# MMBF4860

**CASE 318-02/03, STYLE 10**
**SOT-23 (TO-236AA/AB)**

**FET**
**SWITCHING TRANSISTOR**

**N-CHANNEL**

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## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | Vdc |
| Drain-Gate Voltage | $V_{DG}$ | 30 | Vdc |
| Reverse Gate-Source Voltage | $V_{GS(r)}$ | 30 | Vdc |
| Forward Gate Current | $I_{G(f)}$ | 50 | mAdc |

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| *Total Device Dissipation, $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 350<br>2.8 | mW<br>mW/°C |
| Storage Temperature | $T_{stg}$ | 150 | °C |
| *Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 357 | °C/W |

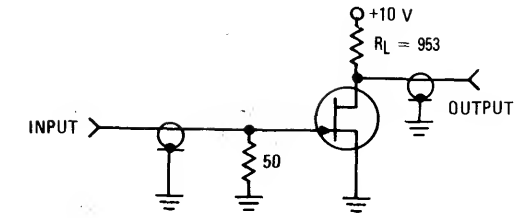
*Package mounted on 99.5% alumina 10 x x 0.6 mm.

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise noted.)

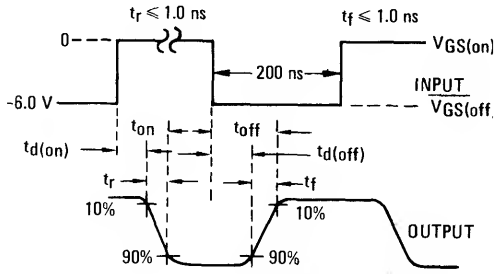
| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Gate-Source Breakdown Voltage<br>($I_G$ = 1.0 μAdc, $V_{DS}$ = 0) | $V_{(BR)GSS}$ | 30 | — | Vdc |
| Gate Reverse Current<br>($V_{GS}$ = 15 Vdc, $V_{DS}$ = 0)<br>($V_{GS}$ = 15 Vdc, $V_{DS}$ = 0, $T_A$ = 150°C) | $I_{GSS}$ | —<br>— | 0.5<br>2.0 | nAdc<br>μAdc |
| Gate Source Cutoff Voltage<br>($V_{DS}$ = 15 Vdc, $I_D$ = 0.5 nAdc) | $V_{GS(off)}$ | 2.0 | 6.0 | Vdc |
| **ON CHARACTERISTICS** | | | | |
| Zero-Gate-Voltage Drain(1)<br>($V_{DS}$ = 15 Vdc, $V_{GS}$ = 0) | $I_{DSS}$ | 20 | 100 | mAdc |
| Drain Cutoff Current<br>($V_{DS}$ = 15 Vdc, $V_{GS}$ = 10 Vdc)<br>($V_{DS}$ = 15 Vdc, $V_{GS}$ = 10 Vdc, $T_A$ = 150°C) | $I_{D(off)}$ | —<br>— | 0.25<br>0.5 | nAdc<br>μAdc |
| Drain-Source On-Voltage<br>($I_D$ = 10 mAdc, $V_{GS}$ = 0) | $V_{DS(on)}$ | — | 0.5 | Vdc |
| Static Drain-Source On Resistance<br>($V_{GS}$ = 0, $I_D$ = 0, f = 1.0 kHz) | $r_{DS(on)}$ | — | 40 | Ohms |
| Input Capacitance<br>($V_{DS}$ = 0, $V_{GS}$ = 10 Vdc, f = 1.0 MHz) | $C_{iss}$ | — | 18 | pF |
| Reverse Transfer Capacitance<br>($V_{DS}$ = 0, $V_{GS}$ = 10 Vdc, f = 1.0 MHz) | $C_{rss}$ | — | 8.0 | pF |
| **SWITCHING CHARACTERISTICS** | | | | |
| Delay Time<br>($V_{DD}$ = 10 Vdc, $I_{D(on)}$ = 20 mAdc)<br>($V_{G(on)}$ = 0, $V_{GS(off)}$ = 10 Vdc) | $t_d$ | — | 6.0 | ns |
| Rise Time<br>($V_{DD}$ = 10 Vdc, $I_{D(on)}$ = 10 mAdc)<br>($V_{GS(on)}$ = 0, $V_{GS(off)}$ = 6.0 Vdc) (Figure 1) | $t_r$ | — | 4.0 | ns |
| Turn-Off Time<br>($V_{DD}$ = 10 Vdc, $I_{D(on)}$ = 5.0 mAdc)<br>($V_{GS(on)}$ = 0, $V_{GS(off)}$ = 4.0 Vdc) (Figure 1) | $t_{off}$ | — | 50 | ns |

(1) Pulse Test: Pulse Width = 100 ms, Duty Cycle ≤ 10%.

## FIGURE 1 — SWITCHING TIMES TEST CIRCUIT




TEST CIRCUIT




VOLTAGE WAVEFORMS

NOTES: 1. The input waveforms are supplied by a generator with the following characteristics:
$Z_{out}$ = 50 ohms, Duty Cycle ≈ 2.0%
2. Waveforms are monitored on an oscilloscope with the following characteristics:
$t_r \leq 0.75$ ns, $R_{in} \geq 1.0$ megohm, $C_{in} \leq 2.5$ pF.