



### N-Channel JFETs

PRODUCT SUMMARY				
Part Number	V <sub>GS(off)</sub> (V)	V <sub>(BR)GSS</sub> Min (V)	g <sub>fs</sub> Min (mS)	I <sub>DSS</sub> Min (mA)
2N4416	-≤6	-30	4.5	5
2N4416A	-2.5 to -6	-35	4.5	5
SST4416	-≤6	-30	4.5	5

#### FEATURES

- Excellent High-Frequency Gain: 2N4416/A, Gps 13 dB (typ) @ 400 MHz
- Very Low Noise: 3 dB (typ) @ 400 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

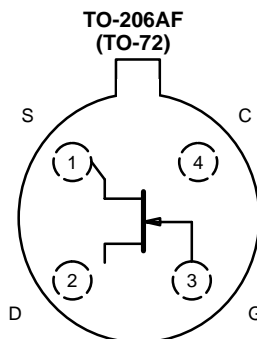
#### APPLICATIONS

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

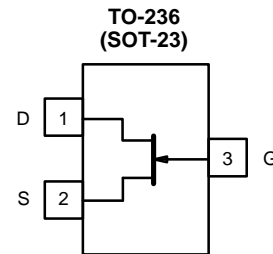
#### DESCRIPTION

The 2N4416/2N4416A/SST4416 n-channel JFETs are designed to provide high-performance amplification at high frequencies.

The TO-206AF (TO-72) hermetically-sealed package is available with full military processing (see Military Information.) The TO-236 (SOT-23) package provides a low-cost option and is available with tape-and-reel options (see Packaging Information). For similar products in the TO-226AA (TO-92) package, see the J304/305 data sheet.



Top View  
2N4416  
2N4416A



Top View  
SST4416 (H1)\*  
\*Marking Code for TO-236

For applications information see AN104.



### ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage :		Operating Junction Temperature . . . . .	-55 to 150 °C
(2N/SST4416) . . . . .	-30 V	Power Dissipation :	(2N Prefix) <sup>a</sup> . . . . . 300 mW
(2N4416A) . . . . .	-35 V	(SST Prefix) <sup>b</sup> . . . . .	350 mW
Gate Current . . . . .	10 mA	Notes	
Lead Temperature . . . . .	300 °C	a. Derate 2.4 mW/°C above 25°C	
Storage Temperature :	(2N Prefix) . . . . . -65 to 200 °C	b. Derate 2.8 mW/°C above 25°C	
(SST Prefix) . . . . .	-65 to 150°C		

SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS NOTED)										
Parameter	Symbol	Test Conditions	Typ <sup>a</sup>	Limits						Unit
				2N4416		2N4416A		SST4416		
				Min	Max	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	-36	-30		-35		-30		V
Gate-Source Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 1 nA	-3		-6	-2.5	-6		-6	
Saturation Drain Current <sup>b</sup>	I <sub>DSS</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V	10	5	15	5	15	5	15	mA
Gate Reverse Current	I <sub>GSS</sub>	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V (2N)	-2		-100		-100			pA
		T <sub>A</sub> = 150°C	-4		-100		-100			nA
		V <sub>GS</sub> = -15 V, V <sub>DS</sub> = 0 V (SST)	-0.002						-1	
		T <sub>A</sub> = 125°C	-0.6							
Gate Operating Current	I <sub>G</sub>	V <sub>DG</sub> = 10 V, I <sub>D</sub> = 1 mA	-20							pA
Drain Cutoff Current <sup>c</sup>	I <sub>D(off)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = -6 V	2							
Drain-Source On-Resistance <sup>c</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1 mA	150							Ω
Gate-Source Forward Voltage <sup>c</sup>	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 <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V f = 1 kHz	6	4.5	7.5	4.5	7.5	4.5	7.5	mS
Common-Source Output Conductance <sup>b</sup>	g <sub>os</sub>		15		50		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		4		4			pF
Common-Source Reverse Transfer Capacitance	C <sub>rss</sub>		0.7		0.8		0.8			
Common-Source Output Capacitance	C <sub>oss</sub>		1		2		2			
Equivalent Input Noise Voltage <sup>c</sup>	e <sub>n</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V f = 1 kHz	6							nV/ √Hz



