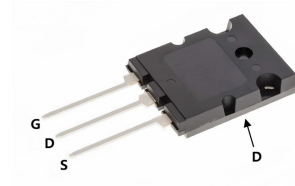


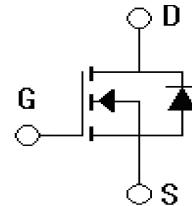
## Features

- Low  $R_{DS(on)}$
- Fast switching
- 100% avalanche tested
- Low package inductance
- Low intrinsic Rectifier
- High current handing diode



## Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC chopper
- AC motor drives
- Uninterruptible power supplies
- Linear current regulators



## Absolute Ratings ( $T_C=25^\circ\text{C}$ )

| Parameter                                              | Symbol                           |                      | Value    | Unit |
|--------------------------------------------------------|----------------------------------|----------------------|----------|------|
| Drain-Source Voltage                                   | V <sub>DSS</sub>                 |                      | 150      | V    |
| Transient Gate-Source Voltage                          | V <sub>GSM</sub>                 |                      | ±30      | V    |
| Continuous Gate-Source Voltage                         | V <sub>GSS</sub>                 |                      | ±20      | V    |
| Drain Current -continuous                              | I <sub>D</sub>                   | T <sub>C</sub> =25℃  | 500      | A    |
|                                                        |                                  | T <sub>C</sub> =100℃ | 300      | A    |
| Drain Current - pulse (note 1)                         | I <sub>DM</sub>                  |                      | 2000     | A    |
| Single Pulsed Avalanche Energy<br>(note 2)             | E <sub>AS</sub>                  |                      | 5400     | mJ   |
| Avalanche Current(note 1)                              | I <sub>AR</sub>                  |                      | 100      | A    |
| Peak Diode Recovery dv/dt(note 3)                      | dv/dt                            |                      | 20       | V/ns |
| Power Dissipation                                      | P <sub>D</sub>                   | T <sub>C</sub> =25℃  | 961      | W    |
|                                                        |                                  | T <sub>C</sub> =100℃ | 384      | W    |
| Operating Temperature and<br>Storage Temperature Range | T <sub>J</sub> ,T <sub>STG</sub> |                      | -55~+150 | ℃    |
| Maximum Lead Temperature for<br>Soldering Purposes     | T <sub>L</sub>                   |                      | 300      | ℃    |

**Electrical Characteristics**( $T_{CASE}=25^{\circ}C$  unless otherwise specified)

| Parameter                          | Symbol              | Tests conditions                                                                      | Min | Type | Max  | Units |
|------------------------------------|---------------------|---------------------------------------------------------------------------------------|-----|------|------|-------|
| Off-Characteristics                |                     |                                                                                       |     |      |      |       |
| Drain-Source Voltage               | BV <sub>DSS</sub>   | I <sub>D</sub> =250uA,V <sub>GS</sub> =0V                                             | 150 | -    | -    | V     |
| Drain cut-off current              | I <sub>DSS</sub>    | V <sub>DS</sub> =V <sub>DSS</sub> ,T <sub>J</sub> =25℃                                | -   | -    | 1    | μA    |
|                                    |                     | V <sub>DS</sub> =V <sub>DSS</sub> ,T <sub>J</sub> =125℃                               | -   | -    | 500  |       |
| Gate-body leakage current          | I <sub>GSS</sub>    | V <sub>DS</sub> =0V,V <sub>GS</sub> =±20V                                             | -   | -    | ±200 | nA    |
| On-Characteristics                 |                     |                                                                                       |     |      |      |       |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250uA                               | 2.5 | 3.7  | 5.0  | V     |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V,I <sub>D</sub> =60A<br>(note 4)                                  | -   | 2.4  | 3.0  | mΩ    |
| Forward Transconductance           | g <sub>fs</sub>     | V <sub>DS</sub> =10V , I <sub>D</sub> =60A<br>(note 4)                                | -   | 252  | -    | S     |
| Dynamic Characteristics            |                     |                                                                                       |     |      |      |       |
| Input capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =25V,<br>V <sub>GS</sub> =0V,<br>f=1.0MHz                             | -   | 21   | -    | nF    |
| Output capacitance                 | C <sub>oss</sub>    |                                                                                       | -   | 3360 | -    | pF    |
| Reverse transfer capacitance       | C <sub>rss</sub>    |                                                                                       | -   | 92   | -    | pF    |
| Gate Input Resistance              | R <sub>Gi</sub>     |                                                                                       | -   | 2.5  | -    | Ω     |
| Switching Characteristics          |                     |                                                                                       |     |      |      |       |
| Turn-On delay time                 | t <sub>d(on)</sub>  | V <sub>DD</sub> =75V,I <sub>D</sub> =250A,<br>R <sub>G</sub> =5Ω,V <sub>GS</sub> =10V | -   | 40   | -    | ns    |
| Turn-On rise time                  | t <sub>r</sub>      |                                                                                       | -   | 28   | -    | ns    |
| Turn-Off delay time                | T <sub>d(off)</sub> |                                                                                       | -   | 170  | -    | ns    |
| Turn-Off Fall time                 | t <sub>f</sub>      |                                                                                       | -   | 20   | -    | ns    |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =75V,I <sub>D</sub> =250A,<br>V <sub>GS</sub> =10V(note5)             | -   | 300  | -    | nC    |
| Gate-Source charge                 | Q <sub>gs</sub>     |                                                                                       | -   | 80   | -    | nC    |
| Gate-Drain charge                  | Q <sub>gd</sub>     |                                                                                       | -   | 82   | -    | nC    |
| Drain-Source Diode Characteristics |                     |                                                                                       |     |      |      |       |
| Drain-Source Voltage               | V <sub>SD</sub>     | V <sub>GS</sub> =0V,I <sub>S</sub> =40A<br>(note 4)                                   | -   | 0.81 | 1.2  | V     |
| Continuous Drain-Source Current    | I <sub>S</sub>      |                                                                                       | -   | -    | 500  | A     |
| Pulsed Drain-Source Current        | I <sub>SM</sub>     |                                                                                       | -   | -    | 2000 | A     |
| Reverse recovery time              | t <sub>rr</sub>     | V <sub>GS</sub> =0V,I <sub>F</sub> =250A<br>dI <sub>F</sub> /dt=200A/us<br>VR=75V     | -   | 90   | -    | ns    |
| Reverse recovery charge            | Q <sub>rr</sub>     |                                                                                       | -   | 0.62 | -    | uC    |
| Reverse recovery current           | I <sub>rr</sub>     |                                                                                       | -   | 18   | -    | A     |

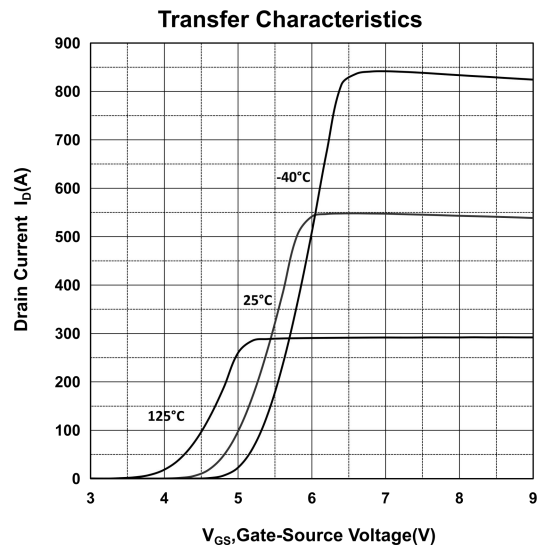
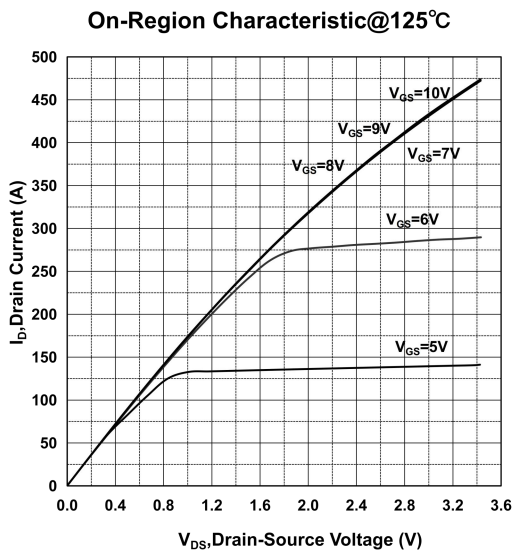
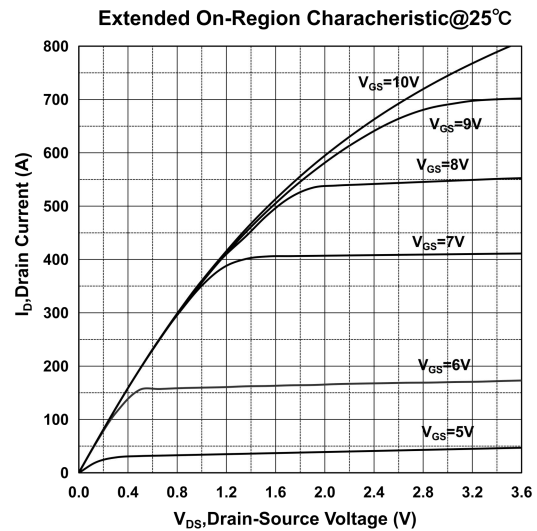
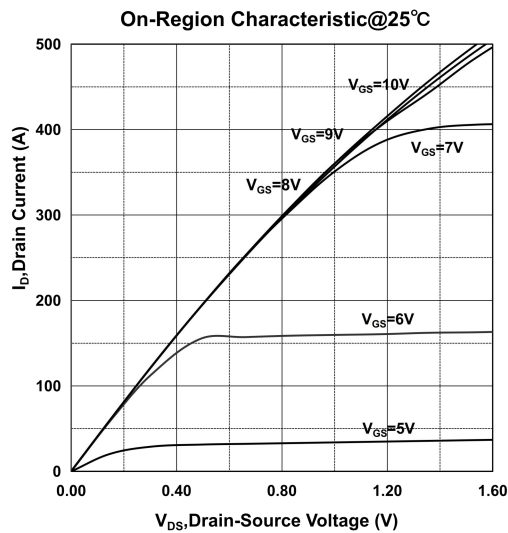
## Thermal Characteristics

