N-Channel JFETs

PRODUCT SUMMARY				
Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	g_{fs} Min (mS)	I_{DSS} Max (mA)
2N4338	–0.3 to –1	–50	0.6	0.6
2N4339	–0.6 to –1.8	–50	0.8	1.5
2N4340	–1 to –3	–50	1.3	3.6
2N4341	–2 to –6	–50	2	9

FEATURES

- Low Cutoff Voltage: 2N4338 <1 V
- High Input Impedance
- Very Low Noise
- High Gain: A_V = 80 @ 20 μA

BENEFITS

- Full Performance from Low-Voltage Power Supply: Down to 1 V
- Low Signal Loss/System Error
- High System Sensitivity
- High-Quality Low-Level Signal Amplification

APPLICATIONS

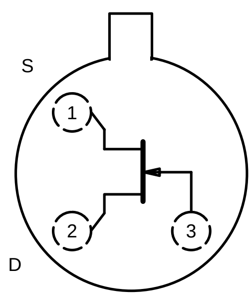
- High-Gain, Low-Noise Amplifiers
- Low-Current, Low-Voltage Battery-Powered Amplifiers
- Infrared Detector Amplifiers
- Ultrahigh Input Impedance Pre-Amplifiers

DESCRIPTION

The 2N4338/4339/4340/4341 n-channel JFETs are designed for sensitive amplifier stages at low- to mid-frequencies. Low cut-off voltages accommodate low-level power supplies and low leakage for improved system accuracy.

The TO-206AA (TO-18) package is hermetically sealed and suitable for military processing (see Military Information). For similar products in TO-226AA (TO-92) and TO-236 (SOT-23) packages, see the J/SST201 series data sheet.

TO-206AA
(TO-18)



Top View

ABSOLUTE MAXIMUM RATINGS

Gate-Source/Gate-Drain Voltage . . . . –50 V
Forward Gate Current . . . . 50 mA
Storage Temperature . . . . –65 to 200°C
Operating Junction Temperature . . . . –55 to 175°C
Lead Temperature ($^{1}/_{16}$" from case for 10 sec.) . . . . 300°C
Power Dissipation[a] . . . . 300 mW

Notes
a. Derate 2 mW/°C above 25°C

For applications information see AN102 and AN106.

SPECIFICATIONS FOR 2N4338 AND 2N4339 (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Typ[a]	Limits 2N4338 Min	Limits 2N4338 Max	Limits 2N4339 Min	Limits 2N4339 Max	Unit
Static								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = –1 µA , V_{DS} = 0 V	–57	–50		–50		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 15 V, I_D = 0.1 µA		–0.3	–1	–0.6	–1.8	V
Saturation Drain Current[b]	I_{DSS}	V_{DS} = 15 V, V_{GS} = 0 V		0.2	0.6	0.5	1.5	mA
Gate Reverse Current	I_{GSS}	V_{GS} = –30 V, V_{DS} = 0 V	–2		–100		–100	pA
		T_A = 150°C	–4		–100		–100	nA
Gate Operating Current[b]	I_G	V_{DG} = 15 V, I_D = 0.1 mA	–2					pA
Drain Cutoff Current	$I_{D(off)}$	V_{DS} = 15 V, V_{GS} = –5 V	2		50		50	pA
Gate-Source Forward Voltage[c]	$V_{GS(F)}$	I_G = 1 mA , V_{DS} = 0 V	0.7					V
Dynamic								
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz		0.6	1.8	0.8	2.4	mS
Common-Source Output Conductance	g_{os}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz			5		15	µS
Drain-Source On-Resistance	$r_{ds(on)}$	V_{DS} = 0 V, V_{GS} = 0 V, f = 1 kHz			2500		1700	Ω
Common-Source Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	5		7		7	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	1.5		3		3	pF
Equivalent Input Noise Voltage[c]	$\bar{e}_n$	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz	6					$nV/\sqrt{Hz}$
Noise Figure	NF	V_{DS} = 15 V, V_{GS} = 0 V f = 1 kHz, R_G = 1 MΩ			1		1	dB

