2N4223
2N4224

CASE 20-03, STYLE 3
TO-72 (TO-206AF)

JFET
VHF AMPLIFIER

N-CHANNEL — DEPLETION

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	Vdc
Drain-Gate Voltage	V_{DG}	30	Vdc
Gate-Source Voltage	V_{GS}	−30	Vdc
Drain Current	I_D	20	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	300 2.0	mW mW/°C
Operating and Junction Temperature Range	T_J	−65 to +175	°C
Storage Temperature Range	T_{stg}	−65 to +175	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Gate-Source Breakdown Voltage (I_G = −10 μAdc, V_{DS} = 0)		$V_{(BR)GSS}$	−30	—	Vdc
Gate Reverse Current		I_{GSS}			nAdc
(V_{GS} = −20 Vdc, V_{DS} = 0)	2N4223		—	−0.25	
	2N4224		—	−0.50	
(V_{GS} = −20 Vdc, V_{DS} = 0, T_A = 100°C)	2N4223		—	−250	
	2N4224		—	−500	
Gate Source Cutoff Voltage		$V_{GS(off)}$			Vdc
(I_D = 0.25 nAdc, V_{DS} = 15 Vdc)	2N4223		−1.2	−8.0	
(I_D = 0.50 nAdc, V_{DS} = 15 Vdc)	2N4224		—	−8.0	
Gate Source Voltage		V_{GS}			Vdc
(I_D = 0.3 mAdc, V_{DS} = 15 Vdc)	2N4223		−1.0	−7.0	
(I_D = 0.2 mAdc, V_{DS} = 15 Vdc)	2N4224		−1.0	−7.5	
ON CHARACTERISTICS					
Zero-Gate-Voltage Drain Current*		I_{DSS}			mAdc
(V_{DS} = 15 Vdc, V_{GS} = 0)	2N4223		3.0	18	
	2N4224		2.0	20	
SMALL-SIGNAL CHARACTERISTICS					
Forward Transfer Admittance		$\|Y_{fs}\|$			μmhos
(V_{DS} = 15 Vdc, V_{GS} = 0, f = 1.0 kHz)*	2N4223		3000	7000	
	2N4224		2000	7500	
(V_{DS} = 15 Vdc, V_{GS} = 0, f = 200 MHz)	2N4223		2700	—	
	2N4224		1700	—	
Input Conductance (V_{DS} = 15 Vdc, V_{GS} = 0, f = 200 MHz)		$Re(y_{is})$	—	800	μmhos
Output Conductance (V_{DS} = 15 Vdc, V_{GS} = 0, f = 200 MHz)		$Re(y_{os})$	—	200	μmhos
Input Capacitance (V_{DS} = 15 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	—	6.0	pF
Reverse Transfer Capacitance (V_{DS} = 15 Vdc, V_{GS} = 0, f = 1.0 MHz)		C_{rss}	—	2.0	pF

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
FUNCTIONAL CHARACTERISTICS				
Noise Figure (V_{DS} = 15 Vdc, V_{GS} = 0, R_S = 1.0 k ohm, f = 200 MHz) 2N4223	NF	—	5.0	dB
Small-Signal Power Gain Common Source (V_{DS} = 15 Vdc, V_{GS} = 0, f = 200 MHz) 2N4223	G_{ps}	10	—	dB

*Pulse Test: Pulse Width ≤ 630 ms, Duty Cycle ≤ 10%.

FIGURE 1–NOISE FIGURE AND POWER GAIN TEST CIRCUIT

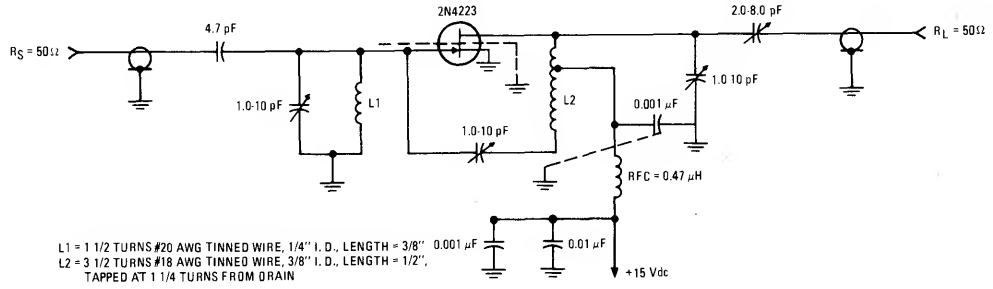

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FIGURE 2 – DRAIN CURRENT versus GATE-SOURCE VOLTAGE

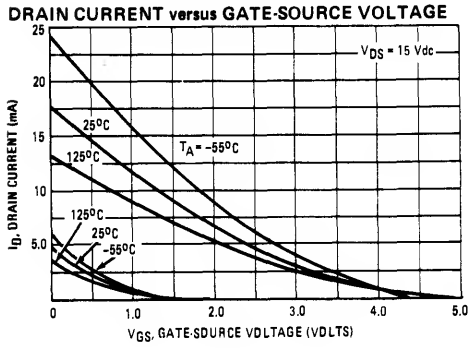


FIGURE 3 – TEMPERATURE COEFFICIENT FOR DRAIN CURRENT

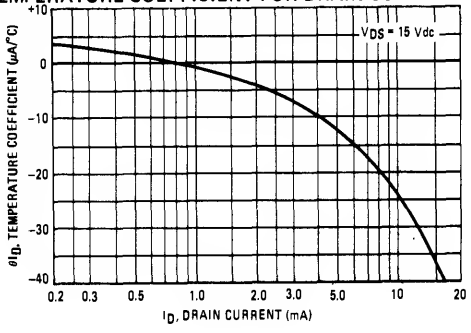


FIGURE 4 – FORWARD TRANSFER ADMITTANCE versus GATE-SOURCE VOLTAGE

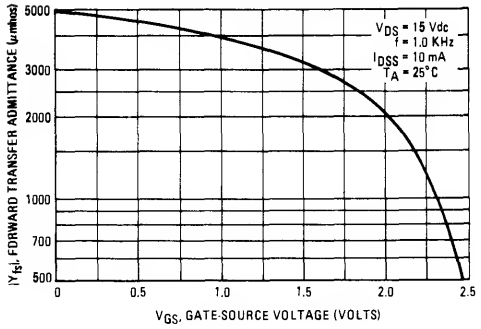


FIGURE 5 – TEMPERATURE COEFFICIENT FOR Y_{fs} versus DRAIN CURRENT

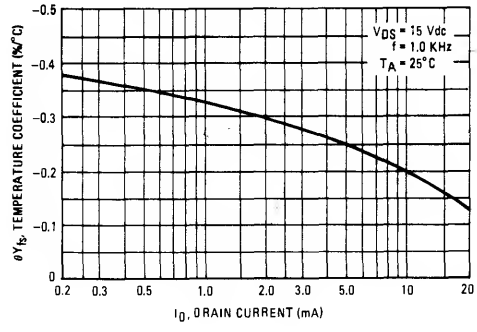


FIGURE 6 – CAPACITANCES

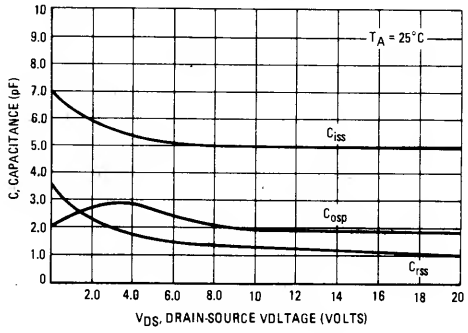


FIGURE 7 – COMMON SOURCE NOISE FIGURE versus SOURCE RESISTANCE

