

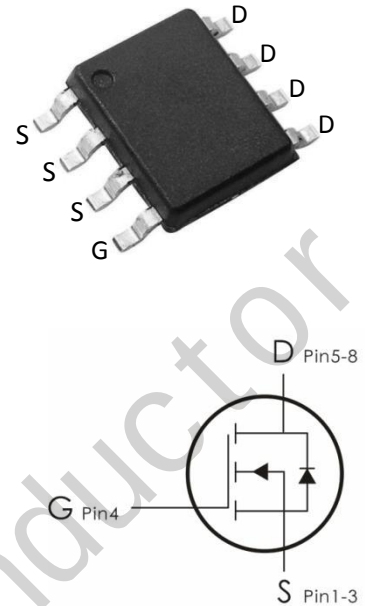
## Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=30V, I_D=11A, R_{DS(on)} < 10m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(on)}$
- 5) Excellent package for good heat dissipation.



## Absolute Maximum Ratings: ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Symbol         | Parameter                                                           | Ratings     | Units            |
|----------------|---------------------------------------------------------------------|-------------|------------------|
| $V_{DS}$       | Drain-Source Voltage                                                | 30          | V                |
| $V_{GS}$       | Gate-Source Voltage                                                 | $\pm 20$    | V                |
| $I_D$          | Drain Current – Continuous ( $T_A=25^\circ\text{C}$ ) <sup>1</sup>  | 11          | A                |
|                | Drain Current – Continuous ( $T_A=100^\circ\text{C}$ ) <sup>1</sup> | 7           |                  |
| $I_{DM}$       | Drain Current – Pulsed <sup>2</sup>                                 | 36          |                  |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>3</sup>                          | 24.2        | mj               |
| $I_{AS}$       | Avalanche Current                                                   | 22          | A                |
| $P_D$          | Power Dissipation ( $T_A=25^\circ\text{C}$ ) <sup>4</sup>           | 1.5         | W                |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range                    | -55 to +150 | $^\circ\text{C}$ |

## Thermal Characteristics:

| Symbol          | Parameter                                            | Max | Units                     |
|-----------------|------------------------------------------------------|-----|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case <sup>1</sup>    | 25  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient <sup>1</sup> | 85  |                           |

