

J309, J310

Preferred Device

JFET VHF/UHF Amplifiers

N-Channel — Depletion

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

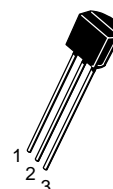
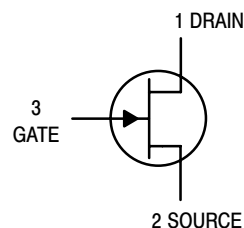
Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	25	Vdc
Gate-Source Voltage	V_{GS}	25	Vdc
Forward Gate Current	I_{GF}	10	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $= 25^\circ\text{C}$	P_D	350 2.8	mW mW/°C
Junction Temperature Range	T_J	-65 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



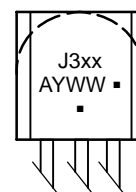
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TO-92
CASE 29-11
STYLE 5

MARKING DIAGRAM



J3xx = Device Code

xx = 09 or 10

A = Assembly Location

Y = Year

WW = Work Week

■ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

J309, J310

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Gate–Source Breakdown Voltage ($I_G = -1.0\ \mu\text{Adc}$, $V_{DS} = 0$)	$V_{(BR)GSS}$	-25	–	–	Vdc
Gate Reverse Current ($V_{GS} = -15\ \text{Vdc}$, $V_{DS} = 0$, $T_A = 25^\circ\text{C}$) ($V_{GS} = -15\ \text{Vdc}$, $V_{DS} = 0$, $T_A = +125^\circ\text{C}$)	I_{GSS}	– –	– –	-1.0 -1.0	nAdc μAdc
Gate Source Cutoff Voltage ($V_{DS} = 10\ \text{Vdc}$, $I_D = 1.0\ \text{nAdc}$)	$V_{GS(off)}$	-1.0 -2.0	– –	-4.0 -6.5	Vdc
ON CHARACTERISTICS					
Zero–Gate–Voltage Drain Current ⁽¹⁾ ($V_{DS} = 10\ \text{Vdc}$, $V_{GS} = 0$)	I_{DSS}	12 24	– –	30 60	mAdc
Gate–Source Forward Voltage ($V_{DS} = 0$, $I_G = 1.0\ \text{mAdc}$)	$V_{GS(f)}$	–	–	1.0	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Common–Source Input Conductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{MHz}$)	$\text{Re}(y_{is})$	– –	0.7 0.5	– –	mmhos
Common–Source Output Conductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{MHz}$)	$\text{Re}(y_{os})$	–	0.25	–	mmhos
Common–Gate Power Gain ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{MHz}$)	G_{pg}	–	16	–	dB
Common–Source Forward Transconductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{MHz}$)	$\text{Re}(y_{fs})$	–	12	–	mmhos
Common–Gate Input Conductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{MHz}$)	$\text{Re}(y_{ig})$	–	12	–	mmhos
Common–Source Forward Transconductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 1.0\ \text{kHz}$)	g_{fs}	10000 8000	– –	20000 18000	μmhos
Common–Source Output Conductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 1.0\ \text{kHz}$)	g_{os}	–	–	250	μmhos
Common–Gate Forward Transconductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 1.0\ \text{kHz}$)	g_{fg}	– –	13000 12000	– –	μmhos
Common–Gate Output Conductance ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 1.0\ \text{kHz}$)	g_{og}	– –	100 150	– –	μmhos
Gate–Drain Capacitance ($V_{DS} = 0$, $V_{GS} = -10\ \text{Vdc}$, $f = 1.0\ \text{MHz}$)	C_{gd}	–	1.8	2.5	pF
Gate–Source Capacitance ($V_{DS} = 0$, $V_{GS} = -10\ \text{Vdc}$, $f = 1.0\ \text{MHz}$)	C_{gs}	–	4.3	5.0	pF
FUNCTIONAL CHARACTERISTICS					
Equivalent Short–Circuit Input Noise Voltage ($V_{DS} = 10\ \text{Vdc}$, $I_D = 10\ \text{mAdc}$, $f = 100\ \text{Hz}$)	\bar{e}_n	–	10	–	$\text{nV}/\sqrt{\text{Hz}}$

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 3.0\%$.

