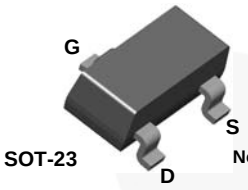
February 2015

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.



SOT-23

Note: Source & Drain are interchangeable

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°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	°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[3]

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

Symbol	Parameter	Max.	Unit
P_D	Total Device Dissipation	225	mW
	Derate Above 25°C	1.8	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	556	°C/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°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		-40		V
I_{GSS}	Gate Reverse Current	V_{GS} = -20 V, V_{DS} = 0			-10	pA
		V_{GS} = -20 V, V_{DS} = 0, T_A = 150°C			-25	nA
$V_{GS(off)}$	Gate-Source Cut-Off Voltage	V_{DS} = -10 V, I_D = 1.0 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 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 V, V_{GS} = 0, f = 1.0 kHz	MMBF4117	70	210	µmhos
			MMBF4118	80	250	
			MMBF4119	100	330	
g_{oss}	Common-Source Output Conductance	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz	MMBF4117		3.0	µmhos
			MMBF4118		5.0	
			MMBF4119		10.0	
$R_{e(yfs)}$	Common-Source Forward Transconductance	V_{DS} = 10 V, V_{GS} = 0, f = 30 MHz	MMBF4117	60		µmhos
			MMBF4118	70		
			MMBF4119	90		
C_{iss}	Input Capacitance	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz			3.0	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 MHz			1.5	pF

Note:

