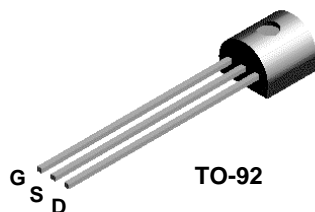
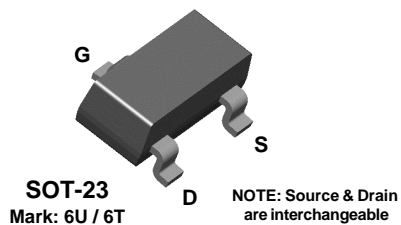


**J309**  
**J310**



**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
$V_{DS}$	Drain-Source Voltage	25	V
$V_{GS}$	Gate-Source Voltage	- 25	V
$I_{GF}$	Forward Gate Current	10	mA
$T_J, T_{stg}$	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	
$P_D$	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		°C/W
$R_{\theta JA}$	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 <sub>(BR)GSS</sub>	Gate-Source Breakdown Voltage	I <sub>G</sub> = - 1.0 μA, V <sub>DS</sub> = 0	- 25			V
I <sub>GSS</sub>	Gate Reverse Current	V <sub>GS</sub> = - 15 V, V <sub>DS</sub> = 0 V <sub>GS</sub> = - 15 V, V <sub>DS</sub> = 0, T <sub>A</sub> = 125°C			- 1.0 - 1.0	nA μA
V <sub>GS(off)</sub>	Gate-Source Cutoff Voltage	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 nA	- 1.0 - 2.0		- 4.0 - 6.5	V V

### ON CHARACTERISTICS

I <sub>DSS</sub>	Zero-Gate Voltage Drain Current*	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0	<b>309</b> <b>310</b>	12 24	30 60	mA mA
V <sub>GS(f)</sub>	Gate-Source Forward Voltage	V <sub>DS</sub> = 0, I <sub>G</sub> = 1.0 mA			1.0	V

### SMALL SIGNAL CHARACTERISTICS

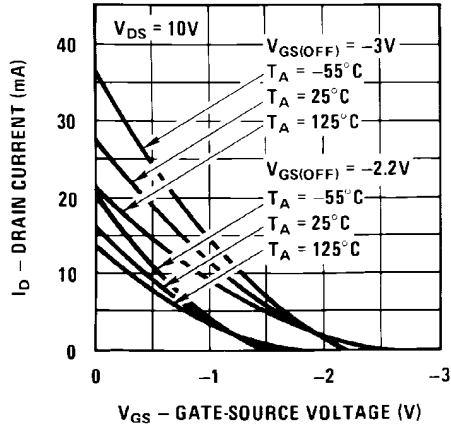
Re(y <sub>is</sub> )	Common-Source Input Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 100 MHz		0.7 0.5		mmhos mmhos
Re(y <sub>os</sub> )	Common-Source Output Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 100 MHz		0.25		mmhos
G <sub>pg</sub>	Common-Gate Power Gain	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 100 MHz		16		dB
Re(y <sub>fs</sub> )	Common-Source Forward Transconductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 100 MHz		12		mmhos
Re(y <sub>ig</sub> )	Common-Gate Input Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 100 MHz		12		mmhos
g <sub>fs</sub>	Common-Source Forward Transconductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 1.0 kHz	10,000 8000		20,000 18,000	μmhos μmhos
g <sub>oss</sub>	Common-Source Output Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 1.0 kHz			150	μmhos
g <sub>fg</sub>	Common-Gate Forward Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 1.0 kHz		13,000 12,000		μmhos μmhos
g <sub>og</sub>	Common-Gate Output Conductance	V <sub>DS</sub> = 10, I <sub>D</sub> = 10 mA, f = 1.0 kHz		100 150		μmhos μmhos
C <sub>dg</sub>	Drain-Gate Capacitance	V <sub>DS</sub> = 0, V <sub>GS</sub> = - 10 V, f = 1.0 MHz		2.0	2.5	pF
C <sub>sg</sub>	Source-Gate Capacitance	V <sub>DS</sub> = 0, V <sub>GS</sub> = - 10 V, f = 1.0 MHz		4.1	5.0	pF
NF	Noise Figure	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 10 mA, f = 450 MHz		3.0		dB
e <sub>n</sub>	Equivalent Short-Circuit Input Noise Voltage	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 10 mA, f = 100 Hz		6.0		nV/√Hz

\* Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

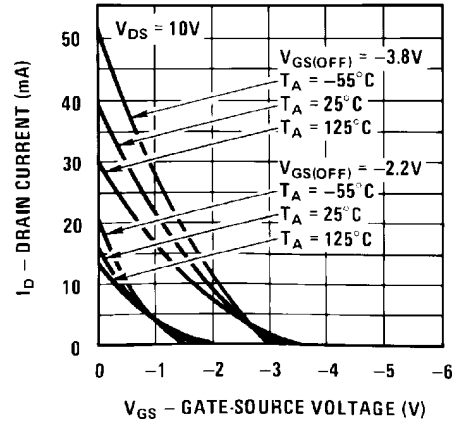
J309 / J310 / MMBFJ309 / MMBFJ310

## Typical Characteristics

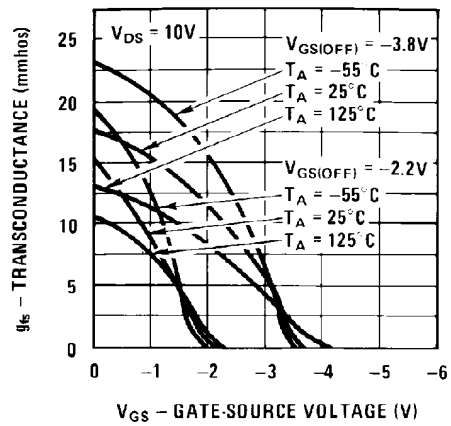
Transfer Characteristics



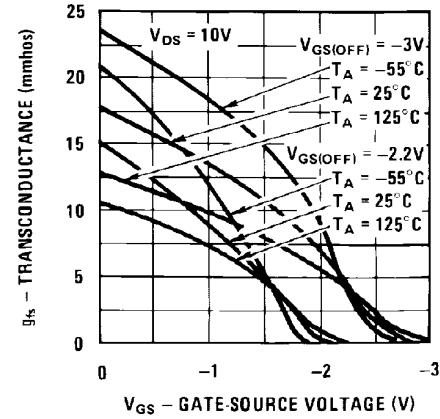
Transfer Characteristics



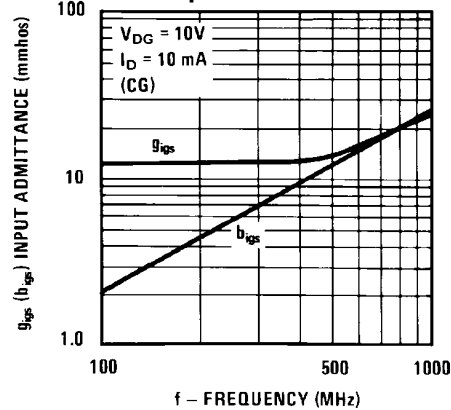
Transfer Characteristics



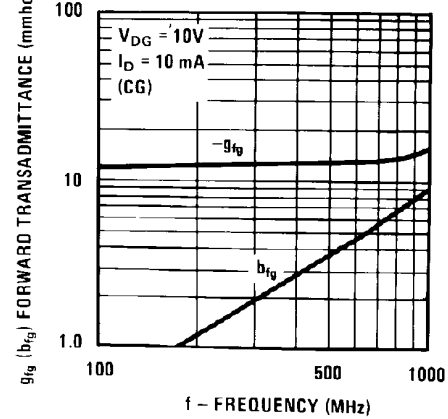
Transfer Characteristics



Input Admittance

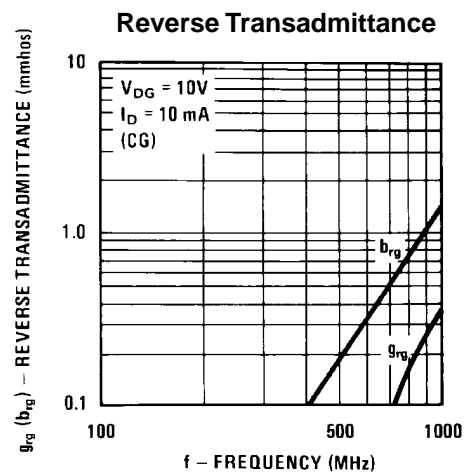
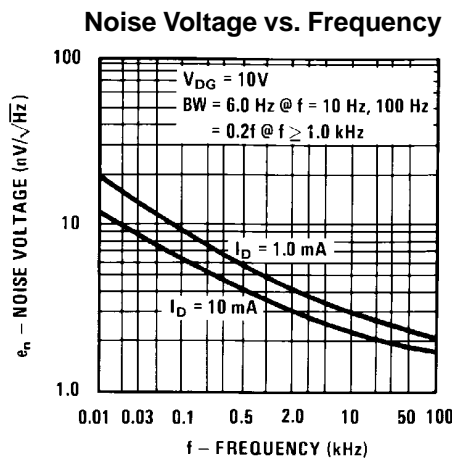
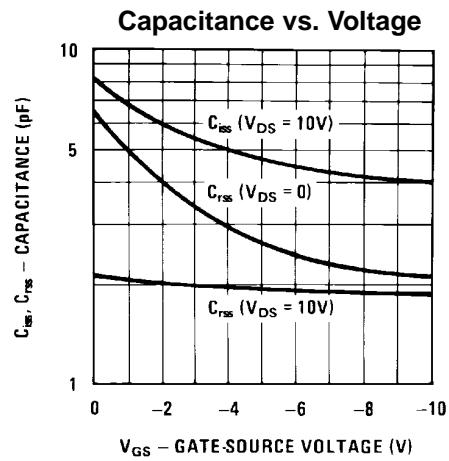
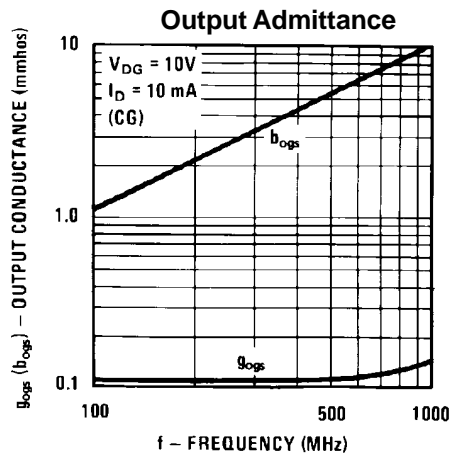
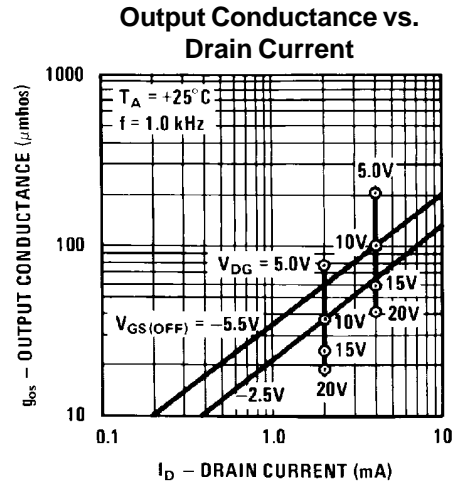
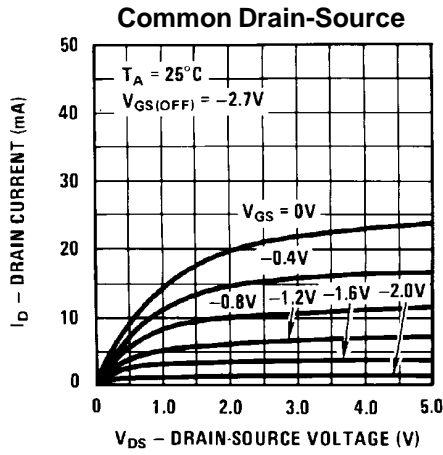