**Electrical Characteristics:** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

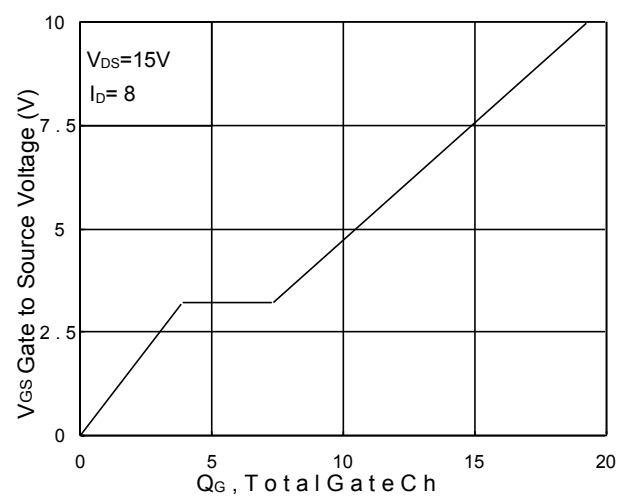
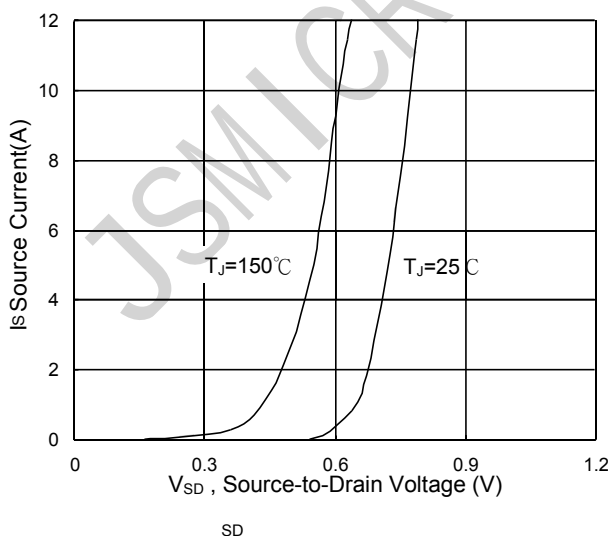
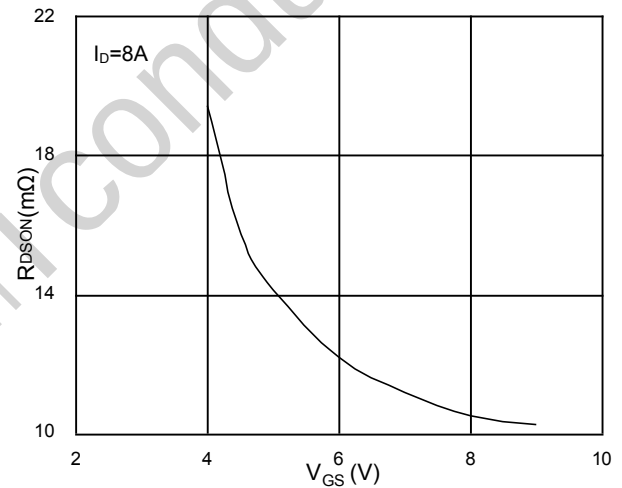
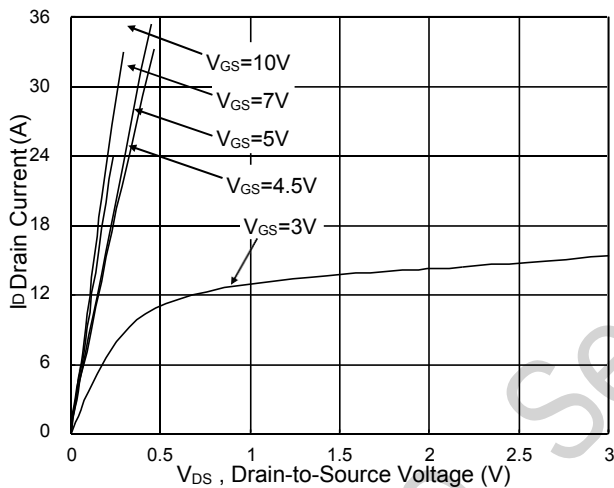
| Symbol                             | Parameter                                       | Conditions                                                                                      | Min | Typ  | Max   | Units |
|------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------|-----|------|-------|-------|
| Off Characteristics                |                                                 |                                                                                                 |     |      |       |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage                  | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μ A                                                    | 30  | ---  | ---   | V     |
| I <sub>DSS</sub>                   | Drain-Source Leakage Current                    | V <sub>DS</sub> =150V , V <sub>GS</sub> =0V                                                     | --- | ---  | 1     | uA    |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current                     | V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0V                                                     | --- | ---  | ± 100 | nA    |
| On Characteristics <sup>3</sup>    |                                                 |                                                                                                 |     |      |       |       |
| V <sub>GS(th)</sub>                | GATE-Source Threshold Voltage                   | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250 μ A                                      | 1.2 | 1.5  | 2.5   | V     |
| R <sub>DS(ON)</sub>                | Static Drain-Source On Resistance <sup>2</sup>  | V <sub>GS</sub> =10V, I <sub>D</sub> =8A                                                        | --- | 9    | 10    | m Ω   |
|                                    |                                                 | V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A                                                       | --- | 12   | 18    |       |
| G <sub>FS</sub>                    | Forward Transconductance                        | V <sub>DS</sub> =5V, I <sub>D</sub> =8A                                                         | --- | 24   | ---   | S     |
| Dynamic Characteristics            |                                                 |                                                                                                 |     |      |       |       |
