TEMIC

Siliconix

2N4416/2N4416A/SST4416

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	≤ 6	−30	4.5	5
2N4416A	−2.5 to −6	−35	4.5	5
SST4416	≤ 6	−30	4.5	5

2N4416, For applications information see AN104, page 21.

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

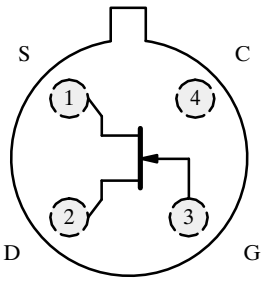
- High-Frequency Amplifier/Mixer
- Oscillator
- Sample-and-Hold
- Very Low Capacitance Switches

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.

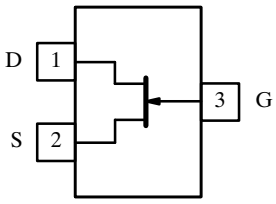
TO-206AF
(TO-72)



Top View

2N4416
2N4416A

TO-236
(SOT-23)



Top View

SST4416 (H1)*

*Marking Code for TO-236

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

2N4416/2N4416A/SST4416

Specifications[a]

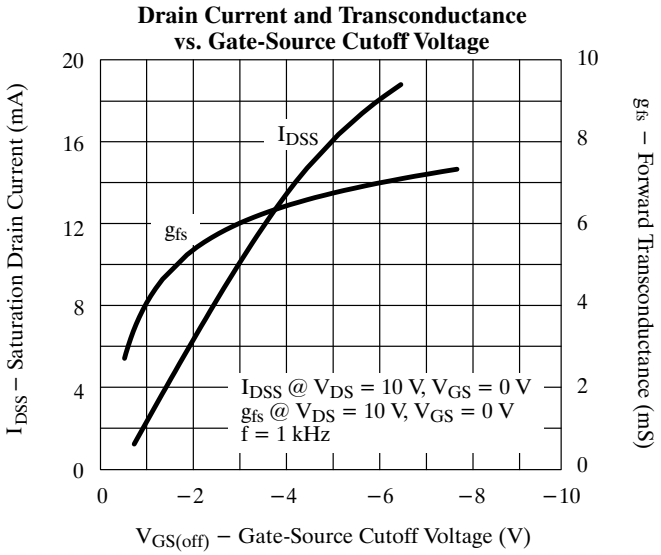
Parameter	Symbol	Test Conditions	Typ[b]	Limits 2N4416 Min	2N4416 Max	2N4416A Min	2N4416A Max	SST4416 Min	SST4416 Max	Unit
Static										
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -1\ \mu A$, $V_{DS} = 0$ V	−36	−30		−35		−30		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 15$ V, $I_D = 1$ nA	−3		−6	−2.5	−6		−6	V
Saturation Drain Current[c]	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			nA
		$V_{GS} = -15$ V, $V_{DS} = 0$ V (SST)	−0.002						−1	nA
		$T_A = 125°C$	−0.6							nA
Gate Operating Current	I_G	$V_{DG} = 10$ V, $I_D = 1$ mA	−20							pA
Drain Cutoff Current[d]	$I_{D(off)}$	$V_{DS} = 10$ V, $V_{GS} = -6$ V	2							pA
Drain-Source On-Resistance[d]	$r_{DS(on)}$	$V_{GS} = 0$ V, $I_D = 1$ mA	150							Ω
Gate-Source Forward Voltage[d]	$V_{GS(F)}$	$I_G = 1$ mA, $V_{DS} = 0$ V	0.7							V
Dynamic										
Common-Source Forward Transconductance[c]	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[c]	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			pF
Common-Source Output Capacitance	C_{oss}		1		2		2			pF
Equivalent Input Noise Voltage[c]	$\overline{e}_n$	$V_{DS} = 10$ V, $V_{GS} = 0$ V, f = 1 kHz	6							$\frac{nV}{\sqrt{Hz}}$

