

## N-Channel JFETs

<b>PRODUCT SUMMARY</b>				
Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	$g_{fs}$ Min (mS)	$I_{DSS}$ Min (mA)
J304	-2 to -6	-30	4.5	5
J305	-0.5 to -3	-30	3	1

### FEATURES

- Excellent High Frequency Gain: J304,  $G_{ps}$  11 dB (typ) @ 400 MHz
- Very Low Noise: 3.8 dB (typ) @ 400 MHz
- Very Low Distortion
- High ac/dc Switch Off-Isolation
- High Gain:  $A_V = 60$  @ 100  $\mu$ A

### BENEFITS

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

### APPLICATIONS

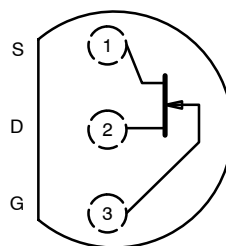
- High-Frequency Amplifier/Mixer
- Oscillator
- Sample-and-Hold
- Very Low Capacitance Switches

### DESCRIPTION

The J304/305 n-channel JFETs provide high-performance amplification, especially at high-frequency. These products are available in tape and reel for automated assembly (see Package Information).

For similar products in TO-236 (SOT-23) packages, see the 2N/SST5484 series data sheet, or in TO-206AF (TO-72) packages, see the 2N/SST4416 series data sheet.

**TO-226AA  
(TO-92)**



Top View

### ABSOLUTE MAXIMUM RATINGS

Gate-Source/Gate-Drain Voltage	-30 V
Forward Gate Current	10 mA
Storage Temperature	-55 to 150°C
Operating Junction Temperature	-55 to 150°C

Lead Temperature ( $1/16$ " from case for 10 sec.)	300°C
Power Dissipation <sup>a</sup>	350 mW

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

SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Typ <sup>a</sup>	Limits				Unit
				J304		J305		
				Min	Max	Min	Max	
<b>Static</b>								
Gate-Source Breakdown Voltage	V <sub>(BR)GSS</sub>	I <sub>G</sub> = -1 μA, V <sub>DS</sub> = 0 V	-35	-30		-30		V
Gate-Source Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 1 nA		-2	-6	-0.5	-3	V
Saturation Drain Current <sup>b</sup>	I <sub>DSS</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V		5	15	1	8	mA
Gate Reverse Current	I <sub>GSS</sub>	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V			-100		-100	pA
			T <sub>A</sub> = 100 °C	-0.2				nA
Gate Operating Current <sup>b</sup>	I <sub>G</sub>	V <sub>DG</sub> = 10 V, I <sub>D</sub> = 1 mA	-20					pA
Drain Cutoff Current	I <sub>D(off)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = -6 V	2					
Drain-Source On-Resistance	r <sub>DS(on)</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 300 μA	200					Ω
Gate-Source Forward Voltage	V <sub>GS(F)</sub>	I <sub>G</sub> = 1 mA, V <sub>DS</sub> = 0 V	0.7					V
<b>Dynamic</b>								
Common-Source Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1 kHz		4.5	7.5	3		mS
Common-Source Output Conductance	g <sub>os</sub>				50		50	μS
Common-Source Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V f = 1 MHz	2.2					pF
Common-Source Reverse Transfer Capacitance	C <sub>rss</sub>		0.7					
Common-Source Output Capacitance	C <sub>oss</sub>		1					
Equivalent Input Noise Voltage	$\bar{e}_n$	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V f = 100 Hz	10					nV/ √Hz