HIGH-FREQUENCY SPECIFICATIONS FOR 2N4416/2N4416A (T <sub>A</sub> = 25 °C UNLESS NOTED)							
Parameter	Symbol	Test Conditions	Limits				Unit
			100 MHz		400 MHz		
			Min	Max	Min	Max	
Common Source Input Conductance	$g_{iss}$	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$		100		1,000	$\mu\text{S}$
Common Source Input Susceptance	$b_{iss}$			2,500		10,000	
Common Source Output Conductance	$g_{oss}$			75		100	
Common Source Output Susceptance	$b_{oss}$			1,000		4,000	
Common Source Forward Transconductance	$g_{fs}$				4,000		
Common-Source Power Gain	$G_{ps}$	$V_{DS} = 15\text{ V}, I_D = 5\text{ mA}$	18		10		dB
Noise Figure	NF	$R_G = 1\text{ k}\Omega$		2		4	

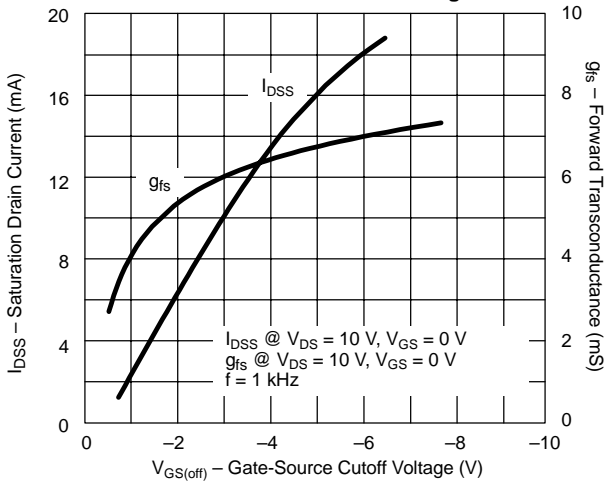
Notes

- 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. This parameter not registered with JEDEC.

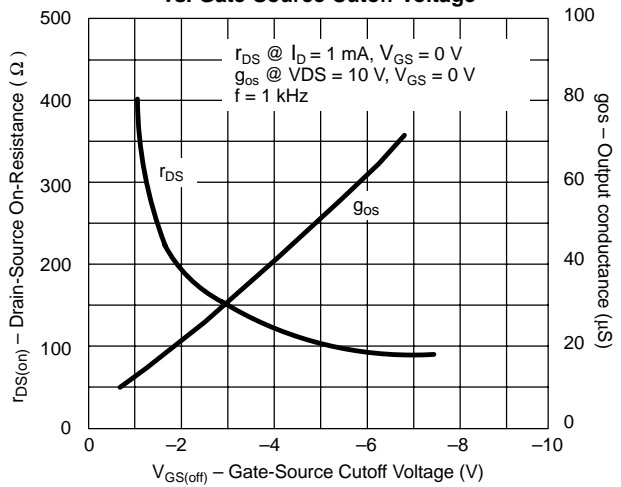
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**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)**

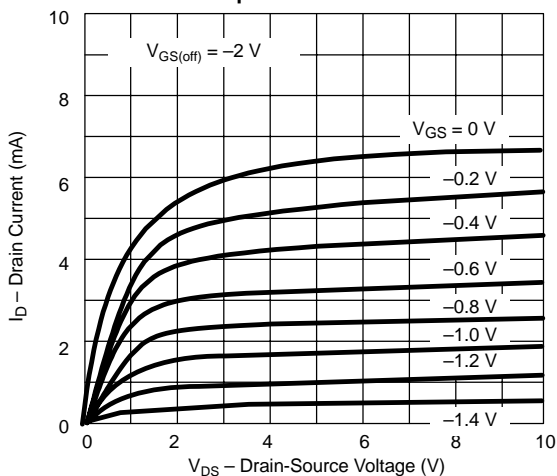
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



