



N-Channel JFETs

PRODUCT SUMMARY

Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	g_{fs} Min (mS)	I_{DSS} Min (mA)
2N4416	$-\leq 6$	-30	4.5	5
2N4416A	-2.5 to -6	-35	4.5	5
SST4416	$-\leq 6$	-30	4.5	5

FEATURES

- Excellent High-Frequency Gain: 2N4416/A, G_{ps} 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

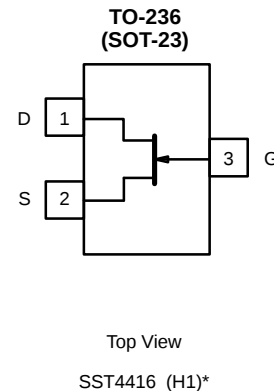
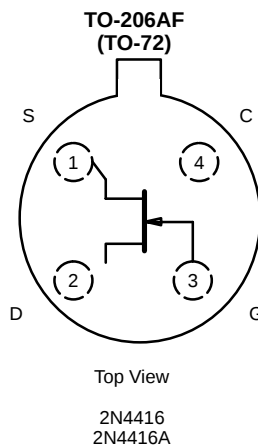
APPLICATIONS

- 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.



*Marking Code for TO-236

For applications information see AN104.

ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage :
 (2N/SST4416) -30 V
 (2N4416A) -35 V
 Gate Current 10 mA
 Lead Temperature 300 °C
 Storage Temperature : (2N Prefix) -65 to 200 °C
 (SST Prefix) -65 to 150 °C

Operating Junction Temperature -55 to 150 °C

Power Dissipation : (2N Prefix)^a 300 mW
 (SST Prefix)^b 350 mW

Notes

- a. Derate 2.4 mW/°C above 25 °C
 b. Derate 2.8 mW/°C above 25 °C

SPECIFICATIONS (T_A = 25 °C UNLESS NOTED)

Parameter	Symbol	Test Conditions	Typ ^a	Limits						Unit
				2N4416		2N4416A		SST4416		
				Min	Max	Min	Max	Min	Max	
Static										
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G = -1 μA , V _{DS} = 0 V	-36	-30		-35		-30		V
Gate-Source Cutoff Voltage	V _{GS(off)}	V _{DS} = 15 V, I _D = 1 nA	-3		-6	-2.5	-6		-6	
Saturation Drain Current ^b	I _{DSS}	V _{DS} = 15 V, V _{GS} = 0 V	10	5	15	5	15	5	15	mA
Gate Reverse Current	I _{GSS}	V _{GS} = -20 V, V _{DS} = 0 V (2N)	-2		-100		-100			pA
		T _A = 150°C	-4		-100		-100			
		V _{GS} = -15 V, V _{DS} = 0 V (SST)	-0.002						-1	nA
		T _A = 125°C	-0.6							
Gate Operating Current	I _G	V _{DG} = 10 V, I _D = 1 mA	-20							pA
Drain Cutoff Current ^c	I _{D(off)}	V _{DS} = 10 V, V _{GS} = -6 V	2							
Drain-Source On-Resistance ^c	r _{DS(on)}	V _{GS} = 0 V, I _D = 1 mA	150							Ω
Gate-Source Forward Voltage ^c	V _{GS(F)}	I _G = 1 mA , V _{DS} = 0 V	0.7							V
Dynamic										
Common-Source Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, V _{GS} = 0 V f = 1 kHz	6	4.5	7.5	4.5	7.5	4.5	7.5	mS
Common-Source Output Conductance ^b	g _{os}		15		50		50		50	μS
Common-Source Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V f = 1 MHz	2.2		4		4			pF
Common-Source Reverse Transfer Capacitance	C _{rss}		0.7		0.8		0.8			
Common-Source Output Capacitance	C _{oss}		1		2		2			
Equivalent Input Noise Voltage ^c	$\bar{e}_n$	V _{DS} = 10 V, V _{GS} = 0 V f = 1 kHz	6							nV/ √Hz

