# AON2800

## 20V Dual N-Channel MOSFET

## General Description

The AON2800 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.

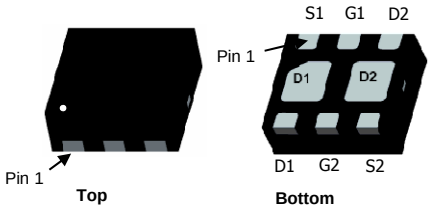
## Product Summary

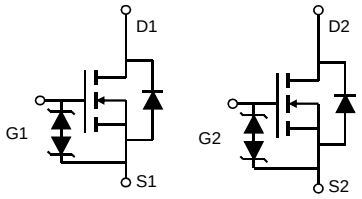
| | |
|---|---|
| $V_{DS}$ | 20V |
| $I_D$ (at $V_{GS}$=4.5V) | 4.5A |
| $R_{DS(ON)}$ (at $V_{GS}$=4.5V) | < 47mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$=2.5V) | < 65mΩ |

***ESD Protected***

Green Product

**DFN 2x2 Package**




**Absolute Maximum Ratings $T_A$=25°C unless otherwise noted**

| Parameter | | Symbol | Maximum | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | V |
| Continuous Drain Current | $T_A$=25°C | $I_D$ | 4.5 | A |
| | $T_A$=70°C | | 3.8 | |
| Pulsed Drain Current [C] | | $I_{DM}$ | 24 | |
| Power Dissipation [B] | $T_A$=25°C | $P_D$ | 1.5 | W |
| | $T_A$=70°C | | 0.95 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |

**Thermal Characteristics**

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t ≤ 10s | $R_{\theta JA}$ | 35 | 45 | °C/W |
| Maximum Junction-to-Ambient [A] | Steady-State | | 65 | 85 | °C/W |
| Maximum Junction-to-Ambient [B] | t ≤ 10s | $R_{\theta JA}$ | 120 | 155 | °C/W |
| Maximum Junction-to-Ambient [B] | Steady-State | | 175 | 235 | °C/W |

**Electrical Characteristics ($T_J$=25°C unless otherwise noted)**

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=250µA, $V_{GS}$=0V | 20 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=20V, $V_{GS}$=0V | | | 1 | µA |
| | | $T_J$=55°C | | | 5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$= ±8V | | | 20 | µA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ $I_D$=250µA | 0.4 | 0.8 | 1.2 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}$=4.5V, $V_{DS}$=5V | 24 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=4.5V, $I_D$=4A | | 37 | 47 | mΩ |
| | | $T_J$=125°C | | 55 | 70 | |
| | | $V_{GS}$=2.5V, $I_D$=3A | | 47 | 65 | mΩ |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=4A | | 14 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | | 0.7 | 1 | V |
| $I_S$ | Maximum Body-Diode Continuous Current | | | | 1.5 | A |
| **DYNAMIC PARAMETERS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=10V, f=1MHz | 285 | 360 | 435 | pF |
| $C_{oss}$ | Output Capacitance | | 45 | 65 | 85 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | 30 | 50 | 70 | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | 1.7 | 3.5 | 5.3 | Ω |
| **SWITCHING PARAMETERS** | | | | | | |
| $Q_g$(4.5V) | Total Gate Charge | $V_{GS}$=4.5V, $V_{DS}$=10V, $I_D$=4A | | 4.15 | 6 | nC |
| $Q_{gs}$ | Gate Source Charge | | | 0.55 | | nC |
| $Q_{gd}$ | Gate Drain Charge | | | 1.15 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}$=4.5V, $V_{DS}$=10V, $R_L$=2.5Ω, $R_{GEN}$=3Ω | | 9.5 | | ns |
| $t_r$ | Turn-On Rise Time | | | 43 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | 26 | | ns |
| $t_f$ | Turn-Off Fall Time | | | 39 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=4A, dI/dt=100A/µs | | 11 | | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=4A, dI/dt=100A/µs | | 3 | | nC |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25° C. The Power dissipation $P_{DSM}$ is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.
B. The value of $R_{\theta JA}$ is measured with the device mounted on a minimum pad board with 2oz. Copper, in a still air environment with $T_A$=25° C. The Power dissipation $P_{DSM}$ is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25° C. The SOA curve provides a single pulse rating.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