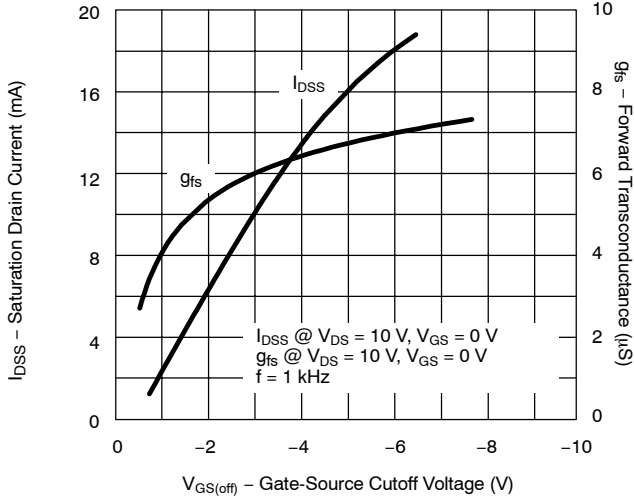
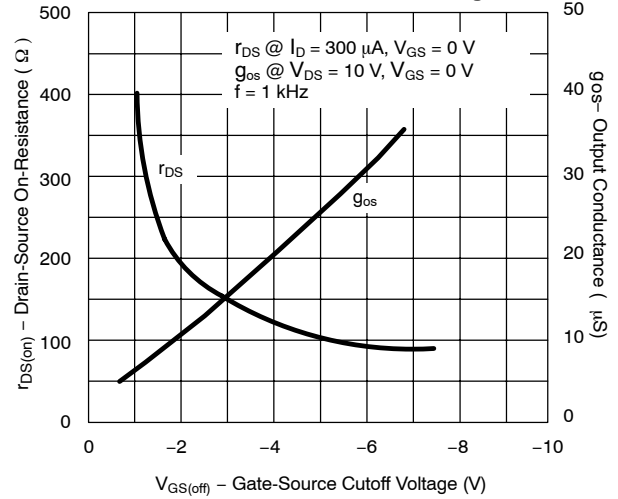
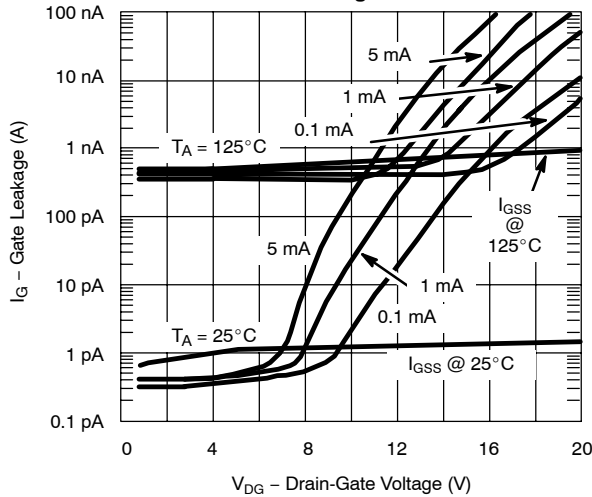
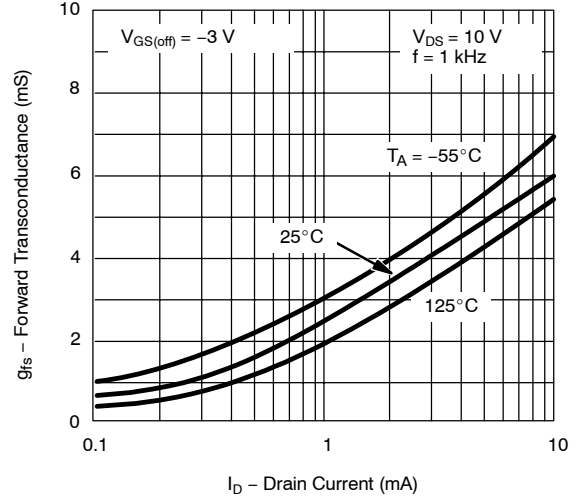
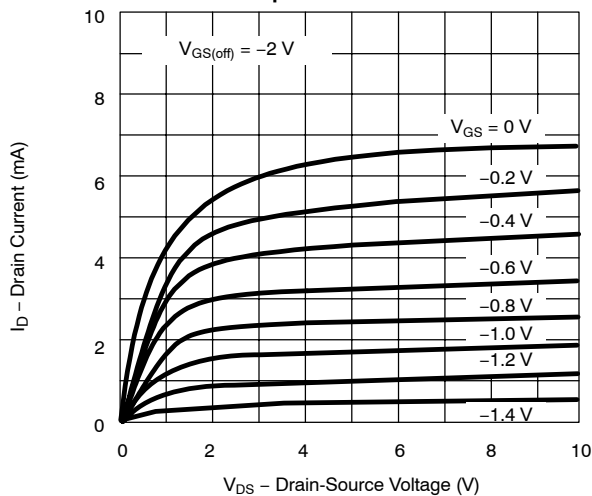
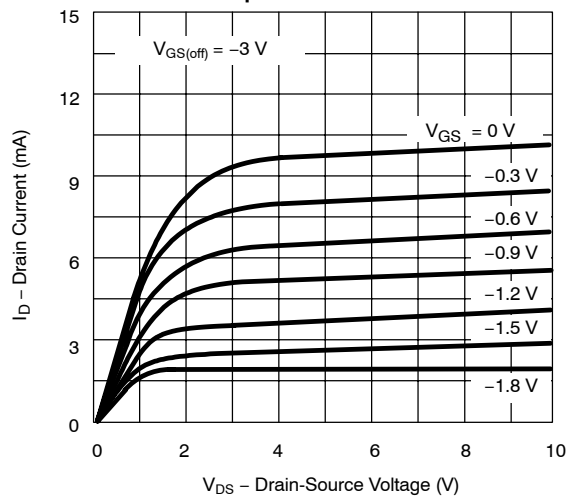
TYPICAL HIGH-FREQUENCY SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Limits (Typ)				Unit	
			J304		J305			
			100 MHz	400 MHz	100 MHz	400 MHz		
<b>High-Frequency</b>								
Common-Source Input Conductance	g <sub>iss</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V	80	800	80			μS
Common-Source Input Susceptance	b <sub>iss</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V	2	7.5	2			mS
Common-Source Output Conductance	g <sub>oss</sub>		60	80	60			μS
Common-Source Output Susceptance	b <sub>oss</sub>		0.8	3.6	0.8			mS
Common-Source Forward Transconductance	g <sub>fs</sub>		4.4	4.2	3			
Common-Source Power Gain	G <sub>ps</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 5 mA	20	11				dB
Noise Figure	NF	R <sub>G</sub> = 1 kΩ	1.7	3.8				