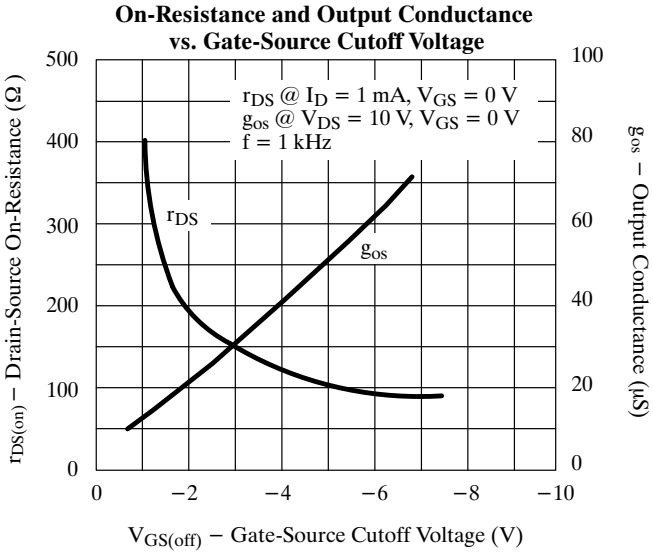
High-Frequency Specifications[a, d] for 2N4416 and 2N4416A

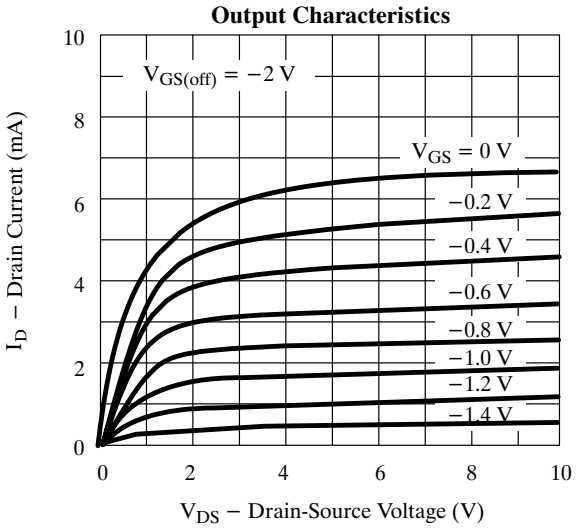
Parameter	Symbol	Test Conditions	Limits 100 MHz Min	100 MHz Max	400 MHz Min	400 MHz Max	Unit
Common Source Input Conductance	g_{iss}	$V_{DS} = 15$ V, $V_{GS} = 0$ V		100		1,000	µS
Common Source Input Susceptance	b_{iss}			2,500		10,000	µS
Common Source Output Conductance	g_{oss}			75		100	µS
Common Source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

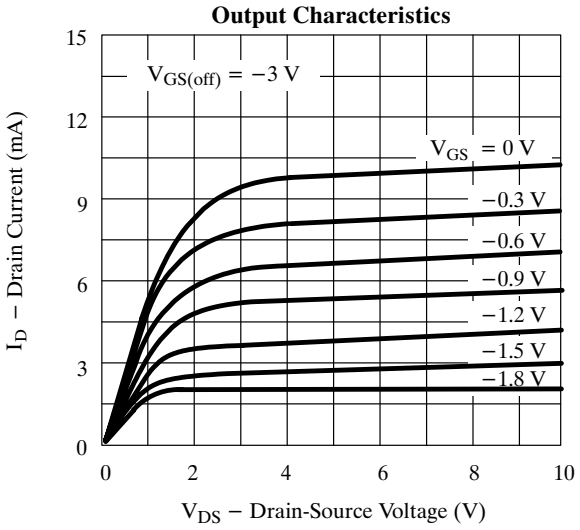
Notes
a. $T_A = 25°C$ unless otherwise noted. NH
b. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
c. Pulse test: PW ≤ 300 µs duty cycle ≤ 3%.
d. This parameter not registered with JEDEC.

