

General Description

The AON2801/L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. AON2801 and AON2801L are electrically identical.

-RoHS Compliant

-Halogen Free*

Features

V_{DS} (V) = -20V

I_D = -3A (V_{GS} = -4.5V)

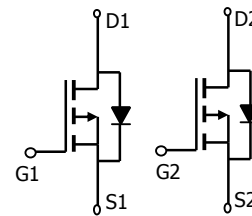
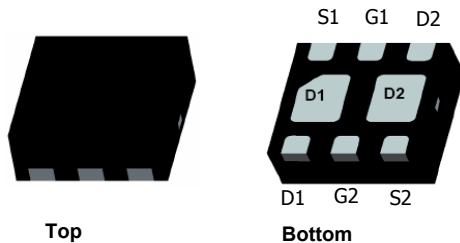
$R_{DS(ON)}$ < 120m Ω (V_{GS} = -4.5V)

$R_{DS(ON)}$ < 160m Ω (V_{GS} = -2.5V)

$R_{DS(ON)}$ < 200m Ω (V_{GS} = -1.8V)



DFN 2x2 Package



| Parameter | Symbol | Maximum | Units |
|--|----------------|------------------------|------------------|
| Drain-Source Voltage | V_{DS} | -20 | V |
| Gate-Source Voltage | V_{GS} | ± 8 | V |
| Continuous Drain Current ^A | I_D | $T_A=25^\circ\text{C}$ | -3 |
| | | $T_A=70^\circ\text{C}$ | -2.3 |
| Pulsed Drain Current ^C | I_{DM} | -15 | A |
| Power Dissipation ^A | P_{DSM} | $T_A=25^\circ\text{C}$ | 1.5 |
| | | $T_A=70^\circ\text{C}$ | 0.95 |
| 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 ^A | $t \leq 10\text{s}$ | $R_{\theta JA}$ | 35 | 45 | $^\circ\text{C/W}$ |
| | Steady-State | | 65 | 85 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^B | $t \leq 10\text{s}$ | $R_{\theta JA}$ | 120 | 155 | $^\circ\text{C/W}$ |
| | Steady-State | | 175 | 235 | $^\circ\text{C/W}$ |

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 T _J =55°C | | | -1 -5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±8V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =-250μA | -0.3 | -0.55 | -1 | V |
| I _{D(ON)} | On state drain current | V _{GS} =-4.5V, V _{DS} =-5V | -15 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =-4.5V, I _D =-3A T _J =125°C | | 100 135 | 120 170 | mΩ |
| | | V _{GS} =-2.5V, I _D =-2.6A | | 128 | 160 | mΩ |
| | | V _{GS} =-1.8V, I _D =-1.5A | | 160 | 200 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =-5V, I _D =-3A | | 6 | | S |
| V _{SD} | Diode Forward Voltage | I _S =-1A, V _{GS} =0V | | -0.76 | | V |
| I _S | Maximum Body-Diode Continuous Current | | | | -1 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =-10V, f=1MHz | | 540 | 700 | pF |
| C _{oss} | Output Capacitance | | | 90 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 63 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 9.5 | | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _g | Total Gate Charge | V _{GS} =-4.5V, V _{DS} =-10V, I _D =-3A | | 5 | 6.5 | nC |
| Q _{gs} | Gate Source Charge | | | 1.2 | | nC |
| Q _{gd} | Gate Drain Charge | | | 1 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =-4.5V, V _{DS} =-10V, R _L =1.5Ω, R _{GEN} =3Ω | | 5 | | ns |
| t _r | Turn-On Rise Time | | | 40 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 28.5 | | ns |
| t _f | Turn-Off Fall Time | | | 46 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =-3A, dI/dt=100A/μs | | 21 | 28 | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =-3A, dI/dt=100A/μs | | 9.1 | | nC |

A: The value of R_{θJA} is measured with the device mounted on 1in² 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_{θJA} 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_{θJA} 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_{θJA} 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_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} 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 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

*This device is guaranteed green after data code 7111 (Oct 15 2007).

