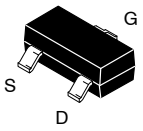
Switch, N-Channel

MMBF4117



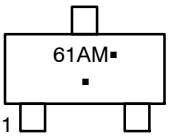
SOT−23 (TO−236)
CASE 318−08

Note: Source & Drain are interchangeable.

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.

MARKING DIAGRAM



61A = Specific Device Code
M = Date Code
▪ = Pb − Free Package

ABSOLUTE MAXIMUM RATINGS

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 Temperature Range	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady−state limits. **onsemi** 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	Value	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

3. Device mounted on FR−4 PCB 1.6 inch x 1.6 inch x 0.06 inch.

ORDERING INFORMATION

Device	Package	Shipping†
MMBF4117	SOT−23 3L	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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	−0.6	−1.8	V
ON CHARACTERISTICS					
I_{DSS}	Zero−Gate Voltage Drain Current	V_{DS} = 10 V, V_{GS} = 0	30	90	μA
SMALL SIGNAL CHARACTERISTICS					
g_{fs}	Common Source Forward Transconductance	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz	70	210	μmhos
g_{oss}	Common−Source Output Conductance	V_{DS} = 10 V, V_{GS} = 0, f = 1.0 kHz	–	3.0	μmhos
$R_{e(yfs)}$	Common−Source Forward Transconductance	V_{DS} = 10 V, V_{GS} = 0, f = 30 MHz	60	–	μmhos
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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

TYPICAL CHARACTERISTICS

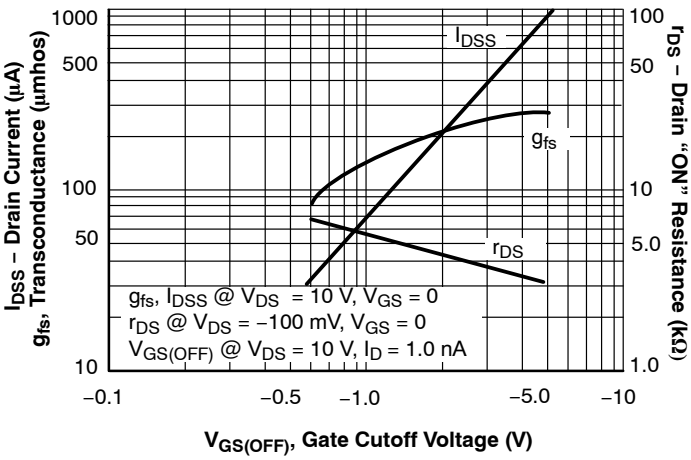


Figure 1. Parameter Interactions

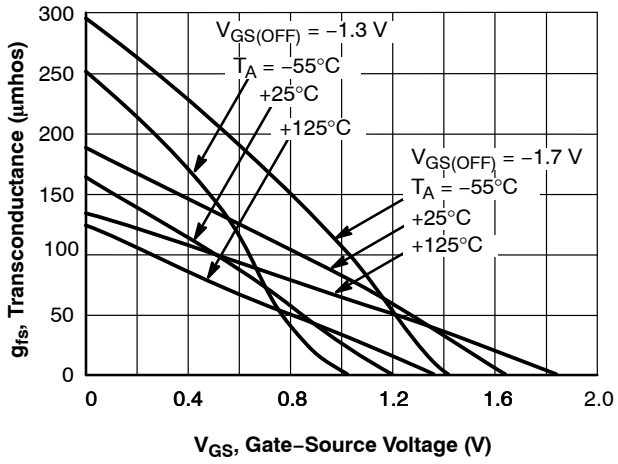


Figure 2. Transfer Characteristics

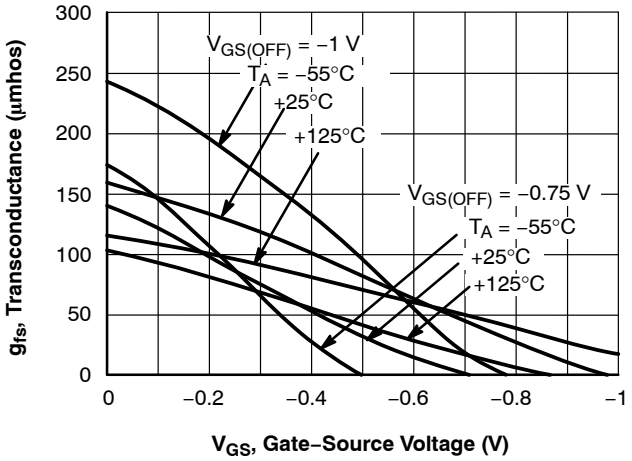


Figure 3. Transfer Characteristics

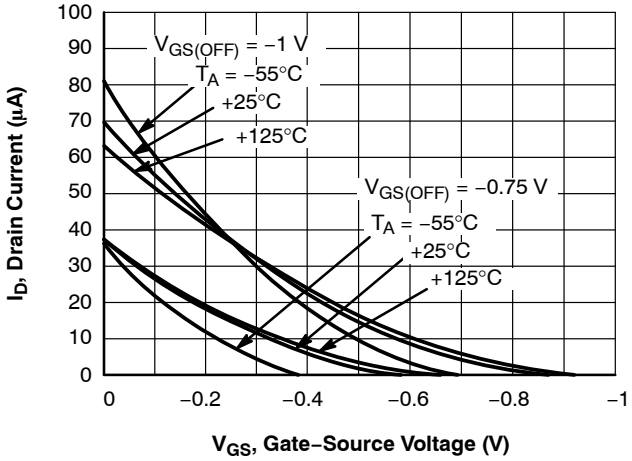


Figure 4. Transfer Characteristics

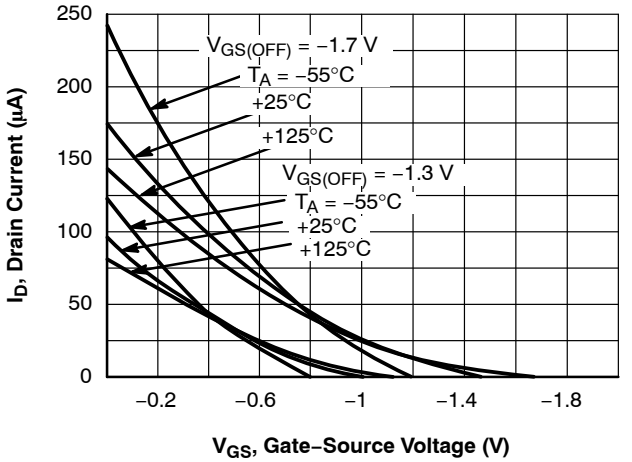


Figure 5. Transfer Characteristics

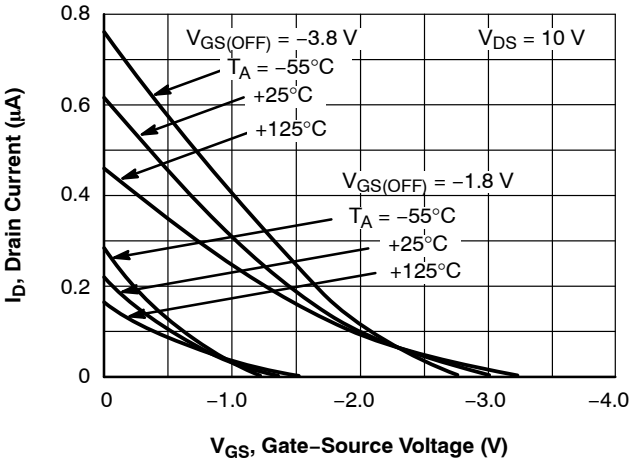


Figure 6. Transfer Characteristics

TYPICAL CHARACTERISTICS (Continued)