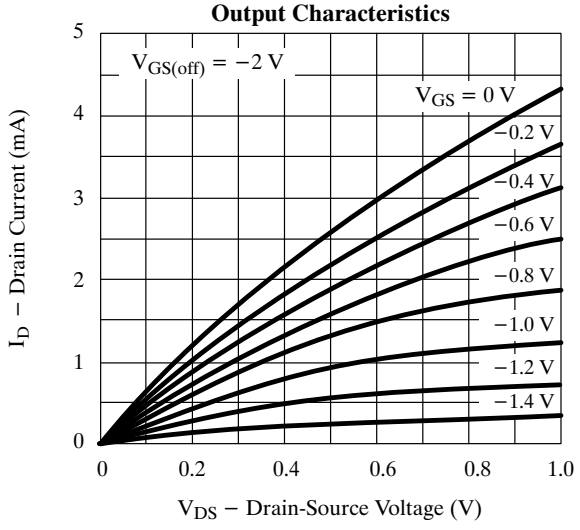
Typical Characteristics

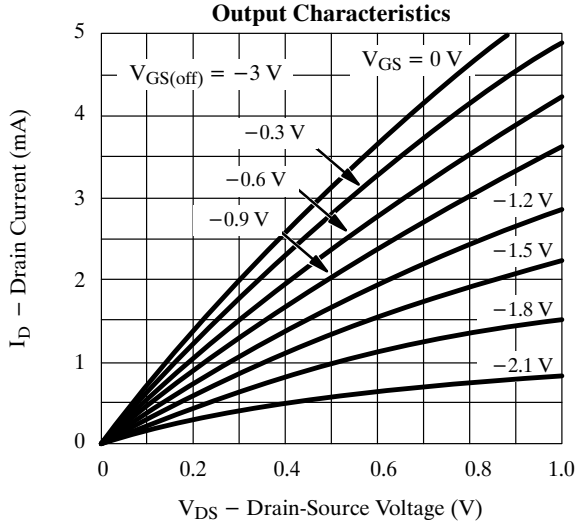












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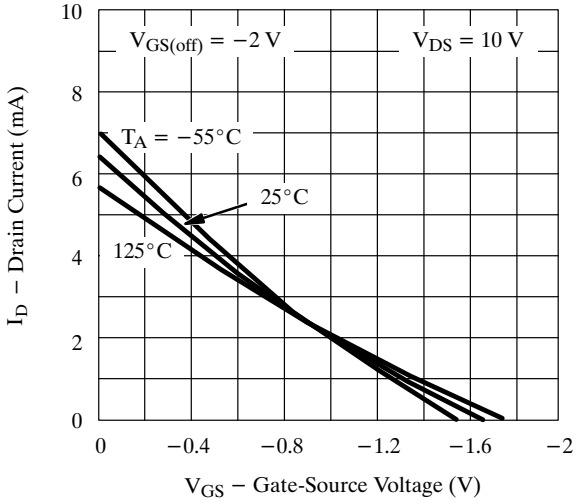
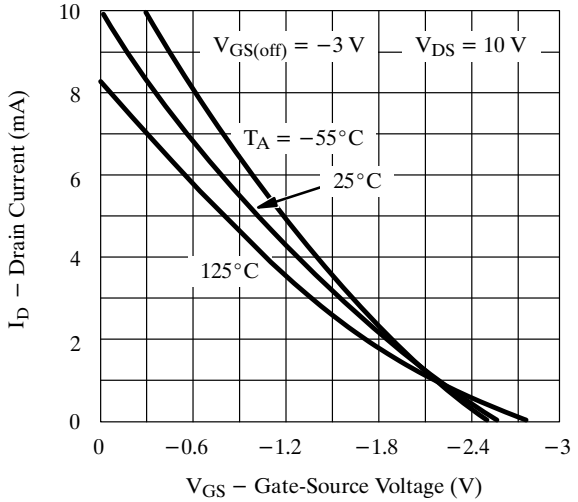
Typical Characteristics (Cont'd)

