

# G2306A

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

|         |      |
|---------|------|
| BVDSS   | 30V  |
| RDS(ON) | 35mΩ |
| ID      | 5A   |

### Description

The G2306A utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.  
The G2306A is universally used for all commercial-industrial applications.

### Features

- \*Capable of 2.5V gate drive
- \*Lower on-resistance

### Package Dimensions

**N-Channel**

**Marking :**

| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 2.70       | 3.10 | G    | 1.90       | REF. |
| B    | 2.40       | 2.80 | H    | 1.00       | 1.30 |
| C    | 1.40       | 1.60 | K    | 0.10       | 0.20 |
| D    | 0.35       | 0.50 | J    | 0.40       | -    |
| E    | 0          | 0.10 | L    | 0.85       | 1.15 |
| F    | 0.45       | 0.55 | M    | 0°         | 10°  |

### Absolute Maximum Ratings

| Parameter   | Symbol                | Ratings    | Unit |
|---|-----------------------|------------|------|
| Drain-Source Voltage                                  | $V_{DS}$              | 30         | V    |
| Gate-Source Voltage                                   | $V_{GS}$              | ±12        | V    |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@4.5V$ | $I_D @Ta=25^{\circ}C$ | 5          | A    |
| Continuous Drain Current <sup>3</sup> , $V_{GS}@4.5V$ | $I_D @Ta=70^{\circ}C$ | 4          | A    |
| Pulsed Drain Current <sup>1,2</sup>                   | $I_{DM}$              | 20         | A    |
| Power Dissipation                                     | $P_D @Ta=25^{\circ}C$ | 1.38       | 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      | Ratings | Unit |
|---|-------------|---------|------|
| Thermal Resistance Junction-ambient <sup>3</sup> Max. | $R_{thj-a}$ | 90      | °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          | $\Delta BV_{DSS} / \Delta T_j$ | -    | 0.1  | -    | V/°C | Reference to 25°C, I <sub>D</sub> =1mA   |
| Gate Threshold Voltage                             | V <sub>GS(th)</sub>            | 0.5  | -    | 1.2  | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA   |
| Forward Transconductance                           | g <sub>fs</sub>                | -    | 13   | -    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> =5A  |
| Gate-Source Leakage Current                        | I <sub>GSS</sub>               | -    | -    | ±100 | nA   | V <sub>GS</sub> = ±12V   |
| 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> =70°C) |                                | -    | -    | 25   | uA   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0   |
| Static Drain-Source On-Resistance                  | R <sub>DS(ON)</sub>            | -    | -    | 30   | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =5A   |
|  |                                | -    | -    | 35   |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A  |
|  |                                | -    | -    | 50   |      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.6A  |
|  |                                | -    | -    | 90   |      | V <sub>GS</sub> =1.8V, I <sub>D</sub> =1.0A  |
| Total Gate Charge <sup>2</sup>                     | Q <sub>g</sub>                 | -    | 8.5  | 15   | nC   | I <sub>D</sub> =5A<br>V <sub>DS</sub> =16V<br>V <sub>GS</sub> =4.5V  |
| Gate-Source Charge                                 | Q <sub>gs</sub>                | -    | 1.5  | -    |      |  |
| Gate-Drain ("Miller") Change                       | Q <sub>gd</sub>                | -    | 3.2  | -    |      |  |
| Turn-on Delay Time <sup>2</sup>                    | T <sub>d(on)</sub>             | -    | 6    | -    | ns   | V <sub>DS</sub> =15V<br>I <sub>D</sub> =5A<br>V <sub>GS</sub> =10V<br>R <sub>G</sub> =3.3Ω<br>R <sub>D</sub> =3Ω |
| Rise Time  | T <sub>r</sub>                 | -    | 20   | -    |      |  |
| Turn-off Delay Time                                | T <sub>d(off)</sub>            | -    | 20   | -    |      |  |
| Fall Time  | T <sub>f</sub>                 | -    | 3    | -    |      |  |
| Input Capacitance                                  | C <sub>iss</sub>               | -    | 660  | 1050 | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =25V<br>f=1.0MHz  |
| Output Capacitance                                 | C <sub>oss</sub>               | -    | 90   | -    |      |  |
| Reverse Transfer Capacitance                       | C <sub>rss</sub>               | -    | 70   | -    |      |  |

**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 <sup>2</sup> | T <sub>rr</sub> | -    | 14   | -    | ns   | I <sub>S</sub> =5A, V <sub>GS</sub> =0V<br>dI/dt=100A/μs |
| Reverse Recovery Charge            | Q <sub>rr</sub> | -    | 7    | -    | 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; 270°C/W when mounted on Min. copper pad.

