



ALPHA & OMEGA
SEMICONDUCTOR

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.

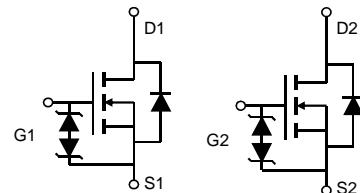
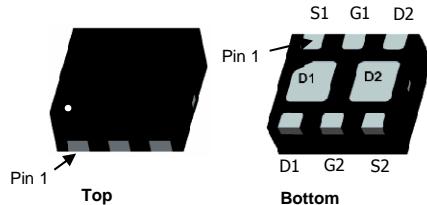
Product Summary

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



DFN 2x2 Package



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current <small>$T_A=25^\circ\text{C}$</small>	I_D	4.5	A
		3.8	
Pulsed Drain Current ^C	I_{DM}	24	
Power Dissipation ^B <small>$T_A=25^\circ\text{C}$</small>	P_D	1.5	W
		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 <small>$t \leq 10\text{s}$</small>	$R_{\theta JA}$	35	45	°C/W
		65	85	°C/W
Maximum Junction-to-Ambient ^B <small>$t \leq 10\text{s}$</small>	$R_{\theta JA}$	120	155	°C/W
		175	235	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 8\text{V}$			20	μA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.4	0.8	1.2	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=4.5\text{V}, V_{DS}=5\text{V}$	24			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=4.5\text{V}, I_D=4\text{A}$ $T_J=125^\circ\text{C}$		37	47	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}, I_D=3\text{A}$		55	70	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=4\text{A}$		47	65	$\text{m}\Omega$
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				1.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=10\text{V}, f=1\text{MHz}$	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	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	1.7	3.5	5.3	Ω
SWITCHING PARAMETERS						
$Q_g(4.5\text{V})$	Total Gate Charge	$V_{GS}=4.5\text{V}, V_{DS}=10\text{V}, I_D=4\text{A}$		4.15	6	nC
Q_{gs}	Gate Source Charge			0.55		nC
Q_{gd}	Gate Drain Charge			1.15		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=4.5\text{V}, V_{DS}=10\text{V}, R_L=2.5\Omega, R_{\text{GEN}}=3\Omega$		9.5		ns
t_r	Turn-On Rise Time			43		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			26		ns
t_f	Turn-Off Fall Time			39		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=4\text{A}, dI/dt=100\text{A}/\mu\text{s}$		11		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=4\text{A}, dI/dt=100\text{A}/\mu\text{s}$		3		nC

A: The value of R_{JJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation P_{DSM} is based on R_{JJA} 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_{JJA} is measured with the device mounted on a minimum pad board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation P_{DSM} is based on R_{JJA} 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_{JJA} is the sum of the thermal impedance from junction to case R_{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 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

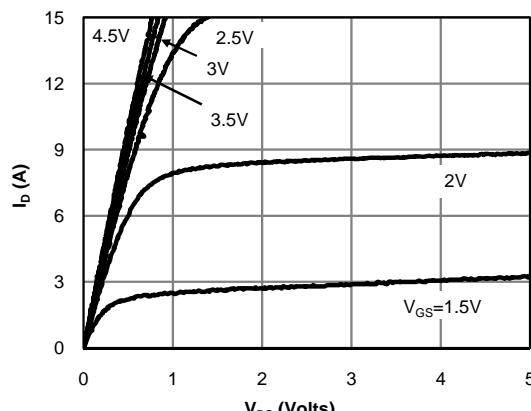


Fig 1: On-Region Characteristics (Note D)

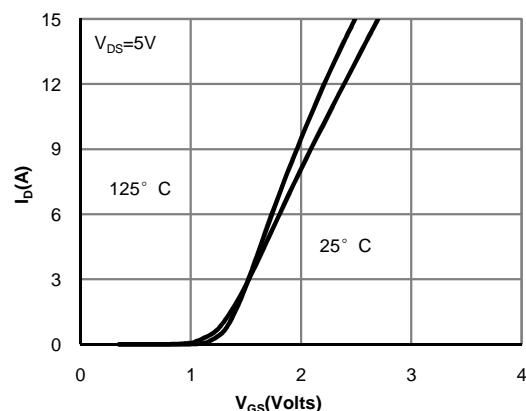


Figure 2: Transfer Characteristics (Note D)