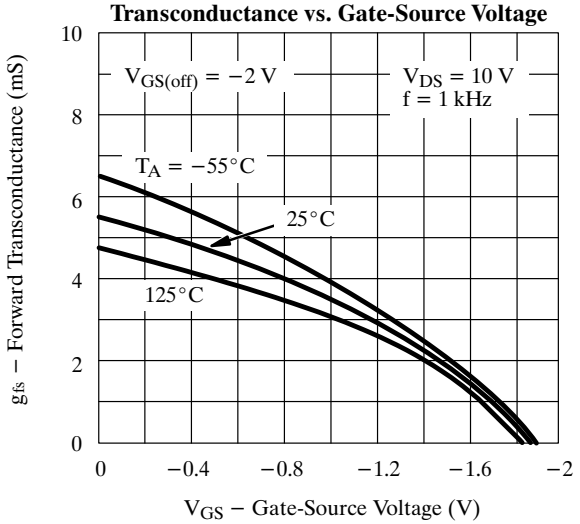
Transfer Characteristics



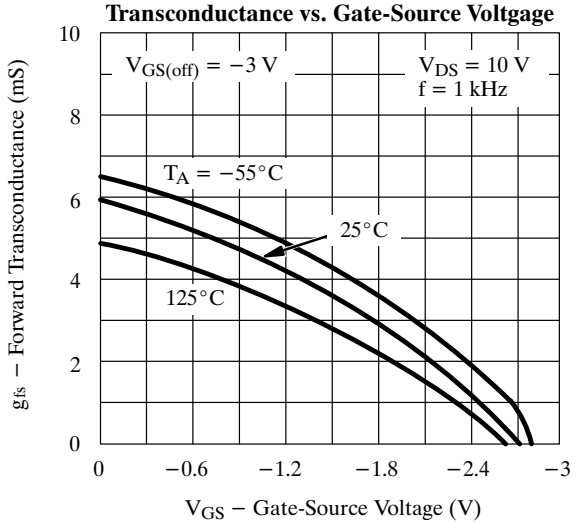
Transfer Characteristics



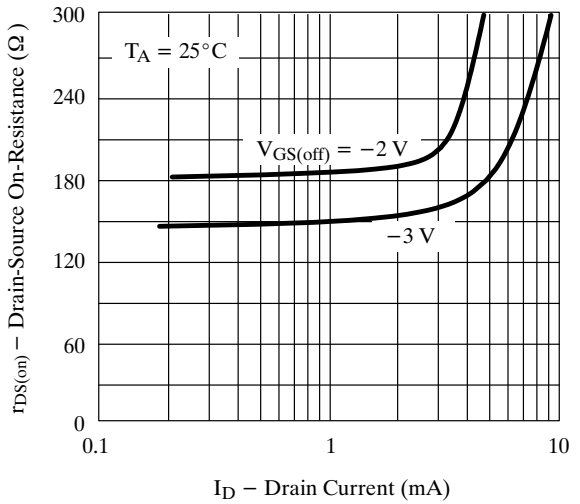
Transconductance vs. Gate-Source Voltage



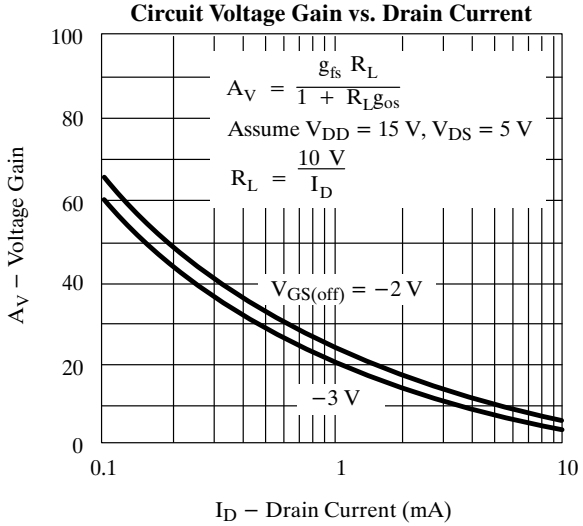
Transconductance vs. Gate-Source Voltgage



