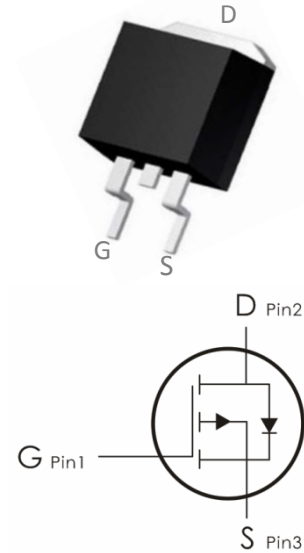


### Description:

This P-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)  $V_{DS}=-40V, I_D=-110A, R_{DS(ON)}<5.3m\Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



### Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol         | Parameter  | Ratings     | Units |
|----------------|--|-------------|-------|
| $V_{DS}$       | Drain-Source Voltage                             | -40         | V     |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V     |
| $I_D$          | Continuous Drain Current-TC=25°C                 | -110        | A     |
|                | Continuous Drain Current-TC=100°C                | -67         |       |
|                | Pulsed Drain Current <sup>1</sup>                | -360        |       |
| $E_{AS}$       | Single Pulse Avalanche Energy                    | 174         | mJ    |
| $P_D$          | Power Dissipation(TC=25°C)                       | 101         | W     |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | °C    |

### Thermal Characteristics:

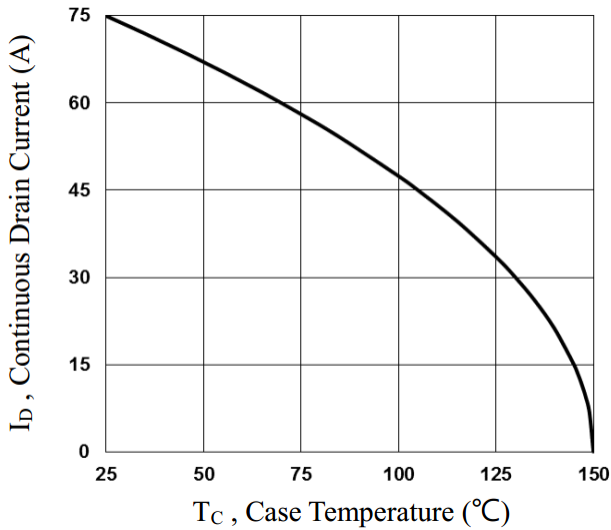
| Symbol          | Parameter                              | Max  | Units |
|-----------------|--|------|-------|
| $R_{\theta JC}$ | Thermal Resistance,Junction to Case    | 1.23 | °C/W  |
| $R_{\theta JA}$ | Thermal Resistance,Junction to Ambient | 62   |       |