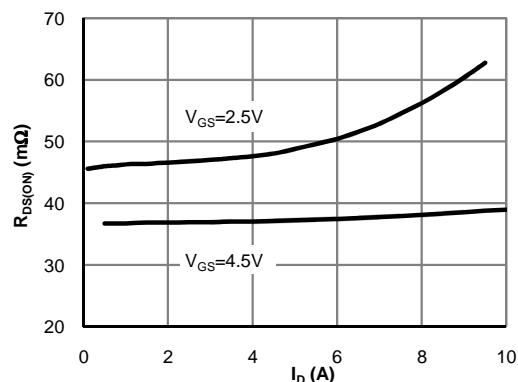


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note D)

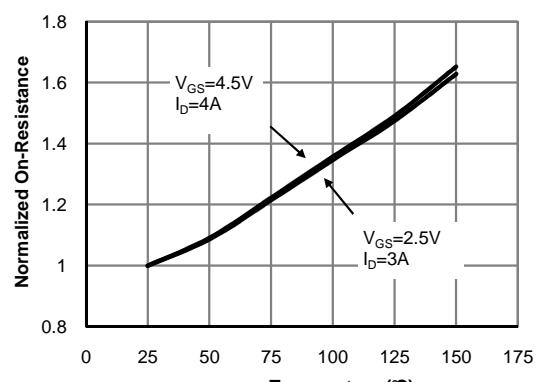


Figure 4: On-Resistance vs. Junction Temperature (Note D)

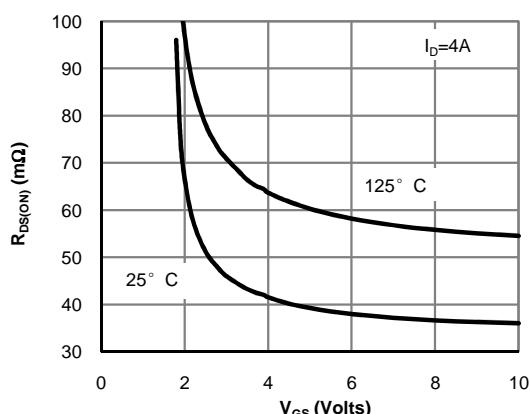


Figure 5: On-Resistance vs. Gate-Source Voltage (Note D)

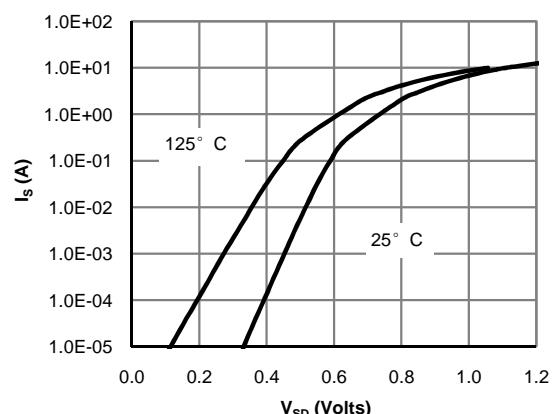


Figure 6: Body-Diode Characteristics (Note D)



