



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

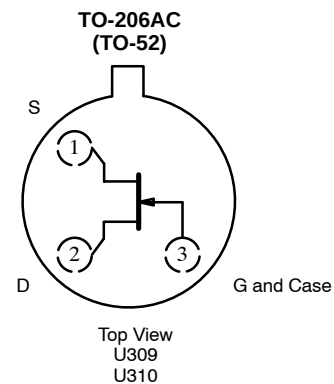
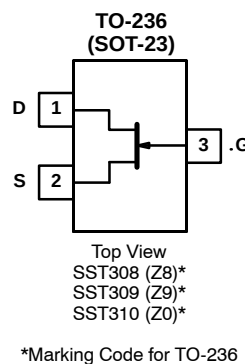
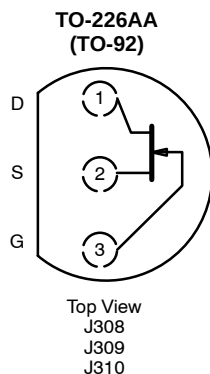
DESCRIPTION

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.



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 ($T_A = 25^\circ\text{C}$ 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		pF	
Common-Source Reverse Transfer Capacitance	C _{rss}		SST	4							
			J	1.9		2.5		2.5			2.5
			SST	1.9							
Equivalent Input Noise Voltage	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	
Common-Gate Output Conductance	g _{og}		f = 450 MHz	13							
			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: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 3\%$.
c. Gain (G_{pg}) measured at optimum input noise match.

