Monolithic N-Channel JFET Duals

PRODUCT SUMMARY					
Part Number	$V_{GS(off)}$ (V)	$V_{(BR)GSS}$ Min (V)	g_{fs} Min (mS)	I_G Max (pA)	$\|V_{GS1} - V_{GS2}\|$ Max (mV)
U421	-0.4 to -2	-40	0.3	-0.25	10
U423	-0.4 to -2	-40	0.3	-0.25	25

FEATURES

- Monolithic Design
- High Slew Rate
- Low Offset/Drift Voltage
- Low Gate Leakage: 0.2 pA
- Low Noise
- High CMRR: 102 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

- Ultralow Input Current Differential Amps
- High-Speed Comparators
- Impedance Converters

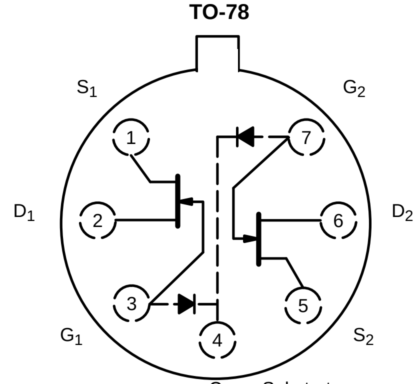
DESCRIPTION

The U421/423 are monolithic dual n-channel JFETs designed to provide very high input impedance for differential amplification and impedance matching. Among its many unique features, this series offers operating gate current specified at -250 fA.

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

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

TO-78



Case, Substrate

Top View

ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage . . . . . . -40 V
Gate-Gate Voltage . . . . . . ±40 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	Specific Test Conditions	Typ[a]	Limits U421 Min	Limits U421 Max	Limits U423 Min	Limits U423 Max	Unit
Static								
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	I_G = -1 µA, V_{DS} = 0 V	-60	-40		-40		V
Gate-Gate Breakdown Voltage	$V_{(BR)G1-G2}$	I_G = ±1 µA, I_D = 0, I_S = 0	±55	±40		±40		V
Gate-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 nA	-1.2	-0.4	-2	-0.4	-2	V
Saturation Drain Current	I_{DSS}	V_{DS} = 10 V, V_{GS} = 0 V	400	60	1000	60	1000	µA
Gate Reverse Current	I_{GSS}	V_{GS} = -20 V, V_{DS} = 0 V	-0.6		-1		-1	pA
		T_A = 125°C	-0.3		-1		-1	nA
Gate Operating Current	I_G	V_{DG} = 10 V, I_D = 30 µA	-0.2		-0.25		-0.25	pA
		T_A = 125°C	-150		-250		-250	pA
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 0 V, I_D = 10 µA	2000					Ω
Gate-Source Voltage	V_{GS}	V_{DG} = 10 V, I_D = 30 µA	-0.8		-1.8		-1.8	V
Gate-Source Forward Voltage	$V_{GS(F)}$	I_G = 1 mA , V_{DS} = 0 V	0.7					V
Dynamic								
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz	0.6	0.3	1.5	0.3	1.5	mS
Common-Source Output Conductance	g_{os}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz	4		10		10	µS
Common-Source Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 30 µA , f = 1 kHz	0.2	0.12	0.35	0.12	0.35	mS
Common-Source Output Conductance	g_{os}	V_{DS} = 10 V, I_D = 30 µA , f = 1 kHz	0.4		3		3	µS
Common-Source Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	1.4		3		3	pF
Common-Source Reverse Transfer Capacitance	C_{rss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	0.7		1.5		1.5	pF
Equivalent Input Noise Voltage	$\bar{e}_n$	V_{DS} = 10 V, I_D = 30 µA , f = 10 Hz	30		70		70	$nV/\sqrt{Hz}$
Noise Figure	NF	R_G = 10 MΩ			1		1	dB
Matching								
Differential Gate-Source Voltage	$\lvert V_{GS1} - V_{GS2} \rvert$	V_{DG} = 10 V, I_D = 30 µA			10		25	mV
Gate-Source Voltage Differential Change with Temperature	$\frac{\Delta \lvert V_{GS1} - V_{GS2} \rvert}{\Delta T}$	V_{DG} = 10 V, I_D = 30 µA T_A = -55 to 125°C			10		40	µV/°C
Common Mode Rejection Ratio	CMRR	V_{DG} = 10 to 20 V, I_D = 30 µA	102	90		80		dB

Notes
a. Typical values are for DESIGN AID ONLY, not guaranteed or subject to production testing.

