

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

| Symbol                      | Parameter                             | Conditions                                                                                  | Min   | Typ      | Max      | Units |
|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------------|-------|----------|----------|-------|
| <b>STATIC PARAMETERS</b>    |                                       |                                                                                             |       |          |          |       |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage        | I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V                                                 | -12   |          |          | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =-12V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                          |       |          | -1<br>-5 | μA    |
| I <sub>GSS</sub>            | Gate-Body leakage current             | V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V                                                   |       |          | ±10      | μA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250μA                                     | -0.35 | -0.53    | -0.85    |       |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V                                                | -60   |          |          | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6.5A<br>T <sub>J</sub> =125°C                      |       | 16<br>23 | 20<br>28 | mΩ    |
|                             |                                       | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-6A                                                 |       | 19       | 24       | mΩ    |
|                             |                                       | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-5.5A                                               |       | 23       | 30       | mΩ    |
|                             |                                       | V <sub>GS</sub> =-1.5V, I <sub>D</sub> =-5A                                                 |       | 28       | 36       | mΩ    |
|                             |                                       |                                                                                             |       |          |          |       |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =-5V, I <sub>D</sub> =-6.5A                                                 |       | 45       |          | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =-1A, V <sub>GS</sub> =0V                                                    |       | -0.56    | -1       | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                             |       |          | -1.4     | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                             |       |          |          |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =-6V, f=1MHz                                           |       | 1740     | 2100     | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                             |       | 334      |          | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                             |       | 200      |          | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                            |       | 1.3      | 1.7      | kΩ    |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                             |       |          |          |       |
| Q <sub>g</sub>              | Total Gate Charge                     | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-6V, I <sub>D</sub> =-6.5A                         |       | 19       | 23       | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                             |       | 4.5      |          | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                             |       | 5.3      |          | nC    |
| t <sub>D(on)</sub>          | Turn-On Delay Time                    | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-6V, R <sub>L</sub> =0.9Ω,<br>R <sub>GEN</sub> =3Ω |       | 240      |          | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                             |       | 580      |          | ns    |
| t <sub>D(off)</sub>         | Turn-Off Delay Time                   |                                                                                             |       | 7        |          | μs    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                             |       | 4.2      |          | μs    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =-6.5A, dI/dt=100A/μs                                                        |       | 22       | 27       | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =-6.5A, dI/dt=100A/μs                                                        |       | 17       |          | nC    |

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25°C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.

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## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

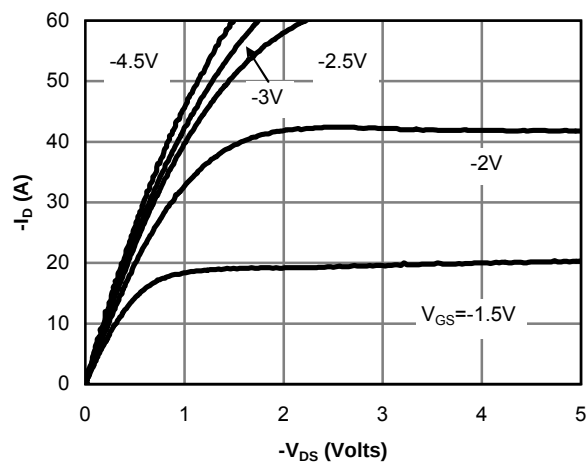


Figure 1: On-Region Characteristics(Note E)

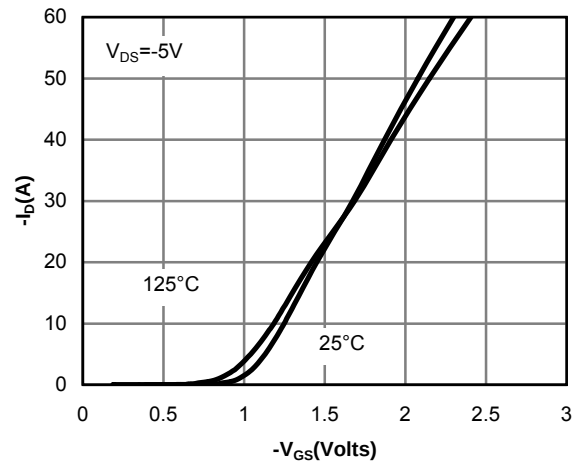


Figure 2: Transfer Characteristics(Note E)

