

### General Description

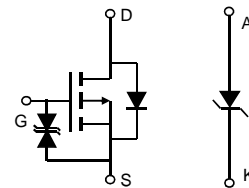
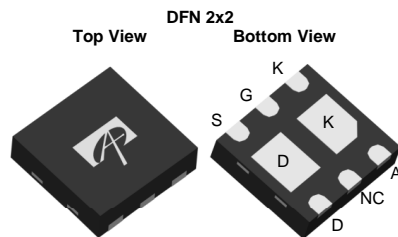
The AON2707 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. A Schottky diode is provided to facilitate the implementation of a bidirectional blocking switch, or for DC-DC conversion applications.

### Product Summary

|                                   |                 |
|-----------------------------------|-----------------|
| $V_{DS}$                          | -30V            |
| $I_D$ (at $V_{GS}=-10V$ )         | -4A             |
| $R_{DS(ON)}$ (at $V_{GS}=-10V$ )  | < 117m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$ ) | < 138m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=-2.5V$ ) | < 193m $\Omega$ |

### Typical ESD protection HBM Class 2

|                      |        |
|----------------------|--------|
| $V_{KA}$             | 20V    |
| $I_F$                | 2A     |
| $V_F$ (at $I_F=1A$ ) | <0.45V |



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

| Parameter                               | Symbol         | MOSFET                 | Schottky   | Units            |
|-----------------------------------------|----------------|------------------------|------------|------------------|
| Drain-Source Voltage                    | $V_{DS}$       | -30                    |            | V                |
| Gate-Source Voltage                     | $V_{GS}$       | $\pm 12$               |            | V                |
| Continuous Drain Current <sup>A</sup>   | $I_D$          | $T_A=25^\circ\text{C}$ | -4         | A                |
|                                         |                | $T_A=70^\circ\text{C}$ | -3         |                  |
| Pulsed Drain Current <sup>B</sup>       | $I_{DM}$       | -15                    |            |                  |
| Schottky reverse voltage                | $V_{KA}$       |                        | 20         | V                |
| Continuous Forward Current <sup>A</sup> | $I_F$          | $T_A=25^\circ\text{C}$ | 2.5        | A                |
|                                         |                | $T_A=70^\circ\text{C}$ | 1.5        |                  |
| Pulsed Forward Current <sup>B</sup>     | $I_{FM}$       |                        | 15         |                  |
| Power Dissipation <sup>A</sup>          | $P_D$          | $T_A=25^\circ\text{C}$ | 2.8        | W                |
|                                         |                | $T_A=70^\circ\text{C}$ | 1.8        |                  |
| Junction and Storage Temperature Range  | $T_J, T_{STG}$ | -55 to 150             | -55 to 150 | $^\circ\text{C}$ |

### Thermal Characteristics

| Parameter: MOSFET                                     | Symbol          | Typ | Max | Units                     |
|-------------------------------------------------------|-----------------|-----|-----|---------------------------|
| Maximum Junction-to-Ambient <sup>A</sup> $t \leq 10s$ | $R_{\theta JA}$ | 35  | 45  | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient <sup>A</sup> Steady-State |                 | 65  | 85  | $^\circ\text{C}/\text{W}$ |
| Parameter: Schottky                                   |                 |     |     |                           |
| Maximum Junction-to-Ambient <sup>A</sup> $t \leq 10s$ | $R_{\theta JA}$ | 36  | 47  | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient <sup>A</sup> Steady-State |                 | 67  | 87  | $^\circ\text{C}/\text{W}$ |