On-Resistance vs. Drain Current

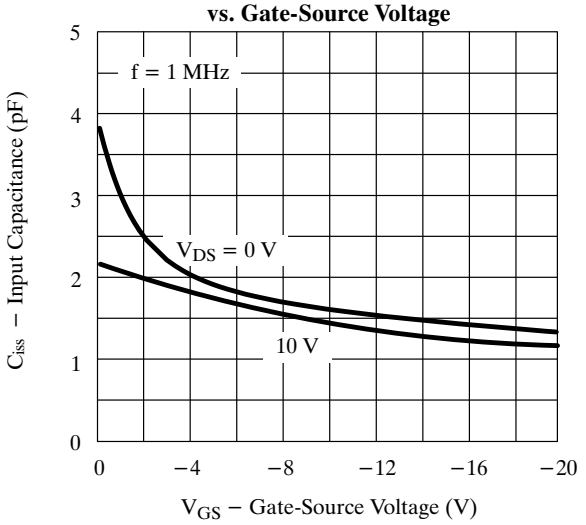


Circuit Voltage Gain vs. Drain Current

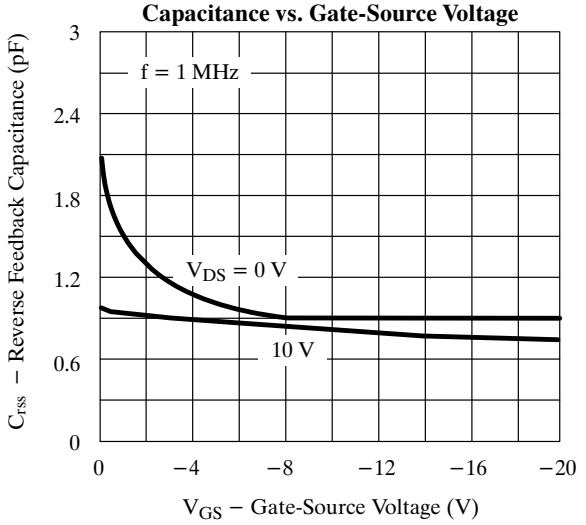


Typical Characteristics (Cont'd)

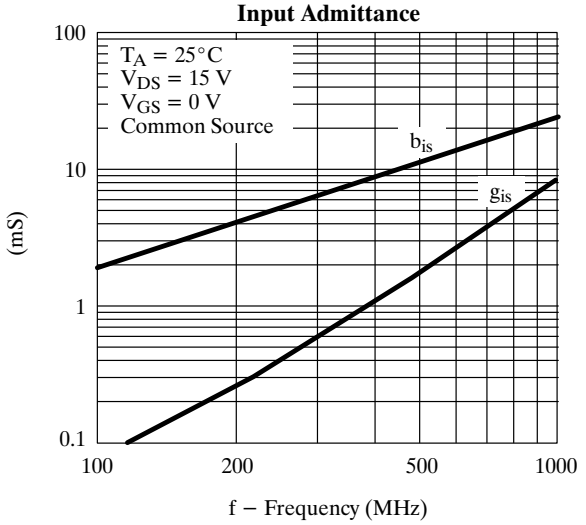
Common-Source Input Capacitance vs. Gate-Source Voltage



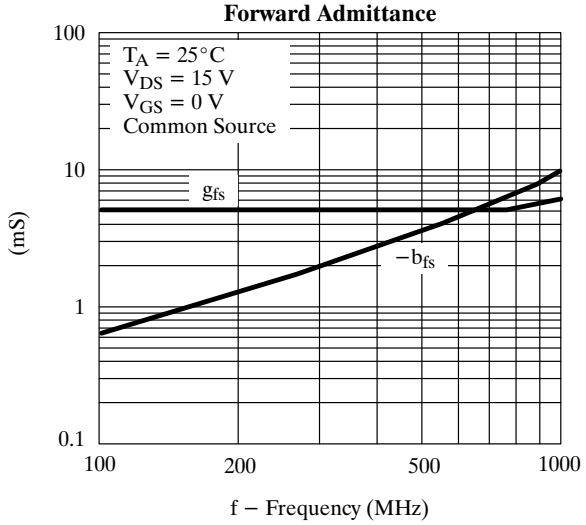
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



