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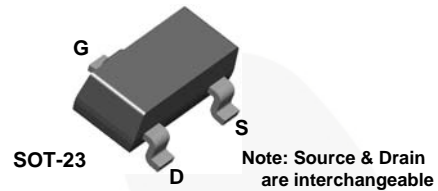


February 2015

# 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<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	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  $150^\circ\text{C}$ .
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<sup>(3)</sup>

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 $25^\circ\text{C}$	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	
<b>Off Characteristics</b>						
$V_{(BR)GSS}$	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	
<b>On Characteristics</b>						
$I_{DSS}$	Zero-Gate Voltage Drain Current <sup>(4)</sup>	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$	MMBF4117	30	90	$\mu\text{A}$
			MMBF4118	80	240	
			MMBF4119	200	600	
<b>Small Signal Characteristics</b>						
$g_{fs}$	Common-Source Forward Transconductance	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ kHz}$	MMBF4117	70	210	$\mu\text{mhos}$
			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	$\mu\text{mhos}$
			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		$\mu\text{mhos}$
			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

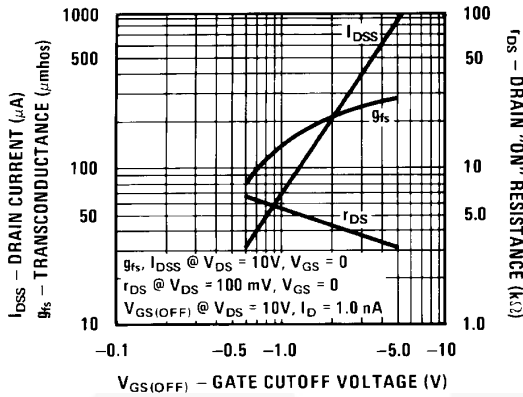


Figure 1. Parameter Interactions

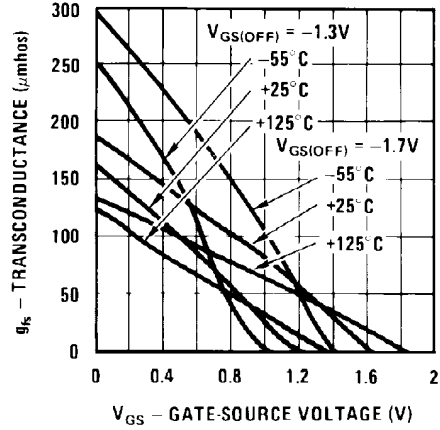


Figure 2. Transfer Characteristics

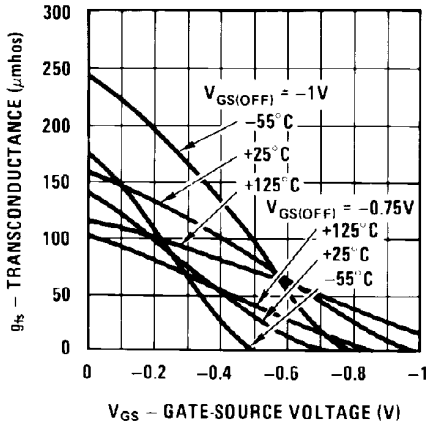


Figure 3. Transfer Characteristics

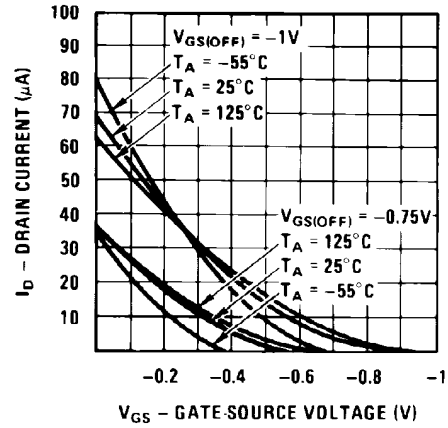


Figure 4. Transfer Characteristics

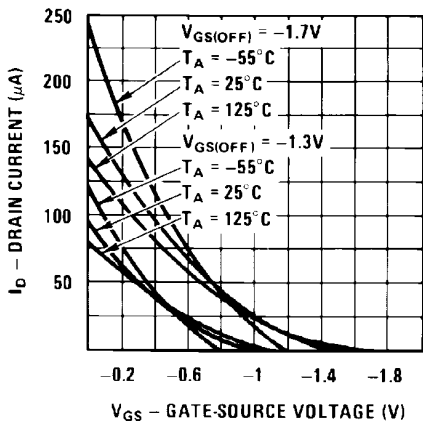


Figure 5. Transfer Characteristics

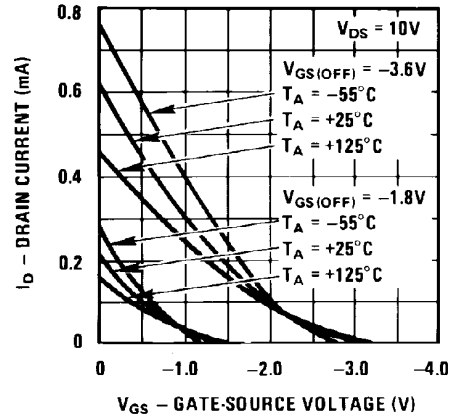


Figure 6. Transfer Characteristics

Typical Performance Characteristics (Continued)

