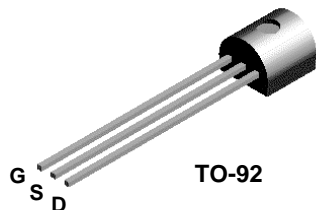
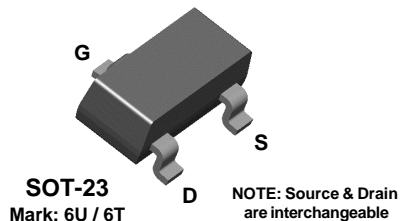


J309
J310



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 _{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 _{θJC}	Thermal Resistance, Junction to Case	125		°C/W
R _{θJA}	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 mA	- 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

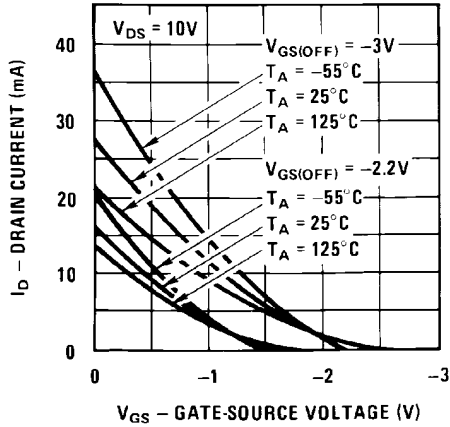
Re(Y _{is})	Common-Source Input Conductance	V _{DS} = 10, I _D = 10 mA, f = 100 MHz	309 310	0.7 0.5		mmhos mmhos
Re(Y _{os})	Common-Source Output Conductance	V _{DS} = 10, I _D = 10 mA, f = 100 MHz		0.25		mmhos
G _{pg}	Common-Gate Power Gain	V _{DS} = 10, I _D = 10 mA, f = 100 MHz		16		dB
Re(Y _{fs})	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%