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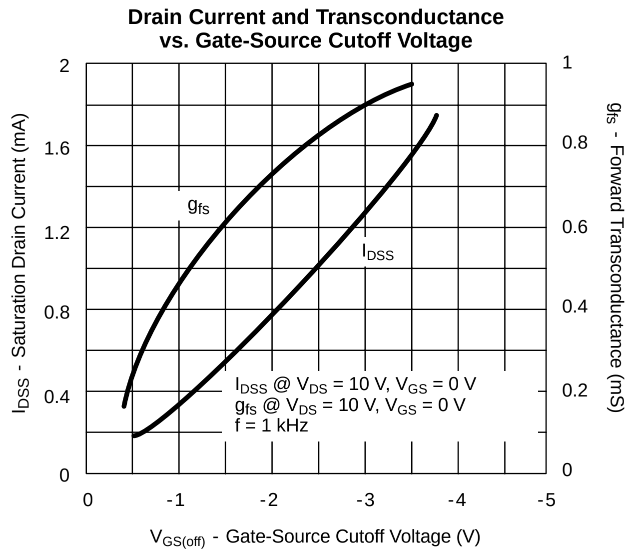
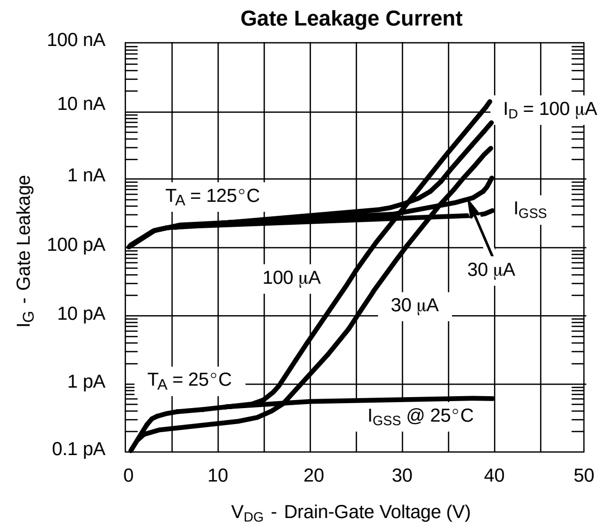
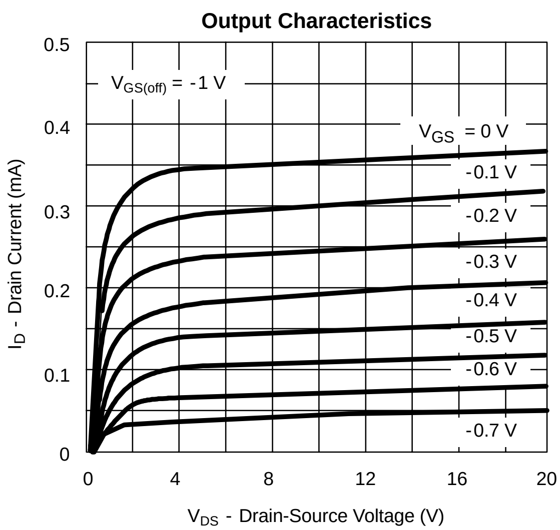
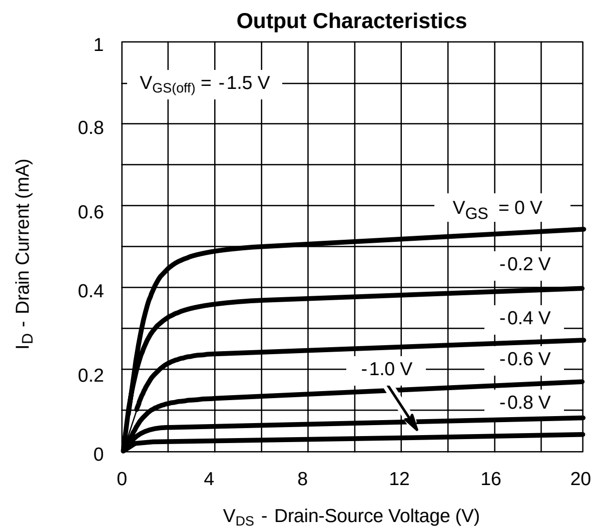
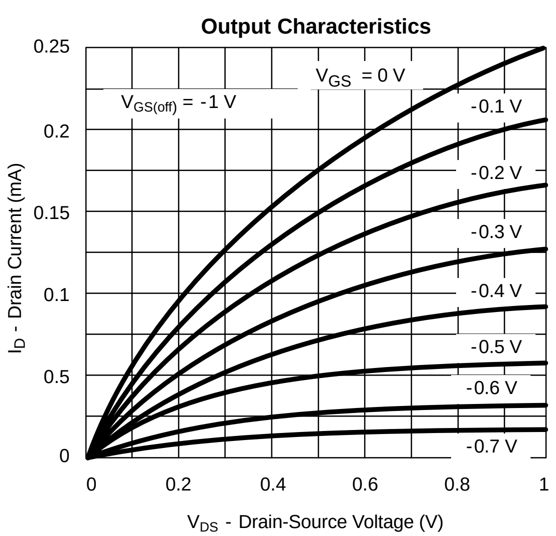
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

