

MOTOROLA SC (XSTRS/R F)

96 DE 6367254 0082608 6

6367254 MOTOROLA SC (XSTRS/R F)

96D 82608 D

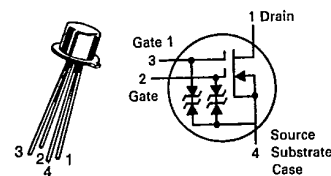
T-31-25

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	25	V _{dc}
Drain-Gate Voltage	V _{DG1} V _{DG2}	30 30	V _{dc}
Drain Current	I _D	50	mAdc
Gate Current	I _{G1} I _{G2}	±10 ±10	mAdc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	360 2.4	mW mW/°C
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	1.2 8.0	Watt mW/°C
Lead Temperature	T _L	300	°C
Junction Temperature Range	T _J	-65 to +175	°C
Storage Channel Temperature Range	T _{stg}	-65 to +175	°C

3N201
3N202
3N203

CASE 20-03, STYLE 9
TO-72 (TO-206AF)



DUAL-GATE MOSFET
VHF AMPLIFIER

N-CHANNEL — DEPLETION

Refer to MPF201 for additional graphs.

#6

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (I _D = 10 μAdc, V _S = 0, V _{G1S} = V _{G2S} = -5.0 Vdc)	V _{(BR)DSX}	25	—	—	V _{dc}
Gate 1-Source Breakdown Voltage(1) (I _{G1} = ±10 mAdc, V _{G2S} = V _{DS} = 0)	V _{(BR)G1SO}	±6.0	±12	±30	V _{dc}
Gate 2-Source Breakdown Voltage(1) (I _{G2} = ±10 mAdc, V _{G1S} = V _{DS} = 0)	V _{(BR)G2SO}	±6.0	±12	±30	V _{dc}
Gate 1 Leakage Current (V _{G1S} = ±5.0 Vdc, V _{G2S} = V _{DS} = 0, T _A = 150°C) (V _{G1S} = -5.0 Vdc, V _{G2S} = V _{DS} = 0, T _A = 150°C)	I _{G1SS}	—	±.040 —	±10 -10	nAdc μAdc
Gate 2 Leakage Current (V _{G2S} = ±5.0 Vdc, V _{G1S} = V _{DS} = 0, T _A = 150°C) (V _{G2S} = -5.0 Vdc, V _{G1S} = V _{DS} = 0, T _A = 150°C)	I _{G2SS}	—	±.050 —	±10 -10	nAdc μAdc
Gate 1 to Source Cutoff Voltage (V _{DS} = 15 Vdc, V _{G2S} = 4.0 Vdc, I _D = 20 μAdc)	V _{G1S(off)}	-0.5	-1.5	-5.0	V _{dc}
Gate 2 to Source Cutoff Voltage (V _{DS} = 15 Vdc, V _{G1S} = 0, I _D = 20 μAdc)	V _{G2S(off)}	-0.2	-1.4	-5.0	V _{dc}
ON CHARACTERISTICS					
Zero-Gate-Voltage Drain Current(2) (V _{DS} = 15 Vdc, V _{G1S} = 0, V _{G2S} = 4.0 Vdc)	I _{DSS}	6.0 3.0	13 11	30 15	mAdc
SMALL-SIGNAL CHARACTERISTICS					
Forward Transfer Admittance(3) (V _{DS} = 15 Vdc, V _{G2S} = 4.0 Vdc, V _{G1S} = 0, f = 1.0 kHz)	Y _{fs}	8.0 7.0	12.8 12.5	20 15	mmhos
Input Capacitance (V _{DS} = 15 Vdc, V _{G2S} = 4.0 Vdc, I _D = I _{DSS} , f = 1.0 MHz)	C _{iss}	—	3.3	—	pF
Reverse Transfer Capacitance (V _{DS} = 15 Vdc, V _{G2S} = 4.0 Vdc, I _D = 10 mAdc, f = 1.0 MHz)	C _{rss}	0.005	0.014	0.03	pF
Output Capacitance (V _{DS} = 15 Vdc, V _{G2S} = 4.0 Vdc, I _D = I _{DSS} , f = 1.0 MHz)	C _{oss}	—	1.7	—	pF
FUNCTIONAL CHARACTERISTICS					
Noise Figure (V _{DD} = 18 Vdc, V _{GG} = 7.0 Vdc, f = 200 MHz) (Figure 1) (V _{DD} = 18 Vdc, V _{GG} = 6.0 Vdc, f = 45 MHz) (Figure 3)	NF	— —	1.8 5.3	4.5 6.0	dB