SPECIFICATIONS FOR 2N4340 AND 2N4341 (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Typ[a]	Limits 2N4340 Min	Limits 2N4340 Max	Limits 2N4341 Min	Limits 2N4341 Max	Unit
Static								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = –1 µA , V_{DS} = 0 V	–57	–50		–50		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 15 V, I_D = 0.1 µA		–1	–3	–2	–6	V
Saturation Drain Current[b]	I_{DSS}	V_{DS} = 15 V, V_{GS} = 0 V		1.2	3.6	3	9	mA
Gate Reverse Current	I_{GSS}	V_{GS} = –30 V, V_{DS} = 0 V	–2		–100		–100	pA
		T_A = 150°C	–4		–100		–100	nA
Gate Operating Current[b]	I_G	V_{DG} = 15 V, I_D = 0.1 mA	–2					pA
Drain Cutoff Current	$I_{D(off)}$	V_{DS} = 15 V, V_{GS} = –5 V	2		50			pA
		V_{DS} = 15 V, V_{GS} = –10 V	3				70	pA
Gate-Source Forward Voltage	$V_{GS(F)}$	I_G = 1 mA , V_{DS} = 0 V	0.7					V

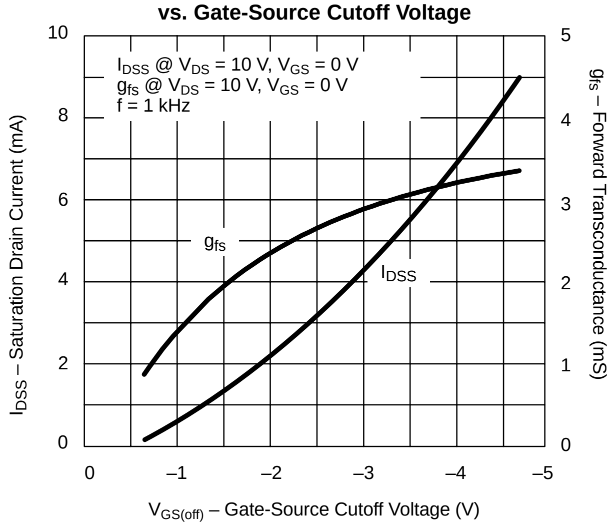
SPECIFICATIONS FOR 2N4340 AND 2N4341 (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Typ[a]	Limits 2N4340 Min	Limits 2N4340 Max	Limits 2N4341 Min	Limits 2N4341 Max	Unit
Dynamic								
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz		1.3	3	2	4	mS
Common-Source Output Conductance	g_{os}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz			30		60	µS
Drain-Source On-Resistance	$r_{ds(on)}$	V_{DS} = 0 V, V_{GS} = 0 V, f = 1 kHz			1500		800	Ω
Common-Source Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	5		7		7	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	1.5		3		3	pF
Equivalent Input Noise Voltage[c]	$\bar{e}_n$	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz	6					nV⁄√Hz
Noise Figure	NF	V_{DS} = 15 V, V_{GS} = 0 V f = 1 kHz, R_G = 1 MΩ			1		1	dB

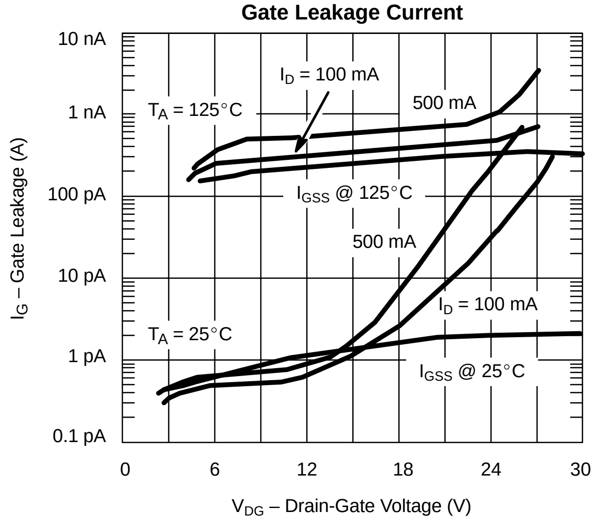
Notes
a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing. NPA
b. Pulse test: PW ≤ 300 µs, duty cycle ≤ 3%.
c. This parameter not registered with JEDEC.

