THE DATASHEET OF

U431

Matched N-Channel Pairs

PRODUCT SUMMARY					
Part Number	**$V_{GS(off)}$ (V)**	**$V_{(BR)GSS}$ Min (V)**	**g_{fs} Min (mS)**	**I_G Typ (pA)**	**$\|V_{GS1} - V_{GS2}\|$ Typ (mV)**
U430	–1 to –4	–25	10	–15	25
U431	–2 to –6	–25	10	–15	25

FEATURES

- Two-Chip Design
- High Slew Rate
- Low Offset/Drift Voltage
- Low Gate Leakage: 15 pA
- Low Noise
- High CMRR: 75 dB

BENEFITS

- Tight Differential Match vs. Current
- Improved Op Amp Speed, Settling Time Accuracy
- Minimum Input Error/Trimming Requirement
- Insignificant Signal Loss/Error Voltage
- High System Sensitivity
- Minimum Error with Large Input Signals

APPLICATIONS

- Wideband Differential Amps
- High-Speed, Temp-Compensated, Single-Ended Input Amps
- High-Speed Comparators
- Impedance Converters

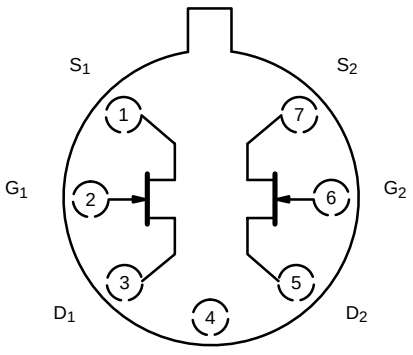
DESCRIPTION

The U430/431 are matched JFET pairs assembled in a TO-78 package. These devices offer good power gain even at frequencies beyond 250 MHz.

The TO-78 package is available with full military processing (see Military Information).

For similar products, see the low-noise U/SST401 series, the high-gain 2N5911/5912, and the low-leakage U421/423 data sheets.

TO-78



ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage . . . . . –25 V
Gate Current . . . . . 10 mA
Lead Temperature ($^1/_{16}$" from case for 10 sec.) . . . . . 300 °C
Storage Temperature . . . . . –65 to 200°C
Operating Junction Temperature . . . . . –55 to 150°C