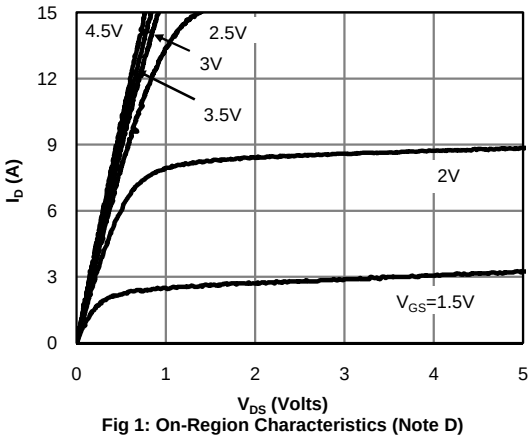



Fig 1: On-Region Characteristics (Note D)

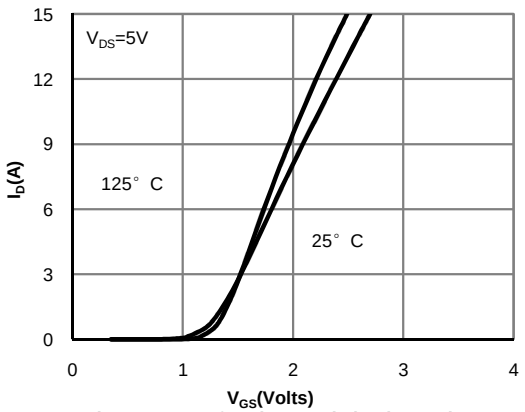



Figure 2: Transfer Characteristics (Note D)

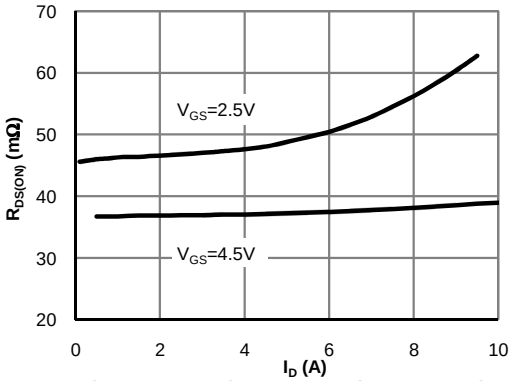



Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note D)

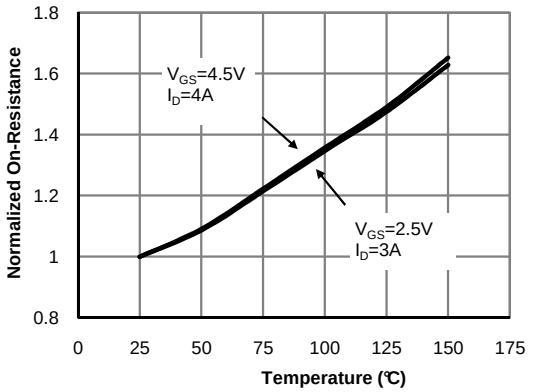



Figure 4: On-Resistance vs. Junction Temperature (Note D)

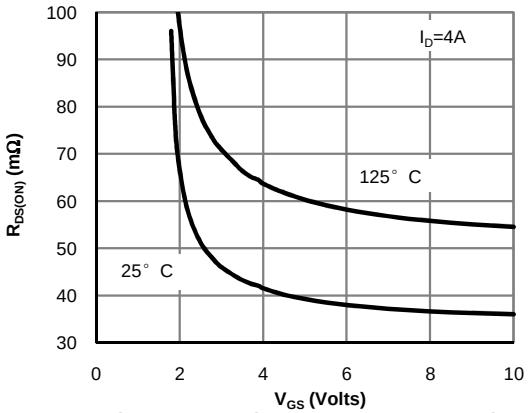



Figure 5: On-Resistance vs. Gate-Source Voltage (Note D)