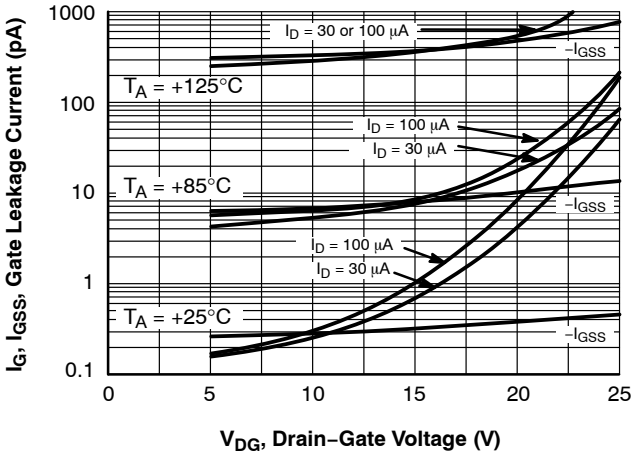


Figure 7. Leakage Current vs. Voltage

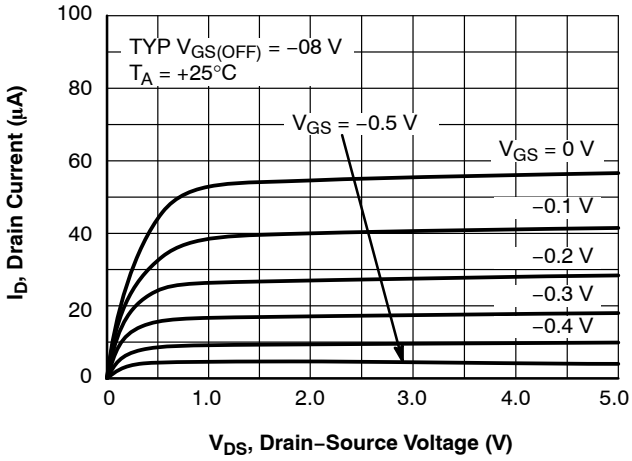


Figure 8. Common Drain−Source

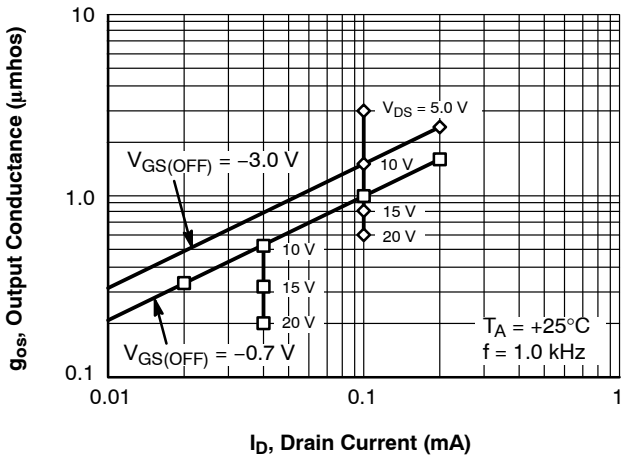


Figure 9. Output Conductance vs. Drain Current

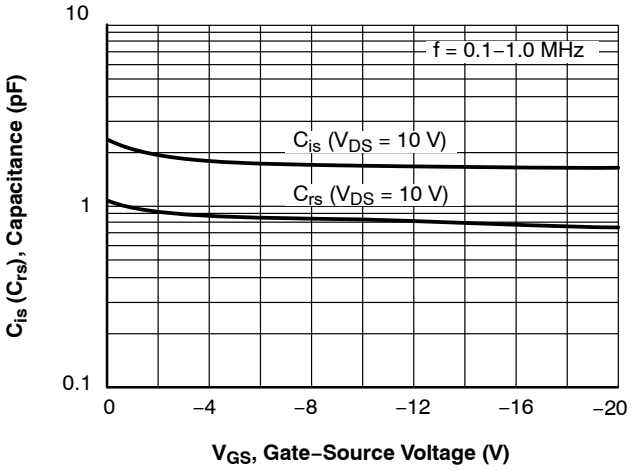


Figure 10. Capacitance vs. Voltage

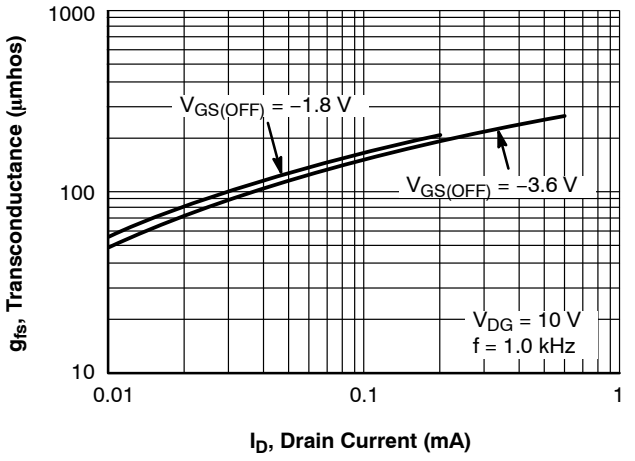


Figure 11. Transconductance vs. Drain Current

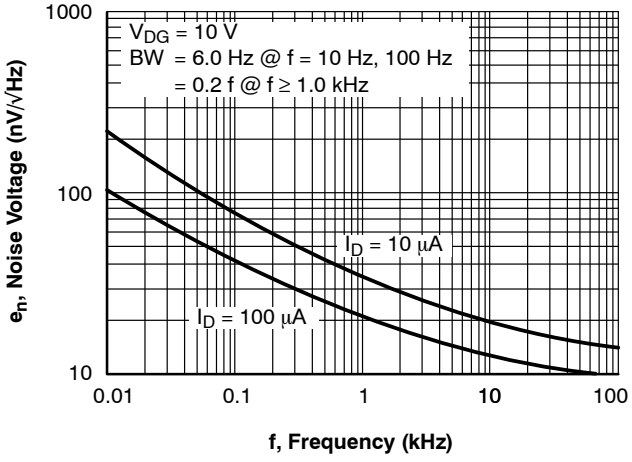
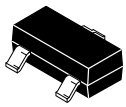


Figure 12. Noise Voltage vs. Frequency

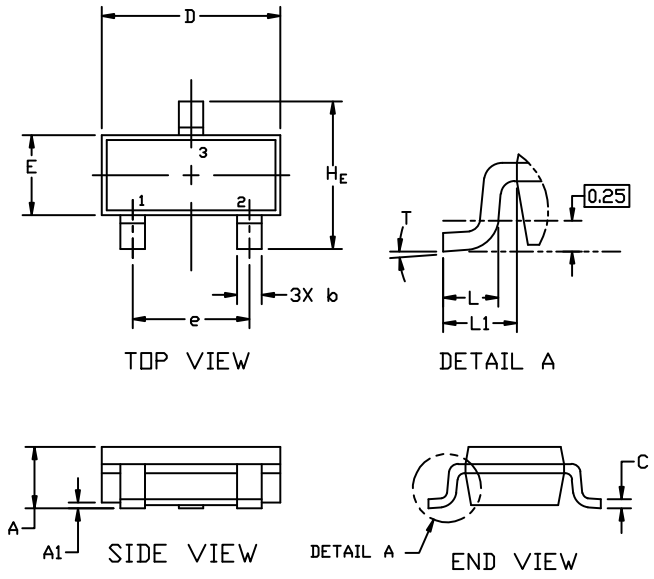
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



SCALE 4:1

SOT−23 (TO−236)
CASE 318
ISSUE AT

DATE 01 MAR 2023

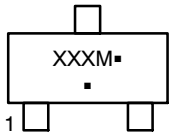


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

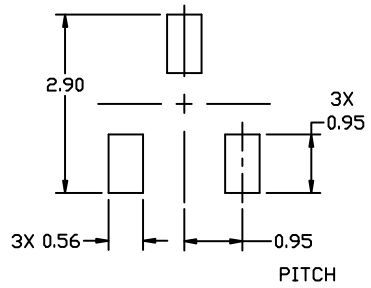
	MILLIMETERS			INCHES		
DIM	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
c	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
H_E	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	---	10°	0°	---	10°

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

DOCUMENT NUMBER:	**98ASB42226B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.	
DESCRIPTION:	**SOT−23 (TO−236)**		**PAGE 1 OF 2**

SOT−23 (TO−236)
CASE 318
ISSUE AT

DATE 01 MAR 2023

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE−ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales