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

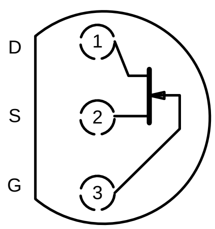
DESCRIPTION

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.)

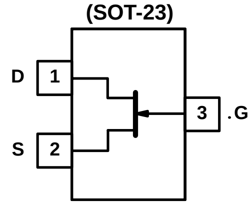
For similar dual products packaged in the TO-78, see the U430/431 data sheet.

TO-226AA
(TO-92)



Top View
J308
J309
J310

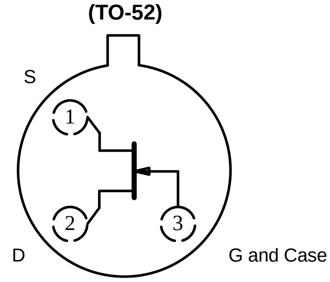
TO-236
(SOT-23)



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 J/SST308 Min	J/SST308 Max	J/SST309 Min	J/SST309 Max	J/SST310 Min	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	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.
b. Pulse test: PW ≤300 μs duty cycle ≤3%.
c. Gain (G_{pg}) measured at optimum input noise match.

NZB

SPECIFICATIONS FOR U309 AND U310 (T_A = 25°C UNLESS NOTED)

Parameter	Symbol	Test Conditions	Typ[a]	Limits U309 Min	Limits U309 Max	Limits U310 Min	Limits U310 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}	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					$nV/\sqrt{Hz}$
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					mS
Common-Gate Output Conductance	g_{og}	f = 105 MHz	0.16					mS
		f = 450 MHz	0.55					mS
Common-Gate Power Gain[c]	G_{pg}	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. 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.

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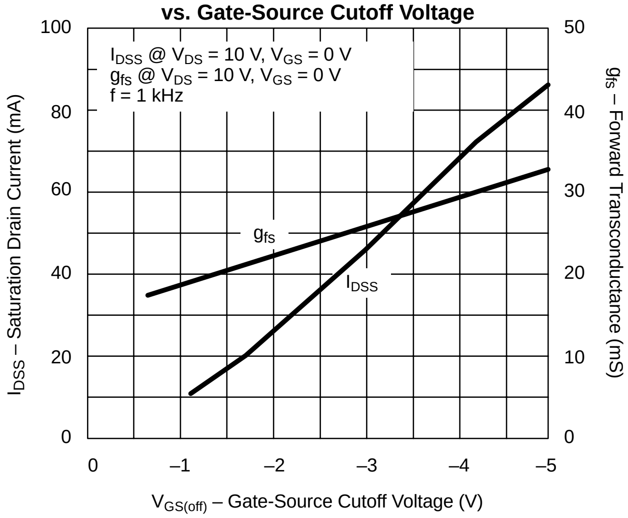
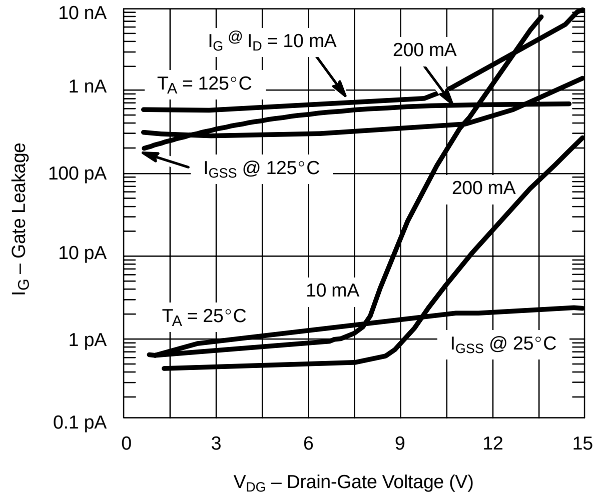
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