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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96D 82609 D

3N201, 3N202, 3N203

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ELECTRICAL CHARACTERISTICS (continued) ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Common Source Power Gain ($V_{DD} = 18\text{ Vdc}$, $V_{GG} = 7.0\text{ Vdc}$, $f = 200\text{ MHz}$) (Figure 1)	G_{ps}	15	20	25	dB
($V_{DD} = 18\text{ Vdc}$, $V_{GG} = 6.0\text{ Vdc}$, $f = 45\text{ MHz}$) (Figure 3)		20	25	30	
($V_{DD} = 18\text{ Vdc}$, $f_{LO} = 245\text{ MHz}$, $f_{RF} = 200\text{ MHz}$) (Figure 2)	$G_c(5)$	15	19	25	
Bandwidth ($V_{DD} = 18\text{ Vdc}$, $V_{GG} = 7.0\text{ Vdc}$, $f = 200\text{ MHz}$) (Figure 1)	BW	5.0	—	9.0	MHz
($V_{DD} = 18\text{ Vdc}$, $f_{LO} = 245\text{ MHz}$, $f_{RF} = 200\text{ MHz}$) (Figure 2)		4.5	—	7.5	
($V_{DD} = 18\text{ Vdc}$, $V_{GG} = 6.0\text{ Vdc}$, $f = 45\text{ MHz}$) (Figure 3)		3.0	—	6.0	
Gain Control Gate-Supply Voltage(4) ($V_{DD} = 18\text{ Vdc}$, $\Delta G_{ps} = -30\text{ dB}$, $f = 200\text{ MHz}$) (Figure 1)	$V_{GG}(GC)$	0	-1.0	-3.0	Vdc
($V_{DD} = 18\text{ Vdc}$, $\Delta G_{ps} = -30\text{ dB}$, $f = 45\text{ MHz}$) (Figure 3)		0	-0.6	-3.0	

(1) All gate breakdown voltages are measured while the device is conducting rated gate current. This ensures that the gate-voltage limiting network is functioning properly.

(2) Pulse Test: Pulse Width = $300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

(3) This parameter must be measured with bias voltages applied for less than 5 seconds to avoid overheating.

(4) ΔG_{ps} is defined as the change in G_{ps} from the value at $V_{GG} = 7.0\text{ volts}$ (3N201) and $V_{GG} = 6.0\text{ volts}$ (3N203).

(5) Power Gain Conversion

FIGURE 1 – 200-MHz TEST CIRCUIT SCHEMATIC FOR 3N201

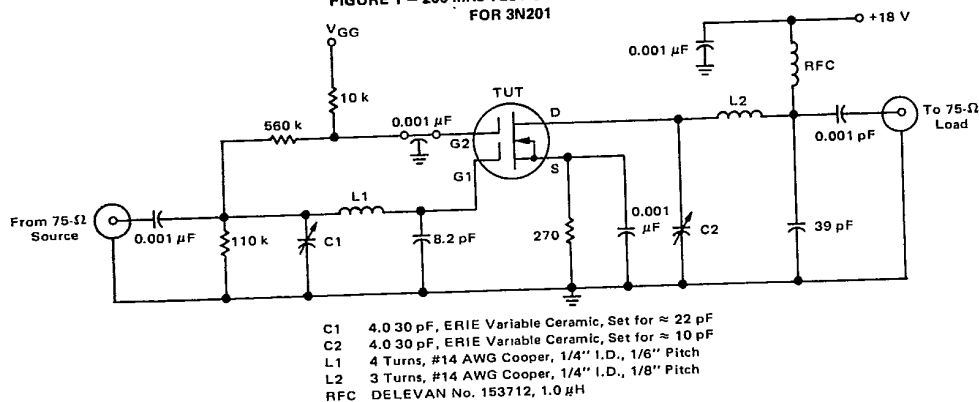
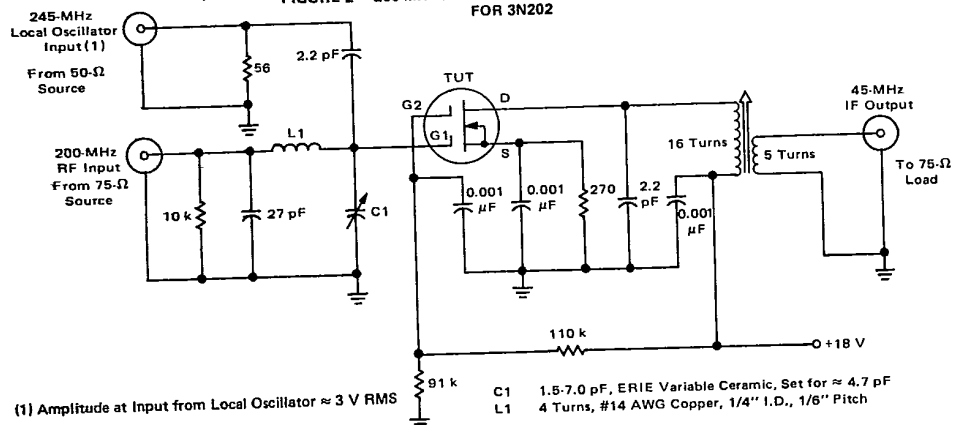


