



THE DATASHEET OF
2N4338-E3





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

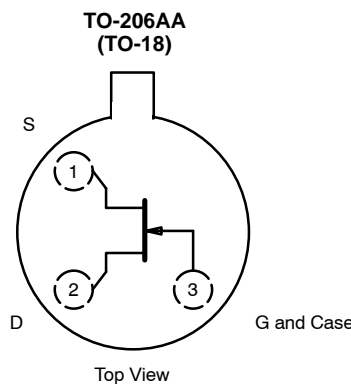
APPLICATIONS

- 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.



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				Unit
				2N4338		2N4339		
				Min	Max	Min	Max	
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	
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 T _A = 150 °C	-2		-100		-100	pA
			-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	
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}					5		15
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}		1.5		3		3	
Equivalent Input Noise Voltage ^c	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

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

Parameter	Symbol	Test Conditions	Typ ^a	Limits				Unit
				2N4340		2N4341		
				Min	Max	Min	Max	
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	
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 T _A = 150 °C	-2		-100		-100	pA
			-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		
			V _{GS} = -10 V	3			70	
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)

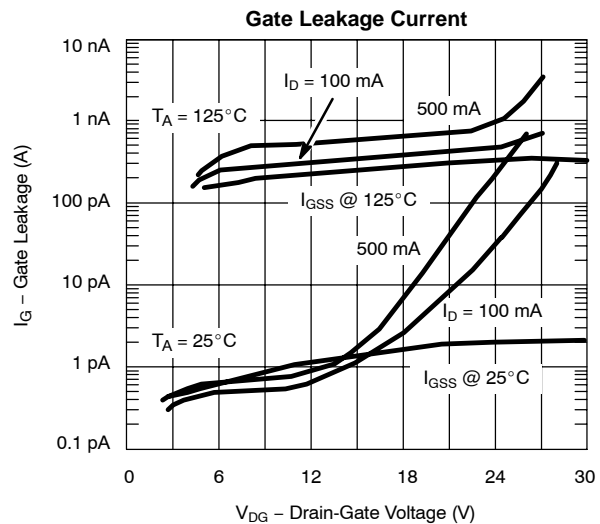
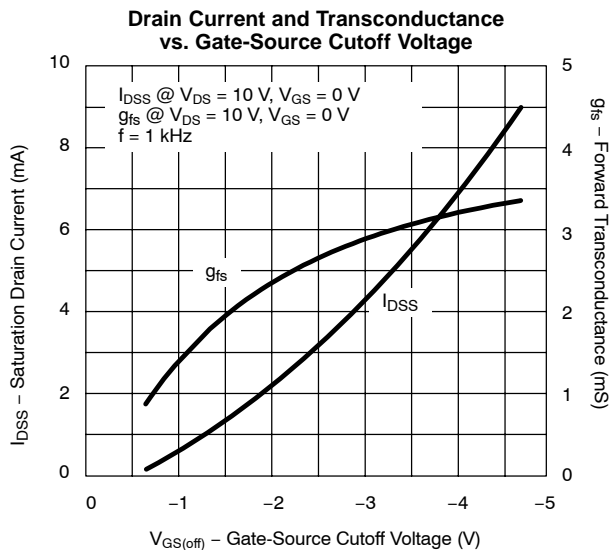
Parameter	Symbol	Test Conditions	Typ ^a	Limits				Unit
				2N4340		2N4341		
				Min	Max	Min	Max	
Dynamic								
Common-Source Forward Transconductance	g_{fs}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ kHz}$		1.3	3	2	4	mS
Common-Source Output Conductance	g_{os}				30		60	μS
Drain-Source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

