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

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

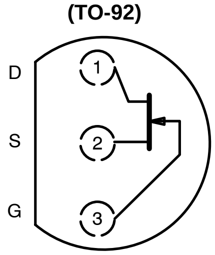
DESCRIPTION

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.)

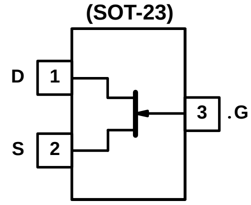
For similar dual products packaged in the TO-78, see the U430/431 data sheet.

TO-226AA (TO-92)



Top View
J308
J309
J310

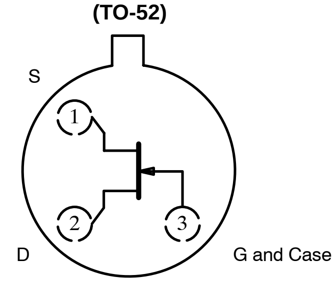
TO-236 (SOT-23)



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

*Marking Code for TO-236

TO-206AC (TO-52)



Top View
U309
U310

For applications information see AN104.

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 FOR J/SST308, J/SST309 AND J/SST310 (T_A = 25°C UNLESS NOTED)

Parameter	Symbol	Test Conditions	Typ[a]	Limits						Unit
				J/SST308		J/SST309		J/SST310		
				Min	Max	Min	Max	Min	Max	
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	V
Saturation Drain Current[b]	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	14							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[c]	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. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing. NZB
b. Pulse test: PW ≤300 µs duty cycle ≤3%.
c. Gain (G_{pg}) measured at optimum input noise match.

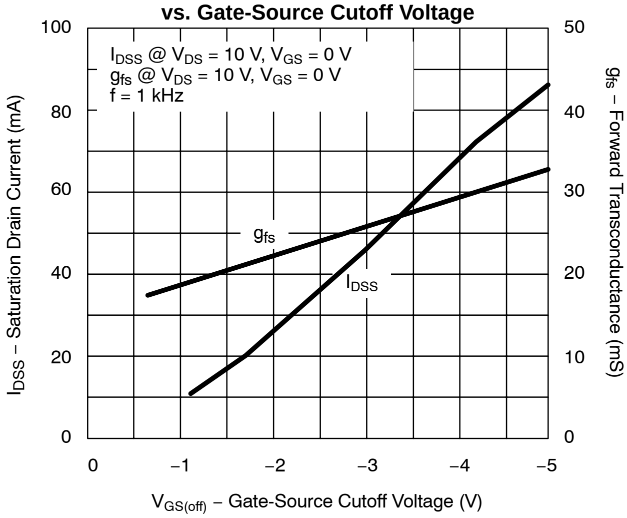
SPECIFICATIONS FOR U309 AND U310 (T_A = 25°C UNLESS NOTED)									
					Limits				
					U309		U310		
Parameter	**Symbol**	**Test Conditions**		**Typ[a]**	**Min**	**Max**	**Min**	**Max**	**Unit**
Static									
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = −1 µA , V_{DS} = 0 V		−35	−25		−25		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 nA			−1	−4	−2.5	−6	V
Saturation Drain Current[b]	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}			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}			1.9		2.5		2.5	
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	14					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[c, d]	G_{pg}		f = 105 MHz	16	14		14		dB
			f = 450 MHz	11.5	10		10		
Noise Figure[d]	NF		f = 105 MHz	1.5		2		2	
			f = 450 MHz	2.7		3.5		3.5	

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

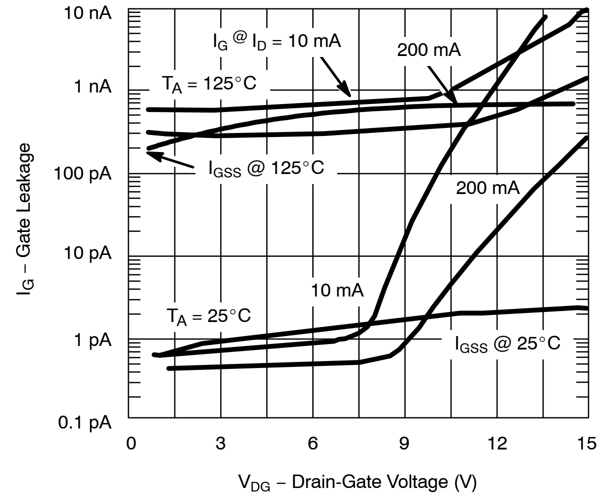
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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

