

# ON Semiconductor

## Is Now

The logo for onsemi, featuring the word "onsemi" in a dark teal, lowercase, sans-serif font. The letter "i" is stylized with a white dot and a teal vertical bar. A small orange triangle is positioned above the top right of the "i". A trademark symbol (TM) is located to the right of the logo.

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ON Semiconductor®

# J211 / MMBFJ211 N-Channel RF Amplifier

## Description

This device is designed for HF/VHF mixer/amplifier and applications where process 50 is not adequate. Sufficient gain and low-noise for sensitive receivers. Sourced from process 90.

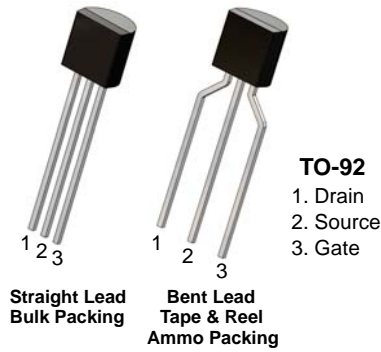


Figure 1. J211 Device Package

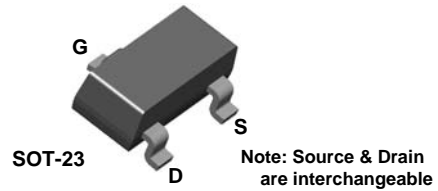


Figure 2. MMBFJ211 Device Package

## Ordering Information

| Part Number | Top Mark | Package   | Packing Method |
|-------------|----------|-----------|----------------|
| J211-D74Z   | J211     | TO-92 3L  | Ammo           |
| MMBFJ211    | 62W      | SOT-23 3L | Tape and Reel  |

### Absolute Maximum Ratings<sup>(1), (2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol         | Parameter  | Value      | Unit             |
|----------------|--|------------|------------------|
| $V_{DG}$       | Drain-Gate Voltage                               | 25         | V                |
| $V_{GS}$       | Gate-Source Voltage                              | -25        | V                |
| $I_{GF}$       | Forward Gate Current                             | 10         | mA               |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |

**Notes:**

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. ON Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

### Thermal Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                               | Max.                |                         | Unit                      |
|-----------------|---|---------------------|-------------------------|---------------------------|
|                 |   | J211 <sup>(3)</sup> | MMBFJ211 <sup>(3)</sup> |                           |
| $P_D$           | Total Device Dissipation                | 350                 | 225                     | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 2.8                 | 1.8                     | mW/ $^\circ\text{C}$      |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case    | 125                 |                         | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 357                 | 556                     | $^\circ\text{C}/\text{W}$ |

**Note:**

3. Device mounted on FR-4 PCB 36mm x 18mm x 1.5mm; mounting pad for the collector lead minimum  $6\text{cm}^2$ .

### Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol                              | Parameter                                      | Conditions   | Min. | Max.  | Unit             |
|-------------------------------------|--|--|------|-------|------------------|
| <b>Off Characteristics</b>          |  |  |      |       |                  |
| $V_{(BR)GSS}$                       | Gate-Source Breakdown Voltage                  | $I_G = 1.0 \mu\text{A}, V_{DS} = 0$                      | -25  |       | V                |
| $I_{GSS}$                           | Gate Reverse Current                           | $V_{GS} = 15 \text{ V}, V_{DS} = 0$                      |      | -100  | pA               |
| $V_{GS(off)}$                       | Gate-Source Cut-Off Voltage                    | $V_{DS} = 15 \text{ V}, I_D = 1.0 \text{ nA}$            | -2.5 | -4.5  | V                |
| <b>On Characteristics</b>           |  |  |      |       |                  |
| $I_{DSS}$                           | Zero-Gate Voltage Drain Current <sup>(4)</sup> | $V_{DS} = 15 \text{ V}, V_{GS} = 0$                      | 7.0  | 20    | mA               |
| <b>Small Signal Characteristics</b> |  |  |      |       |                  |
| $g_{fs}$                            | Common Source Forward Transconductance         | $V_{DS} = 15 \text{ V}, V_{GS} = 0, f = 1.0 \text{ kHz}$ | 7000 | 12000 | $\mu\text{mhos}$ |
| $g_{oss}$                           | Common Source Output Conductance               | $V_{DS} = 15 \text{ V}, V_{GS} = 0, f = 1.0 \text{ kHz}$ |      | 200   | $\mu\text{mhos}$ |