FIGURE 2 – 200-MHz-to-45-MHz TEST CIRCUIT SCHEMATIC FOR 3N202



MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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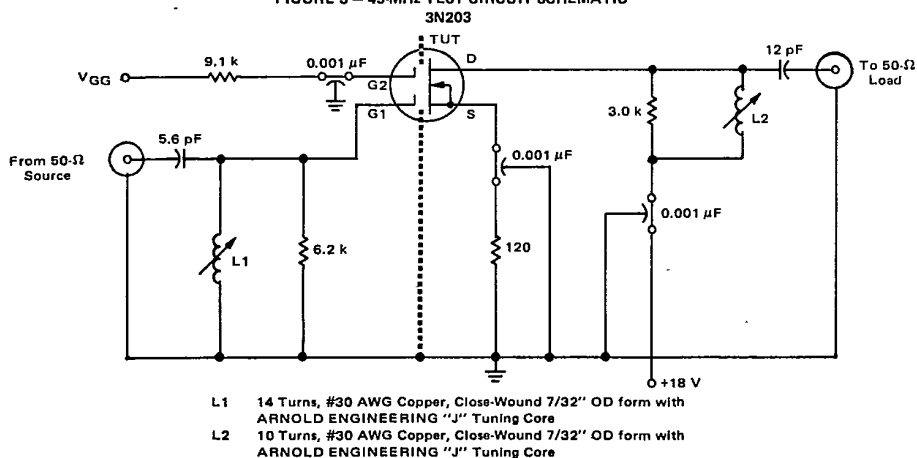
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3N201, 3N202, 3N203

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FIGURE 3 - 45-MHz TEST CIRCUIT SCHEMATIC



