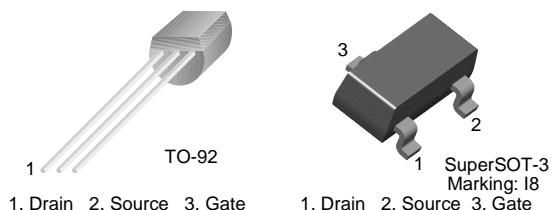


## J108/J109/J110/MMBFJ108

### N-Channel Switch

- This device is designed for digital switching applications where very low on resistance is mandatory.
- Sourced from Process 58.



### Absolute Maximum Ratings \* $T_A=25^\circ\text{C}$ unless otherwise noted

| Symbol         | Parameter  | Value      | Units            |
|----------------|--|------------|------------------|
| $V_{DG}$       | Drain-Gate Voltage                               | 25         | V                |
| $V_{GS}$       | Gate-Source Voltage                              | -25        | V                |
| $I_{GF}$       | Forward Gate Current                             | 10         | mA               |
| $T_J, T_{stg}$ | Operating and Storage Junction Temperature Range | -55 ~ +150 | $^\circ\text{C}$ |

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Electrical Characteristics $T_A=25^\circ\text{C}$ unless otherwise noted

| Symbol                              | Parameter                               | Test Condition  | Min. | Max. | Units    |
|-------------------------------------|---|---|------|------|----------|
| <b>Off Characteristics</b>          |   |   |      |      |          |
| $V_{(BR)GSS}$                       | Gate-Source Breakdown Voltage           | $I_G = -10\mu\text{A}, V_{DS} = 0$                          | -25  |      | V        |
| $I_{GSS}$                           | Gate Reverse Current                    | $V_{GS} = -15\text{V}, V_{DS} = 0$                          |      | -3.0 | nA       |
|                                     |   | $V_{GS} = -15\text{V}, V_{DS} = 0, T_A = 100^\circ\text{C}$ |      | -200 | nA       |
| $V_{GS(off)}$                       | Gate-Source Cutoff Voltage              | $V_{DS} = 15\text{V}, I_D = 10\text{nA}$                    |      |      |          |
|                                     |   | 108   | -3.0 | -10  | V        |
|                                     |   | 109   | -2.0 | -6.0 | V        |
|                                     |   | 110   | -0.5 | -4.0 | V        |
| <b>On Characteristics</b>           |   |   |      |      |          |
| $I_{DSS}$                           | Zero-Gate Voltage Drain Current *       | $V_{DS} = 15\text{V}, I_{GS} = 0$                           |      |      |          |
|                                     |   | 108   | 80   |      | mA       |
|                                     |   | 109   | 40   |      | mA       |
|                                     |   | 110   | 10   |      | mA       |
| $r_{DS(on)}$                        | Drain-Source On Resistance              | $V_{DS} \leq 0.1\text{V}, V_{GS} = 0$                       |      |      |          |
|                                     |   | 108   |      | 8.0  | $\Omega$ |
|                                     |   | 109   |      | 12   | $\Omega$ |
|                                     |   | 110   |      | 18   | $\Omega$ |
| <b>Small Signal Characteristics</b> |   |   |      |      |          |
| $C_{dg(on)}$                        | Drain Gate & Source Gate On Capacitance | $V_{DS} = 0, V_{GS} = 0, f = 1.0\text{MHz}$                 |      | 85   | pF       |
| $C_{sg(off)}$                       | Source-Gate Off Capacitance             |   |      |      |          |
| $C_{dg(off)}$                       | Drain-Gate Off Capacitance              | $V_{DS} = 0, V_{GS} = -10, f = 1.0\text{MHz}$               |      | 15   | pF       |
| $C_{sg(off)}$                       | Source-Gate Off Capacitance             | $V_{DS} = 0, V_{GS} = -10, f = 1.0\text{MHz}$               |      | 15   | pF       |

\* Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

**Thermal Characteristics**  $T_A=25^{\circ}\text{C}$  unless otherwise noted

| Symbol           | Parameter                               | Max.       |           | Units |
|------------------|---|------------|-----------|-------|
|                  |   | J108 - 110 | *MMBFJ108 |       |
| P <sub>D</sub>   | Total Device Dissipation                | 625        | 350       | mW    |
|                  | Derate above 25°C                       | 5.0        | 2.8       | mW/°C |
| R <sub>θJC</sub> | Thermal Resistance, Junction to Case    | 125        |           | °C/W  |
| R <sub>θJA</sub> | Thermal Resistance, Junction to Ambient | 357        | 556       | °C/W  |

\* Device mounted on FR-4 PCB 1.6" × 1.6" × 0.06"

# Typical Characteristics

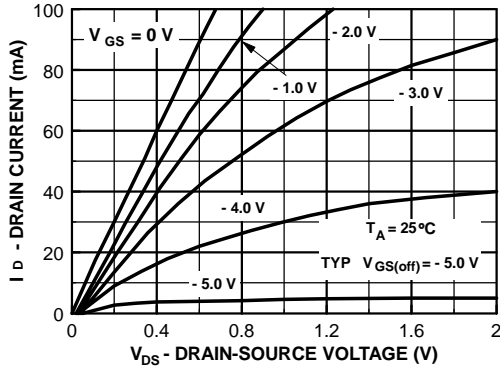


Figure 1. Common Drain-Source

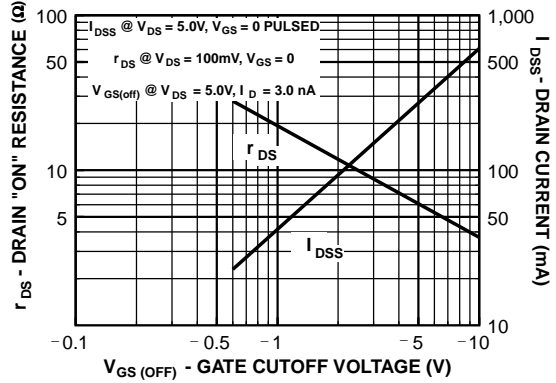


Figure 2. Parameter Interactions

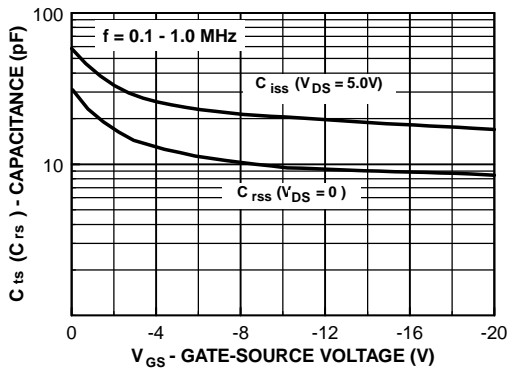


Figure 3. Common Drain-Source

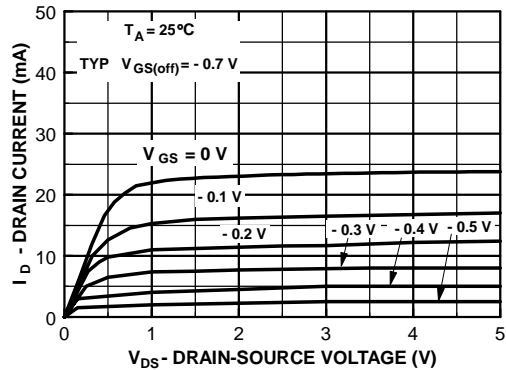


Figure 4. Common Drain-Source

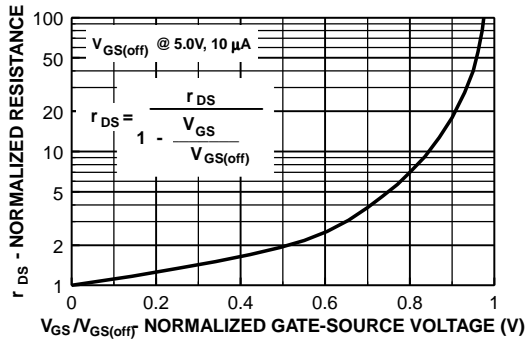


Figure 5. Normalized Drain Resistance vs Bias Voltage

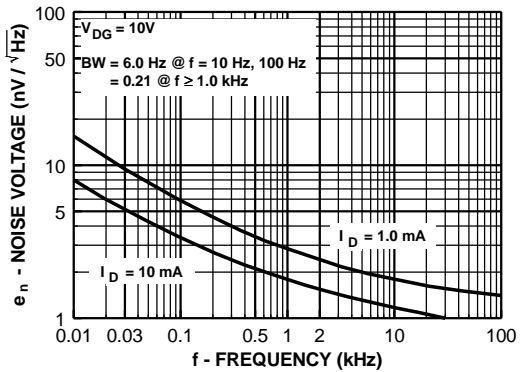


Figure 6. Noise Voltage vs Frequency

Typical Characteristics (Continued)

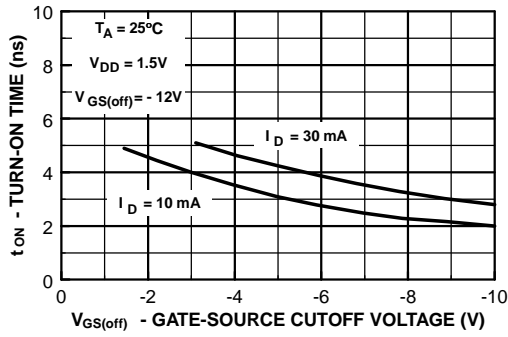


Figure 7. Switching Turn-On Time vs Gate-Source Cutoff Voltage

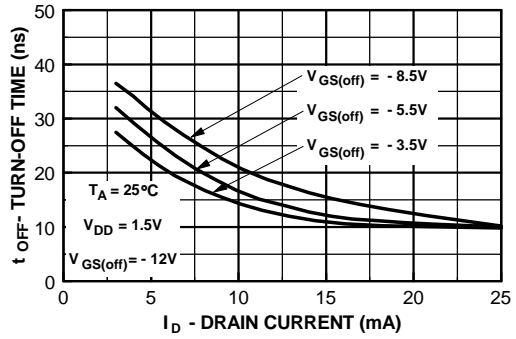


Figure 8. Switching Turn-Off Time vs Drain Current

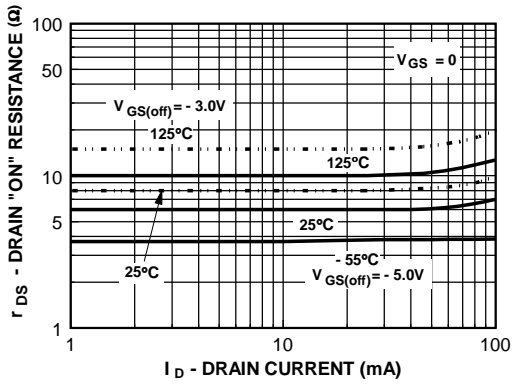


Figure 9. On Resistance vs Drain Current

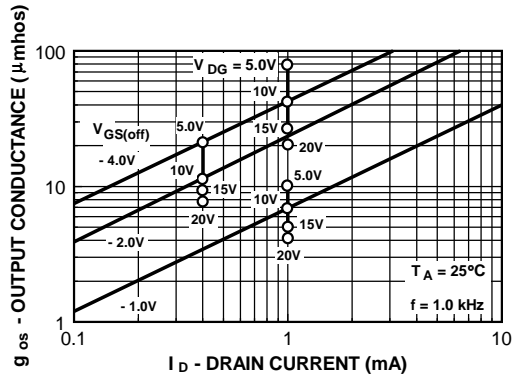


Figure 10. Output Conductance vs Drain Current

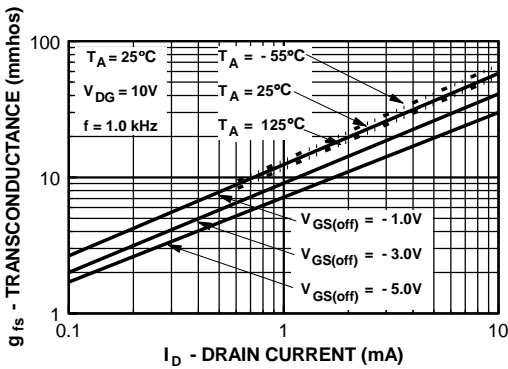


Figure 11. Transconductance vs Drain Current

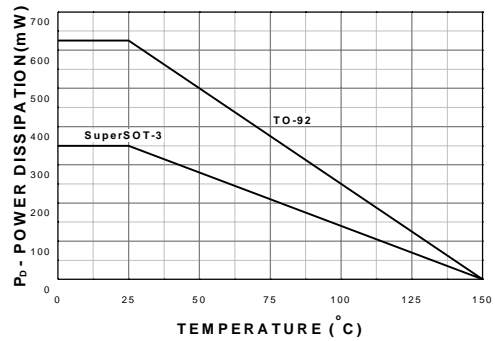
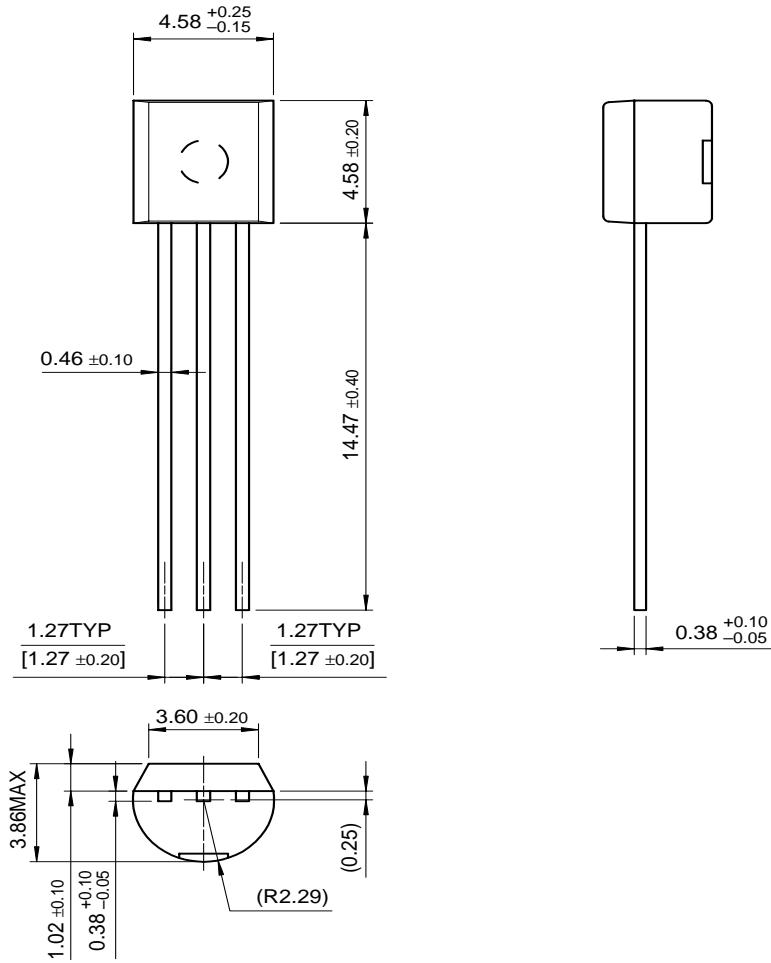


Figure 12. Power Dissipation vs Ambient Temperature

# Package Dimensions

## TO-92



Dimensions in Millimeters

J108/J109/J110/MMBF-J108



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| Bottomless <sup>™</sup>                          | FAST <sup>®</sup>               | LittleFET <sup>™</sup>         | Power247 <sup>™</sup>           | SuperSOT <sup>™</sup> -3    |
| CoolFET <sup>™</sup>                             | FAST <sup>r</sup> <sup>™</sup>  | MicroFET <sup>™</sup>          | PowerTrench <sup>®</sup>        | SuperSOT <sup>™</sup> -6    |
| CROSSVOLT <sup>™</sup>                           | FRFET <sup>™</sup>              | MicroPak <sup>™</sup>          | QFET <sup>™</sup>               | SuperSOT <sup>™</sup> -8    |
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