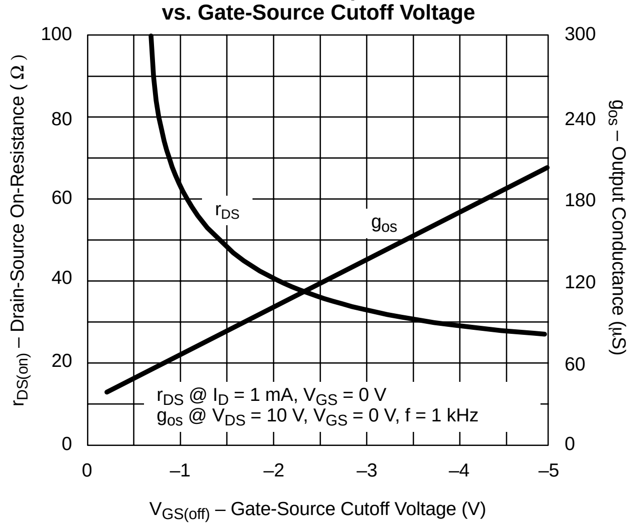
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



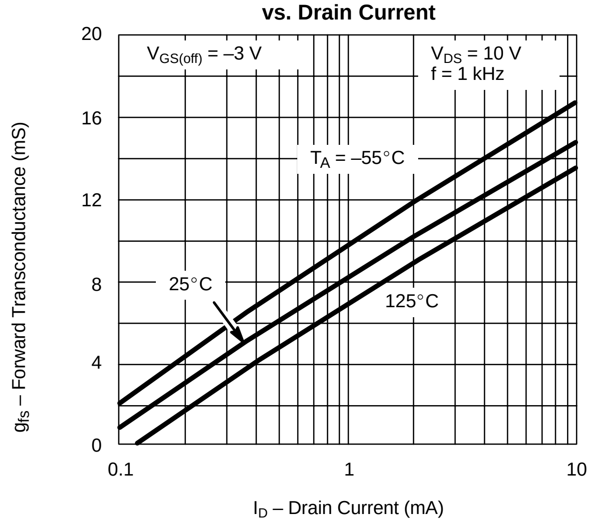
Gate Leakage Current



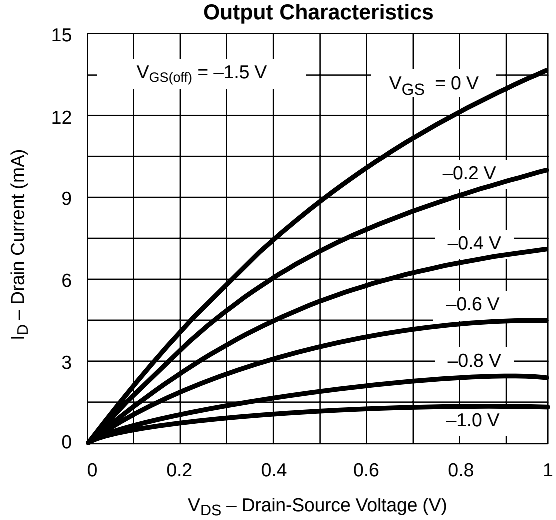
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



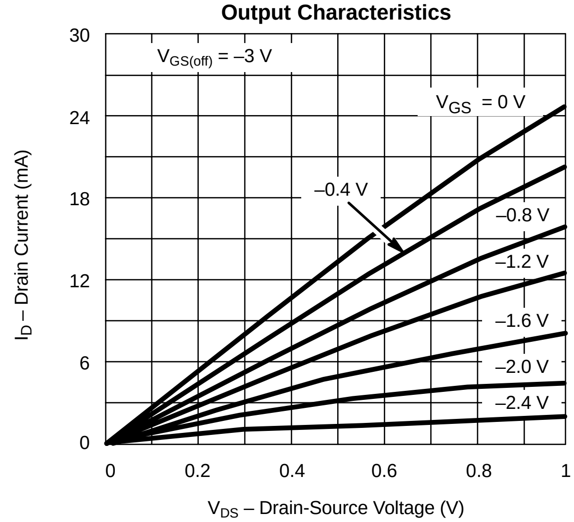
Common-Source Forward Transconductance vs. Drain Current



