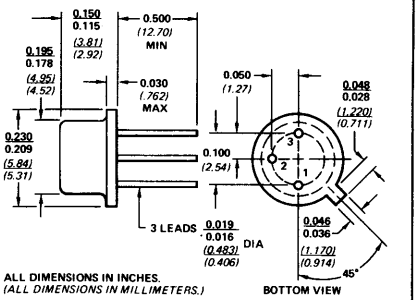
Performance Curves NZF
See Page 4-49

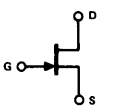
N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTOR

FOR VHF/UHF COMMON-GATE AMPLIFIER AND MIXER APPLICATIONS

- **Power Gain 10 dB at 450 MHz, Common-Gate**
- **Noise Figure 3.5 dB Typical at 450 MHz**



TO-52



PIN	OUT
1	S
2	D
3	G,C

ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage ..... -25 V
Gate Current ..... 10 mA
Total Power Dissipation at or below 25°C
Free-Air Temperature ..... 500 mW
Power Derating ..... 4.0 mW/°C
Operating Temperature Range ..... -65 to +150°C
Storage Temperature Range ..... -65 to +150°C

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

		Characteristic		Min	Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-0.1	nA	V_{GS} = -15 V, V_{DS} = 0	
2					-0.1	μA		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	-6	V	V_{DS} = 10 V, I_D = 1 nA	
5		I_{DSS}	Saturation Drain Current (Note 1)	10	30	mA	V_{DS} = 10 V, V_{GS} = 0	
6	DYN	g_{fg}	Common-Gate Forward Transconductance (Note 1)	6000	10,000	μmho	V_{DS} = 10 V, I_D = 10 mA	f = 1 kHz
7		g_{ogs}	Common-Gate Output Conductance		200	μmho		
8		C_{gd}	Gate-Drain Capacitance		1.2	pF	V_{DG} = 10 V, I_D = 10 mA	f = 1 MHz
9		C_{gs}	Gate-Source Capacitance		3.8	pF		

NOTE:
1. Pulse test duration = 2 ms.

NZF

Performance Curves NZF
See Page 4-49

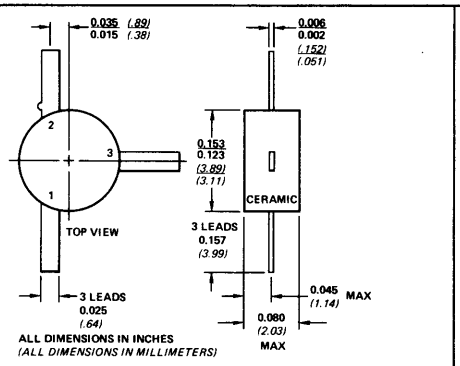
N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

FOR UHF APPLICATIONS

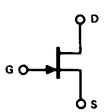
- Hermetic Stripline Package
- Low C_{rss}, 0.9 pF Typical
- Low Intermodulation Distortion
- Typical Noise Figure (450 MHz): 3.4 dB

ABSOLUTE MAXIMUM RATINGS (25°C)

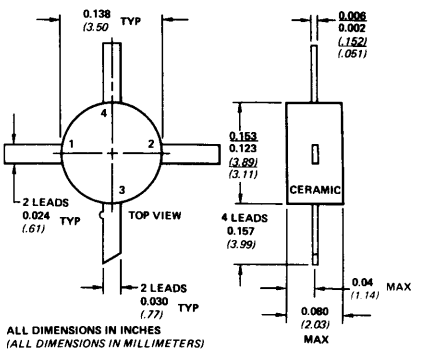
Gate-Drain or Gate-Source Voltage ..... -25 V
Gate Current ..... 10 mA
Total Device Dissipation (Derate 1.0 mW/°C) ..... 175 mW
Storage Temperature Range ..... -65 to +200°C
Operating Temperature Range ..... -65 to +200°C