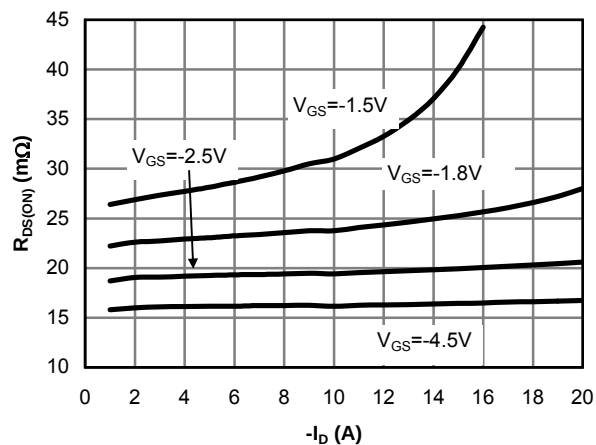


Figure 3: On-Resistance vs. Drain Current and Gate Voltage(Note E)

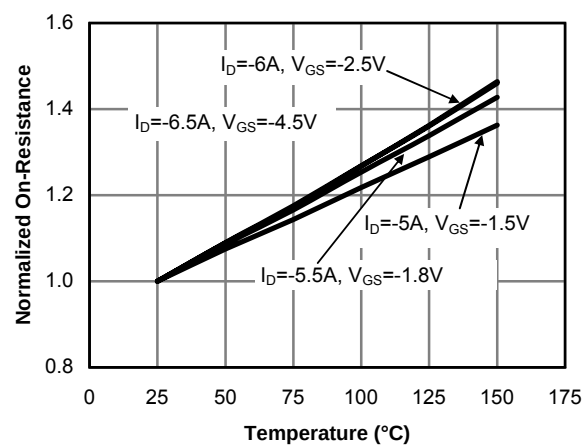


Figure 4: On-Resistance vs. Junction Temperature(Note E)

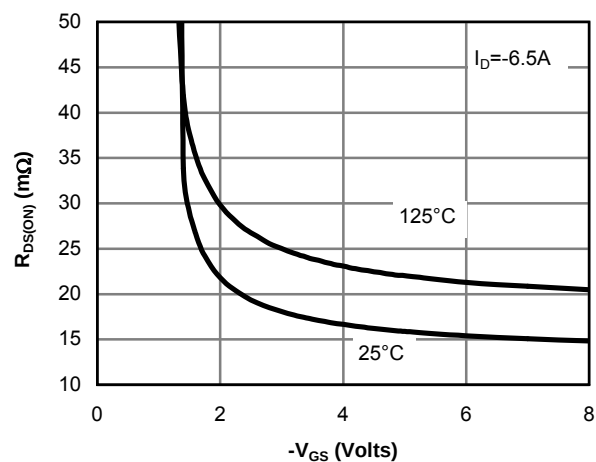


Figure 5: On-Resistance vs. Gate-Source Voltage(Note E)

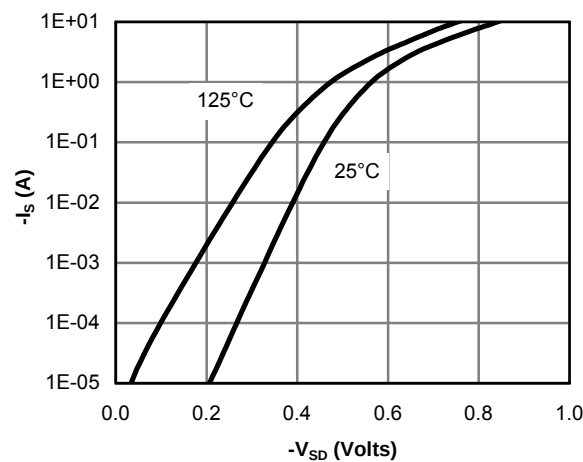


Figure 6: Body-Diode Characteristics(Note E)

