



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, 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

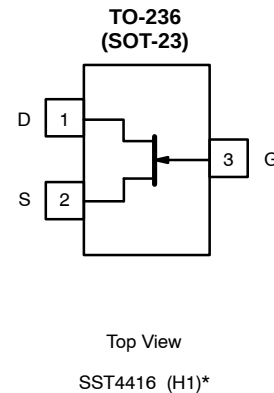
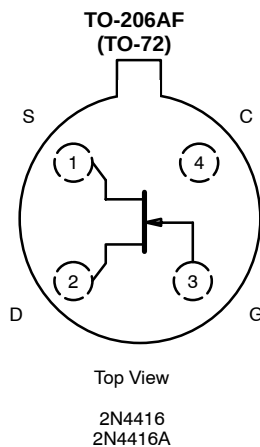
APPLICATIONS

- 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.



*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

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.

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 = 300 μA	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	e _n	V _{DS} = 10 V, V _{GS} = 0 V f = 1 kHz	6							nV/ √Hz

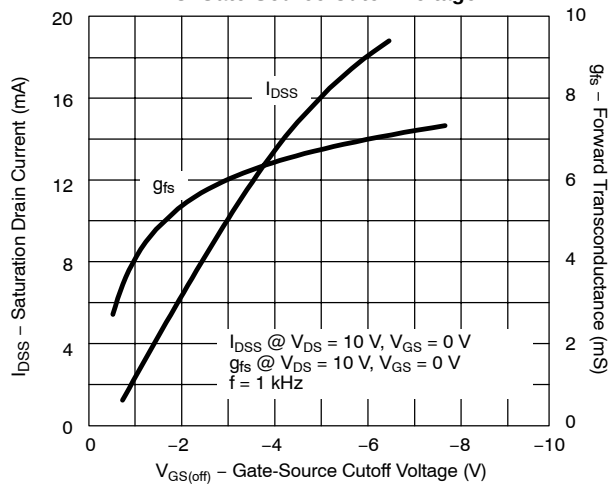
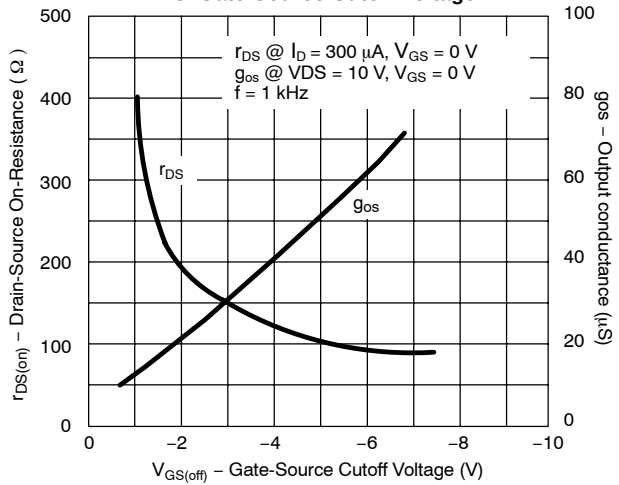
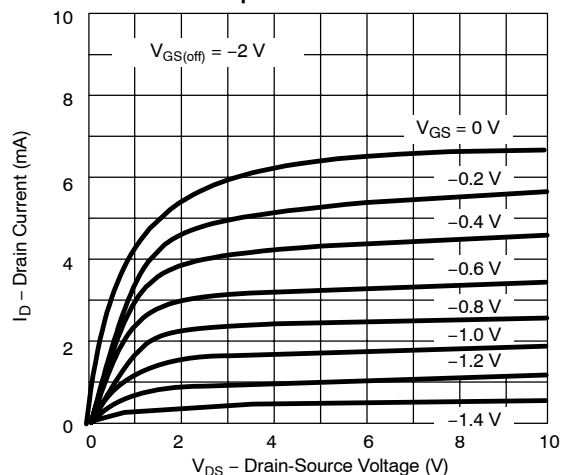
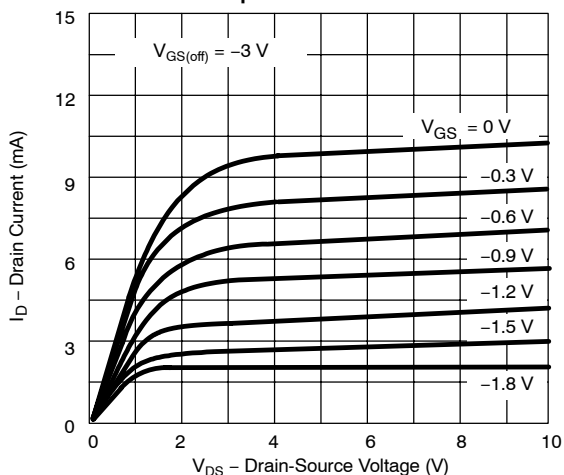
**HIGH-FREQUENCY SPECIFICATIONS FOR 2N4416/2N4416A ($T_A = 25^\circ\text{C}$ UNLESS NOTED)**