4. Pulse test: pulse width ≤ 300 µs, duty cycle ≤ 1.0%

Typical Performance Characteristics

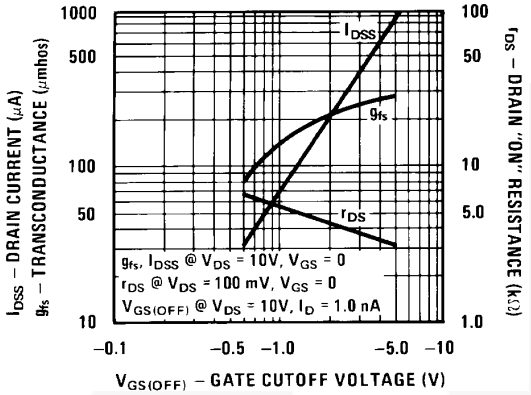


Figure 1. Parameter Interactions

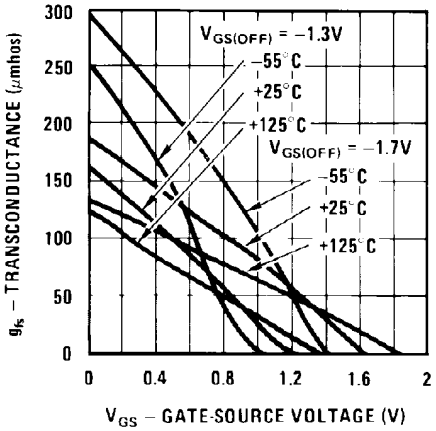


Figure 2. Transfer Characteristics

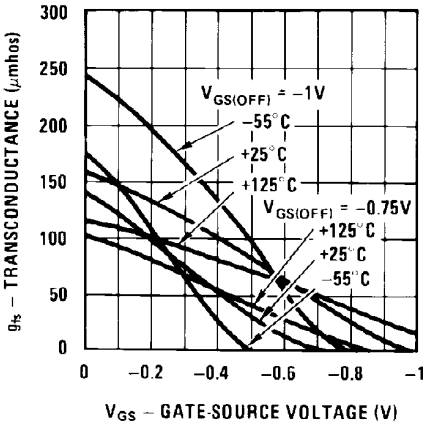


Figure 3. Transfer Characteristics

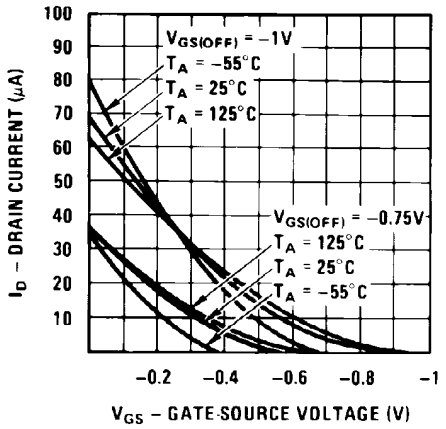


Figure 4. Transfer Characteristics

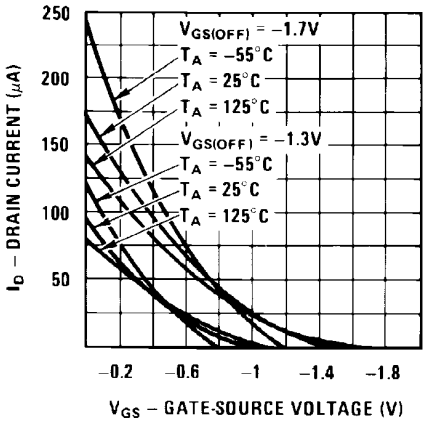


Figure 5. Transfer Characteristics

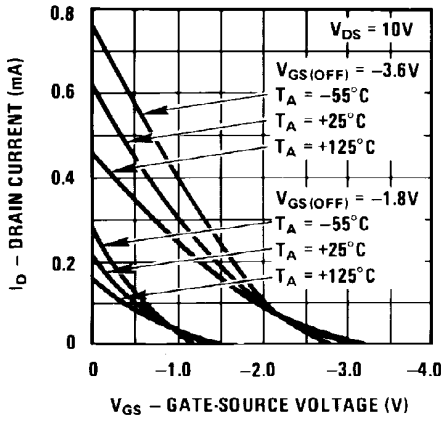


Figure 6. Transfer Characteristics

Typical Performance Characteristics (Continued)

