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## Is Now



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# J309, J310

Preferred Device

## JFET VHF/UHF Amplifiers

### N-Channel — Depletion

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

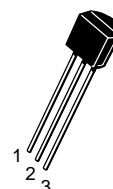
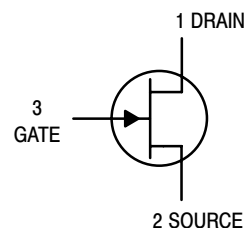
Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	25	Vdc
Gate-Source Voltage	$V_{GS}$	25	Vdc
Forward Gate Current	$I_{GF}$	10	mA <sub>dc</sub>
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $= 25^\circ\text{C}$	$P_D$	350 2.8	mW mW/ $^\circ\text{C}$
Junction Temperature Range	$T_J$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

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.



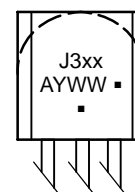
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TO-92  
CASE 29-11  
STYLE 5

#### 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<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Gate–Source Breakdown Voltage (I <sub>G</sub> = –1.0 $\mu$ Adc, V <sub>DS</sub> = 0)	V <sub>(BR)GSS</sub>	–25	–	–	Vdc
Gate Reverse Current (V <sub>GS</sub> = –15 Vdc, V <sub>DS</sub> = 0, T <sub>A</sub> = 25°C) (V <sub>GS</sub> = –15 Vdc, V <sub>DS</sub> = 0, T <sub>A</sub> = +125°C)	I <sub>GSS</sub>	– –	– –	–1.0 –1.0	nAdc $\mu$ Adc
Gate Source Cutoff Voltage (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 1.0 nAdc)	V <sub>GS(off)</sub>	–1.0 –2.0	– –	–4.0 –6.5	Vdc
<b>ON CHARACTERISTICS</b>					
Zero–Gate–Voltage Drain Current <sup>(1)</sup> (V <sub>DS</sub> = 10 Vdc, V <sub>GS</sub> = 0)	I <sub>DSS</sub>	12 24	– –	30 60	mAdc
Gate–Source Forward Voltage (V <sub>DS</sub> = 0, I <sub>G</sub> = 1.0 mAdc)	V <sub>GS(f)</sub>	–	–	1.0	Vdc
<b>SMALL–SIGNAL CHARACTERISTICS</b>					
Common–Source Input Conductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 MHz)	Re(y <sub>is</sub> )	– –	0.7 0.5	– –	mmhos
Common–Source Output Conductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 MHz)	Re(y <sub>os</sub> )	–	0.25	–	mmhos
Common–Gate Power Gain (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 MHz)	G <sub>pg</sub>	–	16	–	dB
Common–Source Forward Transconductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 MHz)	Re(y <sub>fs</sub> )	–	12	–	mmhos
Common–Gate Input Conductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 MHz)	Re(y <sub>ig</sub> )	–	12	–	mmhos
Common–Source Forward Transconductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 1.0 kHz)	g <sub>fs</sub>	10000 8000	– –	20000 18000	$\mu$ mos
Common–Source Output Conductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 1.0 kHz)	g <sub>os</sub>	–	–	250	$\mu$ mos
Common–Gate Forward Transconductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 1.0 kHz)	g <sub>fg</sub>	– –	13000 12000	– –	$\mu$ mos
Common–Gate Output Conductance (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 1.0 kHz)	g <sub>og</sub>	– –	100 150	– –	$\mu$ mos
Gate–Drain Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = –10 Vdc, f = 1.0 MHz)	C <sub>gd</sub>	–	1.8	2.5	pF
Gate–Source Capacitance (V <sub>DS</sub> = 0, V <sub>GS</sub> = –10 Vdc, f = 1.0 MHz)	C <sub>gs</sub>	–	4.3	5.0	pF
<b>FUNCTIONAL CHARACTERISTICS</b>					
Equivalent Short–Circuit Input Noise Voltage (V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 10 mAdc, f = 100 Hz)	$\bar{e}_n$	–	10	–	nV/ $\sqrt{\text{Hz}}$

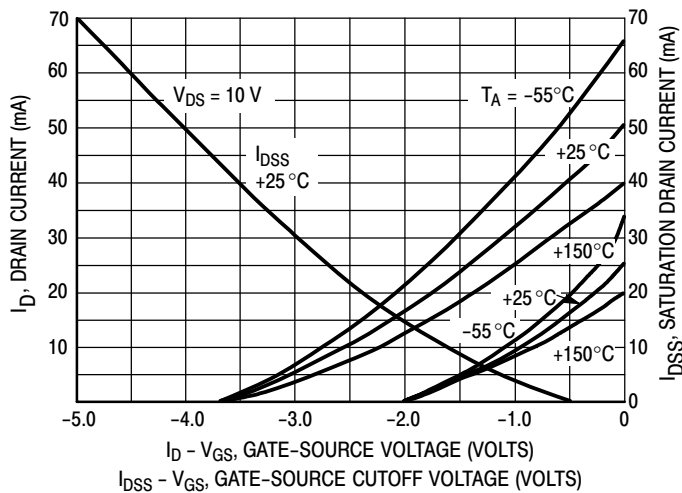
1. Pulse Test: Pulse Width  $\leq$  300  $\mu$ s, Duty Cycle  $\leq$  3.0%.