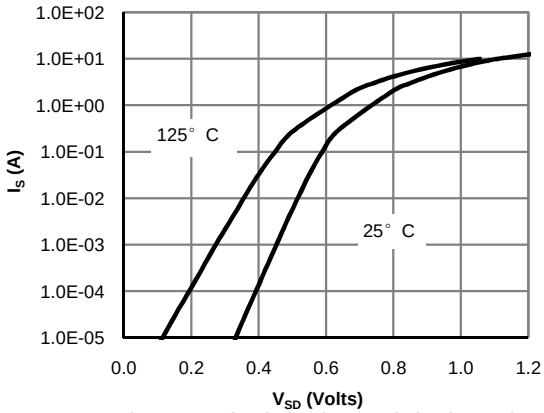



Figure 6: Body-Diode Characteristics (Note D)

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

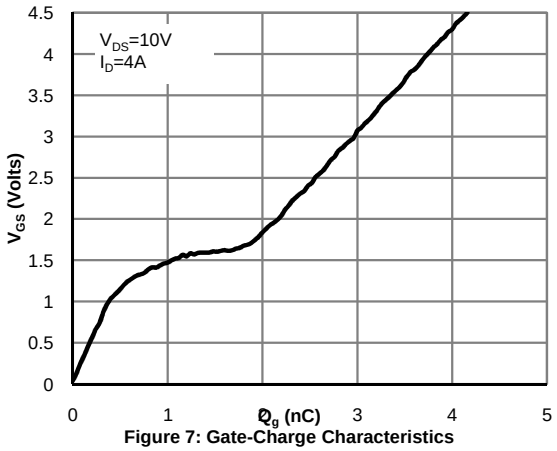



Figure 7: Gate-Charge Characteristics

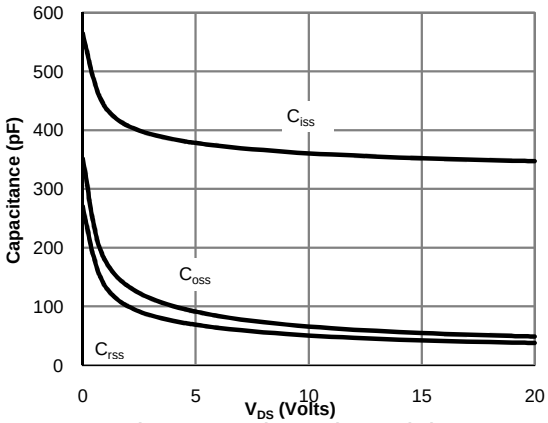



Figure 8: Capacitance Characteristics

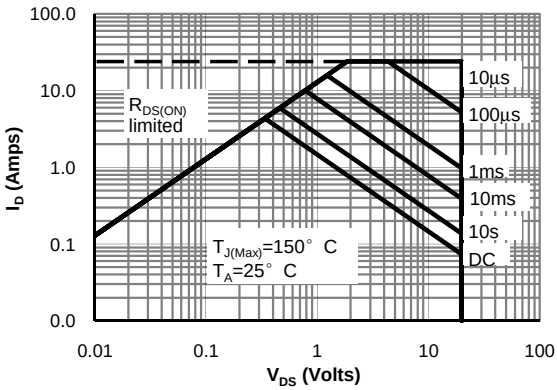



Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

