

## GM162

### P-CHANNEL ENHANCEMENT MODE POWER MOSFET

|                     |       |
|---------------------|-------|
| BV <sub>DSS</sub>   | -30V  |
| R <sub>DS(ON)</sub> | 80mΩ  |
| I <sub>D</sub>      | -3.2A |

### Description

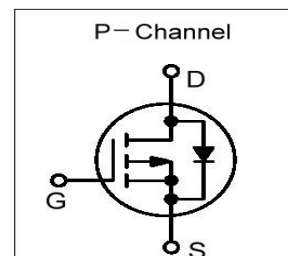
The GM162 provides the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

### Features

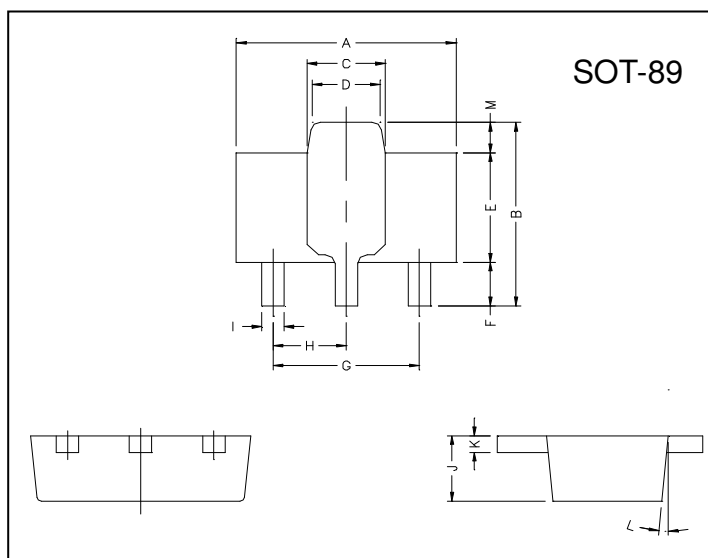
- Lower on-resistance
- Ultra high-speed switching

### Applications

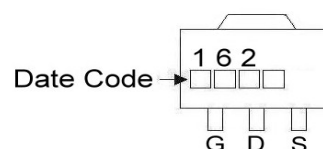
- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery Systems



### 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 <sub>DS</sub>                   | -30        | V    |
| Gate-Source Voltage                              | V <sub>GS</sub>                   | ±12        | V    |
| Continuous Drain Current <sup>3</sup>            | I <sub>D</sub> @Ta=25°C           | -3.2       | A    |
| Continuous Drain Current <sup>3</sup>            | I <sub>D</sub> @Ta=70°C           | -2.6       | A    |
| Pulsed Drain Current <sup>1,2</sup>              | I <sub>DM</sub>                   | -10        | A    |
| Power Dissipation                                | P <sub>D</sub> @Ta=25°C           | 2          | W    |
| Operating Junction and Storage Temperature Range | T <sub>j</sub> , T <sub>stg</sub> | -55 ~ +150 | °C   |
| Linear Derating Factor                           |                                   | 0.01       | W/°C |

### Thermal Data

| Parameter                                             | Symbol               | Ratings | Unit |
|-------------------------------------------------------|----------------------|---------|------|
| Thermal Resistance Junction-ambient <sup>3</sup> Max. | R <sub>thj-amb</sub> | 90      | °C/W |

