

# MMBFJ309LT1, MMBFJ310LT1

## JFET - VHF/UHF Amplifier Transistor

### N-Channel



ON Semiconductor®

<http://onsemi.com>

#### Features

- Pb-Free Packages are Available

#### MAXIMUM RATINGS

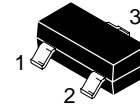
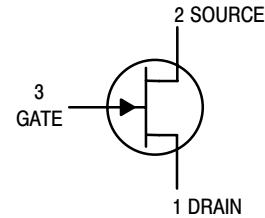
| Rating               | Symbol   | Value | Unit |
|----------------------|----------|-------|------|
| Drain-Source Voltage | $V_{DS}$ | 25    | Vdc  |
| Gate-Source Voltage  | $V_{GS}$ | 25    | Vdc  |
| Gate Current         | $I_G$    | 10    | mAdc |

#### THERMAL CHARACTERISTICS

| Characteristic   | Symbol          | Max         | Unit                       |
|--|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board,<br>(Note 1) $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 225<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient  | $R_{\theta JA}$ | 556         | $^\circ\text{C}/\text{W}$  |
| Junction and Storage Temperature   | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$           |

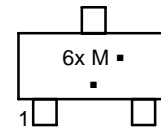
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

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



SOT-23 (TO-236)  
CASE 318  
STYLE 10

#### MARKING DIAGRAM



6x = Device Code  
x = U for MMBFJ309LT1  
x = T for MMBFJ310LT1

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†           |
|--------------|---------------------|---------------------|
| MMBFJ309LT1  | SOT-23              | 3,000 / Tape & Reel |
| MMBFJ309LT1G | SOT-23<br>(Pb-Free) | 3,000 / Tape & Reel |
| MMBFJ310LT1  | SOT-23              | 3,000 / Tape & Reel |
| MMBFJ310LT1G | SOT-23<br>(Pb-Free) | 3,000 / Tape & Reel |

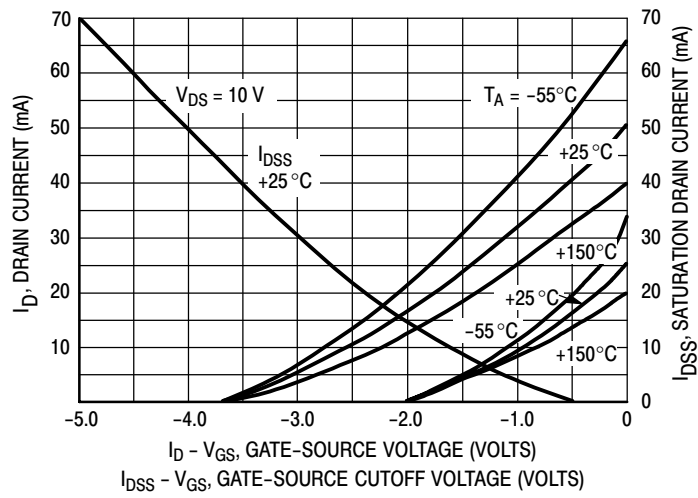
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMBFJ309LT1, MMBFJ310LT1

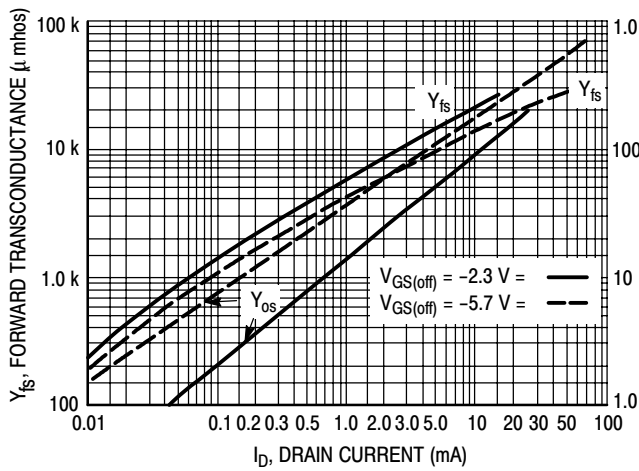
## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

