



## PRODUCT DATA SHEET



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**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

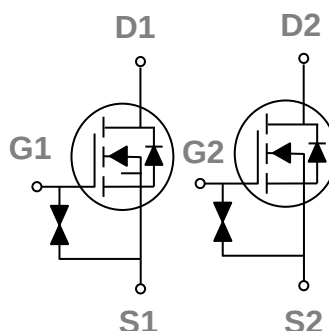
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

| BVDSS | RDSON | ID   |
|-------|-------|------|
| 60V   | 1.1Ω  | 0.3A |

## Features

- 60V, 0.3A,  $R_{DS(ON)} = 1.1\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded

## SOT363



## Applications

- Motor Drive
- Power Tools
- LED Lighting

## Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter                                                | Rating     | Units               |
|-----------|----------------------------------------------------------|------------|---------------------|
| $V_{DS}$  | Drain-Source Voltage                                     | 60         | V                   |
| $V_{GS}$  | Gate-Source Voltage                                      | $\pm 20$   | V                   |
| $I_D$     | Drain Current – Continuous ( $T_c = 25^\circ\text{C}$ )  | 0.3        | A                   |
|           | Drain Current – Continuous ( $T_c = 100^\circ\text{C}$ ) | 0.2        | A                   |
| $I_{DM}$  | Drain Current – Pulsed <sup>1</sup>                      | 1.2        | A                   |
| $P_D$     | Power Dissipation ( $T_c = 25^\circ\text{C}$ )           | 0.35       | W                   |
|           | Power Dissipation – Derate above $25^\circ\text{C}$      | 0.003      | W/ $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature Range                                | -50 to 150 | $^\circ\text{C}$    |
| $T_J$     | Operating Junction Temperature Range                     | -50 to 125 | $^\circ\text{C}$    |

## Thermal Characteristics

| Symbol          | Parameter                              | Typ. | Max. | Unit               |
|-----------------|----------------------------------------|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | ---  | 357  | $^\circ\text{C/W}$ |

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

| Symbol                              | Parameter                                 | Conditions                                                         | Min. | Typ. | Max. | Unit |
|-------------------------------------|-------------------------------------------|--------------------------------------------------------------------|------|------|------|------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage            | V <sub>GS</sub> =0V , I <sub>D</sub> =250uA                        | 60   | ---  | ---  | V    |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient | Reference to 25°C , I <sub>D</sub> =1mA                            | ---  | 0.04 | ---  | V/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current              | V <sub>DS</sub> =60V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C  | ---  | ---  | 1    | uA   |
|                                     |                                           | V <sub>DS</sub> =40V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C | ---  | ---  | 100  | uA   |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current               | V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V                        | ---  | ---  | ±10  | uA   |

**On Characteristics**

|                      |                                             |                                                          |     |      |     |       |
|----------------------|---------------------------------------------|----------------------------------------------------------|-----|------|-----|-------|
| R <sub>DS(ON)</sub>  | Static Drain-Source On-Resistance           | V <sub>GS</sub> =10V , I <sub>D</sub> =0.5A              | --- | 1.1  | 1.5 | Ω     |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage                      | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA | 0.8 | 1.0  | 1.5 | V     |
| ΔV <sub>GS(th)</sub> | V <sub>GS(th)</sub> Temperature Coefficient |                                                          | --- | -4   | --- | mV/°C |
| g <sub>fs</sub>      | Forward Transconductance                    | V <sub>DS</sub> =10V , I <sub>D</sub> =0.1A              | --- | 0.24 | --- | S     |