Rev 2: Sep 2008

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

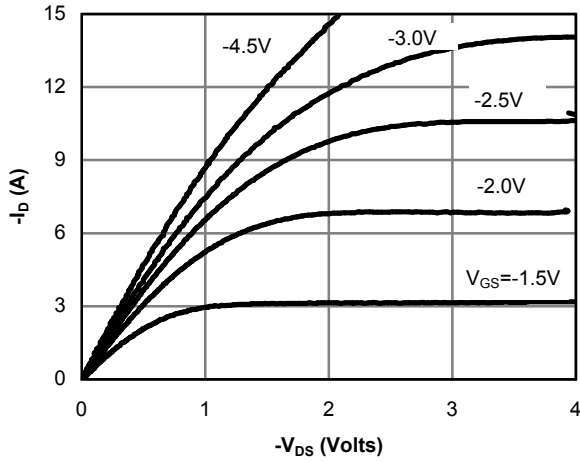


Figure 1: On-Region Characteristics

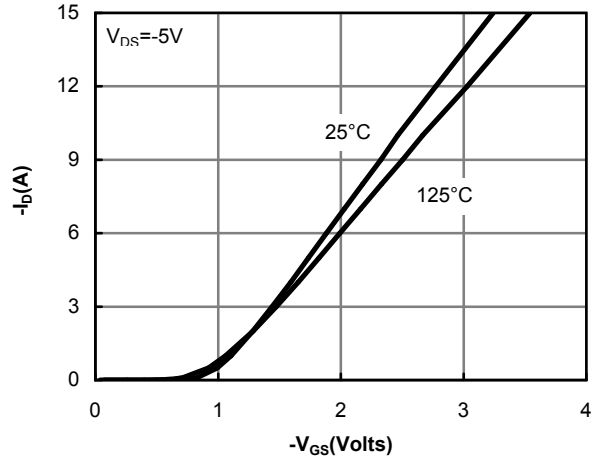


Figure 2: Transfer Characteristics

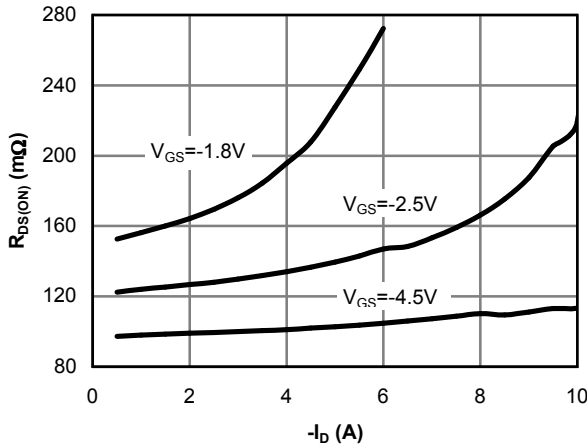


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

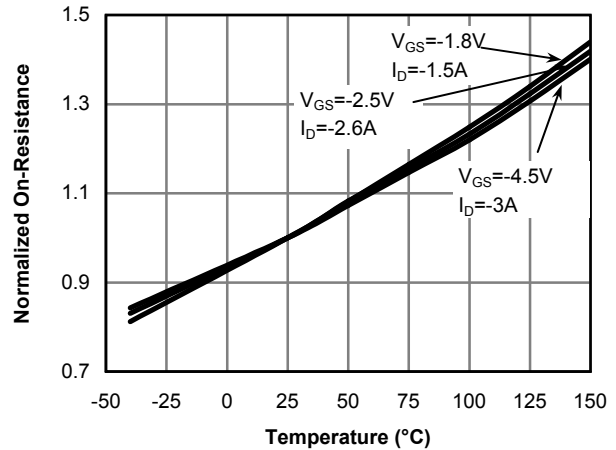


Figure 4: On-Resistance vs. Junction Temperature (Note E)

