

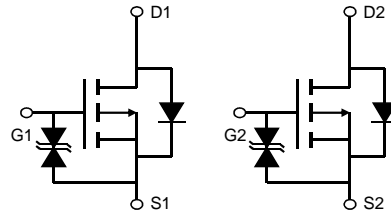
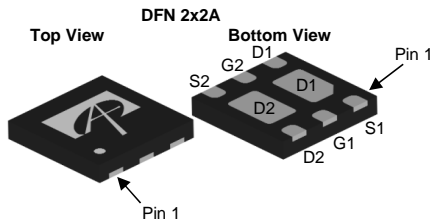
### General Description

The AON2809 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

### Product Summary

|                                   |                 |
|-----------------------------------|-----------------|
| $V_{DS}$                          | -12V            |
| $I_D$ (at $V_{GS}=-4.5V$ )        | -2A             |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$ ) | < 68m $\Omega$  |
| $R_{DS(ON)}$ (at $V_{GS}=-2.5V$ ) | < 90m $\Omega$  |
| $R_{DS(ON)}$ (at $V_{GS}=-1.8V$ ) | < 118m $\Omega$ |

Typical ESD protection **HBM Class 2**



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

| Parameter                              | Symbol         | Maximum                | Units            |
|--|----------------|------------------------|------------------|
| Drain-Source Voltage                   | $V_{DS}$       | -12                    | V                |
| Gate-Source Voltage                    | $V_{GS}$       | $\pm 8$                | V                |
| Continuous Drain Current <sup>G</sup>  | $I_D$          | $T_A=25^\circ\text{C}$ | -2               |
|  |                | $T_A=70^\circ\text{C}$ | -1.6             |
| Pulsed Drain Current <sup>C</sup>      | $I_{DM}$       | -8                     | A                |
| Power Dissipation <sup>B</sup>         | $P_D$          | $T_A=25^\circ\text{C}$ | 2.1              |
|  |                | $T_A=70^\circ\text{C}$ | 1.3              |
| Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 to 150             | $^\circ\text{C}$ |

### Thermal Characteristics

| Parameter  | Symbol          | Typ | Max | Units                     |
|--|-----------------|-----|-----|---------------------------|
| Maximum Junction-to-Ambient <sup>A</sup> $t \leq 10\text{s}$ | $R_{\theta JA}$ | 50  | 60  | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient <sup>A D</sup> Steady-State      |                 | 80  | 100 | $^\circ\text{C}/\text{W}$ |

**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   | -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> = ±6V  |      |          | ±10      | μA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                 | -0.3 | -0.6     | -0.9     | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V  | -8   |          |          | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A<br>T <sub>J</sub> =125°C                      |      | 55<br>72 | 68<br>89 | mΩ    |
|                             |                                       | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1A   |      | 70       | 90       | mΩ    |
|                             |                                       | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-1A   |      | 90       | 118      | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =-5V, I <sub>D</sub> =-2A   |      | 8        |          | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =-1A, V <sub>GS</sub> =0V  |      | -0.7     | -1       | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |   |      |          | -1.5     | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |   |      |          |          |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =-6V, f=1MHz   |      | 415      |          | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |   |      | 115      |          | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |   |      | 78       |          | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  |      | 26       |          | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |   |      |          |          |       |
| Q <sub>g(4.5)</sub>         | Total Gate Charge                     | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-6V, I <sub>D</sub> =-2A                         |      | 4.4      |          | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |   |      | 0.8      |          | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |   |      | 0.9      |          | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-6V, R <sub>L</sub> =3Ω,<br>R <sub>GEN</sub> =3Ω |      | 11.8     |          | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |   |      | 24.5     |          | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |   |      | 54.5     |          | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |   |      | 37.3     |          | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =-2A, di/dt=100A/μs  |      | 21       |          | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =-2A, di/dt=100A/μs  |      | 5        |          | 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 R<sub>θJA</sub>t ≤ 10s and the maximum allowed junction temperature of 150° C.