Notes

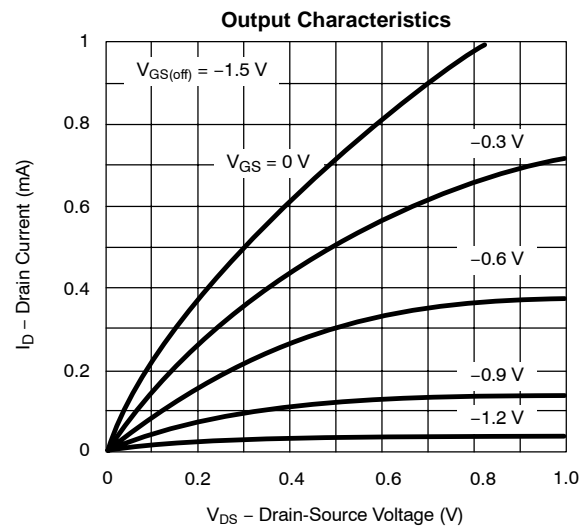
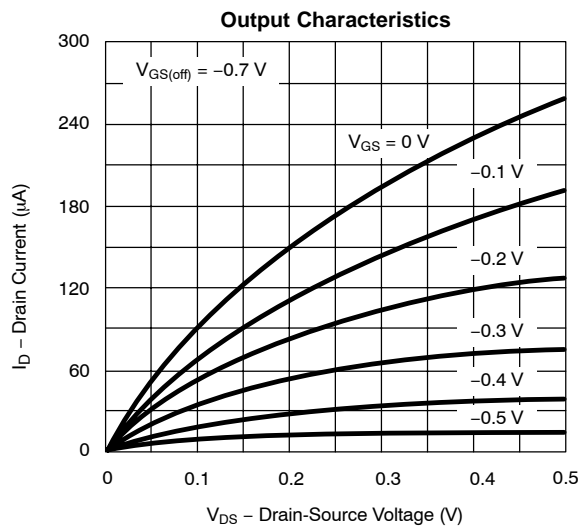
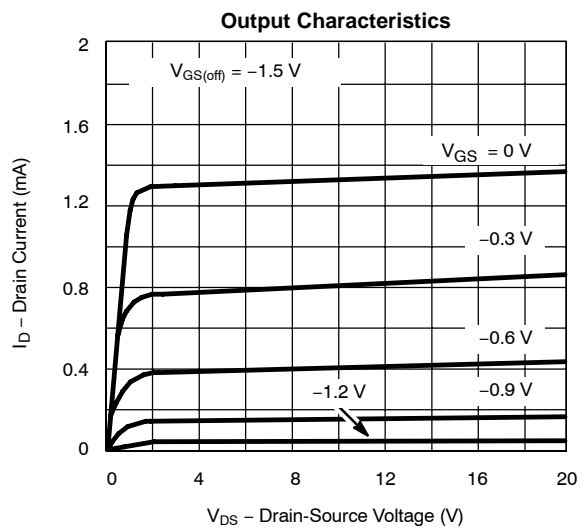
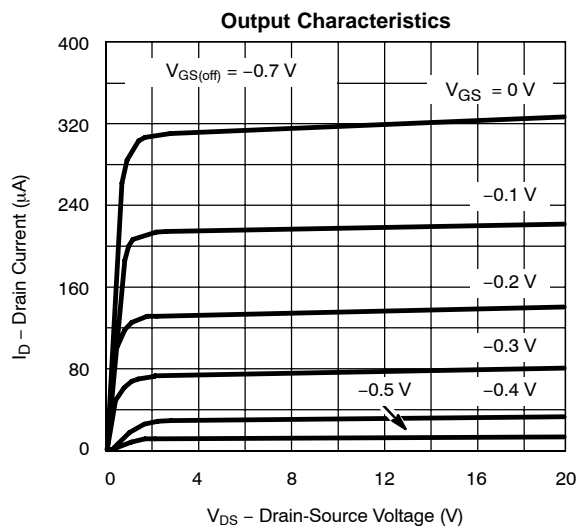
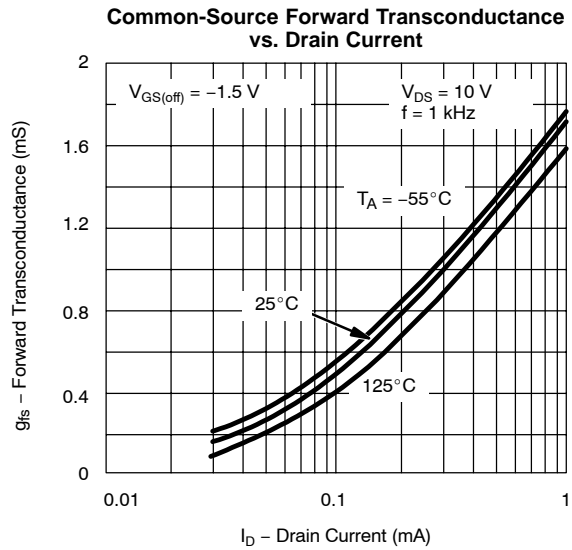
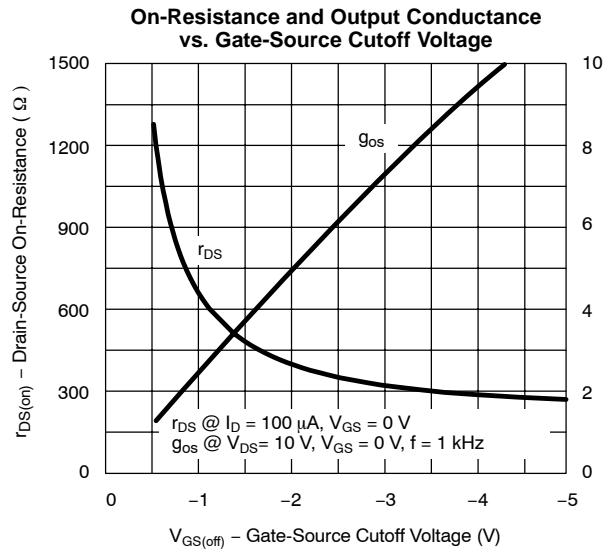
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: $PW \leq 300\ \mu\text{s}$, duty cycle $\leq 3\%$.
- c. This parameter not registered with JEDEC.

