

**GI6679****P-CHANNEL ENHANCEMENT MODE POWER MOSFET**

|                     |      |
|---------------------|------|
| BV <sub>DSS</sub>   | -30V |
| R <sub>DS(ON)</sub> | 9mΩ  |
| I <sub>D</sub>      | -75A |

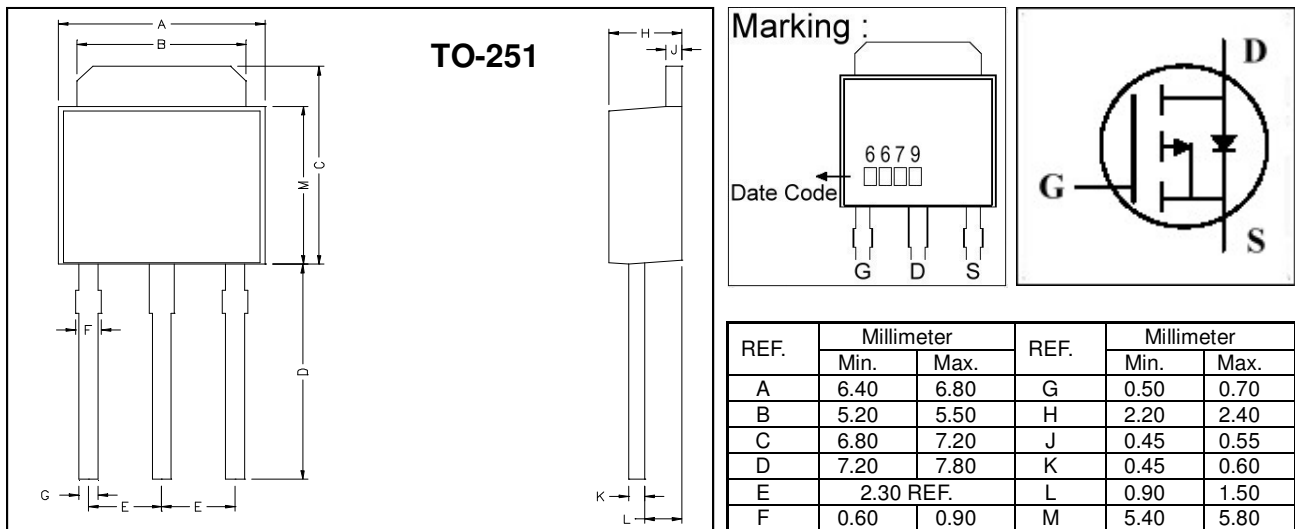
**Description**

The GI6679 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-251 package is available for low-profile applications and suited for low voltage applications such as DC/DC converters.

**Features**

- \*Simple Drive Requirement
- \*Lower On-resistance
- \*Fast Switching Characteristic

**Package Dimensions****Absolute Maximum Ratings**

| Parameter                                        | Symbol                                | Ratings    | Unit |
|--------------------------------------------------|---------------------------------------|------------|------|
| Drain-Source Voltage                             | V <sub>DS</sub>                       | -30        | V    |
| Gate-Source Voltage                              | V <sub>GS</sub>                       | ±25        | V    |
| Continuous Drain Current, V <sub>GS</sub> @10V   | I <sub>D</sub> @T <sub>C</sub> =25°C  | -75        | A    |
| Continuous Drain Current, V <sub>GS</sub> @10V   | I <sub>D</sub> @T <sub>C</sub> =100°C | -50        | A    |
| Pulsed Drain Current <sup>1</sup>                | I <sub>DM</sub>                       | -300       | A    |
| Total Power Dissipation                          | P <sub>D</sub> @T <sub>C</sub> =25°C  | 89         | W    |
| Linear Derating Factor                           |                                       | 0.71       | W/°C |
| Operating Junction and Storage Temperature Range | T <sub>j</sub> , T <sub>stg</sub>     | -55 ~ +150 | °C   |