**Dynamic and switching Characteristics**

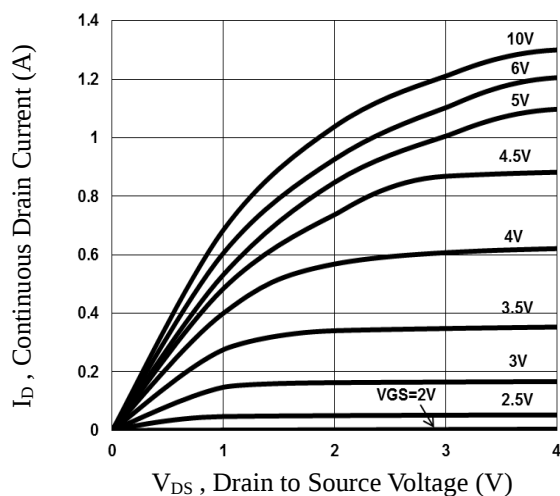
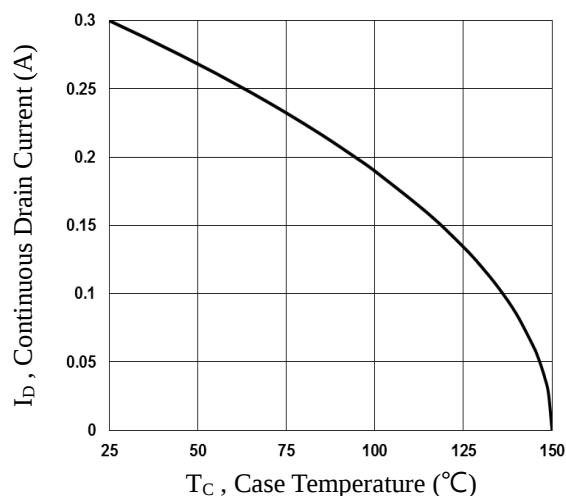
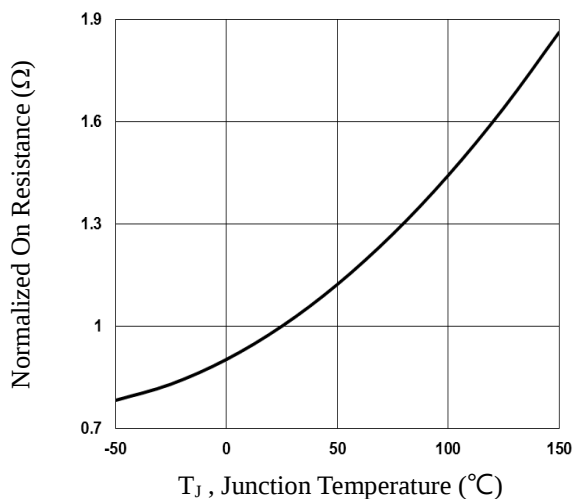
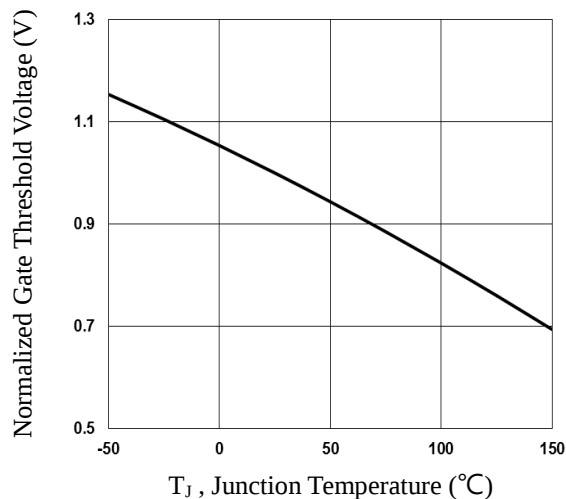
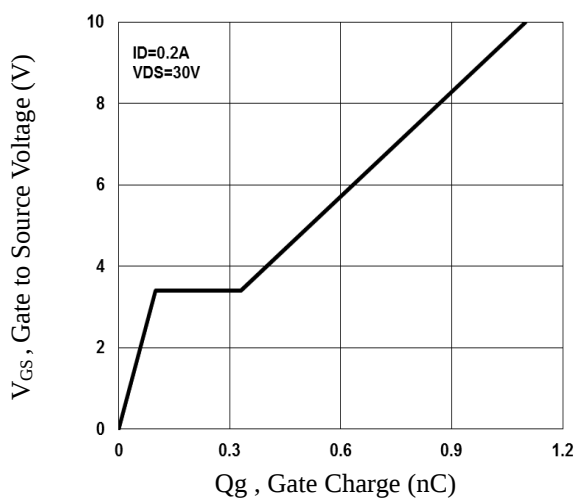
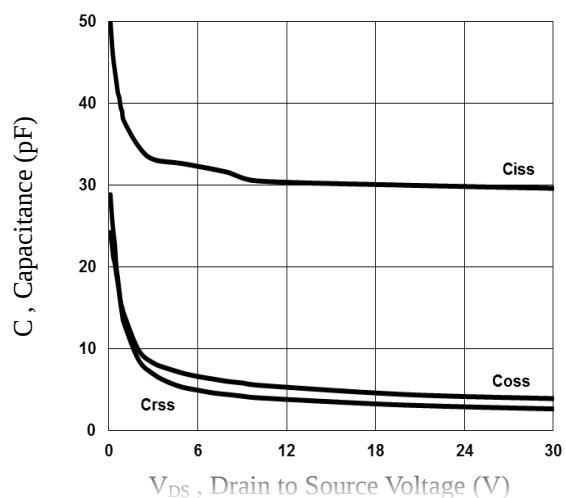
|                     |                                     |                                                                                          |     |      |     |    |
|---------------------|-------------------------------------|------------------------------------------------------------------------------------------|-----|------|-----|----|
| Q <sub>g</sub>      | Total Gate Charge <sup>2, 3</sup>   | V <sub>DS</sub> =30V , V <sub>GS</sub> =10V , I <sub>D</sub> =0.2A                       | --- | 1.1  | --- | nC |
| Q <sub>gs</sub>     | Gate-Source Charge <sup>2, 3</sup>  |                                                                                          | --- | 0.1  | --- |    |
| Q <sub>gd</sub>     | Gate-Drain Charge <sup>2, 3</sup>   |                                                                                          | --- | 0.23 | --- |    |
| T <sub>d(on)</sub>  | Turn-On Delay Time <sup>2, 3</sup>  | V <sub>DD</sub> =30V , V <sub>GS</sub> =10V , R <sub>G</sub> =6Ω<br>I <sub>D</sub> =0.2A | --- | 3    | --- | ns |
| T <sub>r</sub>      | Rise Time <sup>2, 3</sup>           |                                                                                          | --- | 5    | --- |    |
| T <sub>d(off)</sub> | Turn-Off Delay Time <sup>2, 3</sup> |                                                                                          | --- | 14   | --- |    |
| T <sub>f</sub>      | Fall Time <sup>2, 3</sup>           |                                                                                          | --- | 9    | --- |    |
| C <sub>iss</sub>    | Input Capacitance                   | V <sub>DS</sub> =10V , V <sub>GS</sub> =0V , F=1MHz                                      | --- | 30.6 | --- | pF |
| C <sub>oss</sub>    | Output Capacitance                  |                                                                                          | --- | 5.5  | --- |    |
| C <sub>rss</sub>    | Reverse Transfer Capacitance        |                                                                                          | --- | 4    | --- |    |