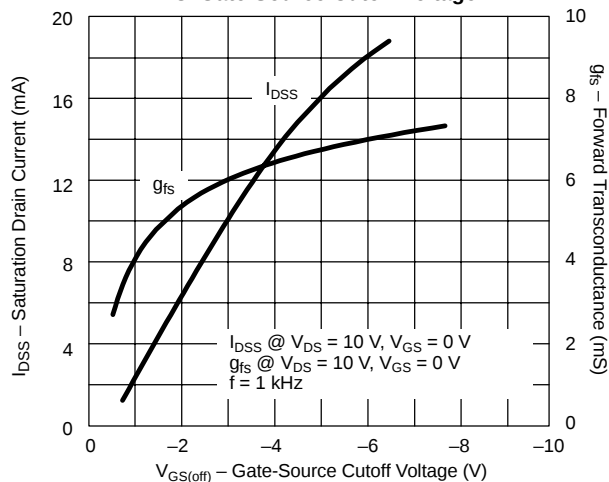
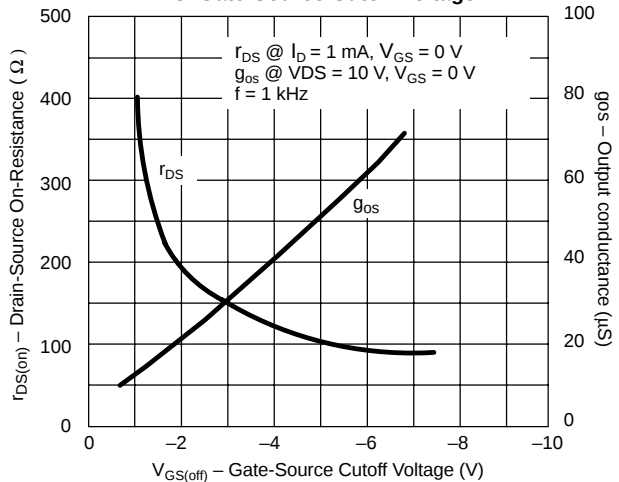
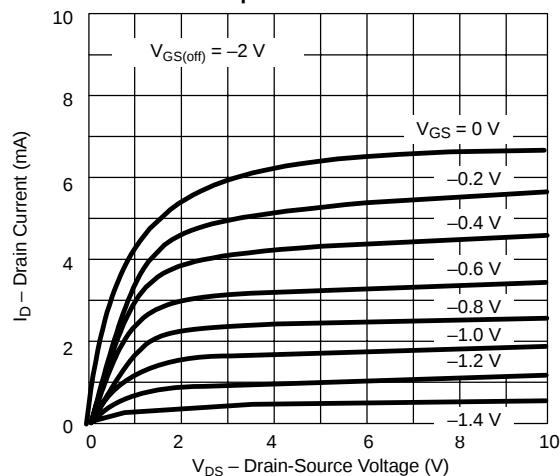
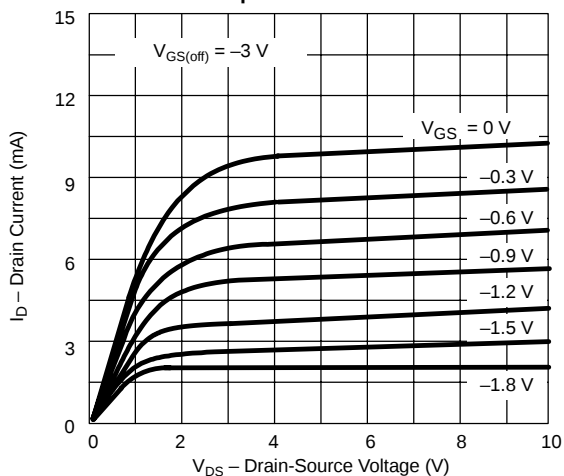
**HIGH-FREQUENCY SPECIFICATIONS FOR 2N4416/2N4416A ($T_A = 25^\circ\text{C}$ UNLESS NOTED)**