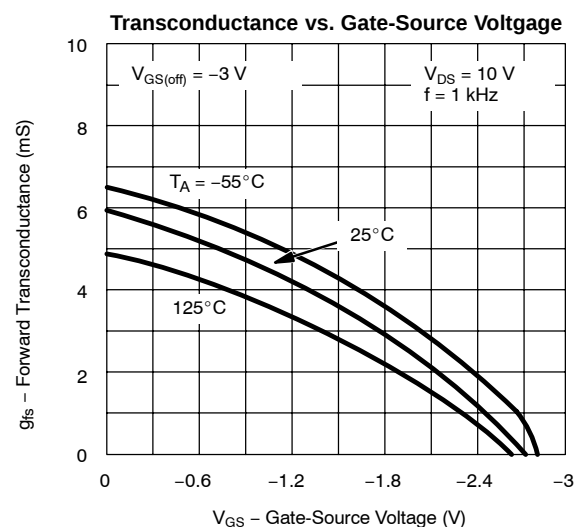
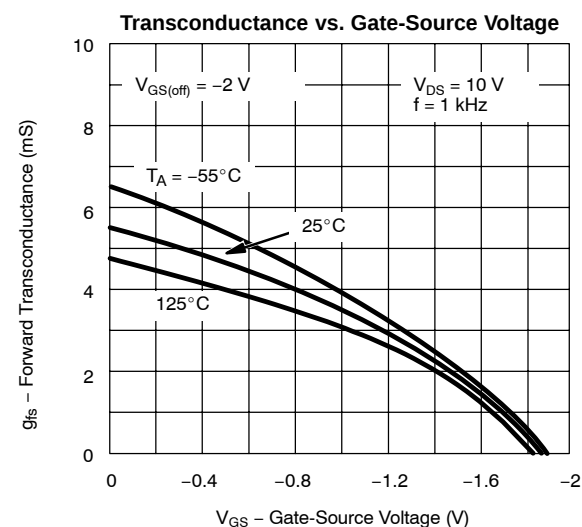
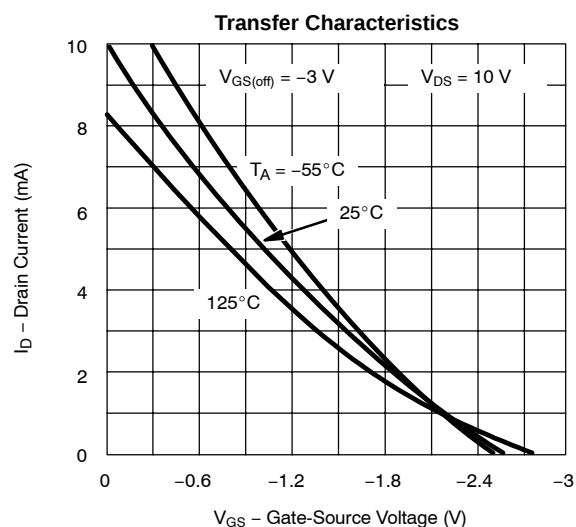
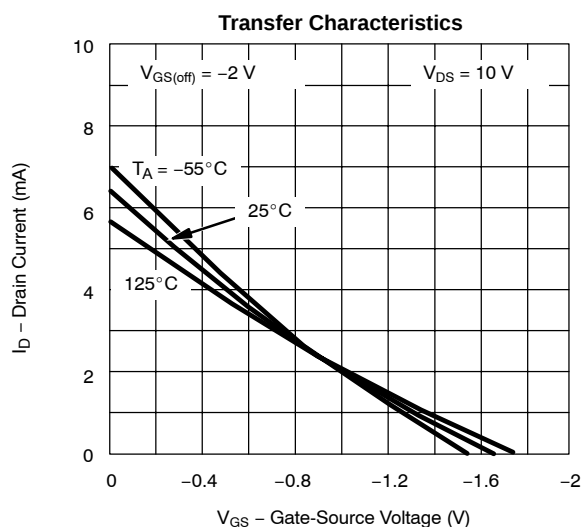
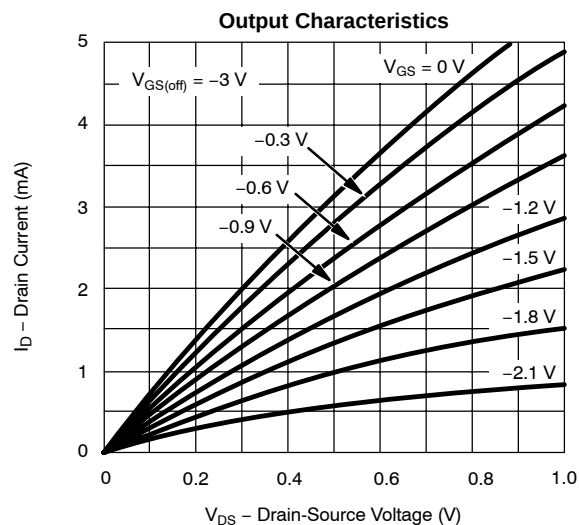
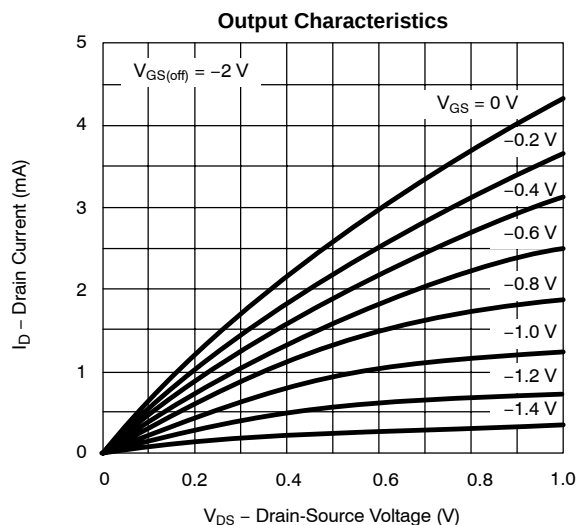
Parameter	Symbol	Test Conditions	Limits				Unit
			100 MHz		400 MHz		
			Min	Max	Min	Max	
Common Source Input Conductance ^d	g_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$		100		1,000	μS
Common Source Input Susceptance ^d	b_{iss}			2,500		10,000	
Common Source Output Conductance ^d	g_{oss}			75		100	
Common Source Output Susceptance ^d	b_{oss}			1,000		4,000	
Common Source Forward Transconductance ^d	g_{fs}				4,000		
Common-Source Power Gain ^d	G_{ps}	$V_{DS} = 15\text{ V}, I_D = 5\text{ mA}$	18		10		dB
Noise Figure ^d	NF	$R_G = 1\text{ k}\Omega$		2		4	