Notes

- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: PW ≤ 300 μs, duty cycle ≤ 2%.

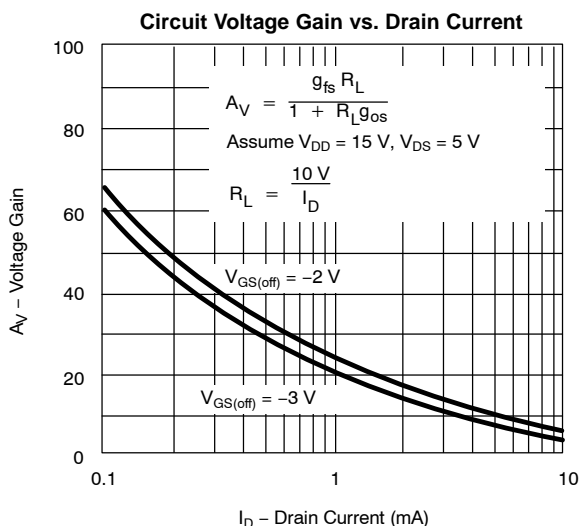
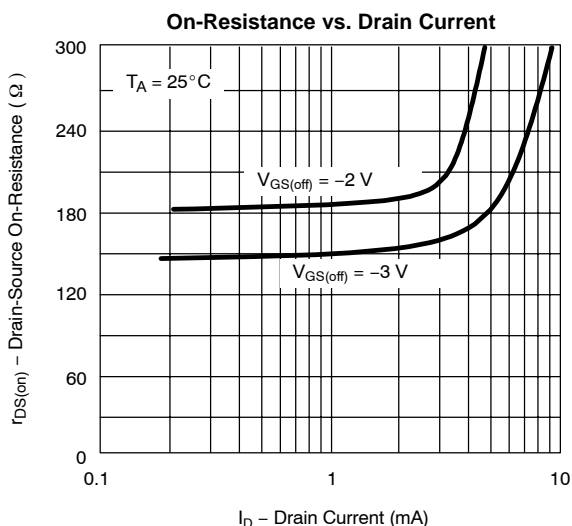
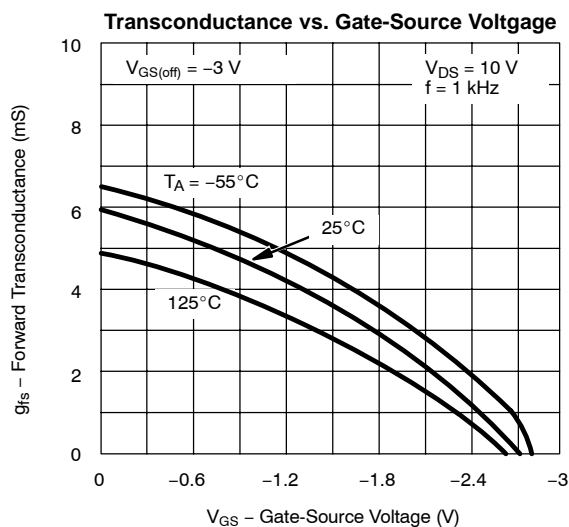
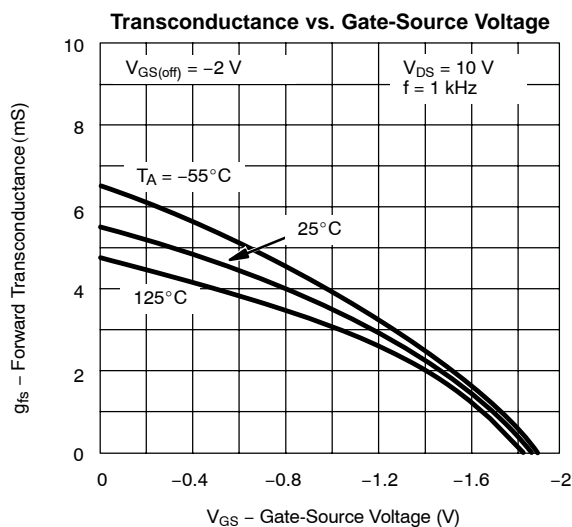
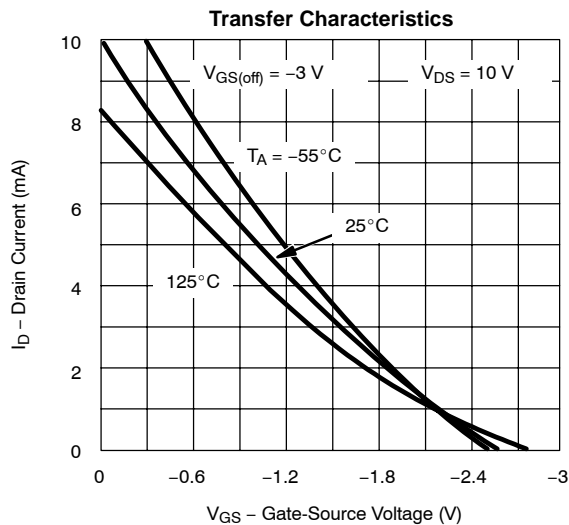
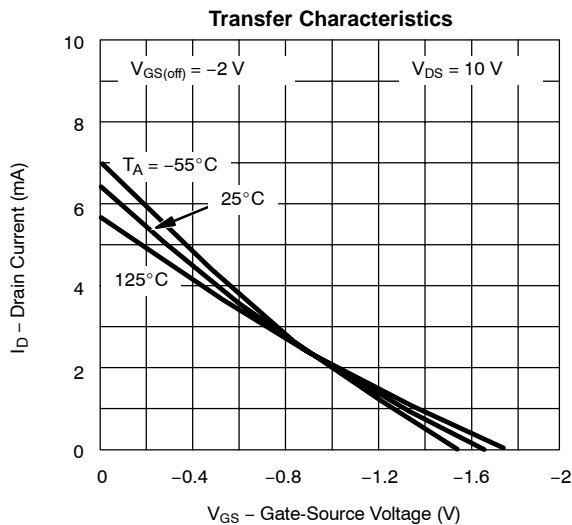
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Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational 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)**
**Drain Current and Transconductance vs. Gate-Source Cutoff Voltage**

