monolithic dual n-channel JFETs *designed for . . .*

Siliconix

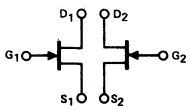
Performance Curves NQP
See Section 4

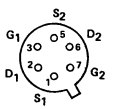
■ Differential Amplifiers

BENEFITS

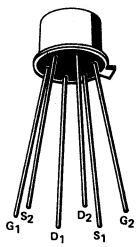
- Good Matching Characteristics

TO-71
See Section 6





Bottom View



ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage . . . . . -50 V
Gate Current . . . . . 50 mA
Total Device Dissipation at 25°C
(Derate 1.7 mW/°C to 200°C) . . . . . 300 mW
Storage Temperature Range . . . . . -65 to +200°C
Lead Temperature
(1/16" from case for 10 seconds) . . . . . .300°C

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

		Characteristic		Min	Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-100	pA	V_{GS} = -30 V, V_{DS} = 0	
2					-500	nA		150°C
3		BV_{GSS}	Gate-Source Breakdown Voltage	-50		V	I_G = -1 μA, V_{DS} = 0	
4		$V_{GS(off)}$	Gate-Source Cutoff Voltage	-0.5	-4.5		V_{DS} = 20 V, I_D = 1 nA	
5		V_{GS}	Gate-Source Voltage	-0.3	-4.0		V_{DG} = 20 V, I_D = 200 μA	
6		I_G	Gate Operating Current		-50	pA		
					-250	nA		125°C
7		I_{DSS}	Saturation Drain Current (Note 1)	0.5	5.0	mA	V_{DS} = 20 V, V_{GS} = 0	
8	DYNAMIC	g_{fs}	Common-Source Forward Transconductance (Note 1)	1000	5000	μmho	V_{DS} = 20 V, V_{GS} = 0	f = 1 kHz
				1000				f = 100 MHz
9		g_{fs}	Common-Source Forward Transconductance (Note 1)	600	1600		V_{DG} = 20 V, I_D = 200 μA	f = 1 kHz
10		g_{os}	Common-Source Output Conductance		35		V_{DS} = 20 V, V_{GS} = 0	
11		g_{os}	Common-Source Output Conductance		10		V_{DG} = 20 V, I_D = 200 μA	
12		C_{iss}	Common-Source Input Capacitance		6	pF	V_{DS} = 20 V, V_{GS} = 0	f = 1 MHz
13		C_{rss}	Common-Source Reverse Transfer Capacitance		2			
14		$\bar{e}_n$	Equivalent Short Circuit Input Noise Voltage		80	$\frac{nV}{\sqrt{Hz}}$		f = 100 Hz

		Characteristic		U231 Max	U232 Max	U233 Max	U234 Max	U235 Max	Unit	Test Conditions	
15	MATCHING	$\lvert I_{G1}-I_{G2}\rvert$	Differential Gate Current	10	10	10	10	10	nA	V_{DG} = 20 V, I_D = 200 μA	125°C
16		$\frac{(I_{DSS1}-I_{DSS2})}{I_{DSS1}}$	Saturation Drain Current Match (Note 1)	5	5	5	10	15	%	V_{DS} = 20 V, V_{GS} = 0	
17		$\lvert V_{GS1}-V_{GS2}\rvert$	Differential Gate-Source Voltage	5	10	15	20	25	mV	V_{DG} = 20 V, I_D = 200 μA	T_A = 25°C, T_B = 125°C
18		$\frac{\Delta\lvert V_{GS1}-V_{GS2}\rvert}{\Delta T}$	Gate-Source Voltage Differential Drift (Note 2)	10	25	50	75	100	μV/°C		
19				10	25	50	75	100			T_A = -55°C, T_B = 25°C
20		$\frac{(g_{fs1}-g_{fs2})}{g_{fs1}}$	Transconductance Match (Note 1)	3	5	5	10	15	%		f = 1 kHz
21		$\lvert g_{os1}-g_{os2}\rvert$	Differential Output Conductance	5	5	5	5	5	μmho		

NOTES:
1. Pulse test required, pulsewidth = 300 μs, duty cycle ⩽ 3%.
2. Measured at end points, T_A and T_B.