**Thermal Data**

| Parameter                                | Symbol                | Value | Unit |
|------------------------------------------|-----------------------|-------|------|
| Thermal Resistance Junction-case Max.    | R <sub>thj-case</sub> | 1.4   | °C/W |
| Thermal Resistance Junction-ambient Max. | R <sub>thj-amb</sub>  | 110   | °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>              | -30  | -     | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =-250uA                                                                              |
| Breakdown Voltage Temperature Coefficient           | $\Delta BV_{DSS} / \Delta T_j$ | -    | -0.03 | -    | 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>                | -    | 34    | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-24A                                                                             |
| Gate-Source Leakage Current                         | I <sub>GSS</sub>               | -    | -     | ±100 | nA   | V <sub>GS</sub> = ±25V                                                                                                  |
| Drain-Source Leakage Current(T <sub>j</sub> =25°C)  | I <sub>DSS</sub>               | -    | -     | -1   | uA   | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0                                                                               |
| Drain-Source Leakage Current(T <sub>j</sub> =150°C) |                                | -    | -     | -25  | uA   | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0                                                                               |
| Static Drain-Source On-Resistance <sup>2</sup>      | R <sub>DS(ON)</sub>            | -    | -     | 9    | mΩ   | V <sub>GS</sub> =-10V, I <sub>D</sub> =-30A                                                                             |
|                                                     |                                | -    | -     | 15   |      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-24A                                                                            |
| Total Gate Charge <sup>2</sup>                      | Q <sub>g</sub>                 | -    | 42    | 67   | nC   | I <sub>D</sub> =-16A<br>V <sub>DS</sub> =-24V<br>V <sub>GS</sub> =-4.5V                                                 |
| Gate-Source Charge                                  | Q <sub>gs</sub>                | -    | 6     | -    |      |                                                                                                                         |
| Gate-Drain ("Miller") Charge                        | Q <sub>gd</sub>                | -    | 25    | -    |      |                                                                                                                         |
| Turn-on Delay Time <sup>2</sup>                     | T <sub>d(on)</sub>             | -    | 11    | -    | ns   | V <sub>DS</sub> =-15V<br>I <sub>D</sub> =-16A<br>V <sub>GS</sub> =-10V<br>R <sub>G</sub> =3.3Ω<br>R <sub>D</sub> =0.94Ω |
| Rise Time                                           | T <sub>r</sub>                 | -    | 35    | -    |      |                                                                                                                         |
| Turn-off Delay Time                                 | T <sub>d(off)</sub>            | -    | 58    | -    |      |                                                                                                                         |
| Fall Time                                           | T <sub>f</sub>                 | -    | 78    | -    |      |                                                                                                                         |
| Input Capacitance                                   | C <sub>iss</sub>               | -    | 2870  | 4590 | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =-25V<br>f=1.0MHz                                                                |
| Output Capacitance                                  | C <sub>oss</sub>               | -    | 960   | -    |      |                                                                                                                         |
| Reverse Transfer Capacitance                        | C <sub>rss</sub>               | -    | 740   | -    |      |                                                                                                                         |

**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> =-24A, V <sub>GS</sub> =0V                  |
| Reverse Recovery Time <sup>2</sup> | T <sub>rr</sub> | -    | 47   | -    | ns   | I <sub>S</sub> =-16A, V <sub>GS</sub> =0V<br>dI/dt=100A/μs |
| Reverse Recovery Charge            | Q <sub>rr</sub> | -    | 43   | -    | nC   |                                                            |

Notes: 1. Pulse width limited by safe operating area.