Power Dissipation :
Per Side[a] . . . . . 300 mW
Total[b] . . . . . 500 mW

Notes
a. Derate 2.4 mW/°C above 25°C
b. Derate 4 mW/°C above 25°C

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

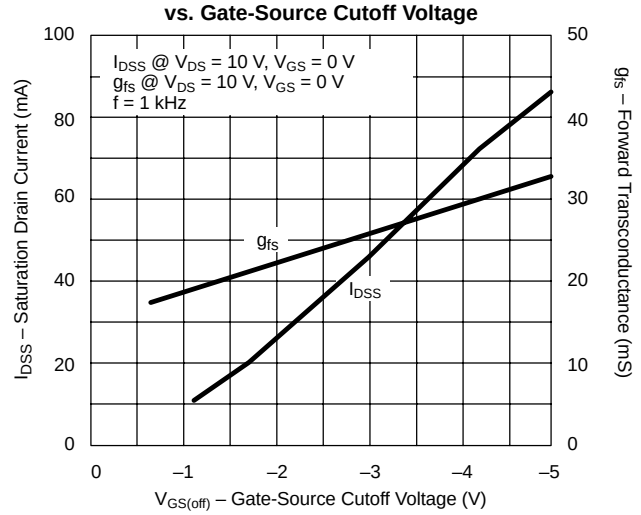
Parameter	Symbol	Test Conditions	Typ[b]	Limits U430 Min	Limits U430 Max	Limits U431 Min	Limits U431 Max	Unit
Static								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = –1 µA, V_{DS} = 0 V	–35	–25		–25		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 nA		–1	–4	–2	–6	
Saturation Drain Current[b]	I_{DSS}	V_{DS} = 10 V, V_{GS} = 0 V		12	30	24	60	mA
Gate Reverse Current	I_{GSS}	V_{GS} = –15 V, V_{DS} = 0 V	–5		–150		–150	pA
		T_A = 150°C	–10		–150		–150	nA
Gate Operating Current	I_G	V_{DG} = 10 V, I_D = 5 mA	–15					pA
		T_A = 150°C	–10					nA
Gate-Source Forward Voltage	$V_{GS(F)}$	I_G = 10 mA , V_{DS} = 0 V	0.8		1		1	V
Dynamic								
Common-Source Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 10 mA , f = 1 kHz	15	10		10		mS
Common-Source Output Conductance[b]	g_{os}		100		250		250	µS
Common-Source Input Capacitance	C_{iss}	V_{GS} = –10 V, V_{DS} = 0 V, f = 1 MHz	4.5		5		5	pF
Common-Source Reverse Transfer Capacitance	C_{rss}		2		2.5		2.5	
Equivalent Input Noise Voltage	$\overline{e}_n$	V_{DS} = 10 V, I_D = 10 mA f = 100 Hz	6					$\frac{nV}{\sqrt{Hz}}$
High Frequency								
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 10 mA f = 100 MHz	14					mS
Common-Source Output Conductance	g_{os}		0.13					
Power-Match Source Admittance	g_{ig}		12					
Matching								
Differential Gate-Source Voltage	$\lvert V_{GS1}–V_{GS2}\rvert$	V_{DG} = 10 V, I_D = 10 mA	25					mV
Saturation Drain Current Ratio[c]	$\frac{I_{DSS1}}{I_{DSS2}}$	V_{DS} = 10 V, V_{GS} = 0 V	0.95	0.9	1	0.9	1	
Transconductance Ratio[c]	$\frac{g_{fs1}}{g_{fs2}}$	V_{DS} = 10 V, I_D = 10 mA, f = 1 kHz	0.95	0.9	1	0.9	1	
Gate-Source Cutoff Voltage Ratio[c]	$\frac{V_{GS(off)1}}{V_{GS(off)2}}$	V_{DS} = 10 V, I_D = 1 nA	0.95	0.9	1	0.9	1	
Differential Gate Current	$\lvert I_{G1}–I_{G2}\rvert$	V_{DG} = 10 V, I_D = 5 mA	–2					pA
Common Mode Rejection Ratio	CMRR	V_{DG} = 5 to 10 V, I_D = 10 mA	75					dB

Notes
a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: PW ≤ 300 µs duty cycle ≤ 3%.
c. Assumes smaller value in the numerator.

