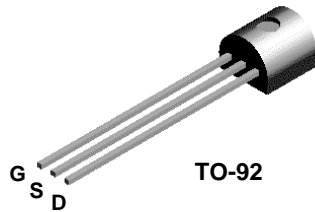
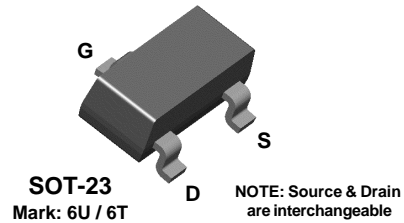


**J309**  
**J310**



**MMBFJ309**  
**MMBFJ310**



J309 / J310 / MMBFJ309 / MMBFJ310

## N-Channel RF Amplifier

This device is designed for VHF/UHF amplifier, oscillator and mixer applications. As a common gate amplifier, 16 dB at 100 MHz and 12 dB at 450 MHz can be realized. Sourced from Process 92.

### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>DS</sub>	Drain-Source Voltage	25	V
V <sub>GS</sub>	Gate-Source Voltage	- 25	V
I <sub>GF</sub>	Forward Gate Current	10	mA
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°C

\*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		J309-J310	*MMBFJ309-310	
P <sub>D</sub>	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	125		°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	357	556	°C/W

\* Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

# N-Channel RF Amplifier

(continued)

## Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### OFF CHARACTERISTICS

$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = -1.0 \mu A, V_{DS} = 0$	-25			V
$I_{GSS}$	Gate Reverse Current	$V_{GS} = -15 V, V_{DS} = 0$ $V_{GS} = -15 V, V_{DS} = 0, T_A = 125^\circ C$			-1.0 -1.0	nA $\mu A$
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 10 V, I_D = 1.0 nA$	309 310	-1.0 -2.0	-4.0 -6.5	V V

### ON CHARACTERISTICS

$I_{DSS}$	Zero-Gate Voltage Drain Current*	$V_{DS} = 10 V, V_{GS} = 0$	309 310	12 24	30 60	mA mA
$V_{GS(f)}$	Gate-Source Forward Voltage	$V_{DS} = 0, I_G = 1.0 mA$			1.0	V

### SMALL SIGNAL CHARACTERISTICS

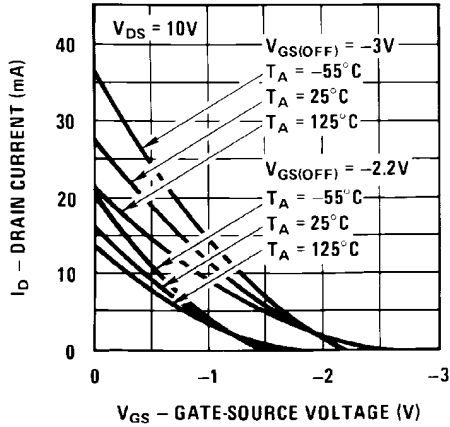
$Re(Y_{is})$	Common-Source Input Conductance	$V_{DS} = 10, I_D = 10 mA, f = 100 MHz$	309 310		0.7 0.5	mmhos mmhos
$Re(Y_{os})$	Common-Source Output Conductance	$V_{DS} = 10, I_D = 10 mA, f = 100 MHz$			0.25	mmhos
$G_{pg}$	Common-Gate Power Gain	$V_{DS} = 10, I_D = 10 mA, f = 100 MHz$			16	dB
$Re(Y_{fs})$	Common-Source Forward Transconductance	$V_{DS} = 10, I_D = 10 mA, f = 100 MHz$			12	mmhos
$Re(Y_{ig})$	Common-Gate Input Conductance	$V_{DS} = 10, I_D = 10 mA, f = 100 MHz$			12	mmhos
$g_{fs}$	Common-Source Forward Transconductance	$V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz$	309 310	10,000 8000	20,000 18,000	$\mu mhos$ $\mu mhos$
$g_{oss}$	Common-Source Output Conductance	$V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz$			150	$\mu mhos$
$g_{fg}$	Common-Gate Forward Conductance	$V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz$	309 310		13,000 12,000	$\mu mhos$ $\mu mhos$
$g_{og}$	Common-Gate Output Conductance	$V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz$	309 310		100 150	$\mu mhos$ $\mu mhos$
$C_{dg}$	Drain-Gate Capacitance	$V_{DS} = 0, V_{GS} = -10 V, f = 1.0 MHz$			2.0	pF
$C_{sg}$	Source-Gate Capacitance	$V_{DS} = 0, V_{GS} = -10 V, f = 1.0 MHz$			4.1	pF
NF	Noise Figure	$V_{DS} = 10 V, I_D = 10 mA, f = 450 MHz$			3.0	dB
$e_n$	Equivalent Short-Circuit Input Noise Voltage	$V_{DS} = 10 V, I_D = 10 mA, f = 100 Hz$			6.0	$nV/\sqrt{Hz}$

\*Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$

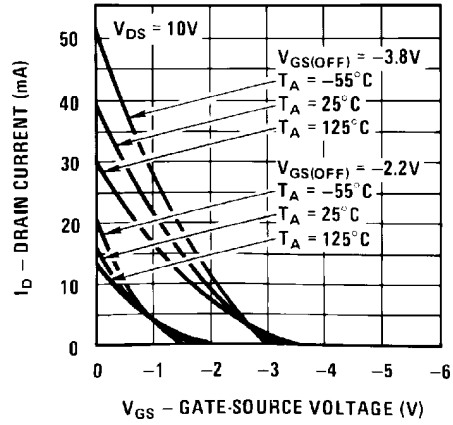
J309 / J310 / MMBFJ309 / MMBFJ310

Typical Characteristics

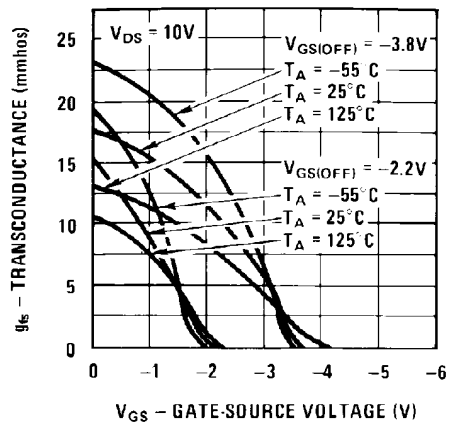
Transfer Characteristics



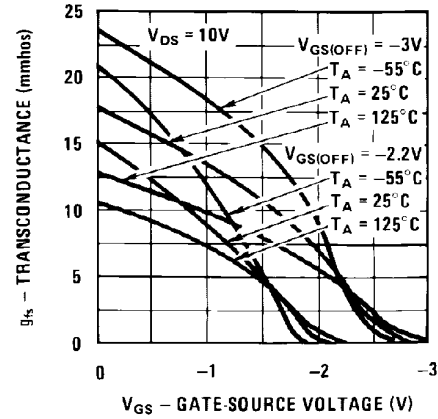
Transfer Characteristics



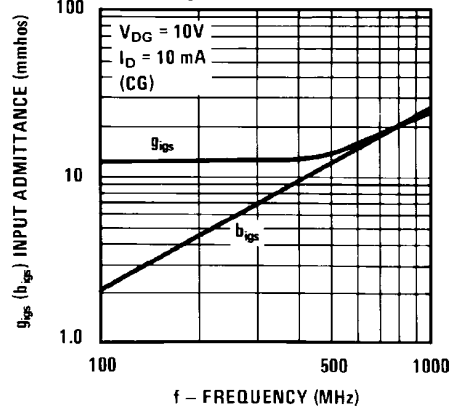
