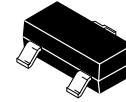


# RF Amplifiers, N-Channel

## MMBF4416



SOT-23  
CASE 318-08

### Features

- This Device is Designed for RF Amplifiers
- Sourced from Process 50
- This is a Pb-Free and Halide Free Device

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted.)

Symbol	Parameter	Value	Unit
V <sub>DG</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	-30	V
I <sub>GF</sub>	Forward Gate Current	10	mA
T <sub>J</sub> , T <sub>STG</sub>	Junction 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.

### THERMAL CHARACTERISTICS

(T<sub>A</sub> = 25°C unless otherwise noted.) (Note 1)

Symbol	Parameter	Max	Unit
P <sub>D</sub>	Total Device Dissipation Derate above 25°C	225 1.8	mW mW/°C
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	556	°C/W

1. Device mounted on FR-4 PCB 1.6" × 1.6" × 0.06".

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

V <sub>(BR)GSS</sub>	Gate-Source Breakdown Voltage	V <sub>DS</sub> = 0, I <sub>G</sub> = 1 μA	-30	-	-	V
I <sub>GSS</sub>	Gate Reverse Current	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0, T <sub>A</sub> = 150°C	-	-	-1 -200	nA nA
V <sub>GS(off)</sub>	Gate Source Cut-off Voltage	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 1 nA	-2.5	-	-6	V
V <sub>GS</sub>	Gate Source Voltage	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 0.5 mA	-1	-	-5.5	V

#### ON CHARACTERISTICS

I <sub>DSS</sub>	Zero-Gate Voltage Drain Current	V <sub>GS</sub> = 15 V, V <sub>GS</sub> = 0	5	-	15	mA
V <sub>GS(f)</sub>	Gate-Source Forward Voltage	V <sub>DS</sub> = 0, I <sub>G</sub> = 1 mA	-	-	1	V

#### SMALL SIGNAL CHARACTERISTICS

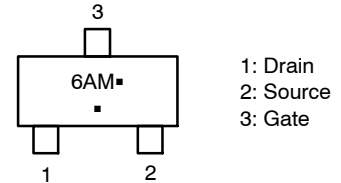
Y <sub>fs</sub>	Forward Transfer Admittance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0, f = 1 kHz	4500	-	7500	μmhos
y <sub>os</sub>	Output Admittance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0, f = 1 kHz	-	-	50	μmhos
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0, f = 1 MHz	-	-	4	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0, f = 1 MHz	-	-	0.9	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0, f = 1 MHz	-	-	2	pF

#### FUNCTIONAL CHARACTERISTICS

NF	Noise Figure	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 5 mA, R <sub>g</sub> = 100 Ω, f = 100 MHz	-	-	2	dB
G <sub>ps</sub>	Common Source Power Gain	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 5 mA, R <sub>g</sub> = 100 Ω, f = 100 MHz	18	-	-	dB

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.

### MARKING DIAGRAM



6A = Specific Device Code  
M = Date Code  
■ = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMBF4416	SOT-23 (Pb-Free/ Halide Free)	3000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



**SOT-23 (TO-236)**  
CASE 318-08  
ISSUE AS

DATE 30 JAN 2018

SCALE 4:1

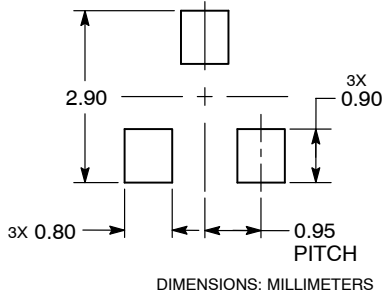


**NOTES:**

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.

DIM	MILLIMETERS			INCHES		
	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
HE	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	---	10°	0°	---	10°

**RECOMMENDED SOLDERING FOOTPRINT**



**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.

- |   |   |   |  |
|---|---|---|--|
| STYLE 1 THRU 5:<br>CANCELLED                                | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR       | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE          | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE           | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE      |
| STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          | STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE          | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE      |
| STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE         |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN           | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT         | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE          |
| STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION | STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE     | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE          |

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