## Electrical Characteristics(Tj = 25°C Unless otherwise specified)

| Parameter                                      | Symbol                       | Min. | Typ. | Max. | Unit | Test Conditions                      |
|------------------------------------------------|------------------------------|------|------|------|------|--------------------------------------|
| Drain-Source Breakdown Voltage                 | $BV_{DSS}$                   | -30  | -    | -    | V    | $V_{GS}=0, I_D=-250\mu A$            |
| Breakdown Voltage Temperature Coefficient      | $\Delta BV_{DSS}/\Delta T_j$ | -    | -0.1 | -    | V/°C | Reference to 25°C, $I_D=-1\text{mA}$ |
| Gate Threshold Voltage                         | $V_{GS(th)}$                 | -0.5 | -    | -1.2 | V    | $V_{DS}=V_{GS}, I_D=-250\mu A$       |
| Forward Transconductance                       | $g_{fs}$                     | -    | 9    | -    | S    | $V_{DS}=-5.0V, I_D=-3.0A$            |
| Gate-Source Leakage Current                    | $I_{GSS}$                    | -    | -    | ±100 | nA   | $V_{GS}= \pm 12V$                    |
| Drain-Source Leakage Current(Tj=25°C)          | $I_{DSS}$                    | -    | -    | -1   | uA   | $V_{DS}=-30V, V_{GS}=0$              |
| Drain-Source Leakage Current(Tj=70°C)          |                              | -    | -    | -25  | uA   | $V_{DS}=-24V, V_{GS}=0$              |
| Static Drain-Source On-Resistance <sup>2</sup> | $R_{DS(ON)}$                 | -    | -    | 60   | mΩ   | $I_D=-3.2A, V_{GS}=-10V$             |
|                                                |                              | -    | -    | 80   |      | $I_D=-3.0A, V_{GS}=-4.5V$            |
|                                                |                              | -    | -    | 150  |      | $I_D=-2.0A, V_{GS}=-2.5V$            |
| Total Gate Charge <sup>2</sup>                 | $Q_g$                        | -    | 10   | 18   | nC   | $I_D=-3.2A$                          |
| Gate-Source Charge                             | $Q_{gs}$                     | -    | 1.8  | -    |      | $V_{DS}=-24V$                        |
| Gate-Drain ("Miller") Charge                   | $Q_{gd}$                     | -    | 3.6  | -    |      | $V_{GS}=-4.5V$                       |
| Turn-on Delay Time <sup>2</sup>                | $T_{d(on)}$                  | -    | 7    | -    | ns   | $V_{DS}=-15V$                        |
| Rise Time                                      | $T_r$                        | -    | 15   | -    |      | $I_D=-3.2A$                          |
| Turn-off Delay Time                            | $T_{d(off)}$                 | -    | 21   | -    |      | $V_{GS}=-10V$                        |
| Fall Time                                      | $T_f$                        | -    | 15   | -    |      | $R_G=3.3\Omega$<br>$R_D=4.6\Omega$   |
| Input Capacitance                              | $C_{iss}$                    | -    | 735  | 1325 | pF   | $V_{GS}=0V$                          |
| Output Capacitance                             | $C_{oss}$                    | -    | 100  | -    |      | $V_{DS}=-25V$                        |
| Reverse Transfer Capacitance                   | $C_{rss}$                    | -    | 80   | -    |      | $f=1.0\text{MHz}$                    |

## Source-Drain Diode

|                                 |          |   |    |      |    |                       |
|---------------------------------|----------|---|----|------|----|-----------------------|
| Forward On Voltage <sup>2</sup> | $V_{SD}$ | - | -  | -1.2 | V  | $I_S=-1.2A, V_{GS}=0$ |
| Reverse Recovery Time           | $T_{rr}$ | - | 24 | -    | ns | $I_S=-3.2A, V_{GS}=0$ |
| Reverse Recovery Charge         | $Q_{rr}$ | - | 19 | -    | nC | $dI/dt=100A/\mu s$    |

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

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

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 270°C/w when mounted on min. copper pad.

## Characteristics Curve

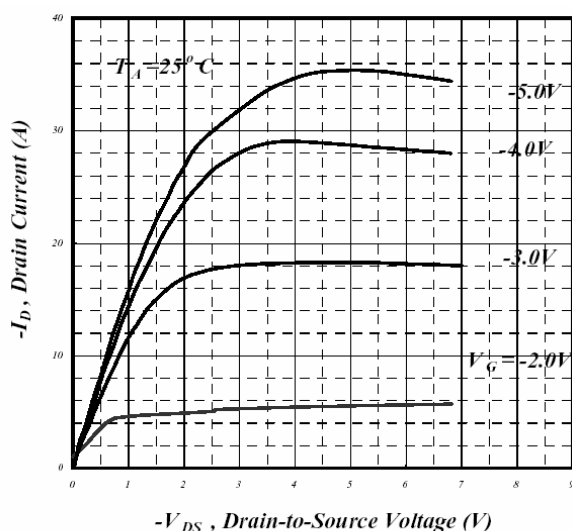


Fig 1. Typical Output Characteristics

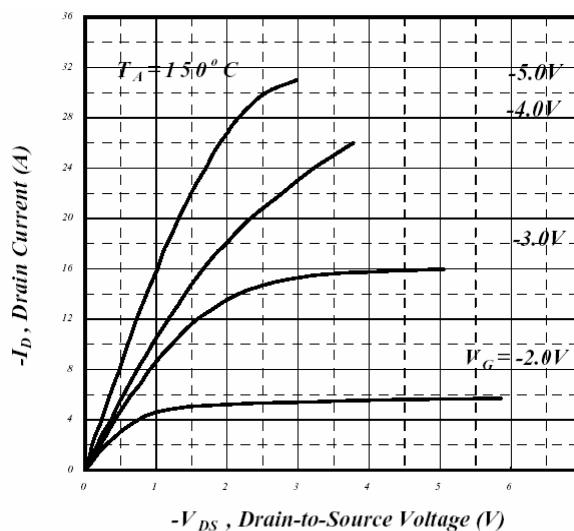
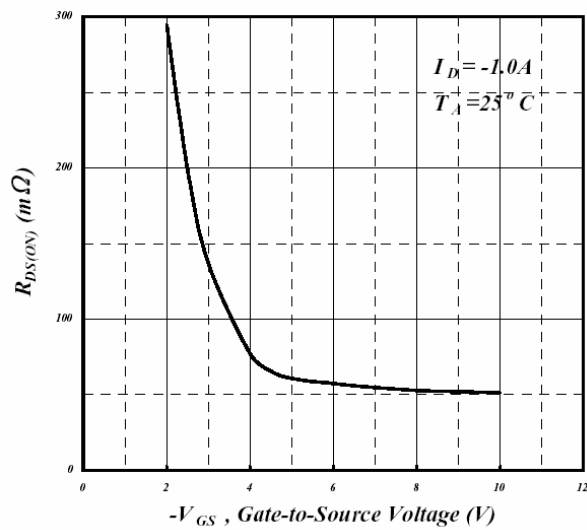
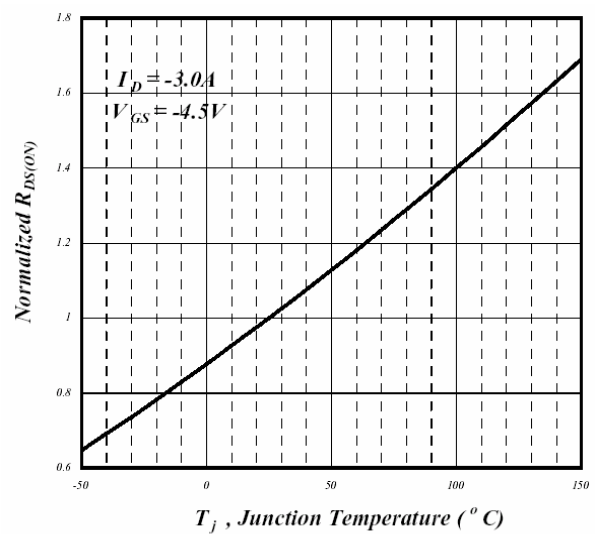


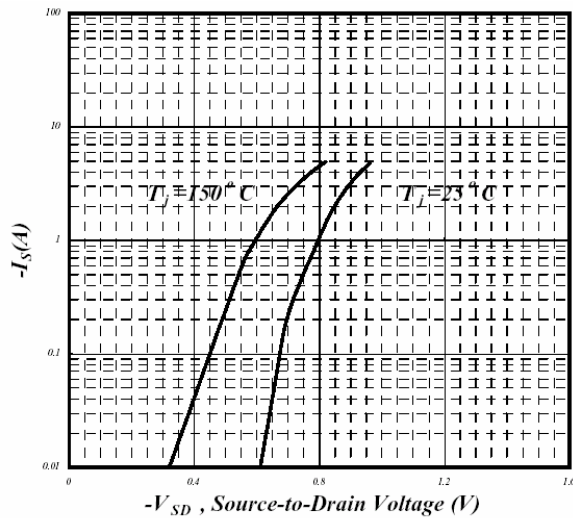
Fig 2. Typical Output Characteristics



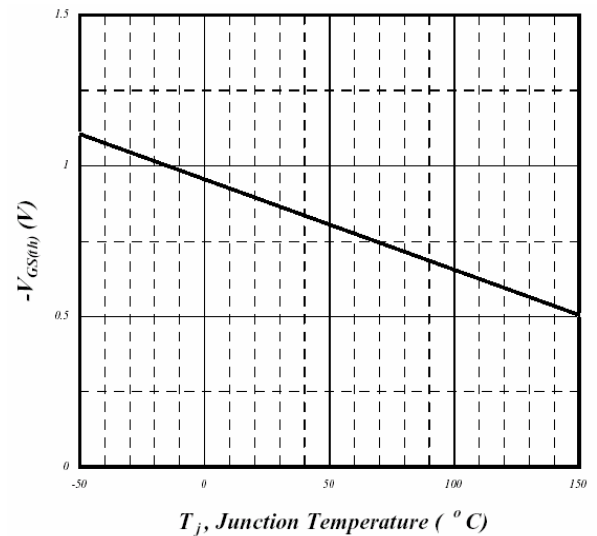
**Fig 3. On-Resistance v.s. Gate Voltage**



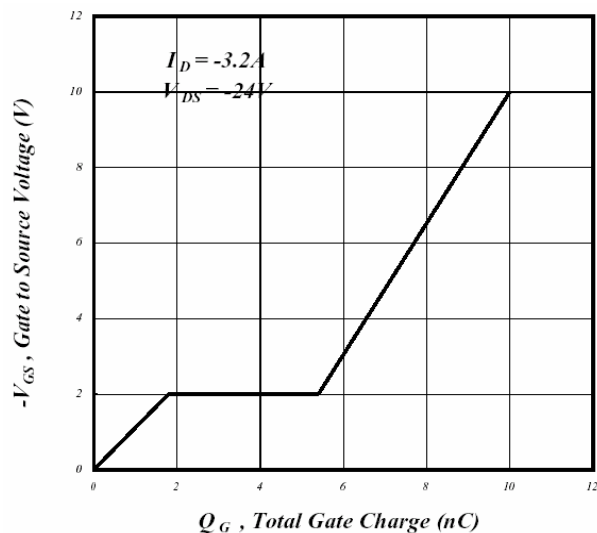
**Fig 4. Normalized On-Resistance**



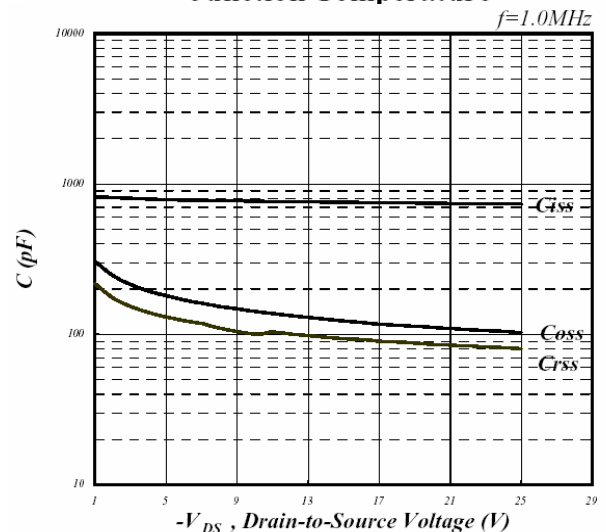
**Fig 5. Forward Characteristic of Reverse Diode**