NQP

matched dual n-channel JFET *designed for . . .*

Siliconix

Performance Curves NZF-D, NNZ See Section 4

■ Wideband Differential Amplifiers

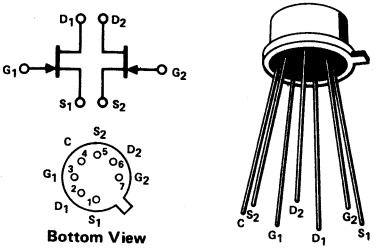
BENEFITS

- **High Gain through 100 MHz**
  g_{fs} = 4500 μmho Minimum
- **Matching Characteristics Specified**

ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage . . . . . -25 V
Gate Current . . . . . 50 mA
Device Dissipation (Each Side), T_A = 85°C
(Derate 3.85 mW/°C) . . . . . 250 mW
Total Device Dissipation, T_A = 85°C
(Derate 7.7 mW/°C) . . . . . 500 mW
Storage Temperature Range . . . . . -65 to + 200°C
Lead Temperature
(1/16" from case for 10 seconds) . . . . . .300°C

TO-78
See Section 6

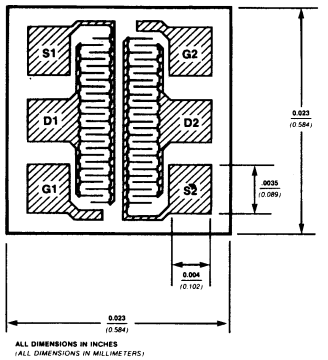


ELECTRICAL CHARACTERISTICS (25° unless otherwise noted)

		Characteristic		Min	Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-100	pA	V_{GS} = -15 V, V_{DS} = 0	
2					-250	nA		150°C
3		BV_{GSS}	Gate-Source Breakdown Voltage	-25		V	I_G = -1 μA, V_{DS} = 0	
4		$V_{GS(off)}$	Gate-Source Cutoff Voltage	-1	-5		V_{DS} = 10 V, I_D = 1 nA	
5		I_{DSS}	Saturation Drain Current (Note 1)	5	40	mA	V_{DS} = 10 V, V_{GS} = 0	
6	DYNAMIC	g_{fs}	Common-Source Forward Transconductance	4500	10,000	μmho	V_{DS} = 10 V, I_D = 5 mA	f = 1 kHz
7		g_{fs}	Common-Source Forward Transconductance	4500	10,000		V_{DG} = 10 V, I_D = 5 mA	f = 100 MHz
8		g_{os}	Common-Source Output Conductance		200		V_{DS} = 10 V, I_D = 5 mA	f = 1 kHz
9		g_{os}	Common-Source Output Conductance		200		V_{DG} = 10 V, I_D = 5 mA	f = 100 MHz
10		C_{iss}	Common-Source Input Capacitance		5	pF		f = 1 MHz
11		C_{rss}	Common-Source Reverse Transfer Capacitance		1.2			
12		$\bar{e}_n$	Equivalent Short Circuit Input Noise Voltage		30	$\frac{nV}{\sqrt{Hz}}$		f = 10 kHz
13	MATCHING	$\frac{I_{DSS1}}{I_{DSS2}}$	Saturation Drain Current Ratio (Notes 1 and 2)	0.85	1		V_{DS} = 10 V, V_{GS} = 0	
14		$\lvert V_{GS1}-V_{GS2}\rvert$	Differential Gate-Source Voltage		100	mV	V_{DG} = 10 V, I_D = 5 mA	
15		$\frac{g_{fs1}}{g_{fs2}}$	Transconductance Ratio (Note 2)	0.85	1			f = 1 kHz
16		$\lvert g_{os1}-g_{os2}\rvert$	Differential Output Conductance		20	μmho		

NOTES:
1. Pulse test required, pulse width = 300 μs, duty cycle ≤ 30%.
2. Assumes smaller value in numerator.