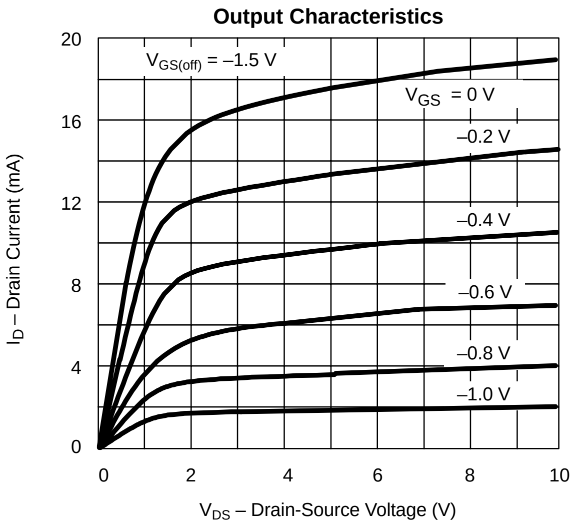
Output Characteristics

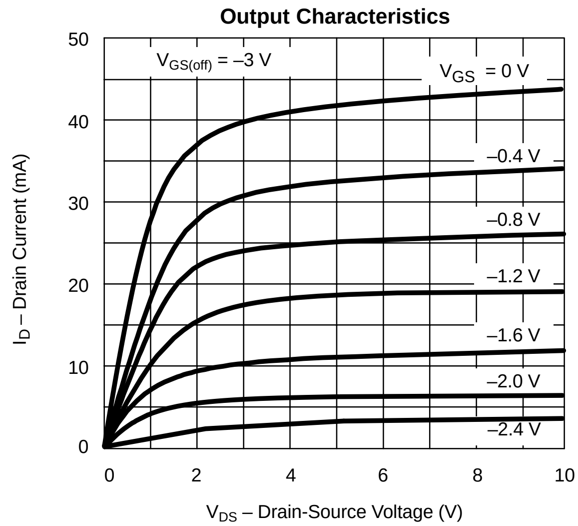


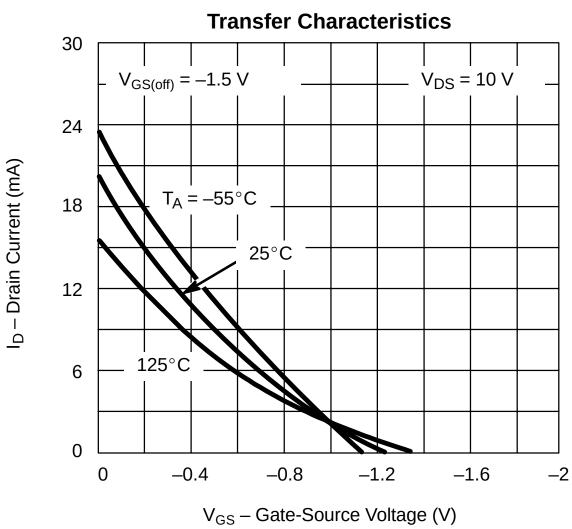
Output Characteristics

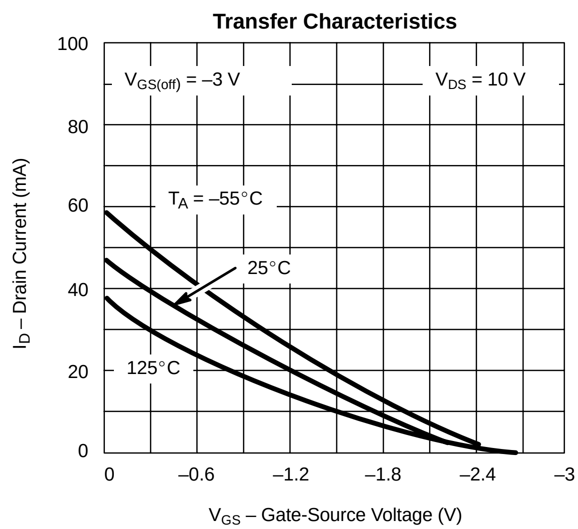


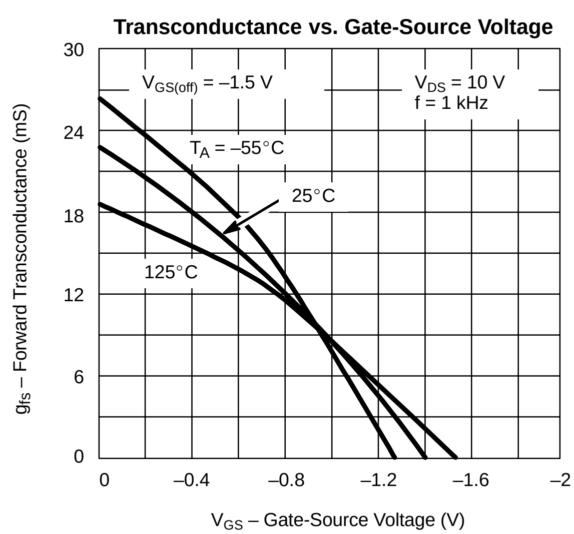
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

