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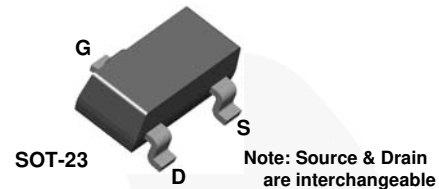


February 2015

MMBF4117 / MMBF4118 / MMBF4119 N-Channel Switch

Description

This device is designed for low current DC and audio applications. These devices provide excellent performance as input stages for sub-picoamp instrumentation or any high impedance signal sources. Sourced from process 53.



Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|-------------|----------|-----------|----------------|
| MMBF4117 | 61A | SOT-23 3L | Tape and Reel |
| MMBF4118 | 61C | SOT-23 3L | Tape and Reel |
| MMBF4119 | 61E | 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 $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|----------------|--|-------------|------------------|
| V_{DG} | Drain-Gate Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | -40 | V |
| I_{GF} | Forward Gate Current | 50 | 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°C .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

MMBF4117 / MMBF4118 / MMBF4119 — N-Channel Switch

Thermal Characteristics⁽³⁾

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

| Symbol | Parameter | Max. | Unit |
|-----------------|---|------|---------------------------|
| P_D | Total Device Dissipation | 225 | mW |
| | Derate Above 25°C | 1.8 | mW/ $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 556 | $^\circ\text{C}/\text{W}$ |

Note:

3. Device mounted on FR-4 PCB 1.6 inch X 1.6 inch X 0.06 inch.

Electrical Characteristics

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

| Symbol | Parameter | Conditions | Min. | Max. | Unit | |
|-------------------------------------|--|---|----------|------|------|------------------|
| Off Characteristics | | | | | | |
| $V_{(BR)GSS}$ | Gate-Source Breakdown Voltage | $I_G = -1.0 \mu\text{A}$, $V_{DS} = 0$ | -40 | | V | |
| I_{GSS} | Gate Reverse Current | $V_{GS} = -20 \text{ V}$, $V_{DS} = 0$ | | -10 | pA | |
| | | $V_{GS} = -20 \text{ V}$, $V_{DS} = 0$, $T_A = 150^\circ\text{C}$ | | -25 | nA | |
| $V_{GS(off)}$ | Gate-Source Cut-Off Voltage | $V_{DS} = -10 \text{ V}$, $I_D = 1.0 \text{ nA}$ | MMBF4117 | -0.6 | -1.8 | V |
| | | | MMBF4118 | -1.0 | -3.0 | |
| | | | MMBF4119 | -2.0 | -6.0 | |
| On Characteristics | | | | | | |
| I_{DSS} | Zero-Gate Voltage Drain Current ⁽⁴⁾ | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$ | MMBF4117 | 30 | 90 | μA |
| | | | MMBF4118 | 80 | 240 | |
| | | | MMBF4119 | 200 | 600 | |
| Small Signal Characteristics | | | | | | |
| g_{fs} | Common-Source Forward Transconductance | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1.0 \text{ kHz}$ | MMBF4117 | 70 | 210 | μmhos |
| | | | MMBF4118 | 80 | 250 | |
| | | | MMBF4119 | 100 | 330 | |
| g_{oss} | Common-Source Output Conductance | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1.0 \text{ kHz}$ | MMBF4117 | | 3.0 | μmhos |
| | | | MMBF4118 | | 5.0 | |
| | | | MMBF4119 | | 10.0 | |
| $R_{e(yfs)}$ | Common-Source Forward Transconductance | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 30 \text{ MHz}$ | MMBF4117 | 60 | | μmhos |
| | | | MMBF4118 | 70 | | |
| | | | MMBF4119 | 90 | | |
| C_{iss} | Input Capacitance | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1.0 \text{ kHz}$ | | 3.0 | pF | |
| C_{rss} | Reverse Transfer Capacitance | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1.0 \text{ MHz}$ | | 1.5 | pF | |

Note:

