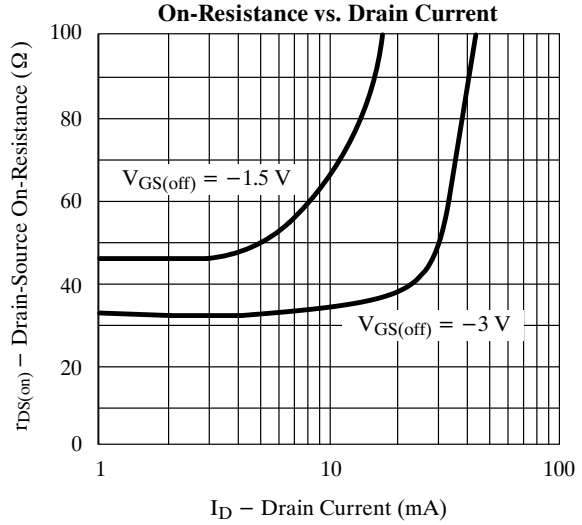
Transconductance vs. Gate-Source Voltage



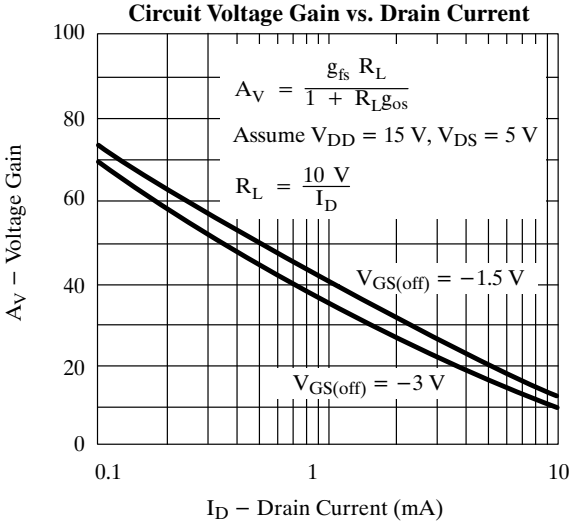
J/SST/U308 Series

Typical Characteristics (Cont'd)

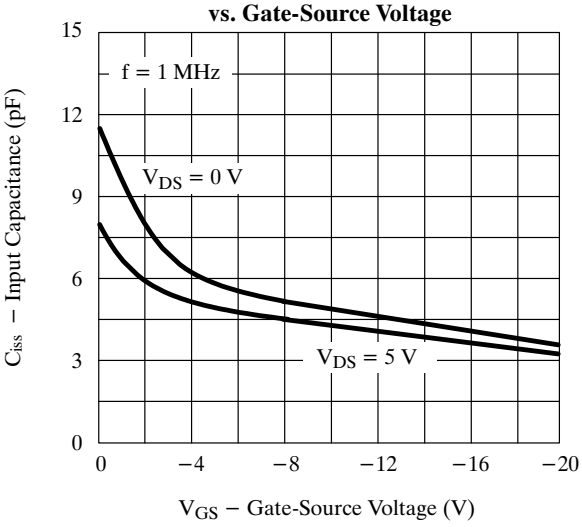
On-Resistance vs. Drain Current



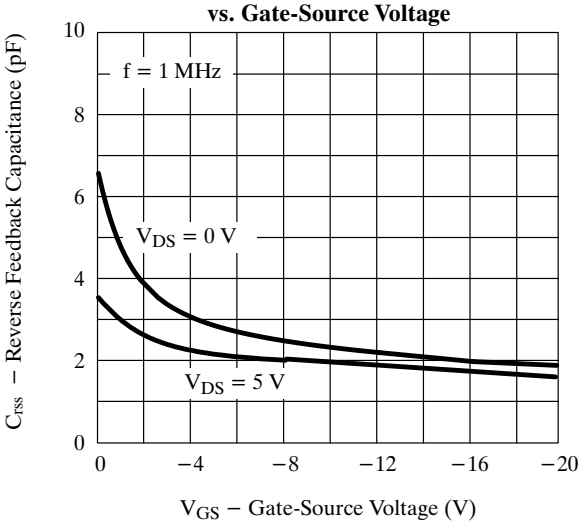
Circuit Voltage Gain vs. Drain Current



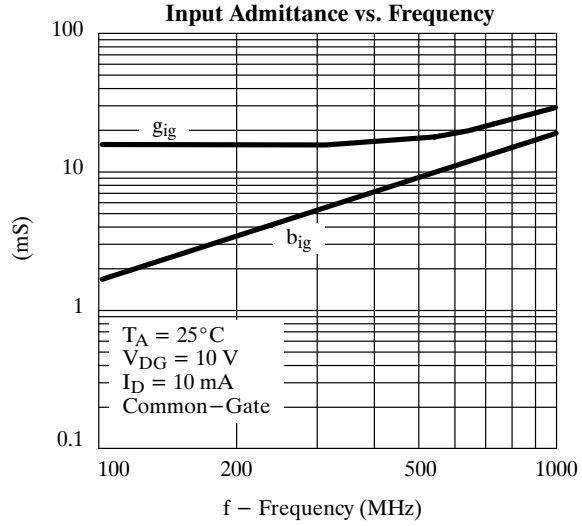
Common-Source Input Capacitance vs. Gate-Source Voltage