| C <sub>iss</sub>                   | Input Capacitance                               | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                               | --- | 940  | 1316  | pF    |
| C <sub>oss</sub>                   | Output Capacitance                              |                                                                                                 | --- | 131  | 183   |       |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance                    |                                                                                                 | --- | 109  | 153   |       |
| Switching Characteristics          |                                                 |                                                                                                 |     |      |       |       |
| t <sub>d(on)</sub>                 | Turn-On Delay Time                              | V <sub>DS</sub> =15V, ,<br>R <sub>GEN</sub> =1.5 Ω , V <sub>GS</sub> =10V<br>I <sub>D</sub> =8A | --- | 4.2  | 8.4   | ns    |
| t <sub>r</sub>                     | Rise Time                                       |                                                                                                 | --- | 8.2  | 15    | ns    |
| t <sub>d(off)</sub>                | Turn-Off Delay Time                             |                                                                                                 | --- | 31   | 62    | ns    |
| t <sub>f</sub>                     | Fall Time                                       |                                                                                                 | --- | 4    | 8     | ns    |
| Q <sub>g</sub>                     | Total Gate Charge                               | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V,<br>I <sub>D</sub> =8A                              | --- | 9.63 | 13.5  | nC    |
| Q <sub>gs</sub>                    | Gate-Source Charge                              |                                                                                                 | --- | 3.88 | 5.4   | nC    |
| Q <sub>gd</sub>                    | Gate-Drain “Miller” Charge                      |                                                                                                 | --- | 3.44 | 4.8   | nC    |
| Drain-Source Diode Characteristics |                                                 |                                                                                                 |     |      |       |       |
| V <sub>SD</sub>                    | Source-Drain Diode Forward Voltage <sup>2</sup> | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25 °C                                  | --- | ---  | 1     | V     |