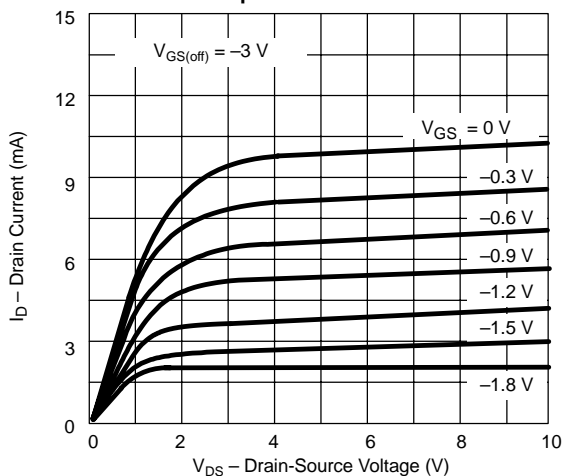
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



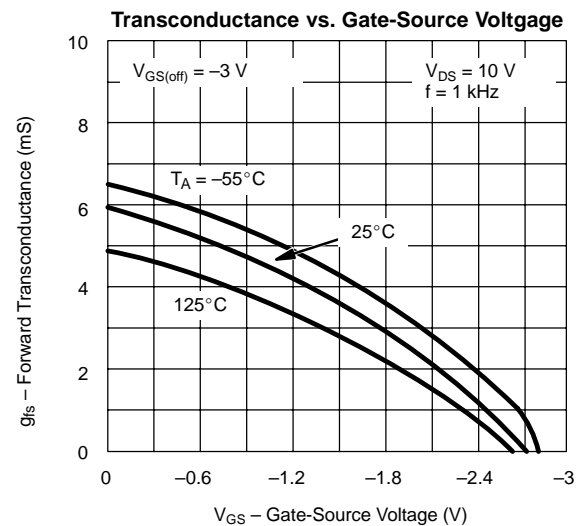
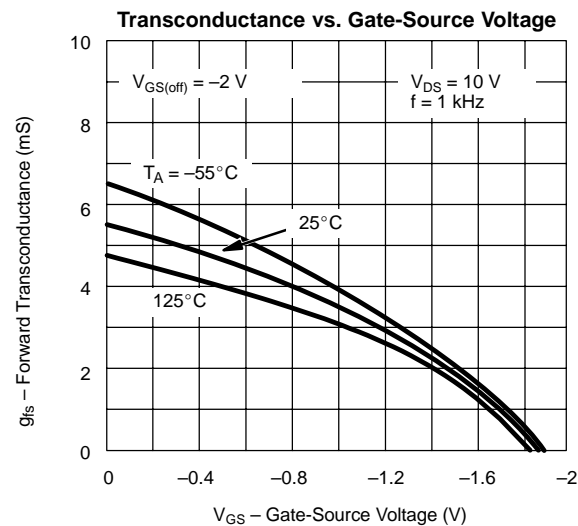