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

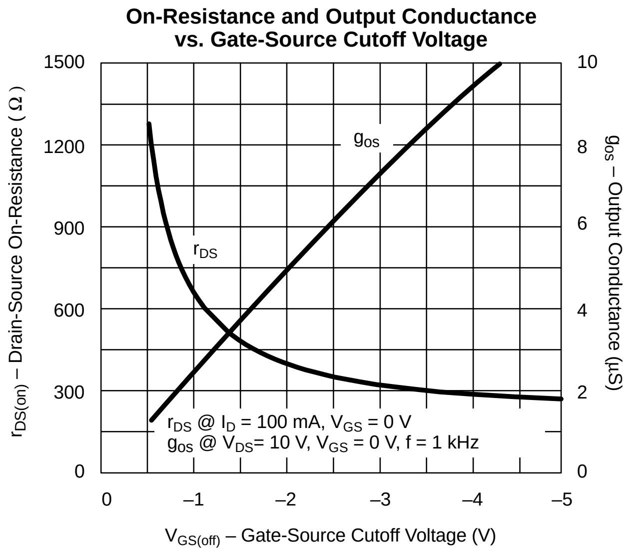
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage

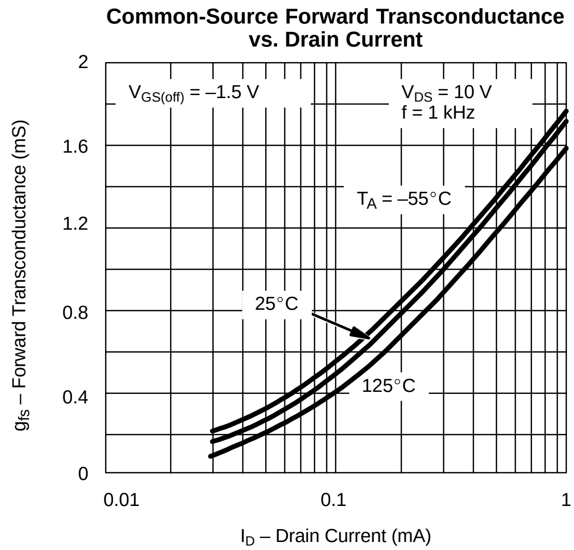


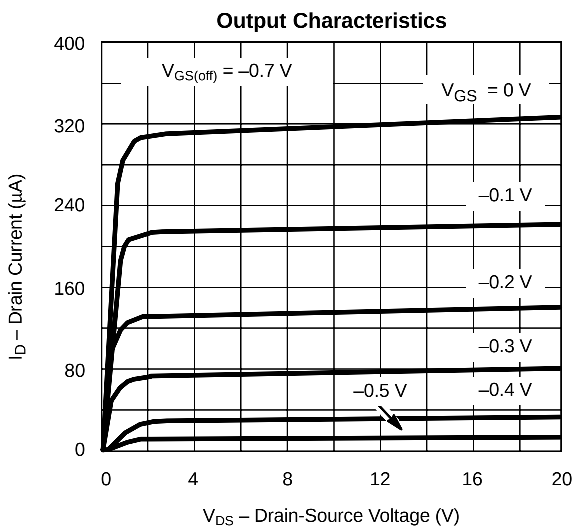
Gate Leakage Current

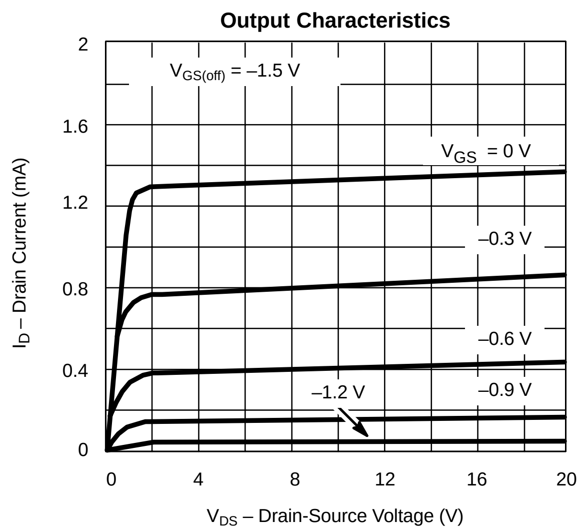


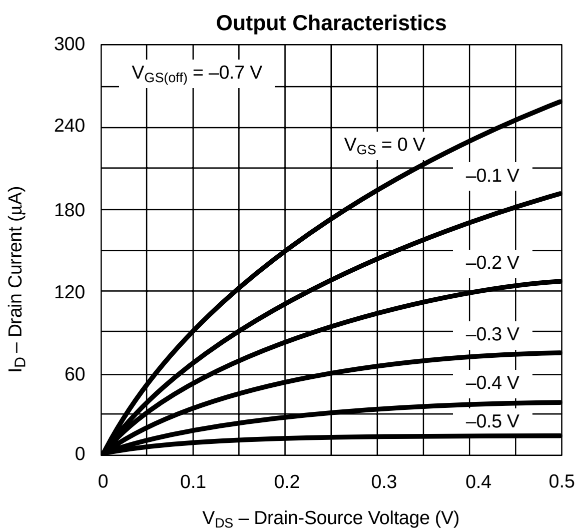
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

