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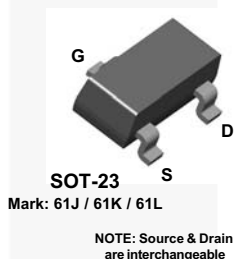
July 2016

MMBF4091/MMBF4092/MMBF4093

N-Channel Switch

Features

- This device is designed for low level analog switching applications, sample and hold circuits and chopper stabilized amplifiers.
- Sourced from Process 51.



Ordering Information

Part Number	Top Mark	Package	Packing Method
MMBF4091	61J	SOT 23	Tape and Reel
MMBF4092	61K	SOT 23	Tape and Reel
MMBF4093	61L	SOT 23	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 $T_A = 25^\circ\text{C}$ 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°C .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

Thermal Characteristics

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

Symbol	Parameter	Max.	Unit
P_D	Total Device Dissipation	350	mW
	Derate Above 25°C	2.8	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient ⁽³⁾	357	$^\circ\text{C/W}$

Notes:

3. Device mounted on FR-4 PCB, 1.6" x 1.6" x 0.06".

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
Off Characteristics					
$V_{(BR)GSS}$	Gate-Source Breakdown Voltage	$I_G = 1\ \mu\text{A}$, $V_{DS} = 0$	-40		V
$V_{GS(off)}$	Gate-Source Cut-Off Voltage	$V_{DS} = 20\ \text{V}$, $I_D = 1\ \text{nA}$	-5.0 -2.0 -1.0	-10.0 -7.0 -5.0	V
I_{DGO}	Drain-Gate Leakage Current	$V_{DS} = 20\ \text{V}$, $I_S = 0$ $V_{DS} = 20\ \text{V}$, $I_S = 0$, $T_A = 150^\circ\text{C}$		-200 -400	pA nA
$I_{D(off)}$	Drain Cutoff Leakage Current	$V_{DS} = 20\ \text{V}$, $V_{GS} = -12\ \text{V}$ MMBF4091 $V_{DS} = 20\ \text{V}$, $V_{GS} = -8\ \text{V}$ MMBF4092 $V_{DS} = 20\ \text{V}$, $V_{GS} = -6\ \text{V}$ MMBF4093 $V_{DS} = 20\ \text{V}$, $V_{GS} = -12\ \text{V}$, $T_A = 150^\circ\text{C}$ MMBF4091 $V_{DS} = 20\ \text{V}$, $V_{GS} = -8\ \text{V}$, $T_A = 150^\circ\text{C}$ MMBF4092 $V_{DS} = 20\ \text{V}$, $V_{GS} = -6\ \text{V}$, $T_A = 150^\circ\text{C}$ MMBF4093		200 200 200 400 400 400	pA pA pA nA nA nA
On Characteristics					
I_{DSS}	Zero-Gate Voltage Drain Current ⁽⁴⁾	$V_{DS} = 20\ \text{V}$, $I_{GS} = 0$	30 15 8		mA
$V_{DS(on)}$	Drain-Source On Voltage	$I_D = 6.6\ \text{mA}$, $V_{GS} = 0$ MMBF4091 $I_D = 4.0\ \text{mA}$, $V_{GS} = 0$ MMBF4092 $I_D = 2.5\ \text{mA}$, $V_{GS} = 0$ MMBF4093		0.2 0.2 0.2	V
$r_{DS(on)}$	Drain-Source On Resistance	$I_D = 1\ \text{mA}$, $V_{GS} = 0$		30 50 80	Ω
Small Signal Characteristics					
$r_{DS(on)}$	Drain-Source On Resistance	$V_{DS} = V_{GS} = 0$, $f = 1\ \text{kHz}$		30 50 80	Ω
C_{iss}	Input Capacitance	$V_{DS} = 20\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1.0\ \text{MHz}$		16	pF
C_{rss}	Reverse Transfer Capacitance	$V_{DS} = -20\ \text{V}$, $f = 1.0\ \text{MHz}$		5	pF

Symbol	Parameter	Conditions	Min.	Max.	Unit
Switching Characteristics					
t_{On}	Turn-On Time	$I_{D(on)} = 12\text{ mA}$ MMBF4091		25	ns
		$I_{D(on)} = 6.0\text{ mA}$ MMBF4092		35	ns
		$I_{D(on)} = 3.0\text{ mA}$ MMBF4093		60	ns
t_{Off}	Turn-Off Time	$V_{GS(off)} = 12\text{ V}$ MMBF4091		40	ns
		$V_{GS(off)} = 6.0\text{ V}$ MMBF4092		60	ns
		$V_{GS(off)} = 3.0\text{ V}$ MMBF4093		80	ns

Note:

4. Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 1\%$.

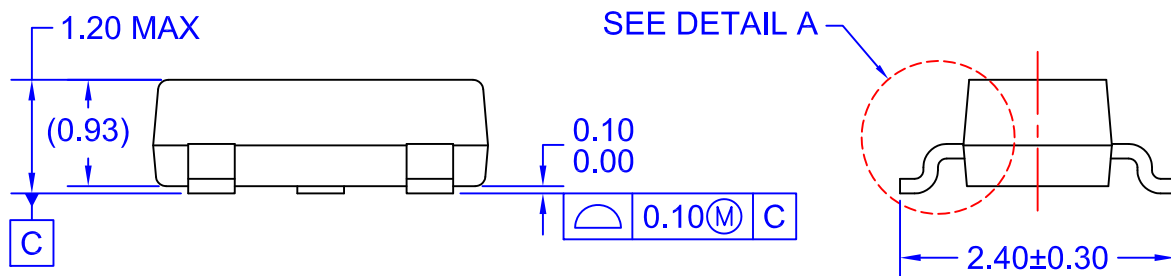


Figure 10.10 illustrates the dimensioning of a part with a hole. The diagram shows a cross-section of a mechanical part. Key dimensions and features are labeled:

- Hole Diameter:** 0.23 with a tolerance of 0.08.
- Distance from Left Face to Start of Hole:** 0.20 MIN.
- Distance from Left Face to Center of Hole:** 0.55.
- Distance from Center of Hole to Right Face:** 0.25.
- GAGE PLANE:** Indicated by a dashed line across the part.
- SEATING PLANE:** Indicated by a solid line at the bottom of the part.

- 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 - 2009.
- E) DRAWING FILE NAME: MA03DREV12



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