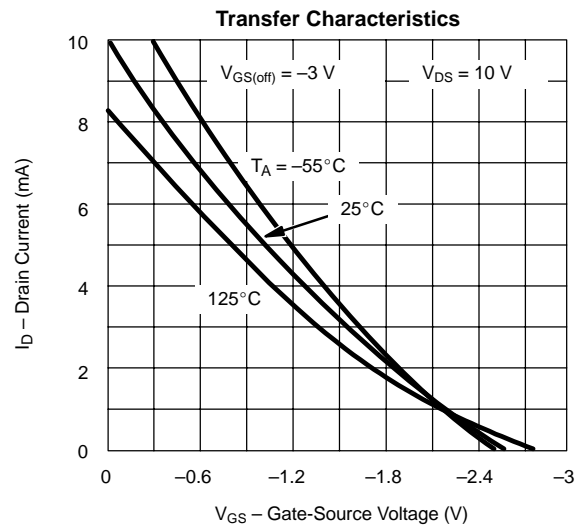
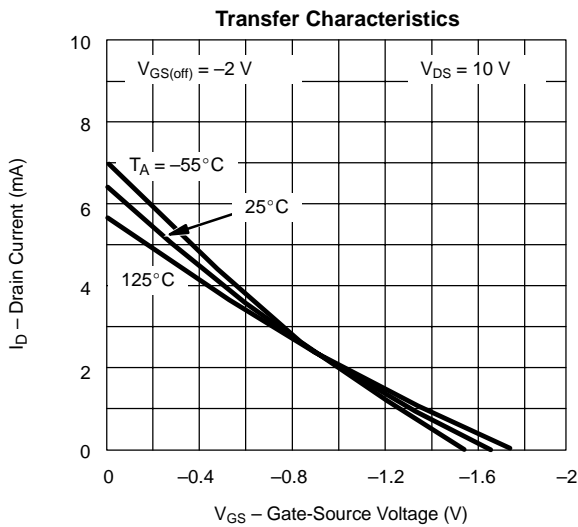
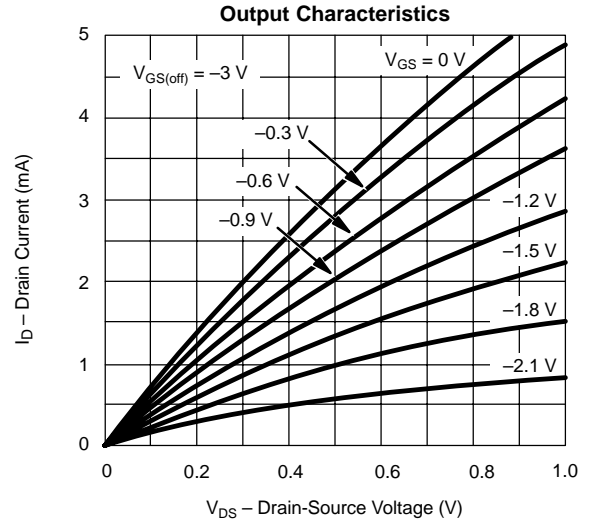
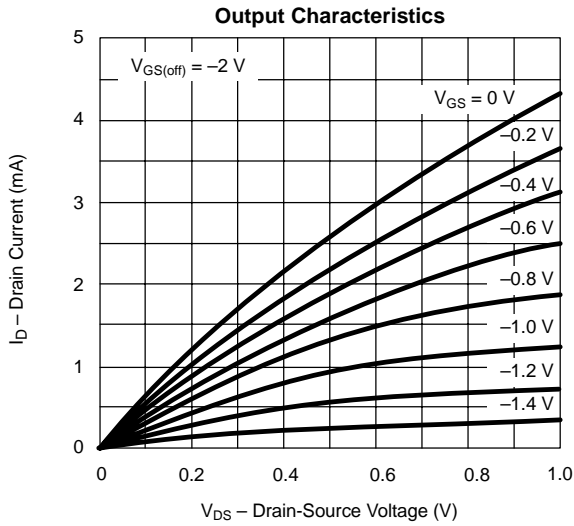
Output Characteristics