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

## Characteristics Curve

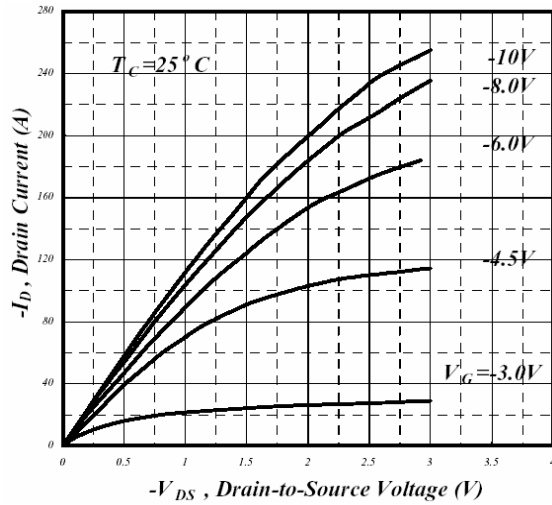


Fig 1. Typical Output Characteristics

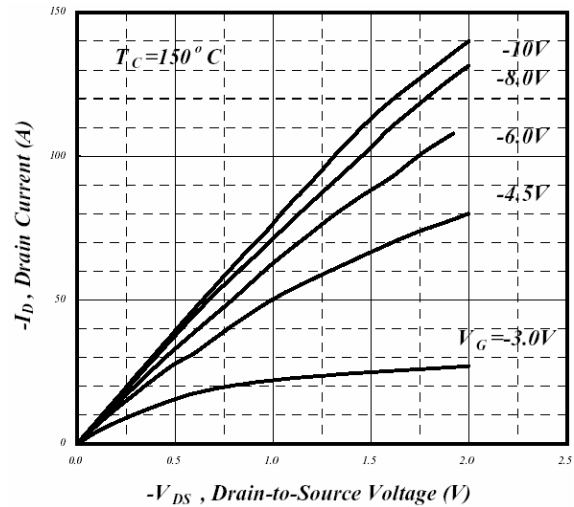


Fig 2. Typical Output Characteristics

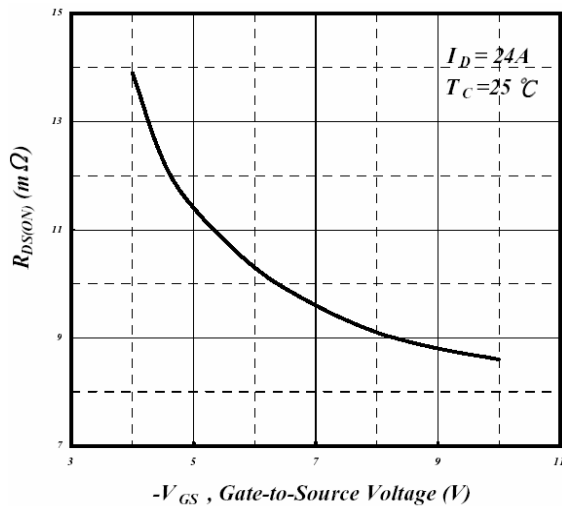


Fig 3. On-Resistance v.s. Gate Voltage

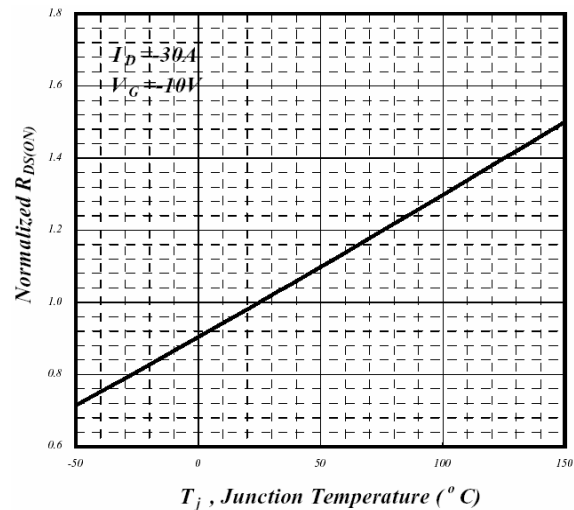


Fig 4. Normalized On-Resistance v.s. Junction Temperature

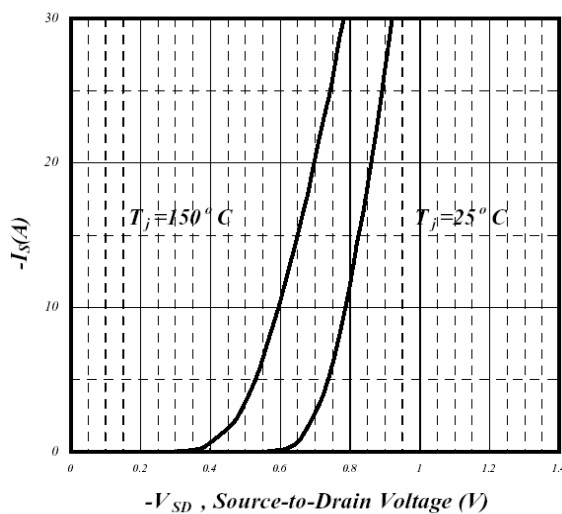


Fig 5. Forward Characteristics of Reverse Diode