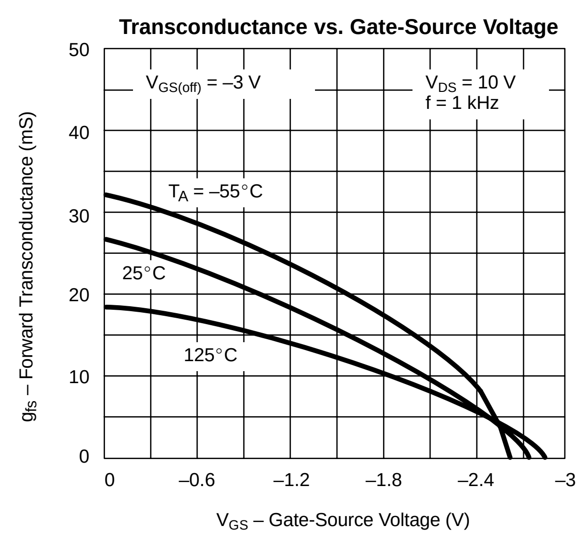




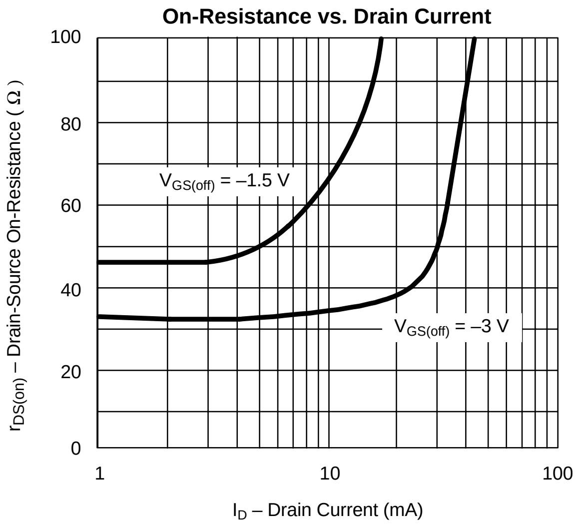


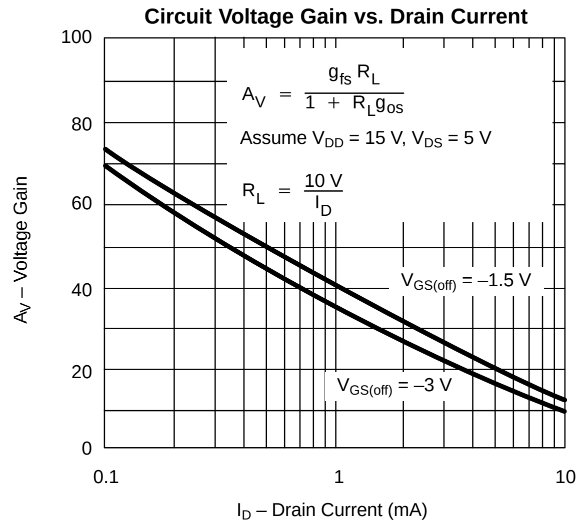


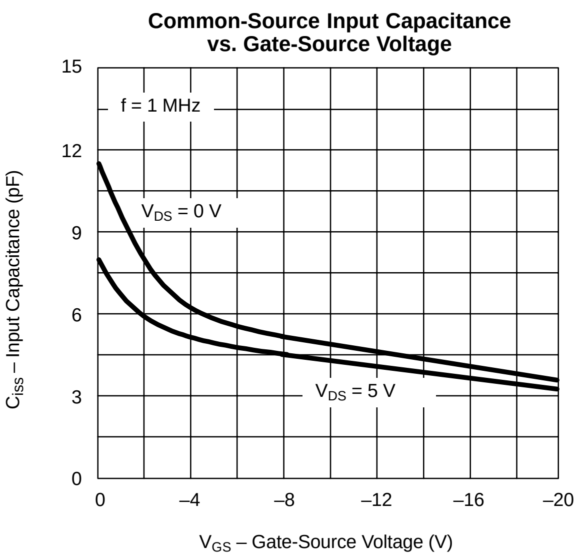