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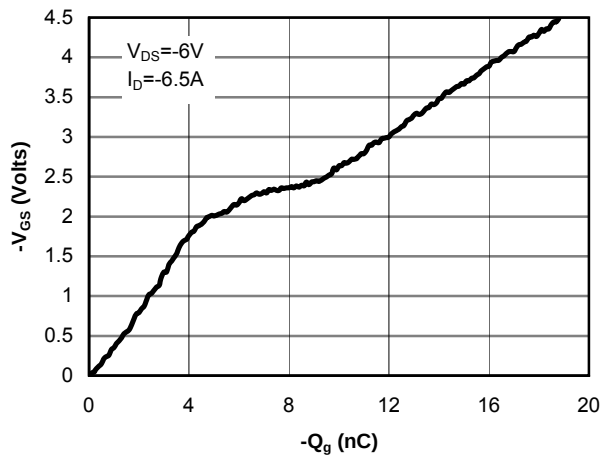


Figure 7: Gate-Charge Characteristics

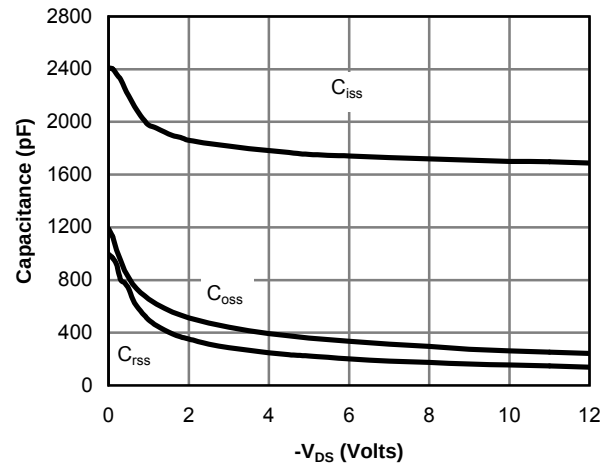


Figure 8: Capacitance Characteristics

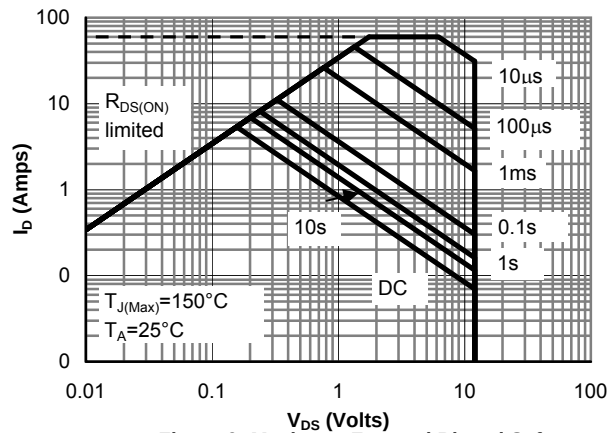


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

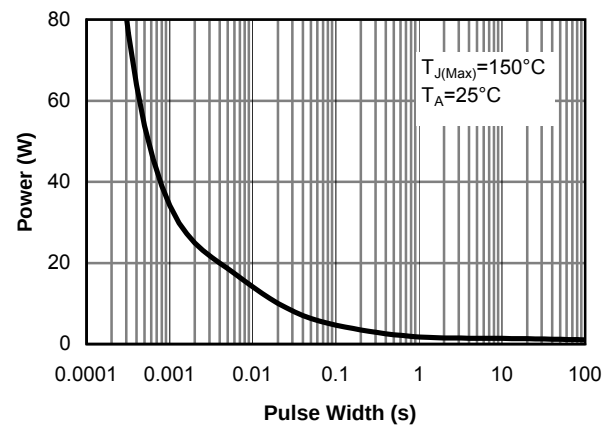


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