**Note:**

4. Pulse test: pulse width  $\leq 300 \mu\text{s}$

Typical Performance Characteristics

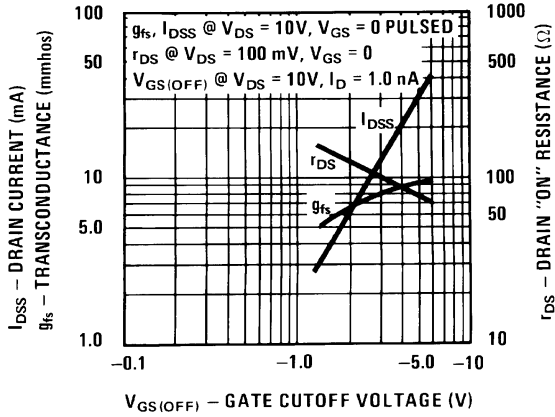


Figure 3. Parameter Interactions

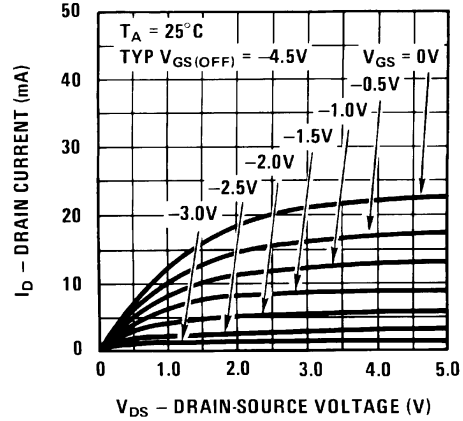


Figure 4. Common Drain-Source

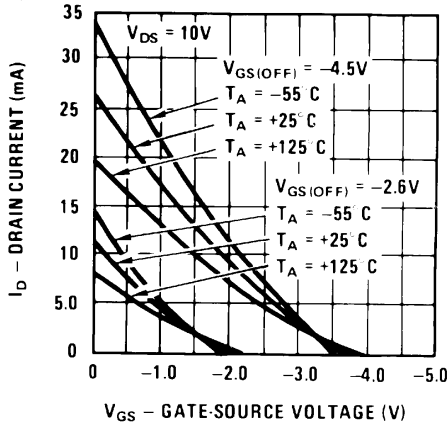


Figure 5. Transfer Characteristics

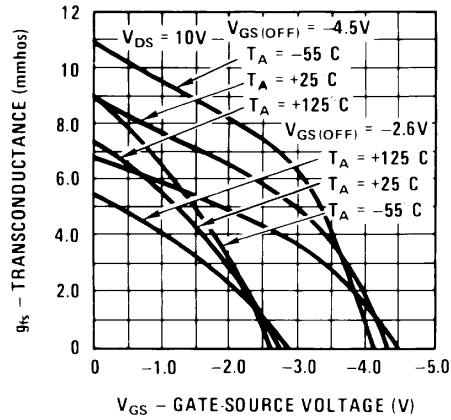


Figure 6. Transfer Characteristics

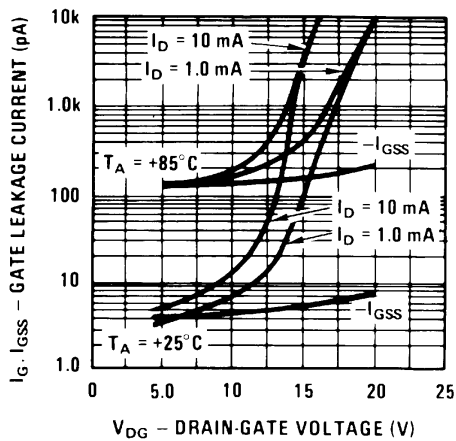


Figure 7. Leakage Current vs. Voltage

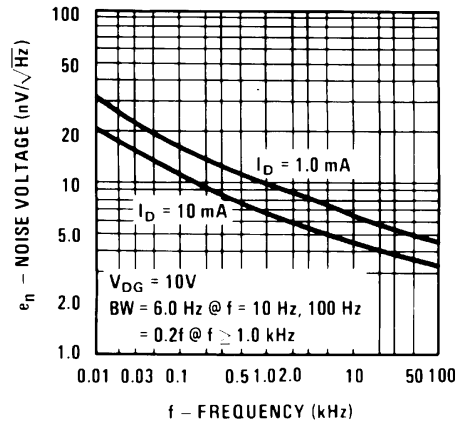


Figure 8. Noise Voltage vs. Frequency

Typical Performance Characteristics (Continued)