4. Pulse test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 1.0\%$

Typical Performance Characteristics

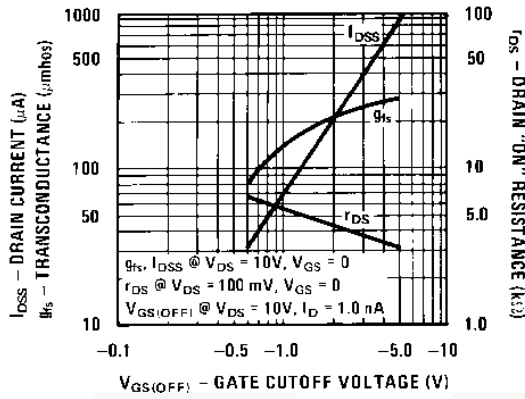


Figure 1. Parameter Interactions

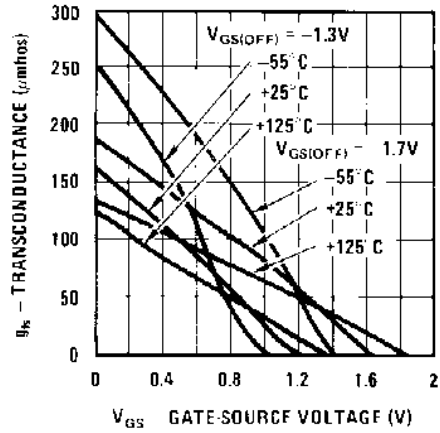


Figure 2. Transfer Characteristics

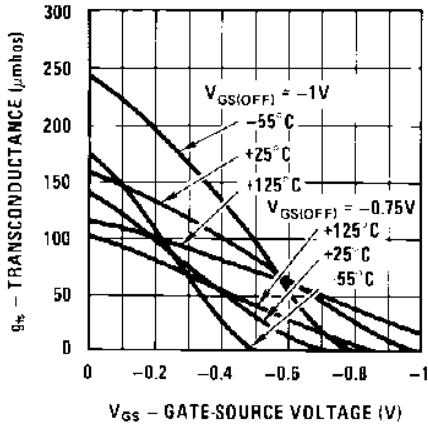


Figure 3. Transfer Characteristics

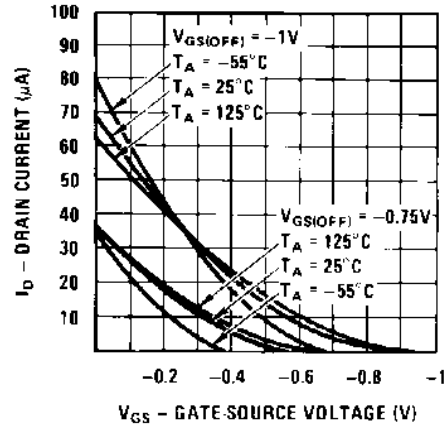


Figure 4. Transfer Characteristics

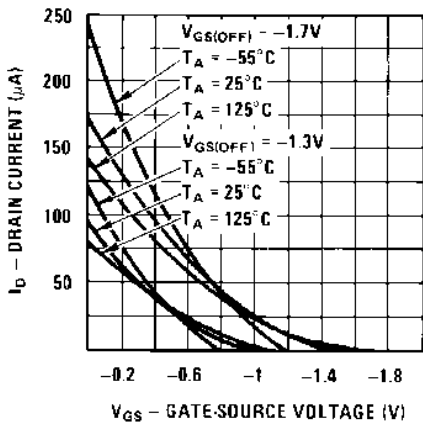


Figure 5. Transfer Characteristics

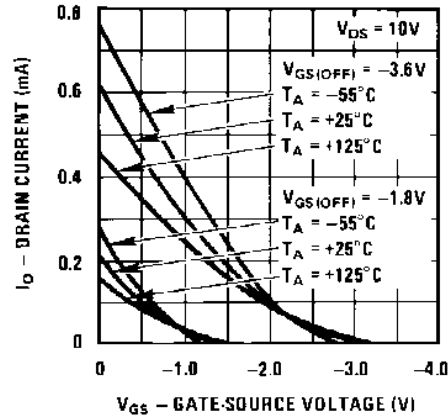


Figure 6. Transfer Characteristics

Typical Performance Characteristics (Continued)