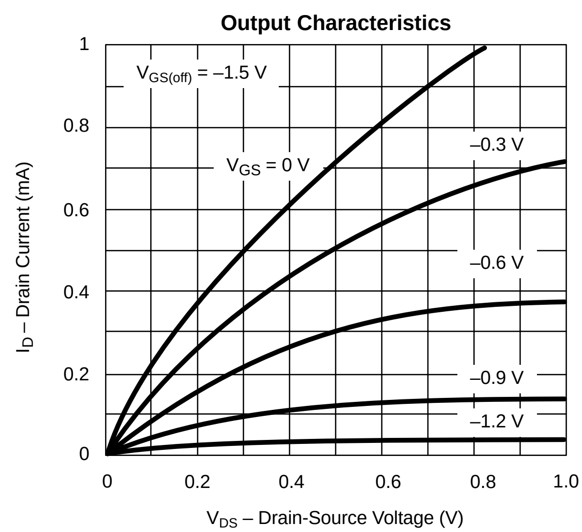






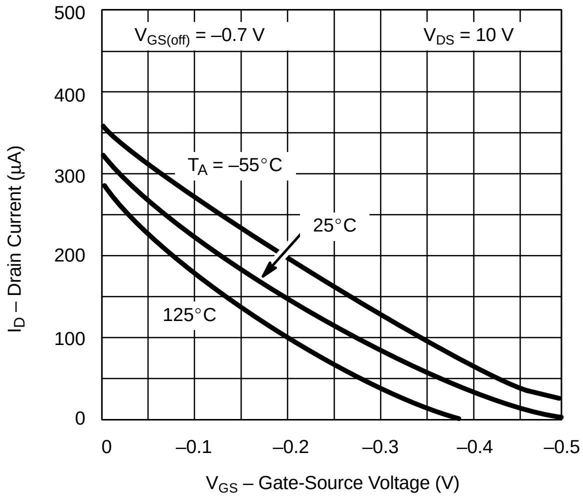




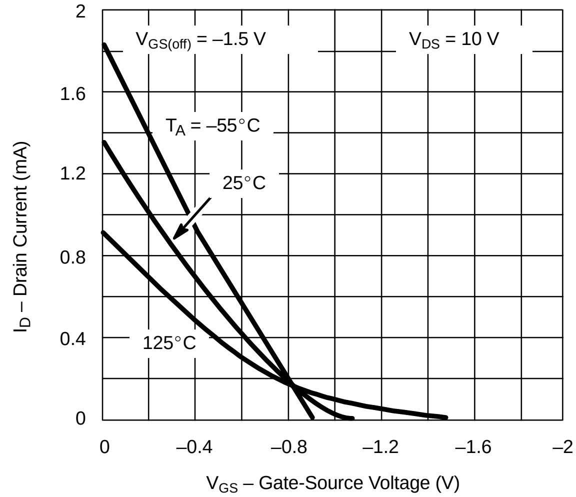


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

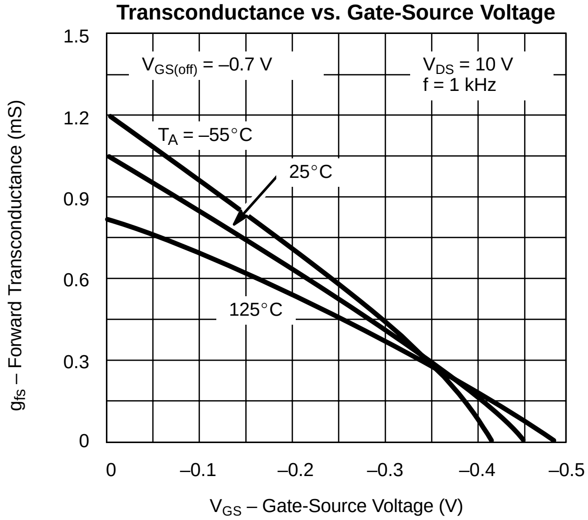
Transfer Characteristics