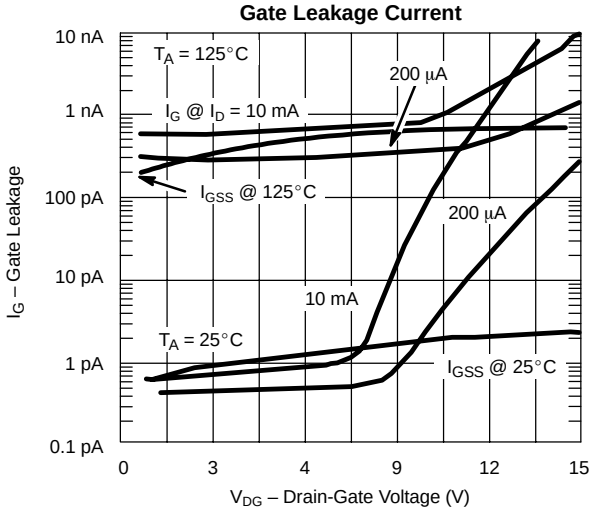
NZBD

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

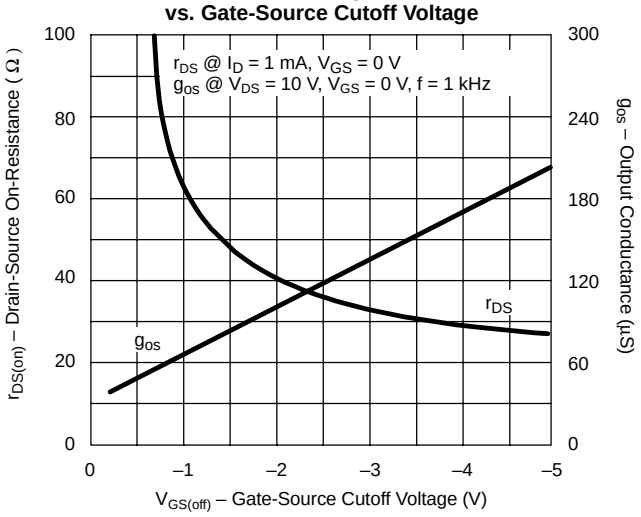
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



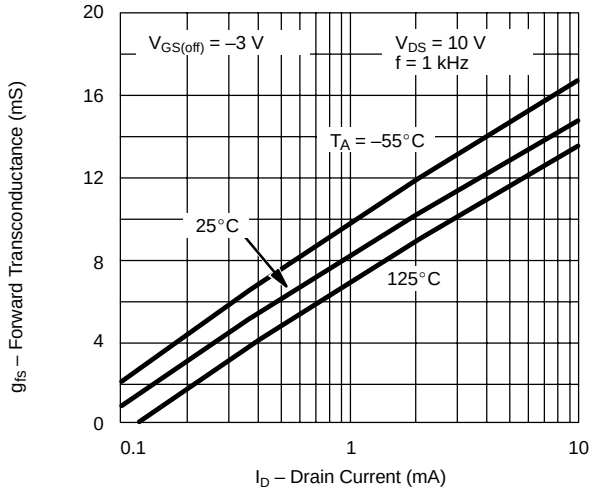
Gate Leakage Current



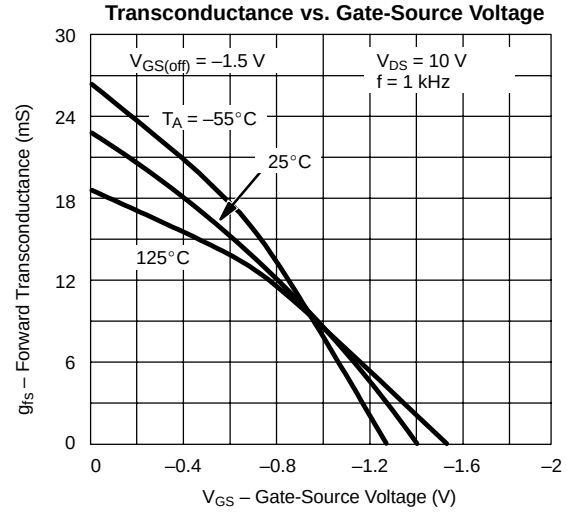
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



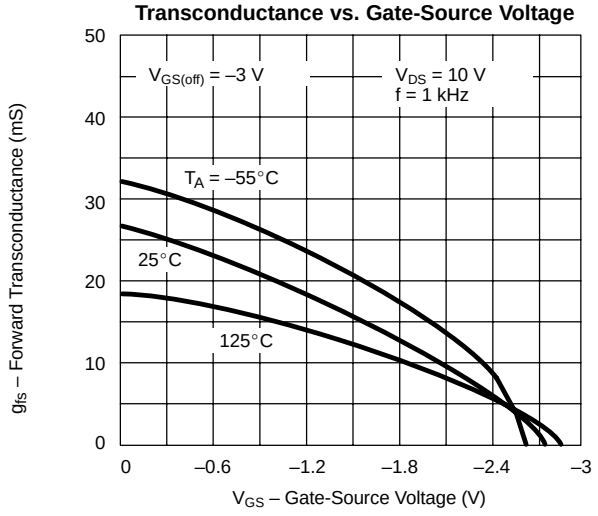
Common-Source Forward Transconductance vs. Drain Current