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

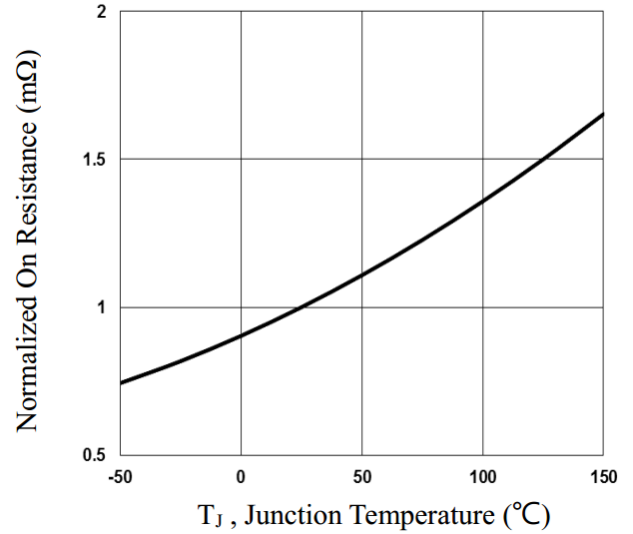
| Symbol                                    | Parameter                                 | Conditions  | Min  | Typ  | Max       | Units         |
|---|---|---|------|------|-----------|---------------|
| <b>Off Characteristics</b>                |   |   |      |      |           |               |
| $BV_{DSS}$                                | Drain-Source Breakdown Voltage            | $V_{GS}=0V, I_D=-250\ \mu\text{A}$                  | -40  | ---  | ---       | V             |
| $I_{DSS}$                                 | Zero Gate Voltage Drain Current           | $V_{DS}=-40V, V_{GS}=0V, T_J=25^{\circ}\text{C}$    | ---  | ---  | -1        | $\mu\text{A}$ |
| $I_{GSS}$                                 | Gate-Source Leakage Current               | $V_{GS}=\pm 20V, V_{DS}=0A$                         | ---  | ---  | $\pm 100$ | nA            |
| <b>On Characteristics</b>                 |   |   |      |      |           |               |
| $V_{GS(th)}$                              | GATE-Source Threshold Voltage             | $V_{GS}=V_{DS}, I_D=-250\ \mu\text{A}$              | -1.2 | -1.6 | -2.5      | V             |
| $R_{DS(on)}$                              | Drain-Source On Resistance                | $V_{GS}=-10V, I_D=-25A$                             | ---  | 3.8  | 5.3       | m $\Omega$    |
|   |   | $V_{GS}=-4.5V, I_D=-15A$                            | ---  | 6.4  | 8.3       |               |
| <b>Dynamic Characteristics</b>            |   |   |      |      |           |               |
| $C_{iss}$                                 | Input Capacitance                         | $V_{DS}=-20V, V_{GS}=0V, f=1\text{MHz}$             | ---  | 6100 | 9100      | pF            |
| $C_{oss}$                                 | Output Capacitance                        |   | ---  | 600  | 900       |               |
| $C_{rss}$                                 | Reverse Transfer Capacitance              |   | ---  | 540  | 810       |               |
| <b>Switching Characteristics</b>          |   |   |      |      |           |               |
| $t_{d(on)}$                               | Turn-On Delay Time <sup>2,3</sup>         | $V_{DD}=-20V, V_{GS}=-10V, R_G=6\ \Omega, I_D=-45A$ | ---  | 41.6 | 82        | ns            |
| $t_r$                                     | Rise Time <sup>2,3</sup>                  |   | ---  | 12.7 | 26        | ns            |
| $t_{d(off)}$                              | Turn-Off Delay Time <sup>2,3</sup>        |   | ---  | 308  | 600       | ns            |
| $t_f$                                     | Fall Time <sup>3,3</sup>                  |   | ---  | 70   | 140       | ns            |
| $Q_g$                                     | Total Gate Charge <sup>2,3</sup>          | $V_{GS}=-10\text{V}, V_{DS}=-20V, I_D=-45A$         | ---  | 115  | 160       | nC            |
| $Q_{gs}$                                  | Gate-Source Charge <sup>2,3</sup>         |   | ---  | 16   | 25        | nC            |
| $Q_{gd}$                                  | Gate-Drain "Miller" Charge <sup>2,3</sup> |   | ---  | 25   | 40        | nC            |
| <b>Drain-Source Diode Characteristics</b> |   |   |      |      |           |               |
| $V_{SD}$                                  | Source-Drain Diode Forward Voltage        | $V_{GS}=0V, I_S=-1A, T_J=25^{\circ}\text{C}$        | ---  | ---  | -1        | V             |

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

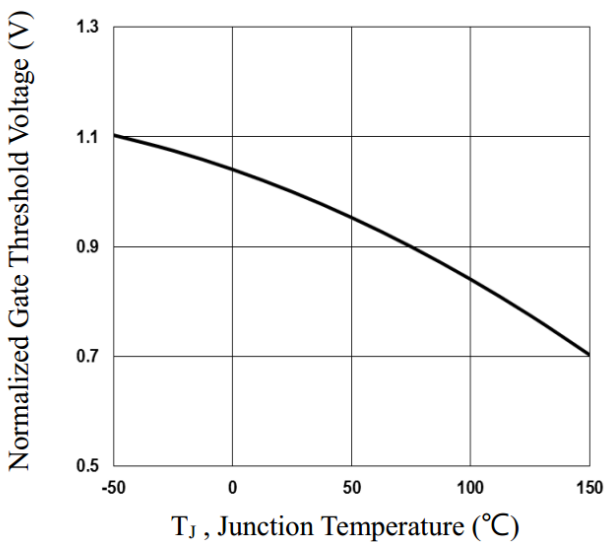
**Typical Characteristics:** ( $T_c=25^\circ C$  unless otherwise noted)



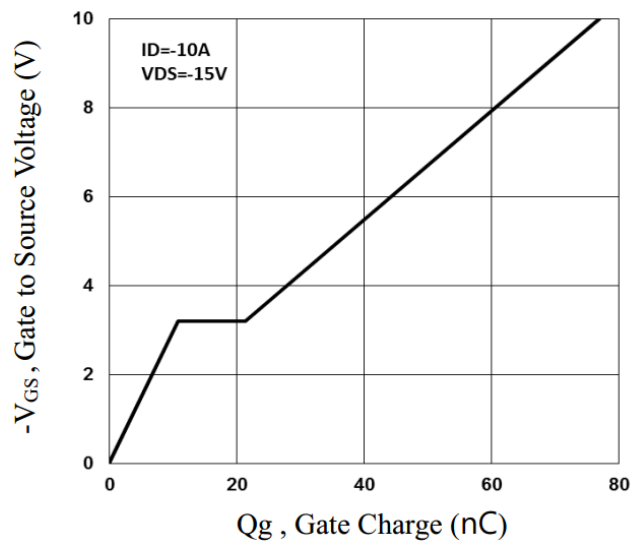
**Fig.1 Continuous Drain Current vs.  $T_c$**



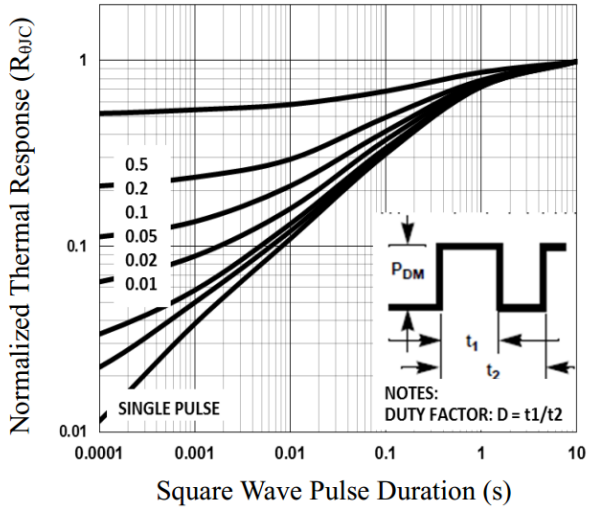
**Fig.2 Normalized RDSON vs.  $T_J$**



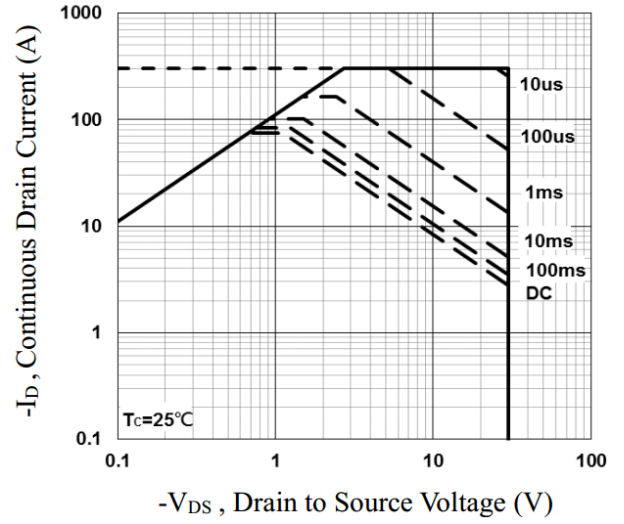
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



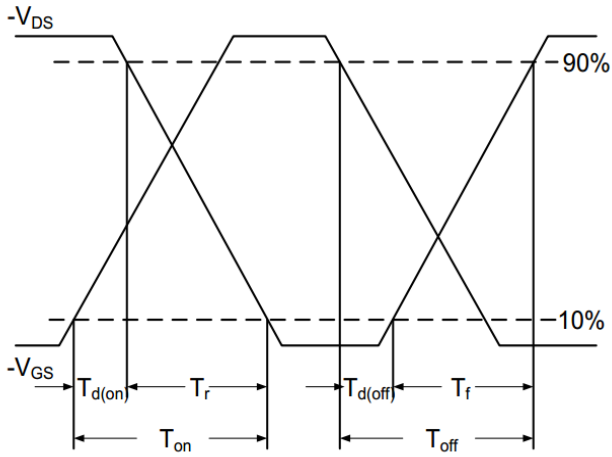
**Fig.4 Gate Charge Waveform**



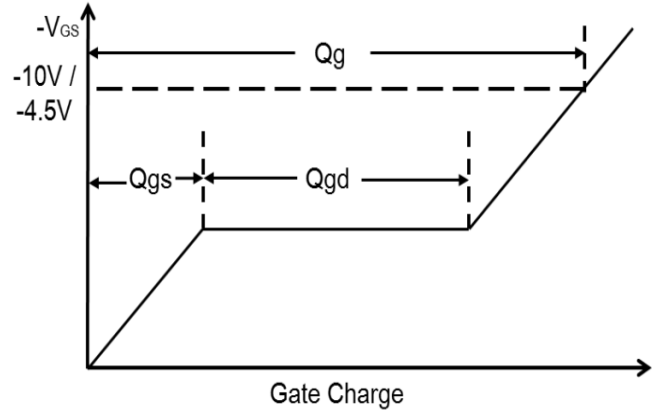
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**



**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

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