

# GP9962

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

|         |      |
|---------|------|
| BVDSS   | 40V  |
| RDS(ON) | 28mΩ |
| ID      | 7A   |

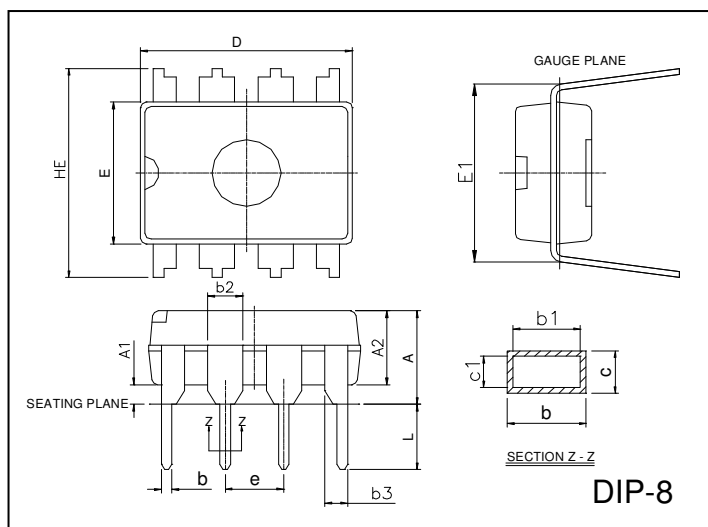
### Description

The GP9962 provides the designer with the best combination of fast switching, ruggedized device design, ultra low on-resistance and cost-effectiveness.

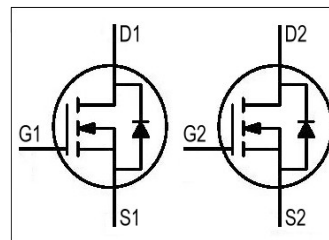
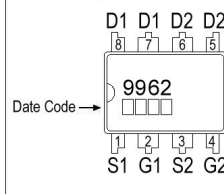
### Features

- \*Low On-Resistance
- \*Single Drive Requirement

### Package Dimensions



#### Marking :



| REF. | Millimeter |        | REF. | Millimeter |       |
|------|------------|--------|------|------------|-------|
|      | Min.       | Max.   |      | Min.       | Max.  |
| A    | -          | 0.5334 | c1   | 0.203      | 0.279 |
| A1   | 0.381      | -      | D    | 9.017      | 10.16 |
| A2   | 2.921      | 4.953  | E    | 6.096      | 7.112 |
| b    | 0.356      | 0.559  | E1   | 7.620      | 8.255 |
| b1   | 0.356      | 0.508  | e    | 2.540 BSC  |       |
| b2   | 1.143      | 1.778  | HE   | -          | 10.92 |
| b3   | 0.762      | 1.143  | L    | 2.921      | 3.810 |
| c    | 0.203      | 0.356  |      |            |       |

### Absolute Maximum Ratings

| Parameter                                            | Symbol                | Ratings    | Unit           |
|------------------------------------------------------|-----------------------|------------|----------------|
| Drain-Source Voltage                                 | $V_{DS}$              | 40         | V              |
| Gate-Source Voltage                                  | $V_{GS}$              | $\pm 20$   | V              |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@10V$ | $I_D @TA=25^{\circ}C$ | 7          | A              |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@10V$ | $I_D @TA=70^{\circ}C$ | 5.5        | A              |
| Pulsed Drain Current <sup>1,2</sup>                  | $I_{DM}$              | 20         | A              |
| Total Power Dissipation                              | $P_D @TA=25^{\circ}C$ | 2          | W              |
| Linear Derating Factor                               |                       | 0.016      | W/ $^{\circ}C$ |
| Operating Junction and Storage Temperature Range     | $T_j, T_{stg}$        | -55 ~ +150 | $^{\circ}C$    |

### Thermal Data

| Parameter                                             | Symbol      | Value | Unit          |
|-------------------------------------------------------|-------------|-------|---------------|
| Thermal Resistance Junction-ambient <sup>3</sup> Max. | $R_{thj-a}$ | 62.5  | $^{\circ}C/W$ |