Transconductance vs. Gate-Source Voltage

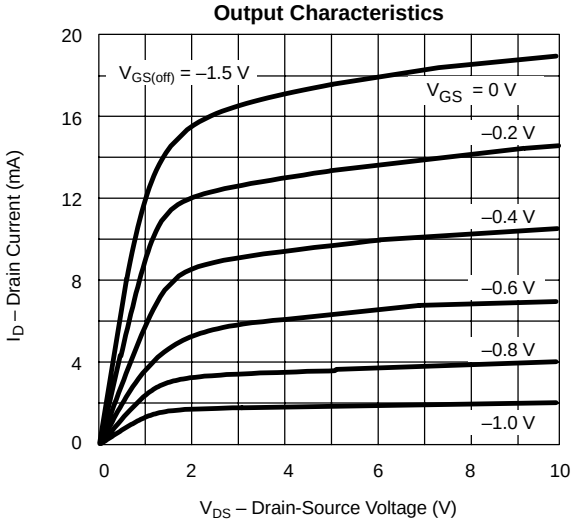


Transconductance vs. Gate-Source Voltage

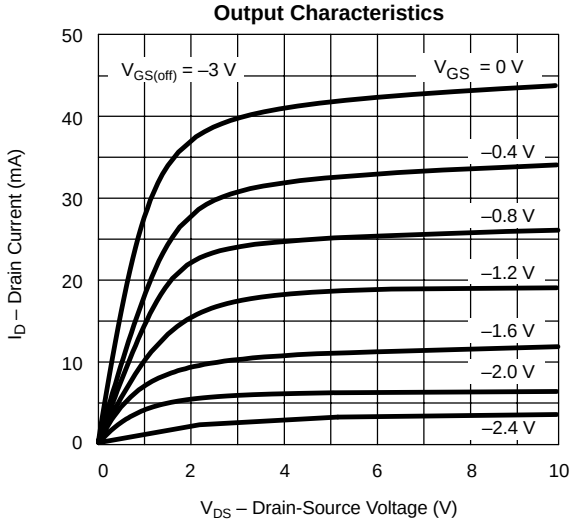


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

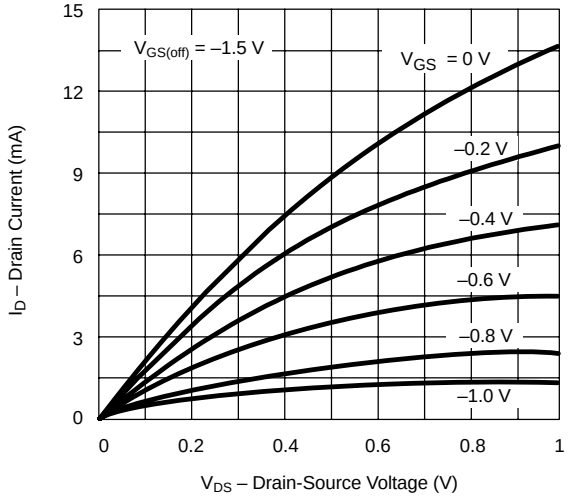
Output Characteristics



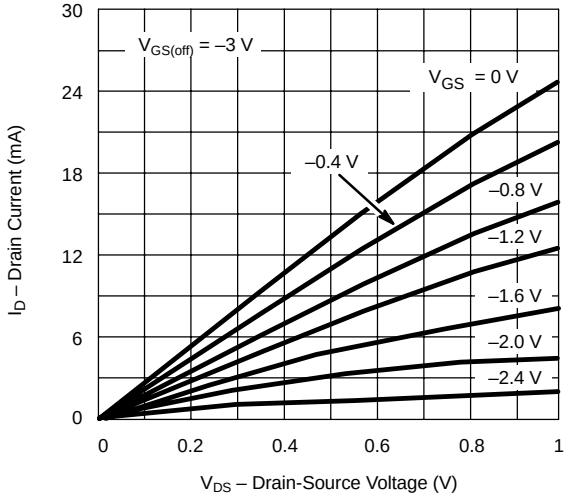
Output Characteristics