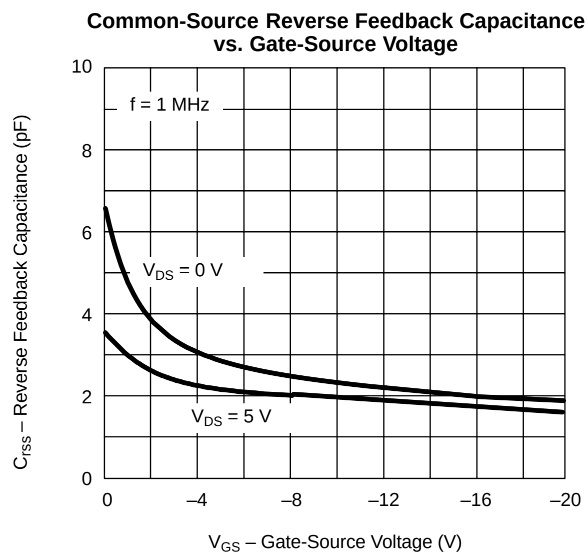


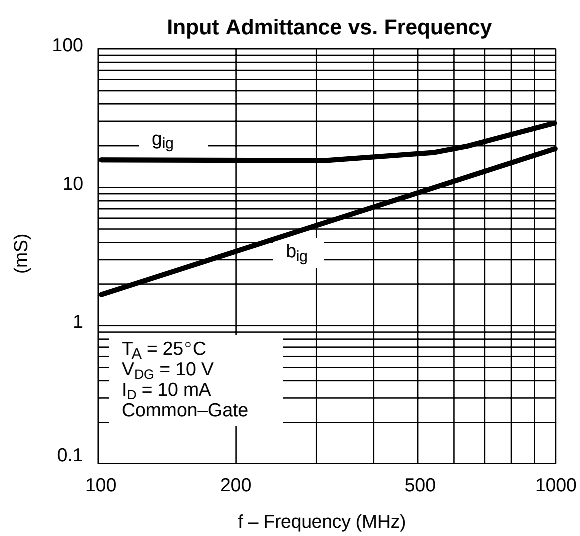
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