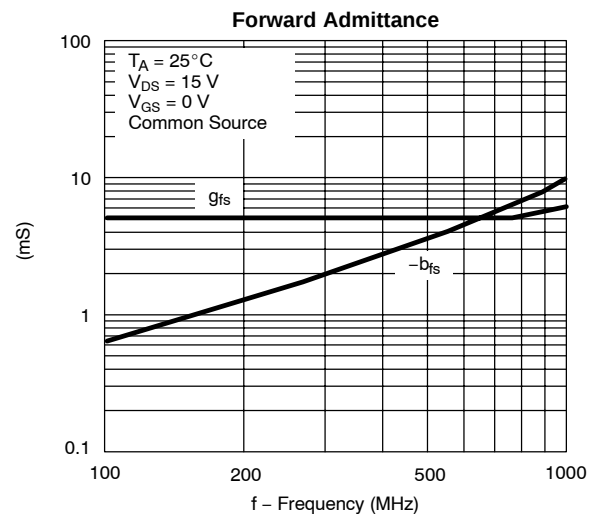
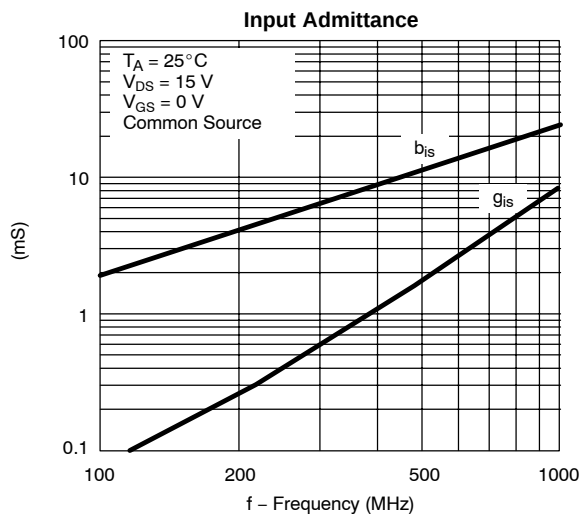
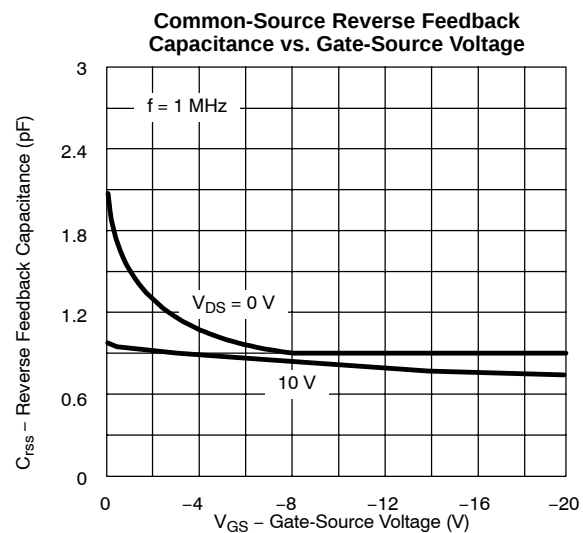
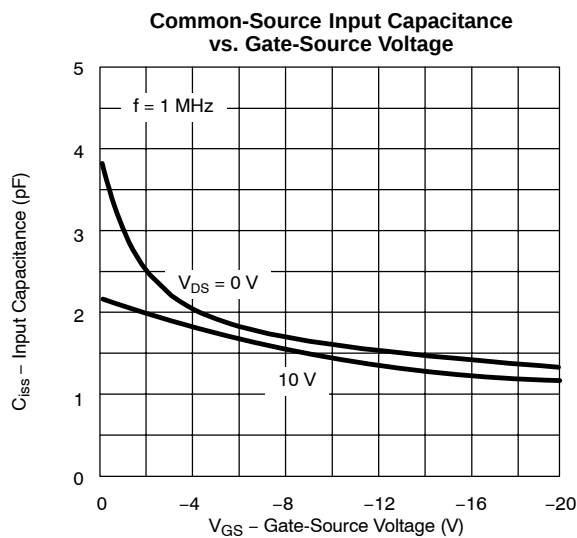
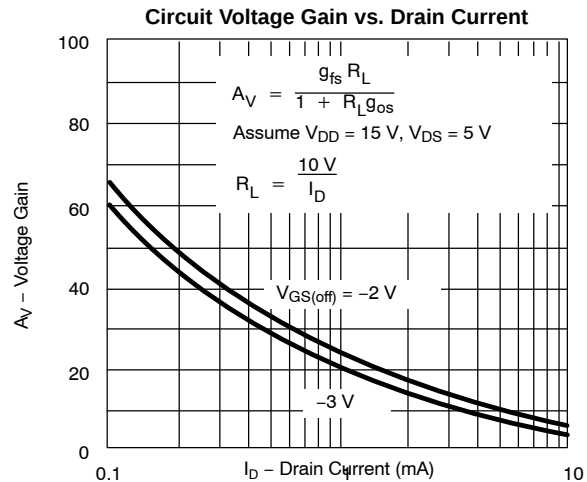
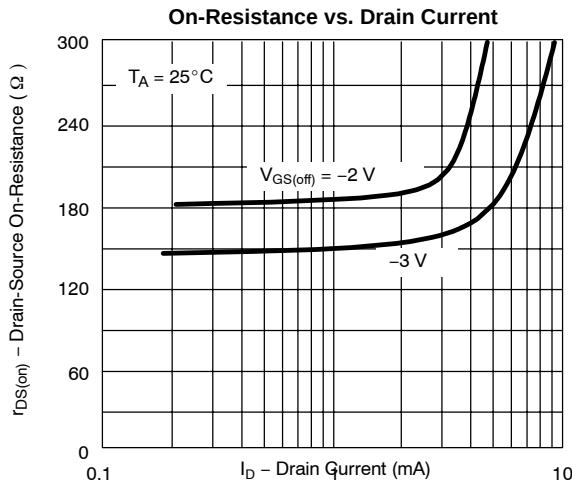
Notes