**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                                                  | -30  |           |            | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =-30V, 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> =±12V                                                   |      |           | ±10        | μA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                    | -0.7 | -1.05     | -1.5       | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V                                                  | -15  |           |            | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =-10V, I <sub>D</sub> =-4A<br>T <sub>J</sub> =125°C                          |      | 97<br>138 | 117<br>165 | mΩ    |
|                             |                                       | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A                                                  |      | 110       | 138        | mΩ    |
|                             |                                       | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1A                                                  |      | 148       | 193        | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =-5V, I <sub>D</sub> =-4A                                                    |      | 9         |            | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =-1A, V <sub>GS</sub> =0V                                                     |      | -0.8      | -1         | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                              |      |           | -3.2       | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                              |      |           |            |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz                                           |      | 305       |            | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                              |      | 42        |            | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                              |      | 26        |            | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                             |      | 8.5       | 17         | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                              |      |           |            |       |
| Q <sub>g(10V)</sub>         | Total Gate Charge                     | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-4A                            |      | 6.8       | 12         | nC    |
| Q <sub>g(4.5V)</sub>        | Total Gate Charge                     |                                                                                              |      | 3.2       | 6          | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                              |      | 0.75      |            | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                              |      | 1.2       |            | nC    |
| t <sub>D(on)</sub>          | Turn-On Delay Time                    | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =3.75Ω,<br>R <sub>GEN</sub> =3Ω |      | 6.0       |            | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                              |      | 5         |            | ns    |
| t <sub>D(off)</sub>         | Turn-Off Delay Time                   |                                                                                              |      | 21        |            | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                              |      | 6.5       |            | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =-4A, dI/dt=100A/μs                                                           |      | 15        |            | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =-4A, dI/dt=100A/μs                                                           |      | 6         |            | nC    |
| <b>SCHOTTKY PARAMETERS</b>  |                                       |                                                                                              |      |           |            |       |
| V <sub>F</sub>              | Forward Voltage Drop                  | I <sub>F</sub> =1A                                                                           |      | 0.4       | 0.45       | V     |
| I <sub>rm</sub>             | Maximum reverse leakage current       | V <sub>R</sub> =5V                                                                           |      |           | 0.05       | mA    |
|                             |                                       | V <sub>R</sub> =5V, T <sub>J</sub> =125°C                                                    |      |           | 10         |       |
| I <sub>rm</sub>             | Maximum reverse leakage current       | V <sub>R</sub> =16V                                                                          |      |           | 0.1        | mA    |
|                             |                                       | V <sub>R</sub> =16V, T <sub>J</sub> =125°C                                                   |      |           | 20         |       |
| C <sub>T</sub>              | Junction Capacitance                  | V <sub>R</sub> =10V                                                                          |      | 34        |            | pF    |
| t <sub>rr</sub>             | Schottky Reverse Recovery Time        | I <sub>F</sub> =1A, dI/dt=100A/μs                                                            |      | 11        | 14         | ns    |
| Q <sub>rr</sub>             | Schottky Reverse Recovery Charge      | I <sub>F</sub> =1A, dI/dt=100A/μs                                                            |      | 0.8       |            | nC    |

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1 in<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. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

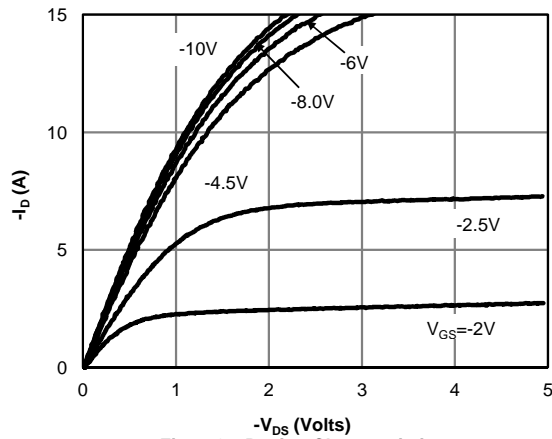
C: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

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

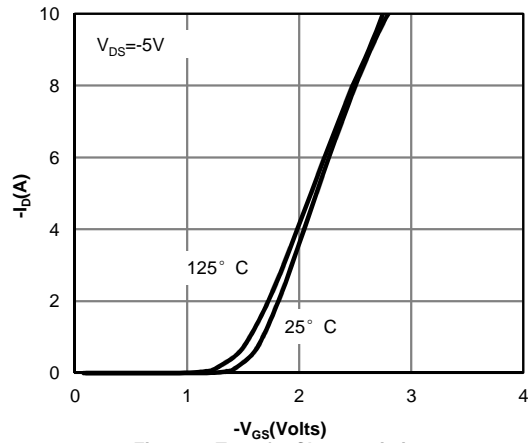
E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C. The SOA curve provides a single pulse rating.