# J309, J310

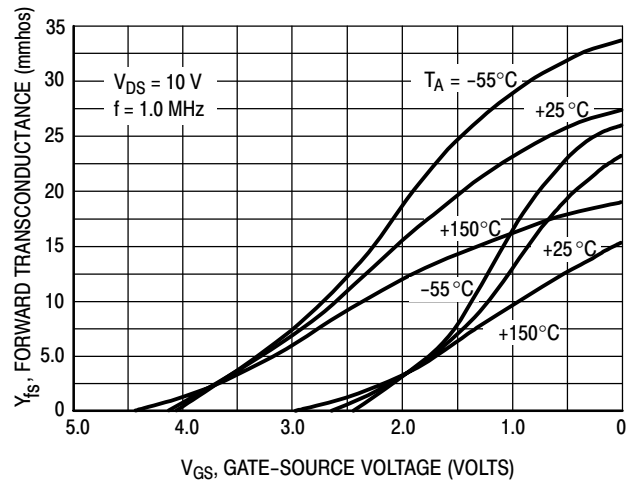
## ORDERING INFORMATION

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)	

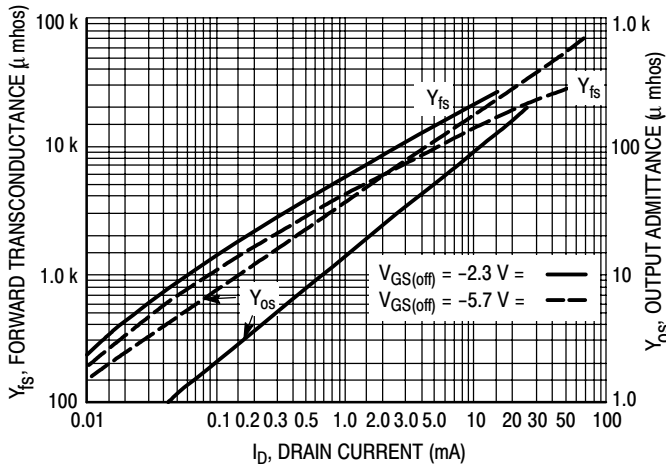
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



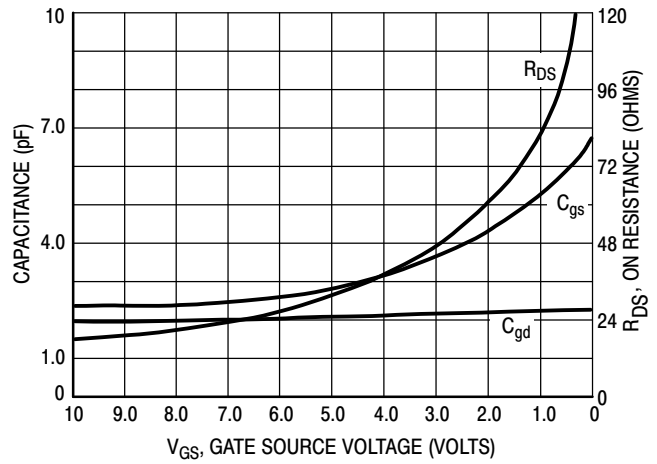
**Figure 1. Drain Current and Transfer Characteristics versus Gate-Source Voltage**



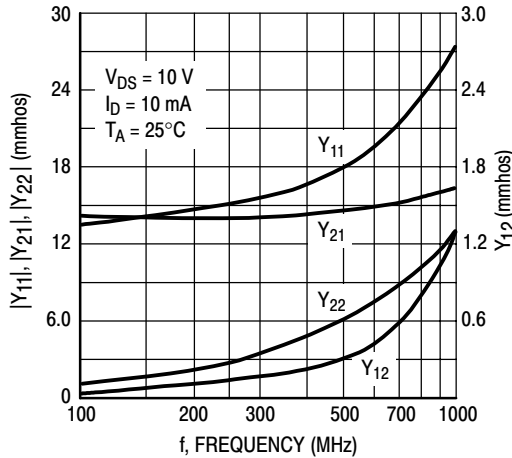
**Figure 2. Forward Transconductance versus Gate-Source Voltage**



