

# MMBFJ309L, MMBFJ310L, SMMBFJ309L, SMMBFJ310L

## JFET - VHF/UHF Amplifier Transistor

### N-Channel

#### Features

- Drain and Source are Interchangeable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	25	Vdc
Gate-Source Voltage	V <sub>GS</sub>	25	Vdc
Gate Current	I <sub>G</sub>	10	mAdc

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1) T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	225 1.8	mW mW/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	556	°C/W
Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

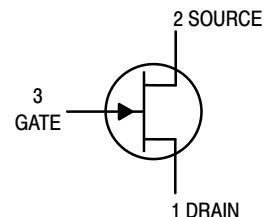
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-5 = 1.0 x 0.75 x 0.062 in.

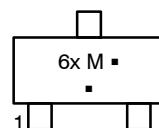


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#### MARKING DIAGRAM



6x = Device Code

x = U for MMBFJ309L, SMMBFJ309L  
x = T for MMBFJ310L, SMMBFJ310L

M = Date Code\*

▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMBFJ309LT1G, SMMBFJ309LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBFJ310LT1G, SMMBFJ310LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
SMMBFJ310LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel

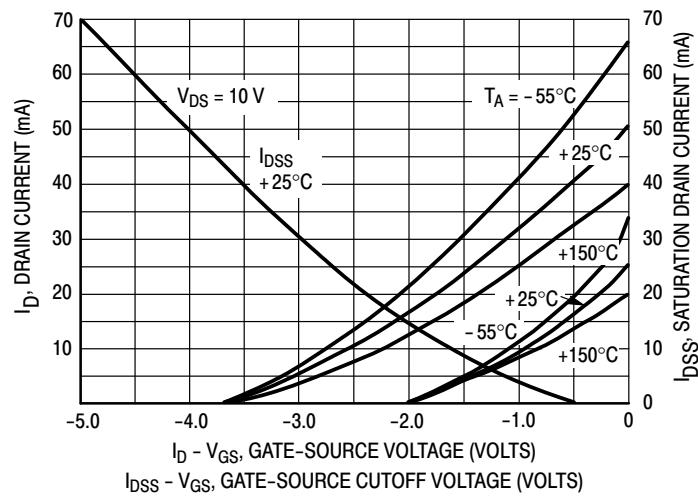
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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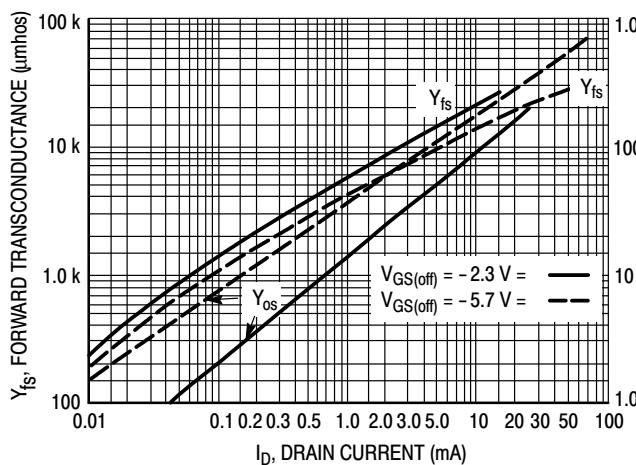
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Gate-Source Breakdown Voltage ( $I_G = -1.0 \mu\text{Adc}$ , $V_{DS} = 0$ )	$V_{(BR)GSS}$	-25	-	-	Vdc	
Gate Reverse Current ( $V_{GS} = -15 \text{ Vdc}$ ) ( $V_{GS} = -15 \text{ Vdc}$ , $T_A = 125^\circ\text{C}$ )	$I_{GSS}$	- -	- -	-1.0 -1.0	nAdc $\mu\text{Adc}$	
Gate Source Cutoff Voltage ( $V_{DS} = 10 \text{ Vdc}$ , $I_D = 1.0 \text{ nAdc}$ )	MMBFJ309 MMBFJ310, SMMBFJ310	$V_{GS(\text{off})}$	-1.0 -2.0	- -	-4.0 -6.5	Vdc
<b>ON CHARACTERISTICS</b>						
Zero-Gate-Voltage Drain Current ( $V_{DS} = 10 \text{ Vdc}$ , $V_{GS} = 0$ )	MMBFJ309 MMBFJ310, SMMBFJ310	$I_{DSS}$	12 24	- -	30 60	mAdc
Gate-Source Forward Voltage ( $I_G = 1.0 \text{ mAdc}$ , $V_{DS} = 0$ )		$V_{GS(f)}$	-	-	1.0	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>						
Forward Transfer Admittance ( $V_{DS} = 10 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 1.0 \text{ kHz}$ )		$ Y_{fs} $	8.0	-	18	mmhos
Output Admittance ( $V_{DS} = 10 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 1.0 \text{ kHz}$ )		$ y_{os} $	-	-	250	$\mu\text{mhos}$
Input Capacitance ( $V_{GS} = -10 \text{ Vdc}$ , $V_{DS} = 0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ )		$C_{iss}$	-	-	5.0	pF
Reverse Transfer Capacitance ( $V_{GS} = -10 \text{ Vdc}$ , $V_{DS} = 0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ )		$C_{rss}$	-	-	2.5	pF
Equivalent Short-Circuit Input Noise Voltage ( $V_{DS} = 10 \text{ Vdc}$ , $I_D = 10 \text{ mAdc}$ , $f = 100 \text{ Hz}$ )		$\bar{e}_n$	-	10	-	$\text{nV}/\sqrt{\text{Hz}}$