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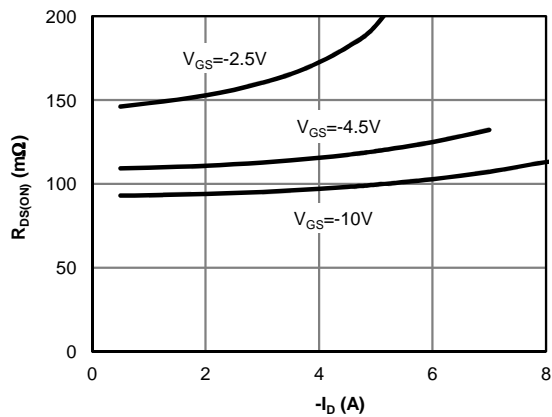
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



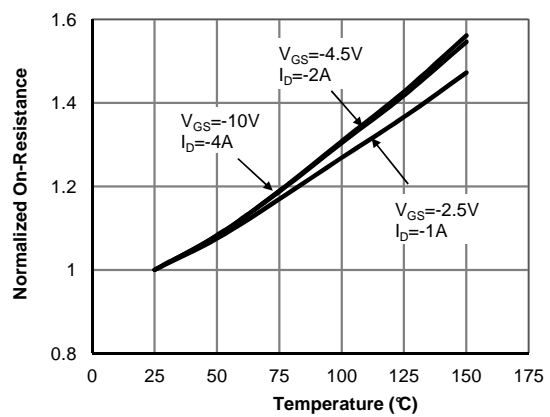
**Fig 1: On-Region Characteristics**



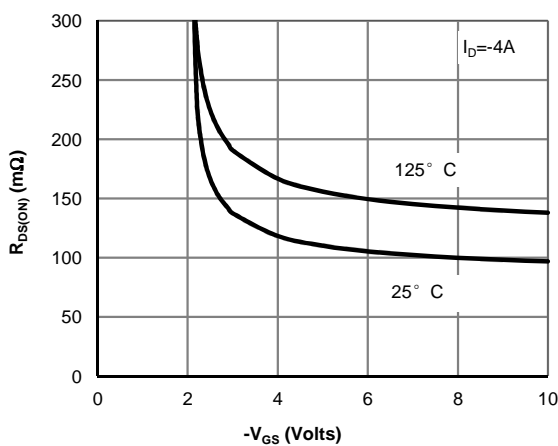
**Figure 2: Transfer Characteristics**



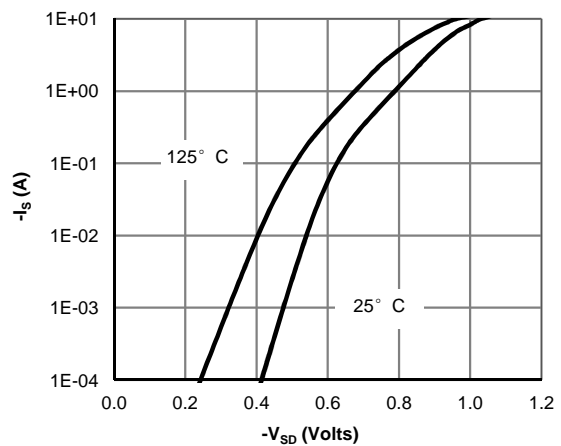
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**