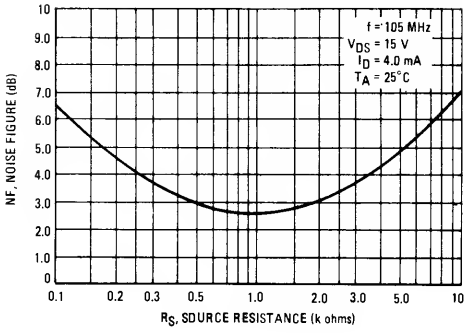


FIGURE 8 – INPUT ADMITTANCE versus FREQUENCY

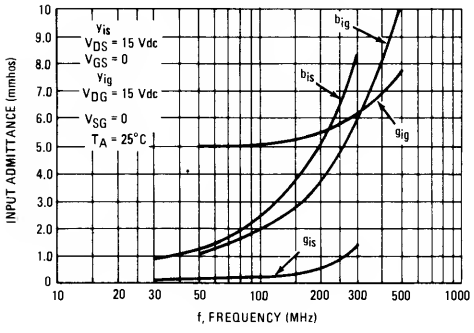


FIGURE 9 – FORWARD TRANSFER ADMITTANCE versus FREQUENCY

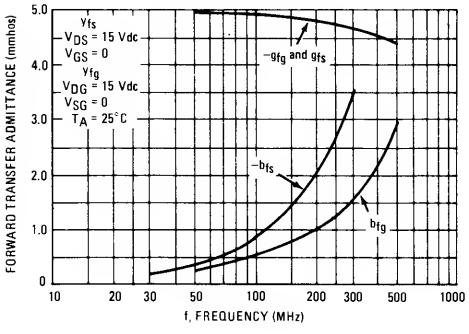


FIGURE 10 – OUTPUT ADMITTANCE versus FREQUENCY

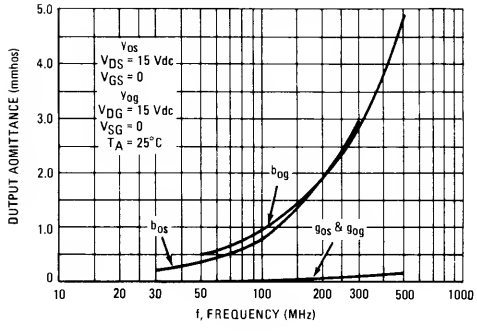


FIGURE 11 – REVERSE TRANSFER ADMITTANCE versus FREQUENCY

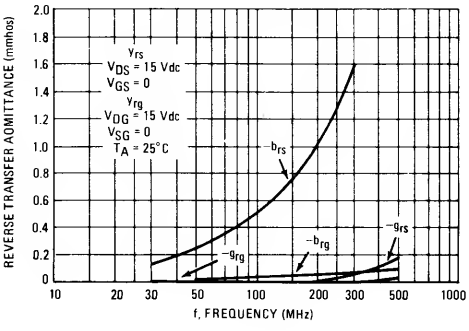


FIGURE 12 – POWER GAIN versus FREQUENCY

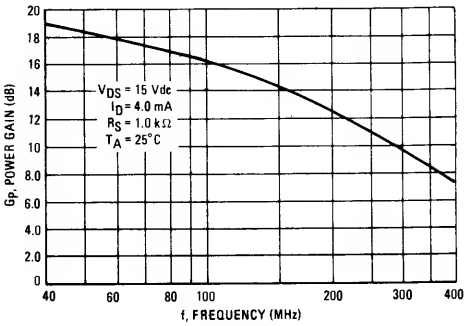
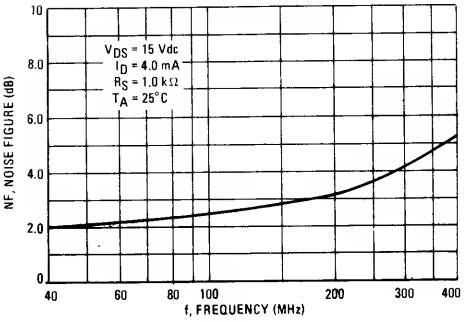


FIGURE 13 – COMMON SOURCE NOISE FIGURE versus FREQUENCY



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