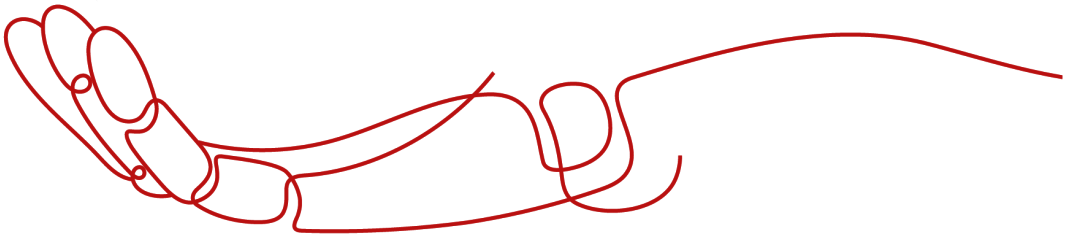




## PRODUCT DATA SHEET



To learn more about JGSEMI, please visit our website at



Datasheet



Resources



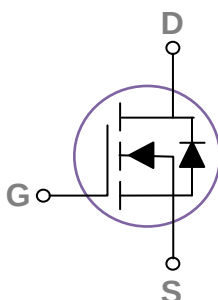
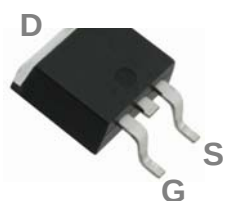
Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at [www.jg-semi.cn](http://www.jg-semi.cn). Please email any questions regarding the system integration to [JINGAO\\_questions@jgsemi.com](mailto:JINGAO_questions@jgsemi.com).

## General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

## TO252 Pin Configuration



| BVDSS | R <sub>DS(on)</sub> | I <sub>D</sub> |
|-------|---------------------|----------------|
| 100V  | 55mΩ                | 25A            |

## Features

- 100V, 25A, R<sub>DS(ON)</sub> = 55mΩ @ V<sub>GS</sub> = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

## Applications

- Networking
- Load Switch
- LED applications

## Absolute Maximum Ratings T<sub>c</sub>=25°C unless otherwise noted

| Symbol           | Parameter                                          | Rating     | Units |
|------------------|----------------------------------------------------|------------|-------|
| V <sub>DS</sub>  | Drain-Source Voltage                               | 100        | V     |
| V <sub>GS</sub>  | Gate-Source Voltage                                | ±20        | V     |
| I <sub>D</sub>   | Drain Current – Continuous (T <sub>C</sub> =25°C)  | 25         | A     |
|                  | Drain Current – Continuous (T <sub>C</sub> =100°C) | 15         | A     |
| I <sub>DM</sub>  | Drain Current – Pulsed <sup>1</sup>                | 100        | A     |
| P <sub>D</sub>   | Power Dissipation (T <sub>C</sub> =25°C)           | 73.5       | W     |
|                  | Power Dissipation – Derate above 25°C              | 0.58       | W/°C  |
| T <sub>STG</sub> | Storage Temperature Range                          | -50 to 150 | °C    |
| T <sub>J</sub>   | Operating Junction Temperature Range               | -50 to 150 | °C    |

## Thermal Characteristics

| Symbol           | Parameter                              | Typ. | Max. | Unit |
|------------------|----------------------------------------|------|------|------|
| R <sub>θJA</sub> | Thermal Resistance Junction to ambient | ---  | 62   | °C/W |
| R <sub>θJC</sub> | Thermal Resistance Junction to Case    | ---  | 1.7  | °C/W |

**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**
**Off Characteristics**

| Symbol                       | Parameter                          | Conditions                                           | Min. | Typ. | Max.      | Unit               |
|------------------------------|------------------------------------|------------------------------------------------------|------|------|-----------|--------------------|
| $BV_{DSS}$                   | Drain-Source Breakdown Voltage     | $V_{GS}=0V$ , $I_D=250\mu A$                         | 100  | ---  | ---       | V                  |
| $\Delta BV_{DSS}/\Delta T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to $25^\circ\text{C}$ , $I_D=1mA$          | ---  | 0.05 | ---       | $V/^\circ\text{C}$ |
| $I_{DSS}$                    | Drain-Source Leakage Current       | $V_{DS}=100V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$ | ---  | ---  | 1         | $\mu A$            |
|                              |                                    | $V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=125^\circ\text{C}$ | ---  | ---  | 10        | $\mu A$            |
| $I_{GSS}$                    | Gate-Source Leakage Current        | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                       | ---  | ---  | $\pm 100$ | nA                 |