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

**Gate Leakage Current**

**Common-Source Forward Transconductance vs. Drain Current**

**Output Characteristics**

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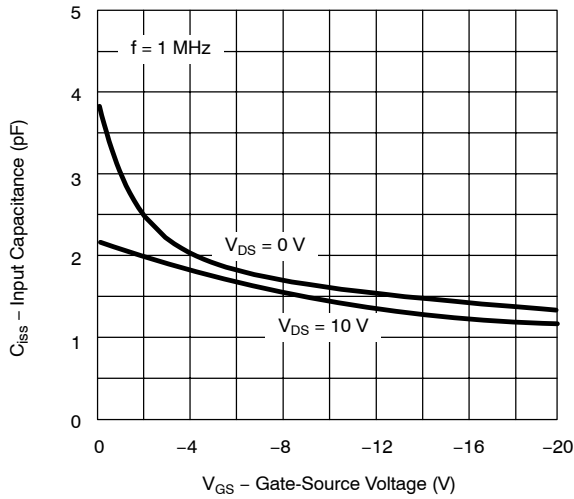


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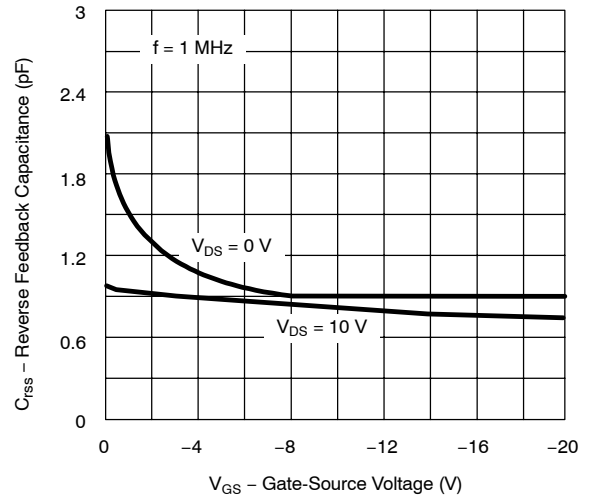


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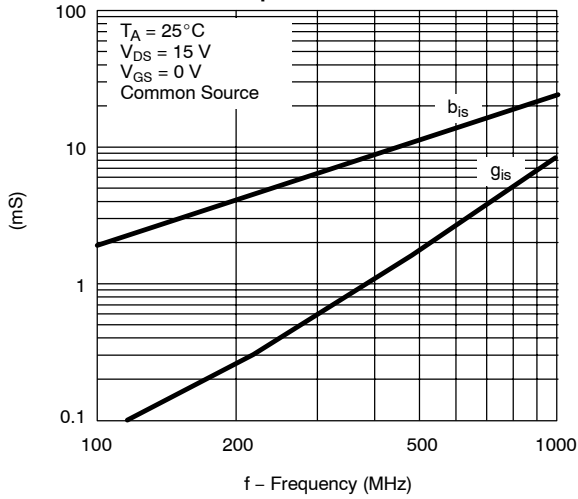
**Common-Source Input Capacitance vs. Gate-Source Voltage**



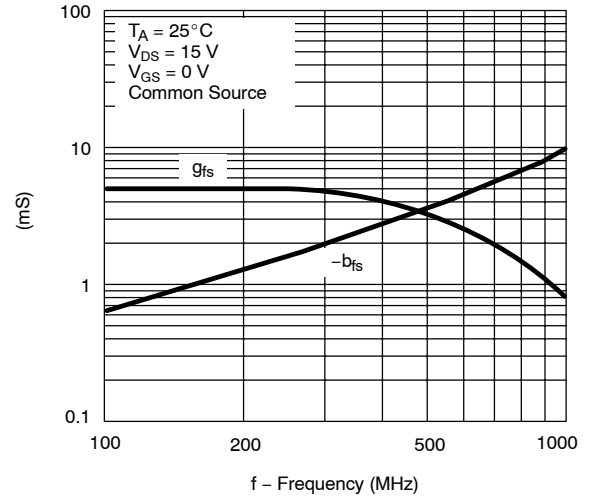
**Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage**