Transfer Characteristics



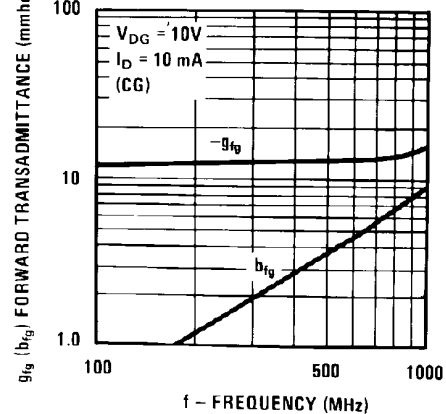
Transfer Characteristics



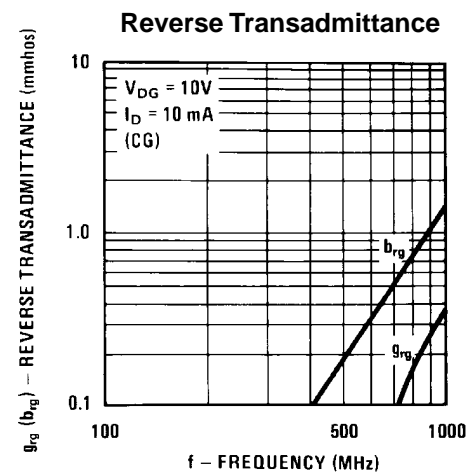
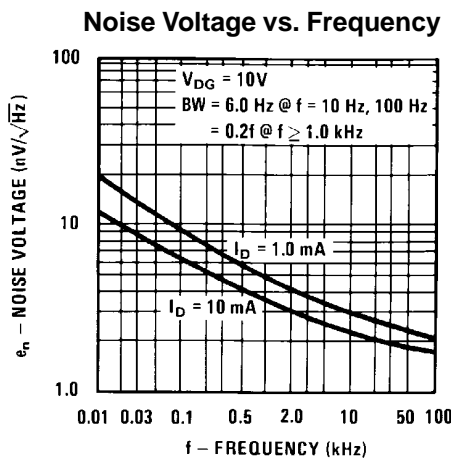
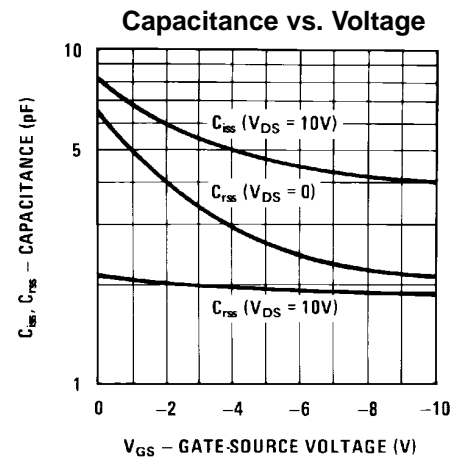
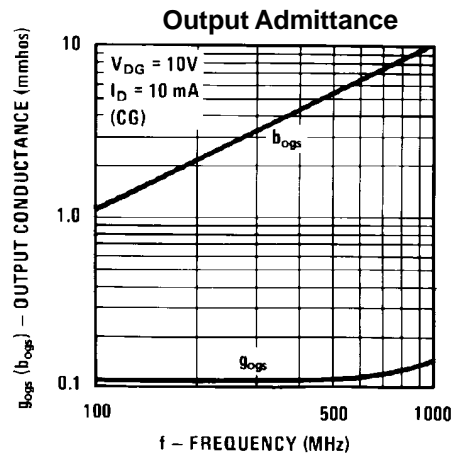
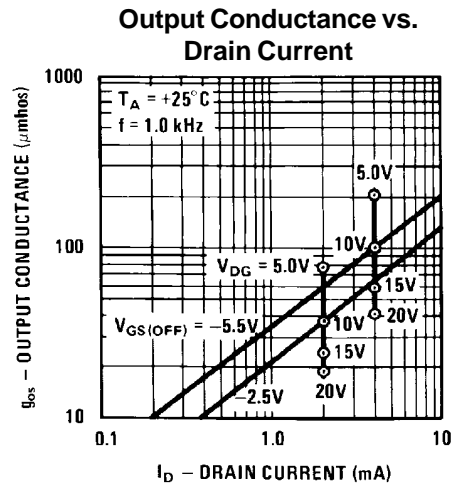
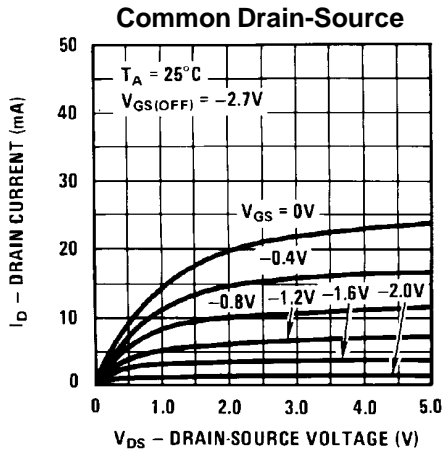
Input Admittance