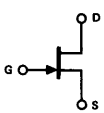
OD-81
U314



PIN	OUT
1	S
2	D
3	G



OD-82
U315



PIN	OUT
1	S
2	D
3	G
4	G

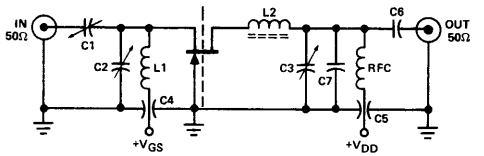
ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

		Characteristic		Min	Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-1	nA	V_{GS} = -15 V, V_{DS} = 0	
2					-1	μA		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	-6		V_{DS} = 10 V, I_D = 1 nA	
5		I_{DSS}	Saturation Drain Current (Note 1)	10	30	mA	V_{DS} = 10 V, V_{GS} = 0 (Note 1)	
6	DYNAMIC	g_{fs}	Common-Source Forward Transconductance	6000	10,000	μmho	V_{DS} = 10 V, I_D = 10 mA	f = 1 kHz
7		g_{os}	Common-Source Output Conductance		200			
8		C_{iss}	Common-Source Input Capacitance		5	pF		f = 1 MHz
9		C_{rss}	Common-Source Reverse Transfer Capacitance		1.2			

NOTE:
1. Pulse test duration = 2 ms.

NZF

TYPICAL RF APPLICATIONS



C1 2.5-11 ERIE N650
C2, C3 .8-10pF JFD MVM010W
C4, C5 1000pF AB FASC
C6 100pF
C7 10pF
L1 17 n hy 3/4" 28 AWG
L2 100nhy, 2T 1/4 OD #18 AWG
RFC .33 hy Miller 9230-30

TYPICAL S PARAMETERS

Common Gate V_{DG} = 15 V, I_D = 10 mA

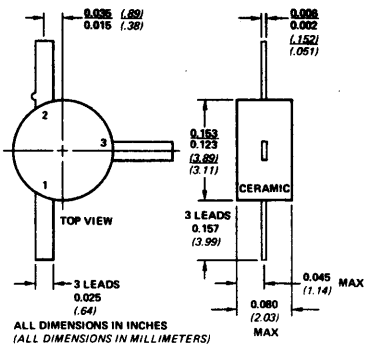
Freq MHz	S_{11}		S_{21}		S_{12}		S_{22}	
	Mag	Angle	Mag	Angle	Mag	Angle	Mag	Angle
100.00	.476	- 6	.520	- 7	.007	35	.996	- 4
150.00	.474	-10	.516	-11	.009	41	.992	- 6
200.00	.475	-14	.521	-15	.011	49	.992	- 7
250.00	.472	-17	.519	-19	.012	59	.991	-10
300.00	.470	-20	.515	-24	.014	61	.992	-12
350.00	.466	-24	.511	-28	.016	64	.988	-14
400.00	.463	-28	.502	-32	.018	66	.984	-16
450.00	.458	-31	.497	-37	.020	68	.984	-18
500.00	.453	-35	.493	-40	.022	70	.985	-20
550.00	.447	-38	.490	-44	.024	72	.986	-22
600.00	.443	-42	.485	-48	.026	73	.983	-24
650.00	.435	-46	.477	-53	.028	75	.975	-27
700.00	.430	-49	.479	-57	.030	76	.975	-29
750.00	.426	-52	.462	-62	.033	78	.966	-30
800.00	.418	-57	.452	-68	.036	79	.972	-33
850.00	.410	-60	.444	-71	.039	80	.973	-34
900.00	.400	-64	.432	-76	.041	81	.966	-37
950.00	.393	-68	.424	-80	.044	81	.958	-39
1000.00	.384	-71	.417	-85	.047	82	.948	-41

Performance Curves NZT
See Page 4-51

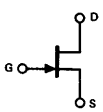
N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

FOR VHF AMPLIFIER, OSCILLATOR AND MIXER APPLICATIONS

- Hermetic Strip Line Package
- High Power Gain
  - 16 dB at 100 MHz, Common-Gate
  - 11 dB at 450 MHz, Common-Gate
- Noise Figure 3 dB Typical at 450 MHz
- Worst Case Input Power Match (75 Ω) VSWR 1.25:1