NZF-D, NNZ



n-channel JFET
designed for . . .

- High Frequency Amplifiers
- Mixers
- Oscillators

Siliconix

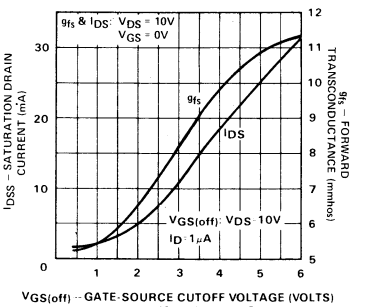
BENEFITS:

- High Power Gain
- Low Input Capacitance

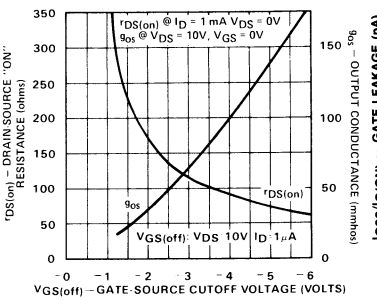
TYPE	PACKAGE	PRINCIPAL DEVICES
Dual	TO-78	2N5911-12, U257 U443-U444
Dual	TO-71	U440-41
Dual	Chip	M5911CHP, M5912CHP, M440CHP, M441CHP

PERFORMANCE CURVES (25°C unless otherwise noted)

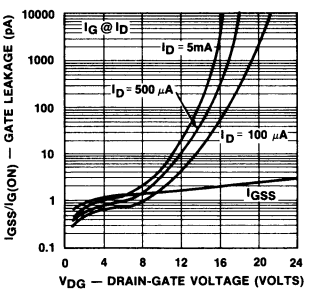
Drain Current and Transconductance vs Gate-Source Cutoff Voltage



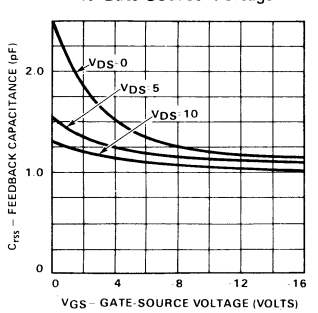
On Resistance & Output Conductance vs Gate-Source Cutoff Voltage



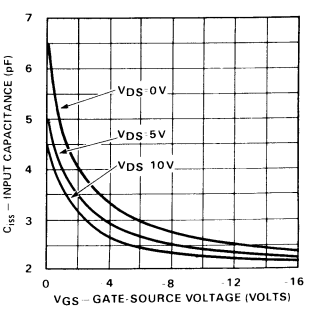
Gate Operating Current vs Drain-Gate Voltage



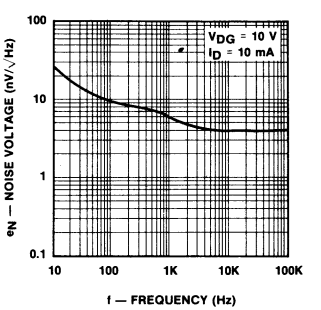
Common Source Feedback Capacitance vs Gate-Source Voltage



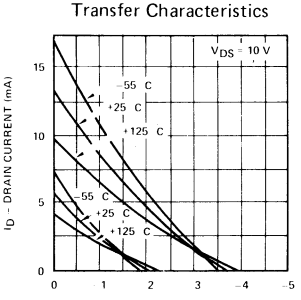
Common Source Input Capacitance vs Gate-Source Voltage



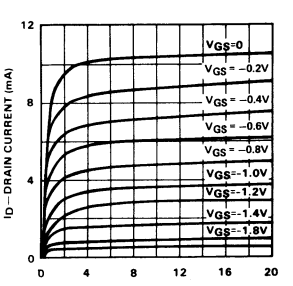
Equivalent Input Noise Voltage vs Frequency



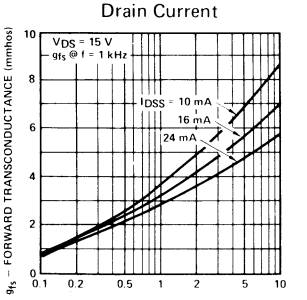
Transfer Characteristics

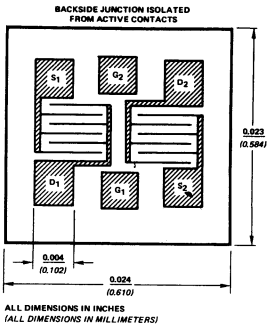


Output Characteristic ($V_{GS(off)}$ = –2.8V)



Forward Transconductance vs Drain Current





monolithic dual n-channel JFET

designed for . . .

- **General Purpose Differential Amplifiers**

TYPE	PACKAGE
Dual	TO-71
Dual	Chip

BENEFITS:

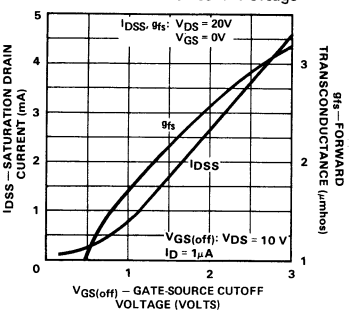
- **Low Cost**
- **High Input Impedance**

PRINCIPAL DEVICES

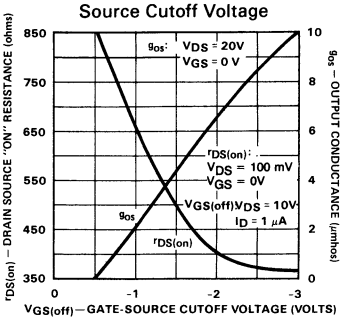
2N3954-55, 2N3954A-55A,
2N3956-58, 2N5045-47,
2N5196-99, 2N5515-24, 2N5452-54
U231-35, U410-12
2N3955, 2N3956-58
2N5047, 2N5199
2N5454, U233-35
U411, 12

PERFORMANCE CURVES (25°C unless otherwise noted)

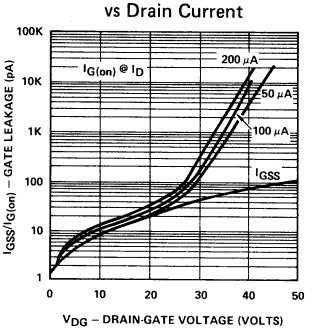
Drain Current & Transconductance vs Gate-Source Cutoff Voltage



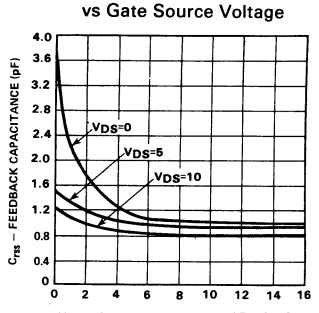
On Resistance & Output Conductance vs Gate-Source Cutoff Voltage



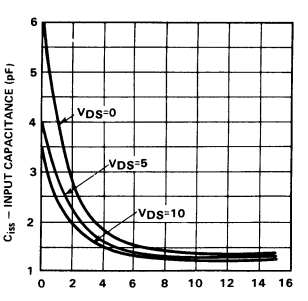
Gate Operating Current vs Drain Current



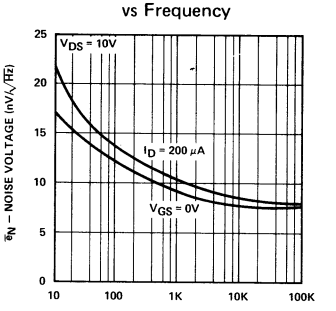
Common Source Reverse Feedback Capacitance vs Gate Source Voltage



