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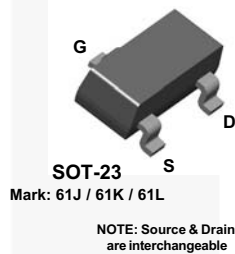
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MMBF4091/MMBF4092/MMBF4093 N-Channel Switch

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 | $^\circ\text{C}/\text{W}$ |

Notes:

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

Electrical Characteristics

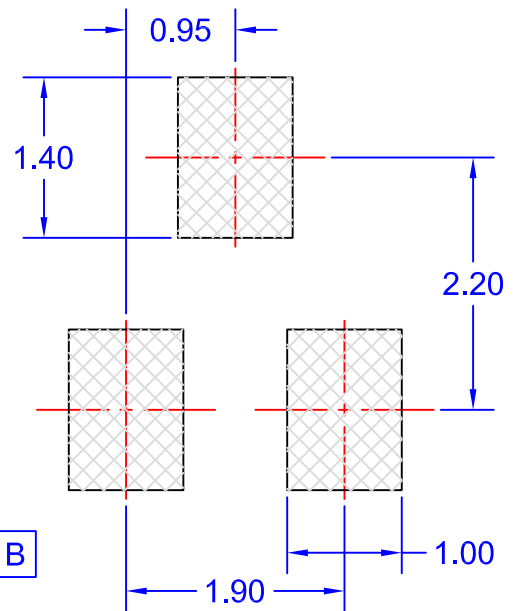
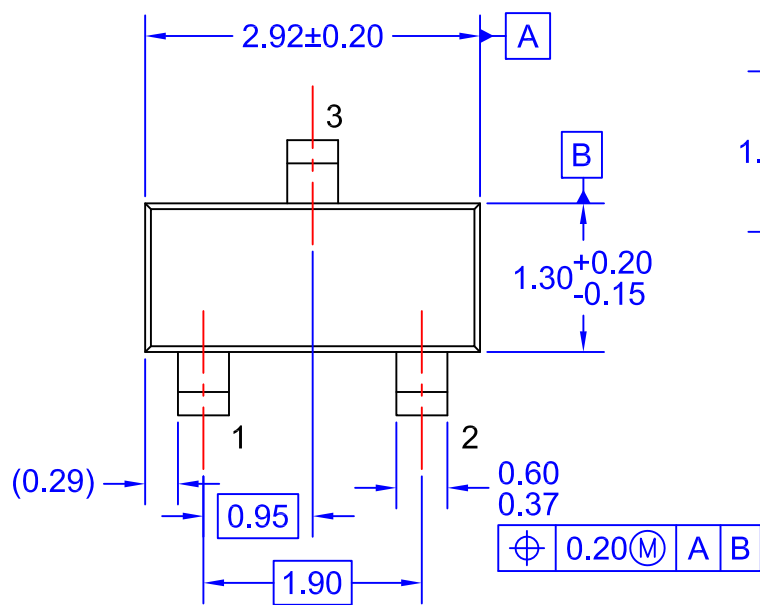
Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