OD-81



PIN	OUT
1	S
2	D
3	G

ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage . . . . . -25 V
Gate Current . . . . . 20 mA
Total Device Dissipation . . . . . 175 mW
Derate . . . . . 1 mW/°C
Surface Temperature Range . . . . . -65°C to +200°C
Lead Temperature 1/16 From Case (max 10 Sec). . . . 300°C

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

		Characteristic		U316 Min	U316 Max	U317 Min	U317 Max	Unit	Test Conditions	
1	STATIC	I_{GSS}	Gate Reverse Current		-1		-1	nA	V_{GS} = -15 V, V_{DS} = 0	
2					-1		-1	μA		T = 125°C
3		BV_{GSS}	Gate Source Breakdown Volt.	-25		-25		V	I_G = -1 μA, V_{DS} = 0	
4		$V_{GS(off)}$	Gate-Source Cutoff Voltage	-1	-4	-2.5	-6		V_{DS} = 10 V, I_D = 1 nA	
5		$V_{GS(f)}$	Gate-Source Forward Voltage		1		1		I_G = 10 mA, V_{DS} = 0	
6		I_{DSS}	Saturation Drain Current	12	30	24	60	mA	V_{DS} = 10 V, V_{GS} = 0 (Note 1)	
7	DYN	g_{fg}	Common-Gate Forward Transconductance	10	20	10	18	μ mho	V_{DS} = 10 V, I_D = 10 mA	f = 1 kHz (Note 1)
8		g_{og}	Common-Gate Output Conductance		150		150			
9		C_{gd}	Gate-Drain Capacitance		3		3	pF	V_{DS} = 10 V V_{GS} = -10 V	f = 1 MHz
10		C_{gs}	Gate-Source Capacitance		3		3			

Note:
1 Pulsed (test duration 2 mS)

NZT

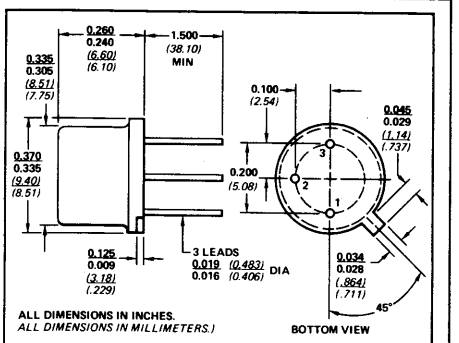
Performance Curves NI
See Page 4-30

N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

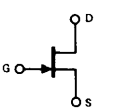
FOR VHF AMPLIFIER, OSCILLATOR AND MIXER APPLICATIONS

This series of FETs is characterized for VHF buffer amplifier service where high r-f power is desired, and for i-f amplifier applications where wide dynamic range and low noise figures are important.

- **High Transconductance (120,000 μmho Typical)**
- **High I_{DSS}**
- **Wide Dynamic Range; High Intercept Point**
- **U320 is Pin-For-Pin Replacement for CP651**



TO-5



PIN	OUT
1	D
2	S
3	G,C

ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage ..... -25 V
Gate Current ..... 100 mA
Total Device Dissipation (25°C Case Temperature) ... 3 mW
Power Rating (to 150°C) ..... 17 mW/°C
Storage Temperature Range ..... -55 to +150°C
Operating Temperature Range ..... -55 to +150°C
Lead Temperature
(1/16" from case for 10 seconds) ..... 300°C

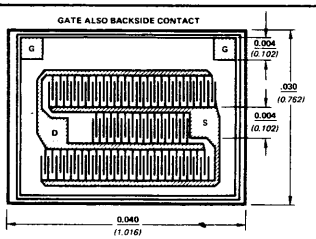
*ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

