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September 2015

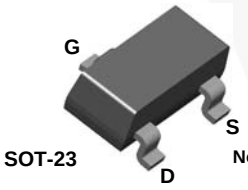
# J211 / MMBFJ211
# N-Channel RF Amplifier

## 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.


**TO-92**
1. Drain
2. Source
3. Gate

**Figure 1. J211 Device Package**




**SOT-23**

**Note: Source & Drain are interchangeable**

**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[1], [2]

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°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 | °C |

**Notes:**

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

## Thermal Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Max. | | Unit |
|---|---|---|---|---|
| | | J211[3] | MMBFJ211[3] | |
| $P_D$ | Total Device Dissipation | 350 | 225 | mW |
| | Derate Above 25°C | 2.8 | 1.8 | mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 125 | | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 357 | 556 | °C/W |

**Note:**

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

## Electrical Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

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

**Note:**

4. Pulse test: pulse width ≤ 300 µs

## Typical Performance Characteristics

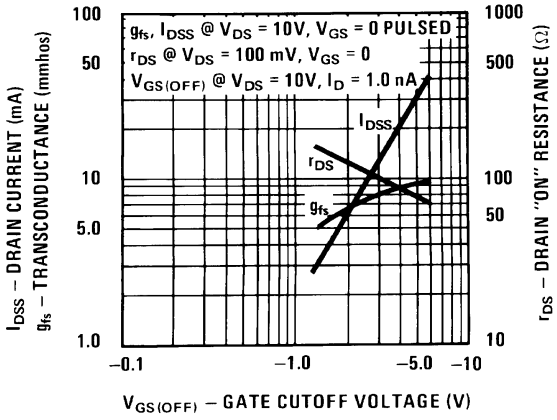