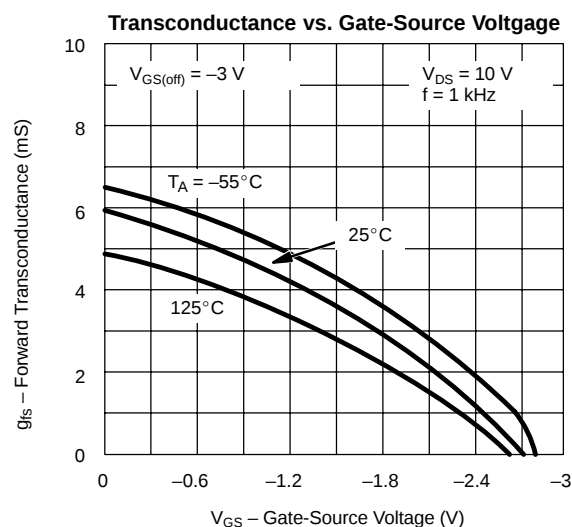
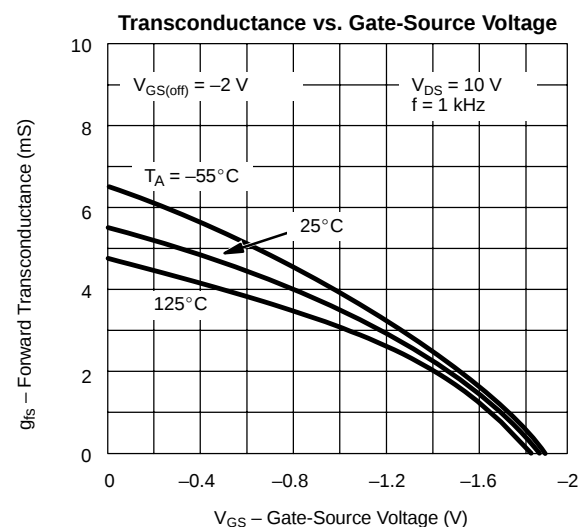
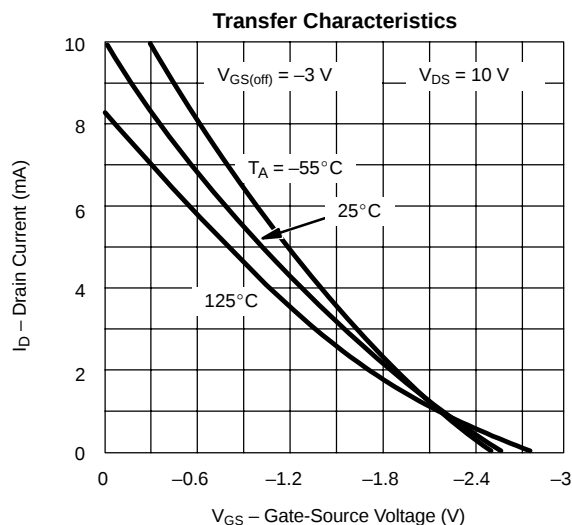
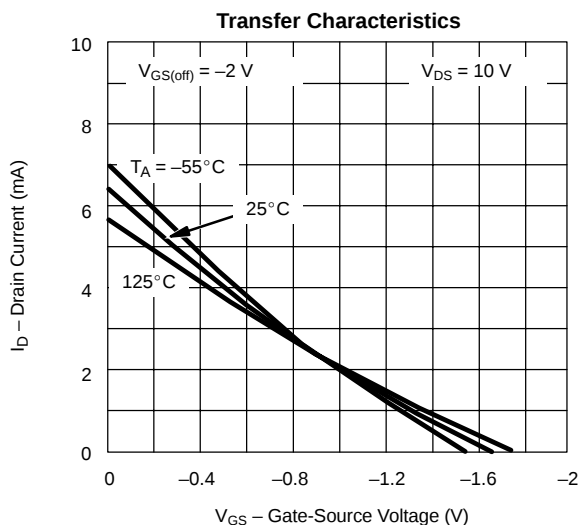
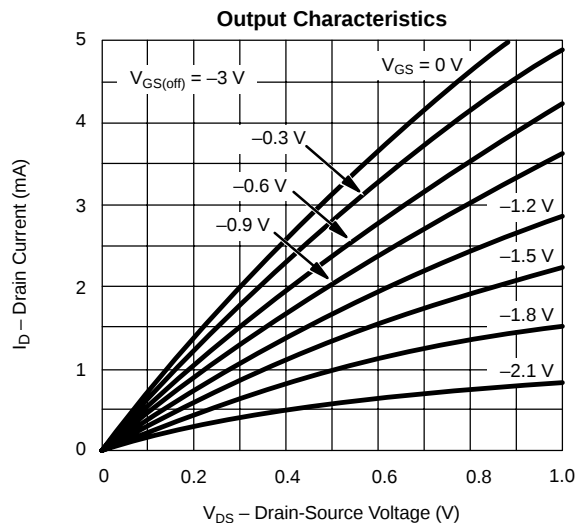
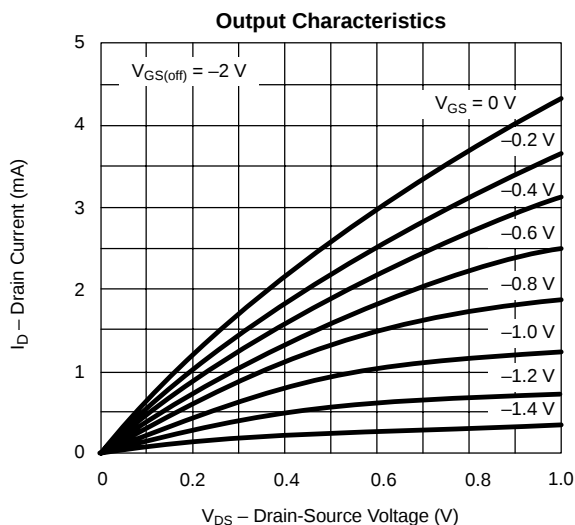
Parameter	Symbol	Test Conditions	Limits				Unit
			100 MHz		400 MHz		
			Min	Max	Min	Max	
Common Source Input Conductance	g_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$		100		1,000	μS
Common Source Input Susceptance	b_{iss}			2,500		10,000	
Common Source Output Conductance	g_{oss}			75		100	
Common 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	