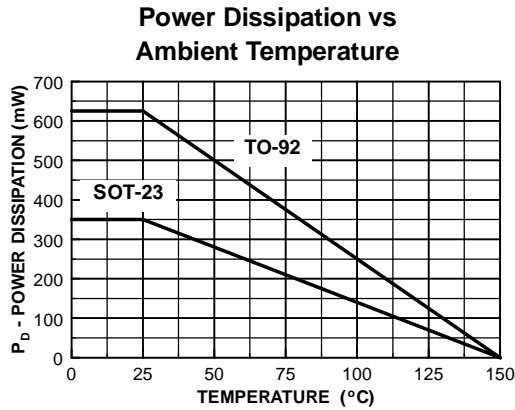
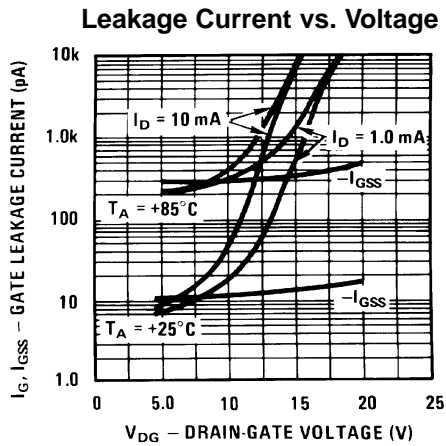
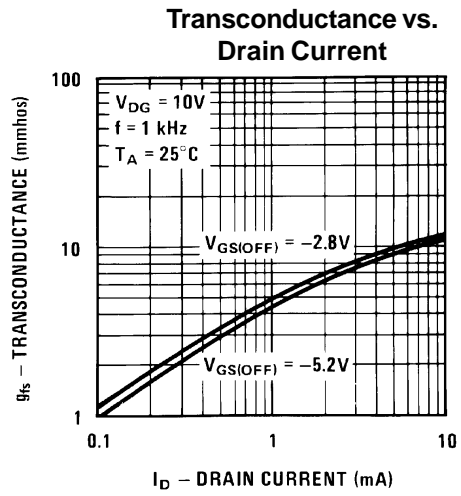
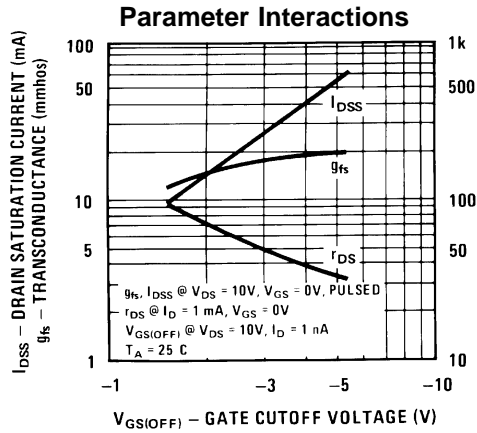
Forward Transadmittance



Typical Characteristics (continued)



Typical Characteristics (continued)



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