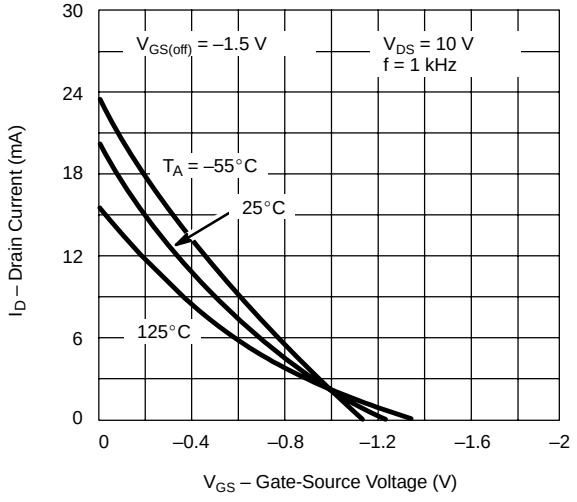
Output Characteristics



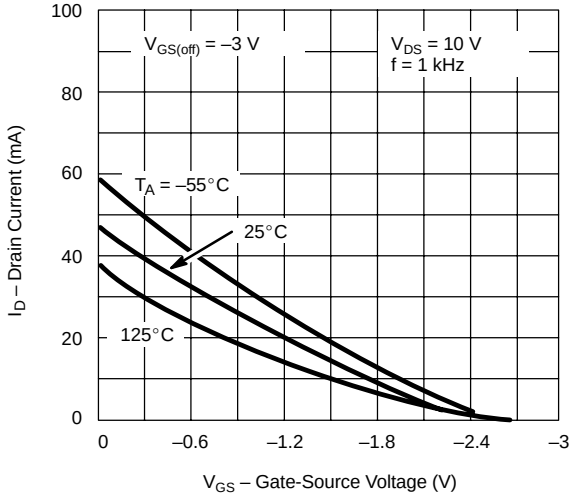
Output Characteristics



Transfer Characteristics



Transfer Characteristics



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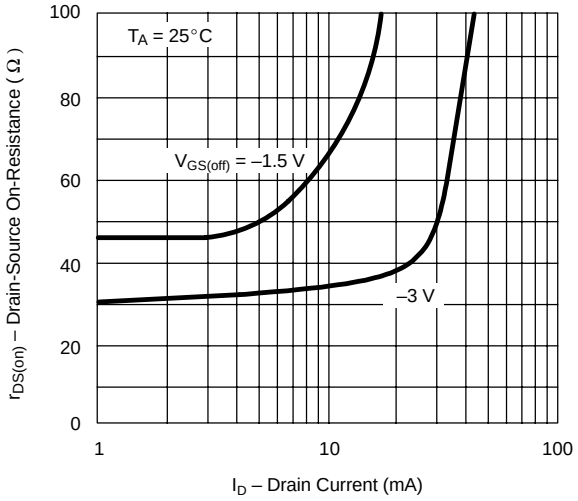
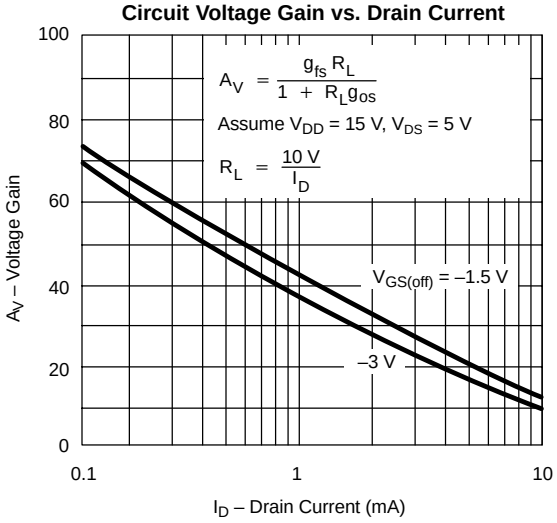
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