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.

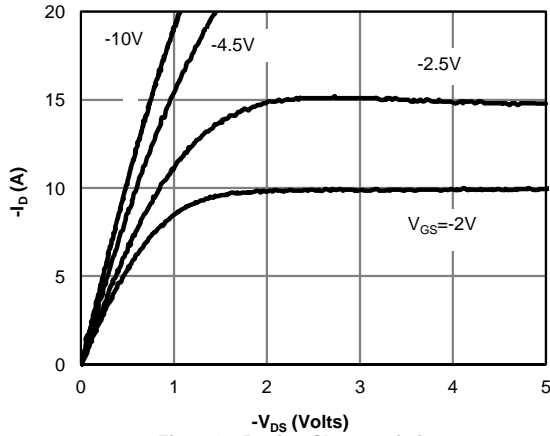
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

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.

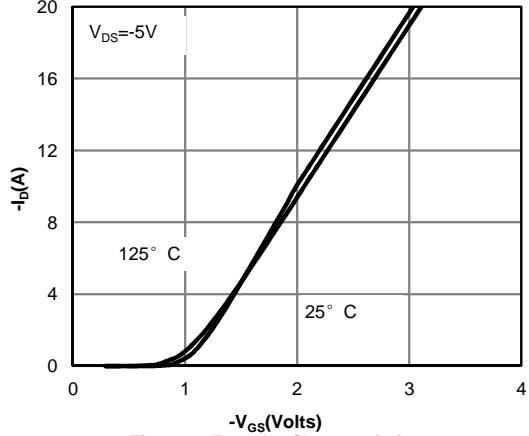
G. The maximum current rating is package limited.

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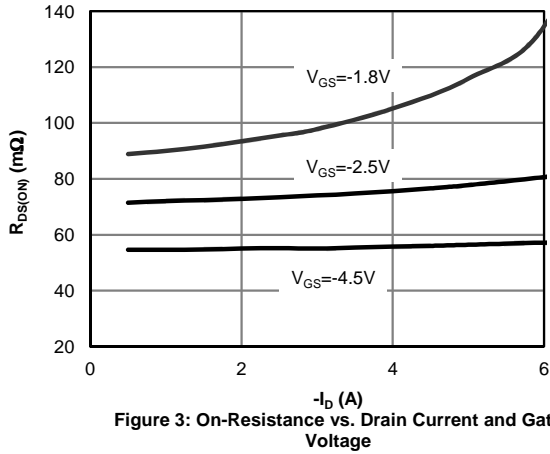
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