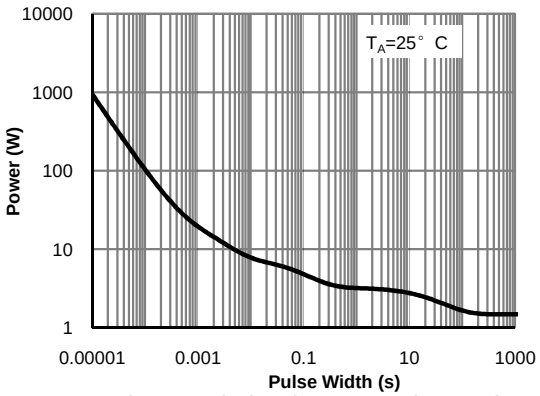



Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

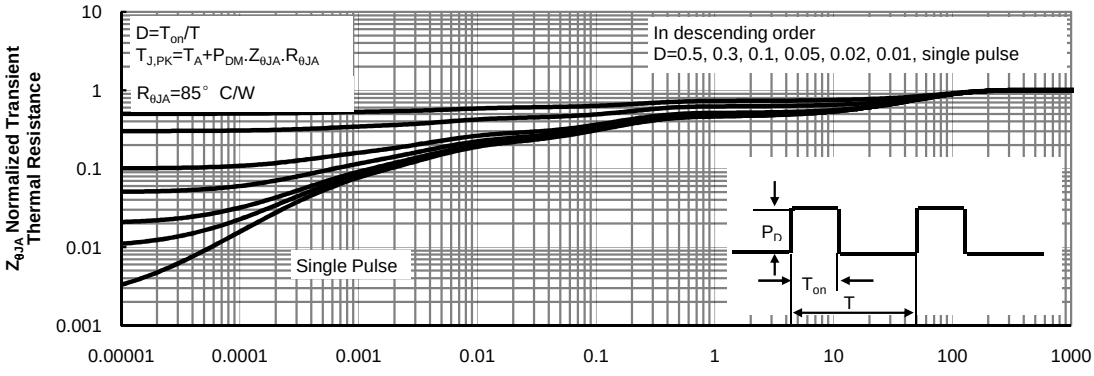
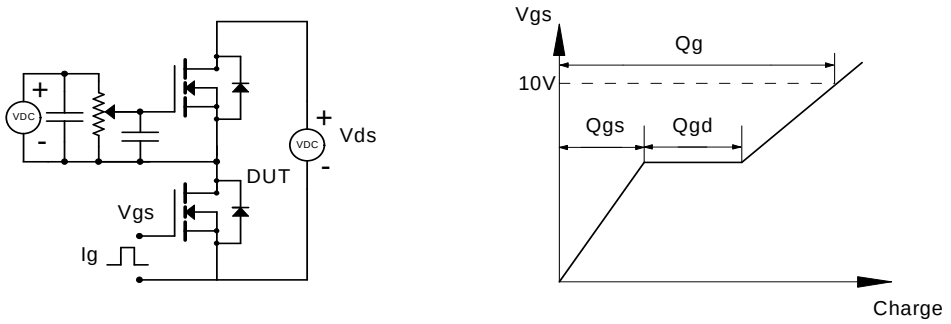
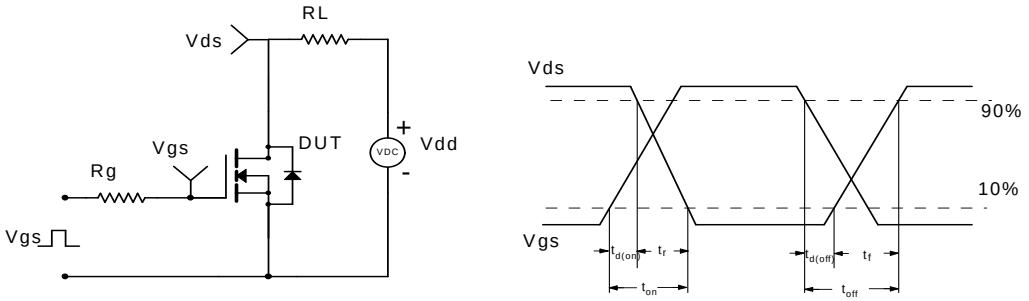



Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

## Gate Charge Test Circuit & Waveform




## Resistive Switching Test Circuit & Waveforms




## Diode Recovery Test Circuit & Waveforms