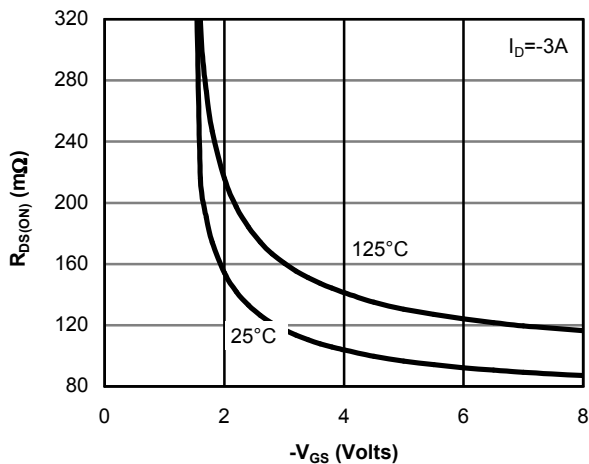


Figure 5: On-Resistance vs. Gate-Source Voltage

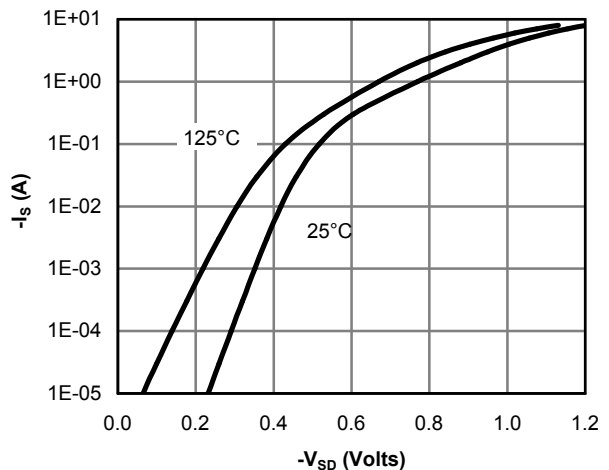


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

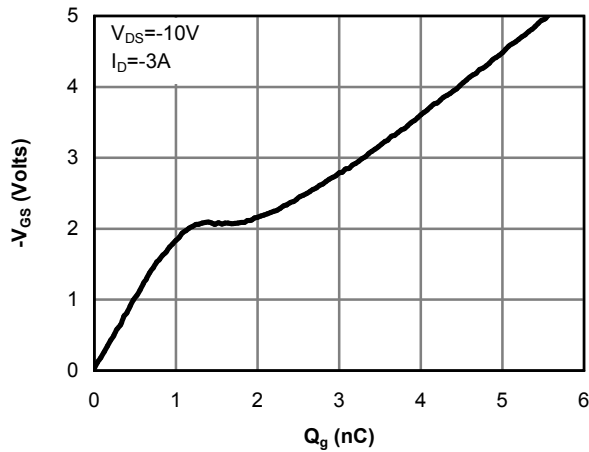


Figure 7: Gate-Charge Characteristics

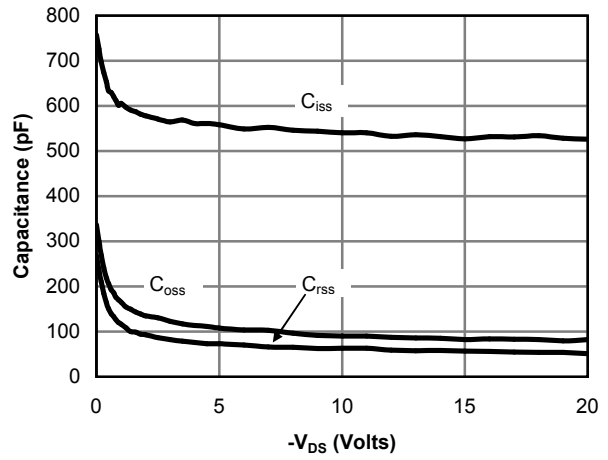


Figure 8: Capacitance Characteristics

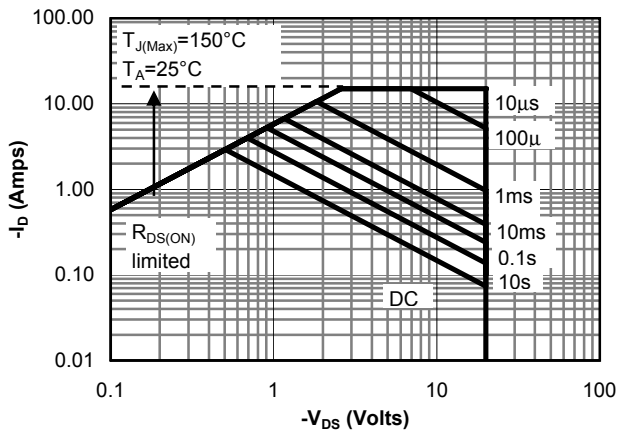