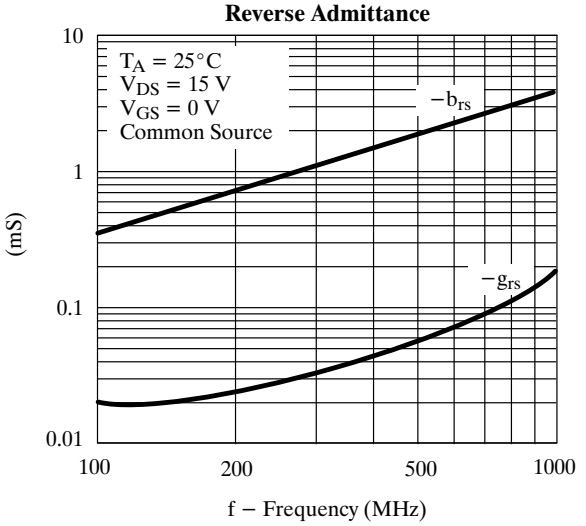
Input Admittance



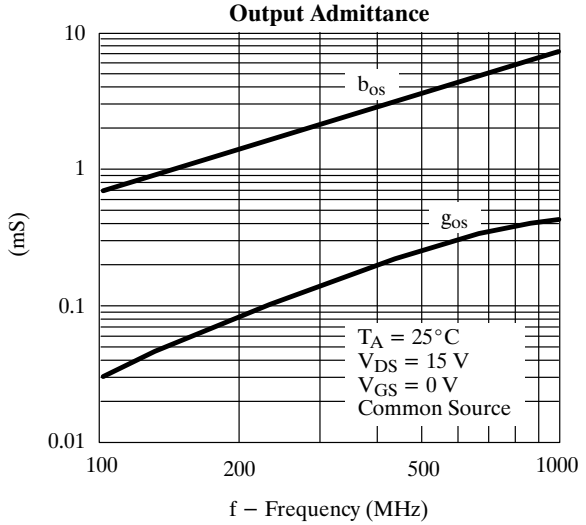
Forward Admittance



Reverse Admittance



Output Admittance



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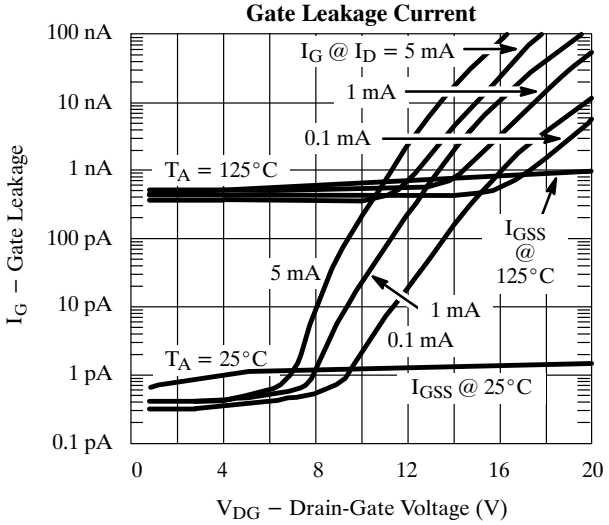
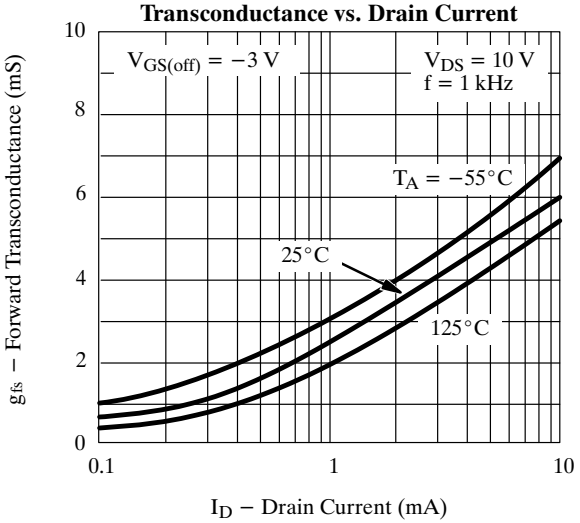
Typical Characteristics (Cont'd)

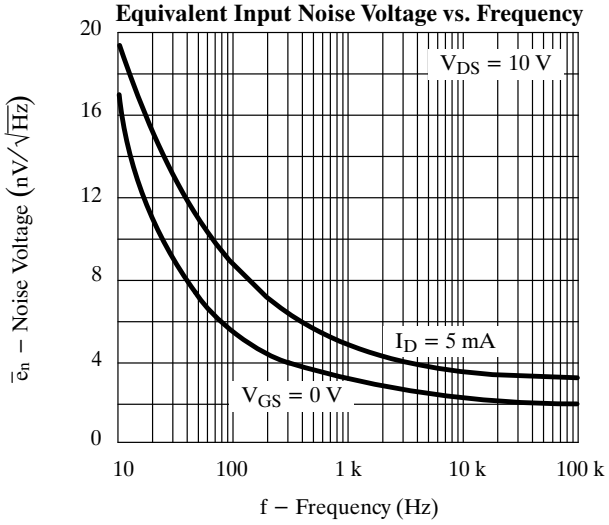
Gate Leakage Current



Common-Source Forward Transconductance vs. Drain Current



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current