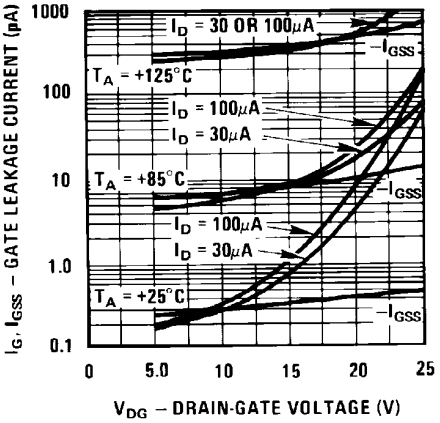


Figure 7. Leakage Current vs. Voltage

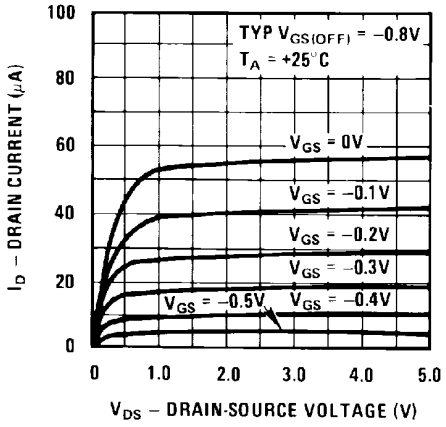


Figure 8. Common Drain-Source

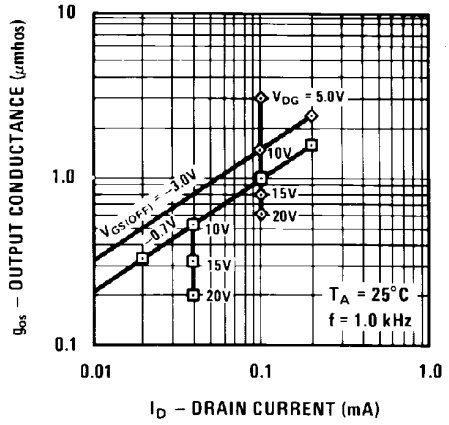


Figure 9. Output Conductance vs. Drain Current

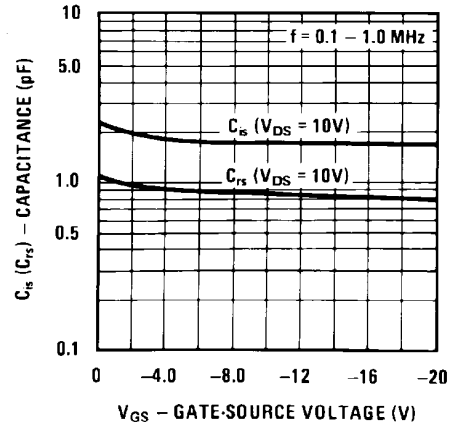


Figure 10. Conductance vs. Voltage

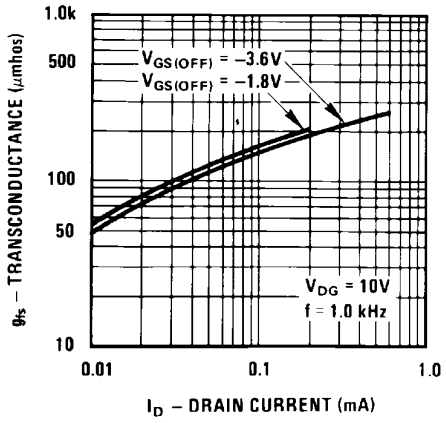


Figure 11. Transconductance vs. Drain Current

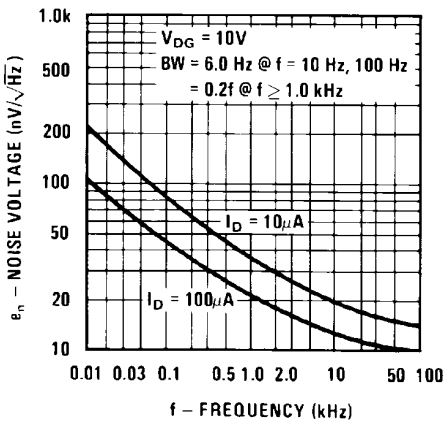


Figure 12. Noise Voltage vs. Frequency

Physical Dimensions

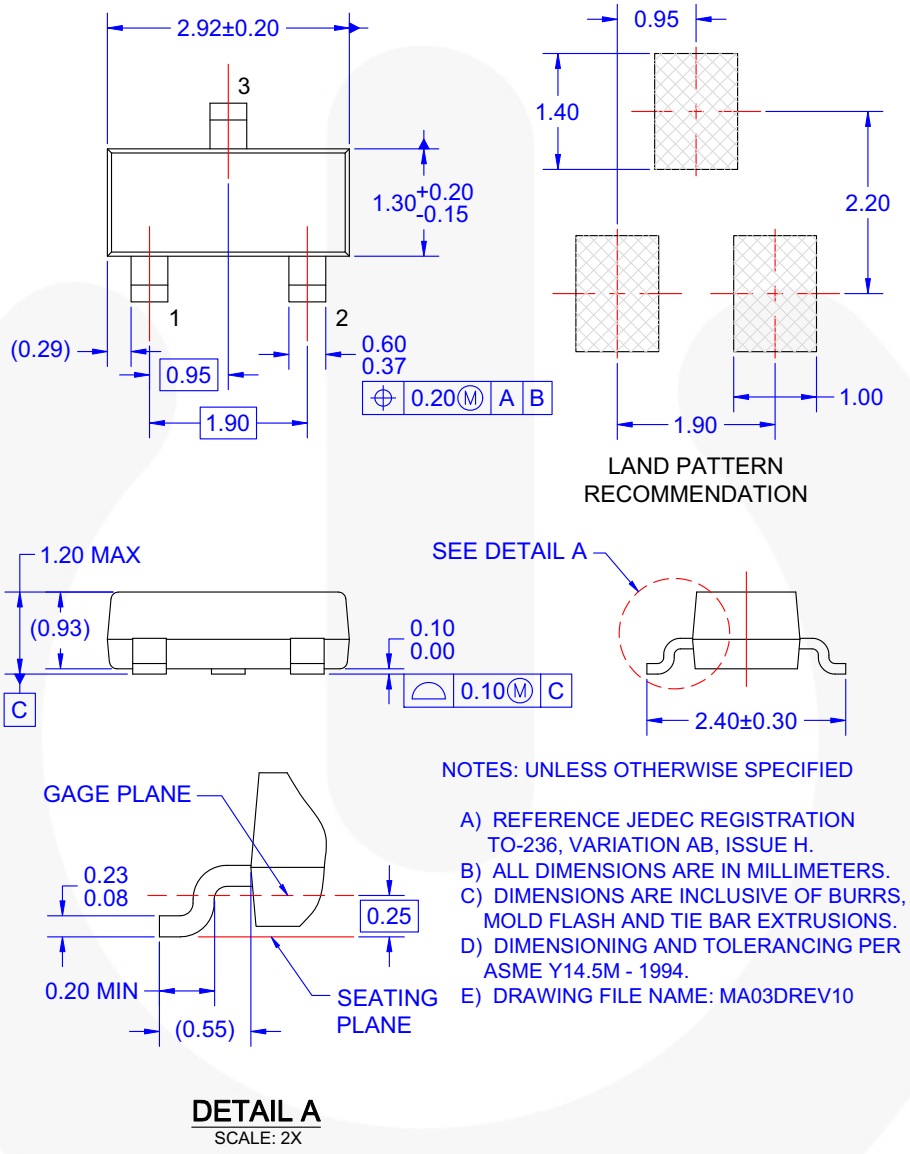


Figure 13. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE

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Rev. I73