NZB

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

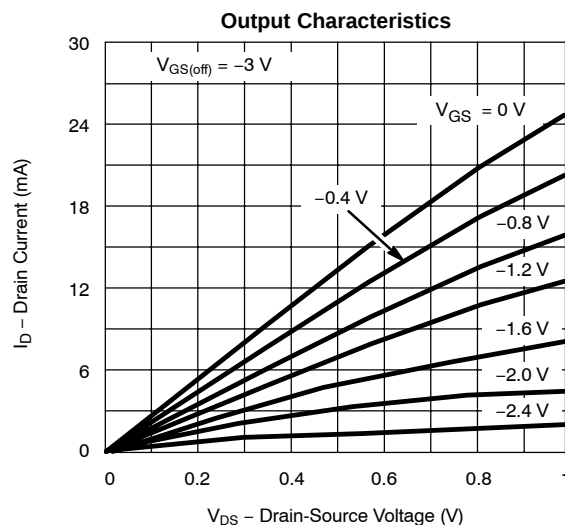
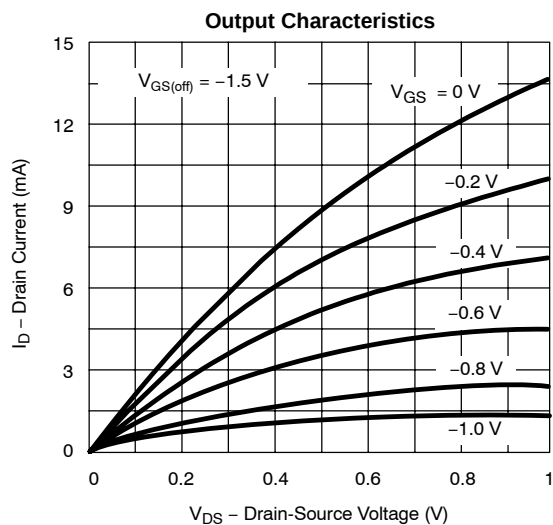
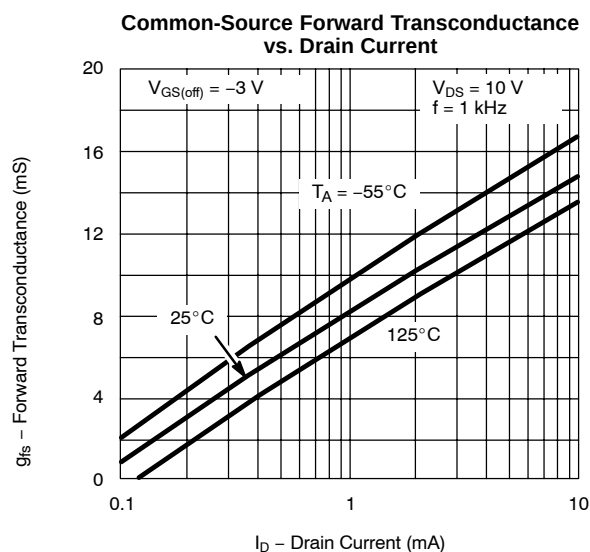
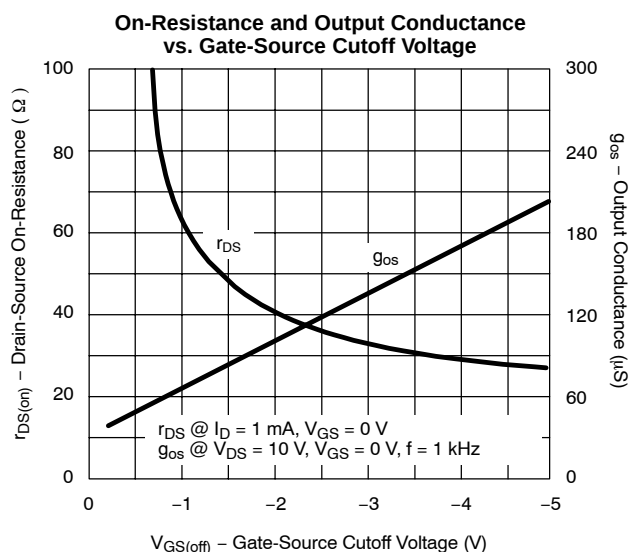
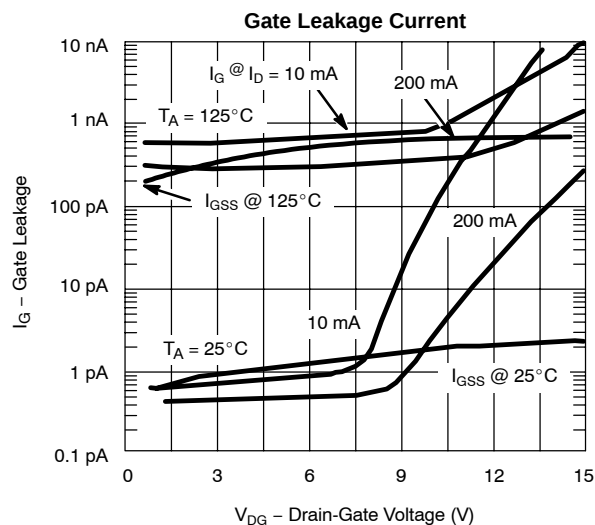
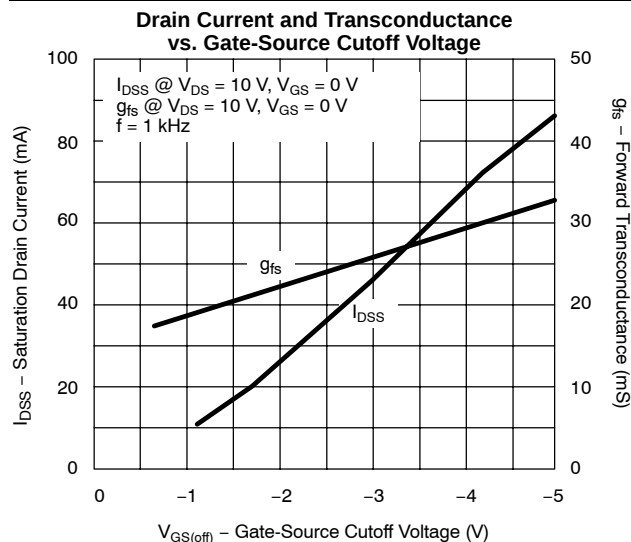
Parameter	Symbol	Test Conditions	Typ ^a	Limits				Unit	
				U309		U310			
				Min	Max	Min	Max		
Static									
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G = -1 μA , V _{DS} = 0 V	-35	-25		-25		V	
Gate-Source Cutoff Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 nA		-1	-4	-2.5	-6	V	
Saturation Drain 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	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		