TYPICAL CHARACTERISTICS

FIGURE 4 - DRAIN CURRENT versus DRAIN TO SOURCE VOLTAGE

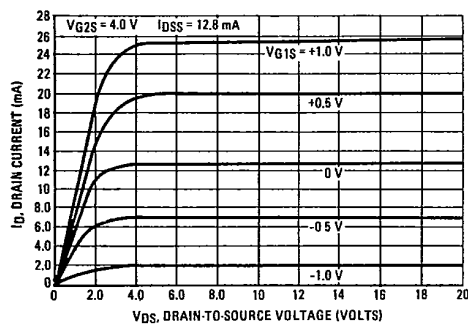


FIGURE 5 - DRAIN CURRENT versus GATE-ONE to SOURCE VOLTAGE

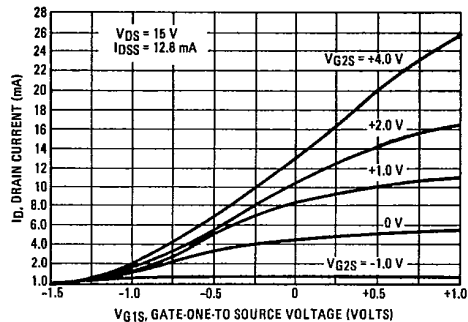


FIGURE 6 - SMALL-SIGNAL COMMON-SOURCE GATE-ONE FORWARD TRANSFER ADMITTANCE versus DRAIN CURRENT

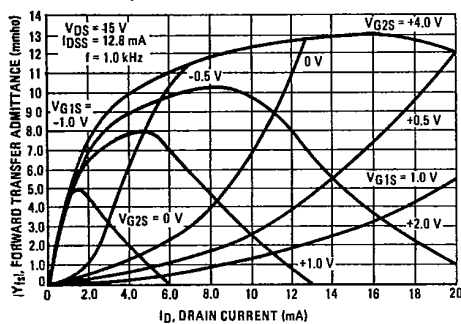
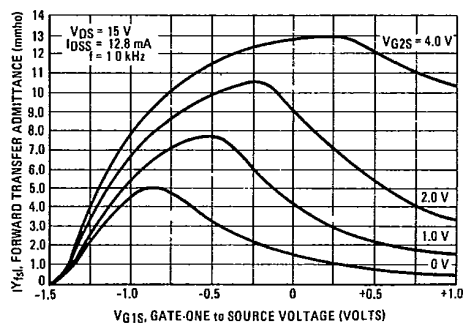


FIGURE 7 - SMALL-SIGNAL COMMON-SOURCE GATE-ONE FORWARD TRANSFER ADMITTANCE versus GATE-ONE to SOURCE VOLTAGE



MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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FIGURE 8 — SMALL-SIGNAL COMMON-SOURCE GATE-ONE
FORWARD TRANSFER ADMITTANCE versus
GATE-TWO to SOURCE VOLTAGE

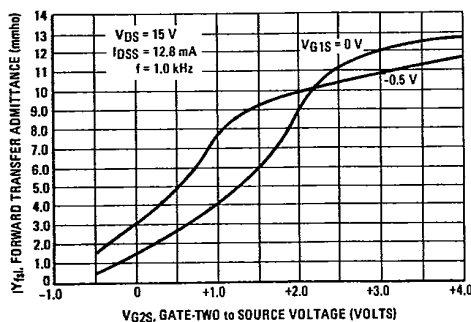
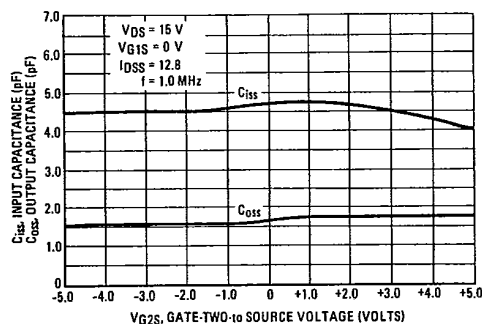