		Characteristic		U320			U321			U322			Unit	Test Conditions	
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max			
1	STATIC	I_{GSS}	Gate Reverse Current (Note 1)			-3			-3			-3	nA	V_{GS} = -15 V, V_{DS} = 0	
2						-0.5			-0.5			-0.5	μA		T = 100°C
3		$V_{GS(off)}$	Gate-Source Cutoff Voltage	-2		-10	-1		-4	-3		-10	V	V_{DS} = 5 V, I_D = 1 mA	
4		BV_{GSS}	Gate-Source Breakdown Voltage	-25			-25			-25				I_G = -1 μA, V_{DS} = 0	
5		I_{DSS}	Saturation Drain Current (Note 2)	100		500	80		250	200		700	mA	V_{DS} = 15 V, V_{GS} = 0	
6		$V_{GS(f)}$	Gate-Source Forward Voltage			1			1			1	V	I_G = 1 mA, V_{DS} = 0	
7		$r_{DS(on)}$	Drain-Source ON Resistance			10			11			8	Ω	V_{GS} = 0, I_D = 10 mA	
8	DYNAMIC	g_{fs}	Common-Source Forward Transconductance (Note 2)	.075	.12	.20	.075	.12	.20	.075	.13	.20	mhos	V_{DS} = 15 V, V_{GS} = 0	f = 1 kHz
9		C_{iss}	Common-Source Input Capacitance			30			30			30	pF	V_{GS} = -10 V, V_{DS} = 0	f = 1 MHz
10		C_{rss}	Common-Source Reverse Transfer Capacitance			15			15			15			
11		C_{gs}	Gate-Source Capacitance		12			12			12			V_{GS} = -10 V, I_D = 0	
12		C_{gd}	Gate-Drain Capacitance		12			12			12			V_{GD} = -10 V, I_S = 0	
13		e_n	Equivalent Input Noise Voltage		10			10			10		$\frac{nV}{\sqrt{Hz}}$	V_{DS} = 5 V, I_D = 10 mA	f = 1 kHz
14	HIGH FREQ	G_{fg}	Forward Transconductance		55			55			55		mmho	V_{DG} = 20 V, I_D = 25 mA	f = 50 MHz
15		g_{igs}	Common-Gate Input Conductance		56			56			56				
16		G_{ogs}	Common-Gate Output Conductance		0.5			0.5			0.5				
17		G_{DS}	Power Gain (Note 3)		9			9			9		dB		
18		F_t	Gain-Bandwidth (Note 4)		.4			.4			.4		GHz	V_{DS} = 15 V, V_{GS} = 0	
19		NF	Noise Figure (Note 3)		2.5			2.5			2.5		dB	V_{DG} = 20 V, I_D = 25 mA	f = 30 MHz

NOTES:

NI

1. Approximately doubles for every 10°C increase in T_A.
2. Pulse test duration = 2 ms.
3. Noise figure (SSB) and power gain measured in circuit shown.
4. Computed as g_{fs}/C_{rss}.



ALL DIMENSIONS IN INCHES.
(ALL DIMENSIONS IN MILLIMETERS.)

N-CHANNEL DEPLETION MODE SILICON JUNCTION FIELD-EFFECT TRANSISTOR

APPLICATIONS

- **Low ON Resistance for Analog Switching.**
- **Ultra High Transconductance for HF/VHF Amplifiers.**

PACKAGE TYPES:

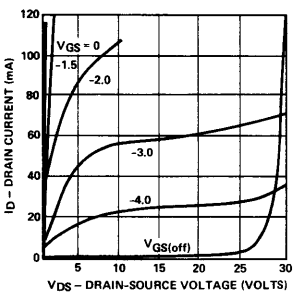
TO-52, TO-60, TO-106

PRINCIPAL DEVICES

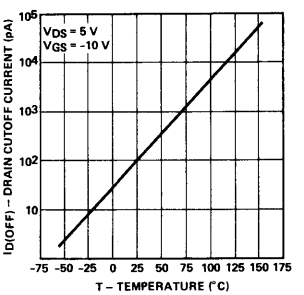
2N5432-34, U244,
U320-22, E108-110,

PERFORMANCE CURVES (25°C unless otherwise noted)

