

MMBFJ309L, MMBFJ310L, SMMBFJ310L



ON Semiconductor®

<http://onsemi.com>

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

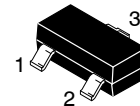
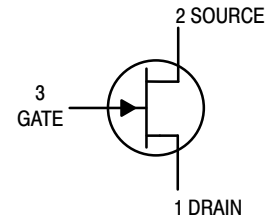
| Rating | Symbol | Value | Unit |
|----------------------|----------|-------|------|
| Drain-Source Voltage | V_{DS} | 25 | Vdc |
| Gate-Source Voltage | V_{GS} | 25 | Vdc |
| Gate Current | I_G | 10 | mAdc |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board, (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 225 1.8 | mW 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 | $^\circ\text{C}$ |

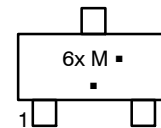
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



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

MARKING DIAGRAM



- 6x = Device Code
 x = U for MMBFJ309L
 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† |
|---------------|---------------------|-------------------------|
| MMBFJ309LT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| MMBFJ310LT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| SMMBFJ310LT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| SMMBFJ310LT3G | SOT-23 (Pb-Free) | 10,000 / 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.

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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 ($V_{GS} = -15 \text{Vdc}$) ($V_{GS} = -15 \text{Vdc}$, $T_A = 125^\circ\text{C}$) | 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 |
| | MMBFJ309 MMBFJ310, SMMBFJ310 | | | | |
| ON CHARACTERISTICS | | | | | |
| Zero-Gate-Voltage Drain Current ($V_{DS} = 10 \text{Vdc}$, $V_{GS} = 0$) | I_{DSS} | 12 24 | - | 30 60 | mAdc |
| | MMBFJ309 MMBFJ310, SMMBFJ310 | | | | |
| Gate-Source Forward Voltage ($I_G = 1.0 \text{mAdc}$, $V_{DS} = 0$) | $V_{GS(f)}$ | - | - | 1.0 | Vdc |
| SMALL-SIGNAL CHARACTERISTICS | | | | | |
| 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 | μmhos |
| 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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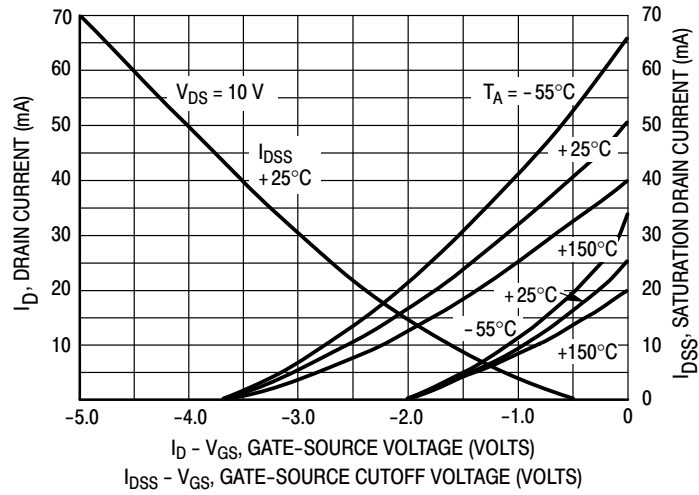


Figure 1. Drain Current and Transfer Characteristics versus Gate-Source Voltage

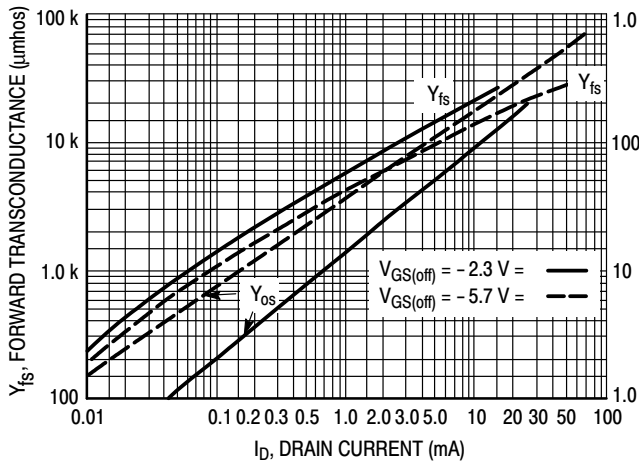


Figure 2. Common-Source Output Admittance and Forward Transconductance versus Drain Current

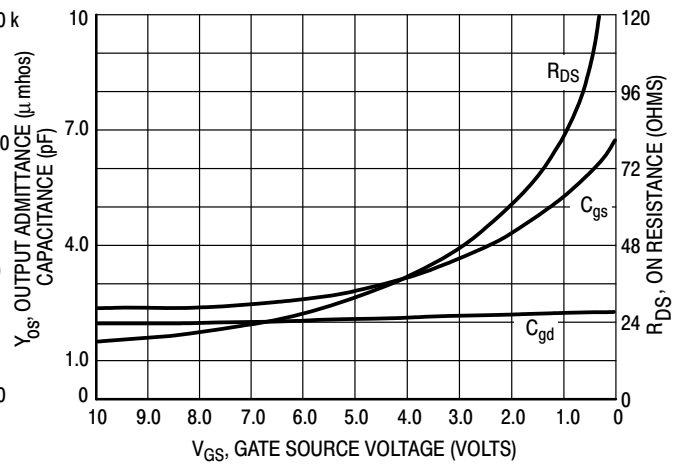


Figure 3. On Resistance and Junction Capacitance versus Gate-Source Voltage

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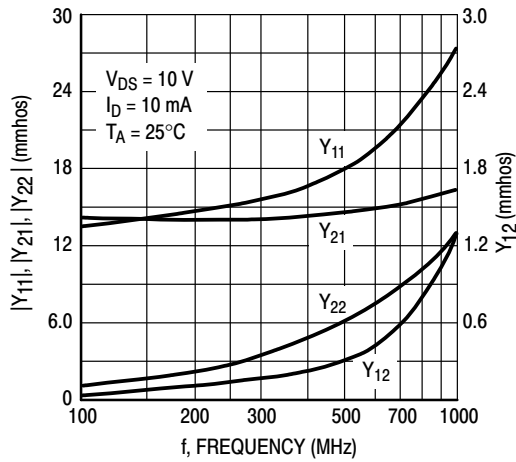