FIGURE 9 — SMALL-SIGNAL COMMON-SOURCE GATE-ONE
INPUT AND OUTPUT CAPACITANCE versus
GATE-TWO to SOURCE VOLTAGE



TYPICAL CHARACTERISTICS

FIGURE 10 — COMMON-SOURCE POWER GAIN AND
SPOT NOISE FIGURE versus DRAIN CURRENT

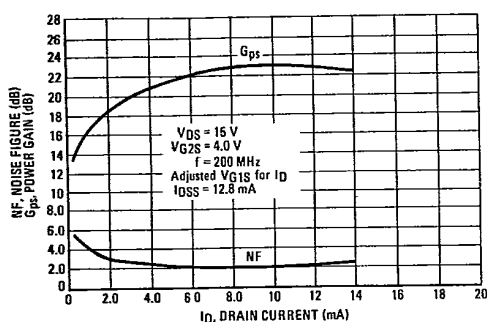


FIGURE 11 — COMMON-SOURCE POWER GAIN AND
SPOT NOISE FIGURE versus GAIN CONTROL
GATE-SUPPLY VOLTAGE — 3N201

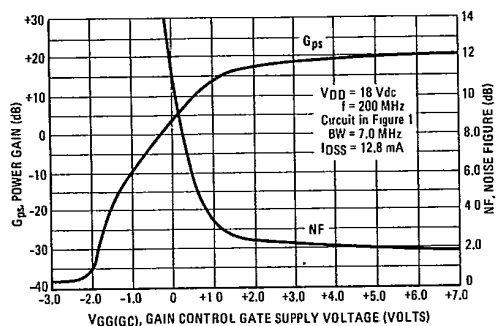


FIGURE 12 — COMMON-SOURCE POWER GAIN
versus DRAIN SUPPLY CURRENT — 3N201

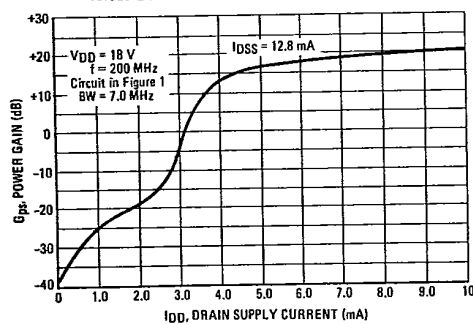
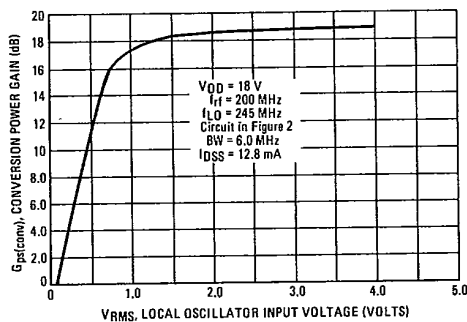


FIGURE 13 — SMALL-SIGNAL COMMON-SOURCE
CONVERSION POWER GAIN versus
LOCAL OSCILLATOR INPUT VOLTAGE — 3N202



MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

MOTOROLA SC (XSTRS/R F)

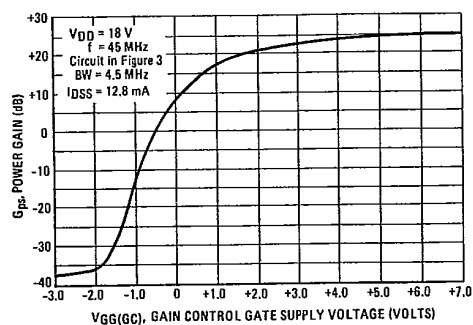
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FIGURE 14 - SMALL-SIGNAL COMMON SOURCE
INSERTION POWER GAIN versus GAIN CONTROL
GATE-SUPPLY VOLTAGE - 3N203



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TYPICAL CHARACTERISTICS

FIGURE 15 - SMALL-SIGNAL GATE ONE FORWARD
TRANSFER ADMITTANCE versus FREQUENCY

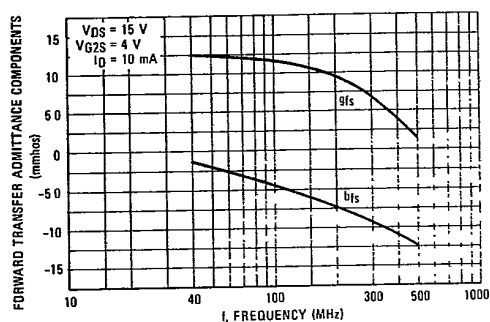


FIGURE 16 - SMALL-SIGNAL GATE ONE INPUT
ADMITTANCE versus FREQUENCY

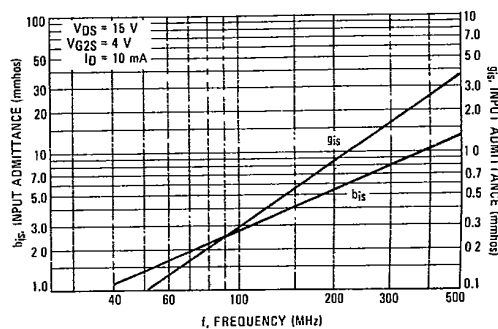
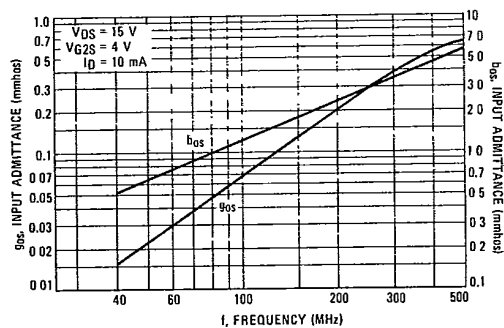


FIGURE 17 - SMALL-SIGNAL GATE ONE OUTPUT
ADMITTANCE versus FREQUENCY



MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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www.datasheetcatalog.com

Datasheets for electronics components.



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