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

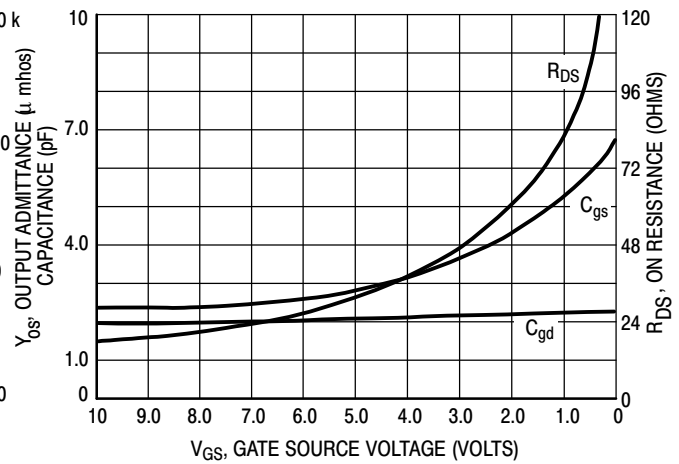
# MMBFJ309LT1, MMBFJ310LT1



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

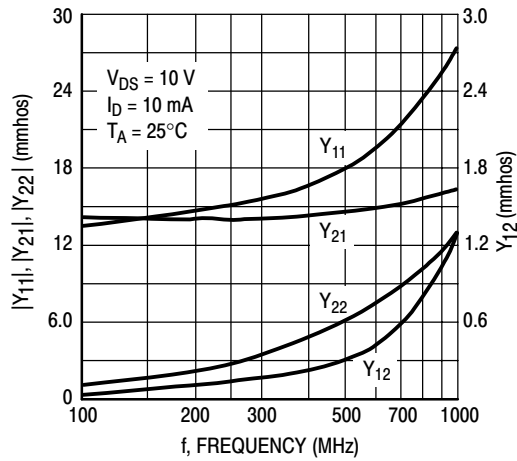


**Figure 2. Common-Source Output Admittance and Forward Transconductance versus Drain Current**

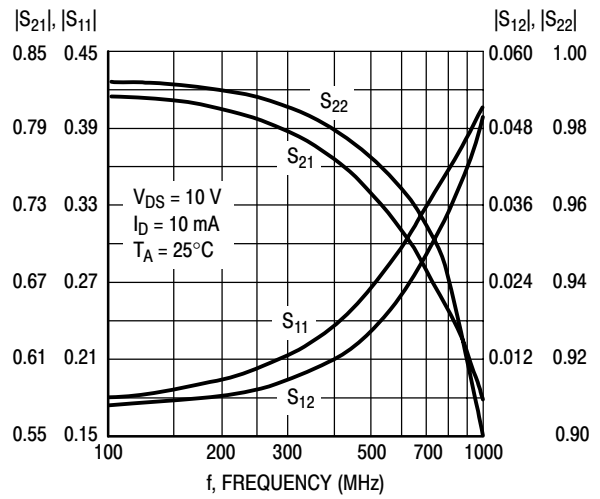


**Figure 3. On Resistance and Junction Capacitance versus Gate-Source Voltage**

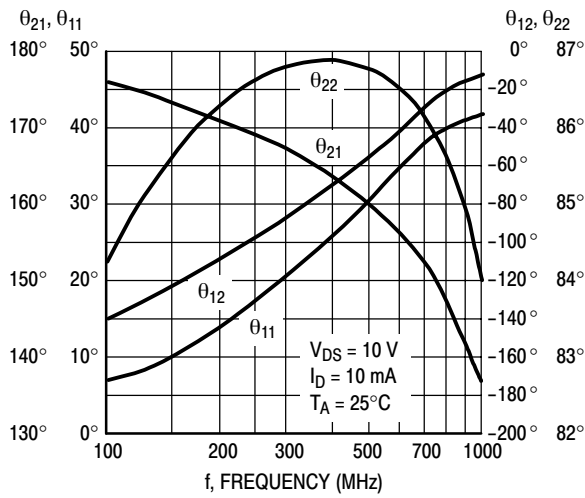
# MMBFJ309LT1, MMBFJ310LT1



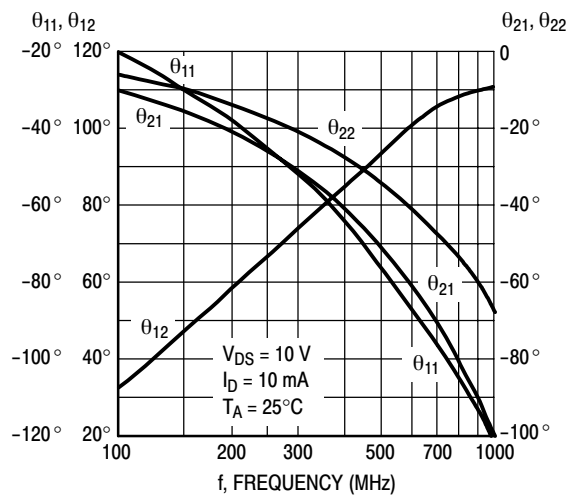
**Figure 4. Common-Gate Y Parameter Magnitude versus Frequency**



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



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

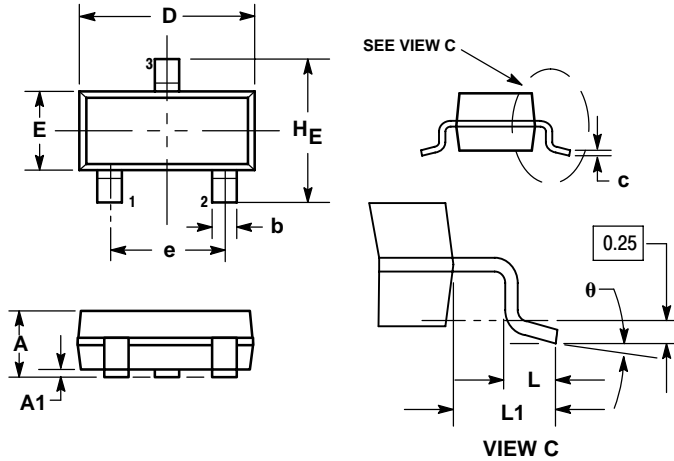


**Figure 7. S Parameter Phase-Angle versus Frequency**

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## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AN



NOTES:

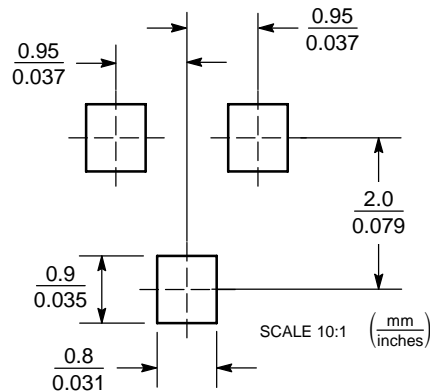
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| 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 |
| HE  | 2.10        | 2.40 | 2.64 | 0.083  | 0.094 | 0.104 |

STYLE 10:

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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