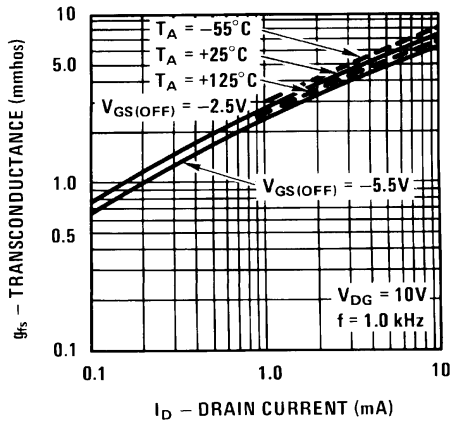


Figure 9. Transconductance vs. Drain Current

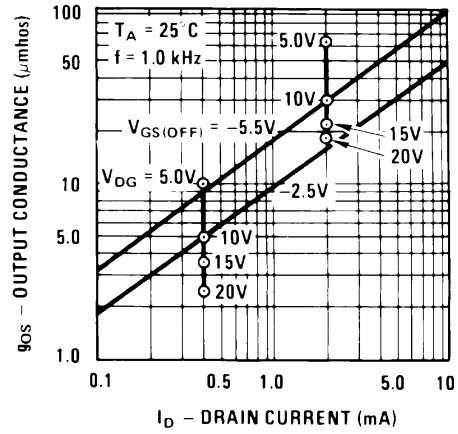


Figure 10. Output Conductance vs. Drain Current

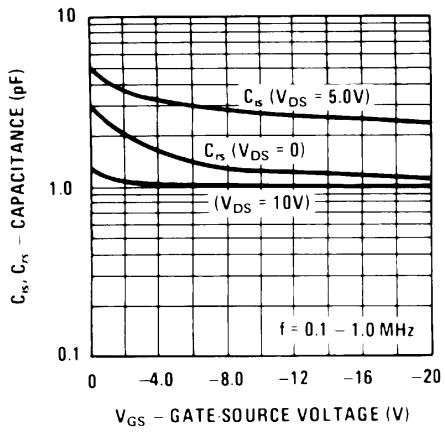


Figure 11. Capacitance vs. Voltage

Common Source Characteristics

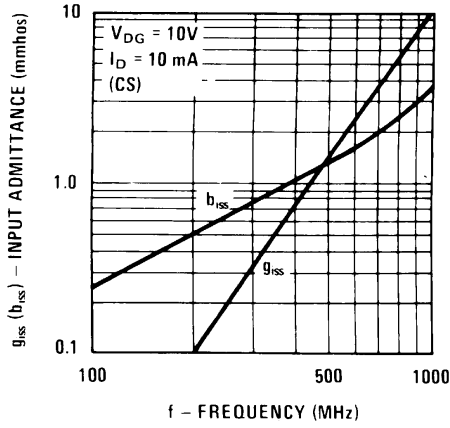


Figure 12. Input Admittance

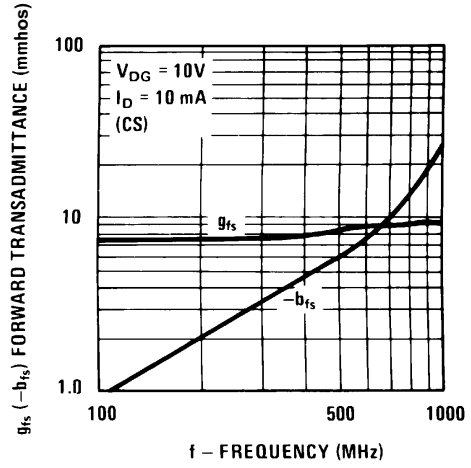


Figure 13. Forward Transadmittance

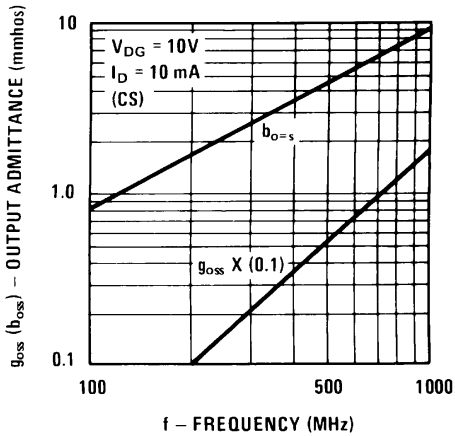