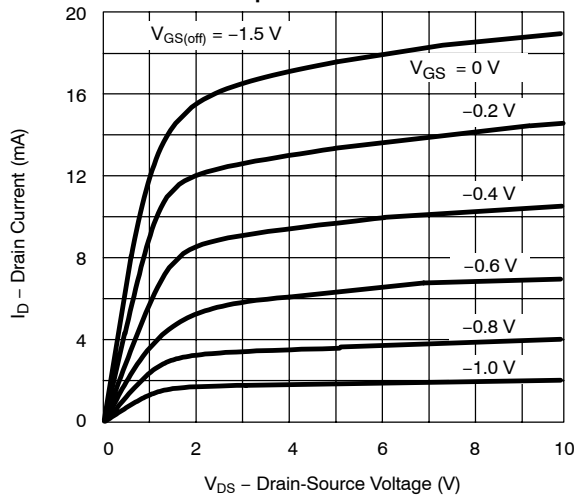
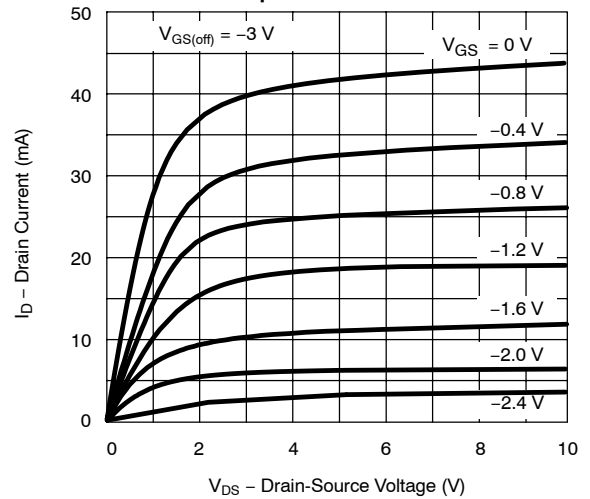
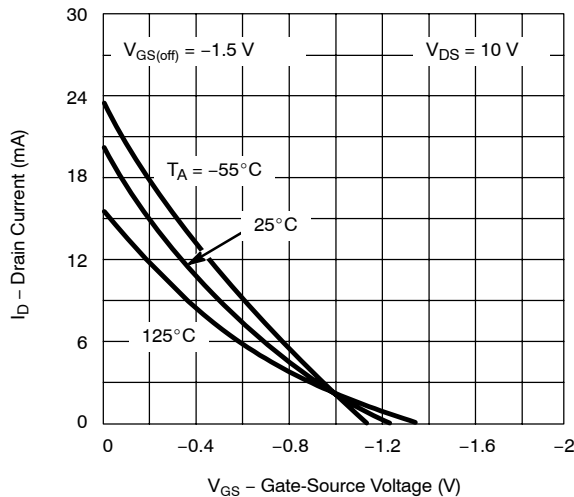
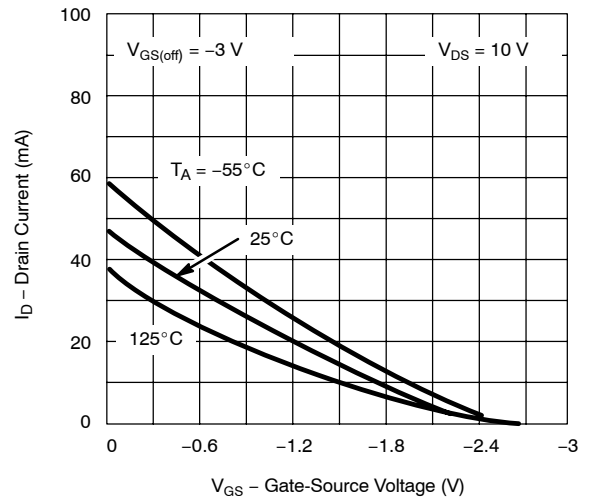
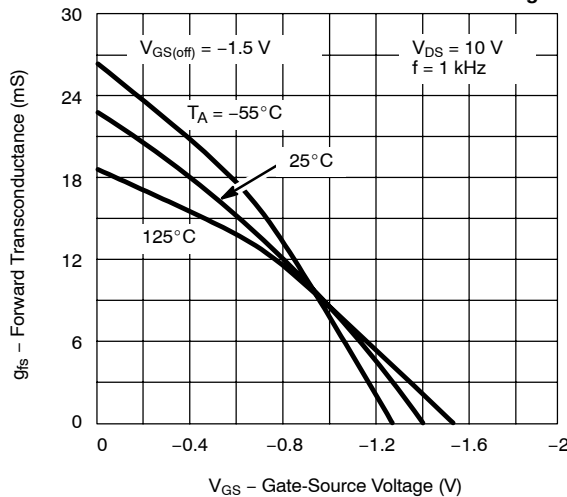
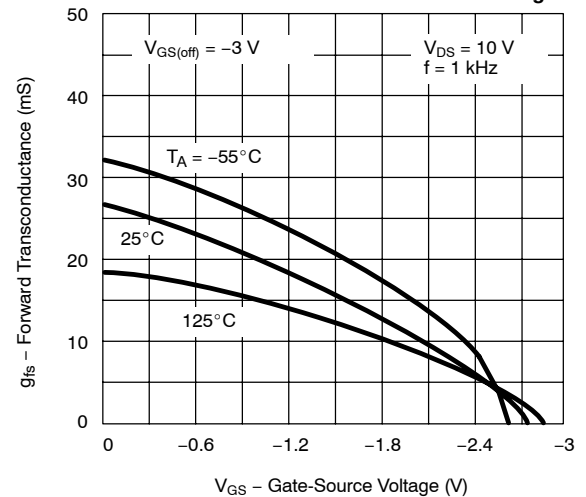
Notes