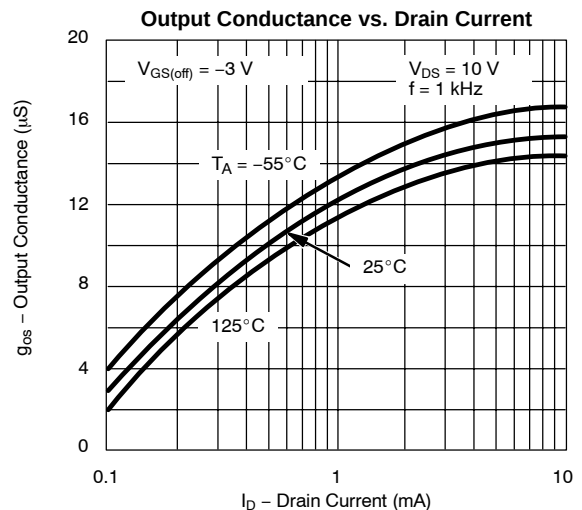
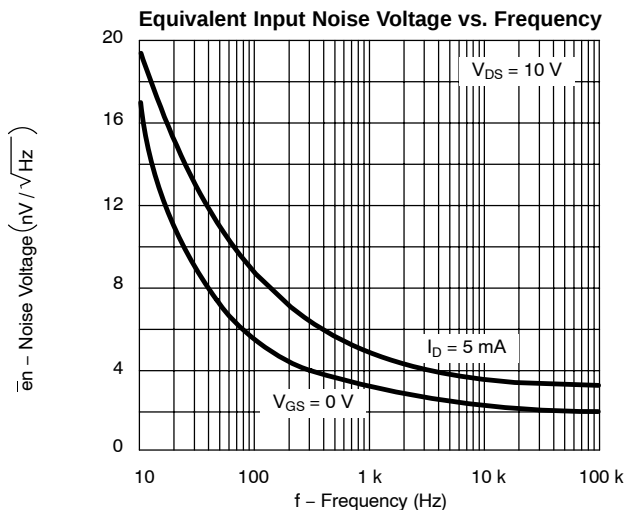
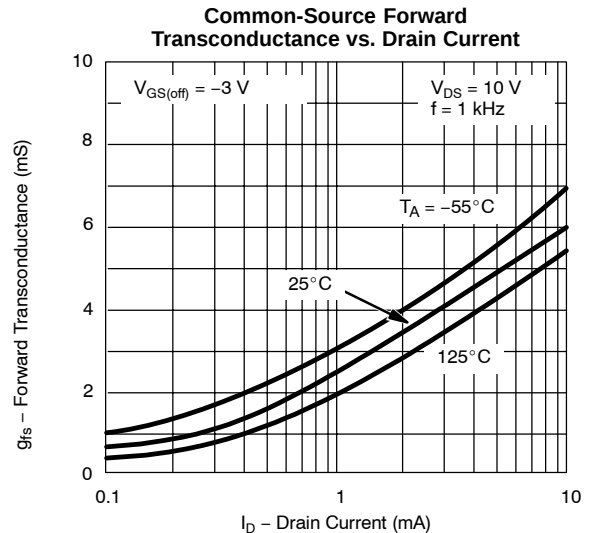
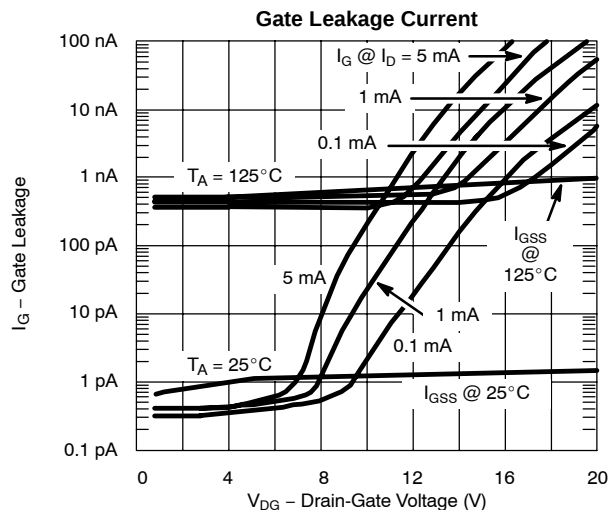
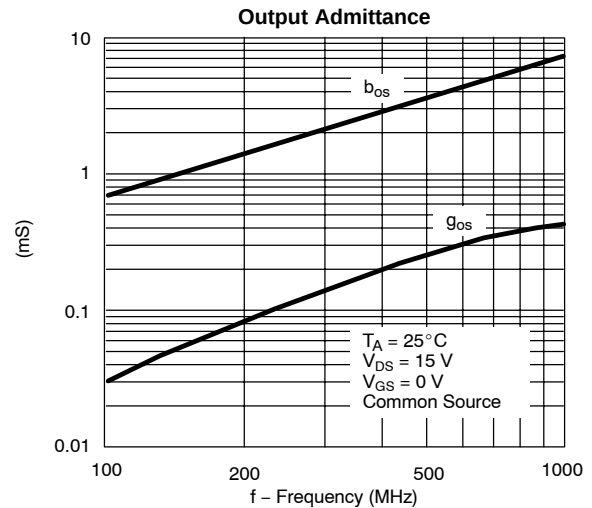
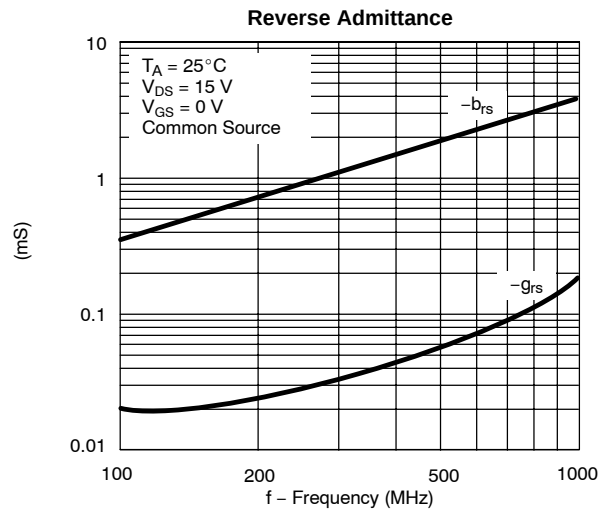
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 3\%$.
c. This parameter not registered with JEDEC.
d. Not a production test.

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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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