

# GSC9575

## P-CHANNEL ENHANCEMENT MODE POWER MOSFET

|         |      |
|---------|------|
| BVDSS   | -60V |
| RDS(ON) | 90mΩ |
| ID      | -4A  |

### Description

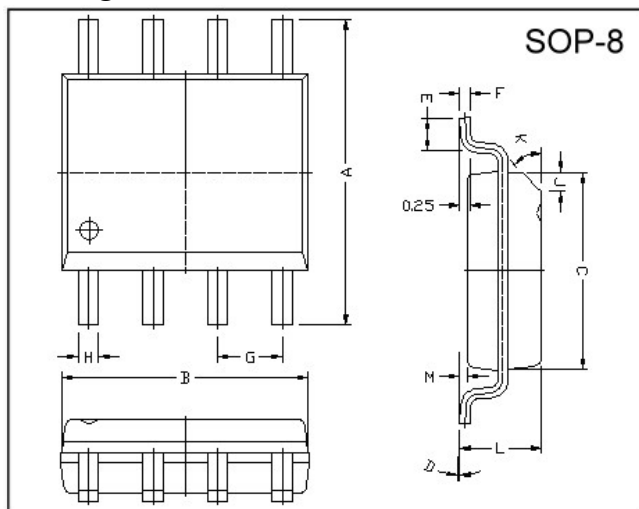
The GSC9575 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

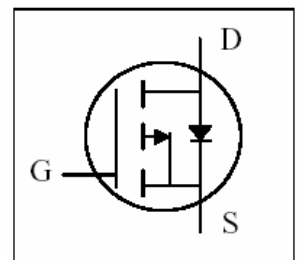
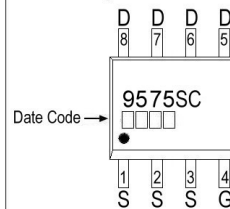
### Features

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

### Package Dimensions



#### Marking :



| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 5.80       | 6.20 | M    | 0.10       | 0.25 |
| B    | 4.80       | 5.00 | H    | 0.35       | 0.49 |
| C    | 3.80       | 4.00 | L    | 1.35       | 1.75 |
| D    | 0°         | 8°   | J    | 0.375 REF. |      |
| E    | 0.40       | 0.90 | K    | 45°        |      |
| F    | 0.19       | 0.25 | G    | 1.27 TYP.  |      |

### Absolute Maximum Ratings

| Parameter                                        | Symbol                   | Ratings    | Unit          |
|--------------------------------------------------|--------------------------|------------|---------------|
| Drain-Source Voltage                             | $V_{DS}$                 | -60        | V             |
| Gate-Source Voltage                              | $V_{GS}$                 | $\pm 25$   | V             |
| Continuous Drain Current <sup>3</sup>            | $I_D @ T_A = 25^\circ C$ | -4.0       | A             |
| Continuous Drain Current <sup>3</sup>            | $I_D @ T_A = 70^\circ C$ | -3.2       | A             |
| Pulsed Drain Current <sup>1</sup>                | $I_{DM}$                 | -20        | A             |
| Total Power Dissipation                          | $P_D @ T_A = 25^\circ C$ | 2.5        | W             |
| Linear Derating Factor                           |                          | 0.02       | 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. | $R_{thj-a}$ | 50    | $^\circ C/W$ |

**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>              | -60  | -     | -    | V    | V <sub>GS</sub> =0, I <sub>D</sub> =-250uA                                                                           |
| Breakdown Voltage Temperature Coefficient          | $\Delta BV_{DSS} / \Delta T_j$ | -    | -0.04 | -    | 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>                | -    | 7     | -    | S    | V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A                                                                           |
| 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> =-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 <sup>2</sup>     | R <sub>DS(on)</sub>            | -    | -     | 90   | mΩ   | V <sub>GS</sub> =-10V, I <sub>D</sub> =-4A                                                                           |
|                                                    |                                | -    | -     | 120  |      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A                                                                          |
| Total Gate Charge <sup>2</sup>                     | Q <sub>g</sub>                 | -    | 18    | 28   | nC   | I <sub>D</sub> =-4A<br>V <sub>DS</sub> =-48V<br>V <sub>GS</sub> =-4.5V                                               |
| Gate-Source Charge                                 | Q <sub>gs</sub>                | -    | 5     | -    |      |                                                                                                                      |
| Gate-Drain ("Miller") Charge                       | Q <sub>gd</sub>                | -    | 7     | -    |      |                                                                                                                      |
| Turn-on Delay Time <sup>2</sup>                    | T <sub>d(on)</sub>             | -    | 12    | -    | 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>            | -    | 68    | -    |      |                                                                                                                      |
| Fall Time                                          | T <sub>f</sub>                 | -    | 32    | -    |      |                                                                                                                      |
| Input Capacitance                                  | C <sub>iss</sub>               | -    | 1745  | 2790 | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =-25V<br>f=1.0MHz                                                             |
| Output Capacitance                                 | C <sub>oss</sub>               | -    | 165   | -    |      |                                                                                                                      |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>               | -    | 125   | -    |      |                                                                                                                      |