| Parameter                                   | Symbol          | Value | Unit                        |
|---------------------------------------------|-----------------|-------|-----------------------------|
| Thermal Resistance, Junction-to-Case,Max    | $R_{\theta JC}$ | 0.13  | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient,Max | $R_{\theta JA}$ | 40    | $^{\circ}\text{C}/\text{W}$ |

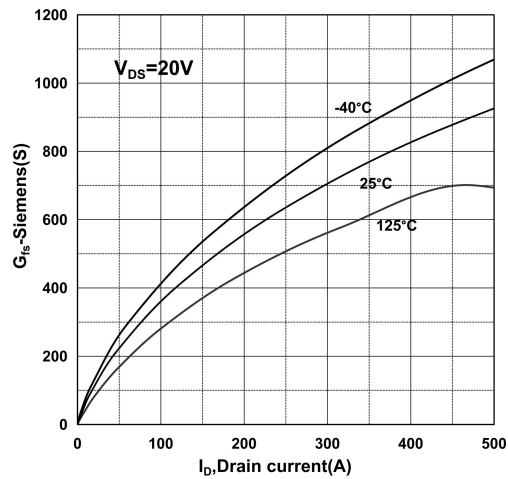
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2:  $L=0.5\text{mH}$ ,  $I_{AS}=120\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\ \Omega$ , Starting  $T_J=25^{\circ}\text{C}$
- 3:  $I_{SD} \leq I_{DM}$ ,  $di/dt \leq 300\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}\text{C}$
- 4: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- 5: Essentially independent of operating temperature