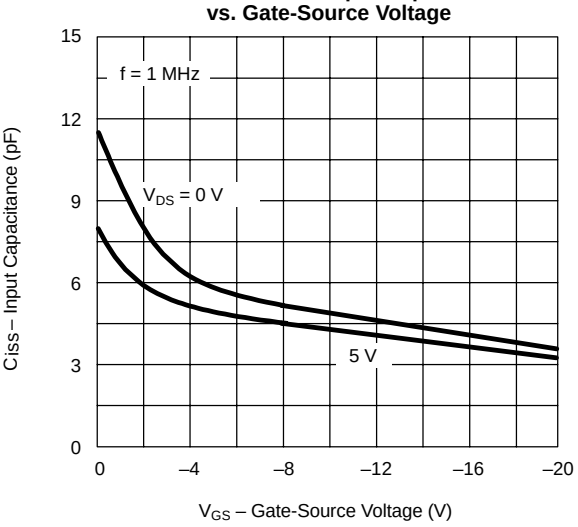
On-Resistance vs. Drain Current



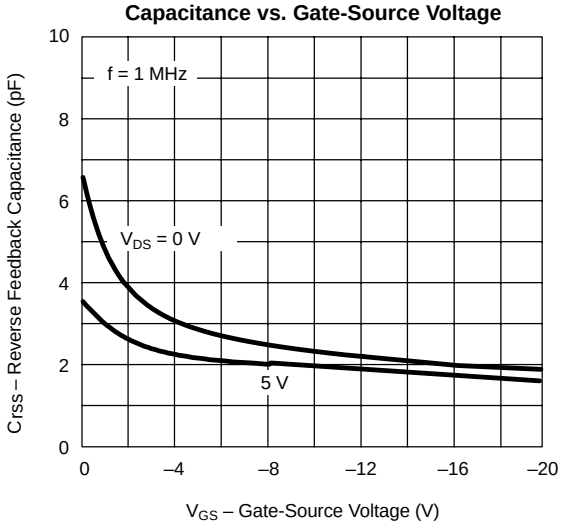
Circuit Voltage Gain vs. Drain Current



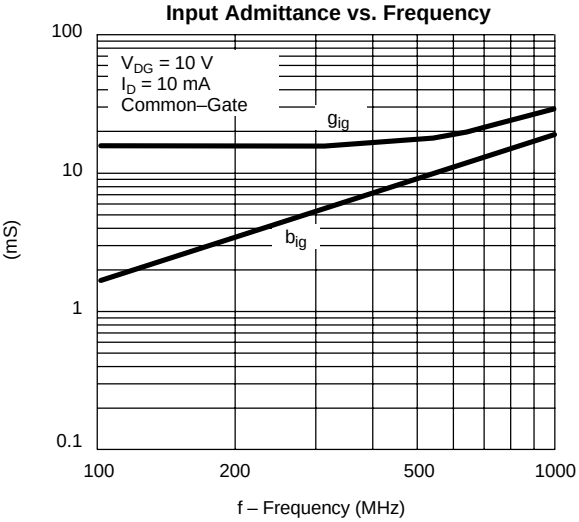
Common-Source Input Capacitance vs. Gate-Source Voltage



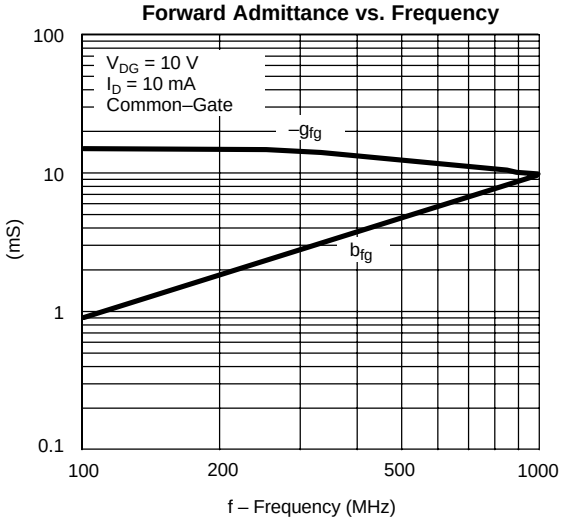
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Input Admittance vs. Frequency

