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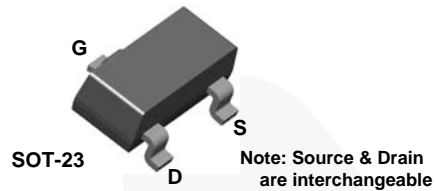


March 2015

# MMBF5460 / MMBF5461 / MMBF5462 P-Channel General-Purpose Amplifier

## Description

This device is designed primarily for low level audio and general-purpose applications with high impedance signal sources. Sourced from process 89.



## Ordering Information

Part Number	Top Mark	Package	Packing Method
MMBF5460	6E	SOT-23 3L	Tape and Reel
MMBF5461	61U	SOT-23 3L	Tape and Reel
MMBF5462	61V	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	10	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.

MMBF5460 / MMBF5461 / MMBF5462 — P-Channel General-Purpose Amplifier

### 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. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

### Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
<b>Off Characteristics</b>							
$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 10 \mu\text{A}$ , $V_{DS} = 0$	40			V	
$I_{GSS}$	Gate Reverse Current	$V_{GS} = 20 \text{ V}$ , $V_{DS} = 0$			5.0	nA	
		$V_{GS} = 20 \text{ V}$ , $V_{DS} = 0$ , $T_A = 100^\circ\text{C}$			1.0	$\mu\text{A}$	
$V_{GS(off)}$	Gate-Source Cut-Off Voltage	$V_{DS} = 15 \text{ V}$ , $I_D = 1.0 \mu\text{A}$	MMBF5460	0.75		6.0	V
			MMBF5461	1.0		7.5	
			MMBF5462	1.8		9.0	
$V_{GS}$	Gate-Source Voltage	$V_{DS} = 15 \text{ V}$ , $I_D = 0.1 \text{ mA}$	MMBF5460	0.5		4.0	V
		$V_{DS} = 15 \text{ V}$ , $I_D = 0.2 \text{ mA}$	MMBF5461	0.8		4.5	
		$V_{DS} = 15 \text{ V}$ , $I_D = 0.4 \text{ mA}$	MMBF5462	1.5		6.0	
<b>On Characteristics</b>							
$I_{DSS}$	Zero-Gate Voltage Drain Current <sup>(4)</sup>	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$	MMBF5460	-1.0		-5.0	mA
			MMBF5461	-2.0		-9.0	
			MMBF5462	-4.0		-16.0	
<b>Small Signal Characteristics</b>							
$g_{fs}$	Forward Transfer Conductance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ kHz}$	MMBF5460	1000		4000	$\mu\text{mhos}$
			MMBF5461	1500		5000	
			MMBF5462	2000		6000	
$g_{os}$	Output Conductance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ kHz}$			75	$\mu\text{mhos}$	
$C_{iss}$	Input Capacitance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ MHz}$		5.0	7.0	pF	
$C_{rss}$	Reverse Transfer Capacitance	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 1.0 \text{ MHz}$		1.0	2.0	pF	
NF	Noise Figure	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $R_G = 1.0 \text{ M}\Omega$ , $f = 100 \text{ Hz}$ , $\text{BW} = 1.0 \text{ Hz}$		1.0	2.5	dB	
$e_n$	Equivalent Short-Circuit Input Noise Voltage	$V_{DS} = 15 \text{ V}$ , $V_{GS} = 0$ , $f = 100 \text{ Hz}$ , $\text{BW} = 1.0 \text{ Hz}$		60	115	$\text{nV}/\sqrt{\text{Hz}}$	