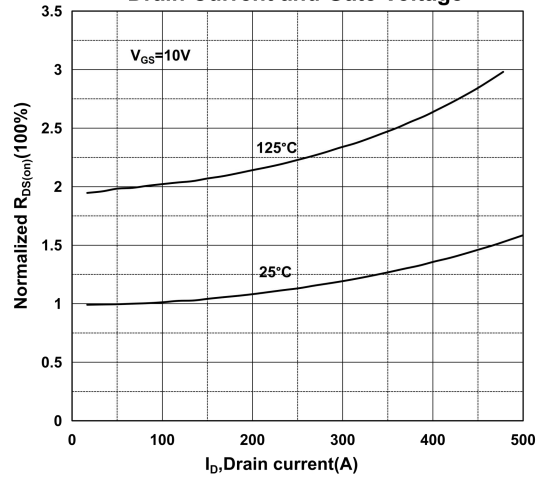
## Electrical Characteristics



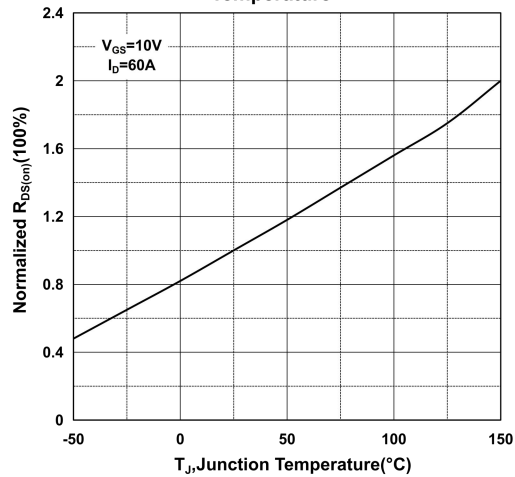
### Transconductance



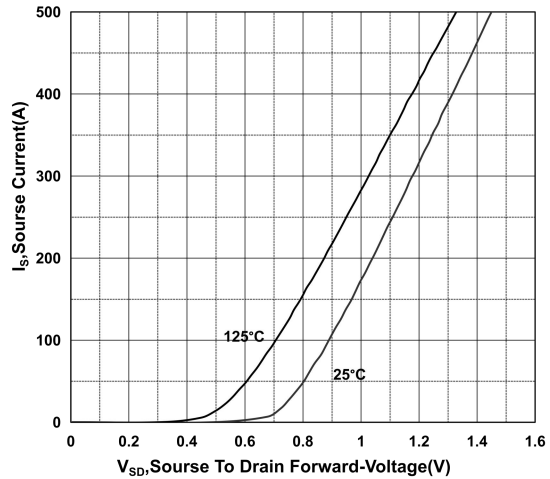
### Normalized On-Resistance Variation vs Drain Current and Gate Voltage



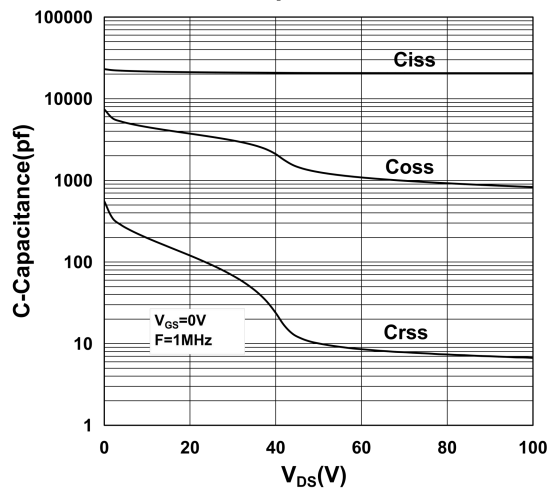
### Normalized On-Resistance Variation vs Temperature



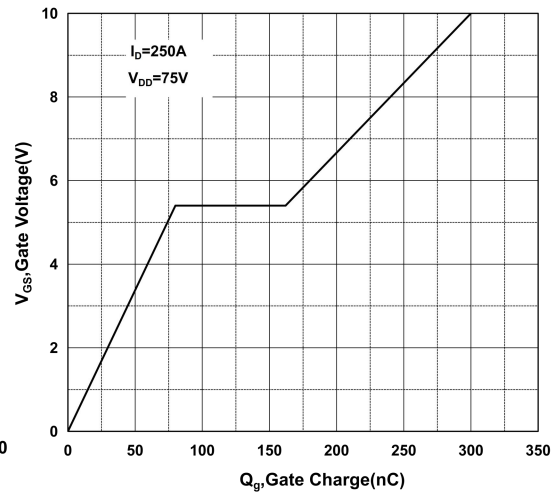
### Body Diode Forward Voltage Variation with Source Current and Temperature