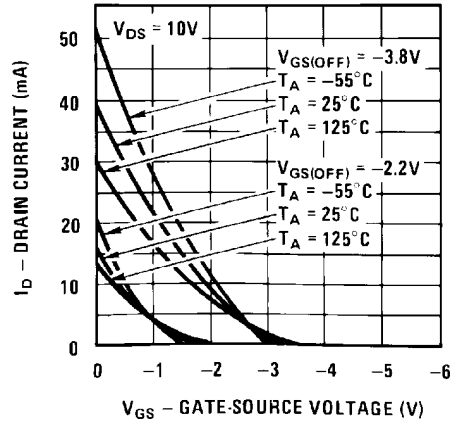
J309 / J310 / MMBFJ309 / MMBFJ310

Typical Characteristics

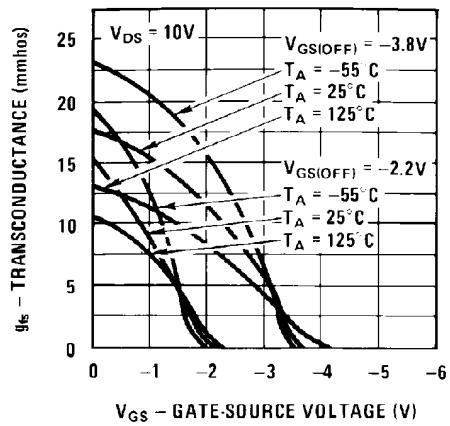
Transfer Characteristics



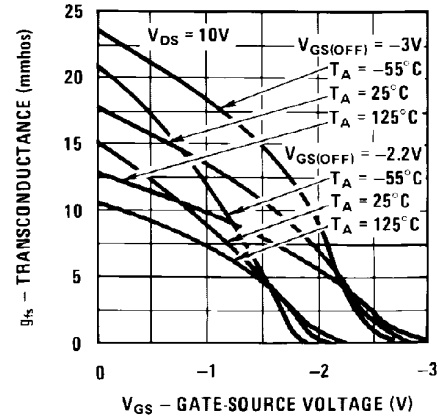
Transfer Characteristics



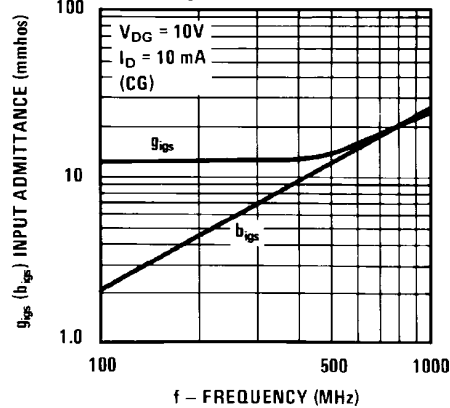
Transfer Characteristics



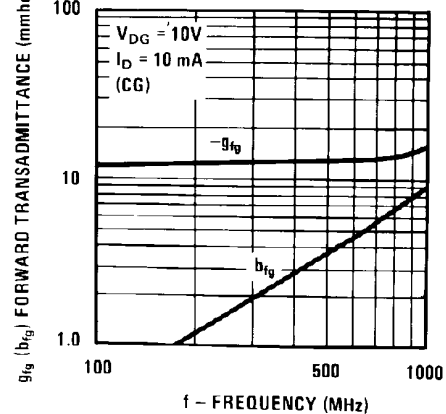
Transfer Characteristics



Input Admittance

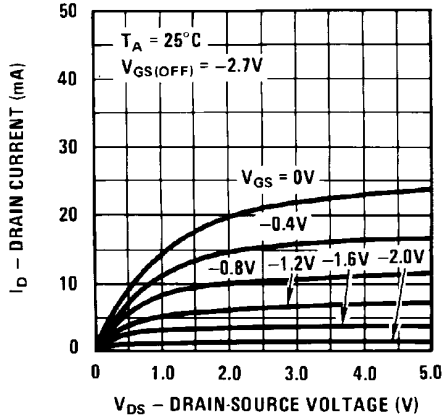


Forward Transadmittance

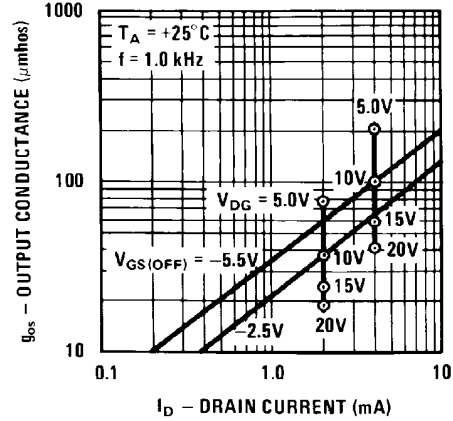


Typical Characteristics (continued)