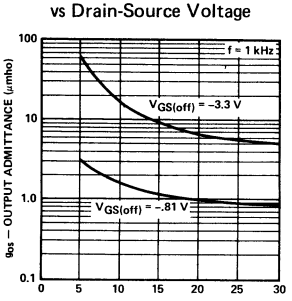
Common Source Input Capacitance vs Gate-Source Voltage



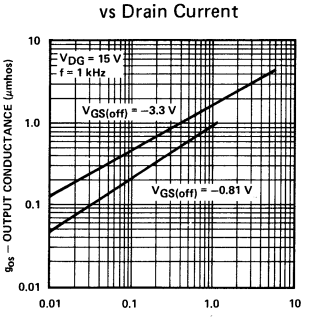
Equivalent Input Noise Voltage vs Frequency



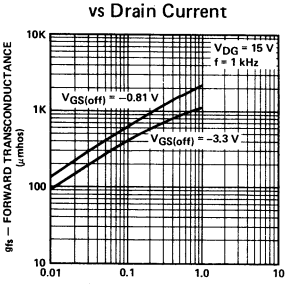
Common Source Output Admittance vs Drain-Source Voltage



Common-Source Output Conductance vs Drain Current

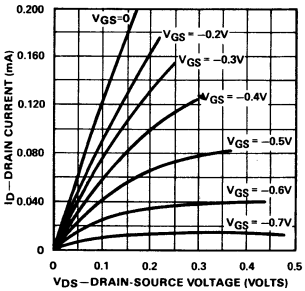


Common Source Forward Transconductance vs Drain Current

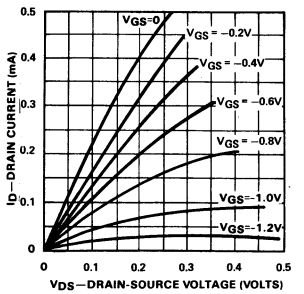


PERFORMANCE CURVES (Cont'd) (25°C unless otherwise noted)

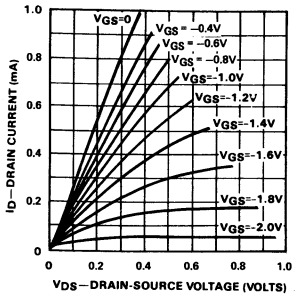
Output Characteristic
($V_{GS(off)}$ = −1.0V)



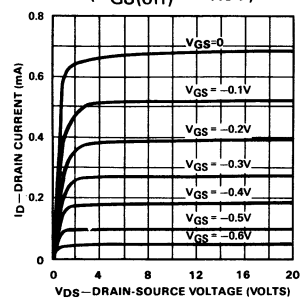
Output Characteristic
($V_{GS(off)}$ = −1.5V)



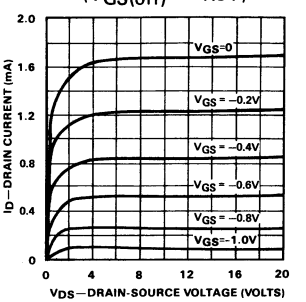
Output Characteristic
($V_{GS(off)}$ = −2.3V)



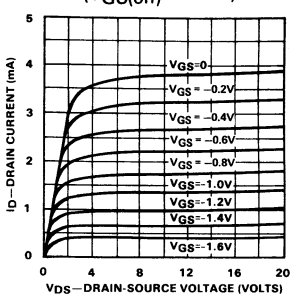
Output Characteristic
($V_{GS(off)}$ = −1.0V)



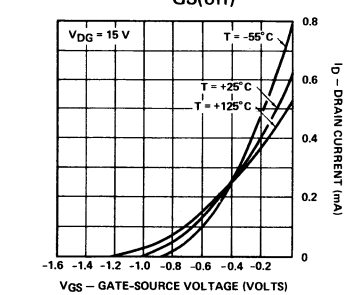
Output Characteristic
($V_{GS(off)}$ = −1.5V)