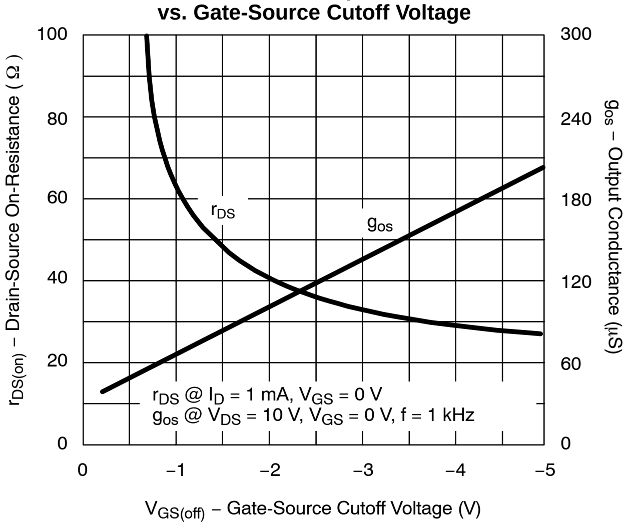
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



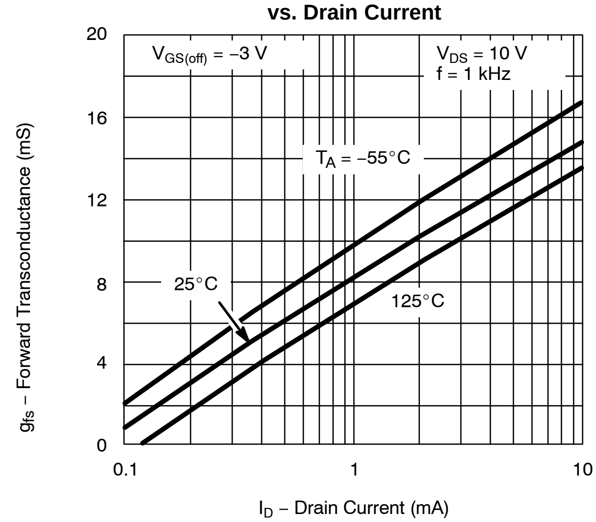
Gate Leakage Current



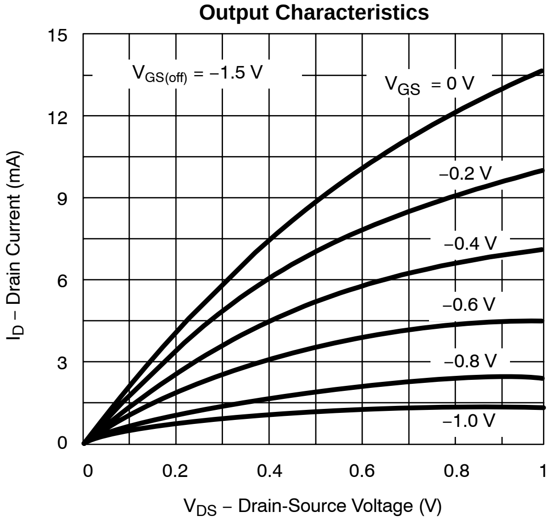
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



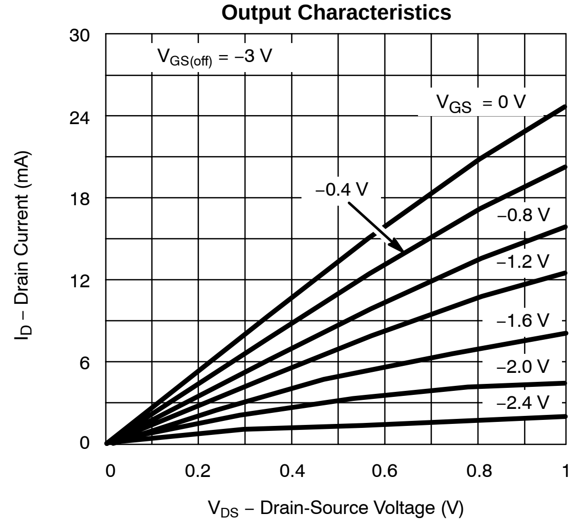
Common-Source Forward Transconductance vs. Drain Current