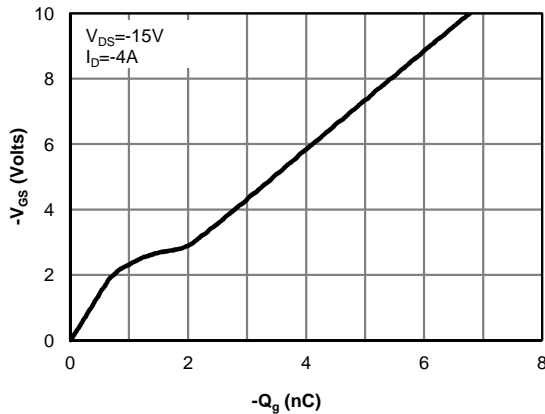


**Figure 5: On-Resistance vs. Gate-Source Voltage**

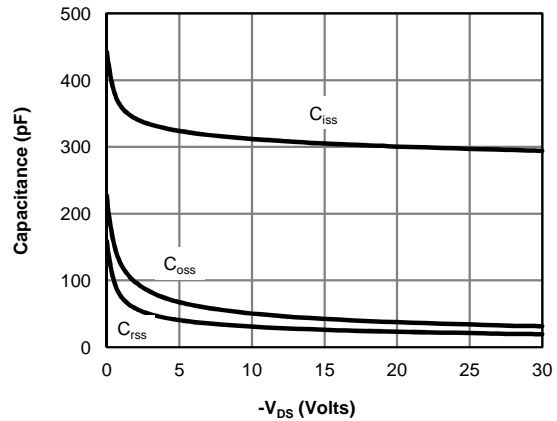


**Figure 6: Body-Diode Characteristics**

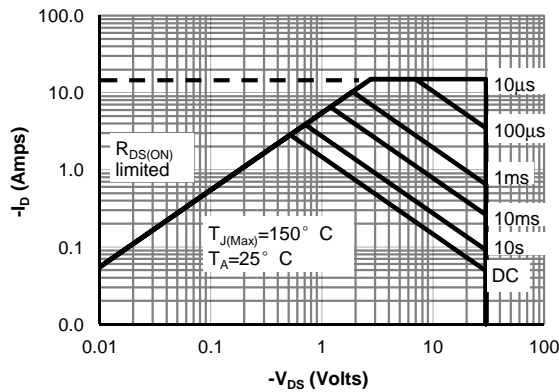
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



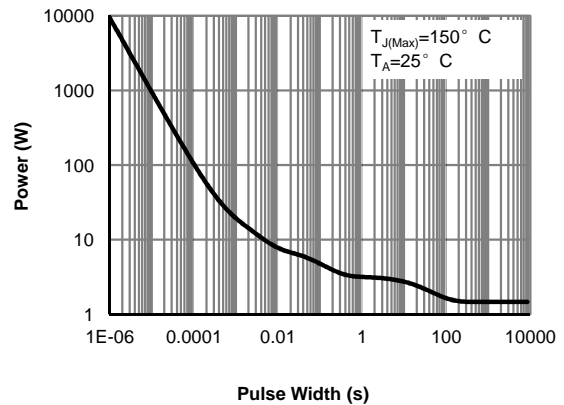
**Figure 7: Gate-Charge Characteristics**