Figure 4. Common-Gate Y Parameter Magnitude versus Frequency

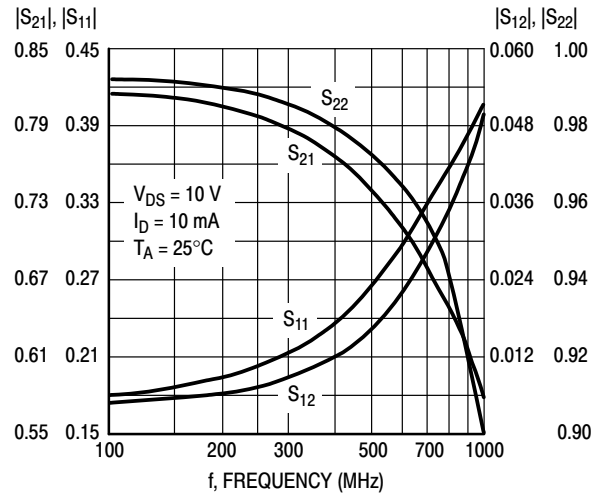


Figure 5. Common-Gate S Parameter Magnitude versus Frequency

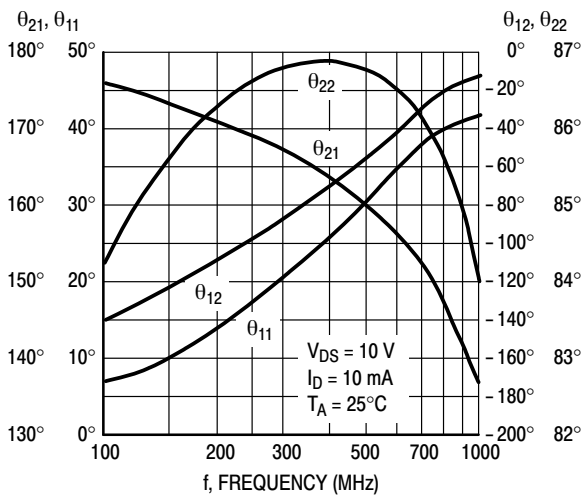


Figure 6. Common-Gate Y Parameter Phase-Angle versus Frequency

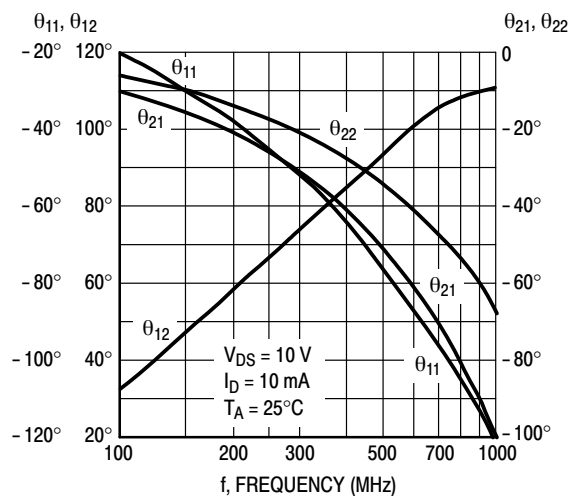
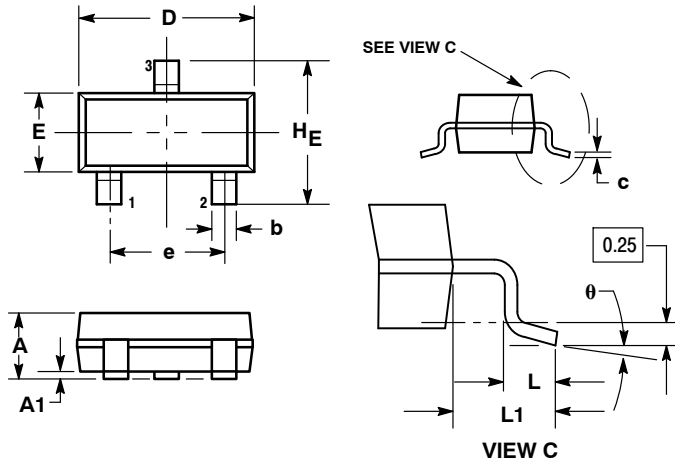


Figure 7. S Parameter Phase-Angle versus Frequency

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PACKAGE DIMENSIONS

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

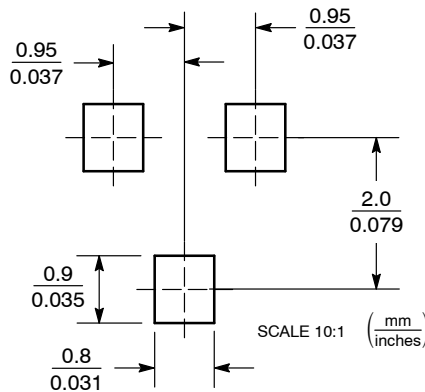


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| 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 |
| HE | 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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