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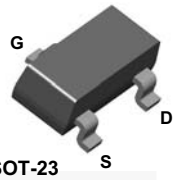
July 2016

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.



SOT-23
Mark: 61J / 61K / 61L

NOTE: Source & Drain are interchangeable

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°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.

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Thermal Characteristics

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

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

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

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

Note:

4. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 1%.

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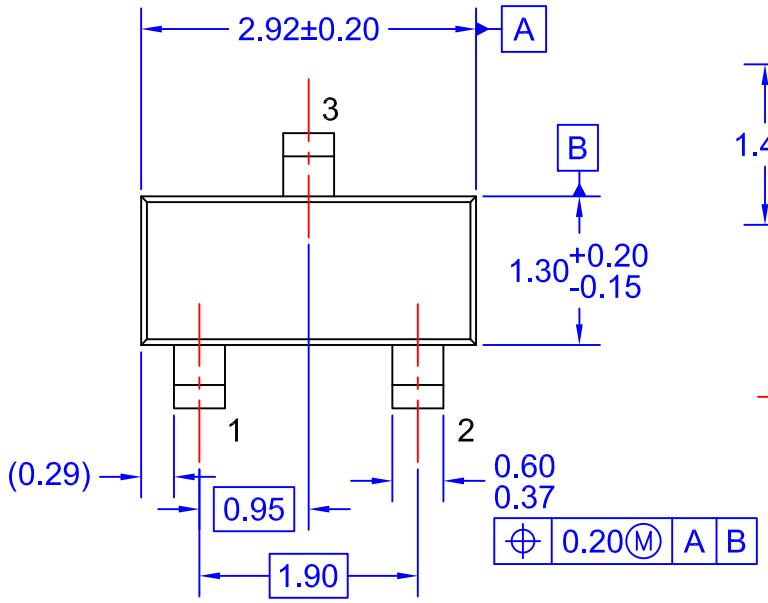
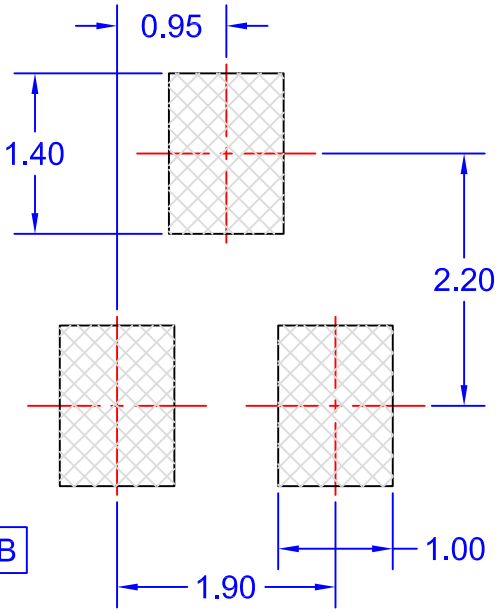
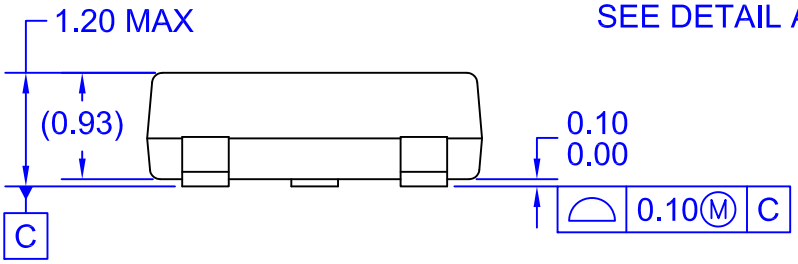
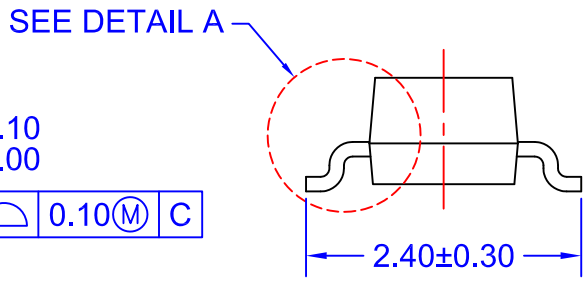
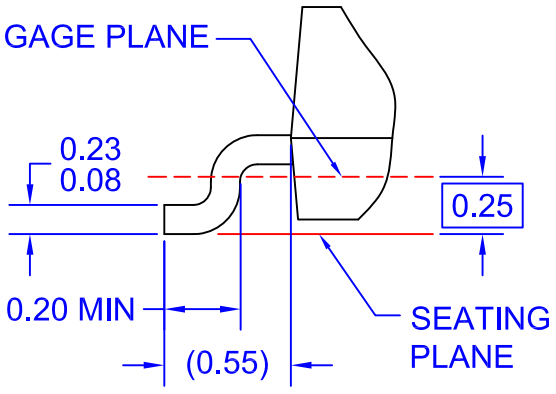




LAND PATTERN
RECOMMENDATION







DETAIL A
SCALE: 2X

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