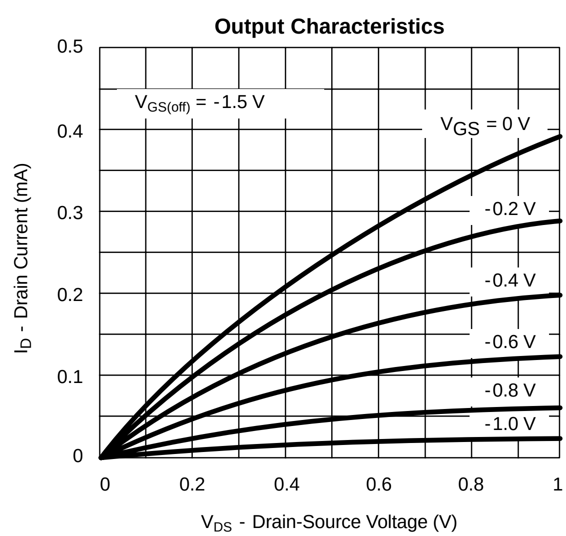






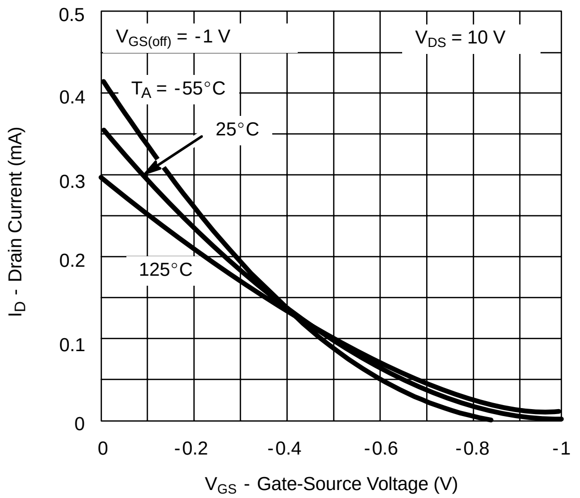




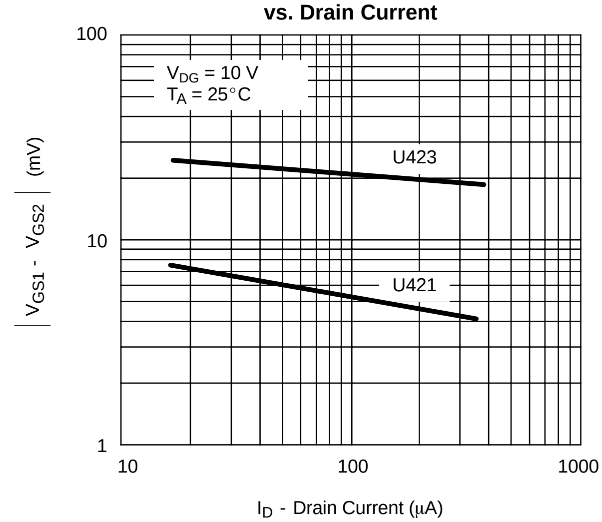


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

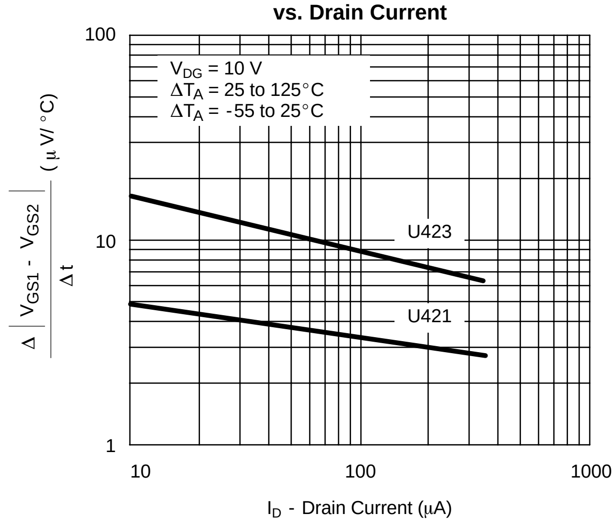
Transfer Characteristics



