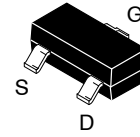


# Switch, N-Channel

## MMBF4093



SOT-23  
CASE 318-08

Note: Source & Drain are interchangeable

### Features

- This Device is Designed for Low Level Analog Switching Applications, Sample and Hold Circuits and Chopper Stabilized Amplifiers.
- Sourced from Process 51.
- This is a Pb-Free and a Halide Free Device

### ABSOLUTE MAXIMUM RATINGS (Note 1), (Note 2)

( $T_A = 25^\circ\text{C}$  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 | $^\circ\text{C}$ |

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.

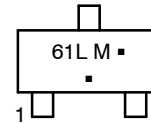
1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. **onsemi** should be consulted on applications involving pulsed or low-duty cycle operations.

### THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

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

3. Device mounted on FR-4 PCB  $1.6'' \times 1.6'' \times 0.06''$ .

### MARKING DIAGRAM



61L = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device   | Package          | Shipping <sup>†</sup> |
|----------|------------------|-----------------------|
| MMBF4093 | SOT-23 (Pb-Free) | 3000 / Tape and 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](#).

# MMBF4093

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Test 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   | $V_{DS} = 20 \text{ V}, I_D = 1 \text{ nA}$   | -1.0 | -5.0         | V        |
| $I_{DGO}$     | Drain–Gate Leakage Current    | $V_{DG} = 20 \text{ V}, I_S = 0$<br>$V_{DG} = 20 \text{ V}, I_S = 0, T_A = 150^\circ\text{C}$                             | -    | -200<br>-400 | pA<br>nA |
| $I_D(off)$    | Drain Cutoff Leakage Current  | $V_{DS} = 20 \text{ V}, V_{GS} = -6 \text{ V}$<br>$V_{DS} = 20 \text{ V}, V_{GS} = -6 \text{ V}, T_A = 150^\circ\text{C}$ | -    | 200<br>400   | pA<br>nA |

### ON CHARACTERISTICS

|              |  |                                     |   |     |          |
|--------------|--|-------------------------------------|---|-----|----------|
| $I_{DSS}$    | Zero–Gate Voltage Drain Current (Note 4) | $V_{DS} = 20 \text{ V}, I_{GS} = 0$ | 8 | -   | mA       |
| $V_{DS(on)}$ | Drain–Source On Voltage                  | $I_D = 2.5 \text{ mA}, V_{GS} = 0$  | - | 0.2 | V        |
| $r_{DS(on)}$ | Drain–Source On Resistance               | $I_D = 1 \text{ mA}, V_{GS} = 0$    | - | 80  | $\Omega$ |

### SMALL SIGNAL CHARACTERISTICS

|              |                              |  |   |    |          |
|--------------|------------------------------|--|---|----|----------|
| $r_{DS(on)}$ | Drain–Source On Resistance   | $V_{DS} = V_{GS} = 0, f = 1 \text{ kHz}$                           | - | 80 | $\Omega$ |
| $C_{iss}$    | 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       |

### SWITCHING CHARACTERISTICS

|           |               |                               |   |    |    |
|-----------|---------------|-------------------------------|---|----|----|
| $t_{on}$  | Turn–On Time  | $I_{D(on)} = 3.0 \text{ mA}$  | - | 60 | ns |
| $t_{off}$ | Turn–Off Time | $V_{GS(off)} = 3.0 \text{ V}$ | - | 80 | ns |

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.

4. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 1\%$ .

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