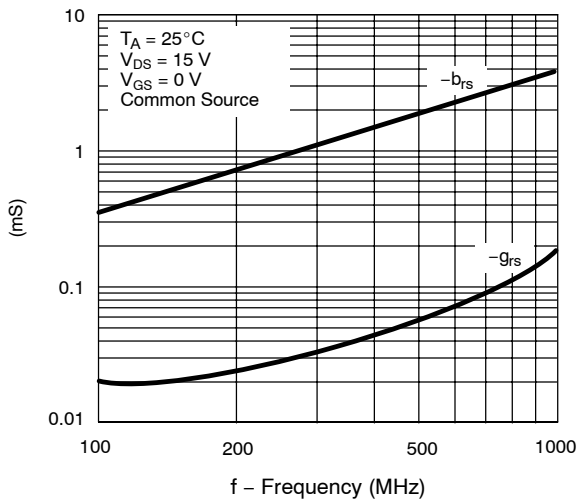
**Input Admittance**



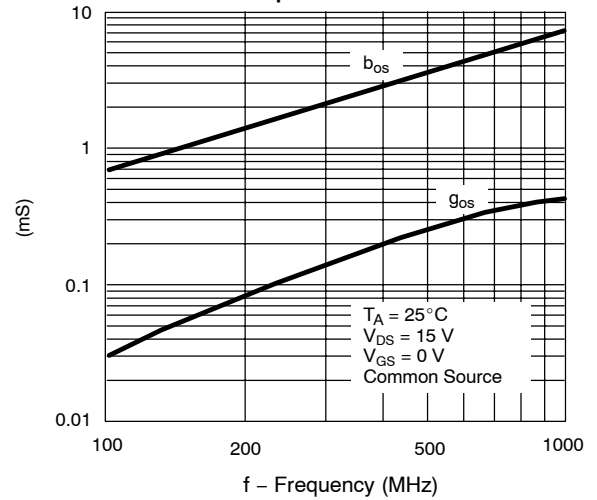
**Forward Admittance**



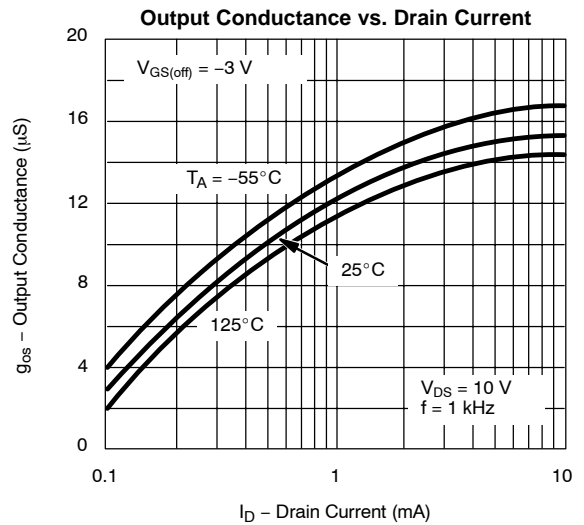
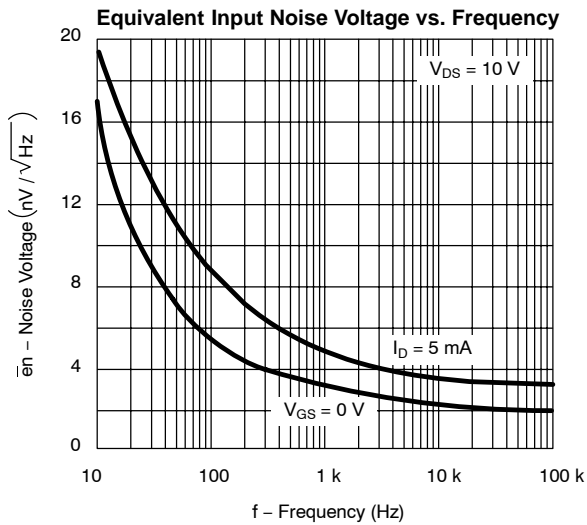
**Reverse Admittance**



**Output Admittance**



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



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