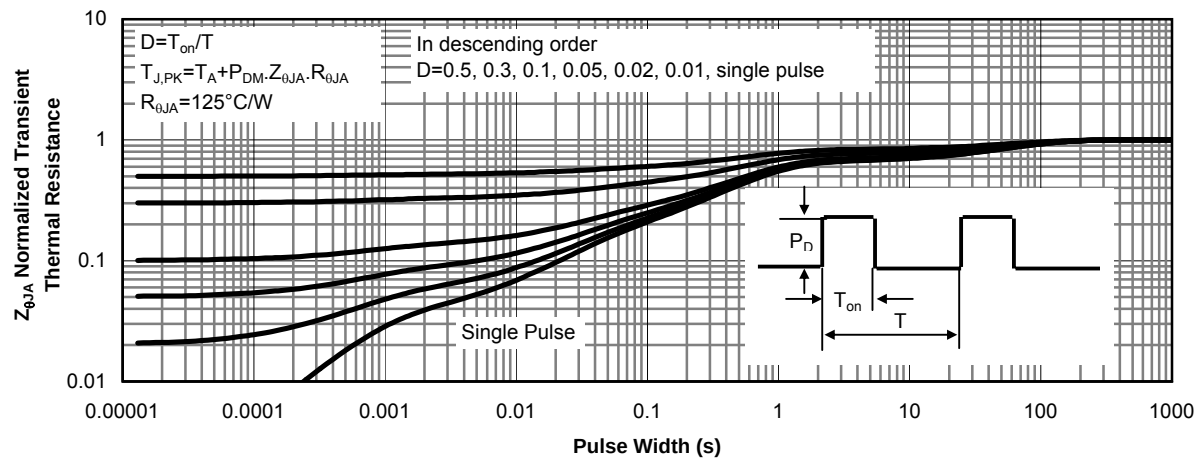
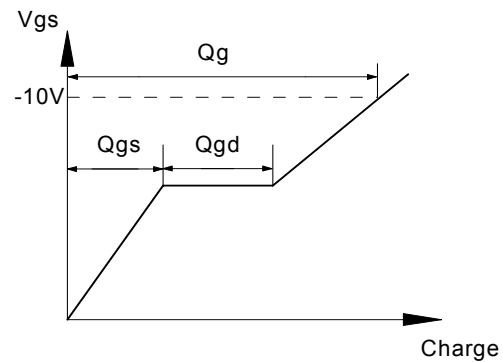
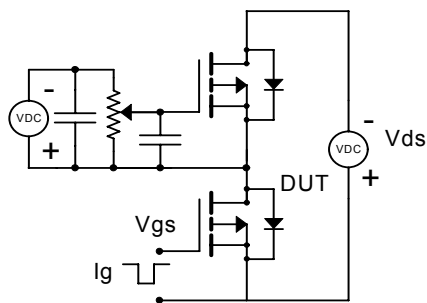
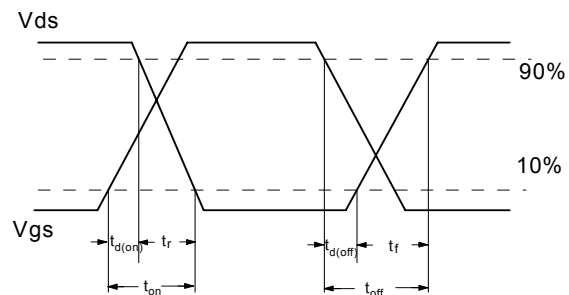
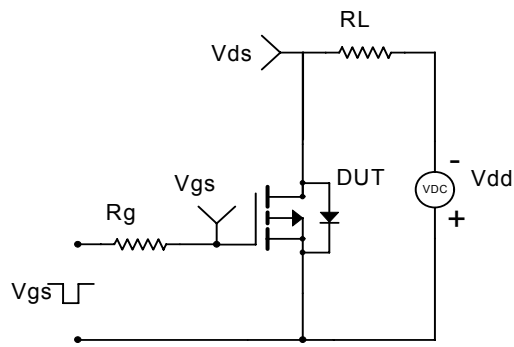


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

## Gate Charge Test Circuit &amp; Waveform



## Resistive Switching Test Circuit &amp; Waveforms



## Diode Recovery Test Circuit &amp; Waveforms