NPA

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



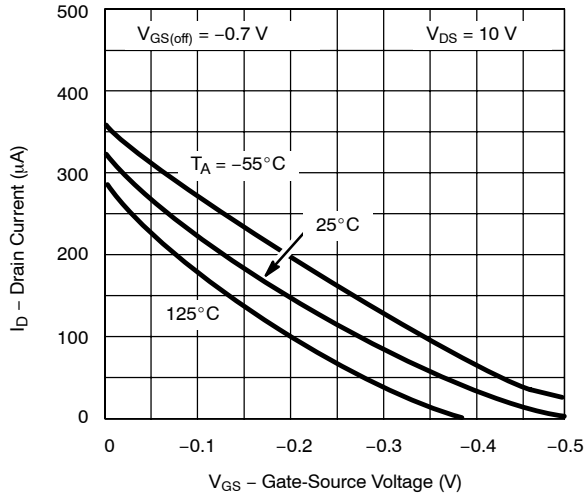
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



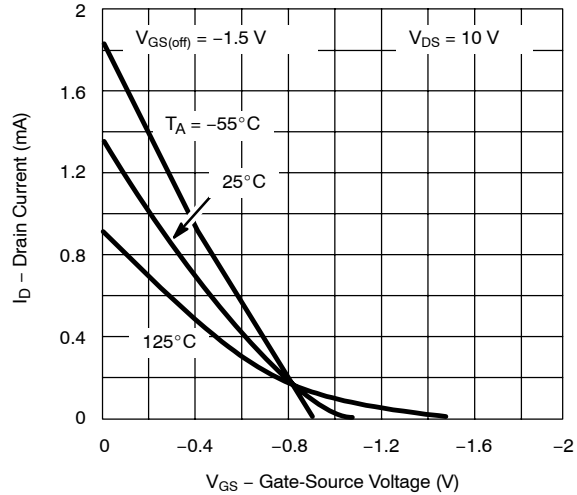


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

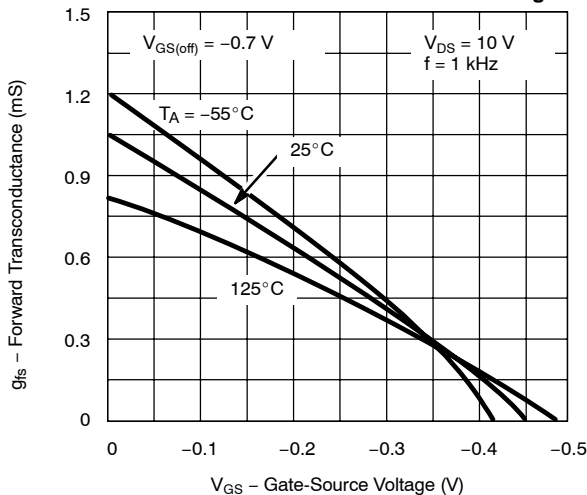
Transfer Characteristics



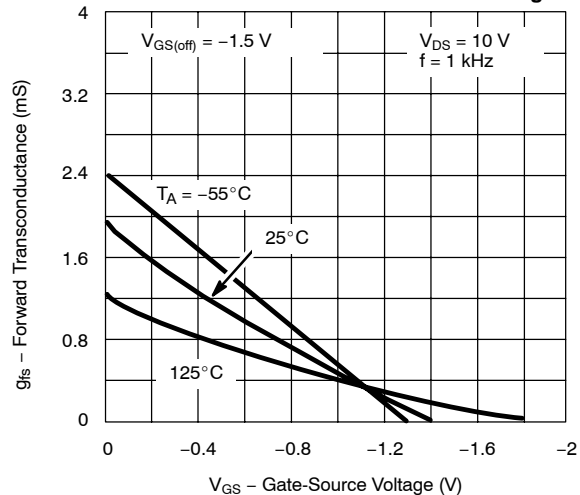
Transfer Characteristics



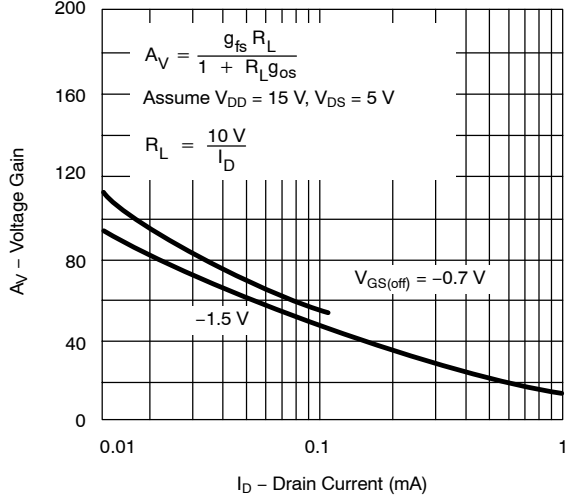
Transconductance vs. Gate-Source Voltage



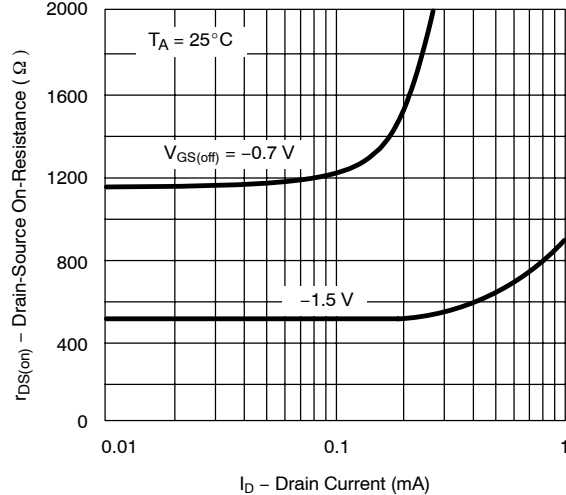
Transconductance vs. Gate-Source Voltage