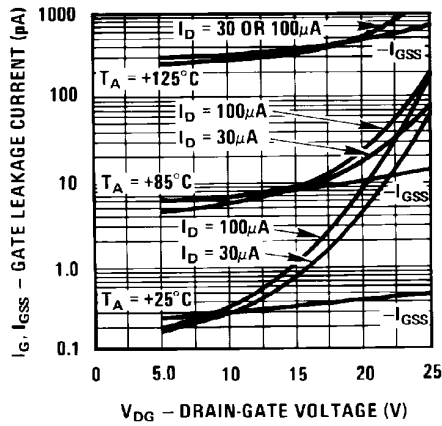


Figure 7. Leakage Current vs. Voltage

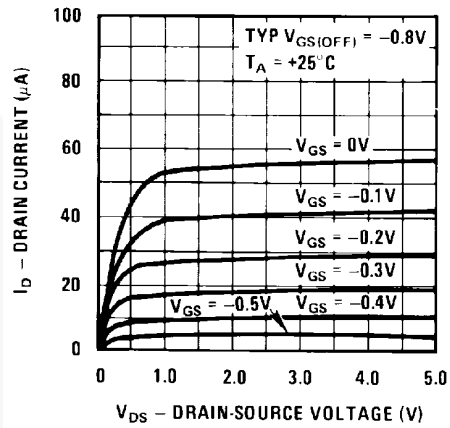


Figure 8. Common Drain-Source

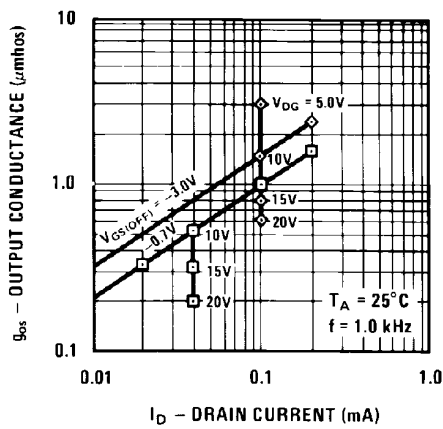


Figure 9. Output Conductance vs. Drain Current

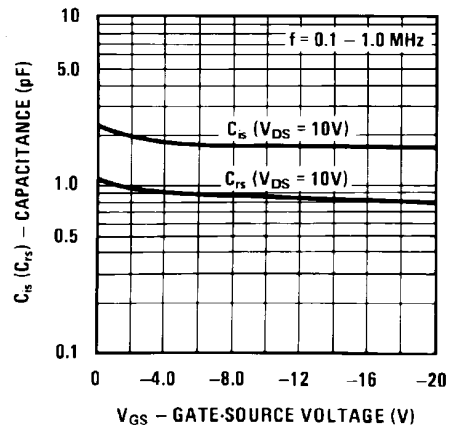


Figure 10. Conductance vs. Voltage

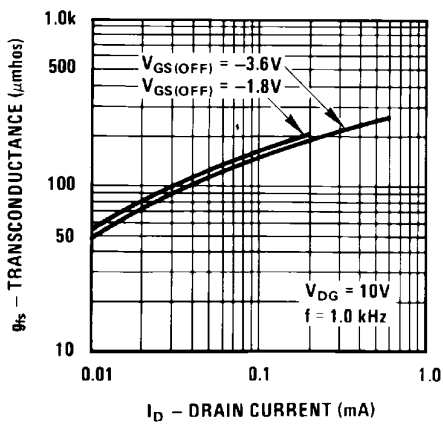