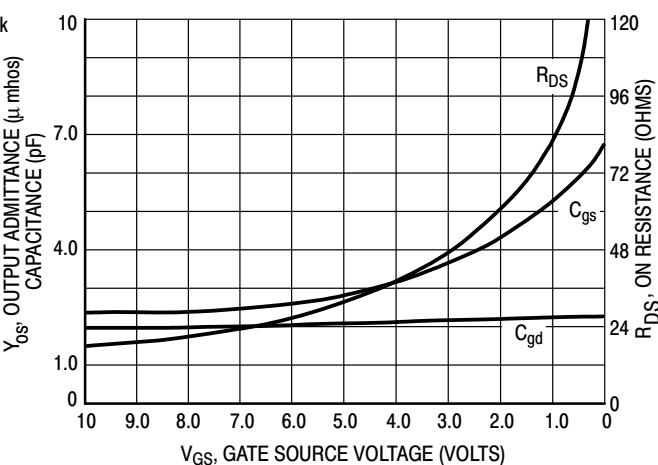
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**Figure 1. Drain Current and Transfer Characteristics versus Gate-Source Voltage**

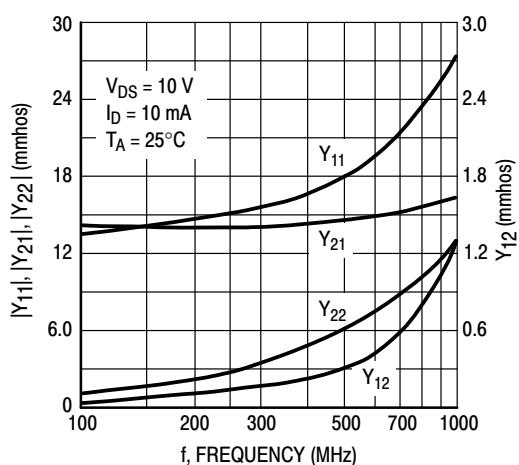


**Figure 2. Common-Source Output Admittance and Forward Transconductance versus Drain Current**

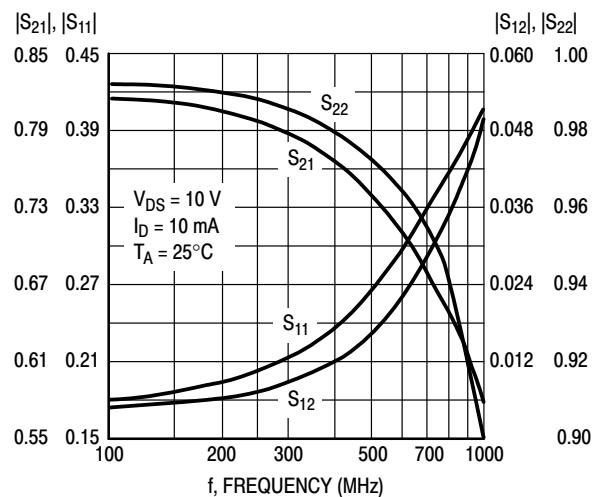


**Figure 3. On Resistance and Junction Capacitance versus Gate-Source Voltage**

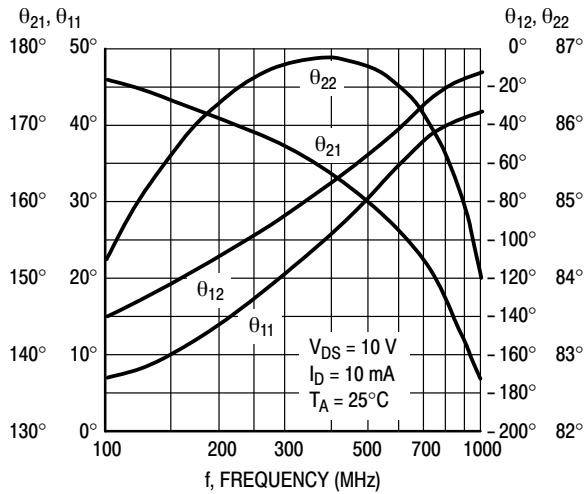
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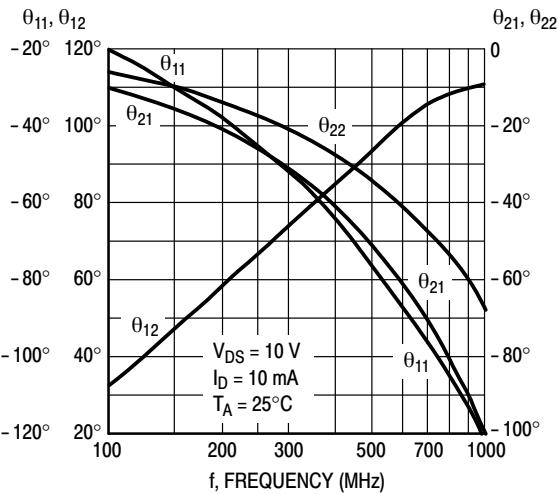
**Figure 4. Common-Gate Y Parameter Magnitude versus Frequency**



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



