

## TO-220AB Plastic-Encapsulate MOSFETS

### 12N60

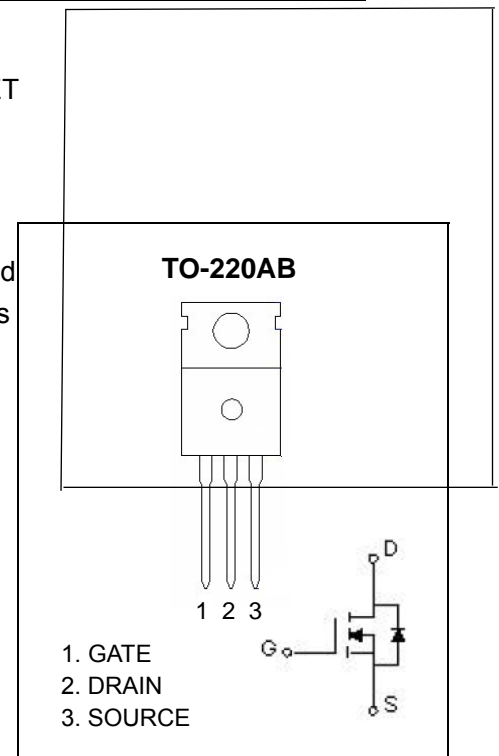
600V N-Channel Power MOSFET

#### General Description

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supply.

#### FEATURE

- Low  $C_{RSS}$
- Fast switching
- Improved dv/dt capability



#### Maximum ratings ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                   | Symbol          | Value      | Unit                        |
|---|-----------------|------------|-----------------------------|
| Drain-Source Voltage                        | $V_{DS}$        | 600        | V                           |
| Gate-Source Voltage                         | $V_{GS}$        | $\pm 30$   |                             |
| Continuous Drain Current                    | $I_D$           | 12         | A                           |
| Single Pulsed Avalanche Energy (note1)      | $E_{AS}$        | 790        | mJ                          |
| Power Dissipation                           | $P_D$           | 2          | W                           |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5       | $^{\circ}\text{C}/\text{W}$ |
| Operating Temperature                       | $T_J$           | 150        | $^{\circ}\text{C}$          |
| Storage Temperature                         | $T_{STG}$       | -55 ~ +150 |                             |

**Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)**

| Parameter                                 | Symbol               | Test Condition   | Min | Typ  | Max  | Units |
|---|----------------------|--|-----|------|------|-------|
| <b>Off characteristics</b>                |                      |  |     |      |      |       |
| Drain-source breakdown voltage            | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                      | 600 |      |      | V     |
| Drain-source diode forward voltage(note2) | V <sub>SD</sub>      | V <sub>GS</sub> = 0V, I <sub>S</sub> =12A                        |     |      | 1.4  |       |
| Zero gate voltage drain current           | I <sub>DSS</sub>     | V <sub>DS</sub> =600V, V <sub>GS</sub> =0V                       |     |      | 10   | μA    |
| Gate-body leakage current, forward(note2) | I <sub>GSSF</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =30V                        |     |      | 100  | nA    |
| Gate-body leakage current, reverse(note2) | I <sub>GSSR</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V                       |     |      | -100 |       |
| <b>On characteristics (note2)</b>         |                      |  |     |      |      |       |
| Gate-threshold voltage                    | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA         | 2.0 |      | 4.0  | V     |
| Static drain-source on-resistance         | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A                       |     |      | 0.8  | Ω     |
| <b>Dynamic characteristics (note 3)</b>   |                      |  |     |      |      |       |
| Input capacitance                         | C <sub>ISS</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz               |     | 1800 |      | pF    |
| Output capacitance                        | C <sub>OSS</sub>     |  |     | 200  |      |       |
| Reverse transfer capacitance              | C <sub>ISS</sub>     |  |     | 25   |      |       |
| <b>Switching characteristics(note3)</b>   |                      |  |     |      |      |       |
| Turn-on delay time                        | t <sub>d(on)</sub>   | V <sub>DD</sub> =325V, R <sub>G</sub> =4.7Ω, I <sub>D</sub> =12A |     | 30   |      | ns    |
| Turn-on rise time                         | t <sub>r</sub>       |  |     | 90   |      |       |
| Turn-off delay time                       | t <sub>d(off)</sub>  |  |     | 160  |      |       |
| Turn-off fall time                        | t <sub>f</sub>       |  |     | 90   |      |       |

**Notes :**

1. L=10mH, I<sub>AS</sub>=12 A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
2. Pulse Test : Pulse width≤300μs, duty cycle ≤2%.
3. These parameters have no way to verify.