n-channel JFETs *designed for . . .*

- **VHF Amplifiers**
- **Front End High Sensitivity Amplifiers**
- **Oscillators**
- **Mixers**

Performance Curves NZA See Section 4

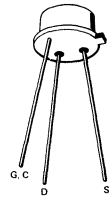
BENEFITS

- Industry Standard
- High Power Gain
  16 dB at 105 MHz, Common-Gate
  11 dB at 450 MHz, Common-Gate
- Low Noise
  2.7 dB Noise Figure at 450 MHz
- Wide Dynamic Range
  Greater than 100 dB
- 75 Ω Input Match Common Gate

ABSOLUTE MAXIMUM RATINGS (25°C)

Gate-Drain or Gate-Source Voltage . . . . . -25 V
Gate Current . . . . . 20 mA
Total Power Dissipation at T_A = 25°C . . . . . 500 mW
Power Derating to 150°C . . . . . 4.0 mW/°C
Storage Temperature Range . . . . . -65 to +150°C
Lead Temperature
(1/16" from case for 10 seconds) . . . . . 300°C

TO-52
See Section 5



ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

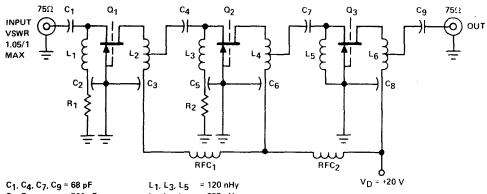
		Characteristic		U308			U309			U310			Unit	Test Conditions	
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max			
1	STATIC	I_{GSS}	Gate Reverse Current			–150			–150			–150	pA	V_{GS} = –15 V, V_{GS} = 0	
2						–150			–150			–150	nA		T_A = 125°C
3		BV_{GSS}	Gate-Source Breakdown Voltage	–25			–25			–25			V	I_G = –1 μA, V_{DS} = 0	
4		$V_{GS(off)}$	Gate-Source Cutoff Voltage	–1.0		–6.0	–1.0		–4.0	–2.5		–6.0		V_{DS} = 10 V, I_D = 1 nA	
5		I_{DSS}	Saturation Drain Current (Note 1)	12		60	12		30	24		60	mA	V_{DS} = 10 V, V_{GS} = 0	
6		$V_{GS(f)}$	Gate-Source Forward Voltage			1.0			1.0			1.0	V	I_G = 10 mA, V_{DS} = 0	
7	DYNAMIC	g_{fg}	Common-Gate Forward Transconductance (Note 1)	10		20	10		20	10		18	mmho	V_{DS} = 10 V, I_D = 10 mA	f = 1 kHz
8		g_{og}	Common-Gate Output Conductance			150			150			150	μmho		
9		C_{gd}	Drain-Gate Capacitance			2.5			2.5			2.5	pF	V_{GS} = –10 V, V_{DS} = 10 V	f = 1 MHz
10		C_{gs}	Gate-Source Capacitance			5.0			5.0			5.0			
11		$\overline{e_n}$	Equivalent Short Circuit Input Noise Voltage		10			10			10		$\frac{nV}{\sqrt{Hz}}$	V_{DS} = 10 V, I_D = 10 mA	f = 100 Hz
12	HI FREQ	g_{fg}	Common-Gate Forward Transconductance		15			15			15		mmho	V_{DS} = 10 V, I_D = 10 mA	f = 105 MHz
13					14			14			14				f = 450 MHz
14		g_{og}	Common-Gate Output Conductance		0.18			0.18			0.18				f = 105 MHz
15					0.32			0.32			0.32				f = 450 MHz
16		G_{pg}	Common-Gate Power Gain (Note 2)	14	16		14	16		14	16		dB		f = 105 MHz
17				10	11		10	11		10	11				f = 450 MHz
18		NF	Noise Figure		1.5	2.0		1.5	2.0		1.5	2.0			f = 105 MHz
19					2.7	3.5		2.7	3.5		2.7	3.5			f = 450 MHz

NOTES:
1. Pulse test duration = 2 ms.
2. Gain (G_{pg}) measured at optimum input noise match.

NZA

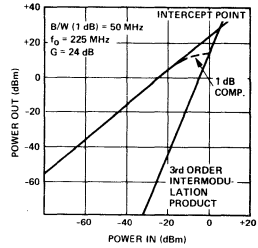
APPLICATIONS

200-250 MHz Wideband Amplifer (1 dB Ripple) 3-Stage Amplifier Circuit

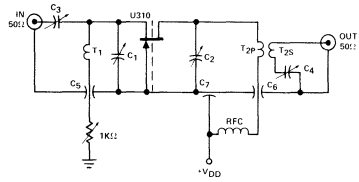


C_1, C_4, C_7, C_9 = 68 pF
C_2, C_5 = 500 pF
C_3, C_6, C_8 = 1,000 pF
Q_1, Q_2, Q_3 = Siliconix U310
L_1, L_3, L_5 = 120 nHy
L_2, L_4, L_6 = 222 nHy
RFC_1, RFC_2 = 2.2 μHy
R_1, R_2 = 51 Ω

2 Tone Intercept & Compression Point Measurement

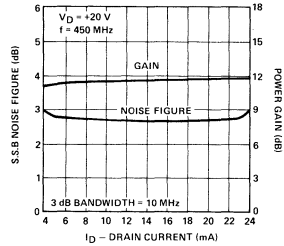


450 MHz Common Gate Amplifier

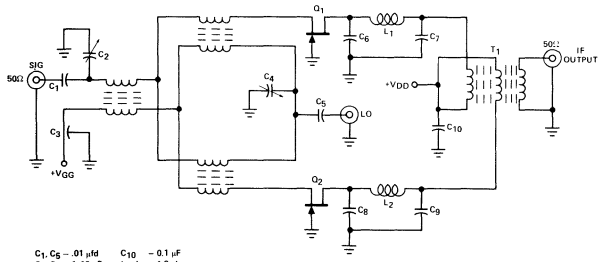


C_1, C_2 – 0.8–10 pF JFD model MVM 010W
C_3, C_4 – 8–35 pF Erie series 539 002D
C_5, C_6 – 5000 pF Erie (2443-000)
C_7 – 1000 pF ALLEN-BRADLEY type FA5C
RFC – 33 μH MILLER type (9230-30)
T_1 – one turn, #16 copper wire, ¼" I.D. (Air Core)
T_{2P} – one turn, #16 copper wire, ¼" I.D. (Air Core)
T_{2S} – one turn, #16 copper wire, ¼" I.D. (Air Core)

Noise Figure vs. Power Gain



Prototype Active Balanced Mixer*



C_1, C_6 – .01 μfd
C_2, C_4 – 1-10 pF
C_3 – 1000 pF
C_5, C_8 – 30 pF
C_7, C_9 – 68 pF
C_{10} – 0.1 μF
L_1, L_2 – 1.3 μhy
Q_1, Q_2 – U310
T_1 – RELCOM BT-9

*Reference Siliconix Application Note AN71-2.

Comparison of Mixer IM Characteristics