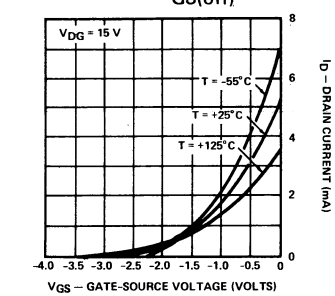
Output Characteristic
($V_{GS(off)}$ = -2.3V)



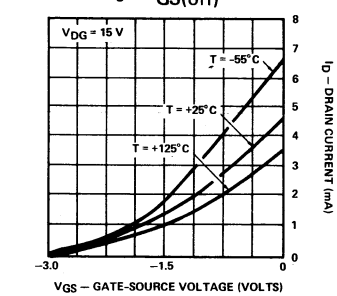
Transfer Characteristics
Low $V_{GS(off)}$



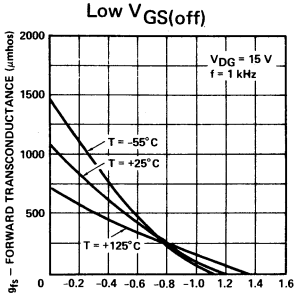
Transfer Characteristics
Medium $V_{GS(off)}$



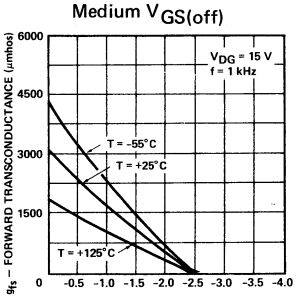
Transfer Characteristics
High $V_{GS(off)}$



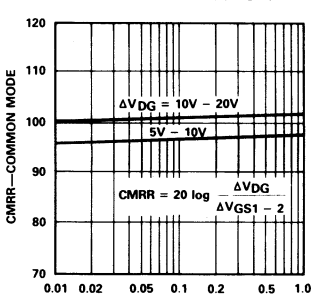
Transconductance Characteristics
Low $V_{GS(off)}$

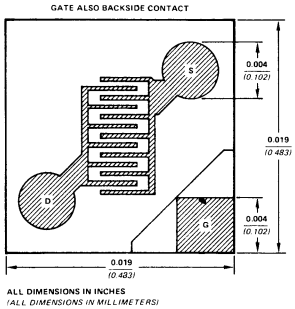


Transconductance Characteristics
Medium $V_{GS(off)}$



CMRR vs Drain Current





ALL DIMENSIONS IN INCHES
(ALL DIMENSIONS IN MILLIMETERS)

n-channel JFET
designed for . . .

- High Frequency Amplifiers
- Mixers
- Oscillators

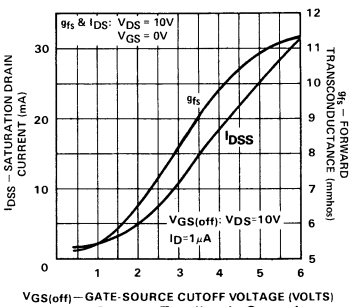
BENEFITS:

- High Power Gain
- Low Input Capacitance

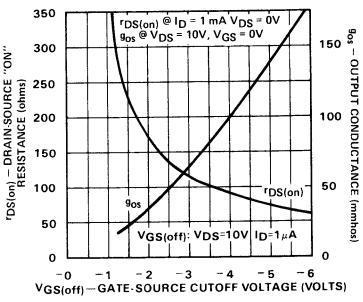
TYPE	PACKAGE	PRINCIPAL DEVICES
Single	TO-92	J300, J210-12
Dual	TO-78	2N5911-12, U257, U443-U444
Dual	TO-71	U440-41
Single	Chip	J300, J210-2CHP
Dual	Chip	2N5912CHP, U257CHP U441CHP, U444CHP

PERFORMANCE CURVES (25°C unless otherwise noted)