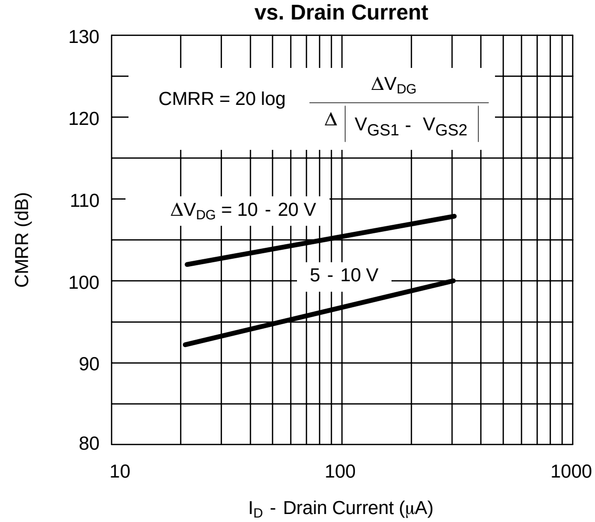
Gate-Source Differential Voltage vs. Drain Current



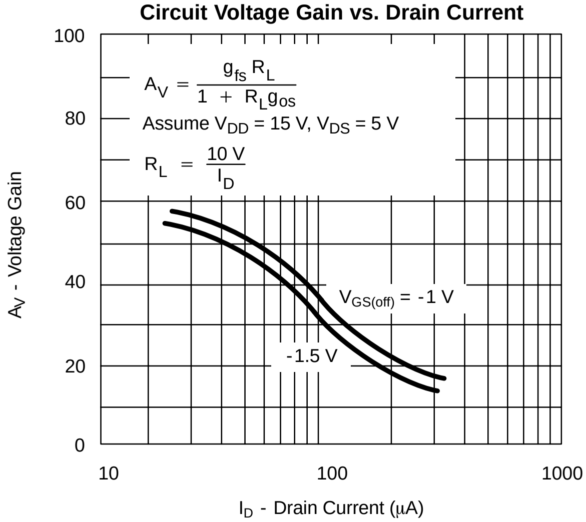
Voltage Differential with Temperature vs. Drain Current



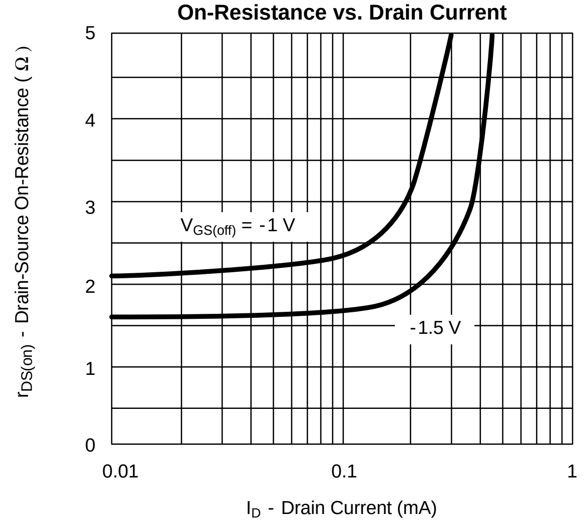
Common Mode Rejection Ratio vs. Drain Current