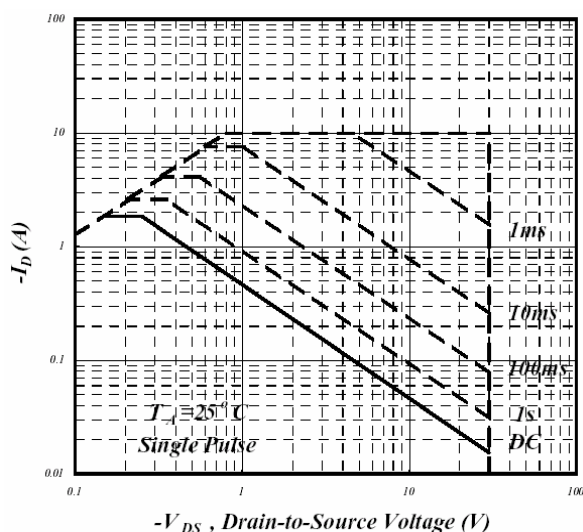
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



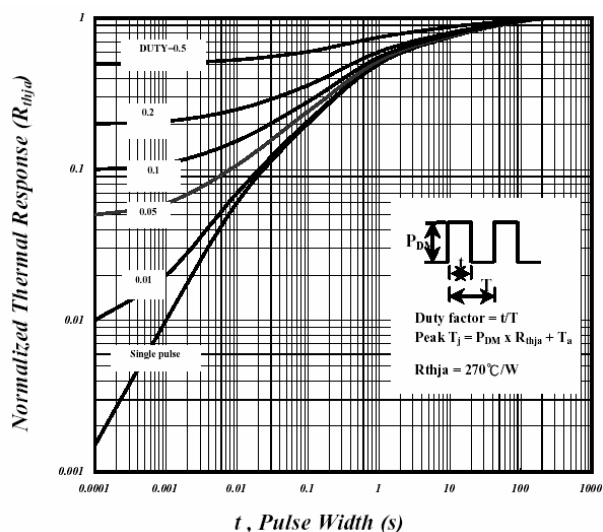
**Fig 7. Gate Charge Characteristics**



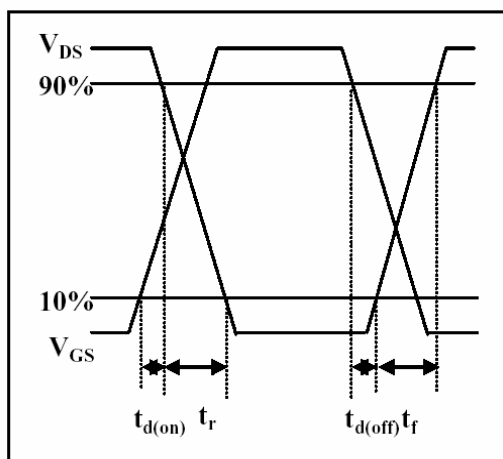
**Fig 8. Typical Capacitance Characteristics**



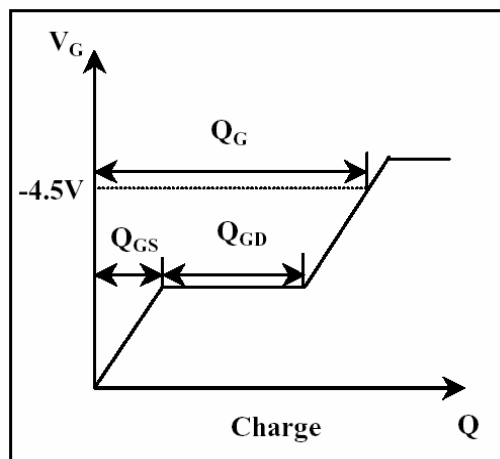
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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