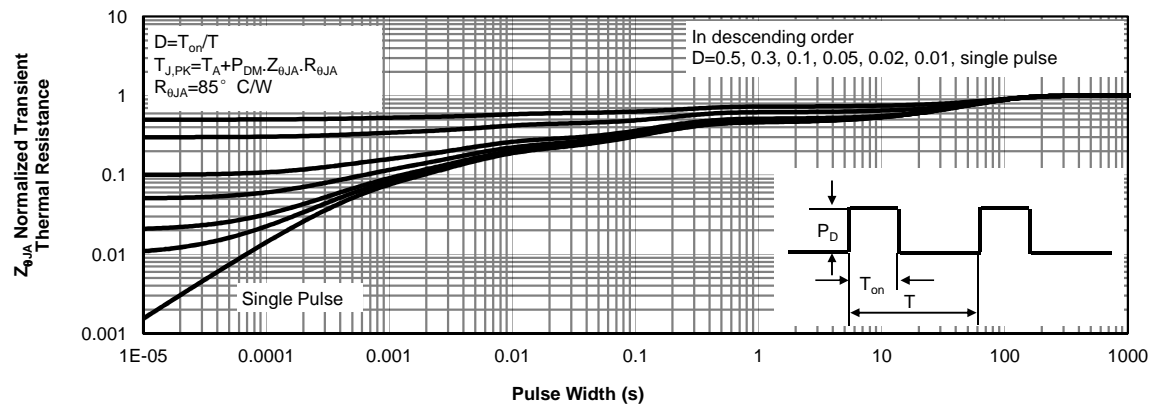
**Figure 8: Capacitance Characteristics**