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

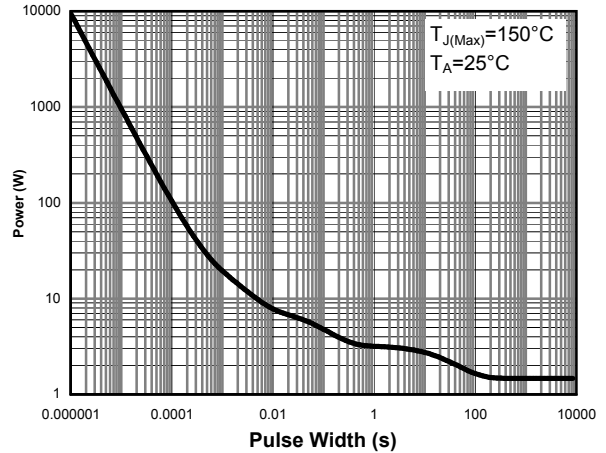


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

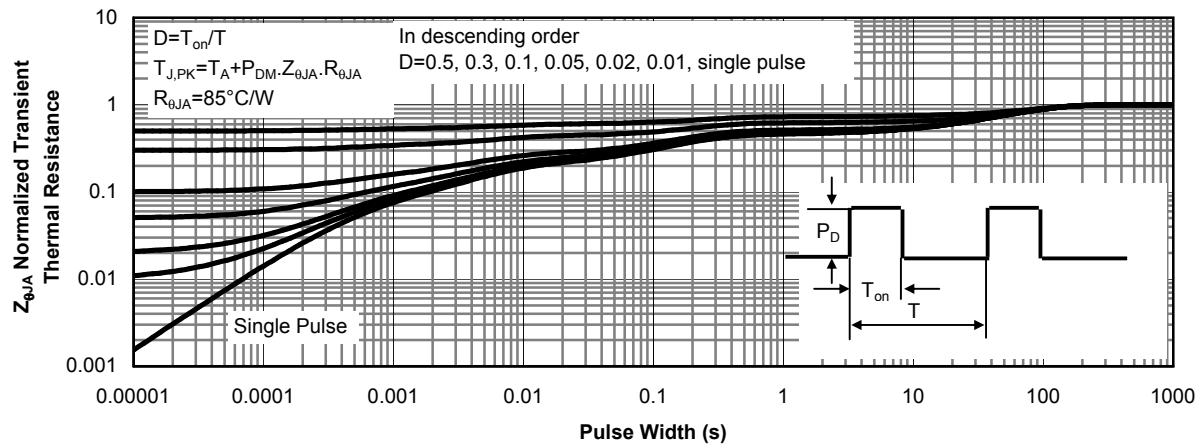
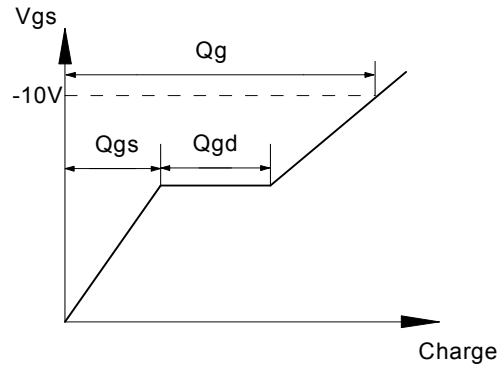
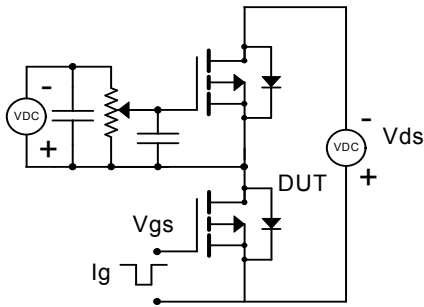
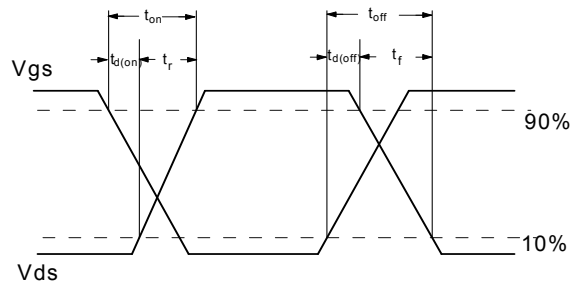
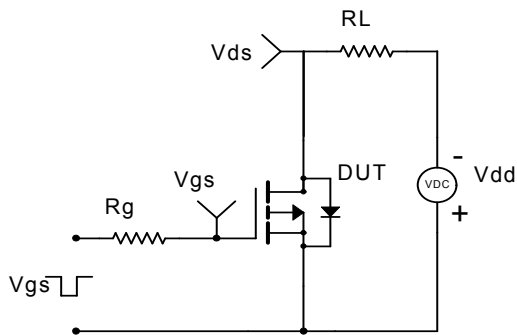


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