#### Note:

4. Pulse test: pulse width  $\leq 300 \text{ ms}$ , duty cycle  $\leq 2.0\%$

Typical Performance Characteristics

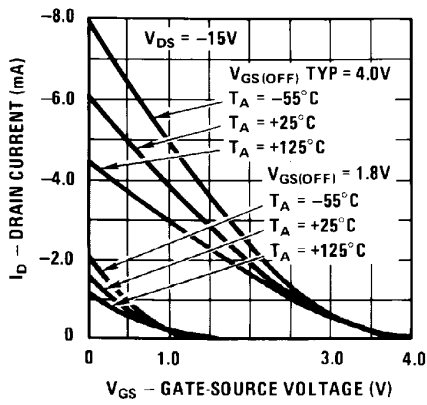


Figure 1. Transfer Characteristics

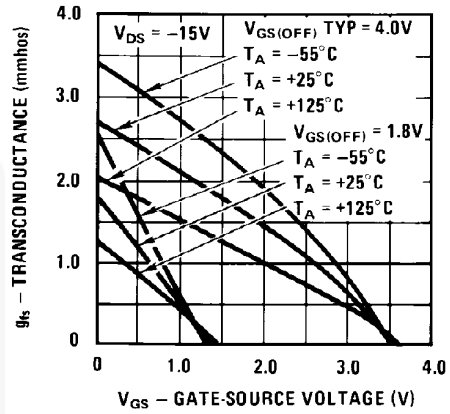


Figure 2. Transfer Characteristics

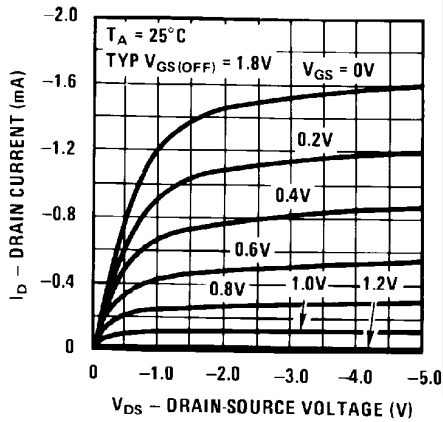


Figure 3. Common Drain-Source

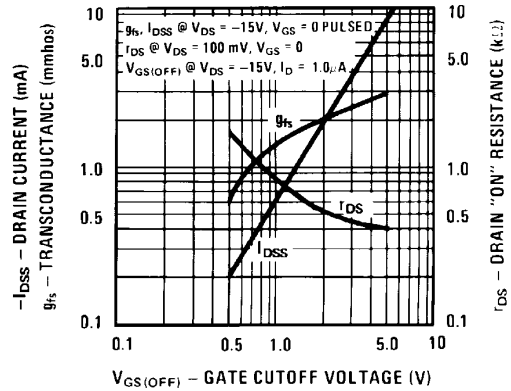


Figure 4. Parameter Interactions

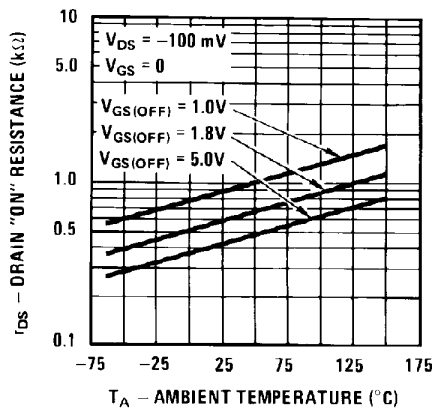


Figure 5. Leakage Current vs. Voltage

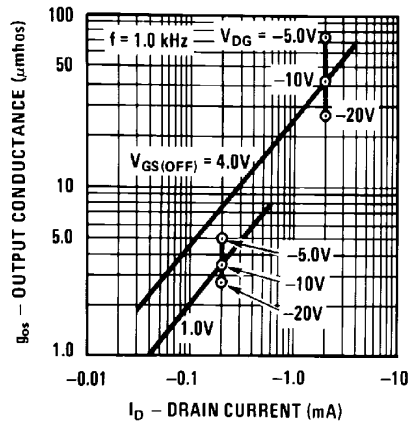


Figure 6. Output Conductance vs. Drain Current

Typical Performance Characteristics (Continued)

