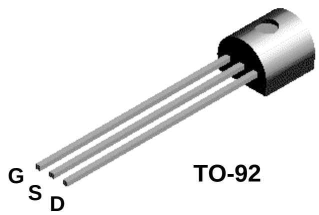
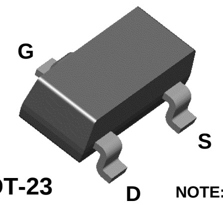
FAIRCHILD
SEMICONDUCTOR ™

J309
J310

MMBFJ309
MMBFJ310



TO-92



SOT-23
Mark: 6U / 6T

NOTE: Source & Drain are interchangeable

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 Derate above 25°C	625 5.0	350 2.8	mW 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)

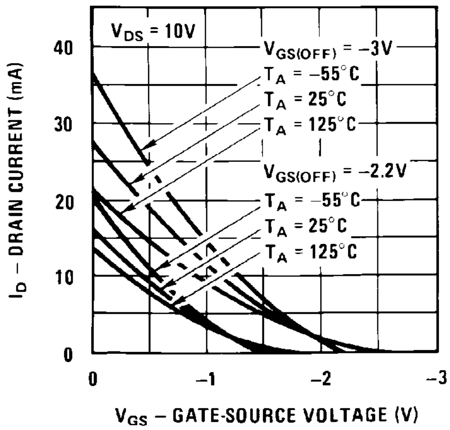
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	I_G = - 1.0 μA, 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°C			- 1.0 - 1.0	nA μA
$V_{GS(off)}$	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	μmhos μmhos
g_{oss}	Common-Source Output Conductance	V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz			150	μmhos
g_{fg}	Common-Gate Forward Conductance	V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz **309** **310**		13,000 12,000		μmhos μmhos
g_{og}	Common-Gate Output Conductance	V_{DS} = 10, I_D = 10 mA, f = 1.0 kHz **309** **310**		100 150		μmhos μmhos
C_{dg}	Drain-Gate Capacitance	V_{DS} = 0, V_{GS} = - 10 V, f = 1.0 MHz		2.0	2.5	pF
C_{sg}	Source-Gate Capacitance	V_{DS} = 0, V_{GS} = - 10 V, f = 1.0 MHz		4.1	5.0	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/√Hz

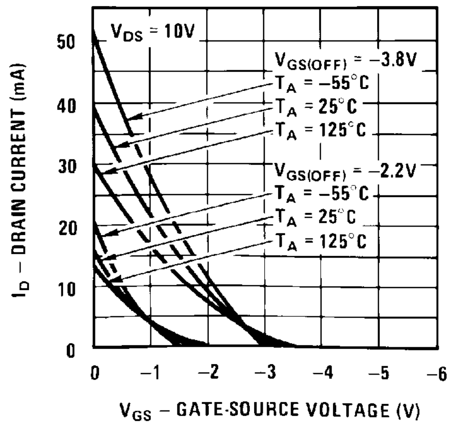
*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Typical Characteristics

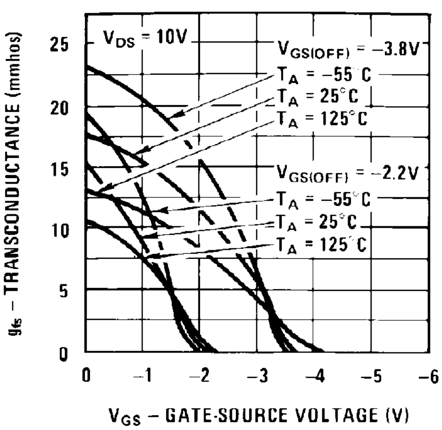
Transfer Characteristics



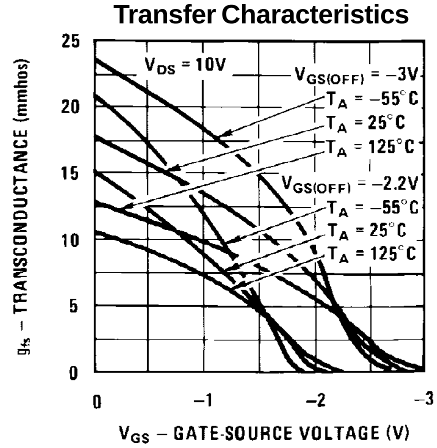
Transfer Characteristics



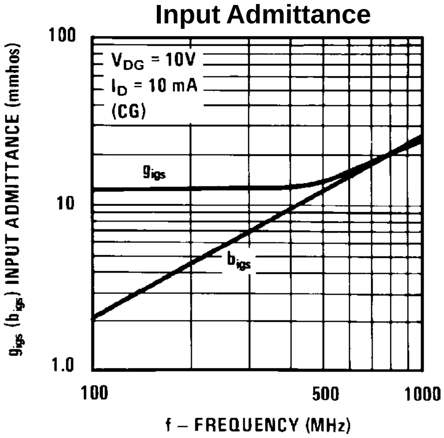
Transfer Characteristics



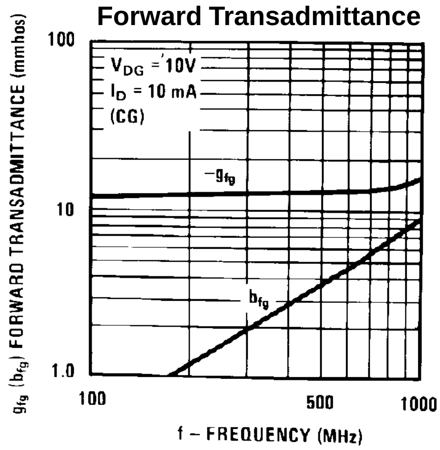
Transfer Characteristics



Input Admittance

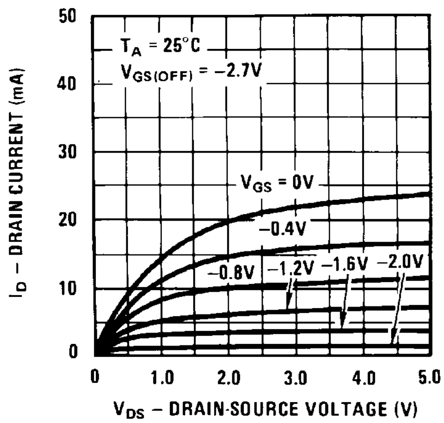


Forward Transadmittance

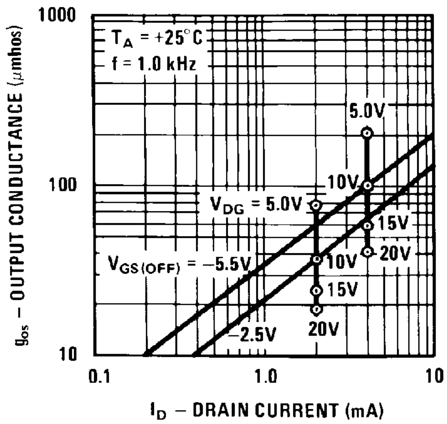


Typical Characteristics (continued)

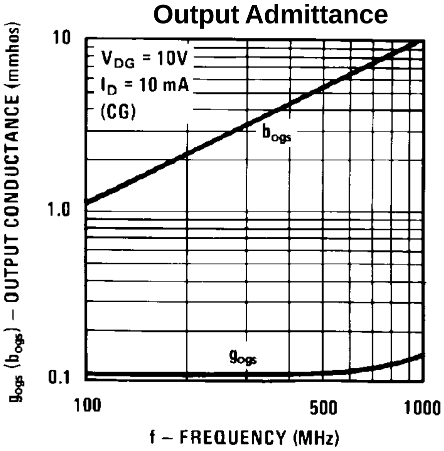
Common Drain-Source



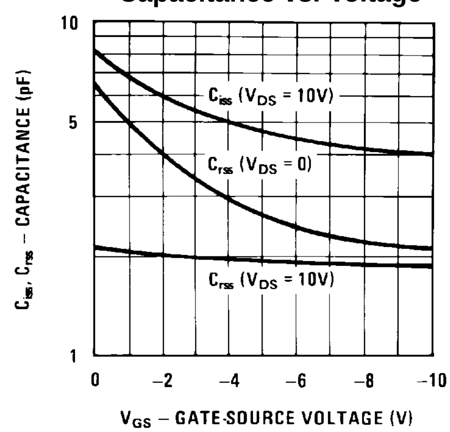
Output Conductance vs. Drain Current



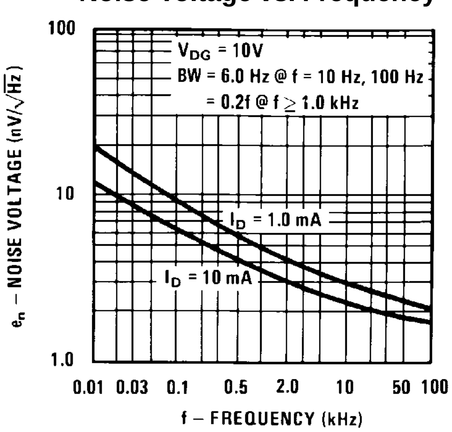
Output Admittance



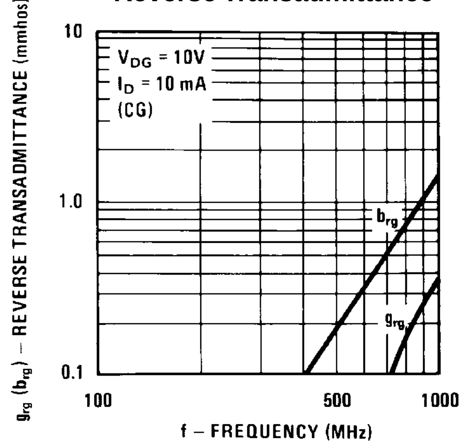
Capacitance vs. Voltage



Noise Voltage vs. Frequency

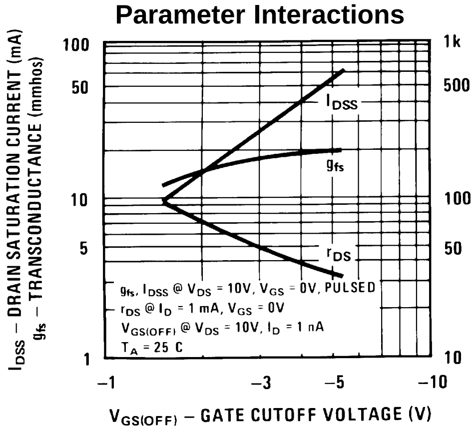


Reverse Transadmittance

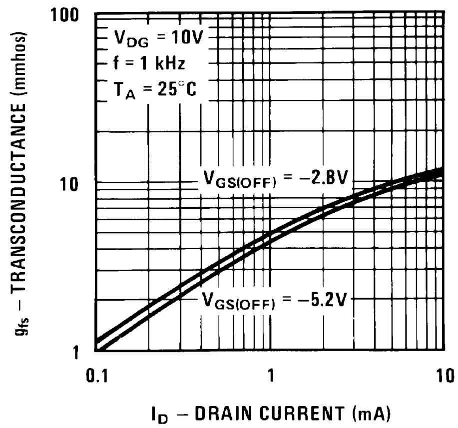


Typical Characteristics (continued)

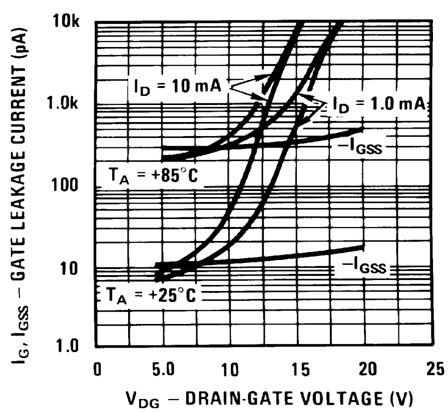
Parameter Interactions



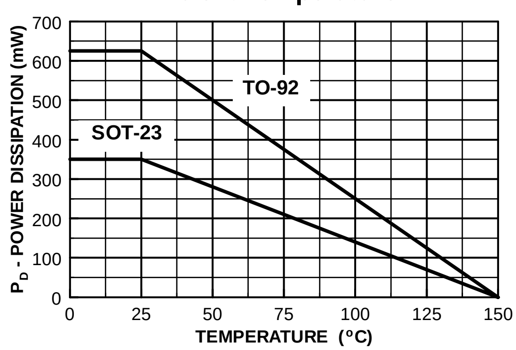
Transconductance vs. Drain Current



Leakage Current vs. Voltage



Power Dissipation vs Ambient Temperature



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