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

NZB

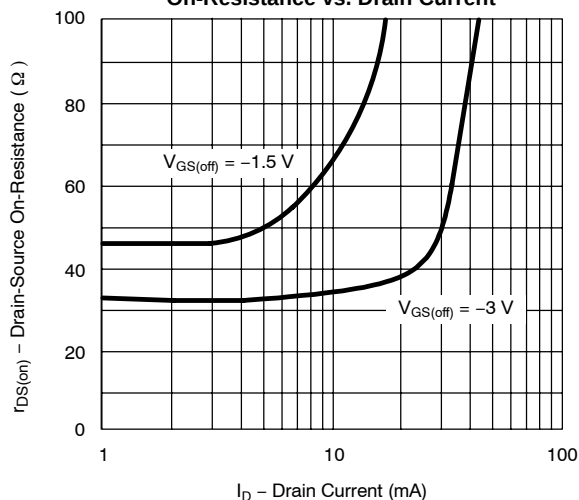
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)


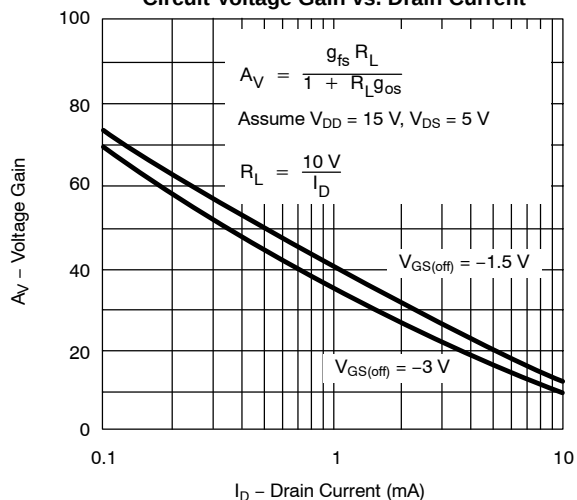
**TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)****Output Characteristics****Output Characteristics****Transfer Characteristics****Transfer Characteristics****Transconductance vs. Gate-Source Voltage****Transconductance vs. Gate-Source Voltage**