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



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



**Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)**

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

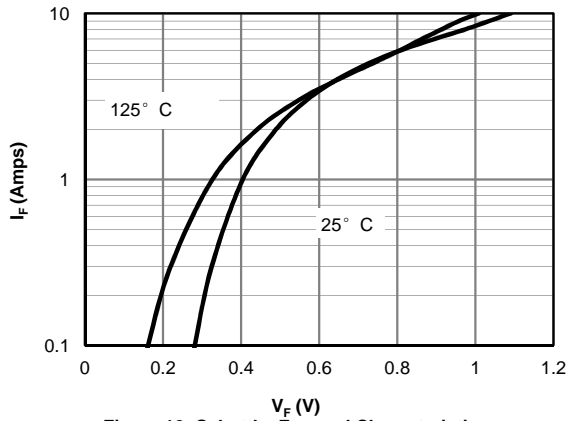


Figure 12: Schottky Forward Characteristics

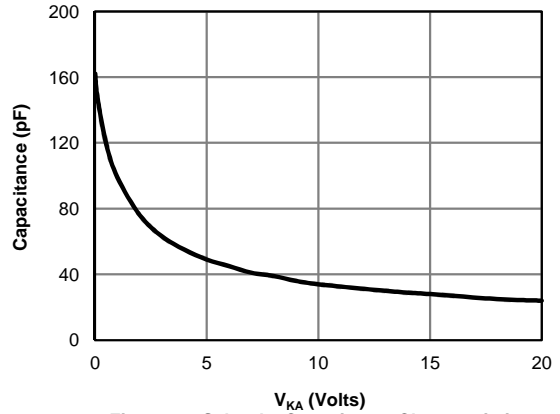


Figure 13: Schottky Capacitance Characteristics

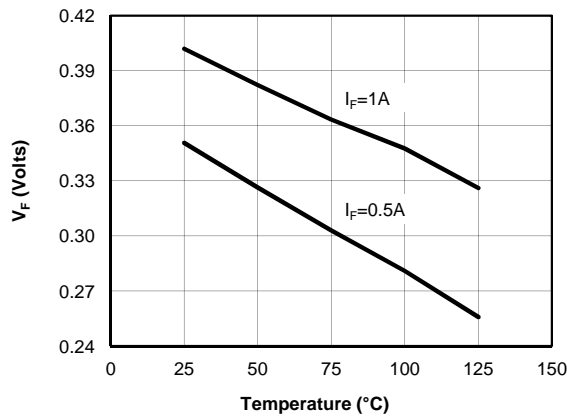


Figure 14: Schottky Forward Drop vs. Junction Temperature

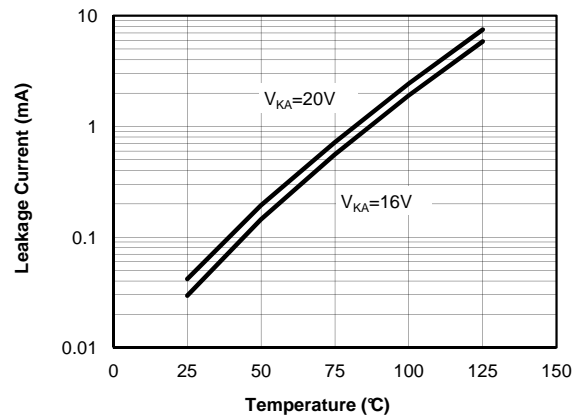


Figure 15: Schottky Leakage Current vs. Junction Temperature

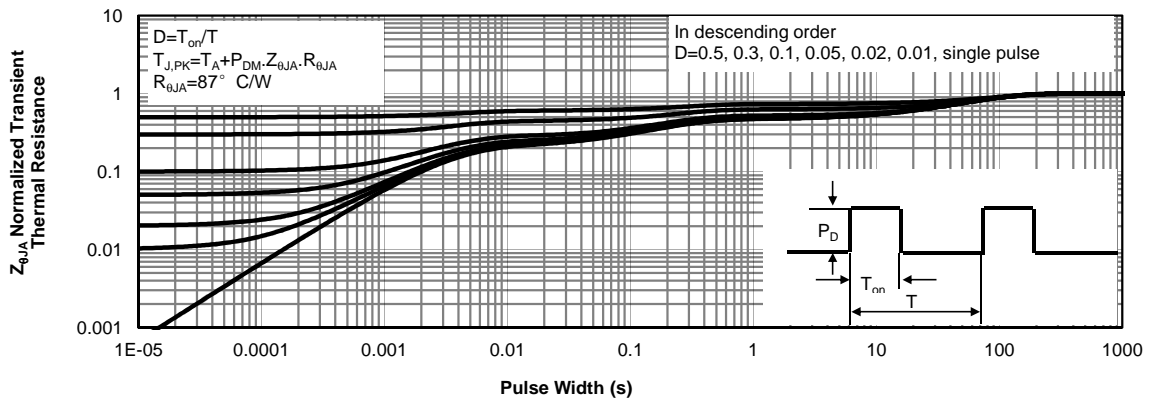
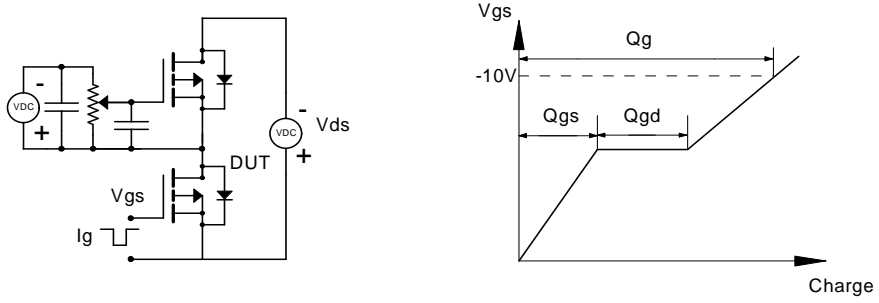
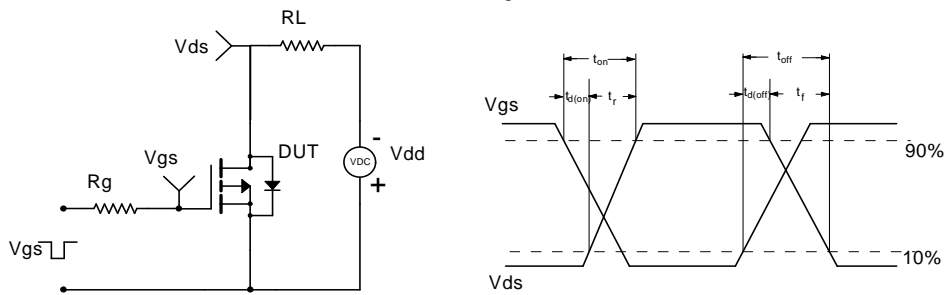


Figure 16: Schottky Normalized Maximum Transient Thermal Impedance (Note E)

**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**