**On Characteristics**

|                     |                                      |                                  |     |     |     |                     |
|---------------------|--------------------------------------|----------------------------------|-----|-----|-----|---------------------|
| $R_{DS(ON)}$        | Static Drain-Source On-Resistance    | $V_{GS}=10V$ , $I_D=10A$         | --- | 45  | 55  | $m\Omega$           |
|                     |                                      | $V_{GS}=4.5V$ , $I_D=5A$         | --- | 50  | 60  | $m\Omega$           |
| $V_{GS(th)}$        | Gate Threshold Voltage               | $V_{GS}=V_{DS}$ , $I_D=250\mu A$ | 1.2 | 1.6 | 2.5 | V                   |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient |                                  | --- | -5  | --- | $mV/^\circ\text{C}$ |
| $g_{fs}$            | Forward Transconductance             | $V_{DS}=10V$ , $I_D=3A$          | --- | 8.7 | --- | S                   |

**Dynamic and switching Characteristics**

|              |                                     |                                                           |     |      |      |          |
|--------------|-------------------------------------|-----------------------------------------------------------|-----|------|------|----------|
| $Q_g$        | Total Gate Charge <sup>2, 3</sup>   | $V_{DS}=50V$ , $V_{GS}=10V$ , $I_D=5A$                    | --- | 46   | 80   | nC       |
| $Q_{gs}$     | Gate-Source Charge <sup>2, 3</sup>  |                                                           | --- | 4.5  | 9    |          |
| $Q_{gd}$     | Gate-Drain Charge <sup>2, 3</sup>   |                                                           | --- | 12   | 20   |          |
| $T_{d(on)}$  | Turn-On Delay Time <sup>2, 3</sup>  | $V_{DD}=30V$ , $V_{GS}=10V$ , $R_G=3.3\Omega$<br>$I_D=1A$ | --- | 6.8  | 12   | ns       |
| $T_r$        | Rise Time <sup>2, 3</sup>           |                                                           | --- | 21   | 40   |          |
| $T_{d(off)}$ | Turn-Off Delay Time <sup>2, 3</sup> |                                                           | --- | 32   | 60   |          |
| $T_f$        | Fall Time <sup>2, 3</sup>           |                                                           | --- | 8.2  | 16   |          |
| $C_{iss}$    | Input Capacitance                   | $V_{DS}=25V$ , $V_{GS}=0V$ , $F=1MHz$                     | --- | 2860 | 4200 | pF       |
| $C_{oss}$    | Output Capacitance                  |                                                           | --- | 120  | 180  |          |
| $C_{rss}$    | Reverse Transfer Capacitance        |                                                           | --- | 70   | 105  |          |
| $R_g$        | Gate resistance                     | $V_{GS}=0V$ , $V_{DS}=0V$ , $F=1MHz$                      | --- | 1.2  | 2.4  | $\Omega$ |

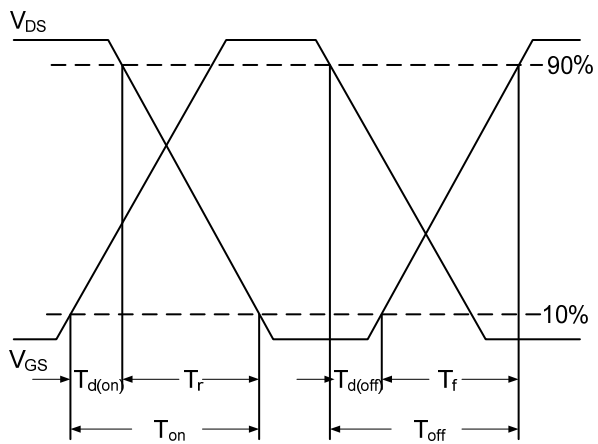
**Drain-Source Diode Characteristics and Maximum Ratings**

| Symbol   | Parameter                            | Conditions                                             | Min. | Typ. | Max. | Unit |
|----------|--------------------------------------|--------------------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current            | $V_G=V_D=0V$ , Force Current                           | ---  | ---  | 25   | A    |
| $I_{SM}$ | Pulsed Source Current                |                                                        | ---  | ---  | 50   | A    |
| $V_{SD}$ | Diode Forward Voltage                | $V_{GS}=0V$ , $I_S=1A$ , $T_J=25^\circ\text{C}$        | ---  | ---  | 1    | V    |
| $t_{rr}$ | Reverse Recovery Time <sup>2</sup>   | $I_S=1A$ , $dI/dt=100A/\mu s$ , $T_J=25^\circ\text{C}$ | ---  | ---  | ---  | ns   |
| $Q_{rr}$ | Reverse Recovery Charge <sup>2</sup> |                                                        | ---  | ---  | ---  | nC   |

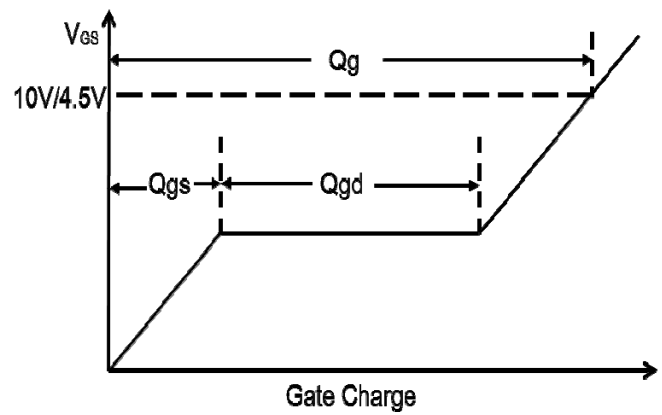
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.