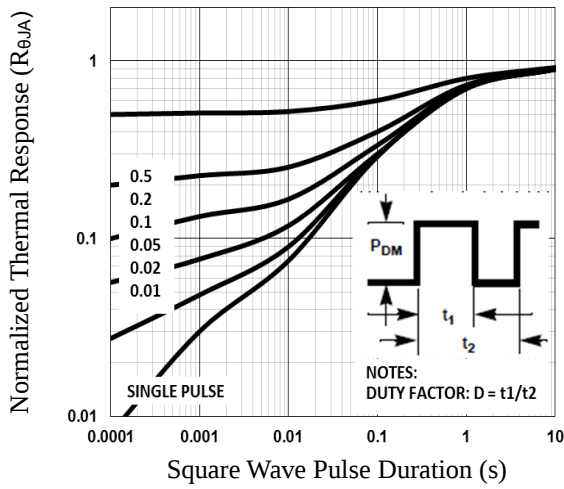
**Drain-Source Diode Characteristics and Maximum Ratings**

| Symbol          | Parameter                 | Conditions                                                      | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|-----------------------------------------------------------------|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current              | ---  | ---  | 0.3  | A    |
| I <sub>SM</sub> | Pulsed Source Current     |                                                                 | ---  | ---  | 0.6  | A    |
| V <sub>SD</sub> | Diode Forward Voltage     | V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C | ---  | ---  | 1.3  | V    |

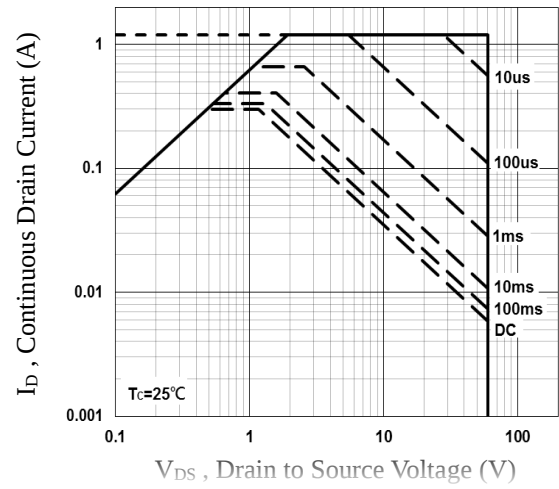
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=1mH, I<sub>AS</sub>=7A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.