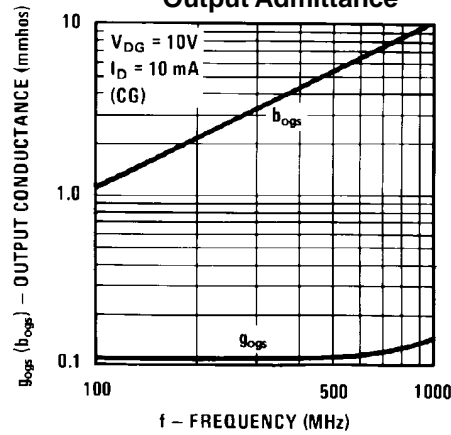
Common Drain-Source



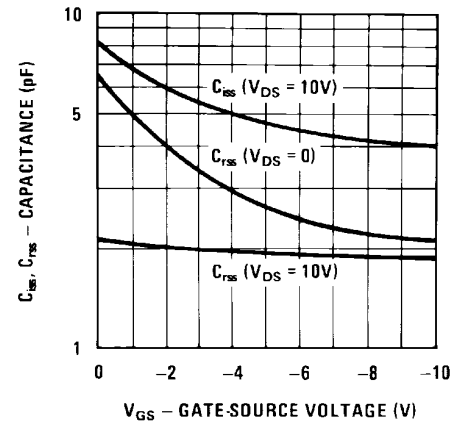
Output Conductance vs. Drain Current



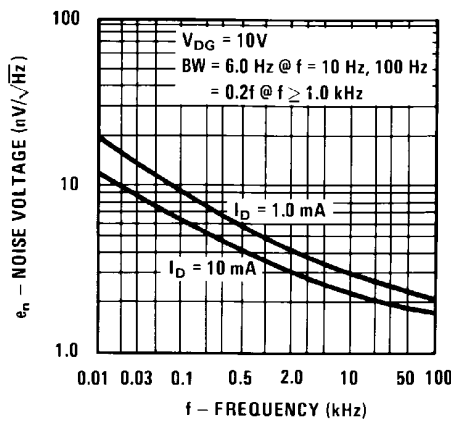
Output Admittance



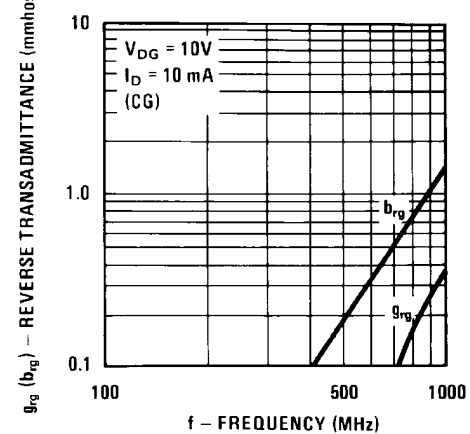
Capacitance vs. Voltage



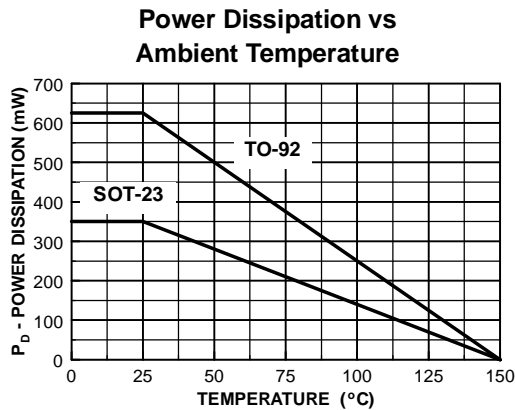
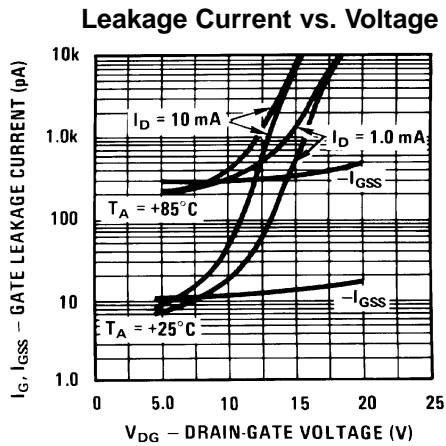
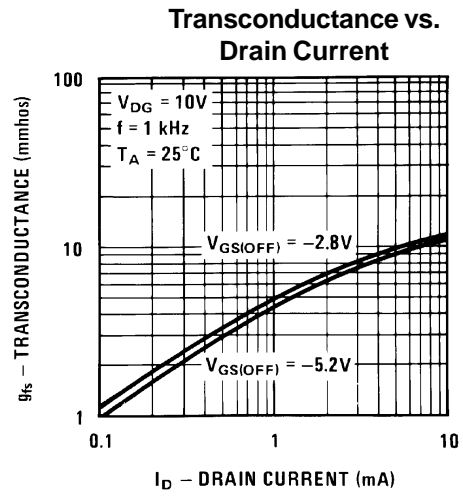
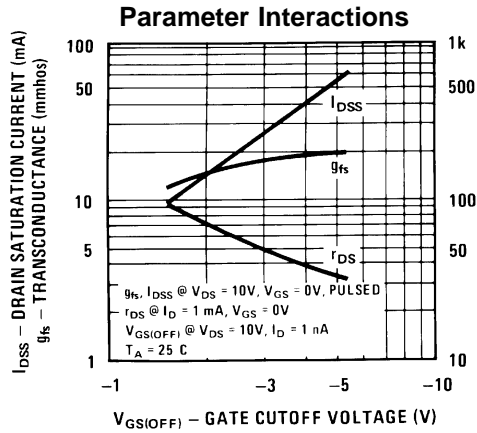
Noise Voltage vs. Frequency



Reverse Transadmittance



Typical Characteristics (continued)



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FASTr™	PowerTrench®	SyncFET™
Bottomless™	GlobalOptoisolator™	QFET™	TinyLogic™
CoolFET™	GTO™	QS™	UHC™
CROSSVOLT™	HiSeC™	QT Optoelectronics™	VCX™
DOME™	ISOPLANAR™	Quiet Series™	
E ² CMOS™	MICROWIRE™	SILENT SWITCHER®	
EnSigna™	OPTOLOGIC™	SMART START™	
FACT™	OPTOPLANAR™	SuperSOT™-3	
FACT Quiet Series™	PACMAN™	SuperSOT™-6	
FAST®	POP™	SuperSOT™-8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.