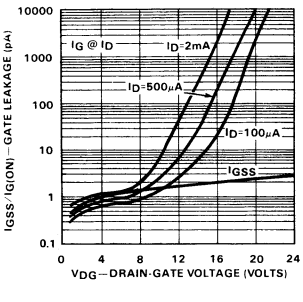
Drain Current and Transconductance vs Gate-Source Cutoff Voltage



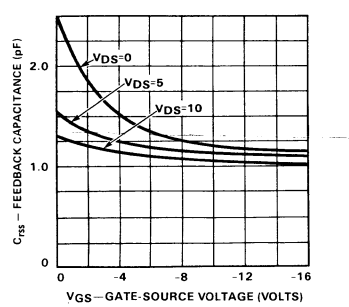
On Resistance & Output Conductance vs Gate-Source Cutoff Voltage



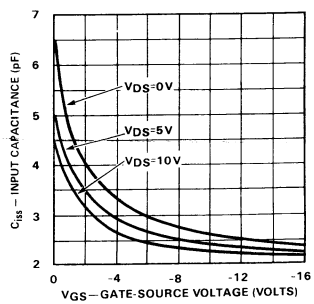
Gate Operating Current vs Drain-Gate Voltage



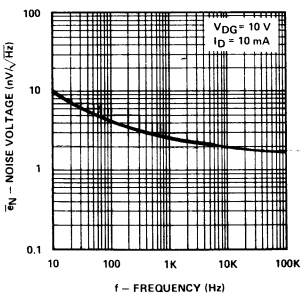
Common Source Feedback Capacitance vs Gate-Source Voltage



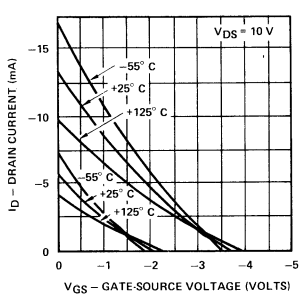
Common Source Input Capacitance vs Gate-Source Voltage



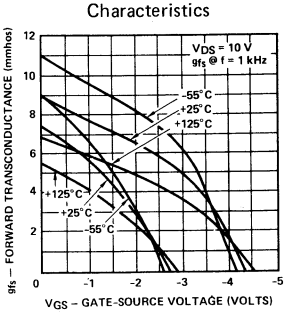
Equivalent Input Noise Voltage vs Frequency



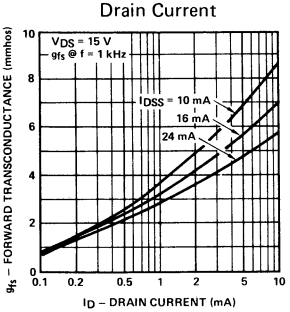
Transfer Characteristics



Transconductance Characteristics

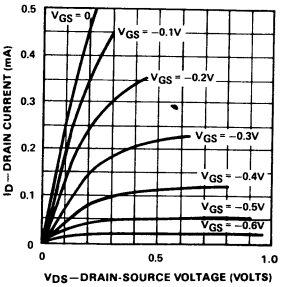


Forward Transconductance vs Drain Current

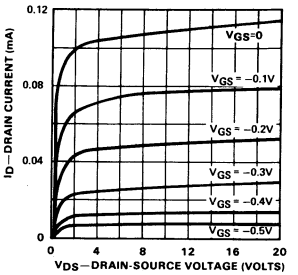


PERFORMANCE CURVES (Cont'd) (25°C unless otherwise noted)

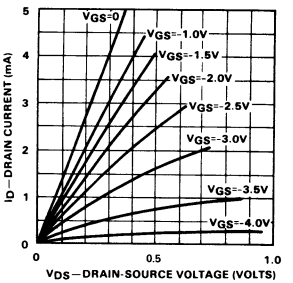
Output Characteristic
($V_{GS(off)}$ = −0.8V)