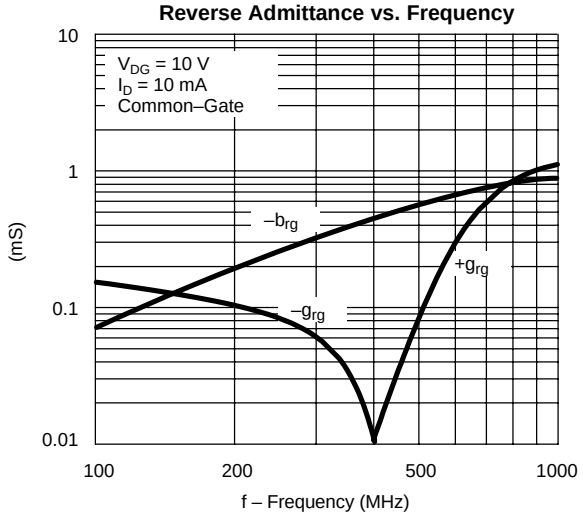


Forward Admittance vs. Frequency

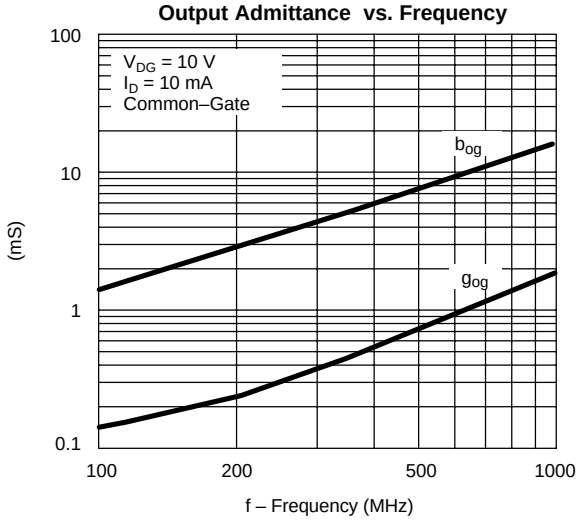


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

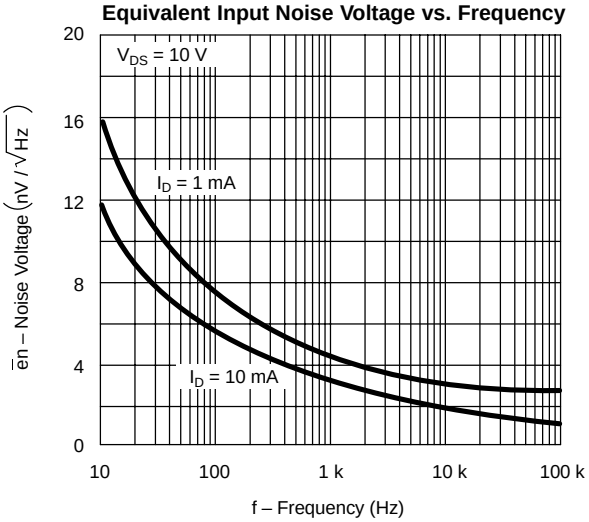
Reverse Admittance vs. Frequency



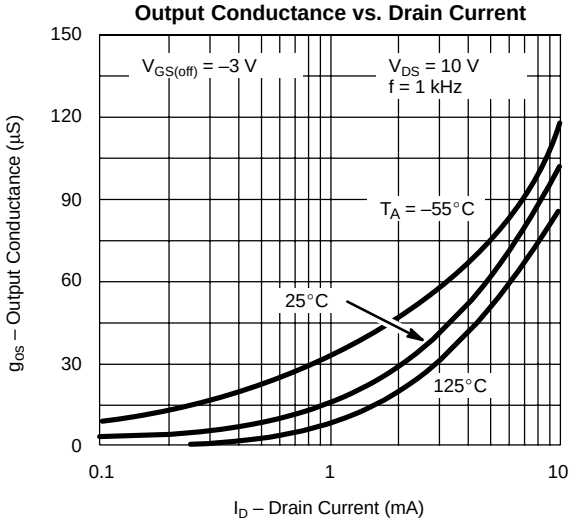
Output Admittance vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current



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