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

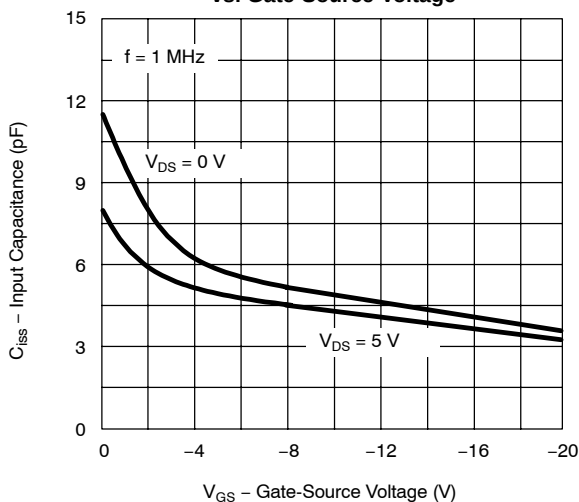
On-Resistance vs. Drain Current



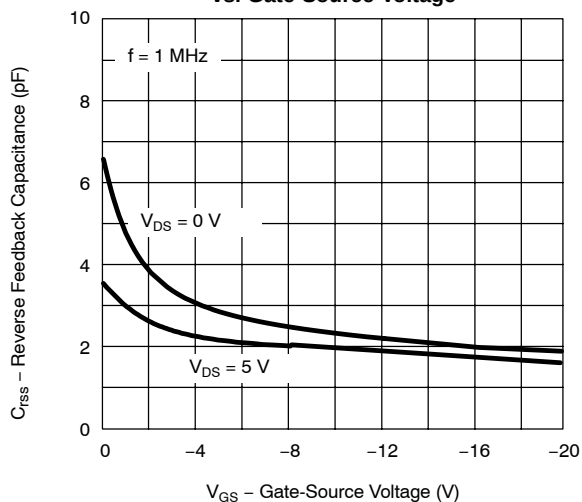
Circuit Voltage Gain vs. Drain Current



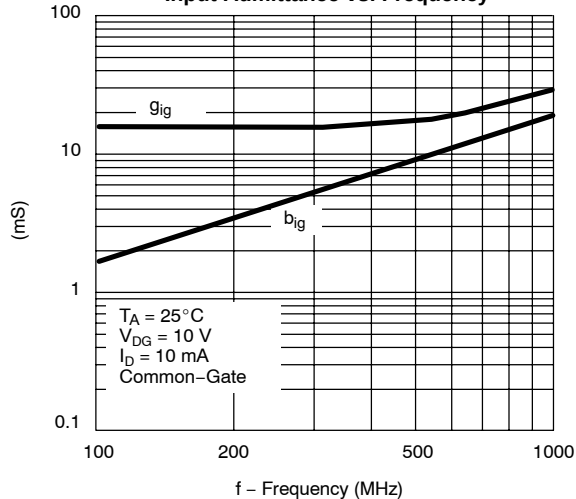
Common-Source Input Capacitance vs. Gate-Source Voltage



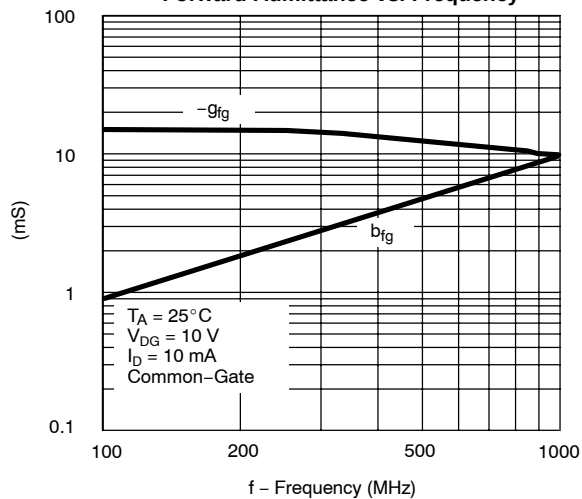
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage

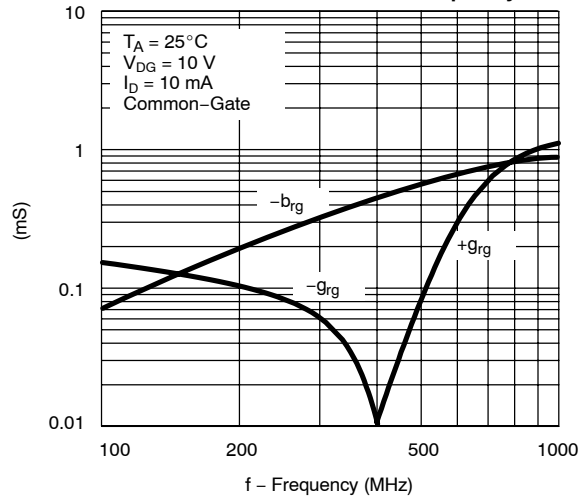
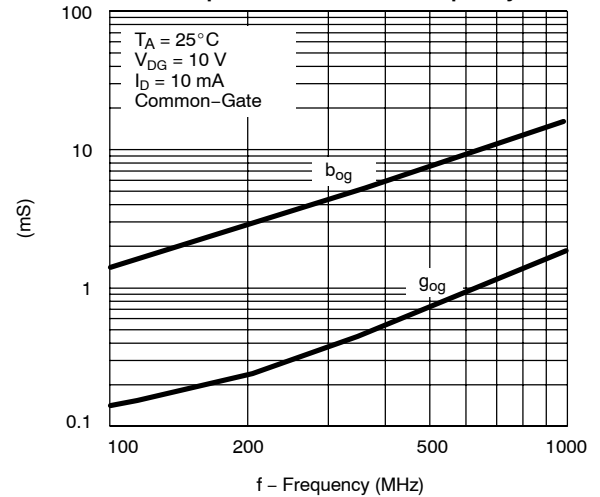
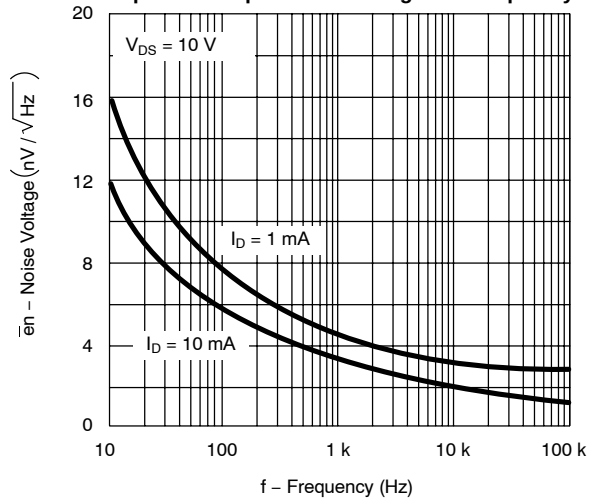
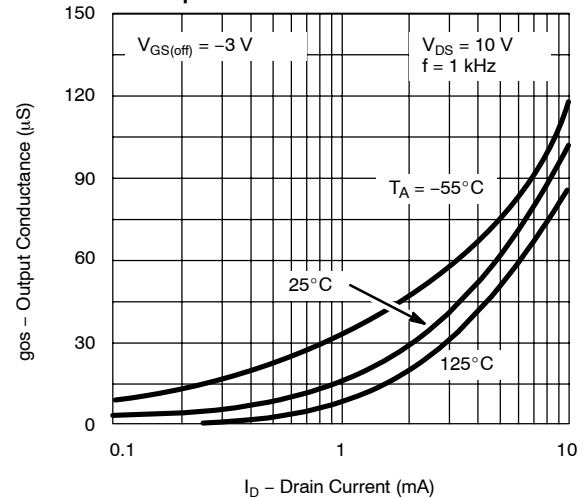


Input Admittance vs. Frequency



Forward Admittance vs. Frequency



**TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ 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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