Output Characteristics

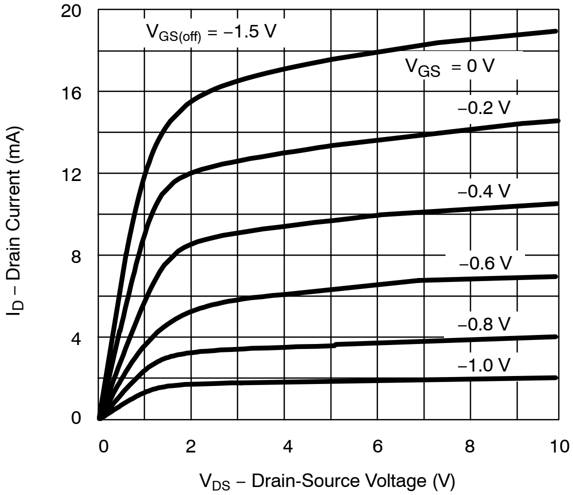


Output Characteristics

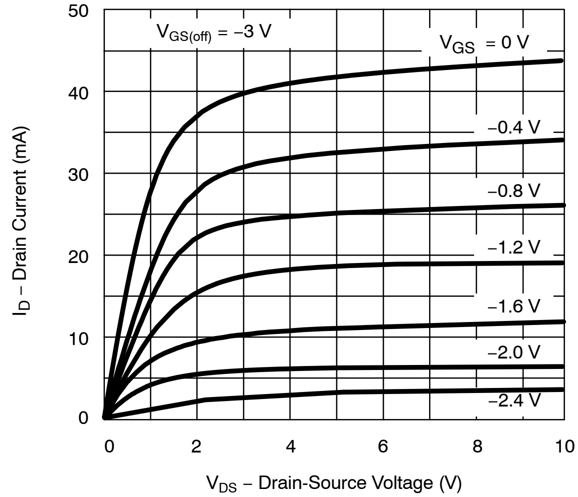


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

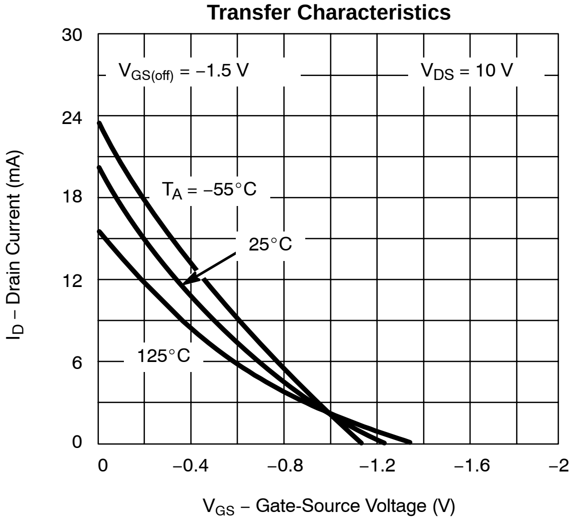
Output Characteristics



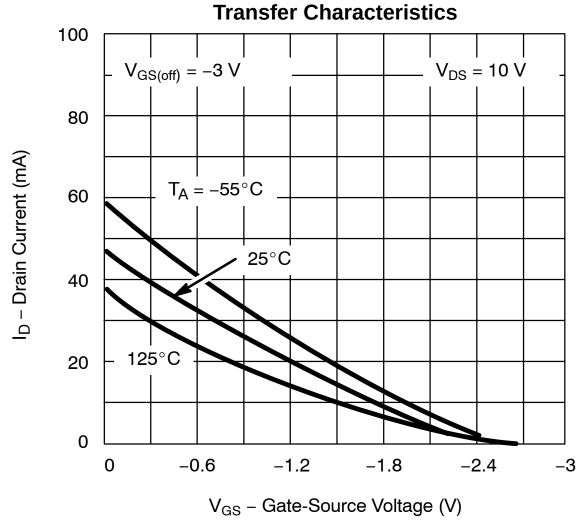
Output Characteristics



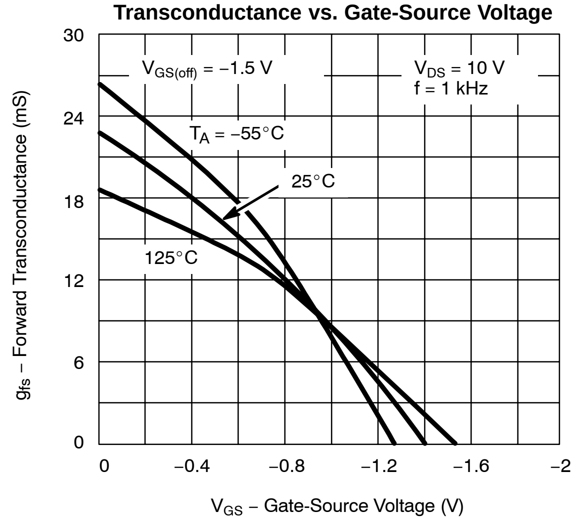