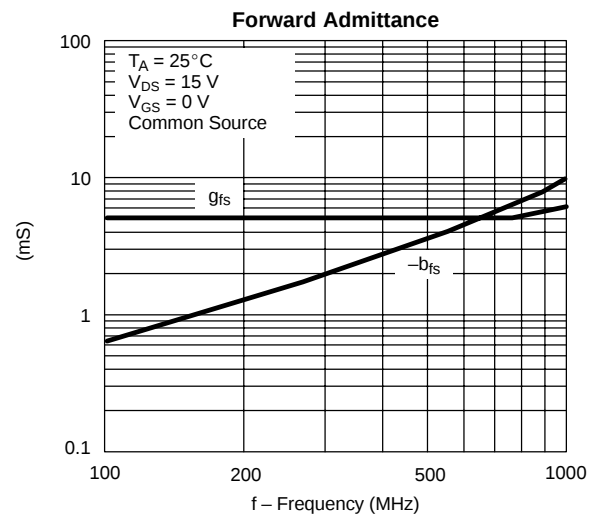
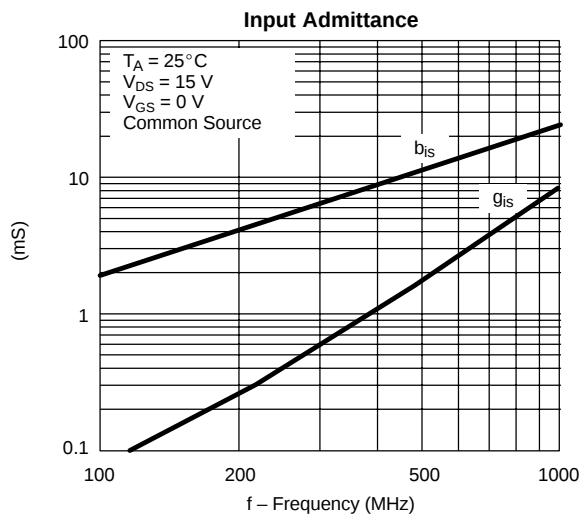
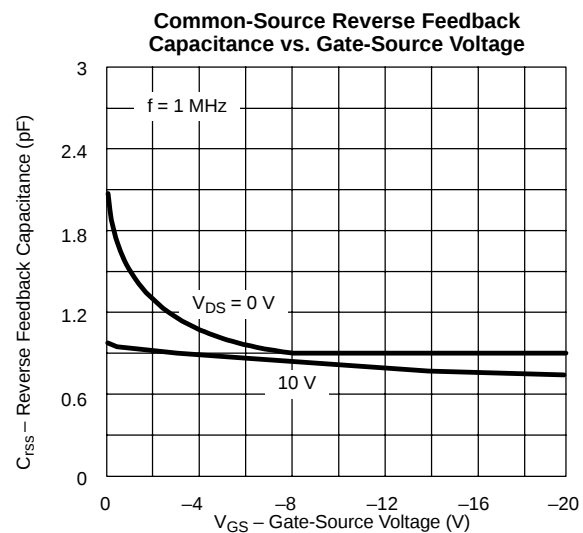
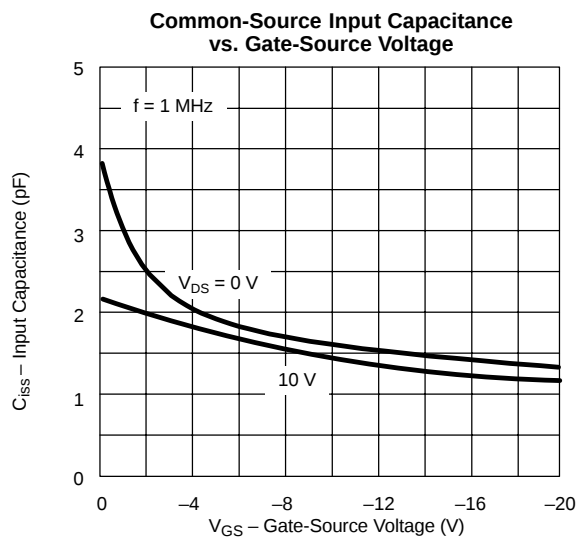
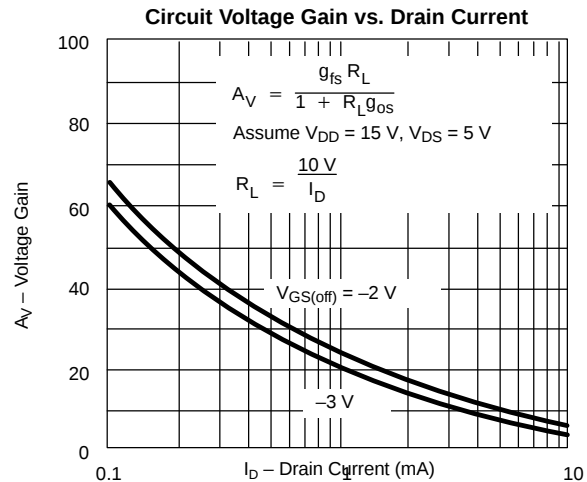
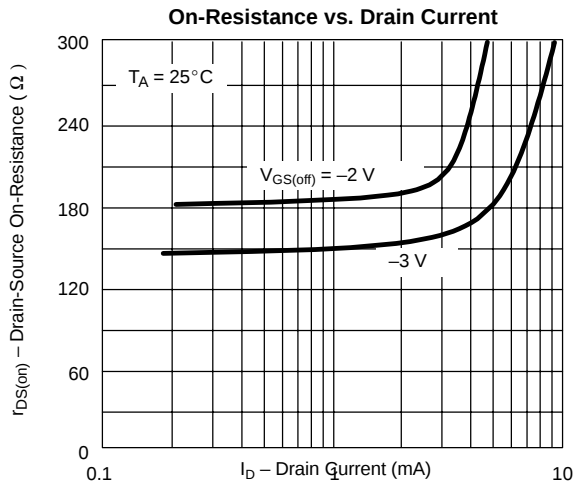