**Figure 3. Parameter Interactions**

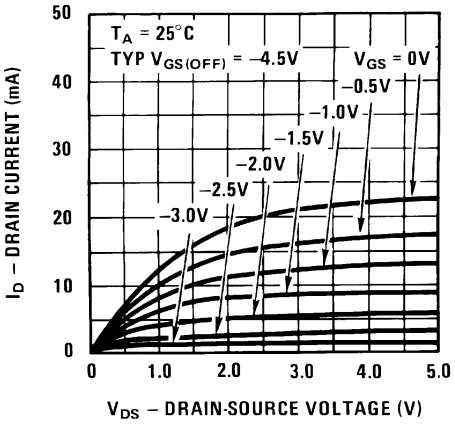



**Figure 4. Common Drain-Source**

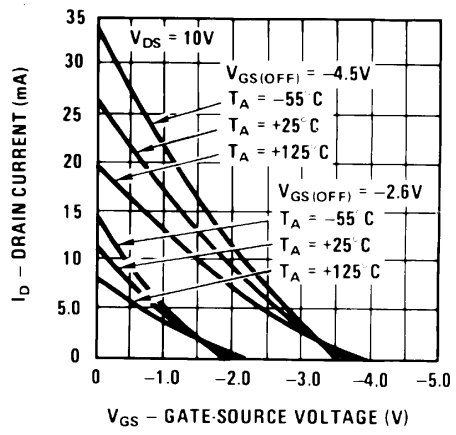



**Figure 5. Transfer Characteristics**

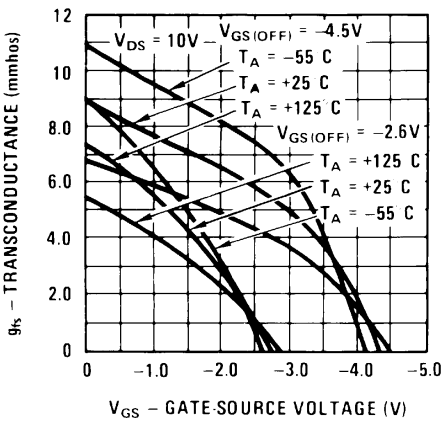



**Figure 6. Transfer Characteristics**

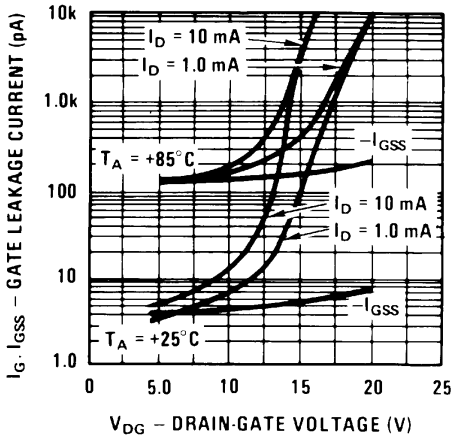



**Figure 7. Leakage Current vs. Voltage**

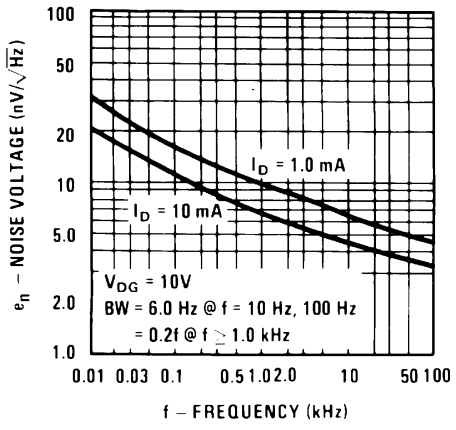



**Figure 8. Noise Voltage vs. Frequency**

## Typical Performance Characteristics (Continued)

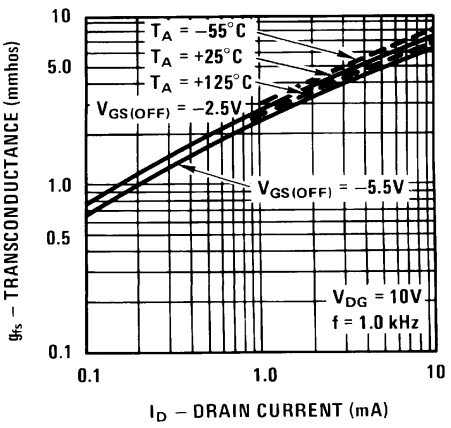