Circuit Voltage Gain vs. Drain Current

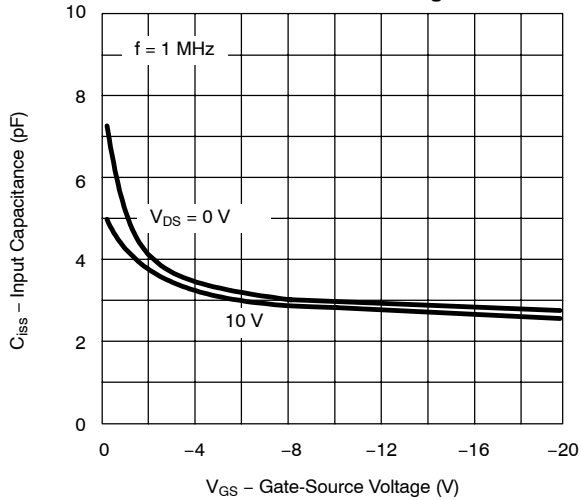


On-Resistance vs. Drain Current

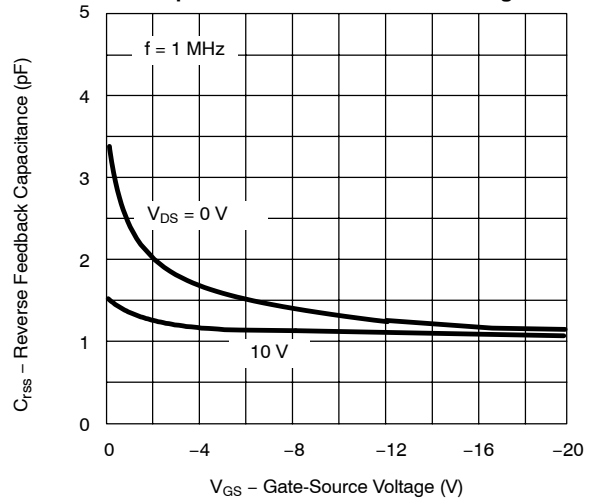


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

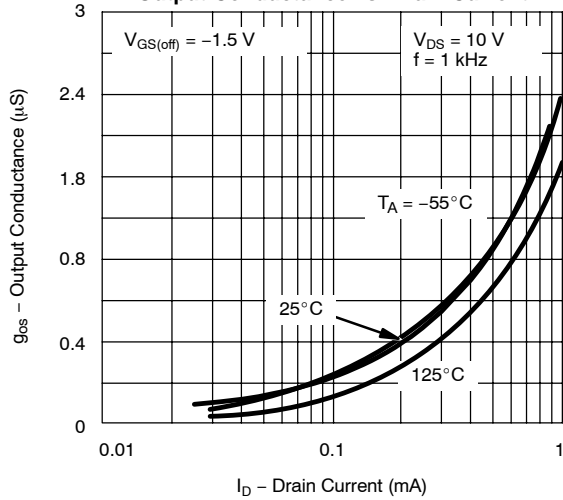
Common-Source Input Capacitance vs. Gate-Source Voltage



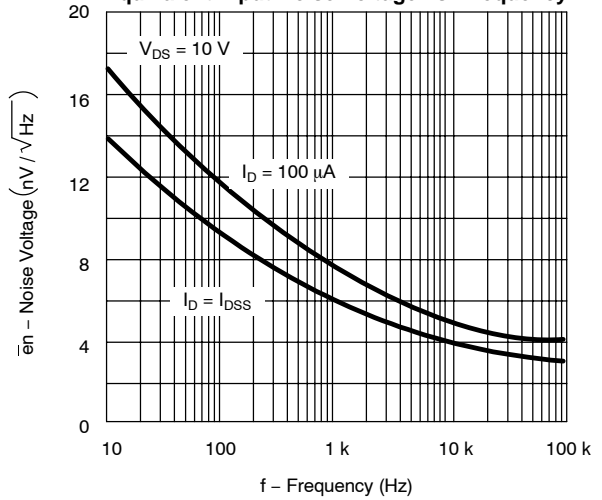
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Output Conductance vs. Drain Current



Equivalent Input Noise Voltage vs. Frequency





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