**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> =-2A, V <sub>GS</sub> =0V                  |
| Reverse Recovery Time <sup>2</sup> | T <sub>rr</sub> | -    | 56   | -    | ns   | I <sub>S</sub> =-4A, V <sub>GS</sub> =0V<br>dI/dt=100A/μs |
| Reverse Recovery Charge            | Q <sub>rr</sub> | -    | 146  | -    | nC   |                                                           |

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; 125°C/W when mounted on Min. copper pad.

## Characteristics Curve

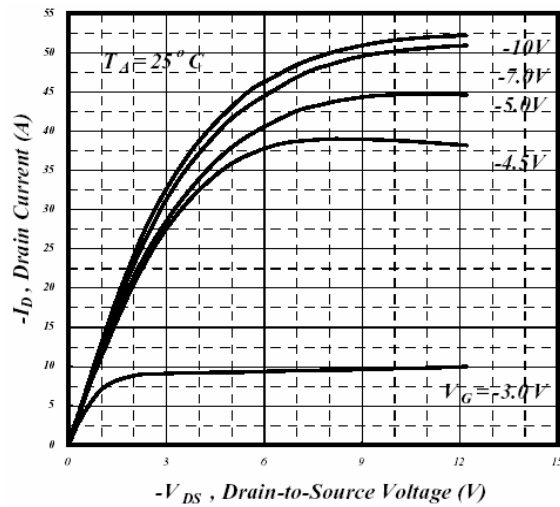