Circuit Voltage Gain vs. Drain Current



On-Resistance vs. Drain Current



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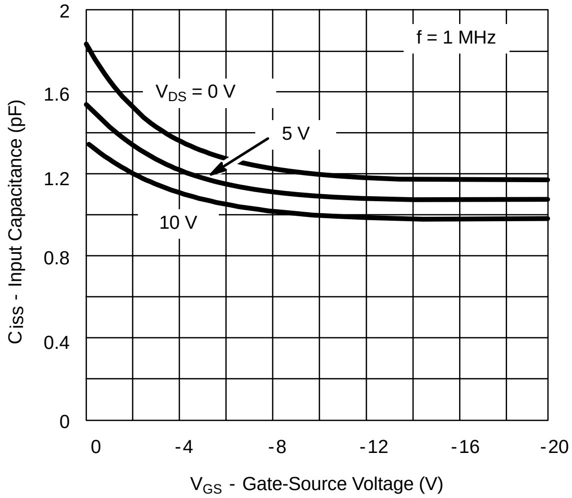
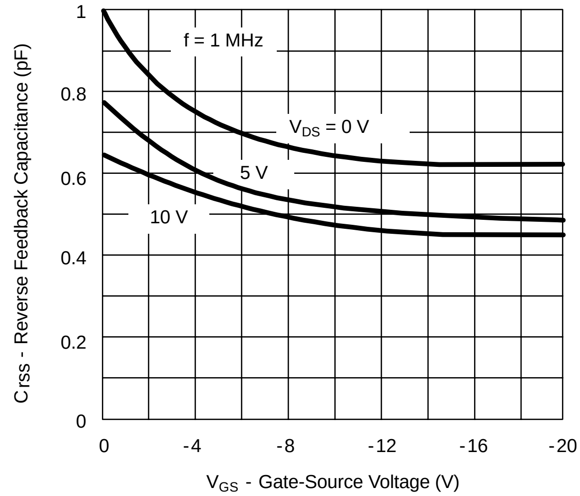
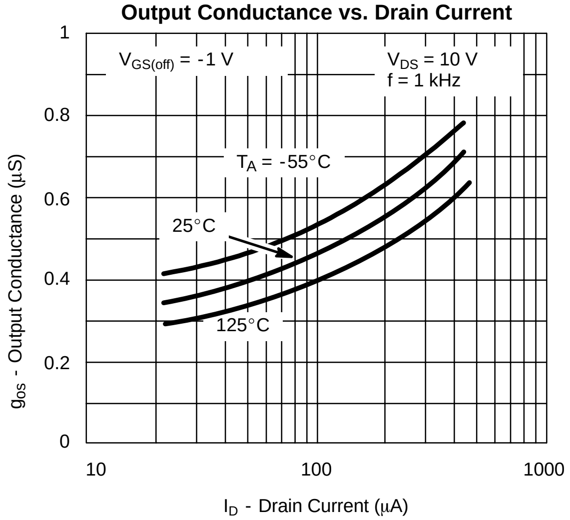
Common-Source Input Capacitance vs. Gate-Source Voltage



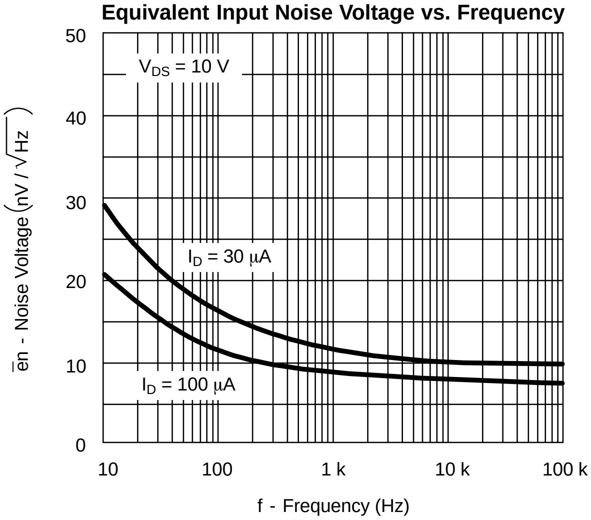
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



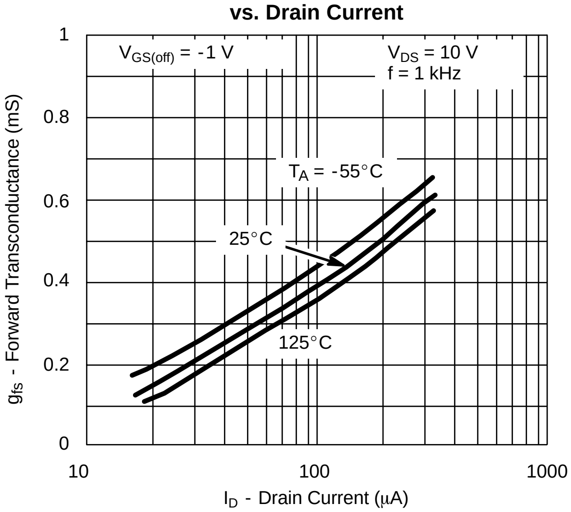
Output Conductance vs. Drain Current



Equivalent Input Noise Voltage vs. Frequency



Common-Source Forward Transconductance vs. Drain Current



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