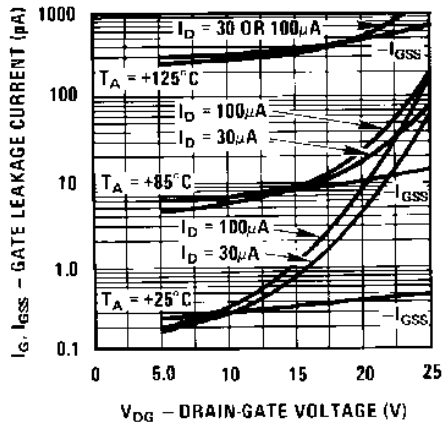


Figure 7. Leakage Current vs. Voltage

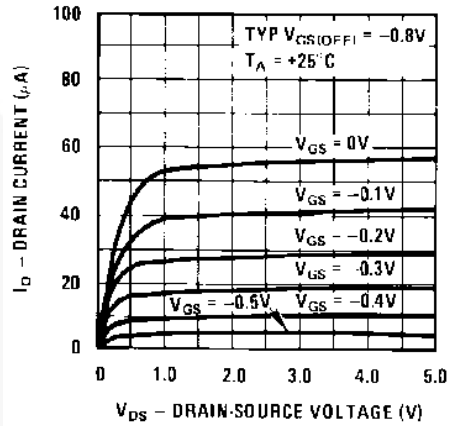


Figure 8. Common Drain-Source

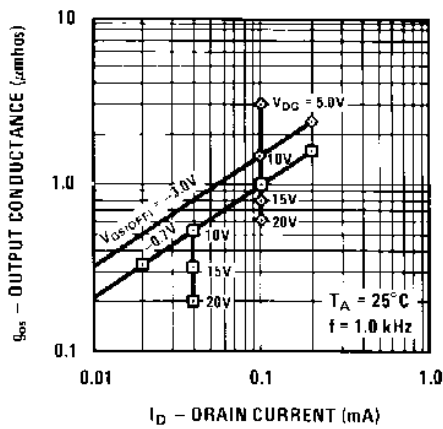


Figure 9. Output Conductance vs. Drain Current

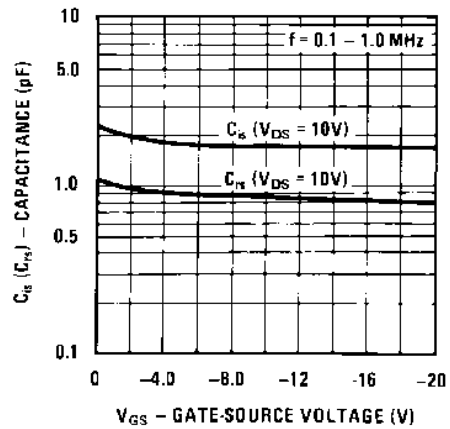


Figure 10. Conductance vs. Voltage

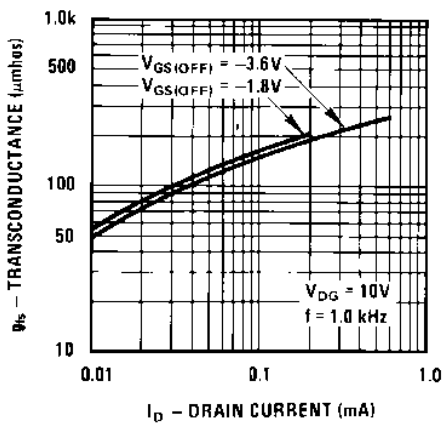


Figure 11. Transconductance vs. Drain Current

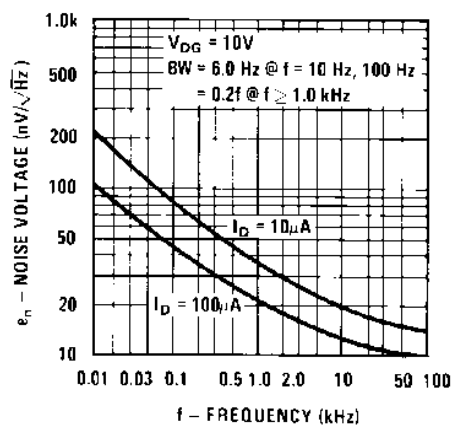
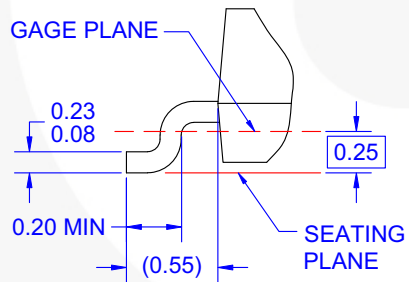
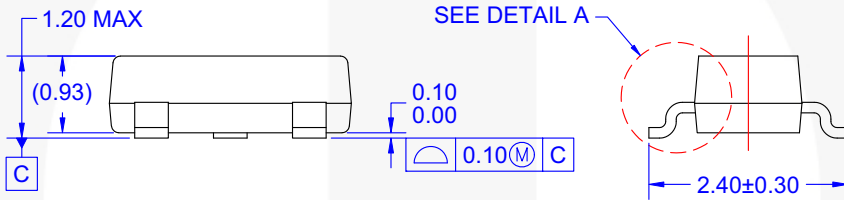
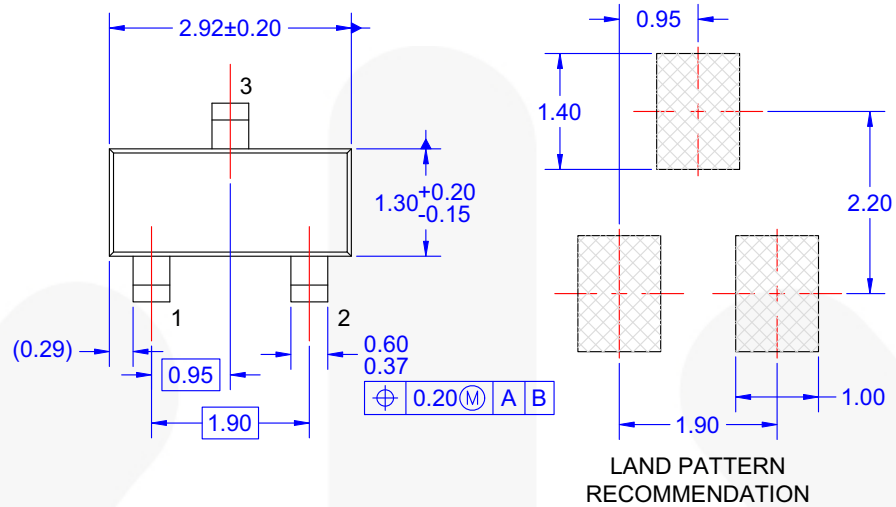


Figure 12. Noise Voltage vs. Frequency

Physical Dimensions



- 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 13. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE



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