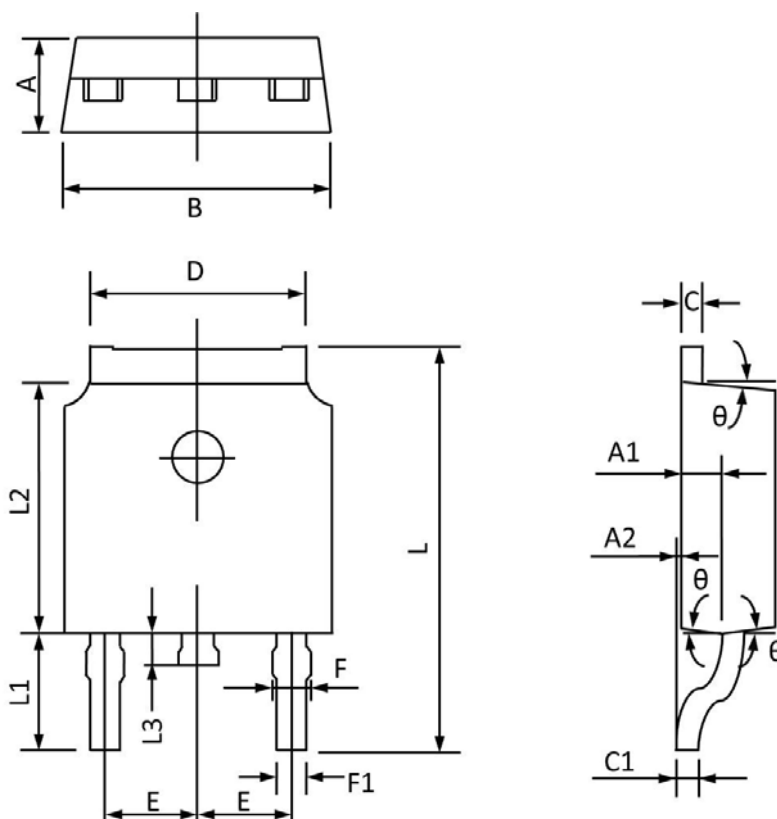


**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

## TO252 PACKAGE INFORMATION



| Symbol    | Dimensions In Millimeters |              | Dimensions In Inches |              |
|-----------|---------------------------|--------------|----------------------|--------------|
|           | Min                       | Max          | Min                  | Max          |
| <b>A</b>  | <b>2.20</b>               | <b>2.40</b>  | <b>0.087</b>         | <b>0.094</b> |
| <b>A1</b> | <b>0.91</b>               | <b>1.11</b>  | <b>0.036</b>         | <b>0.044</b> |
| <b>A2</b> | <b>0.00</b>               | <b>0.15</b>  | <b>0.000</b>         | <b>0.006</b> |
| <b>B</b>  | <b>6.50</b>               | <b>6.70</b>  | <b>0.256</b>         | <b>0.264</b> |
| <b>C</b>  | <b>0.46</b>               | <b>0.580</b> | <b>0.018</b>         | <b>0.230</b> |
| <b>C1</b> | <b>0.46</b>               | <b>0.580</b> | <b>0.018</b>         | <b>0.030</b> |
| <b>D</b>  | <b>5.10</b>               | <b>5.46</b>  | <b>0.201</b>         | <b>0.215</b> |
| <b>E</b>  | <b>2.186</b>              | <b>2.386</b> | <b>0.086</b>         | <b>0.094</b> |
| <b>F</b>  | <b>0.74</b>               | <b>0.94</b>  | <b>0.029</b>         | <b>0.037</b> |
| <b>F1</b> | <b>0.660</b>              | <b>0.860</b> | <b>0.026</b>         | <b>0.034</b> |
| <b>L</b>  | <b>9.80</b>               | <b>10.40</b> | <b>0.386</b>         | <b>0.409</b> |
| <b>L1</b> | <b>2.9REF</b>             |              | <b>0.114REF</b>      |              |
| <b>L2</b> | <b>6.00</b>               | <b>6.20</b>  | <b>0.236</b>         | <b>0.244</b> |
| <b>L3</b> | <b>0.60</b>               | <b>1.00</b>  | <b>0.024</b>         | <b>0.039</b> |
| <b>θ</b>  | <b>3°</b>                 | <b>9°</b>    | <b>3°</b>            | <b>9°</b>    |

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