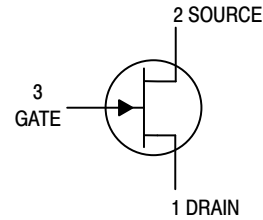


JFET - VHF/UHF Amplifier Transistor

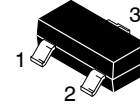
N-Channel

MMBFJ309L, MMBFJ310L, SMMBFJ309L, SMMBFJ310L



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



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

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 |

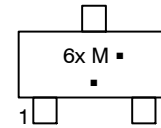
THERMAL CHARACTERISTICS

| 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 those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

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 [†] |
|--------------------------------|---------------------|-------------------------|
| 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 |

[†]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.

MMBFJ309L, MMBFJ310L, SMMBFJ309L, SMMBFJ310L

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 | - | $\text{nV}/\sqrt{\text{Hz}}$ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

MMBFJ309L, MMBFJ310L, SMMBFJ309L, SMMBFJ310L

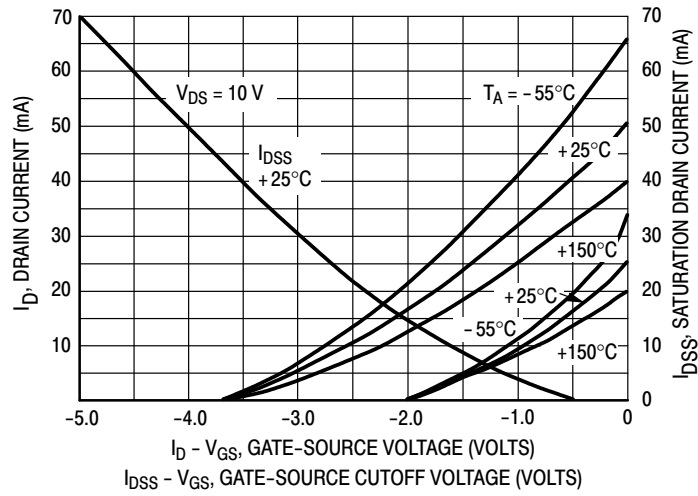


Figure 1. Drain Current and Transfer Characteristics versus Gate-Source Voltage

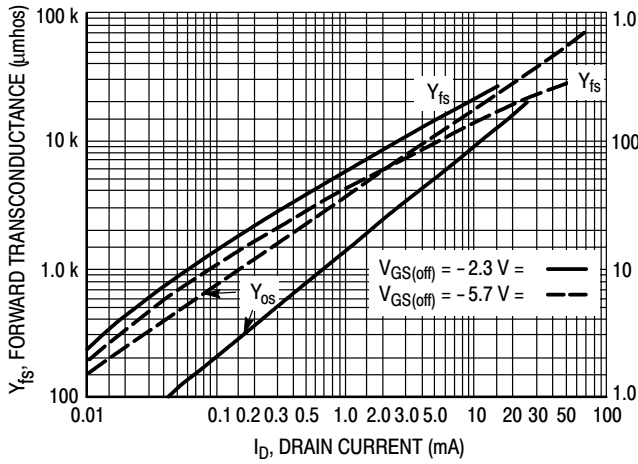


Figure 2. Common-Source Output Admittance and Forward Transconductance versus Drain Current