| 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 | $V_{DS} = 20 \text{ V}$, $I_D = 1 \text{ nA}$ | MMBF4091 | -5.0 | -10.0 | V |
| | | | MMBF4092 | -2.0 | -7.0 | |
| | | | MMBF4093 | -1.0 | -5.0 | |
| I_{DGO} | Drain-Gate Leakage Current | $V_{DS} = 20 \text{ V}$, $I_s = 0$ | | -200 | pA | |
| | | $V_{DS} = 20 \text{ V}$, $I_s = 0$, $T_A = 150^\circ\text{C}$ | | -400 | nA | |
| $I_D(off)$ | Drain Cutoff Leakage Current | $V_{DS} = 20 \text{ V}$, $V_{GS} = -12 \text{ V}$ | MMBF4091 | | 200 | pA |
| | | $V_{DS} = 20 \text{ V}$, $V_{GS} = -8 \text{ V}$ | MMBF4092 | | 200 | pA |
| | | $V_{DS} = 20 \text{ V}$, $V_{GS} = -6 \text{ V}$ | MMBF4093 | | 200 | pA |
| | | $V_{DS} = 20 \text{ V}$, $V_{GS} = -12 \text{ V}$, $T_A = 150^\circ\text{C}$ | MMBF4091 | | 400 | nA |
| | | $V_{DS} = 20 \text{ V}$, $V_{GS} = -8 \text{ V}$, $T_A = 150^\circ\text{C}$ | MMBF4092 | | 400 | nA |
| | | $V_{DS} = 20 \text{ V}$, $V_{GS} = -6 \text{ V}$, $T_A = 150^\circ\text{C}$ | MMBF4093 | | 400 | nA |
| On Characteristics | | | | | | |
| I_{DSS} | Zero-Gate Voltage Drain Current ⁽⁴⁾ | $V_{DS} = 20 \text{ V}$, $I_{GS} = 0$ | MMBF4091 | 30 | | mA |
| | | | MMBF4092 | 15 | | |
| | | | MMBF4093 | 8 | | |
| $V_{DS(on)}$ | Drain-Source On Voltage | $I_D = 6.6 \text{ mA}$, $V_{GS} = 0$ | MMBF4091 | | 0.2 | V |
| | | $I_D = 4.0 \text{ mA}$, $V_{GS} = 0$ | MMBF4092 | | 0.2 | |
| | | $I_D = 2.5 \text{ mA}$, $V_{GS} = 0$ | MMBF4093 | | 0.2 | |
| $r_{DS(on)}$ | Drain-Source On Resistance | $I_D = 1 \text{ mA}$, $V_{GS} = 0$ | MMBF4091 | | 30 | Ω |
| | | | MMBF4092 | | 50 | |
| | | | MMBF4093 | | 80 | |
| Small Signal Characteristics | | | | | | |
| $r_{DS(on)}$ | Drain-Source On Resistance | $V_{DS} = V_{GS} = 0$, $f = 1 \text{ kHz}$ | MMBF4091 | | 30 | Ω |
| | | | MMBF4092 | | 50 | |
| | | | MMBF4093 | | 80 | |
| 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 | |

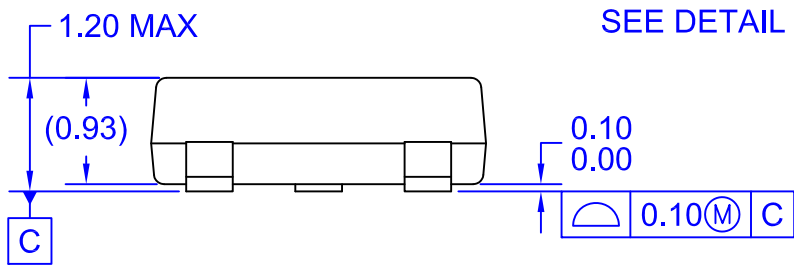
| Symbol | Parameter | Conditions | Min. | Max. | Unit | |
|----------------------------------|---------------|------------------------------|----------|------|------|----|
| Switching Characteristics | | | | | | |
| t_{On} | Turn-On Time | $I_{D(on)} = 12\text{ mA}$ | MMBF4091 | | 25 | ns |
| | | $I_{D(on)} = 6.0\text{ mA}$ | 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:

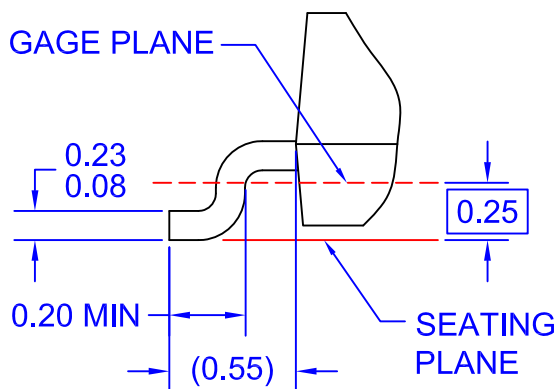
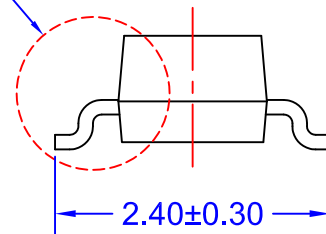
4. Pulse test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 1\%$.



LAND PATTERN
RECOMMENDATION



SEE DETAIL A



DETAIL A
SCALE: 2X

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