**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>              | 40   | -    | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =250uA                |
| Breakdown Voltage Temperature Coefficient          | $\Delta BV_{DSS} / \Delta T_j$ | -    | 0.1  | -    | 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>                | -    | 11   | -    | S    | V <sub>DS</sub> =10V, I <sub>D</sub> =7A                 |
| 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>               | -    | -    | 1    | uA   | V <sub>DS</sub> =40V, V <sub>GS</sub> =0                 |
| Drain-Source Leakage Current(T <sub>j</sub> =70°C) |                                | -    | -    | 25   | uA   | V <sub>DS</sub> =32V, V <sub>GS</sub> =0                 |
| Static Drain-Source On-Resistance <sup>2</sup>     | R <sub>DS(ON)</sub>            | -    | -    | 28   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =7A                 |
|                                                    |                                | -    | -    | 40   |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                |
| Total Gate Charge <sup>2</sup>                     | Q <sub>g</sub>                 | -    | 13   | 20   | nC   | I <sub>D</sub> =7A                                       |
| Gate-Source Charge                                 | Q <sub>gs</sub>                | -    | 4    | -    |      | V <sub>DS</sub> =32V                                     |
| Gate-Drain ("Miller") Charge                       | Q <sub>gd</sub>                | -    | 7    | -    |      | V <sub>GS</sub> =4.5V                                    |
| Turn-on Delay Time <sup>2</sup>                    | T <sub>d(on)</sub>             | -    | 10   | -    | ns   | V <sub>DS</sub> =20V                                     |
| Rise Time                                          | T <sub>r</sub>                 | -    | 8    | -    |      | I <sub>D</sub> =1A                                       |
| Turn-off Delay Time                                | T <sub>d(off)</sub>            | -    | 26   | -    |      | V <sub>GS</sub> =10V                                     |
| Fall Time                                          | T <sub>f</sub>                 | -    | 9    | -    |      | R <sub>G</sub> =3.3Ω<br>R <sub>D</sub> =20Ω              |
| Input Capacitance                                  | C <sub>iss</sub>               | -    | 1170 | 1870 | pF   | V <sub>GS</sub> =0V                                      |
| Output Capacitance                                 | C <sub>oss</sub>               | -    | 180  | -    |      | V <sub>DS</sub> =25V                                     |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>               | -    | 116  | -    |      | f=1.0MHz                                                 |

**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> =1.7A, V <sub>GS</sub> =0V                |
| Reverse Recovery Time <sup>2</sup> | T <sub>rr</sub> | -    | 24   | -    | ns   | I <sub>S</sub> =7A, V <sub>GS</sub> =0V<br>dI/dt=100A/μs |
| Reverse Recovery Charge            | Q <sub>rr</sub> | -    | 18   | -    | nC   |                                                          |

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

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

3. Mounted on 1 in<sup>2</sup> copper pad of FR4 board; 90°C/W when mounted on Min. copper pad.

## Characteristics Curve

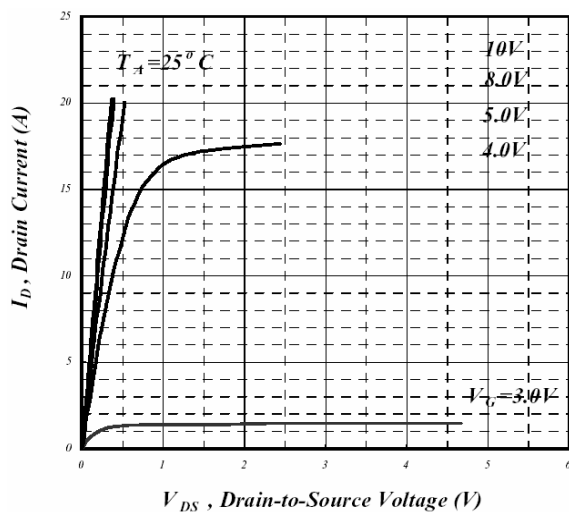


Fig 1. Typical Output Characteristics

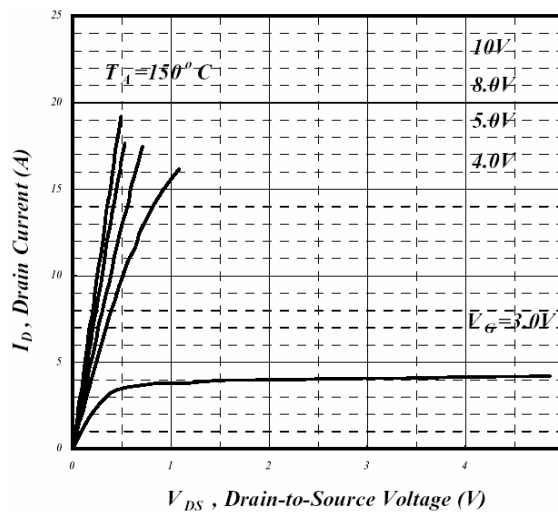


Fig 2. Typical Output Characteristics

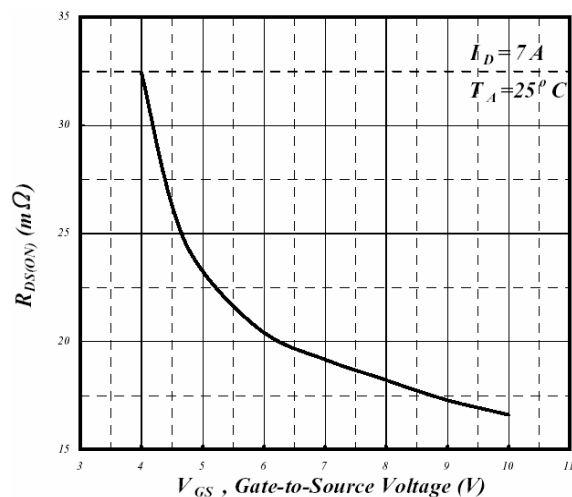
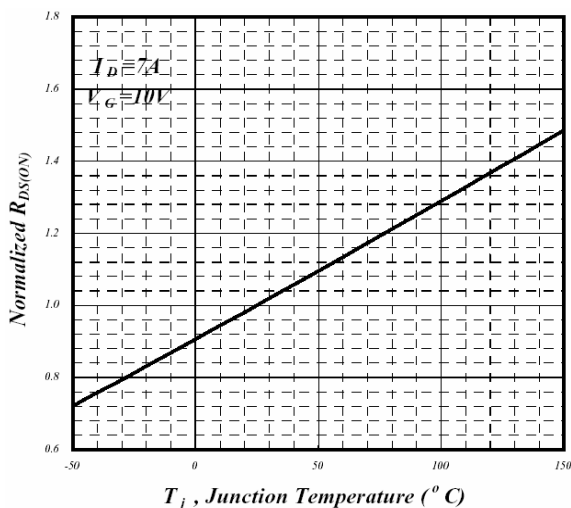
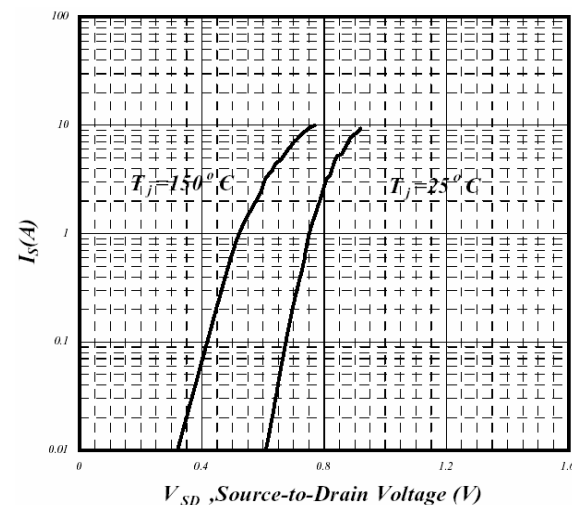
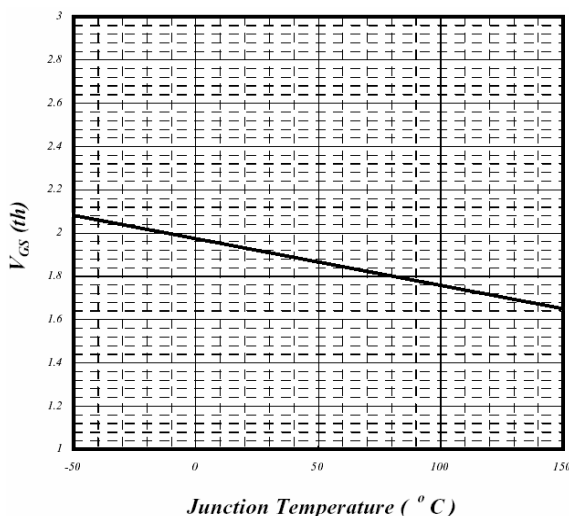


Fig 3. On-Resistance v.s. Gate Voltage

Fig 4. Normalized On-Resistance  
v.s. Junction TemperatureFig 5. Forward Characteristics of  
Reverse DiodeFig 6. Gate Threshold Voltage v.s.  
Junction Temperature

