

n-channel JFETs designed for . . .

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

Performance Curves NZA
See Section 4

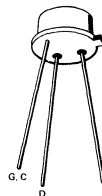
BENEFITS

- 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 $T_A = 25^\circ\text{C}$	500 mW
Power Derating to 150°C	4.0 mW/ $^\circ\text{C}$
Storage Temperature Range	-65 to $+150^\circ\text{C}$
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	S T A T I C	IGSS	Gate Reverse Current		-150			-150			-150	pA	VGS = -15 V, VGS = 0	TA = 125°C	
2					-150			-150			-150	nA			
3		BVGSS	Gate-Source Breakdown Voltage	-25		-25			-25			V	IG = -1 μA, VDS = 0		
4		VGS(off)	Gate-Source Cutoff Voltage	-1.0	-6.0	-1.0	-4.0	-2.5	-6.0				VDS = 10 V, ID = 1 nA		
5		IDSS	Saturation Drain Current (Note 1)	12	60	12		30	24	60		mA	VDS = 10 V, VGS = 0		
6		VGS(f)	Gate-Source Forward Voltage			1.0			1.0			1.0	V		IG = 10 mA, VDS = 0
7	D Y N A M I C	gfg	Common-Gate Forward Transconductance (Note 1)	10		20	10		20	10		18	mmho	VDS = 10 V, ID = 10 mA	f = 1 kHz
8		gog	Common-Gate Output Conductance			150			150			150	μmho		
9		Cgd	Drain-Gate Capacitance			2.5			2.5			2.5	pF	VGS = -10 V, VDS = 10 V	f = 1 MHz
10		Cgs	Gate-Source Capacitance			5.0			5.0			5.0			
11		en	Equivalent Short Circuit Input Noise Voltage		10			10			10		nV √Hz	VDS = 10 V, ID = 10 mA	f = 100 Hz
12		H I F R E Q	gfg	Common-Gate Forward Transconductance		15			15			15	mmho		
13	gog		Common-Gate Output Conductance		14			14			14				
14					0.18		0.18		0.18						
15			0.32		0.32		0.32								
16	Gpg		Common-Gate Power Gain (Note 2)	14	16	14	16	14	16						
17				10	11	10	11	10	11						
18	NF	Noise Figure		1.5	2.0		1.5	2.0		1.5	2.0	dB	f = 105 MHz f = 450 MHz		
19				2.7	3.5	2.7	3.5	2.7	3.5						

NOTES:

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

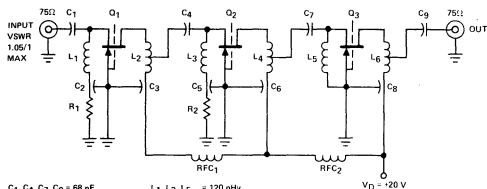
NZA

U308 U309 U310

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APPLICATIONS

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

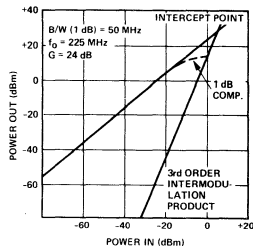


C₁, C₄, C₇, C₉ = 68 pF
C₂, C₅ = 500 pF
C₃, C₆, C₈ = 1,000 pF
Q₁, Q₂, Q₃ = Siliconix U310

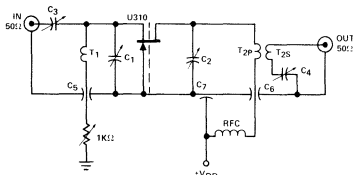
L₁, L₃, L₅ = 120 nH
L₂, L₄, L₆ = 222 nH
RFC₁, RFC₂ = 2.2 μH
R₁, R₂ = 51 Ω

V_D = +20 V

2 Tone Intercept & Compression Point Measurement



450 MHz Common Gate Amplifier

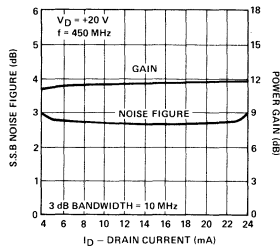


C₁, C₂ = 0.8-10 pF JFD model MVM 010W
C₃, C₄ = 8-35 pF Ene series 538 002D
C₅, C₆ = 5000 pF Ene (2443 000)
C₇ = 1000 pF ALLEN-BRADLEY type FASC

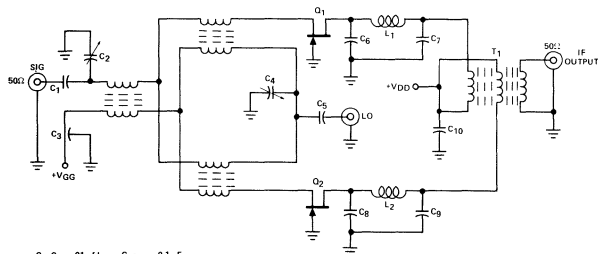
RFC = 33 μH MILLER type (9230-30)
T₁ = one turn, 16 copper wire, 1/4" I.D. (Air Core)
T₂ = one turn, 16 copper wire, 1/4" I.D. (Air Core)
T₃ = one turn, 16 copper wire, 1/4" I.D. (Air Core)

V_D

Noise Figure vs. Power Gain



Prototype Active Balanced Mixer*

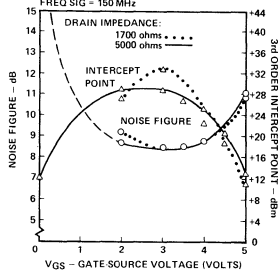


C₁, C₅ = 0.1 μF
C₂, C₄ = 1-10 pF
C₃ = 1000 pF
C₆, C₈ = 30 pF
C₇, C₉ = 68 pF

C₁₀ = 0.1 μF
L₁, L₂ = 1.3 μH
Q₁, Q₂ = U310
T₁ = RELCOM BT 9

Comparison of Mixer IM Characteristics

SOURCE INJECTED MIXER (L.O. & SIGNAL)
FREQ LO = 120 MHz; POWER LO: +17 dBm
FREQ SIG = 150 MHz



*Reference Siliconix Application Note AN71-2.