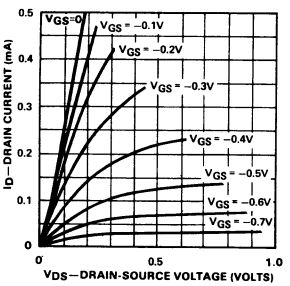
Output Characteristic
($V_{GS(off)}$ = −0.8V)



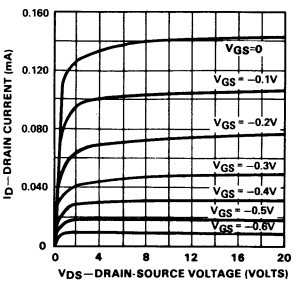
Output Characteristic
($V_{GS(off)}$ = −5.0V)



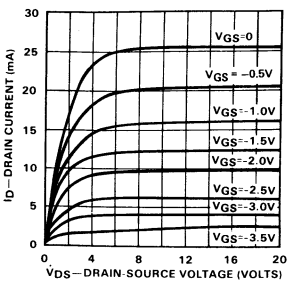
Output Characteristic
($V_{GS(off)}$ =−1.0V)



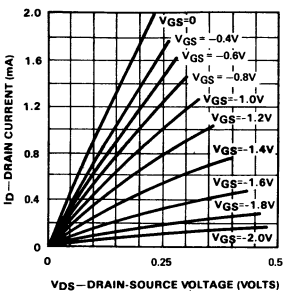
Output Characteristic
($V_{GS(off)}$ =−1.0V)



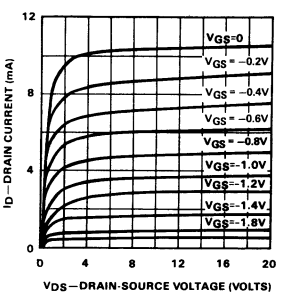
Output Characteristic
($V_{GS(off)}$ = −5.0V)



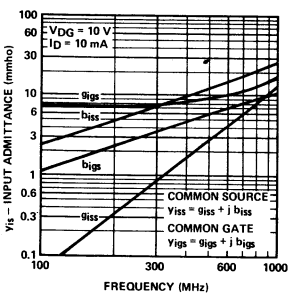
Output Characteristic
($V_{GS(off)}$ = −2.8V)



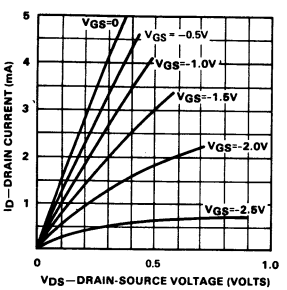
Output Characteristic
($V_{GS(off)}$ = −2.8V)



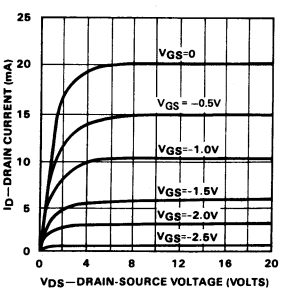
Input Admittance vs Frequency



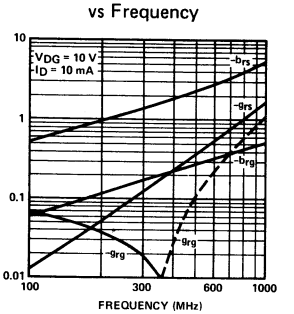
Output Characteristic
($V_{GS(off)}$ = −3.5V)



Output Characteristic
($V_{GS(off)}$ = −3.5V)

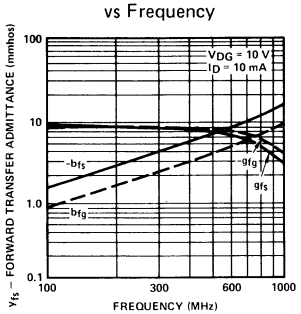


Reverse Transfer Admittance vs Frequency



PERFORMANCE CURVES (Cont'd) (25°C unless otherwise noted)

Forward Transfer Admittance vs Frequency



Output Admittance vs Frequency