J309, J310

ORDERING INFORMATION

Device	Package	Shipping†
J309	TO-92	1000 Units / Bulk
J309G	TO-92 (Pb-Free)	
J310	TO-92	1000 Units / Bulk
J310G	TO-92 (Pb-Free)	
J310RLRP	TO-92	2000 Units / Tape & Ammo Box
J310RLRPG	TO-92 (Pb-Free)	
J310ZL1	TO-92	2000 Units / Tape & Ammo Box
J310ZL1G	TO-92 (Pb-Free)	

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

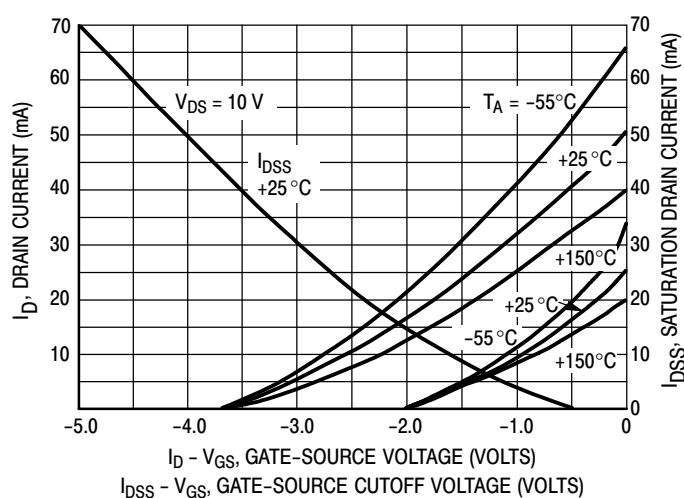


Figure 1. Drain Current and Transfer Characteristics versus Gate-Source Voltage

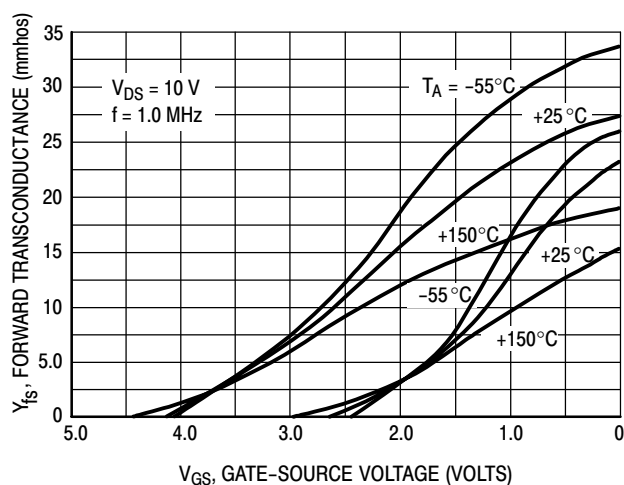


Figure 2. Forward Transconductance versus Gate-Source Voltage

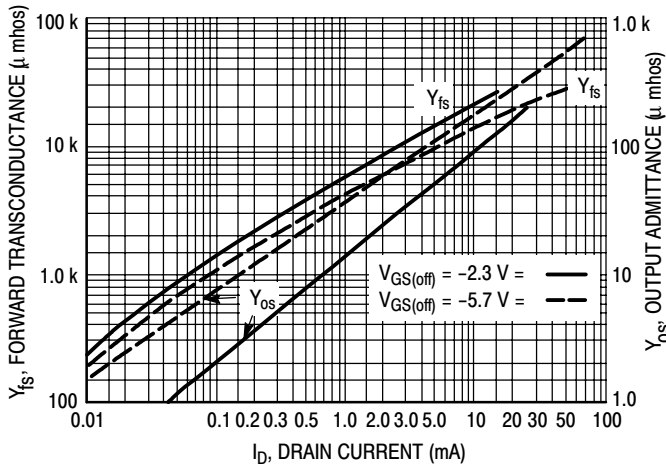


Figure 3. Common-Source Output Admittance and Forward Transconductance versus Drain Current