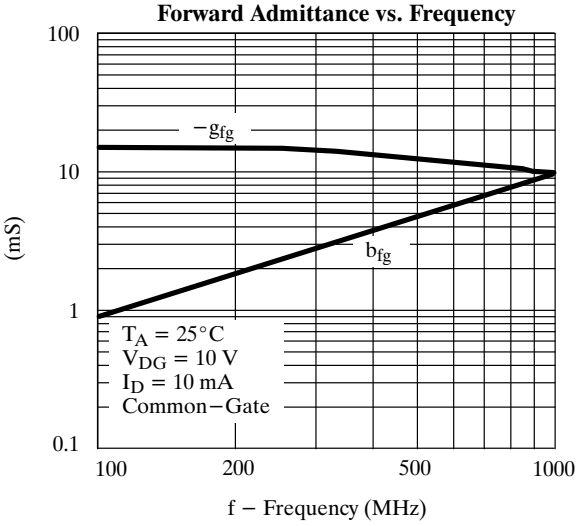
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



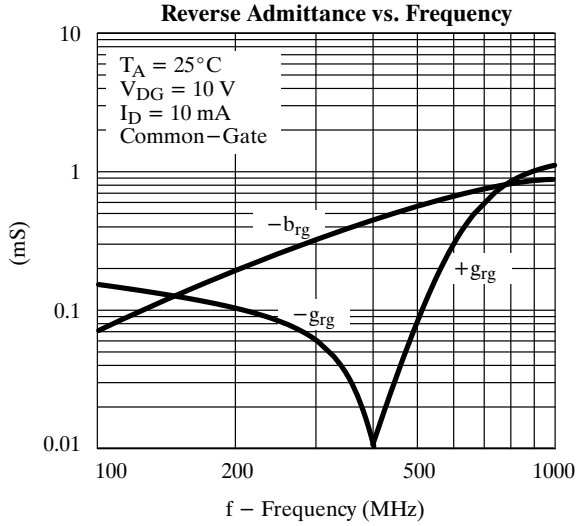
Input Admittance vs. Frequency



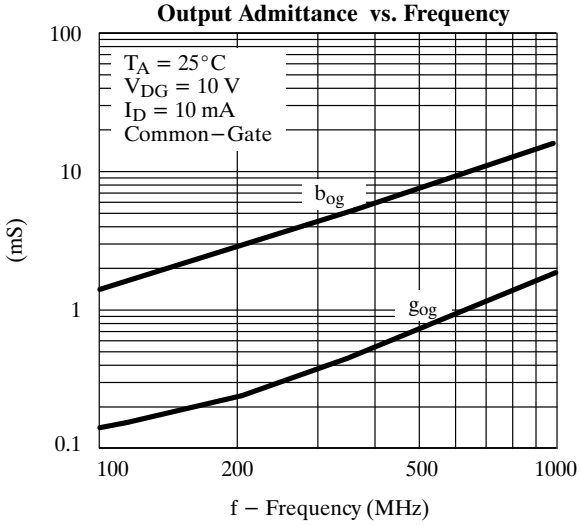
Forward Admittance vs. Frequency



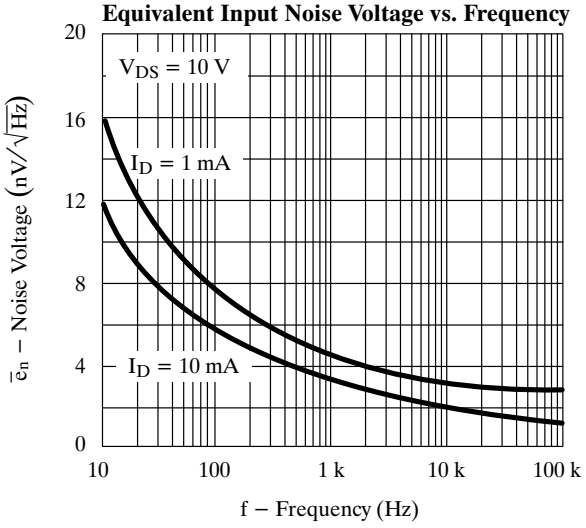
Reverse Admittance vs. Frequency



Output Admittance vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current