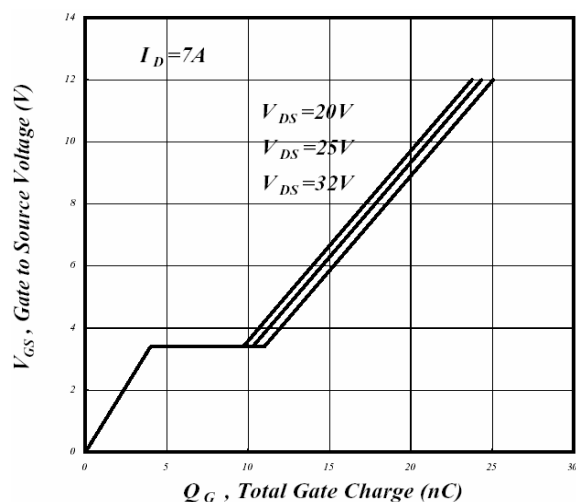


Fig 7. Gate Charge Characteristics

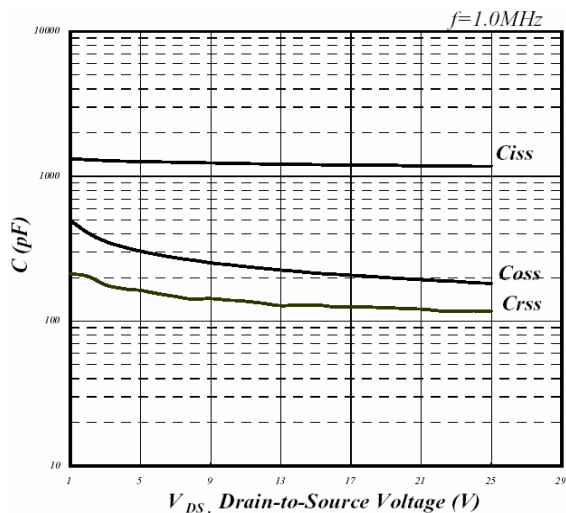


Fig 8. Typical Capacitance Characteristics

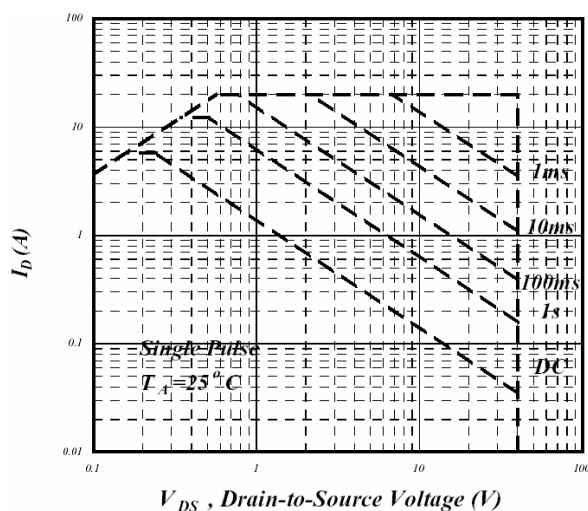


Fig 9. Maximum Safe Operating Area

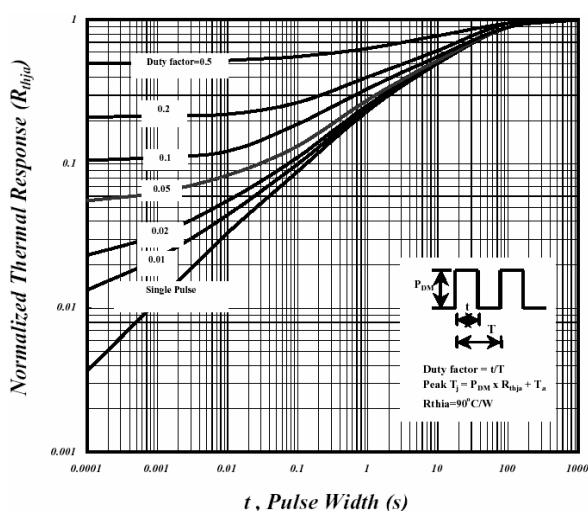


Fig 10. Effective Transient Thermal Impedance

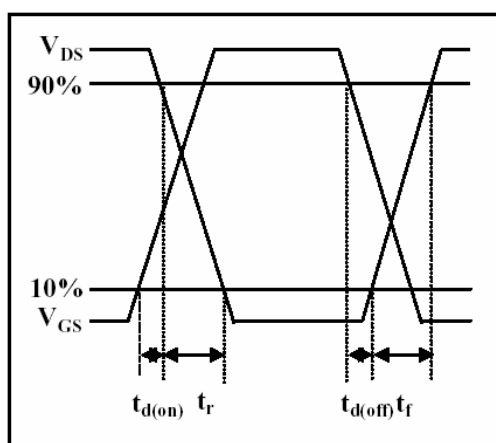


Fig 11. Switching Time Waveform

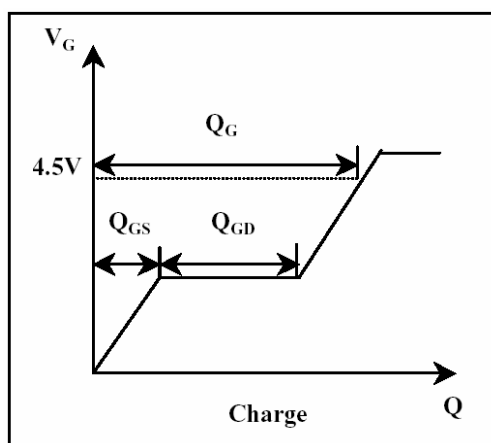


Fig 12. Gate Charge Waveform

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