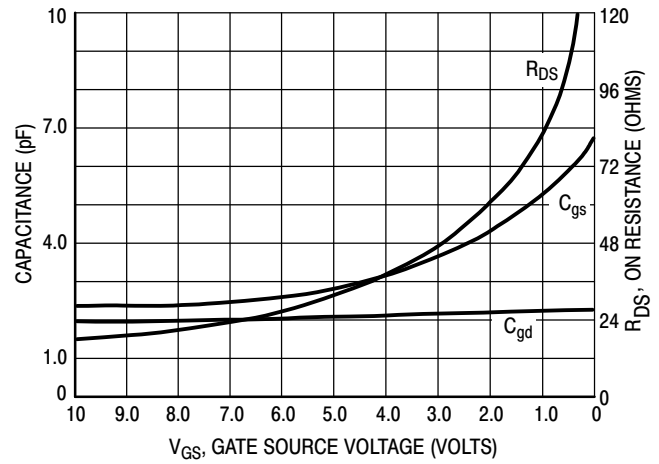


Figure 4. On Resistance and Junction Capacitance versus Gate-Source Voltage

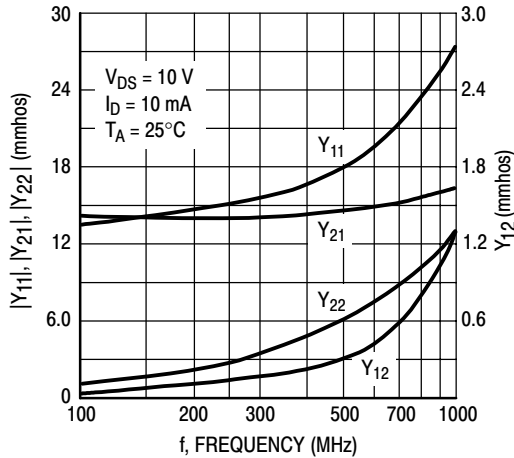


Figure 5. Common-Gate Y Parameter Magnitude versus Frequency

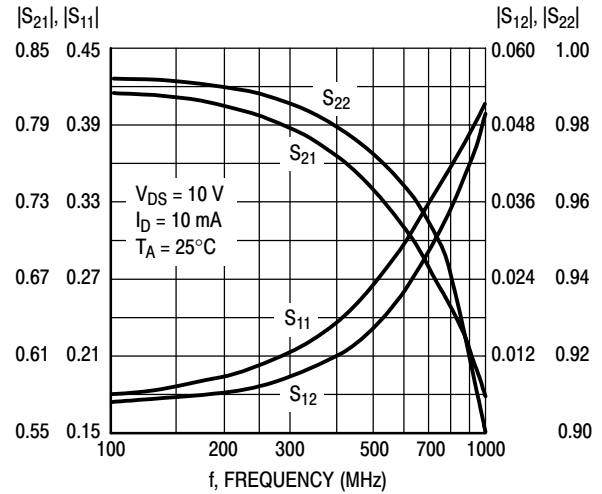


Figure 6. Common-Gate S Parameter Magnitude versus Frequency

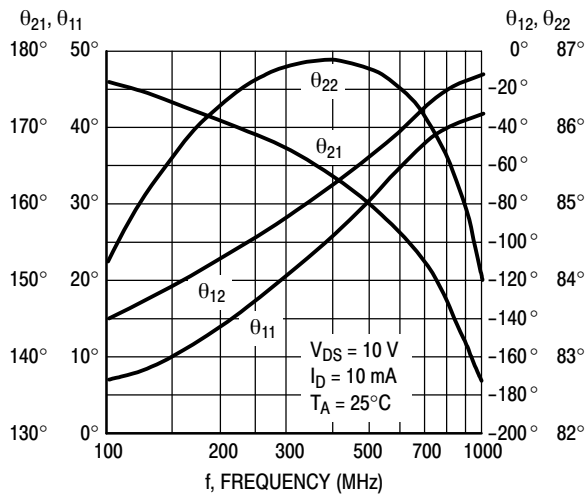


Figure 7. Common-Gate Y Parameter Phase-Angle versus Frequency

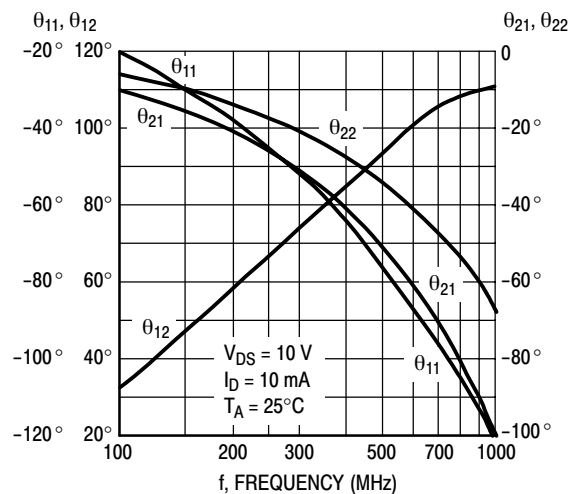


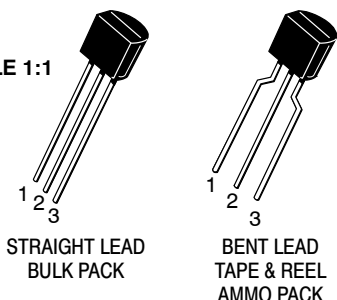
Figure 8. S Parameter Phase-Angle versus Frequency

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

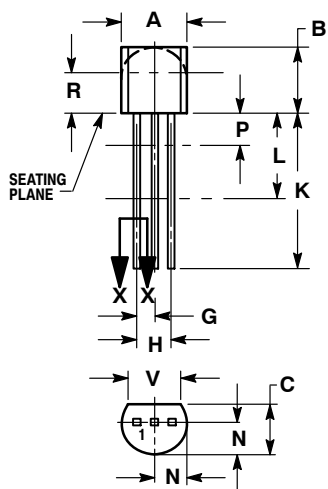
ON

SCALE 1:1

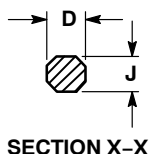


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ISSUE AM

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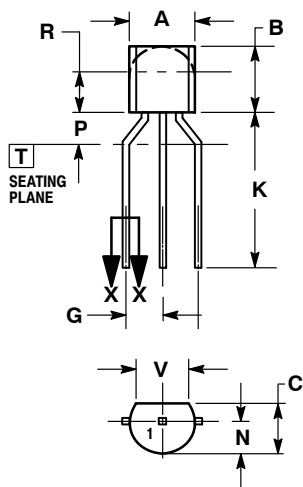
STRAIGHT LEAD
BULK PACK



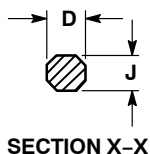
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---



BENT LEAD
TAPE & REEL
AMMO PACK



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLES ON PAGE 2

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ISSUE AM

DATE 09 MAR 2007

STYLE 1: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 2: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 3: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 5: PIN 1. DRAIN 2. SOURCE 3. GATE
STYLE 6: PIN 1. GATE 2. SOURCE & SUBSTRATE 3. DRAIN	STYLE 7: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 8: PIN 1. DRAIN 2. GATE 3. SOURCE & SUBSTRATE	STYLE 9: PIN 1. BASE 1 2. EMITTER 3. BASE 2	STYLE 10: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 11: PIN 1. ANODE 2. CATHODE & ANODE 3. CATHODE	STYLE 12: PIN 1. MAIN TERMINAL 1 2. GATE 3. MAIN TERMINAL 2	STYLE 13: PIN 1. ANODE 1 2. GATE 3. CATHODE 2	STYLE 14: PIN 1. EMITTER 2. COLLECTOR 3. BASE	STYLE 15: PIN 1. ANODE 1 2. CATHODE 3. ANODE 2
STYLE 16: PIN 1. ANODE 2. GATE 3. CATHODE	STYLE 17: PIN 1. COLLECTOR 2. BASE 3. EMITTER	STYLE 18: PIN 1. ANODE 2. CATHODE 3. NOT CONNECTED	STYLE 19: PIN 1. GATE 2. ANODE 3. CATHODE	STYLE 20: PIN 1. NOT CONNECTED 2. CATHODE 3. ANODE
STYLE 21: PIN 1. COLLECTOR 2. EMITTER 3. BASE	STYLE 22: PIN 1. SOURCE 2. GATE 3. DRAIN	STYLE 23: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 24: PIN 1. EMITTER 2. COLLECTOR/ANODE 3. CATHODE	STYLE 25: PIN 1. MT 1 2. GATE 3. MT 2
STYLE 26: PIN 1. V_{CC} 2. GROUND 2 3. OUTPUT	STYLE 27: PIN 1. MT 2. SUBSTRATE 3. MT	STYLE 28: PIN 1. CATHODE 2. ANODE 3. GATE	STYLE 29: PIN 1. NOT CONNECTED 2. ANODE 3. CATHODE	STYLE 30: PIN 1. DRAIN 2. GATE 3. SOURCE
STYLE 31: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 32: PIN 1. BASE 2. COLLECTOR 3. EMITTER	STYLE 33: PIN 1. RETURN 2. INPUT 3. OUTPUT	STYLE 34: PIN 1. INPUT 2. GROUND 3. LOGIC	STYLE 35: PIN 1. GATE 2. COLLECTOR 3. EMITTER

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