Figure 14. Output Admittance

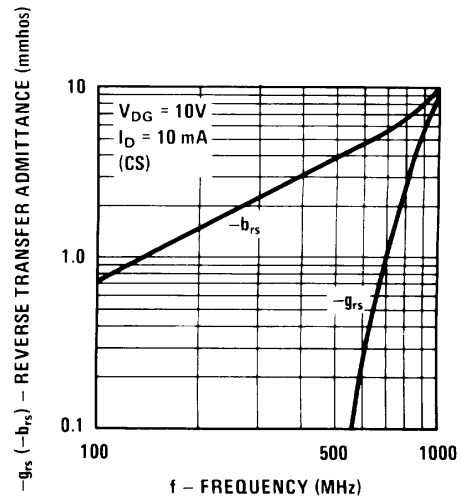


Figure 15. Reverse Transadmittance

Common Gate Characteristics

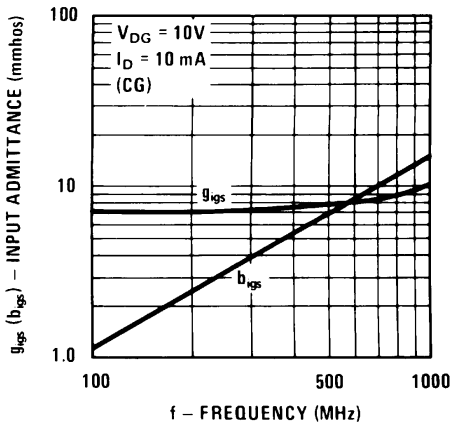


Figure 16. Input Admittance

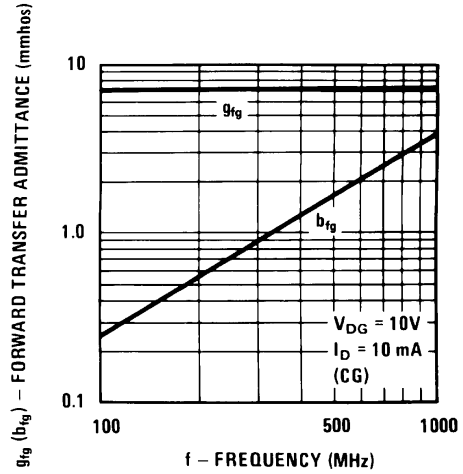


Figure 17. Forward Transadmittance

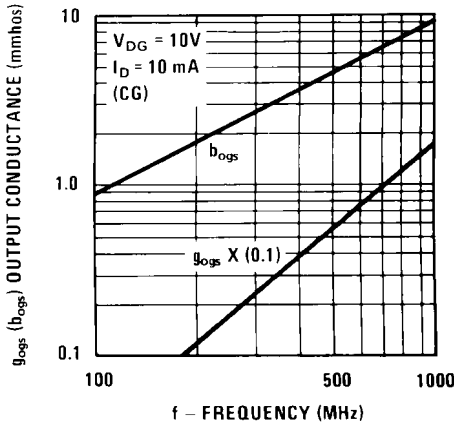


Figure 18. Output Admittance

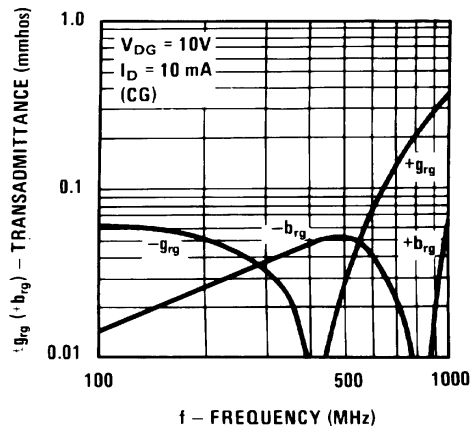
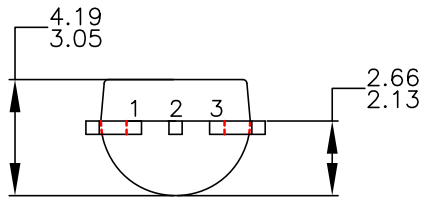
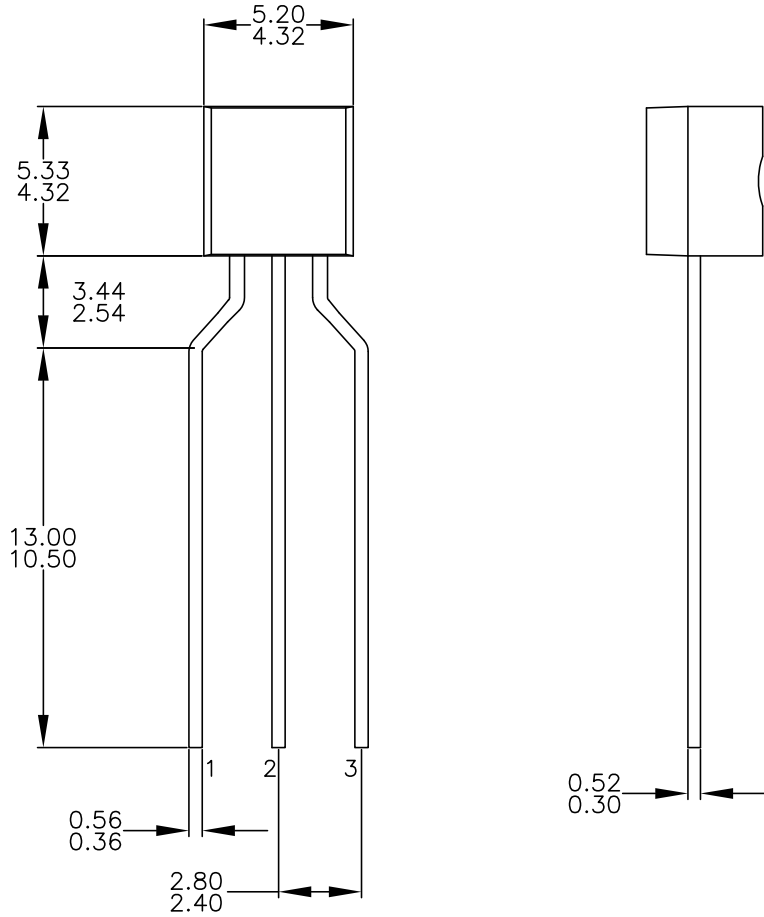