**Fig.1 Output Characteristics**

**Fig.2 Continuous Drain Current vs.  $T_C$** 

**Fig.3 Normalized  $R_{DS(on)}$  vs.  $T_J$** 

**Fig.4 Normalized  $V_{th}$  vs.  $T_J$** 

**Fig.5 Gate Charge Waveform**

**Fig.6 Capacitance Characteristics**

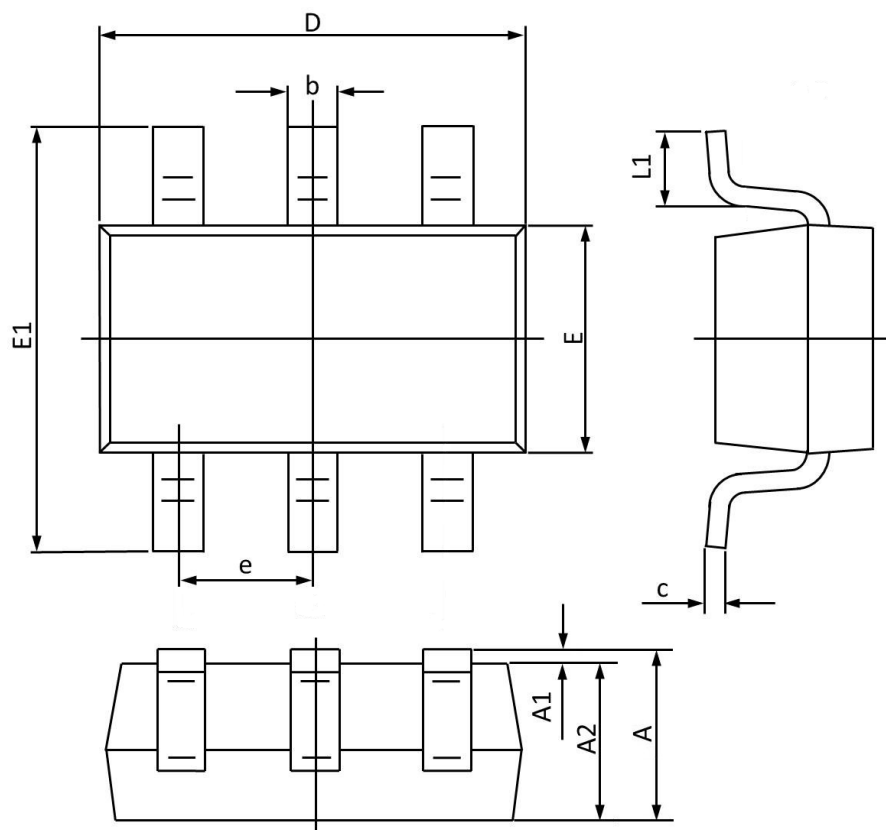


**Fig.7 Normalized Transient Impedance**



**Fig.8 Maximum Safe Operation Area**

## SOT363 PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | MAX                       | MIN   | MAX                  | MIN   |
| A      | 1.100                     | 0.800 | 0.043                | 0.031 |
| A1     | 0.100                     | 0.000 | 0.004                | 0.000 |
| A2     | 1.000                     | 0.800 | 0.039                | 0.031 |
| b      | 0.330                     | 0.100 | 0.013                | 0.004 |
| c      | 0.250                     | 0.100 | 0.010                | 0.004 |
| D      | 2.200                     | 1.800 | 0.087                | 0.071 |
| E      | 1.350                     | 1.150 | 0.053                | 0.045 |
| E1     | 2.400                     | 1.800 | 0.094                | 0.071 |
| e      | 0.65BSC                   |       | 0.026BSC             |       |
| L1     | 0.350                     | 0.100 | 0.014                | 0.004 |

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