## Characteristics Curve

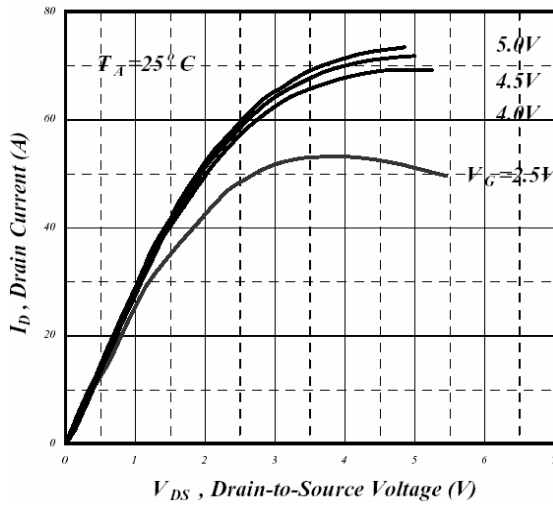


Fig 1. Typical Output Characteristics

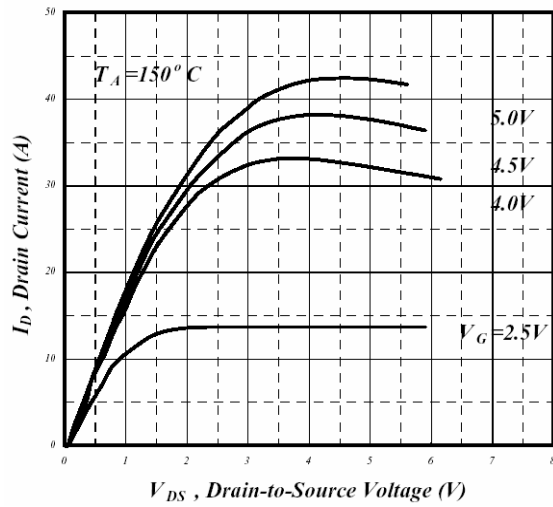


Fig 2. Typical Output Characteristics

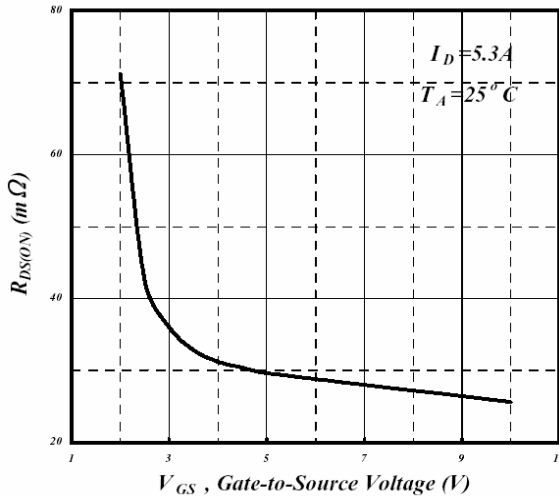


Fig 3. On-Resistance v.s. Gate Voltage

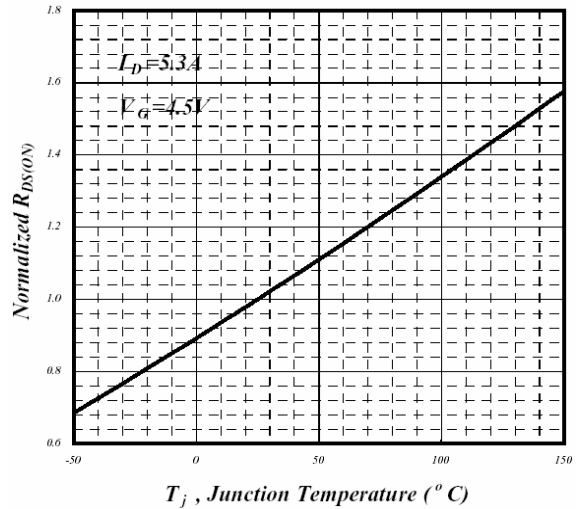