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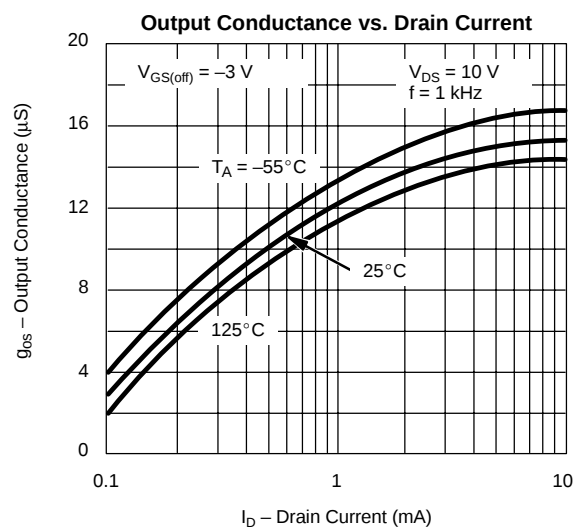
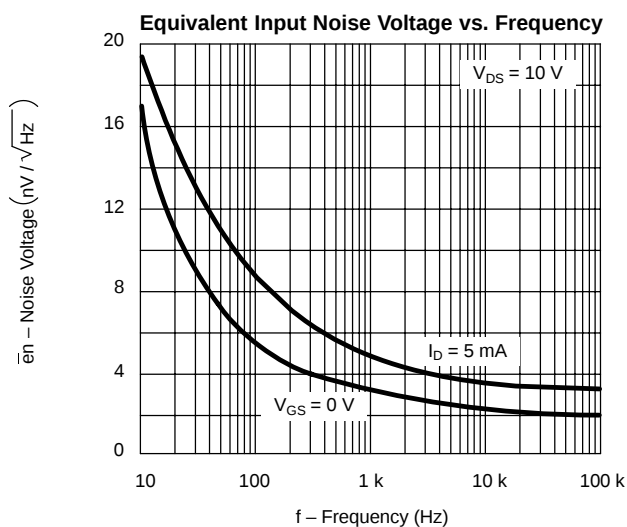
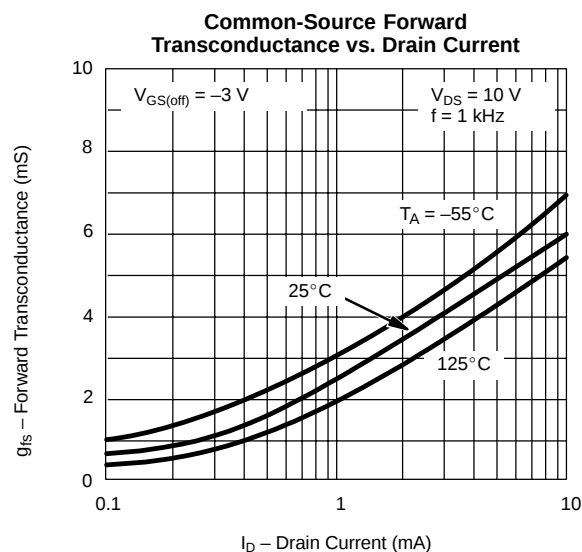
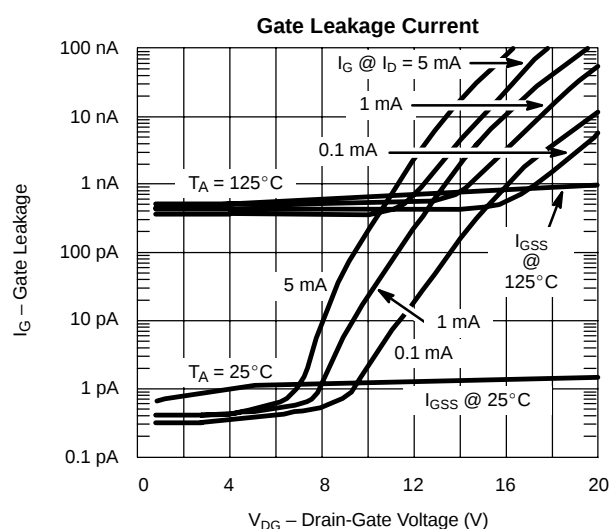
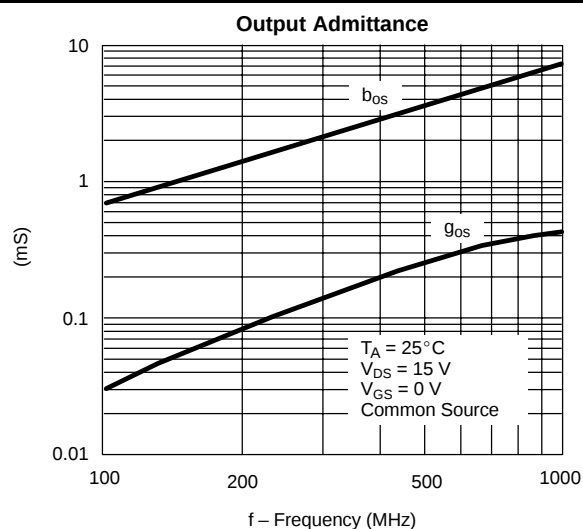
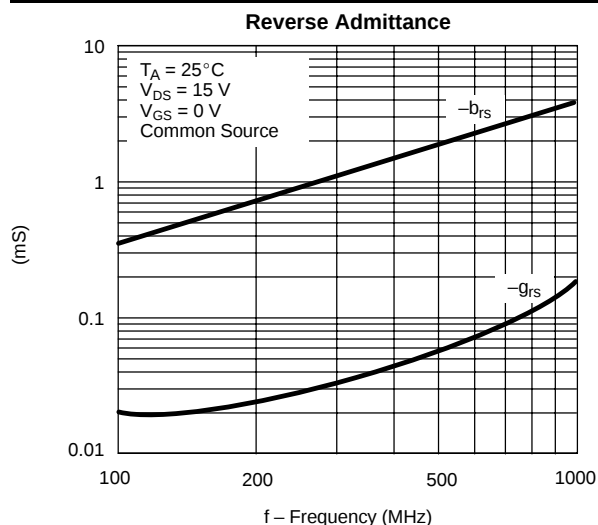
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 3\%$.
c. This parameter not registered with JEDEC.

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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****Output Characteristics****Output Characteristics**

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