Transfer Characteristics



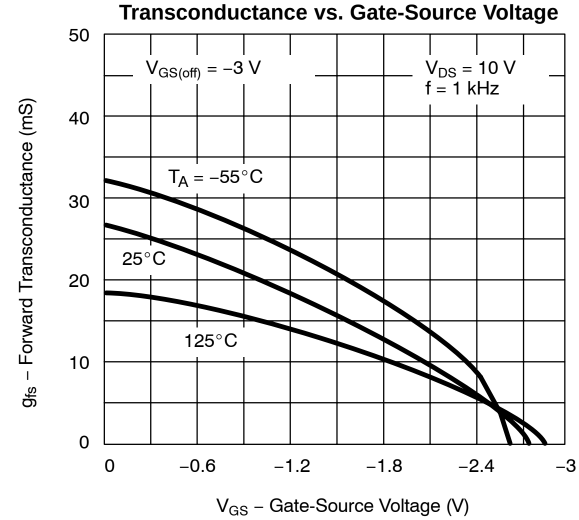
Transfer Characteristics



Transconductance vs. Gate-Source Voltage

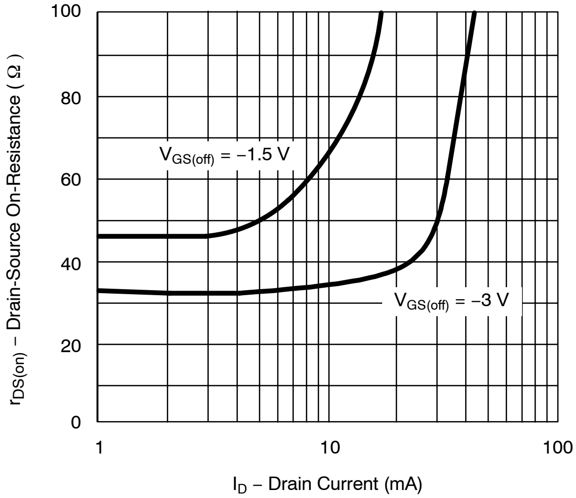


Transconductance vs. Gate-Source Voltage

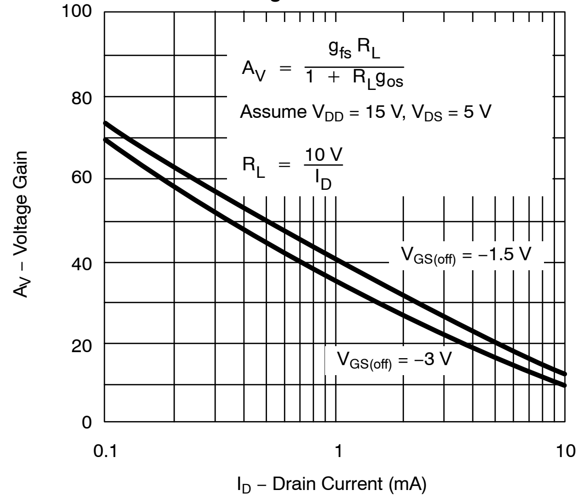


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

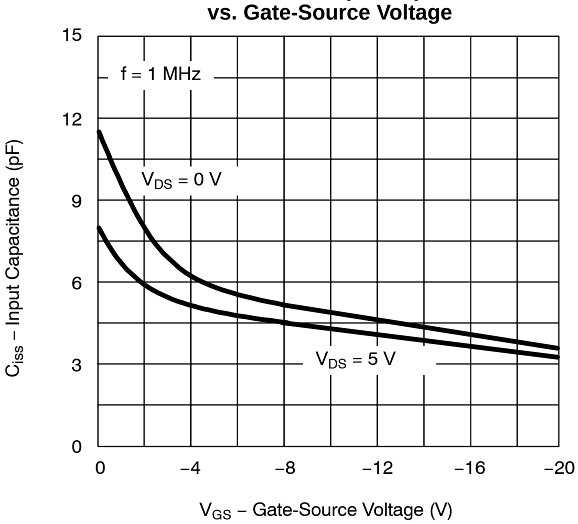
On-Resistance vs. Drain Current



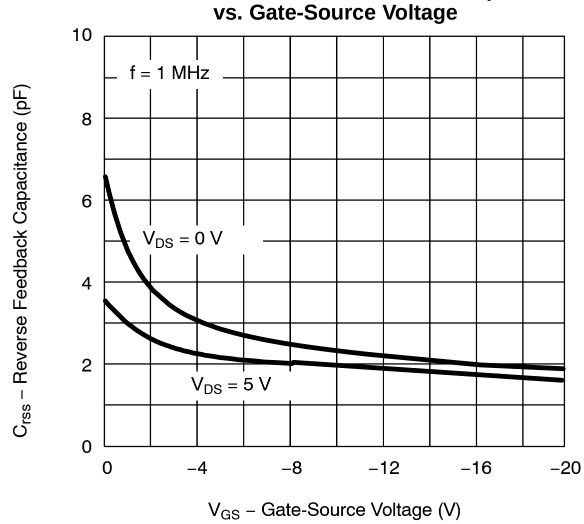
Circuit Voltage Gain vs. Drain Current



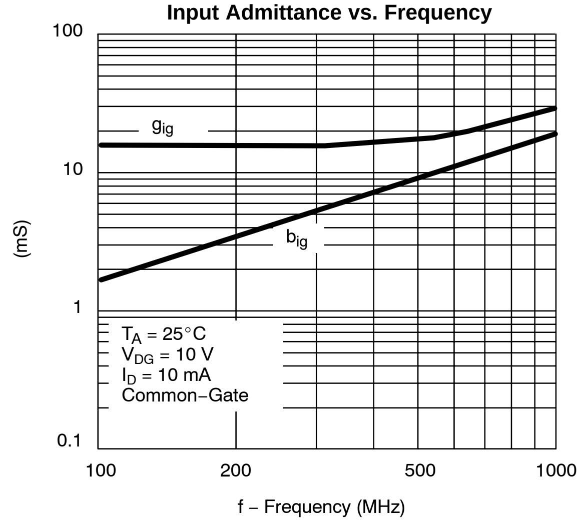
Common-Source Input Capacitance vs. Gate-Source Voltage



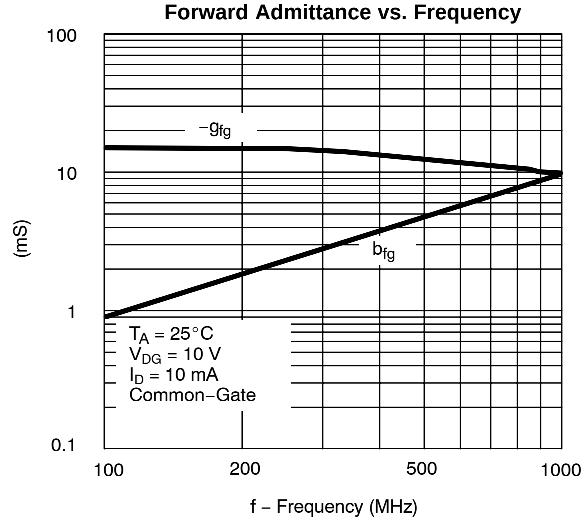
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Input Admittance vs. Frequency

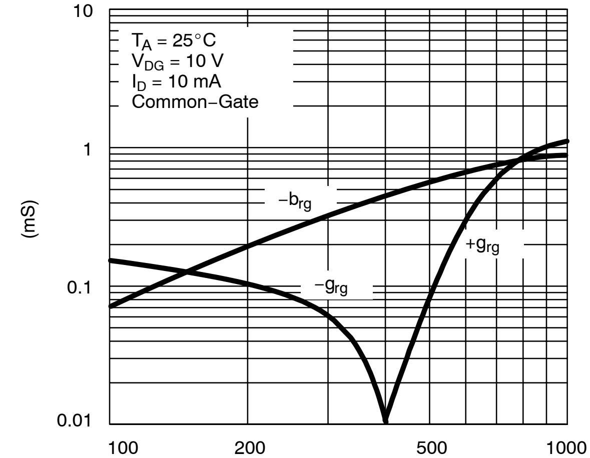


Forward Admittance vs. Frequency

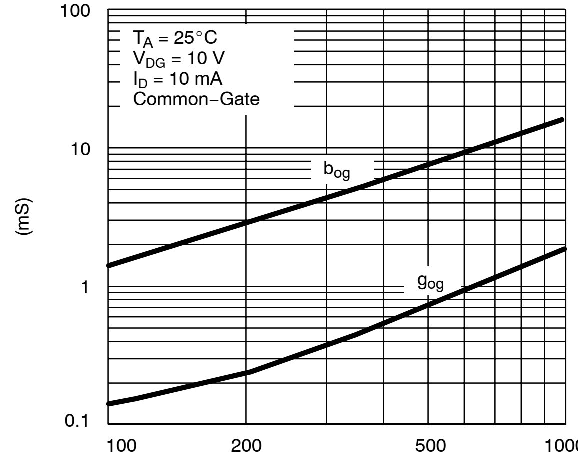


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

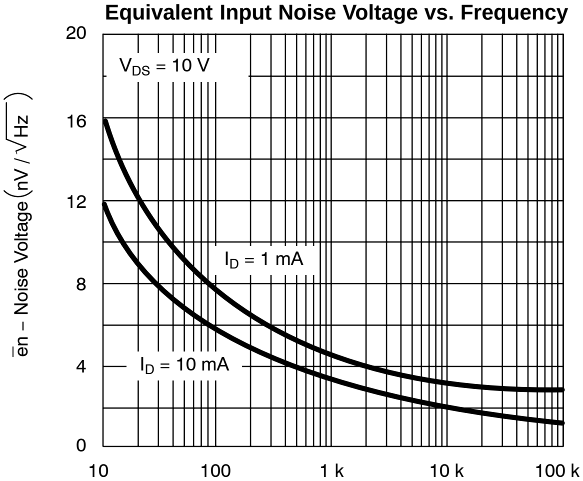
Reverse Admittance vs. Frequency



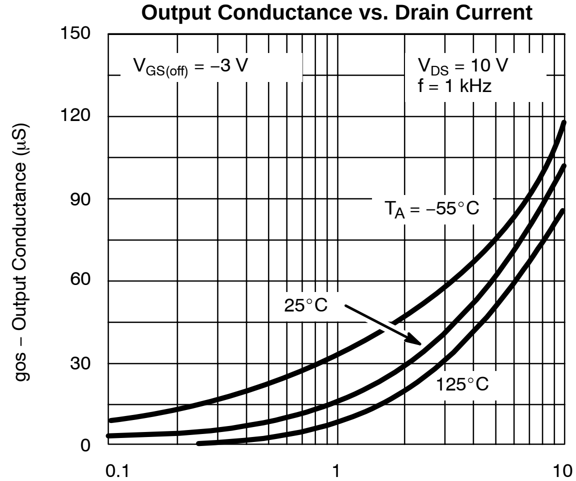
Output Admittance vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current



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