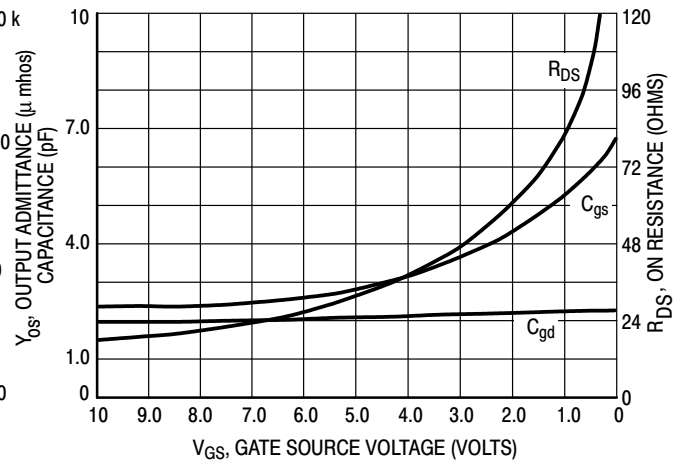


Figure 3. On Resistance and Junction Capacitance versus Gate-Source Voltage

MMBFJ309L, MMBFJ310L, SMMBFJ309L, SMMBFJ310L

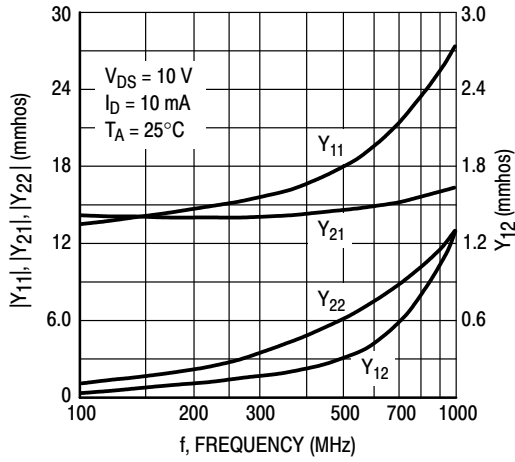


Figure 4. Common-Gate Y Parameter Magnitude versus Frequency

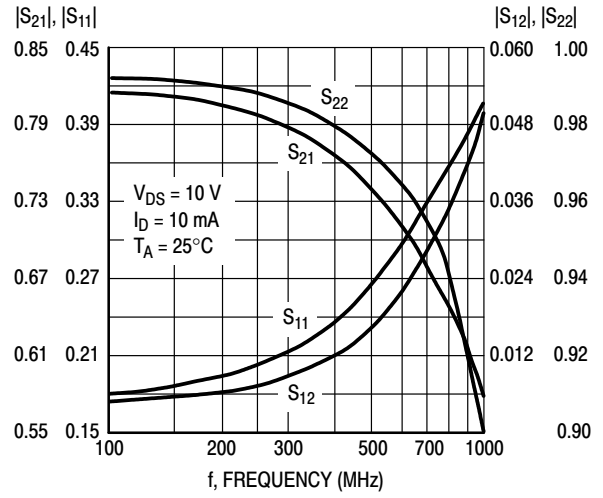


Figure 5. Common-Gate S Parameter Magnitude versus Frequency

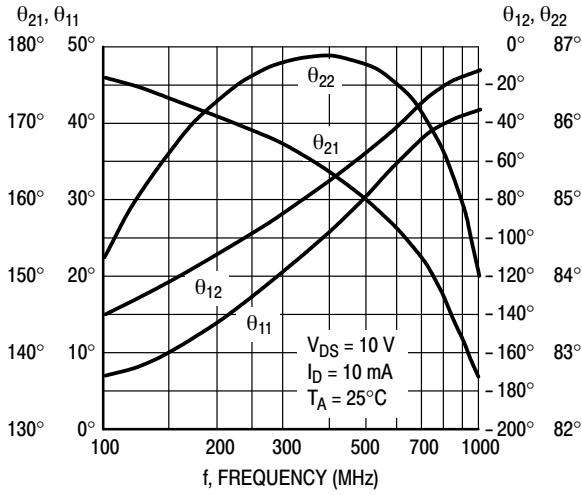


Figure 6. Common-Gate Y Parameter Phase-Angle versus Frequency

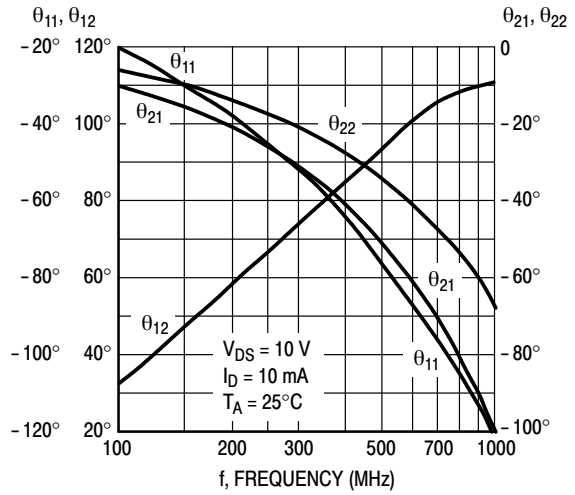
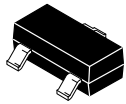


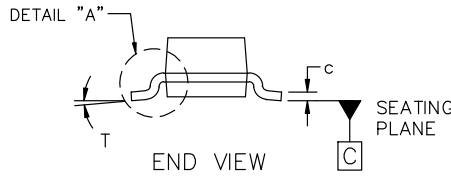
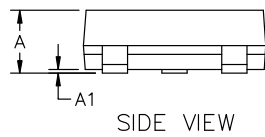
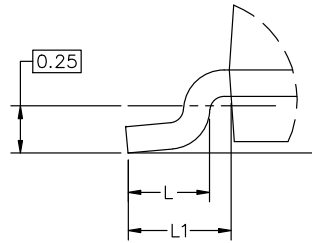
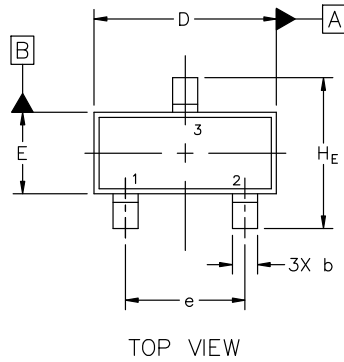
Figure 7. S Parameter Phase-Angle versus Frequency



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P
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ISSUE AU

DATE 14 AUG 2024

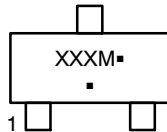


| MILLIMETERS | | | |
|-------------|------|------|------|
| DIM | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.08 | 0.14 | 0.20 |
| D | 2.80 | 2.90 | 3.04 |
| E | 1.20 | 1.30 | 1.40 |
| e | 1.78 | 1.90 | 2.04 |
| L | 0.30 | 0.43 | 0.55 |
| L1 | 0.35 | 0.54 | 0.69 |
| HE | 2.10 | 2.40 | 2.64 |
| T | 0° | --- | 10° |

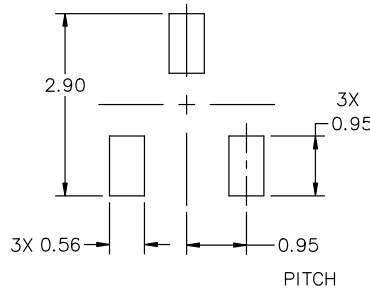
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package



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

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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CASE 318
ISSUE AU

DATE 14 AUG 2024

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

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

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE-ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE-ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

| | | |
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