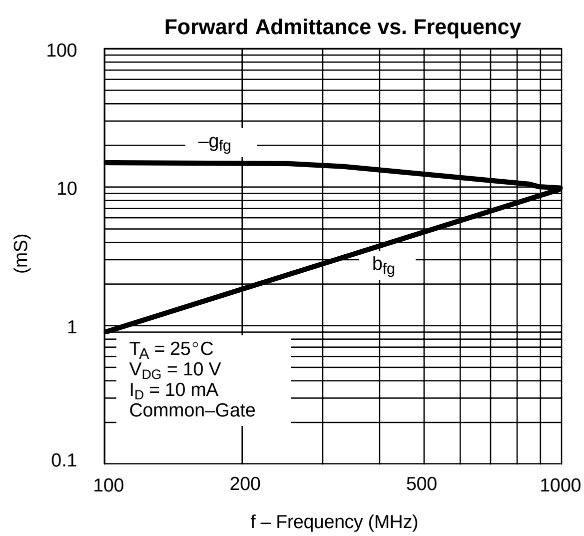






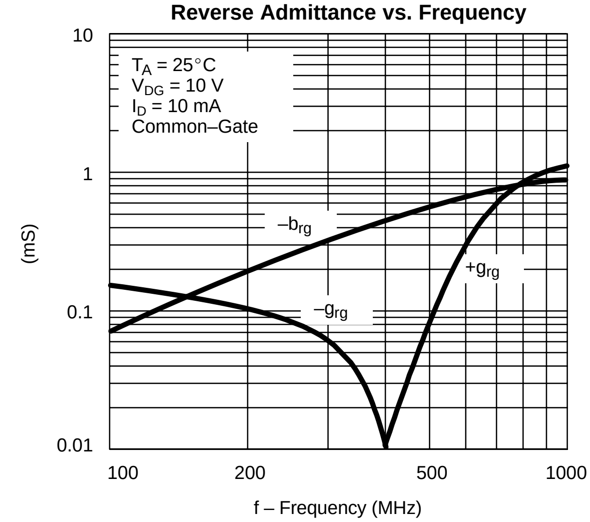




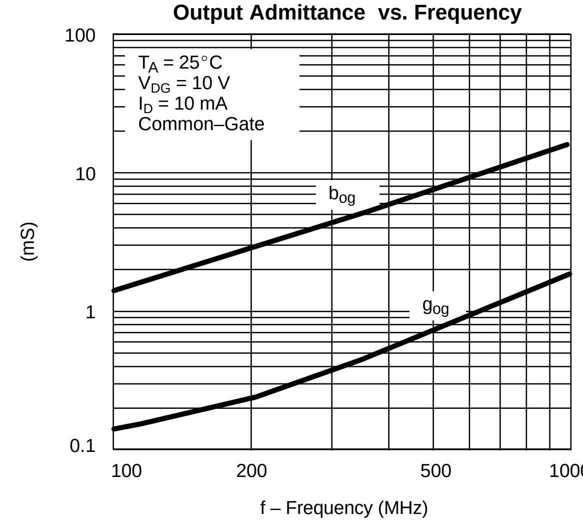


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

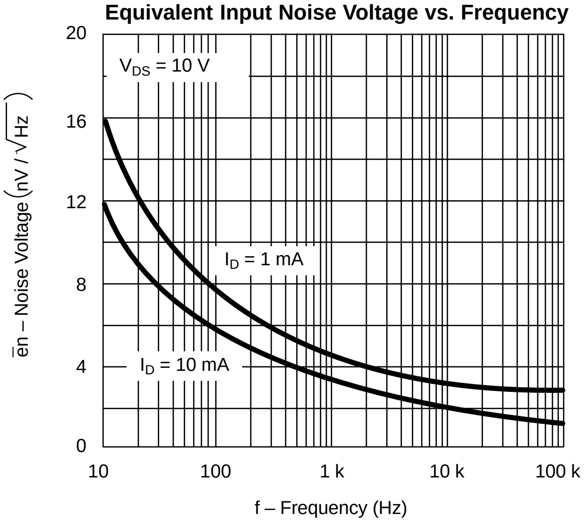
Reverse Admittance vs. Frequency



Output Admittance vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current