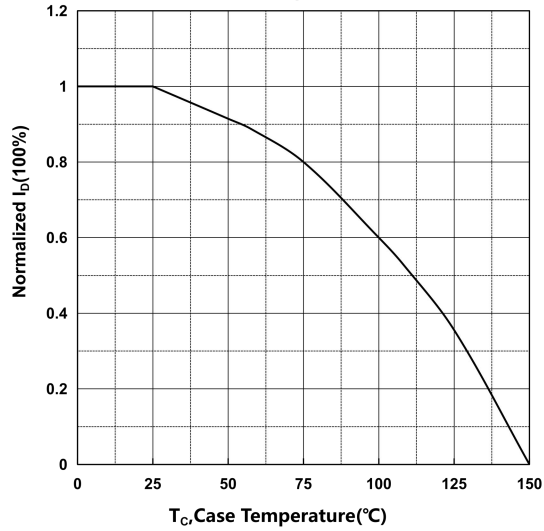
### Capacitance



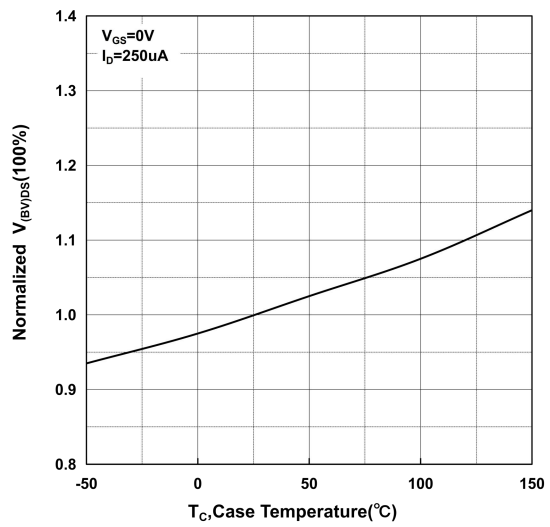
### Gate Charge



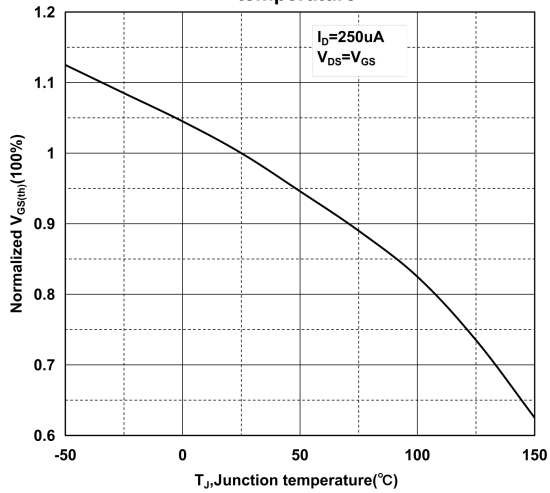
Normalized Maximum Drain Current vs Case Temperature



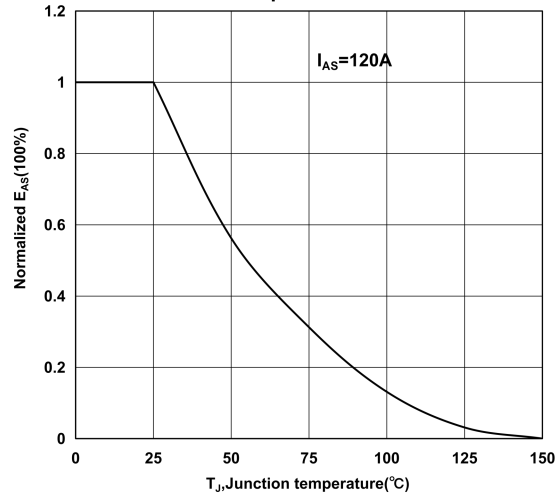
Normalized  $V_{(BV)DS}$  vs temperature



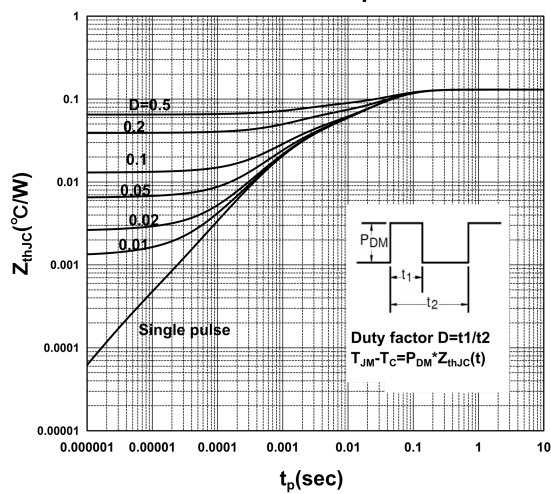
Normalized gate threshold voltage vs temperature



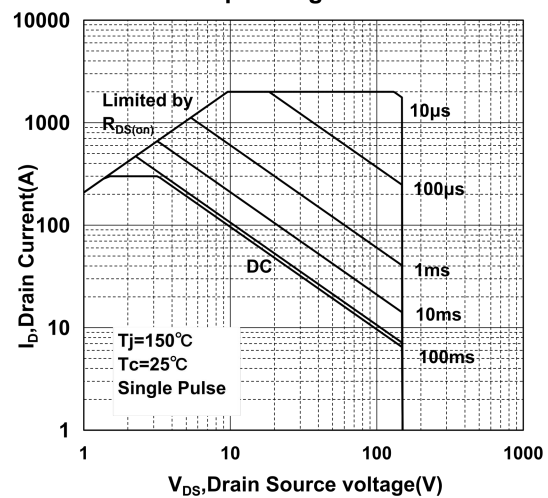
Normalized Maximum avalanche energy vs temperature



Transient Thermal Response Curve



Safe Operating Area



## Package Mechanical DATA