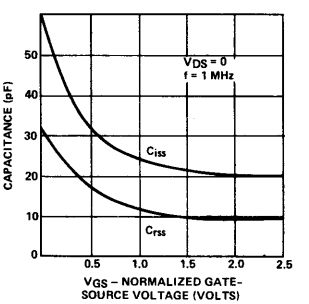
Output Characteristic



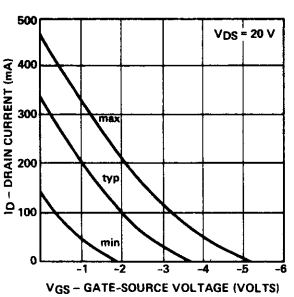
Drain Cutoff Current vs Ambient Temperature



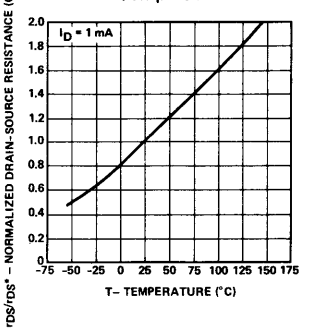
Common-Source Capacitance vs Normalized Gate-Source Voltage



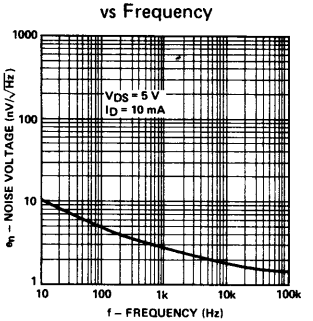
Transfer Characteristics



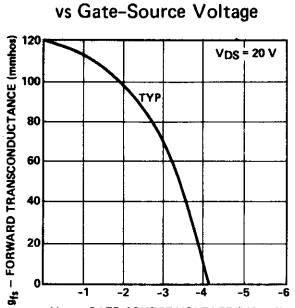
ON Resistance vs Ambient Temperature



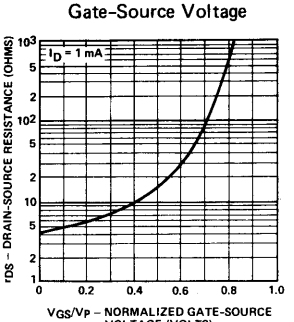
Equivalent Input Noise Voltage vs Frequency



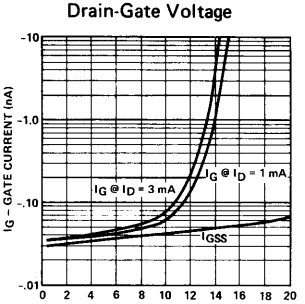
Transconductance Characteristics vs Gate-Source Voltage

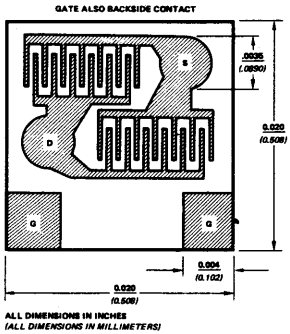


ON Resistance vs Gate-Source Voltage



Gate Currents vs Drain-Gate Voltage





N-CHANNEL DEPLETION MODE SILICON JUNCTION FIELD-EFFECT TRANSISTOR

APPLICATIONS

- VHF/UHF Amplifiers, Oscillators, and Mixers Where Maximum JFET Performance is Required
- Low ON Resistance, Low Capacitance, High Speed Switch

PRINCIPAL TYPES

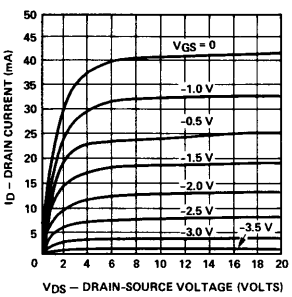
E308-10 E430-31
J308-10 U308-10
U311 U316-17
U430-31

PACKAGE TYPES

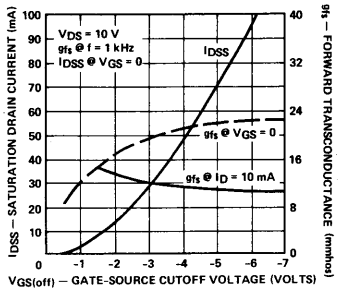
TO-52 TO-72 TO-92
TO-99 TO-105 TO-106
OD-81

PERFORMANCE CURVES (25°C unless otherwise noted)

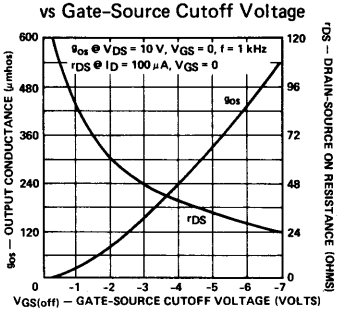
Output Characteristic



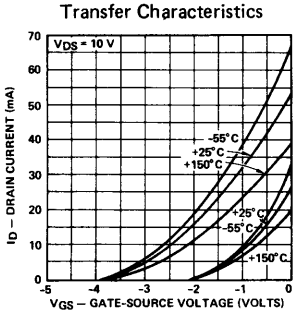
Drain Current & Transconductance vs Gate-Source Cutoff Voltage



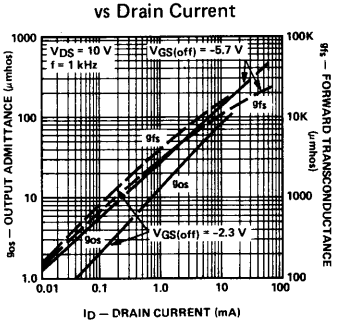
ON Resistance & Output Conductance vs Gate-Source Cutoff Voltage



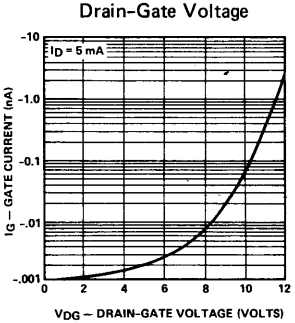
Transfer Characteristics



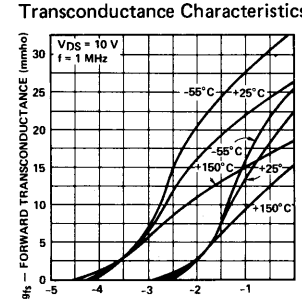
Common-Source Output Admittance & Forward Transconductance vs Drain Current



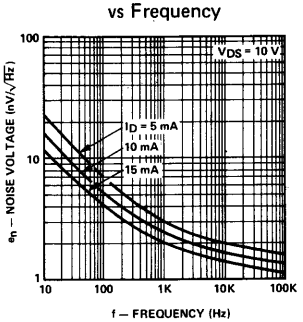
Gate Operating Current vs Drain-Gate Voltage



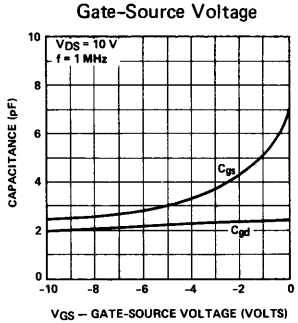
Transconductance Characteristics



Equivalent Input Noise Voltage vs Frequency

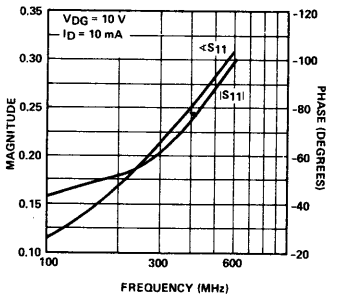


Junction Capacitance vs Gate-Source Voltage

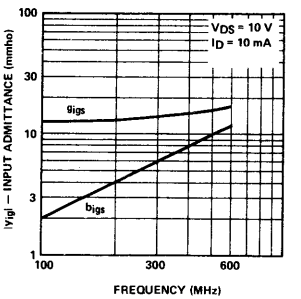


PERFORMANCE CURVES (Con't) (25°C unless otherwise noted)

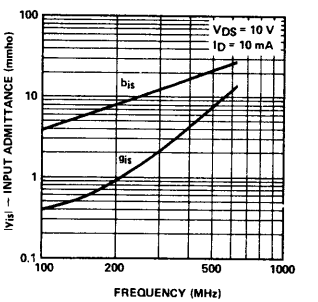
Forward Reflection Coefficient Common Gate



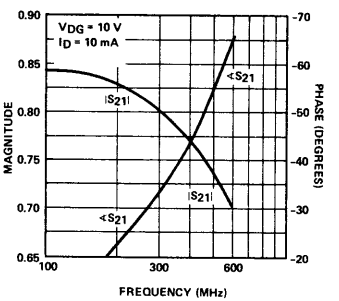
Input Admittance Common Gate



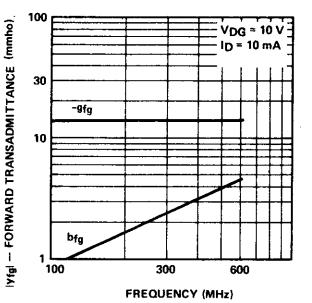
Input Admittance Common Source



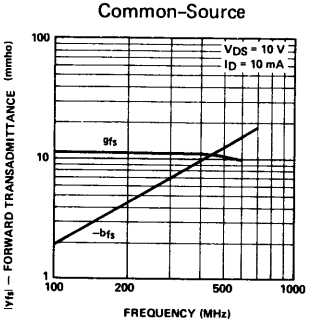
Forward Transmission Coefficient Common Gate



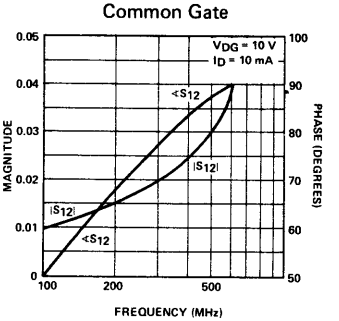
Forward Transfer Admittance Common Gate



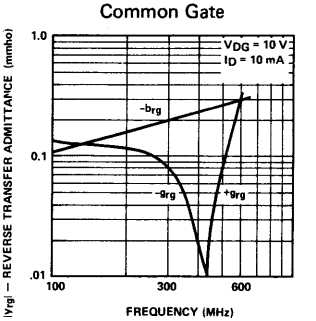
Forward Transfer Admittance Common-Source



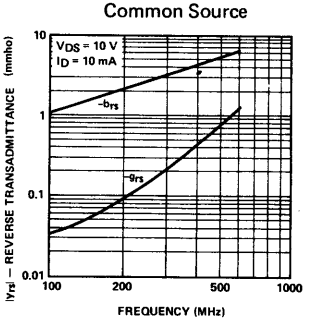
Reverse Transmission Coefficient Common Gate



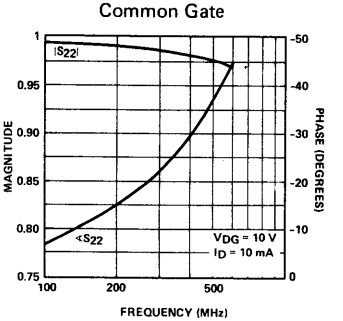
Reverse Transfer Admittance Common Gate



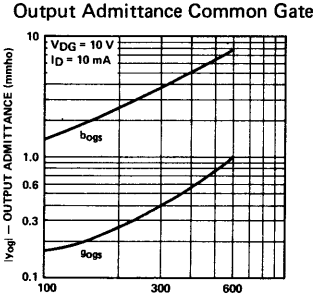
Reverse Transfer Admittance Common Source



Reverse Reflection Coefficient Common Gate



Output Admittance Common Gate



Output Admittance Common Source