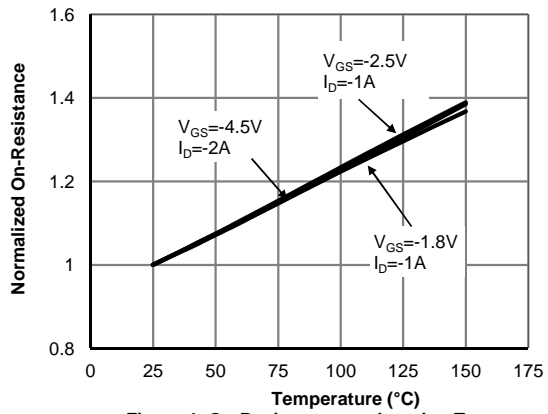
**Fig 1: On-Region Characteristics**



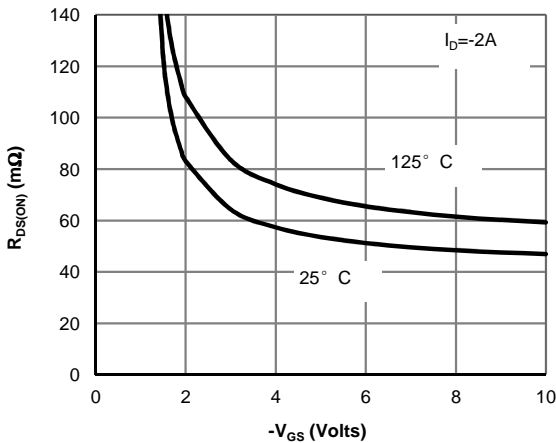
**Figure 2: Transfer Characteristics**



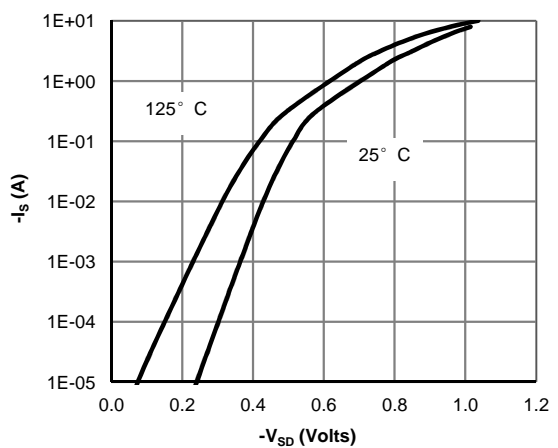
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**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**