Figure 19. Reverse Transadmittance

Physical Dimensions



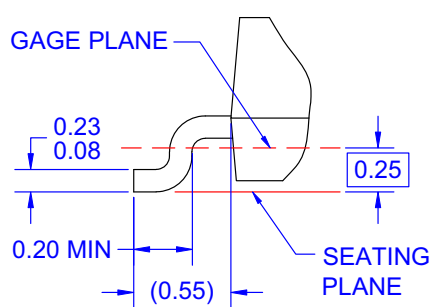
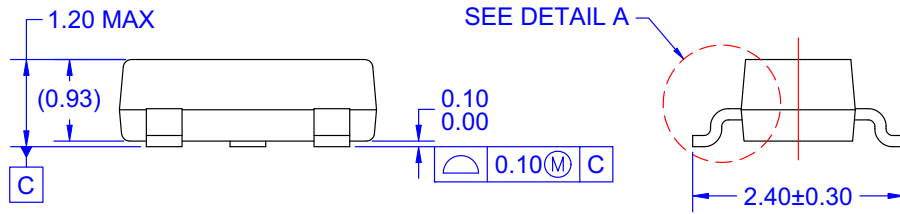
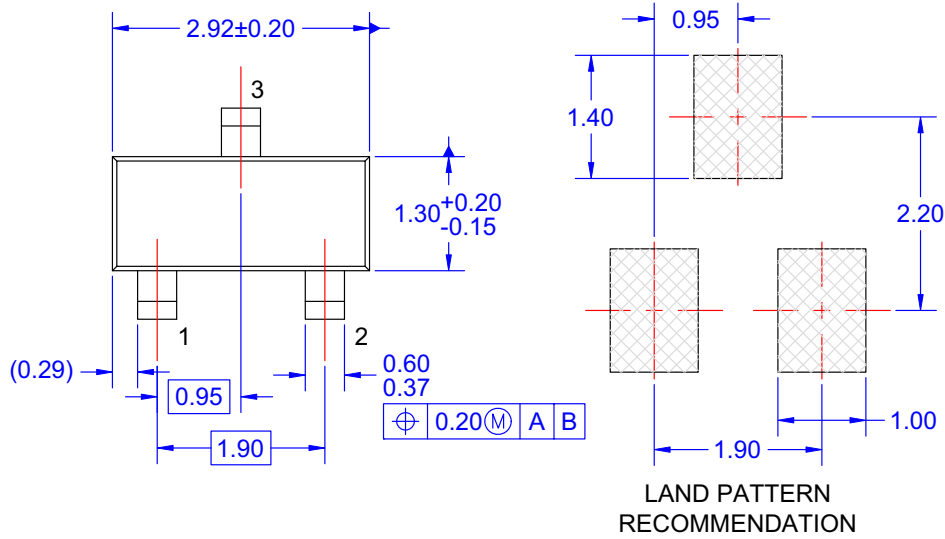
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- A. DRAWING CONFORMS TO JEDEC MS-013, VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREV3.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 20. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form



Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994.
- E) DRAWING FILE NAME: MA03DREV10

**DETAIL A**  
SCALE: 2X

Figure 21. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE

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