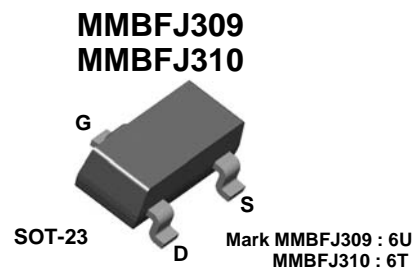


J309 / J310 / MMBFJ309 / MMBFJ310 N-Channel RF Amplifier

Features

- 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.
- Source & Drain are interchangeable.



Absolute Maximum Ratings * $T_a = 25^\circ\text{C}$ 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	$^\circ\text{C}$

* 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 $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max.		Units
		J309-J310	*MMBFJ309-310	
P_D	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	127		$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	$^\circ\text{C}/\text{W}$

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

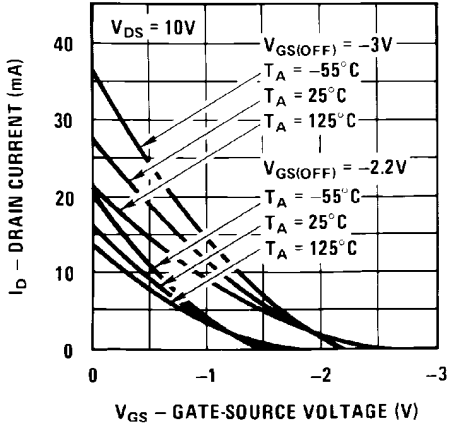
Electrical Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristics						
$BV_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = -1.0\mu\text{A}, V_{DS} = 0$	-25			V
I_{GSS}	Gate Reverse Current	$V_{GS} = -15\text{V}, V_{DS} = 0$ $V_{GS} = -15\text{V}, V_{DS} = 0, T_a = 125^\circ\text{C}$			-1.0 -1.0	nA μA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 10\text{V}, I_D = 1.0\text{nA}$	309 310	-1.0 -2.0	-4.0 -6.5	V V
On Characteristics						
I_{DSS}	Zero-Gate Voltage Drain Current*	$V_{DS} = 10\text{V}, V_{GS} = 0$	309 310	12 24	30 60	mA mA
$V_{GS(f)}$	Gate-Source Forward Voltage	$V_{DS} = 0, I_G = 1.0\text{mA}$			1.0	V
Small Signal Characteristics						
$Re_{(yis)}$	Common-Source Input Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{MHz}$	309 310	0.7 0.5		mmhos mmhos
$Re_{(yos)}$	Common-Source Output Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{MHz}$		0.25		mmhos
G_{pg}	Common-Gate Power Gain	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{MHz}$		16		dB
$Re_{(yfs)}$	Common-Source Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{MHz}$		12		mmhos
$Re_{(yig)}$	Common-Gate Input Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{MHz}$		12		mmhos
g_{fs}	Common-Source Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 1.0\text{kHz}$	309 310	10,000 8,000	20,000 18,000	μmhos μmhos
g_{oss}	Common-Source Output Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 1.0\text{kHz}$			150	μmhos
g_{fg}	Common-Gate Forward Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 1.0\text{kHz}$	309 310	13,000 12,000		μmhos μmhos
g_{og}	Common-Gate Output Conductance	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 1.0\text{kHz}$	309 310	100 150		μmhos μmhos
C_{dg}	Drain-Gate Capacitance	$V_{DS} = 0, V_{GS} = -10\text{V}, f = 1.0\text{MHz}$		2.0	2.5	pF
C_{sg}	Source-Gate Capacitance	$V_{DS} = 0, V_{GS} = -10\text{V}, f = 1.0\text{MHz}$		4.1	5.0	pF
NF	Noise Figure	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 450\text{MHz}$		3.0		dB
e_n	Equivalent Short-Circuit Input Noise Voltage	$V_{DS} = 10\text{V}, I_D = 10\text{mA}, f = 100\text{Hz}$		6.0		nV/ $\sqrt{\text{Hz}}$

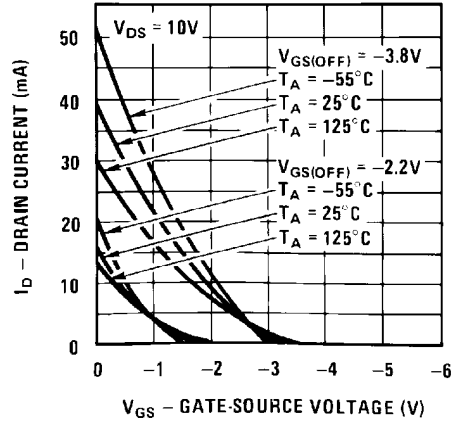
* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Typical Performance Characteristics

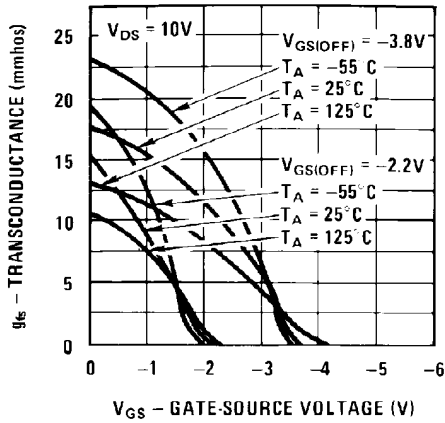
Transfer Characteristics



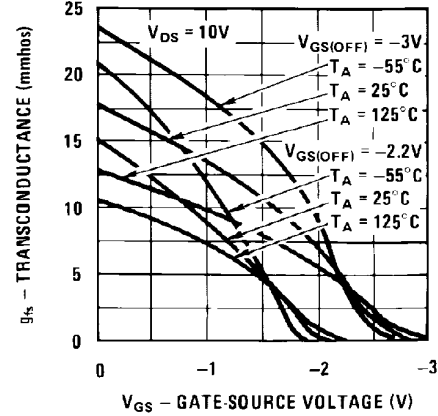
Transfer Characteristics



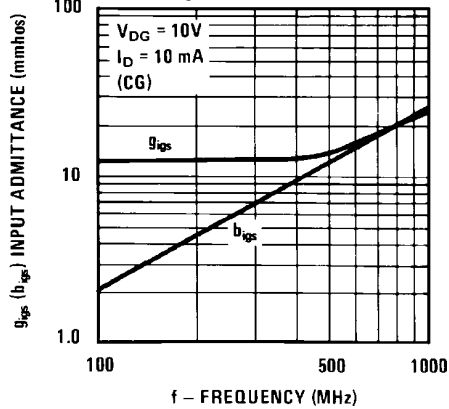
Transfer Characteristics



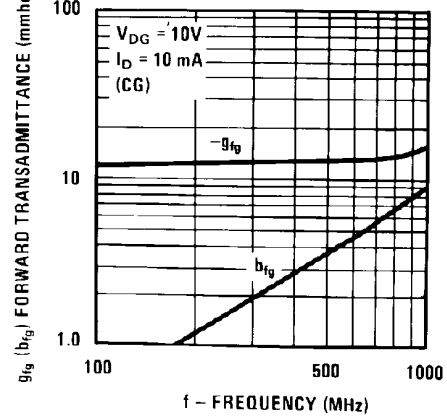
Transfer Characteristics



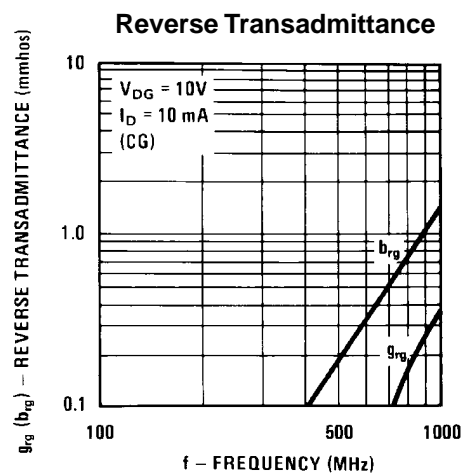
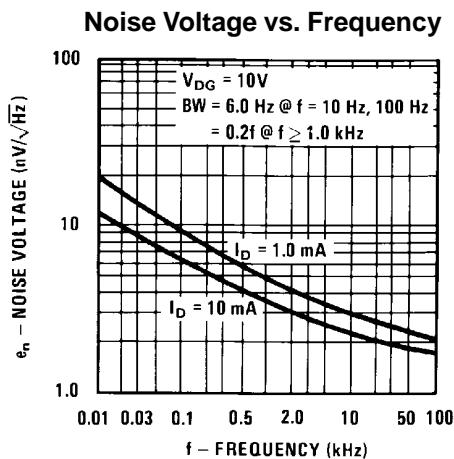
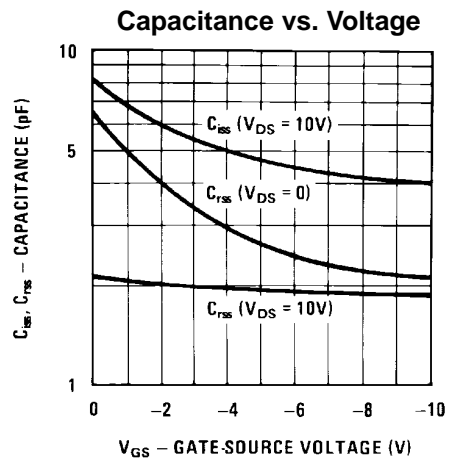
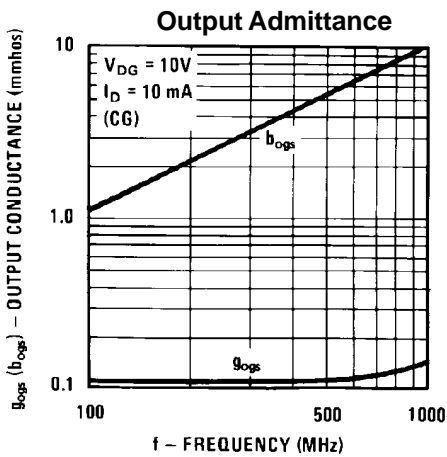
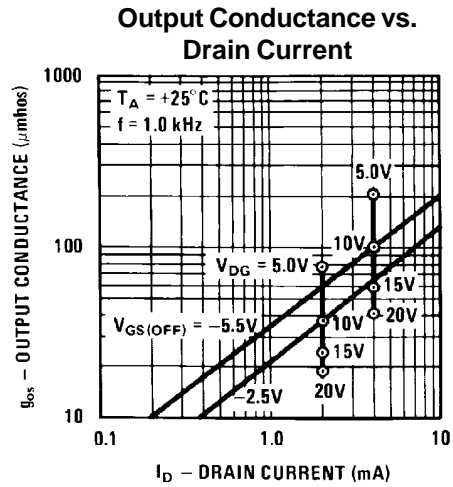
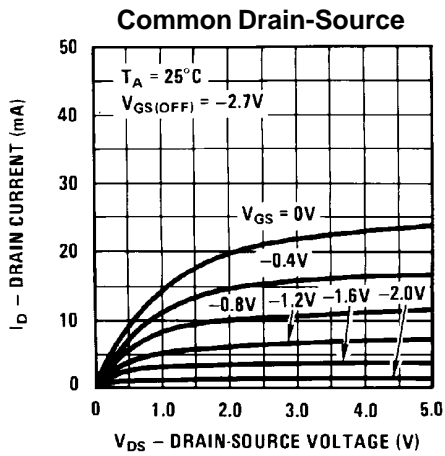
Input Admittance



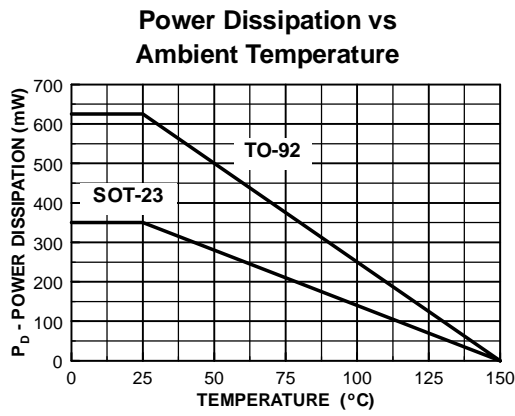
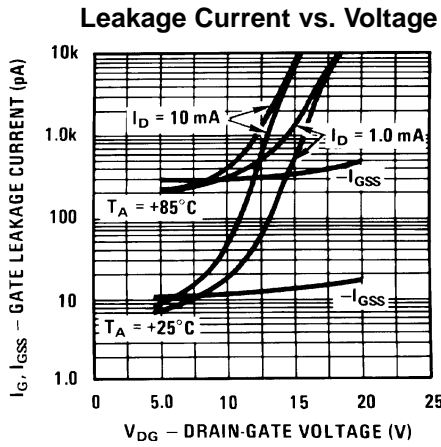
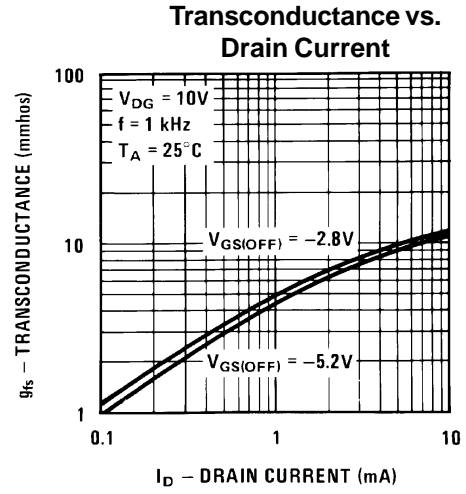
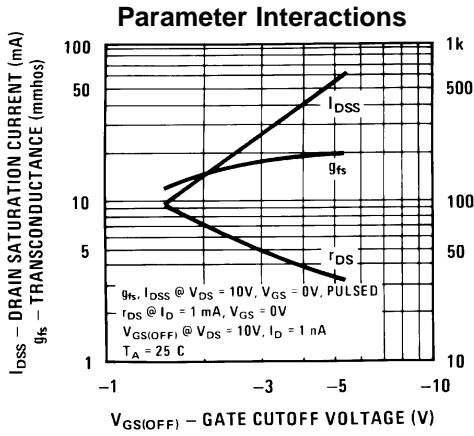
Forward Transadmittance



Typical Performance Characteristics (continued)



Typical Performance Characteristics (continued)





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