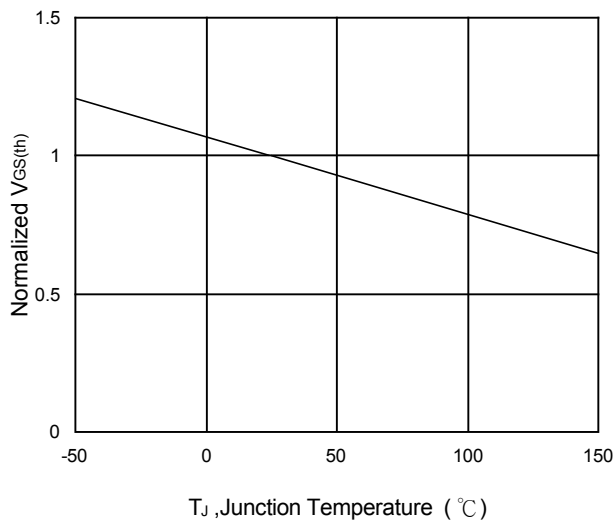
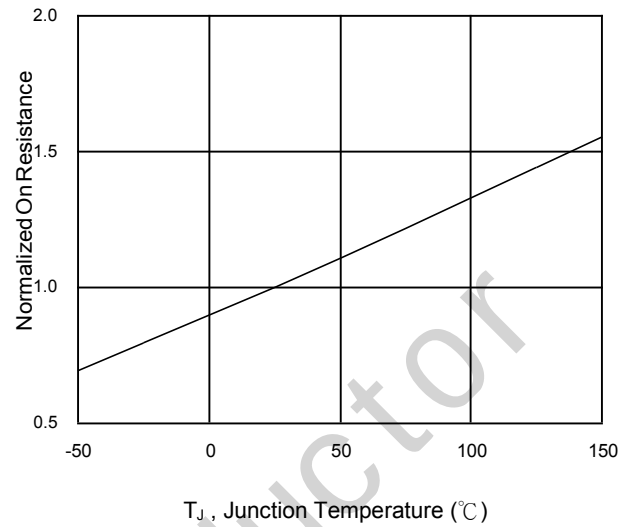
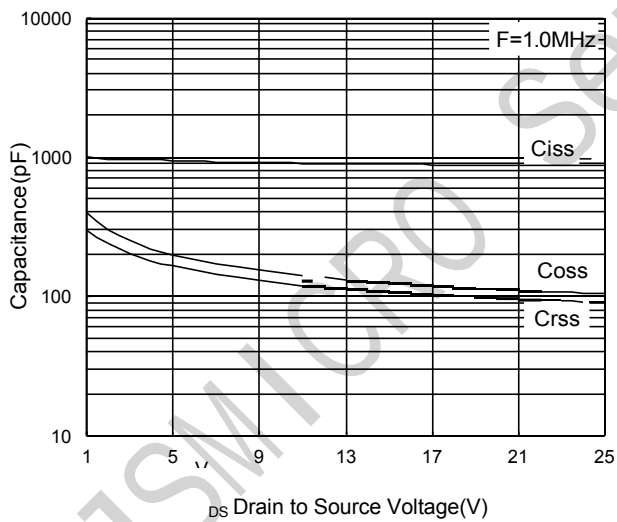
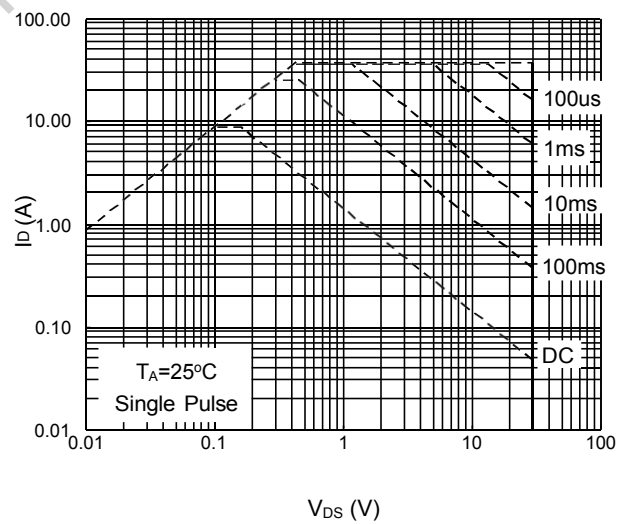
|                       |                                          |                                                     |     |     |     |    |
|-----------------------|------------------------------------------|-----------------------------------------------------|-----|-----|-----|----|
| <b>I<sub>S</sub></b>  | Continuous Source Current <sup>1,5</sup> | $V_G=V_D=0V$ , Force Current                        | --- | --- | 9   | A  |
| <b>I<sub>SM</sub></b> | Pulsed Source Current <sup>2,5</sup>     |                                                     | --- | --- | 36  |    |
| <b>T<sub>rr</sub></b> | Body Diode Reverse Recovery Time         | $I_F=8A$ ,<br>$di/dt=100A/\mu s$ , $T_J=25^\circ C$ | --- | 8   | --- | Ns |
| <b>Q<sub>rr</sub></b> | Body Diode Reverse Recovery Charge       |                                                     | --- | 2.9 | --- | Nc |

### Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=22A$
4. The power dissipation is limited by  $150^\circ C$  junction temperature
5. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

### Typical Characteristics:




**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$** 

**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$** 

**Fig.7 Capacitance**

**Fig.8 Safe Operating Area**

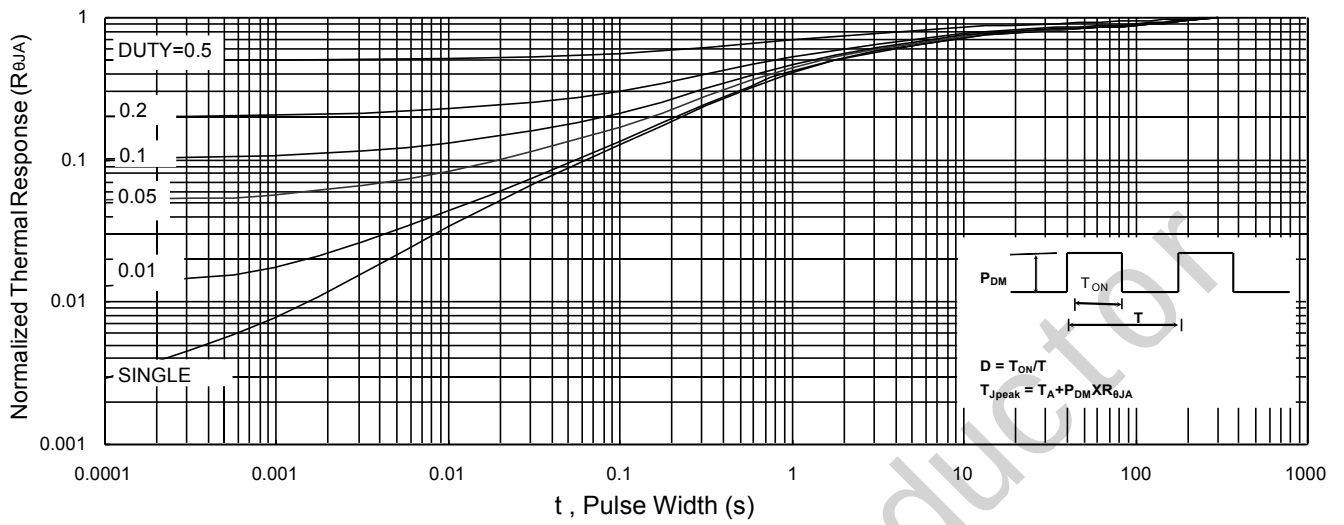
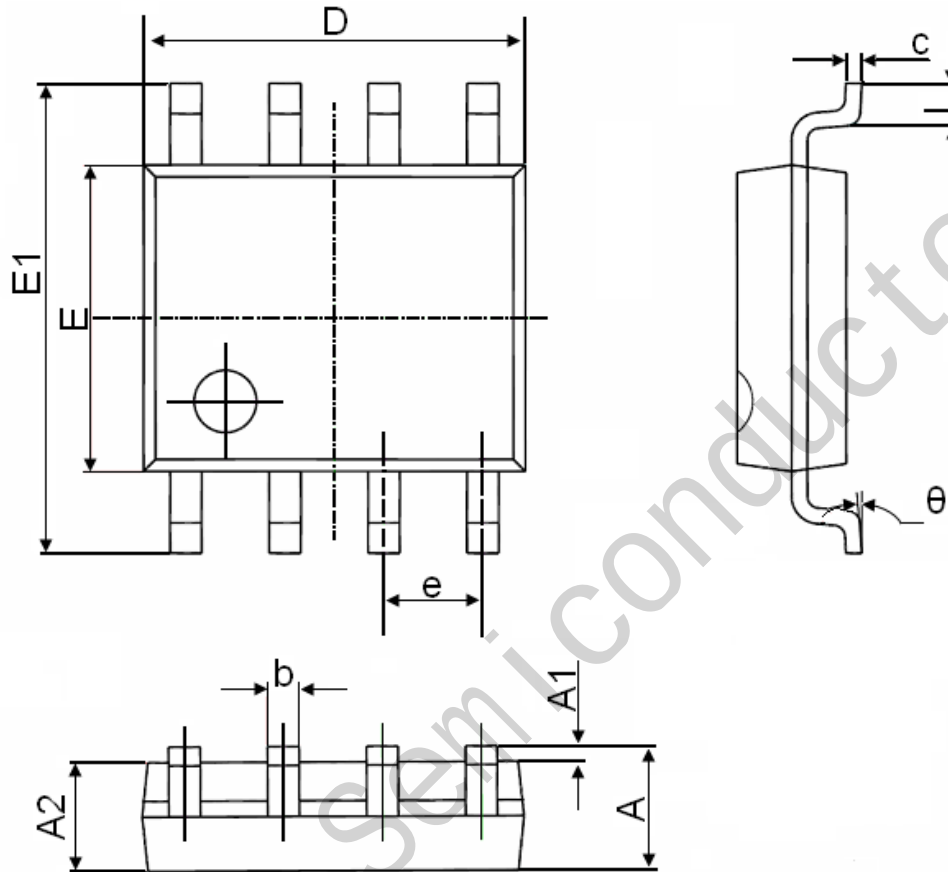


Fig.9 Normalized Maximum Transient Thermal Impedance

### SOP-8 Package Information



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1       | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2       | 1.350                     | 1.550 | 0.053                | 0.061 |
| b        | 0.330                     | 0.510 | 0.013                | 0.020 |
| c        | 0.170                     | 0.250 | 0.006                | 0.010 |
| D        | 4.700                     | 5.100 | 0.185                | 0.200 |
| E        | 3.800                     | 4.000 | 0.150                | 0.157 |
| E1       | 5.800                     | 6.200 | 0.228                | 0.244 |
| e        | 1.270(BSC)                |       | 0.050(BSC)           |       |
| L        | 0.400                     | 1.270 | 0.016                | 0.050 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |