

**GM2308****N-CHANNEL ENHANCEMENT MODE POWER MOSFET**

|         |       |
|---------|-------|
| BVDSS   | 60V   |
| RDS(ON) | 160mΩ |
| ID      | 3A    |

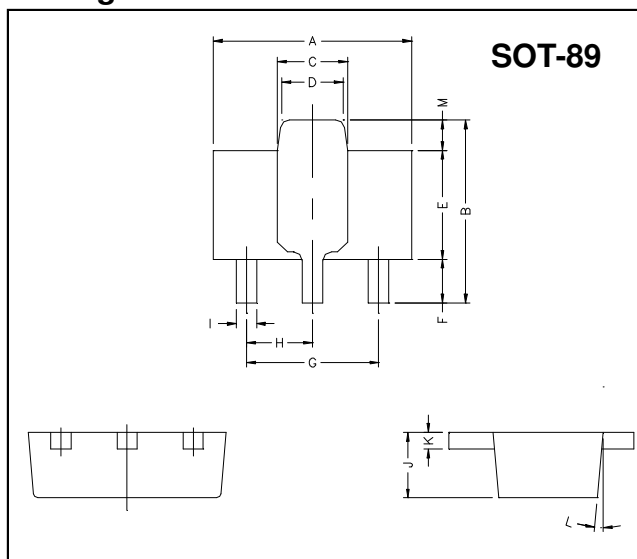
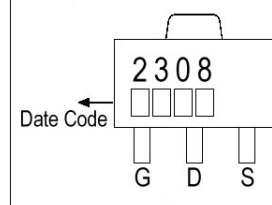
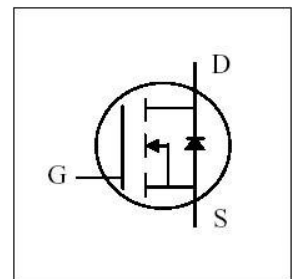
**Description**

The GM2308 utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.

The GM2308 is universally used for all commercial-industrial surface mount applications.

**Features**

- \*Simple Drive Requirement
- \*Small Package Outline

**Package Dimensions****Marking :**

| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 4.4        | 4.6  | G    | 3.00       | REF. |
| B    | 4.05       | 4.25 | H    | 1.50       | REF. |
| C    | 1.50       | 1.70 | I    | 0.40       | 0.52 |
| D    | 1.30       | 1.50 | J    | 1.40       | 1.60 |
| E    | 2.40       | 2.60 | K    | 0.35       | 0.41 |
| F    | 0.89       | 1.20 | L    | 5° TYP.    |      |
|      |            |      | M    | 0.70 REF.  |      |

**Absolute Maximum Ratings**

| Parameter                                             | Symbol                | Ratings    | Unit |
|-------------------------------------------------------|-----------------------|------------|------|
| Drain-Source Voltage                                  | $V_{DS}$              | 60         | V    |
| Gate-Source Voltage                                   | $V_{GS}$              | $\pm 20$   | V    |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@4.5V$ | $I_D @T_A=25^\circ C$ | 3.0        | A    |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@4.5V$ | $I_D @T_A=70^\circ C$ | 2.3        | A    |
| Pulsed Drain Current <sup>1,2</sup>                   | $I_{DM}$              | 10         | A    |
| Power Dissipation                                     | $P_D @T_A=25^\circ C$ | 1.5        | W    |
| Linear Derating Factor                                |                       | 0.01       | W/°C |
| Operating Junction and Storage Temperature Range      | $T_j, T_{stg}$        | -55 ~ +150 | °C   |

**Thermal Data**

| Parameter                                             | Symbol      | Value | Unit |
|-------------------------------------------------------|-------------|-------|------|
| Thermal Resistance Junction-ambient <sup>3</sup> Max. | $R_{thj-a}$ | 83.3  | °C/W |

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

| Parameter                                          | Symbol                         | Min. | Typ. | Max. | Unit | Test Conditions                                                                                                   |
|----------------------------------------------------|--------------------------------|------|------|------|------|-------------------------------------------------------------------------------------------------------------------|
| Drain-Source Breakdown Voltage                     | BV <sub>DSS</sub>              | 60   | -    | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =250uA                                                                         |
| Breakdown Voltage Temperature Coefficient          | $\Delta BV_{DSS} / \Delta T_j$ | -    | 0.05 | -    | V/°C | Reference to 25°C, I <sub>D</sub> =1mA                                                                            |
| Gate Threshold Voltage                             | V <sub>GS(th)</sub>            | 1.0  | -    | 3.0  | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                                          |
| Forward Transconductance                           | g <sub>fs</sub>                | -    | 5.0  | -    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> =3A                                                                           |
| Gate-Source Leakage Current                        | I <sub>GSS</sub>               | -    | -    | ±100 | nA   | V <sub>GS</sub> = ±20V                                                                                            |
| Drain-Source Leakage Current(T <sub>j</sub> =25°C) | I <sub>DSS</sub>               | -    | -    | 10   | uA   | V <sub>DS</sub> =60V, V <sub>GS</sub> =0                                                                          |
| Drain-Source Leakage Current(T <sub>j</sub> =70°C) |                                | -    | -    | 25   | uA   | V <sub>DS</sub> =48V, V <sub>GS</sub> =0                                                                          |
| Static Drain-Source On-Resistance                  | R <sub>DS(ON)</sub>            | -    | -    | 160  | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =2.0A                                                                        |
|                                                    |                                | -    | -    | 220  |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.7A                                                                       |
| Total Gate Charge <sup>2</sup>                     | Q <sub>g</sub>                 | -    | 6    | 10   | nC   | I <sub>D</sub> =3A<br>V <sub>DS</sub> =48V<br>V <sub>GS</sub> =4.5V                                               |
| Gate-Source Charge                                 | Q <sub>gs</sub>                | -    | 1.6  | -    |      |                                                                                                                   |
| Gate-Drain ("Miller") Charge                       | Q <sub>gd</sub>                | -    | 3    | -    |      |                                                                                                                   |
| Turn-on Delay Time <sup>2</sup>                    | T <sub>d(on)</sub>             | -    | 6    | -    | ns   | V <sub>DS</sub> =30V<br>I <sub>D</sub> =1A<br>V <sub>GS</sub> =10V<br>R <sub>G</sub> =3.3Ω<br>R <sub>D</sub> =30Ω |
| Rise Time                                          | T <sub>r</sub>                 | -    | 5    | -    |      |                                                                                                                   |
| Turn-off Delay Time                                | T <sub>d(off)</sub>            | -    | 16   | -    |      |                                                                                                                   |
| Fall Time                                          | T <sub>f</sub>                 | -    | 3    | -    |      |                                                                                                                   |
| Input Capacitance                                  | C <sub>iss</sub>               | -    | 490  | 780  | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =25V<br>f=1.0MHz                                                           |
| Output Capacitance                                 | C <sub>oss</sub>               | -    | 55   | -    |      |                                                                                                                   |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>               | -    | 40   | -    |      |                                                                                                                   |

**Source-Drain Diode**

| Parameter                       | Symbol          | Min. | Typ. | Max. | Unit | Test Conditions                                          |
|---------------------------------|-----------------|------|------|------|------|----------------------------------------------------------|
| Forward On Voltage <sup>2</sup> | V <sub>SD</sub> | -    | -    | 1.2  | V    | I <sub>S</sub> =1.2A, V <sub>GS</sub> =0V                |
| Reverse Recovery Time           | T <sub>rr</sub> | -    | 25   | -    | ns   | I <sub>S</sub> =3A, V <sub>GS</sub> =0V<br>di/dt=100A/μs |
| Reverse Recovery Charge         | Q <sub>rr</sub> | -    | 26   | -    | nC   |                                                          |

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on FR4 board, t ≤ 10sec.

## Characteristics Curve

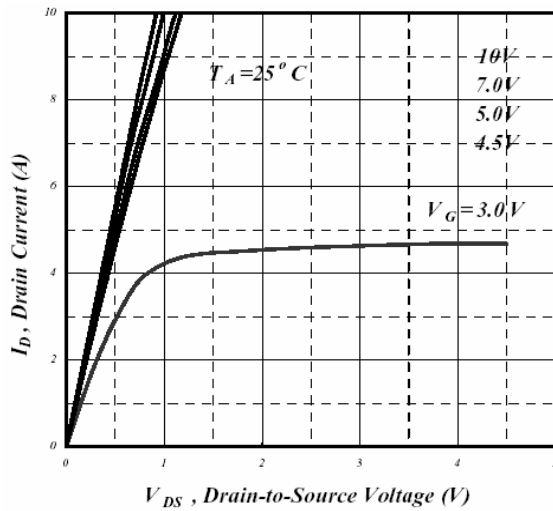


**Fig 1. Typical Output Characteristics**

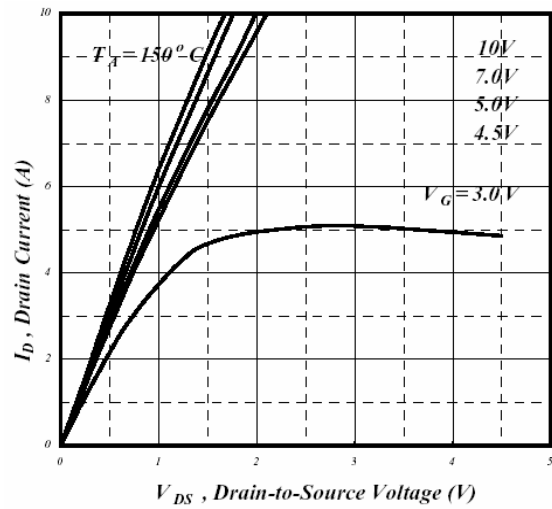


**Fig 2. Typical Output Characteristics**

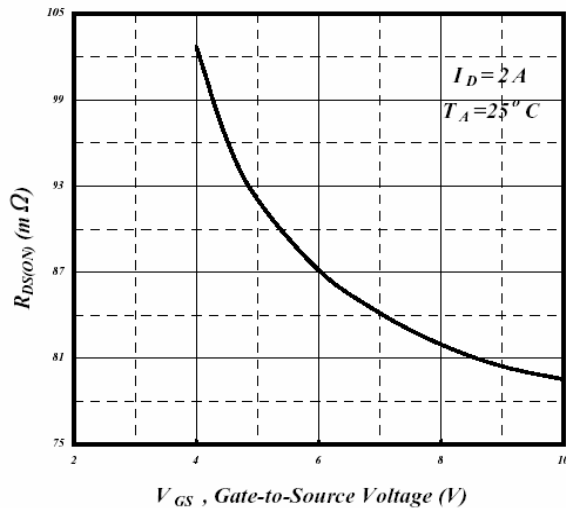


**Fig 3. On-Resistance v.s. Gate Voltage**

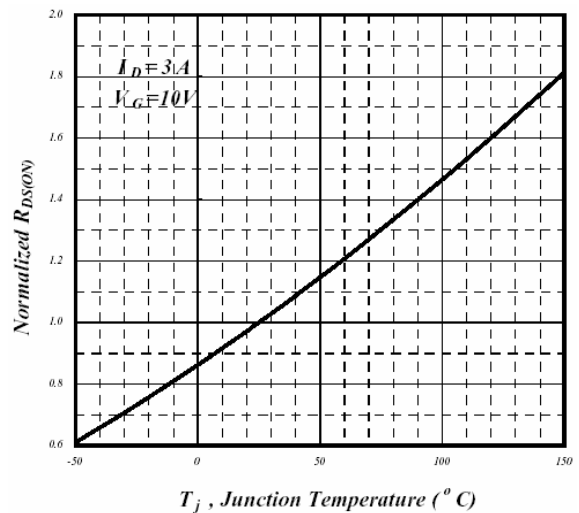


**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

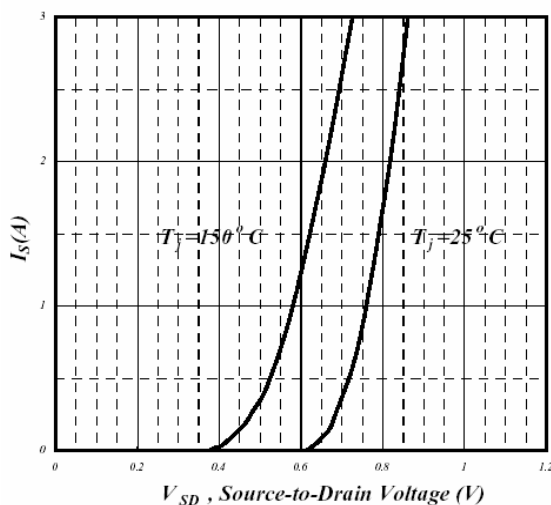


**Fig 5. Forward Characteristics of Reverse Diode**

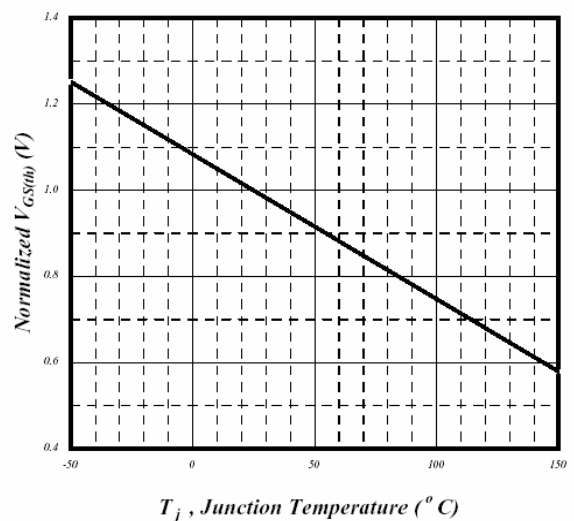


**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

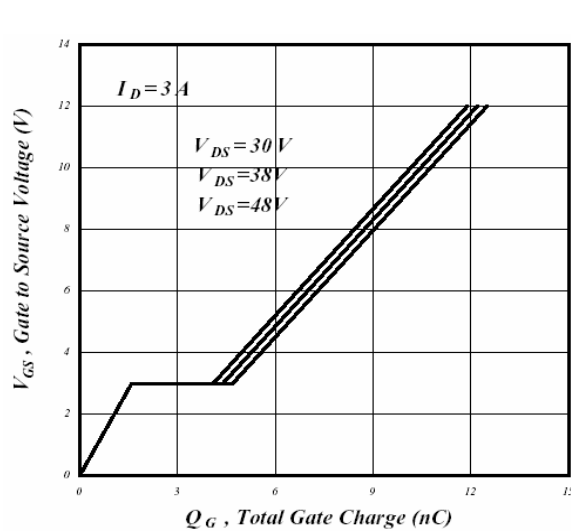


**Fig 7. Gate Charge Characteristics**

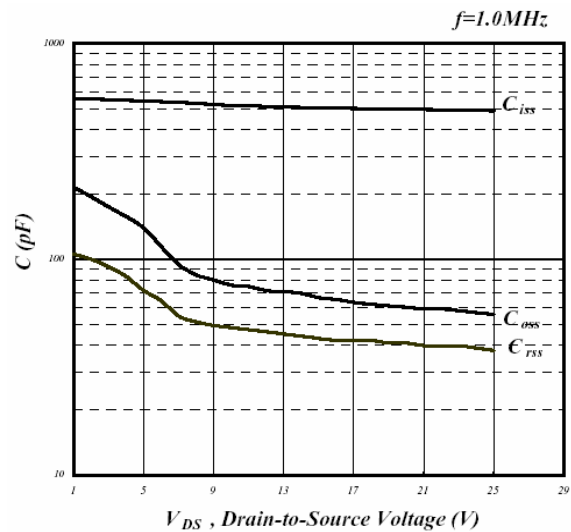


**Fig 8. Typical Capacitance Characteristics**

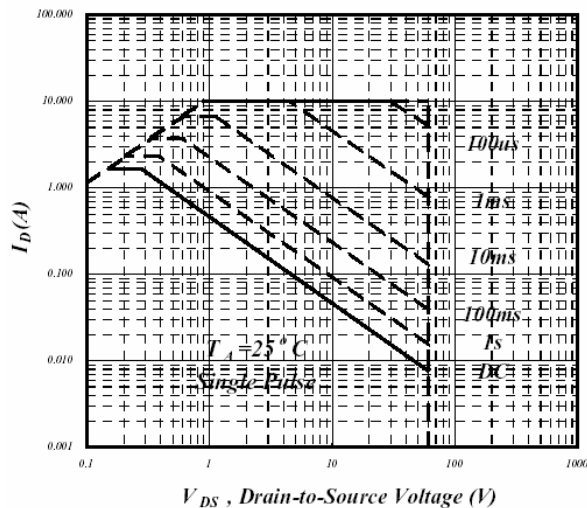


**Fig 9. Maximum Safe Operating Area**

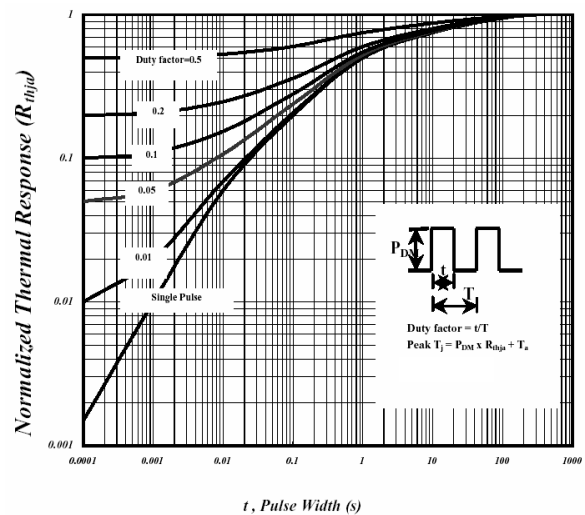


**Fig 10. Effective Transient Thermal Impedance**

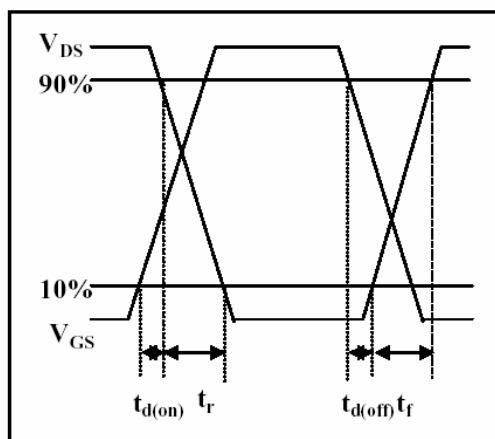


**Fig 11. Switching Time Waveform**

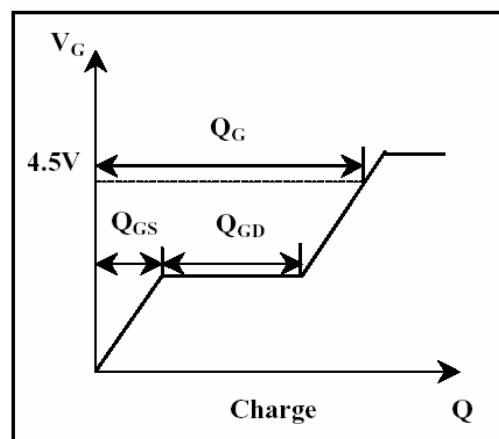


**Fig 12. Gate Charge Waveform**

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**Head Office And Factory:**

- **Taiwan:** No. 17-1 Tatung Rd. Fu Kou Hsin-Chu Industrial Park, Hsin-Chu, Taiwan, R. O. C.  
TEL : 886-3-597-7061 FAX : 886-3-597-9220, 597-0785
- **China:** (201203) No.255, Jang-Jiang Tsai-Lueng RD. , Pu-Dung-Hsin District, Shang-Hai City, China  
TEL : 86-21-5895-7671 ~ 4 FAX : 86-21-38950165