Fig 1. Typical Output Characteristics

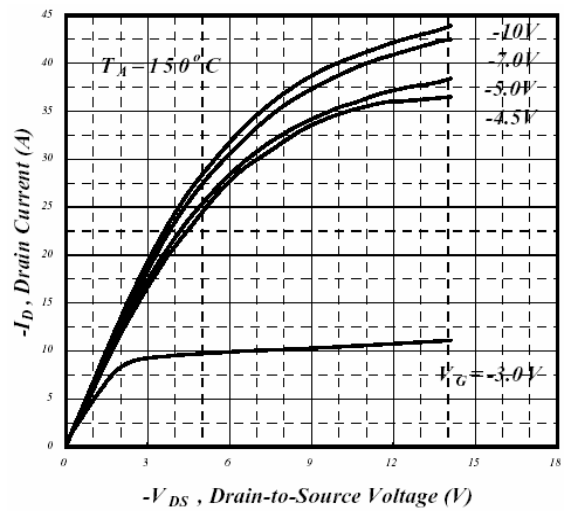


Fig 2. Typical Output Characteristics

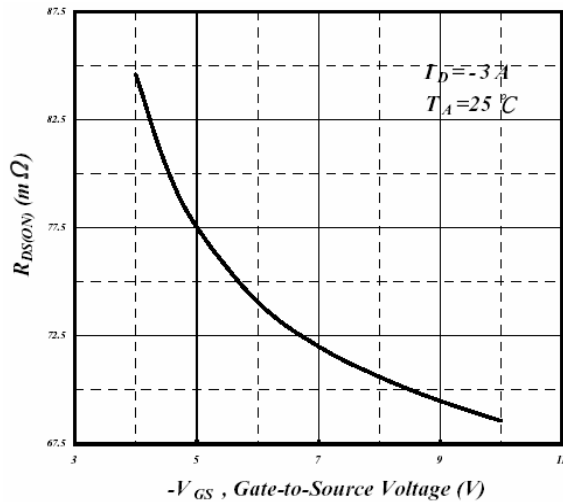


Fig 3. On-Resistance v.s. Gate Voltage

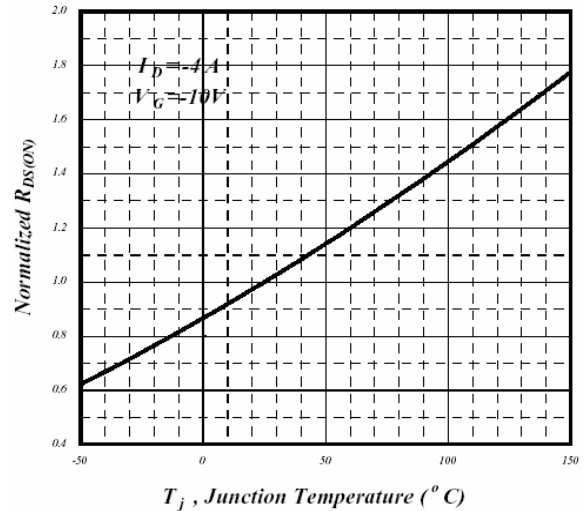


Fig 4. Normalized On-Resistance v.s. Junction Temperature

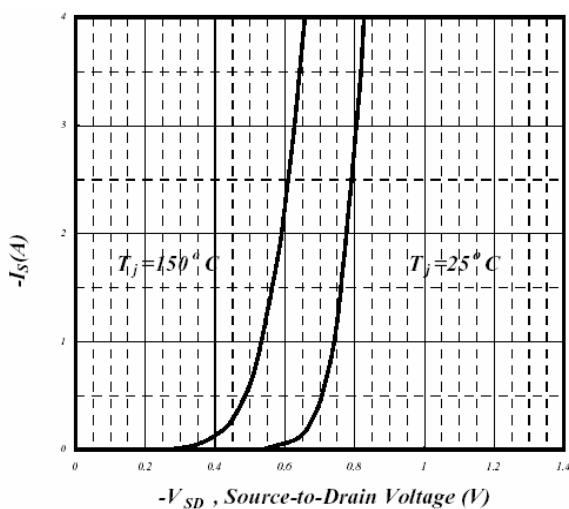


Fig 5. Forward Characteristics of Reverse Diode

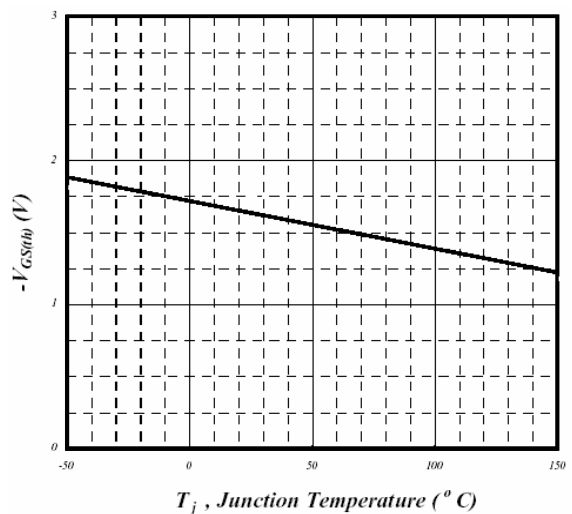
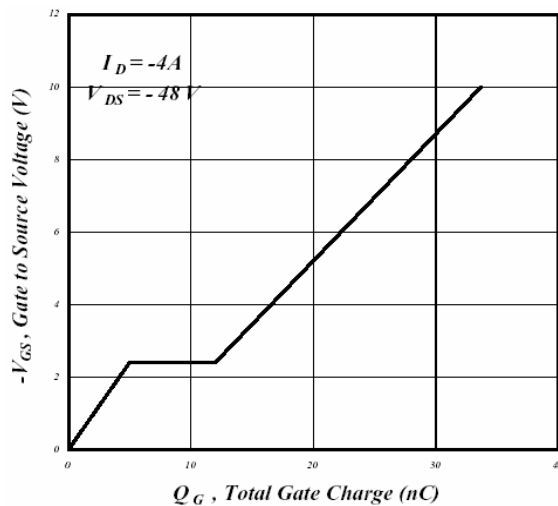
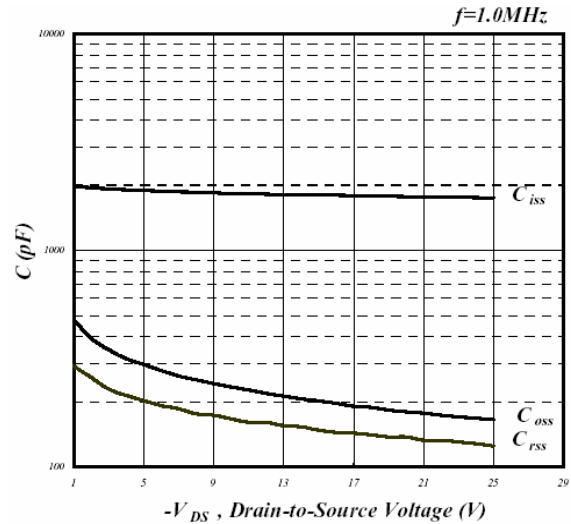


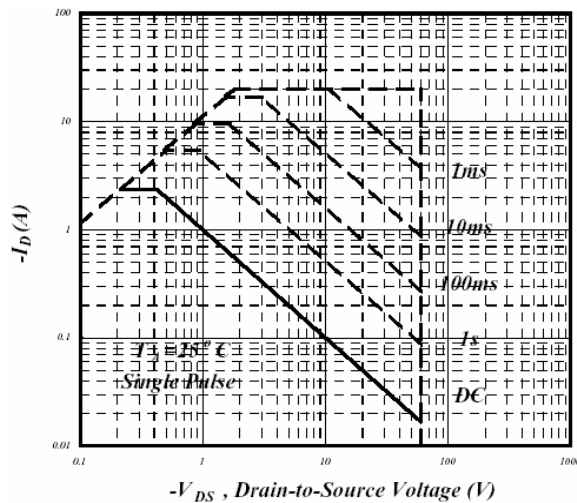
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



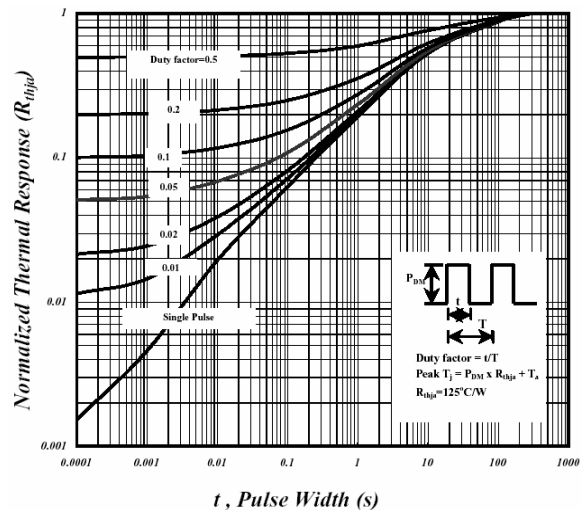
**Fig 7. Gate Charge Characteristics**



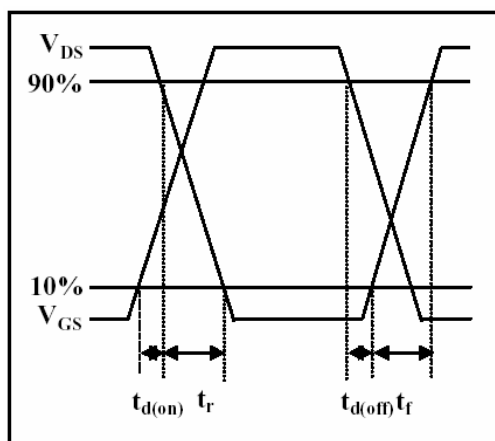
**Fig 8. Typical Capacitance Characteristics**



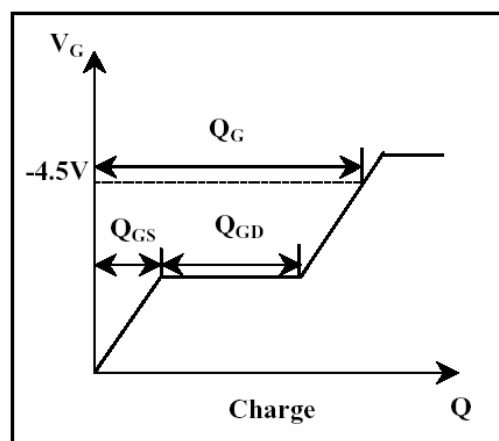
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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