Figure 11. Transconductance vs. Drain Current

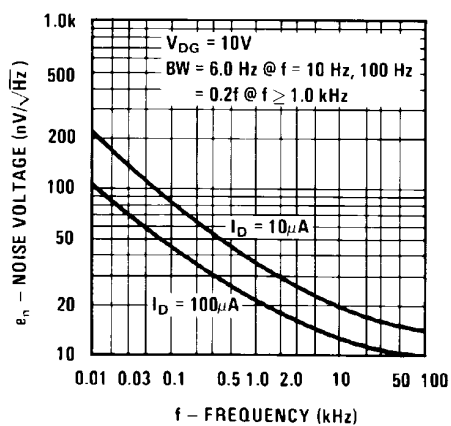
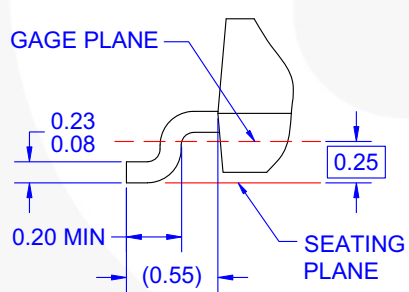
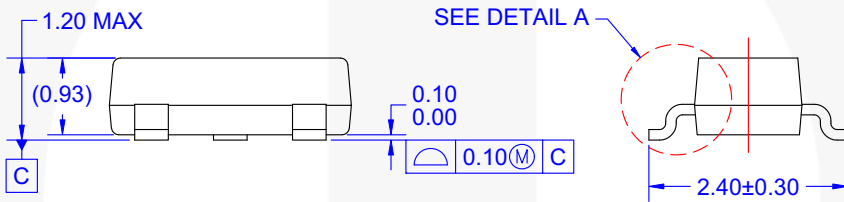
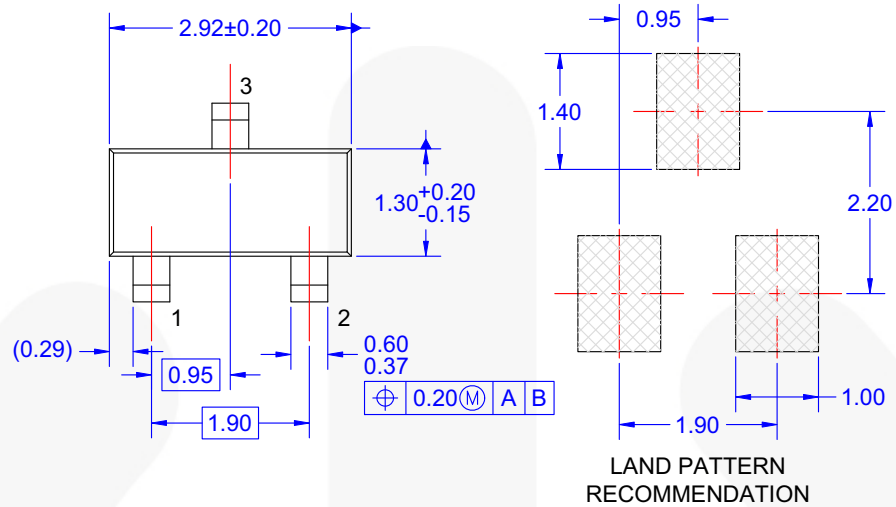


Figure 12. Noise Voltage vs. Frequency

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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