Fig 4. Normalized On-Resistance v.s. Junction Temperature

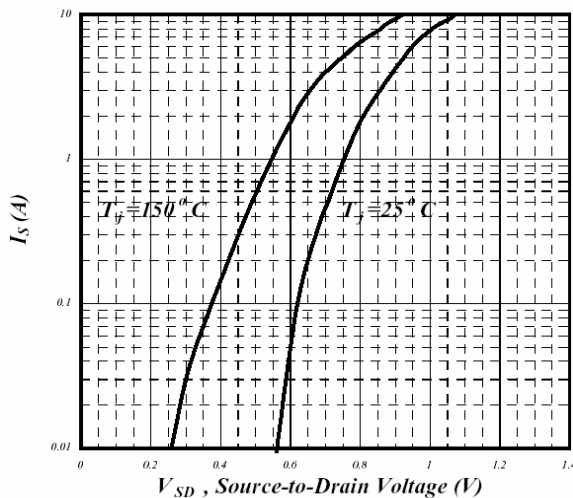


Fig 5. Forward Characteristics of Reverse Diode

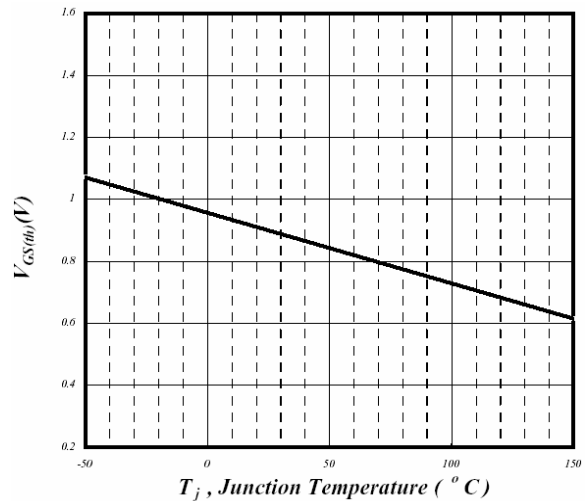
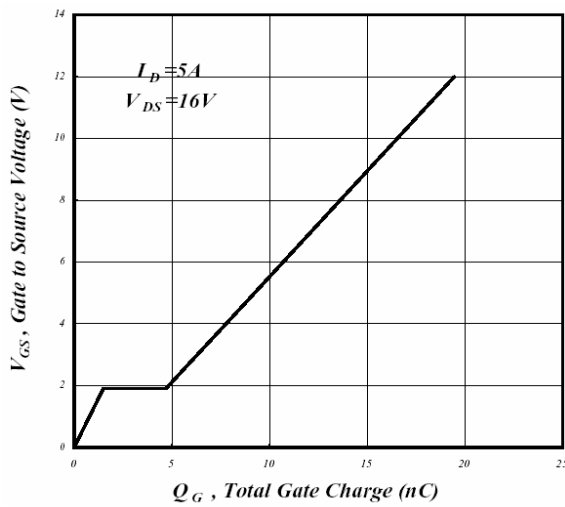
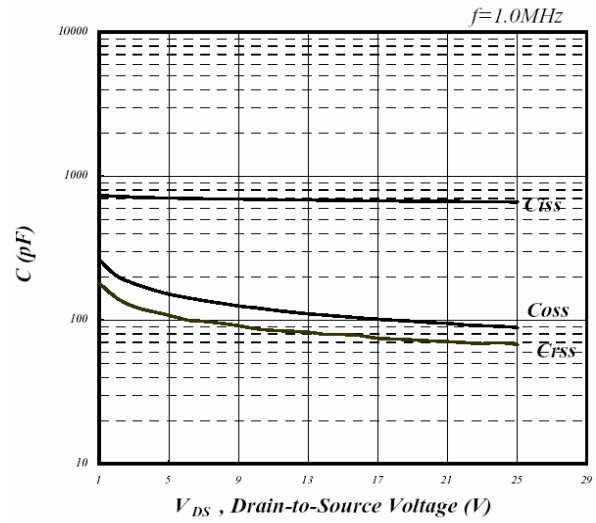


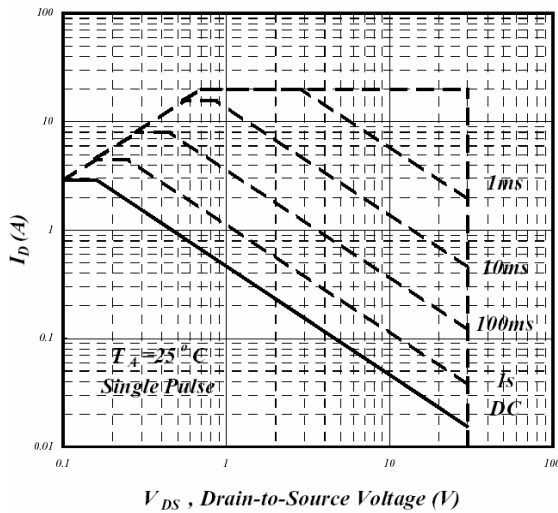
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



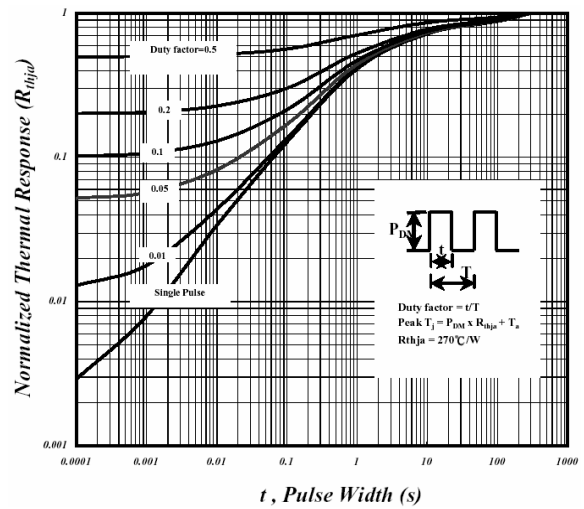
**Fig 7. Gate Charge Characteristics**



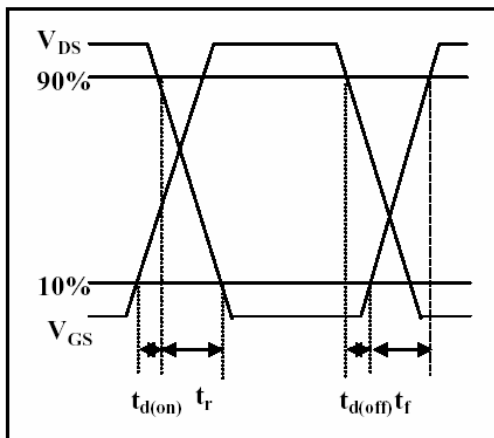
**Fig 8. Typical Capacitance Characteristics**



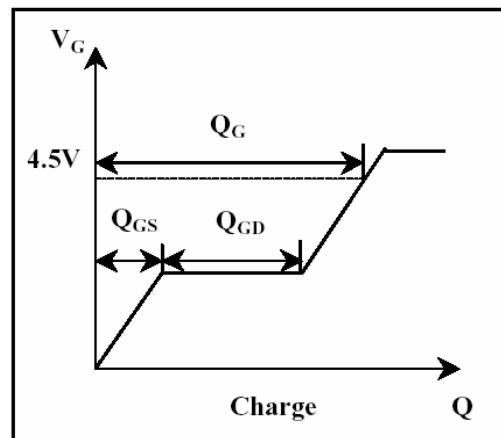
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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