**Figure 9. Transconductance vs. Drain Current**

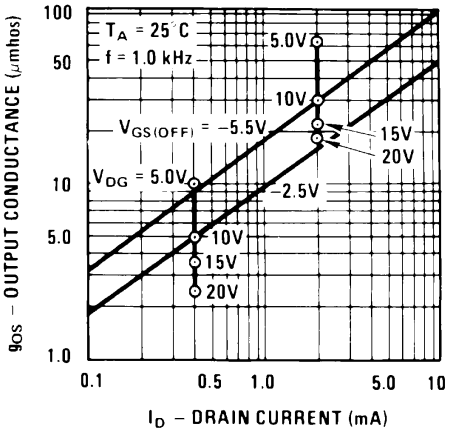



**Figure 10. Output Conductance vs. Drain Current**

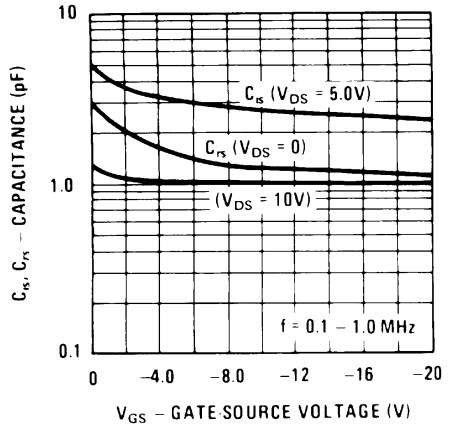



**Figure 11. Capacitance vs. Voltage**

## Common Source Characteristics

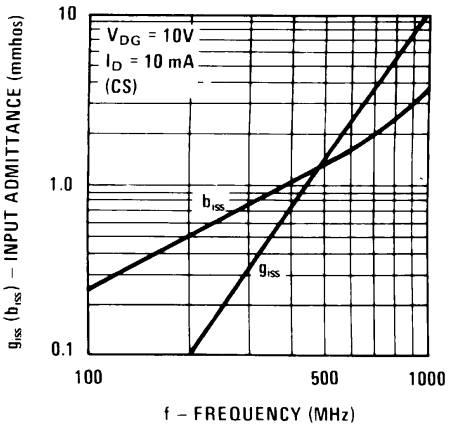



**Figure 12. Input Admittance**

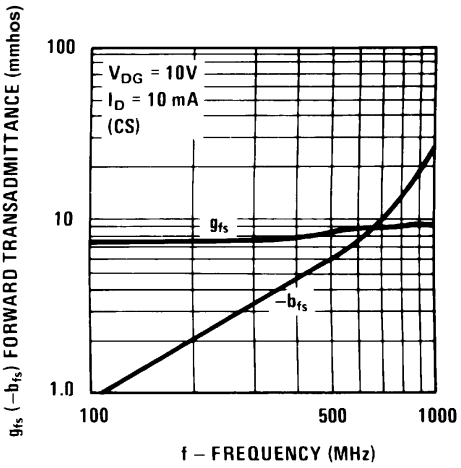



**Figure 13. Forward Transadmittance**

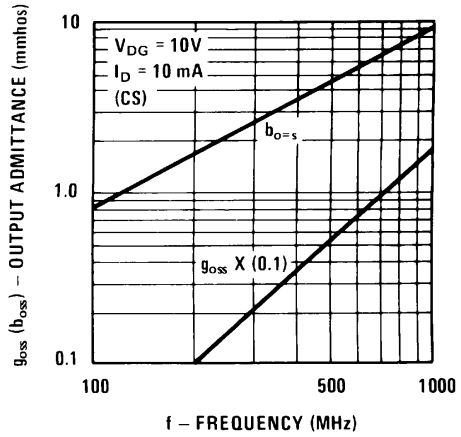



**Figure 14. Output Admittance**

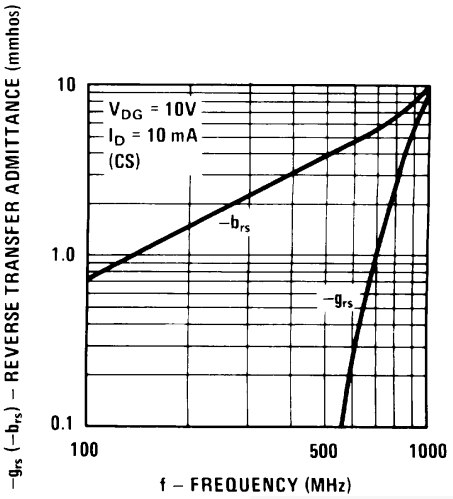



**Figure 15. Reverse Transadmittance**

## Common Gate Characteristics

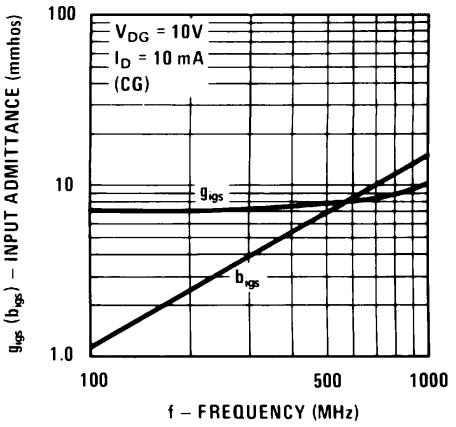



**Figure 16. Input Admittance**

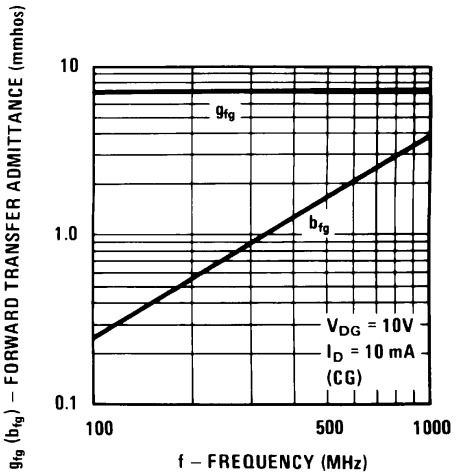



**Figure 17. Forward Transadmittance**

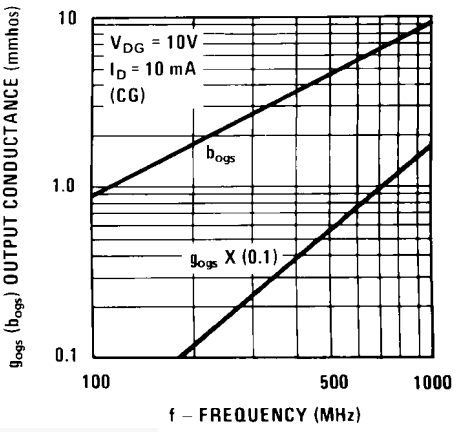



**Figure 18. Output Admittance**

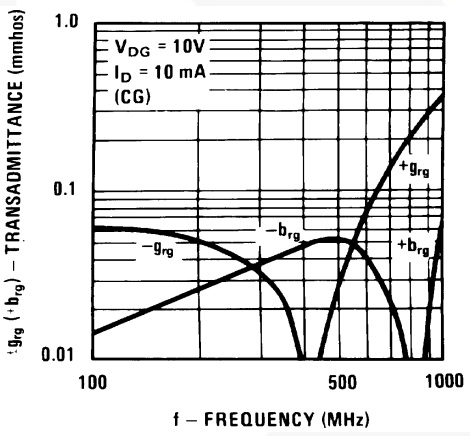



**Figure 19. Reverse Transadmittance**

## Physical Dimensions

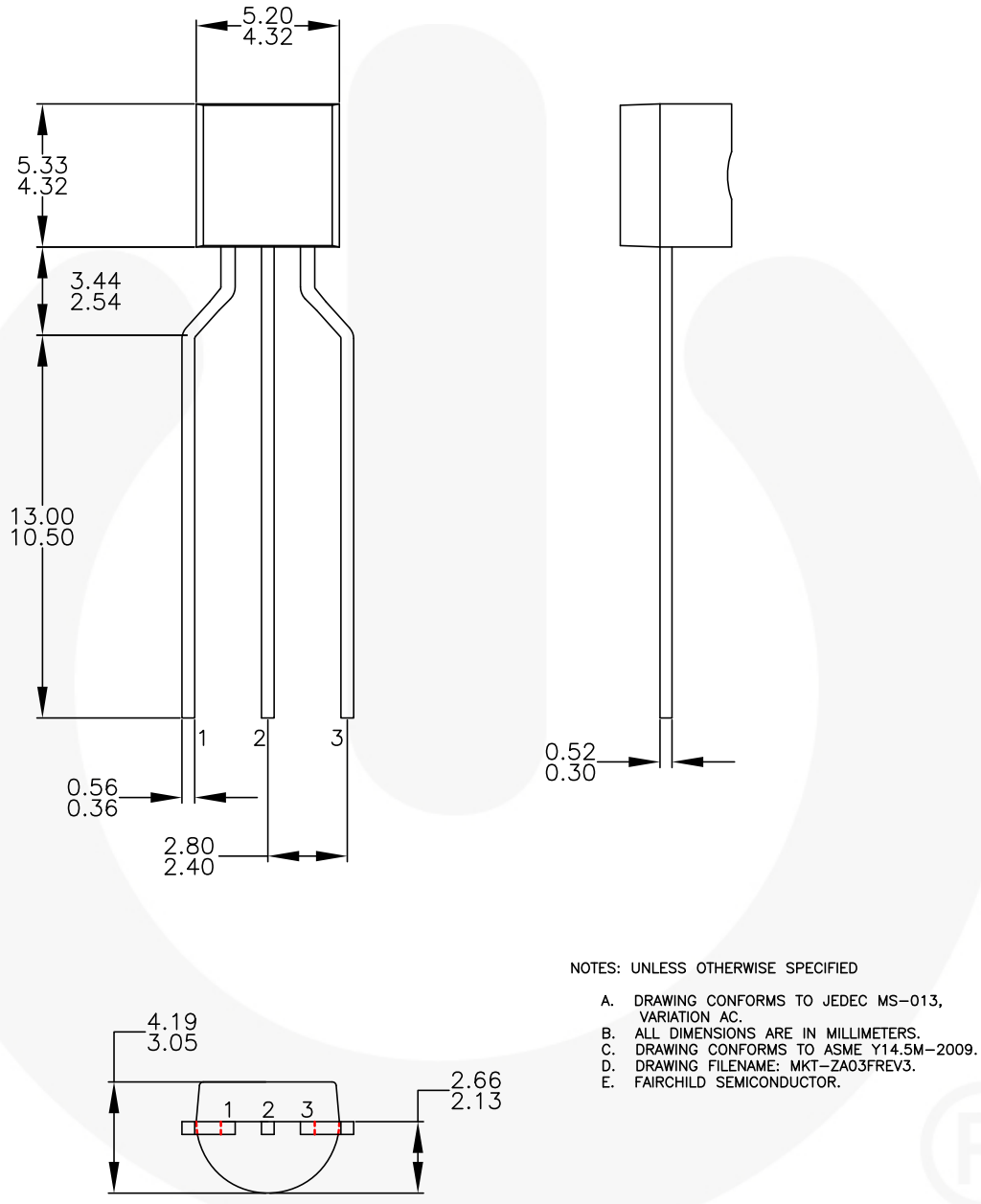



**Figure 20. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form**

## Physical Dimensions (Continued)

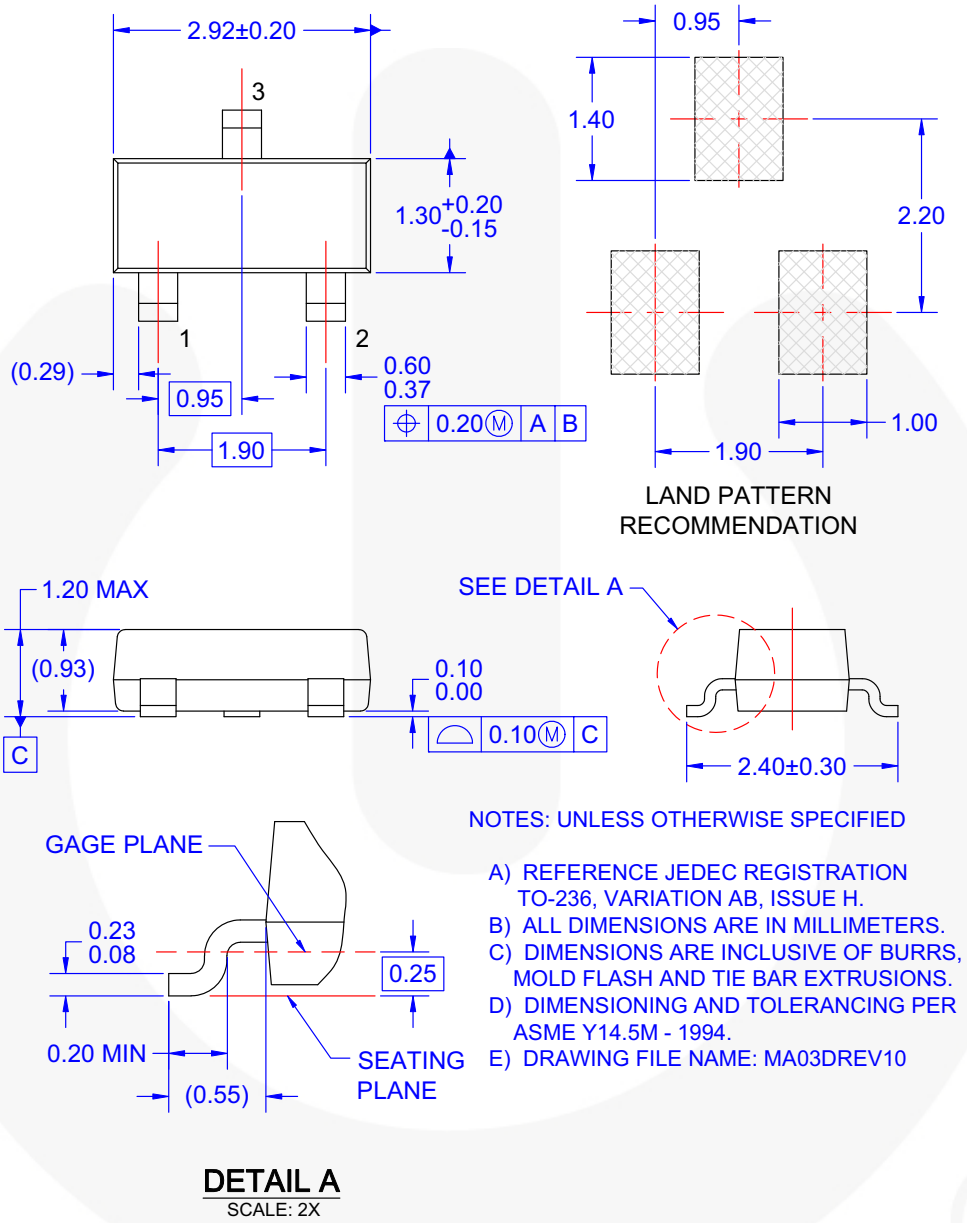



**Figure 21. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE**

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