Output Characteristics

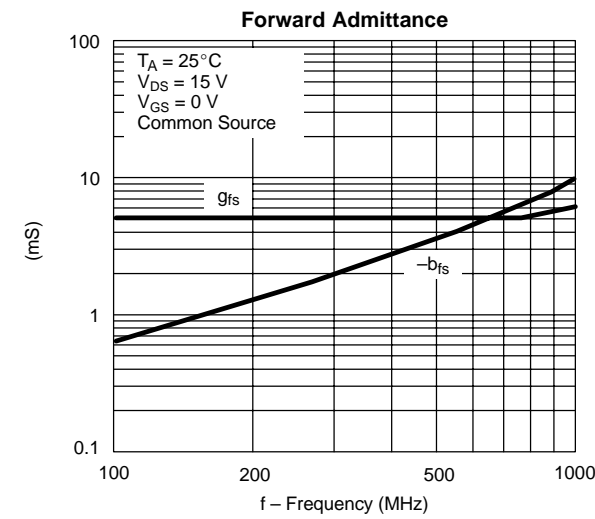
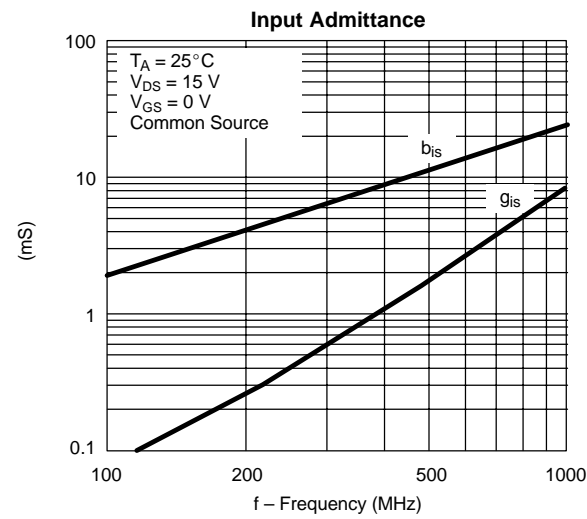
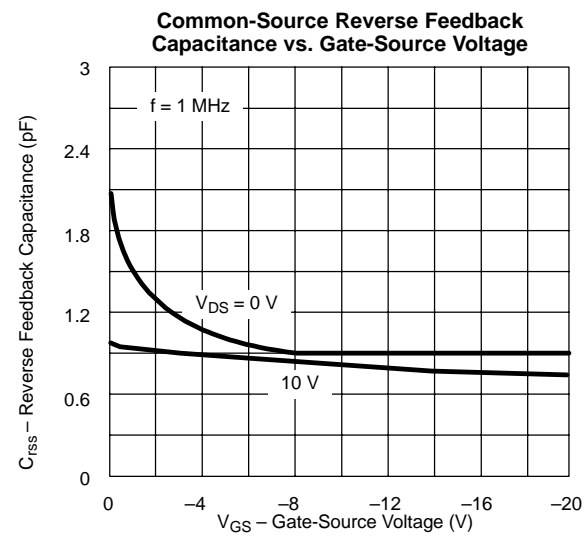
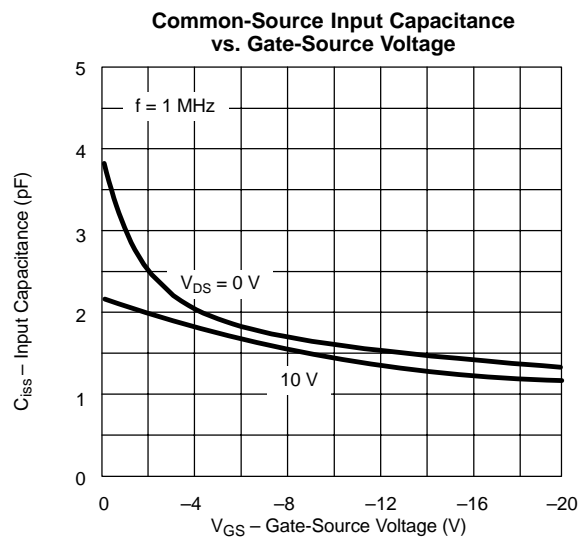
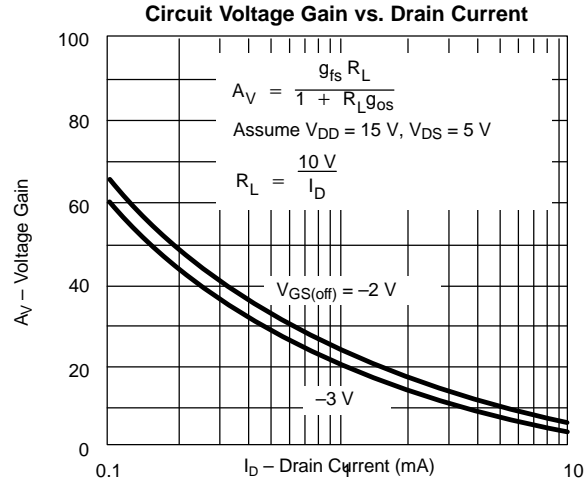
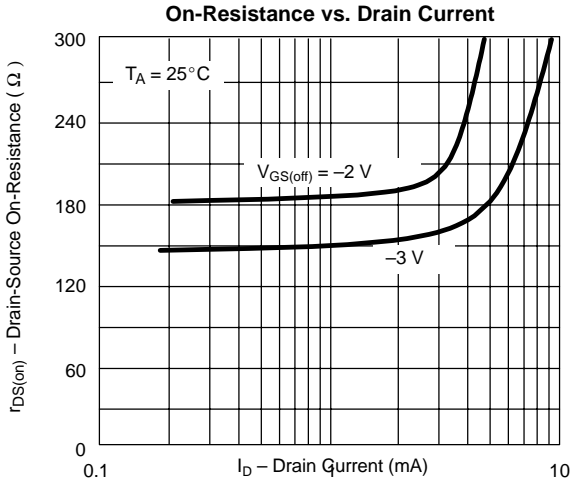