Forward Transadmittance

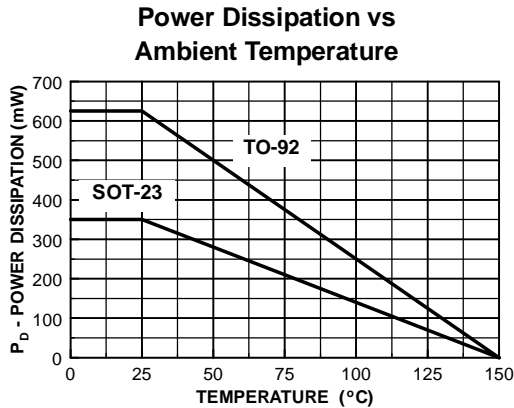
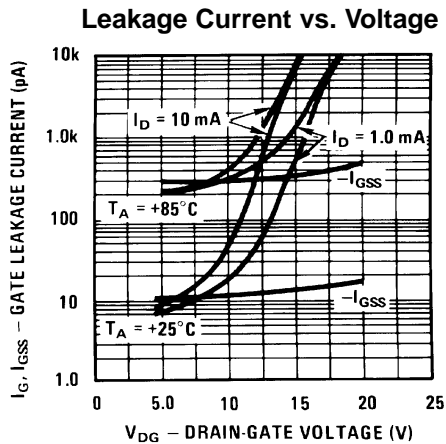
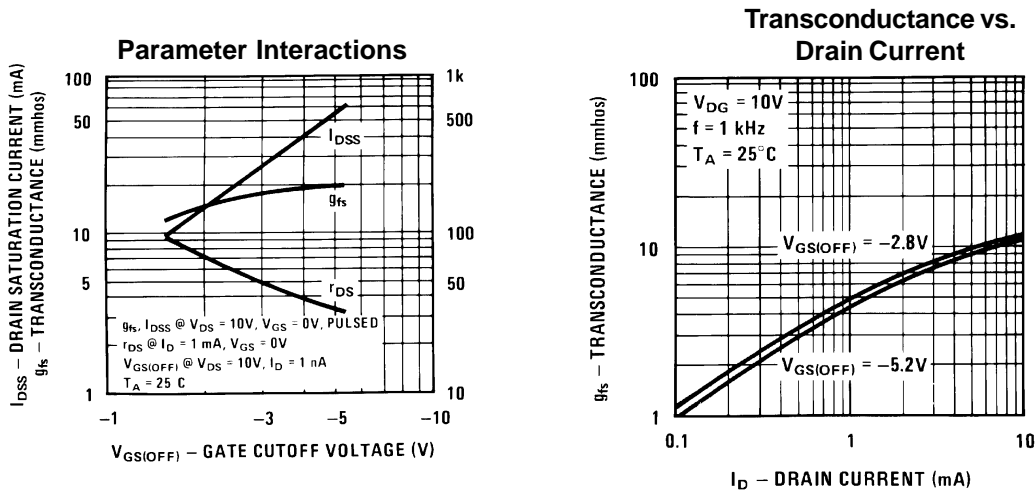


# N-Channel RF Amplifier (continued)

## Typical Characteristics (continued)



Typical Characteristics (continued)



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