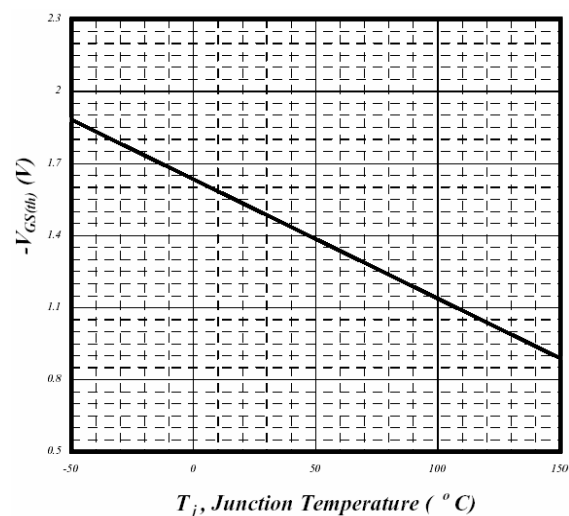
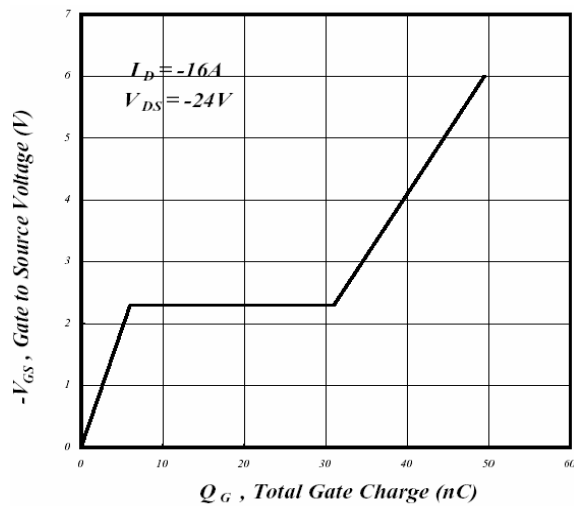
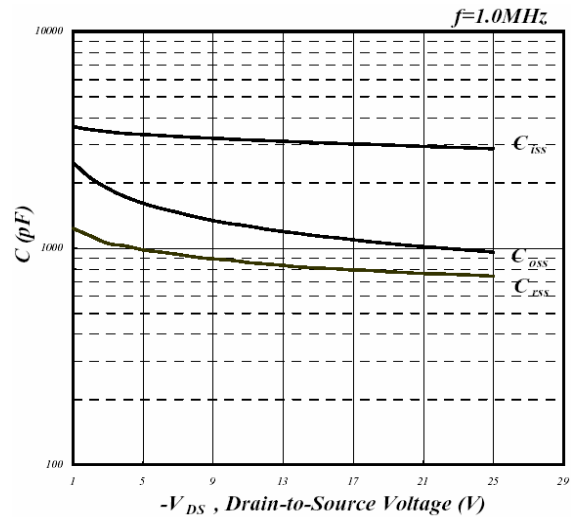


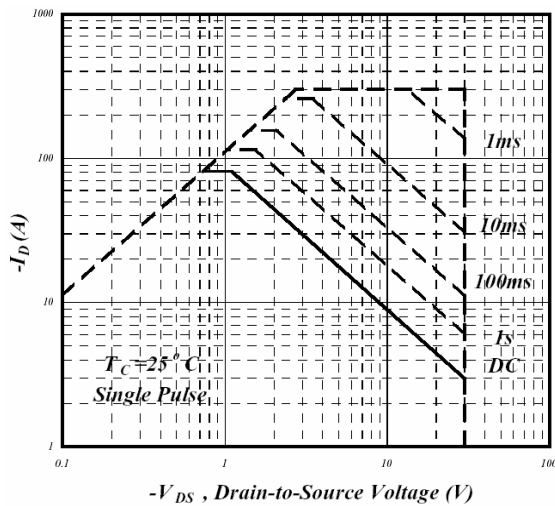
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



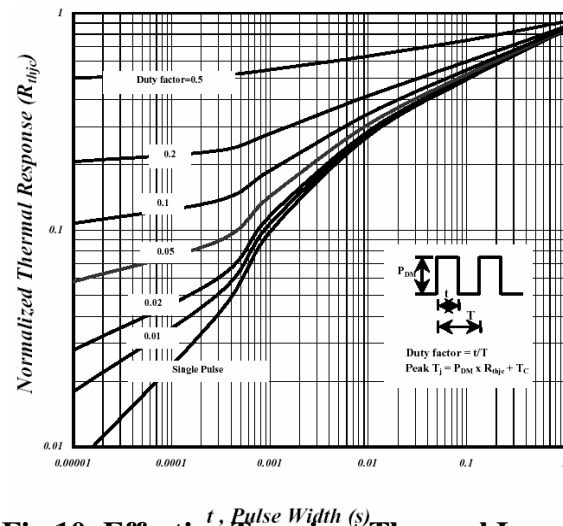
**Fig 7. Gate Charge Characteristics**



**Fig 8. Typical Capacitance Characteristics**



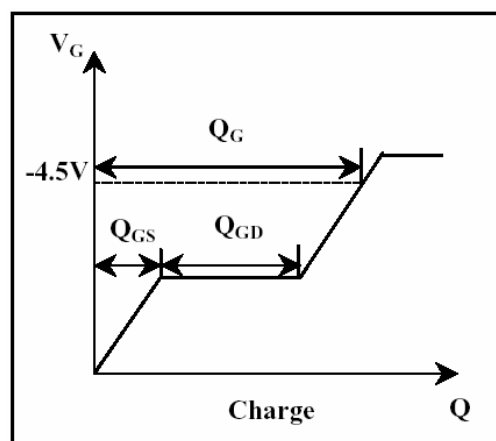
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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