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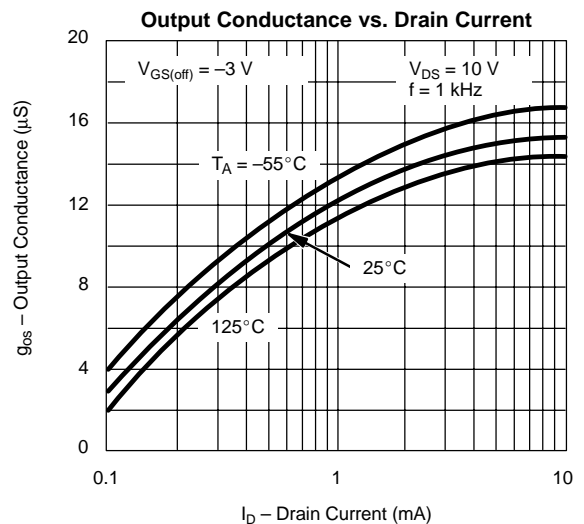
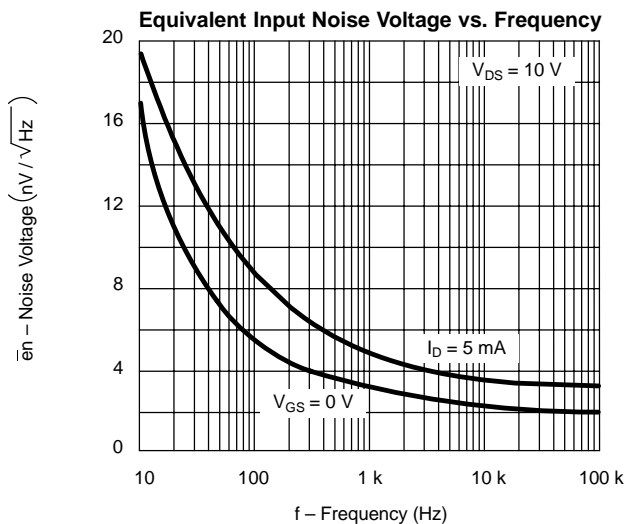
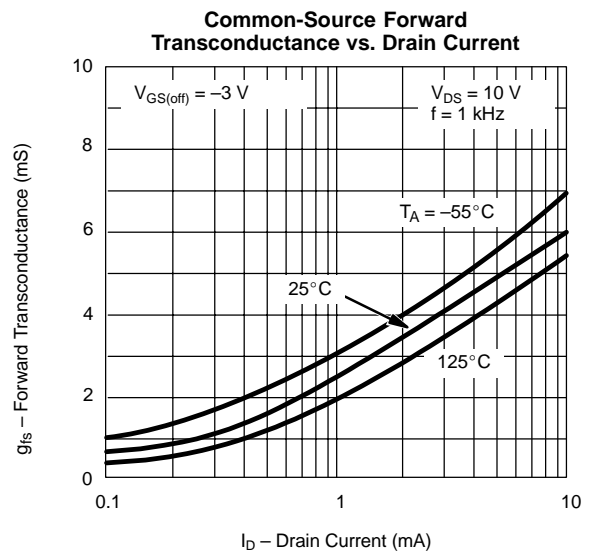
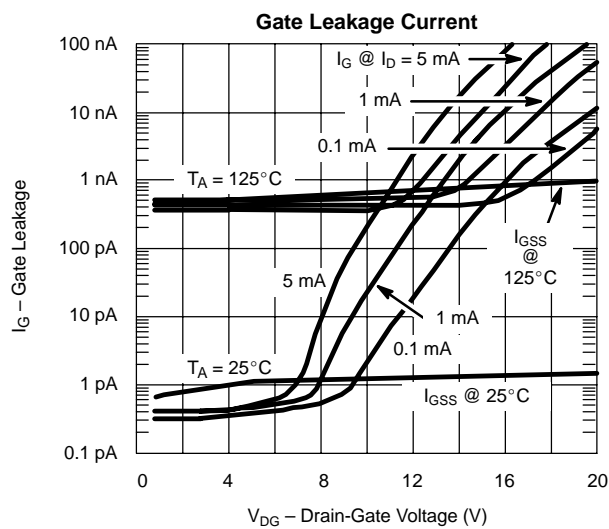
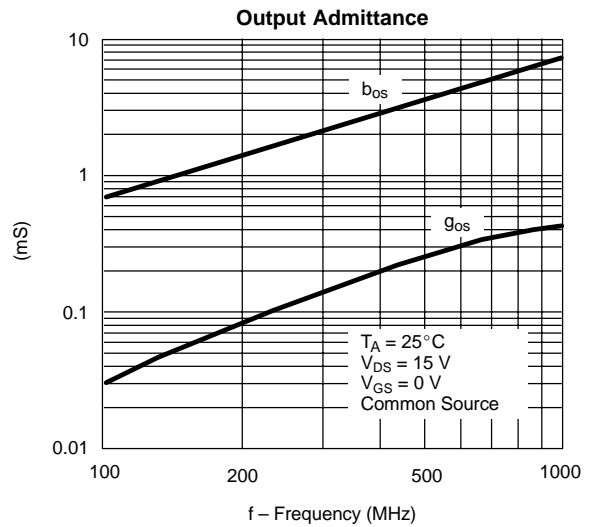
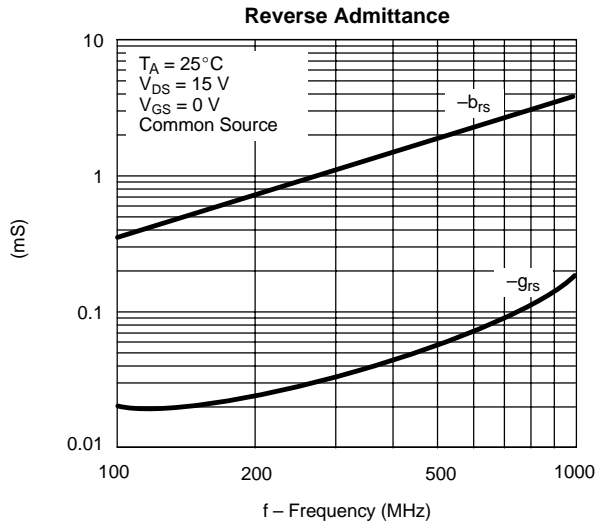




**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)**



**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)**



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