**Figure 6. Common-Gate Y Parameter Phase-Angle versus Frequency**

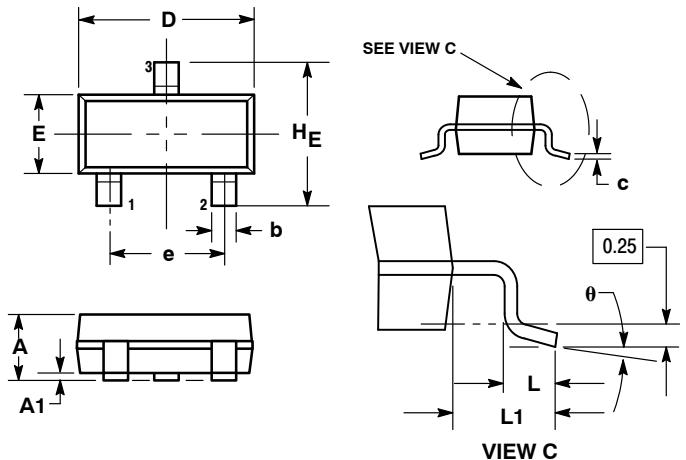


**Figure 7. S Parameter Phase-Angle versus Frequency**

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## PACKAGE DIMENSIONS

### SOT-23 (TO-236) CASE 318-08 ISSUE AP



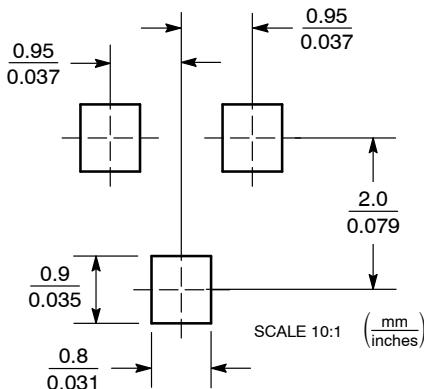
#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H <sub>E</sub>	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	---	10°	0°	---	10°

STYLE 10:  
PIN 1. DRAIN  
2. SOURCE  
3. GATE

### SOLDERING FOOTPRINT\*



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

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