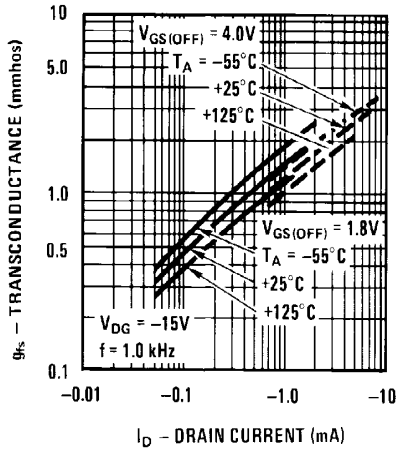


Figure 7. Transconductance vs. Drain Current

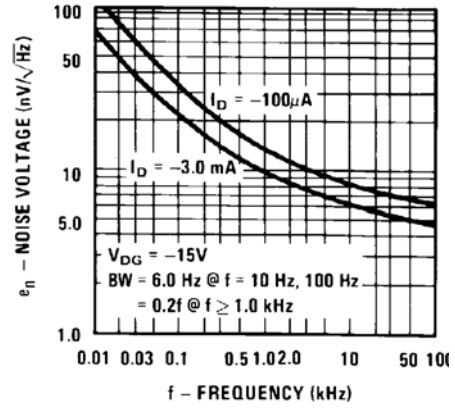


Figure 8. Noise Voltage vs. Frequency

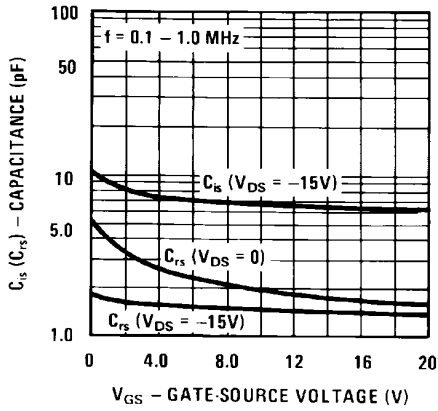


Figure 9. Capacitance vs. Voltage

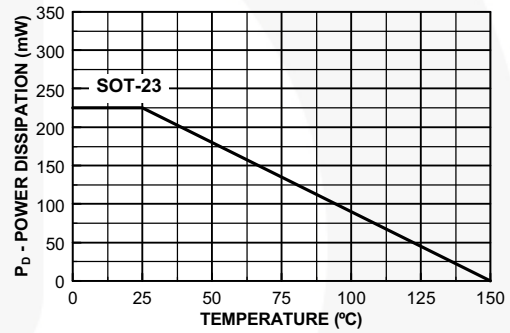
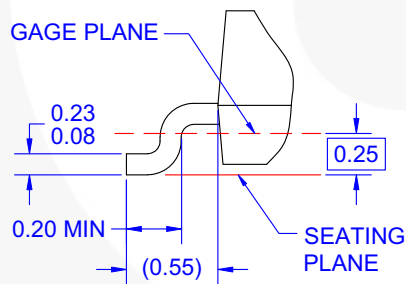
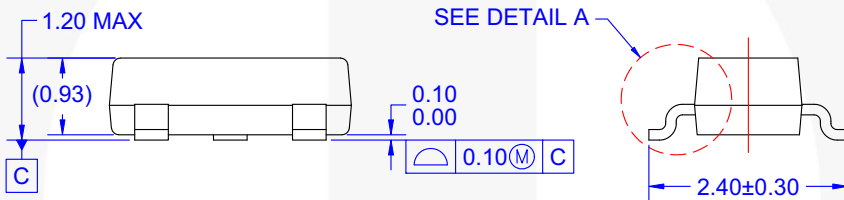
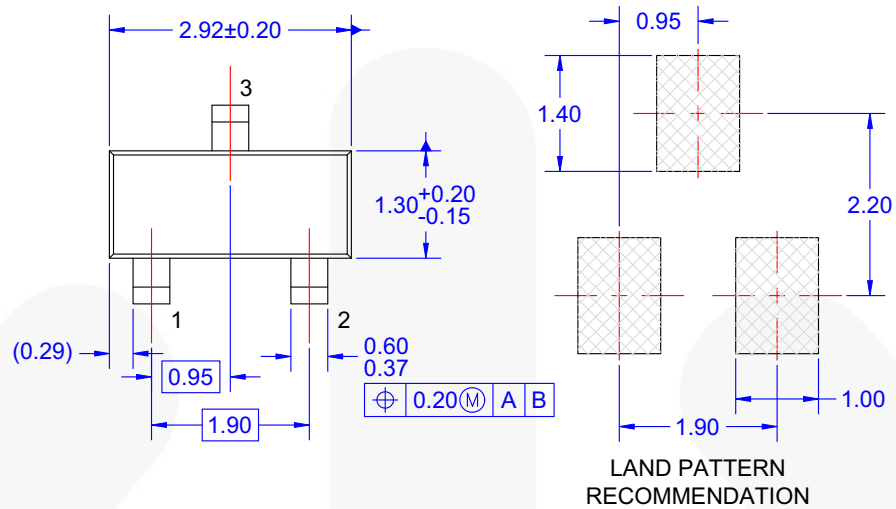


Figure 10. Power Dissipation vs. Ambient Temperature

## 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 11. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE





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