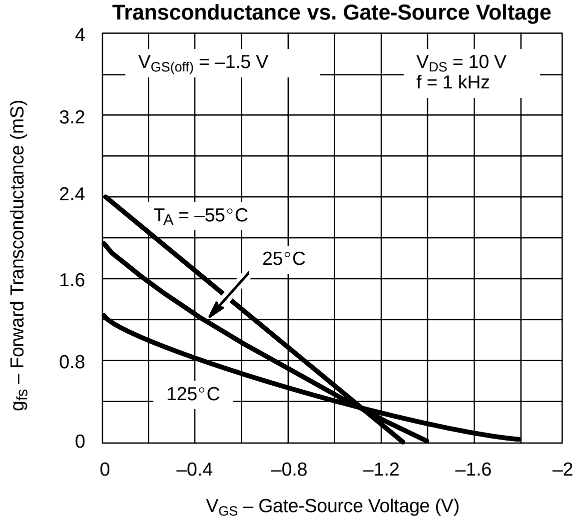
Transfer Characteristics



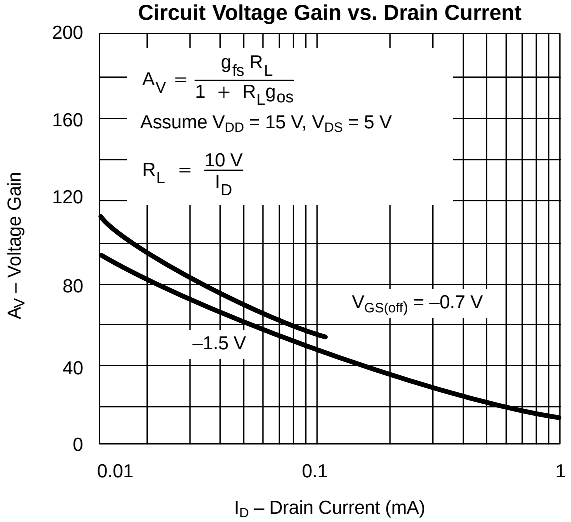
Transconductance vs. Gate-Source Voltage



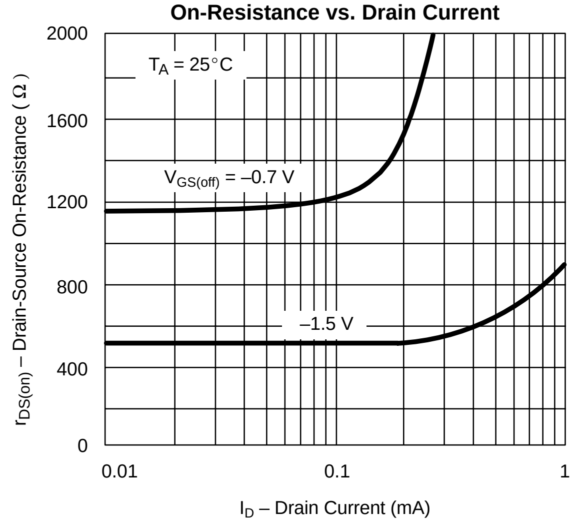
Transconductance vs. Gate-Source Voltage



Circuit Voltage Gain vs. Drain Current

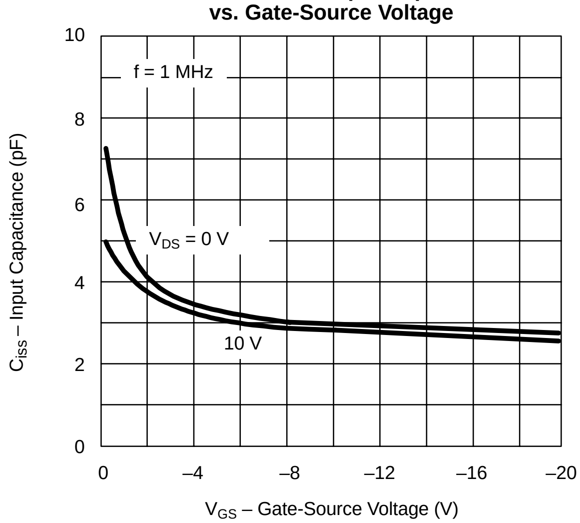


On-Resistance vs. Drain Current

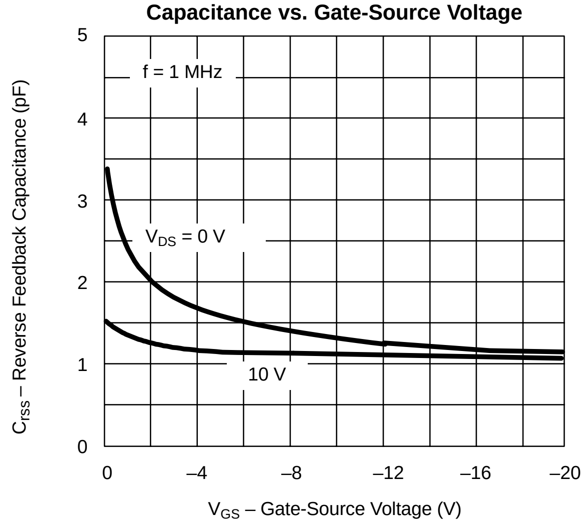


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

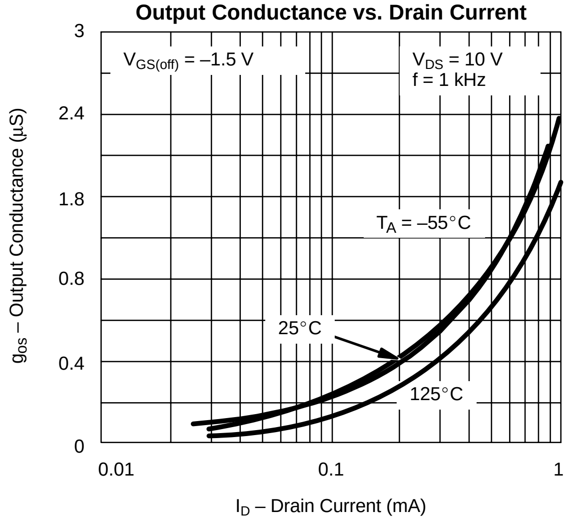
Common-Source Input Capacitance vs. Gate-Source Voltage



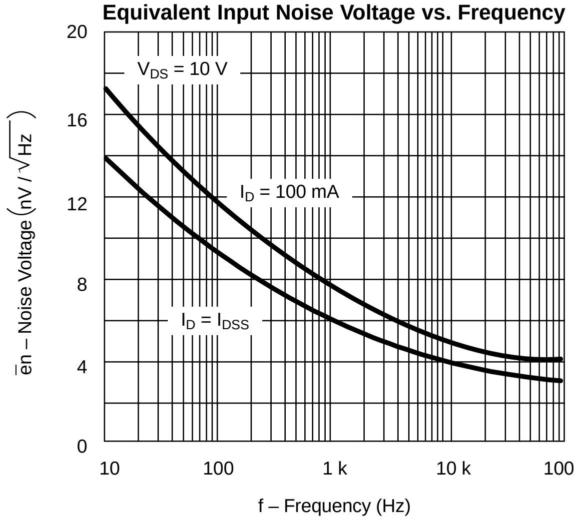
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Output Conductance vs. Drain Current



Equivalent Input Noise Voltage vs. Frequency



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