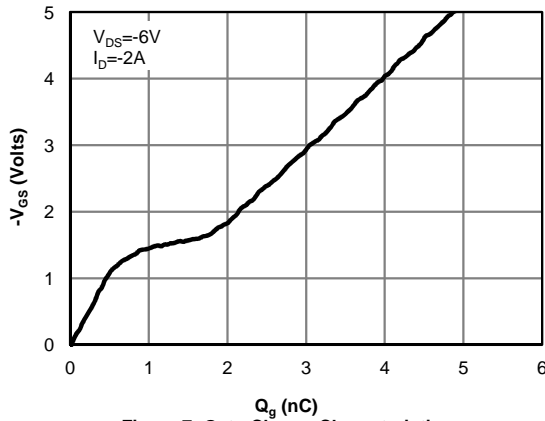


Figure 7: Gate-Charge Characteristics

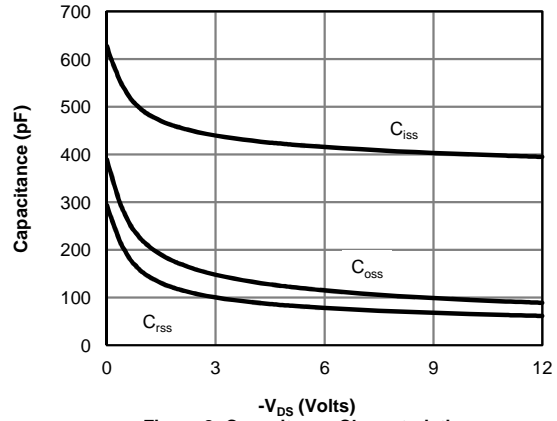


Figure 8: Capacitance Characteristics

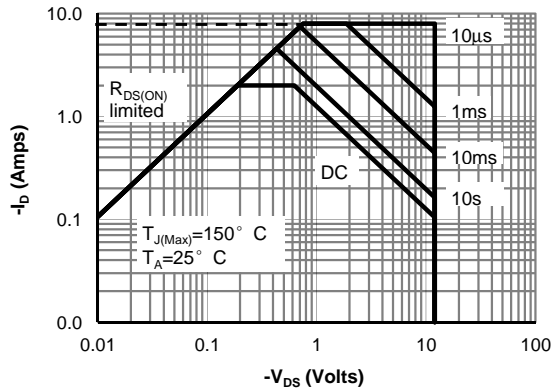


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

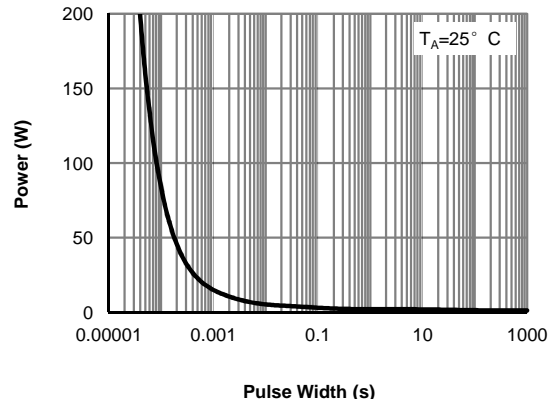


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

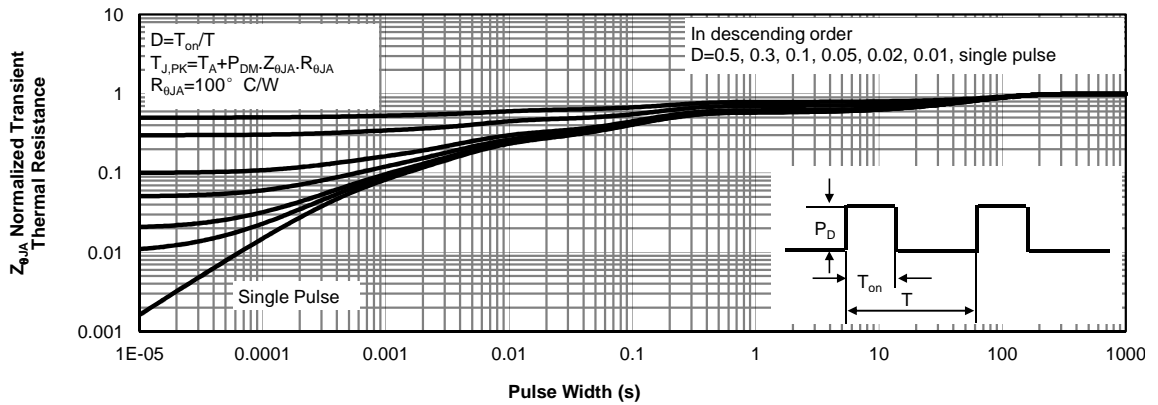
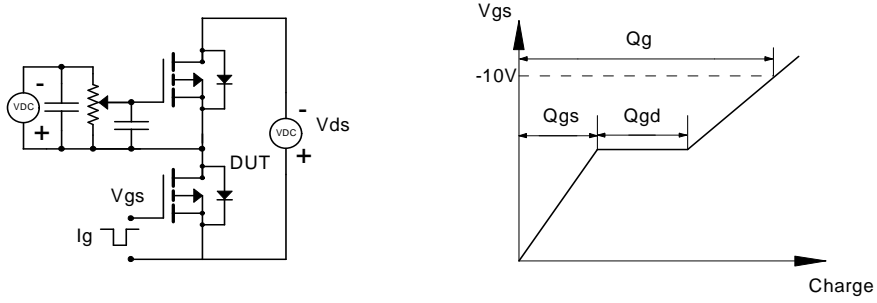
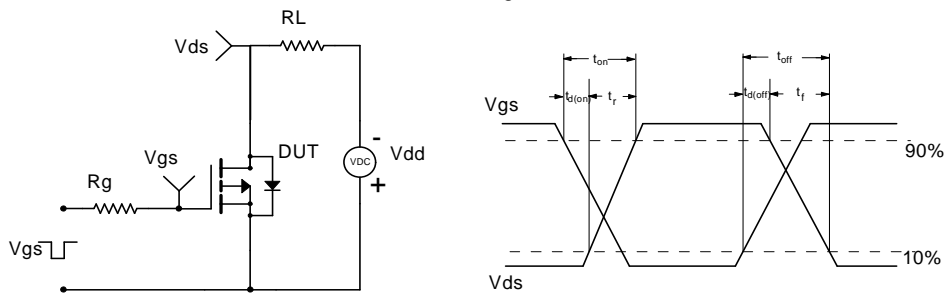


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**