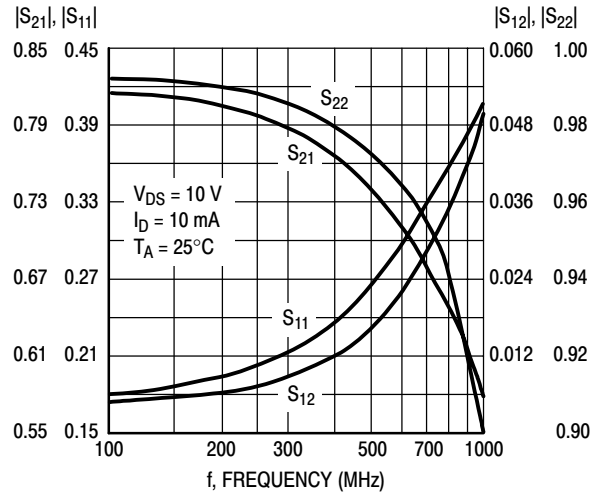
**Figure 3. Common-Source Output Admittance and Forward Transconductance versus Drain Current**



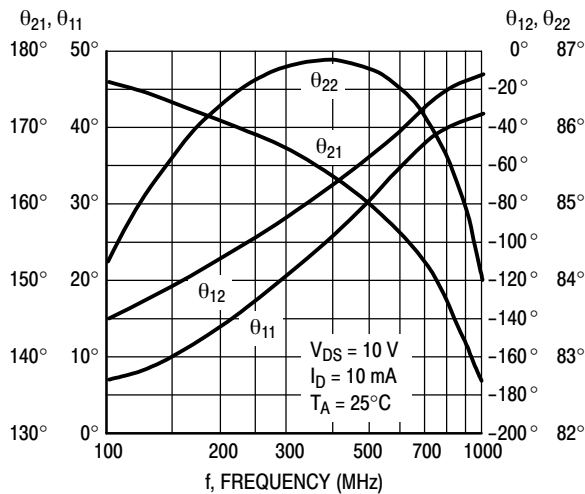
**Figure 4. On Resistance and Junction Capacitance versus Gate-Source Voltage**



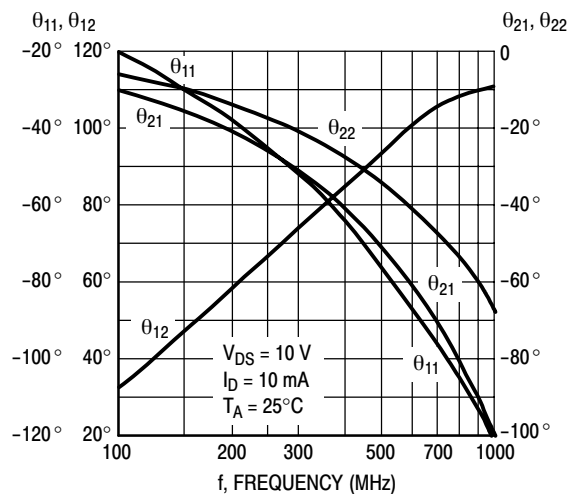
**Figure 5. Common-Gate Y Parameter Magnitude versus Frequency**



**Figure 6. Common-Gate S Parameter Magnitude versus Frequency**



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



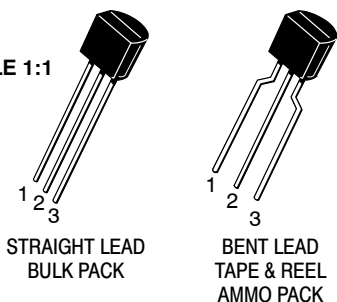
**Figure 8. S Parameter Phase-Angle versus Frequency**

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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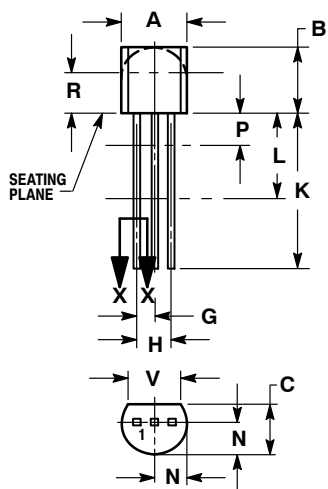
ON

SCALE 1:1

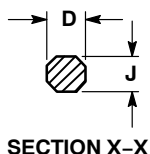


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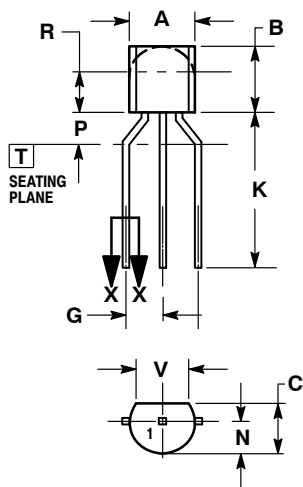
STRAIGHT LEAD  
BULK PACK



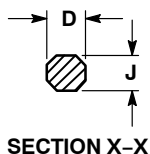
NOTES:

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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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 <sub>CC</sub> 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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