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

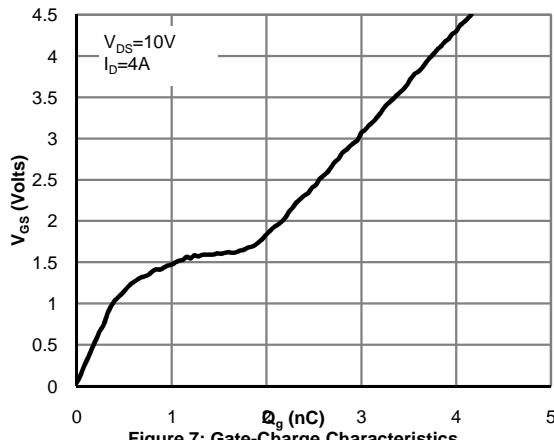


Figure 7: Gate-Charge Characteristics

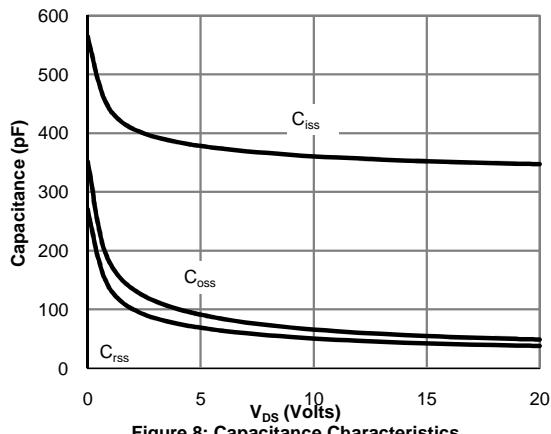


Figure 8: Capacitance Characteristics

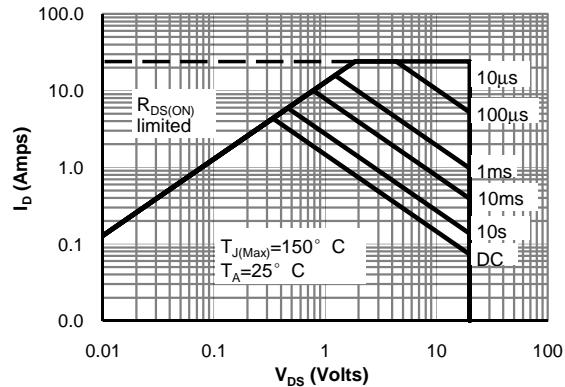


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

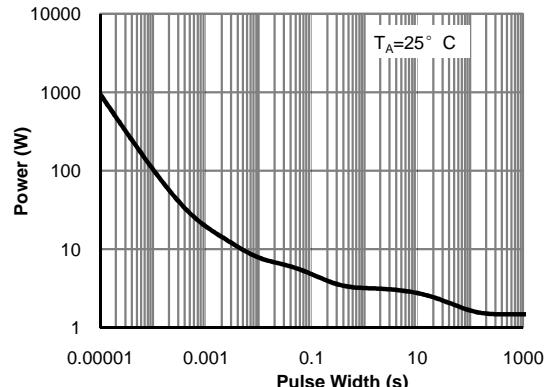


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

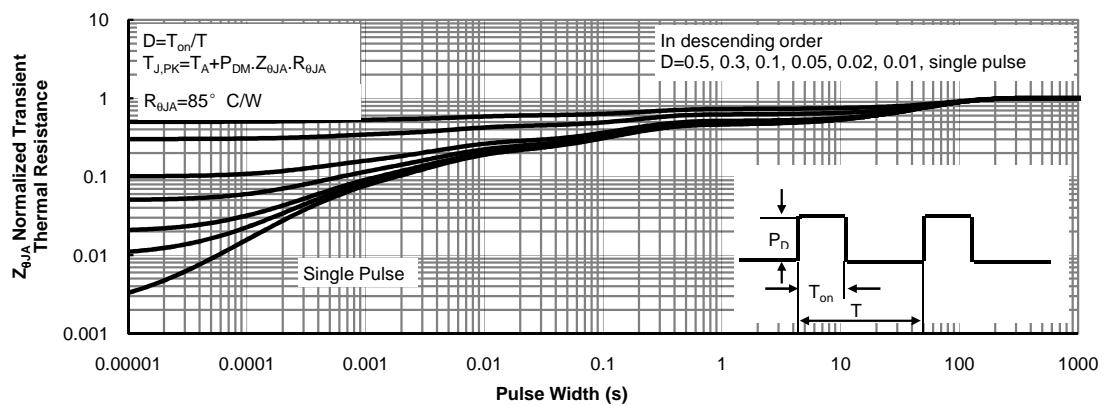
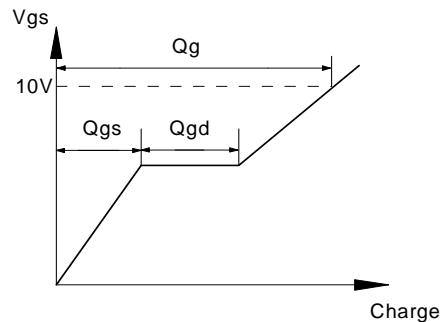
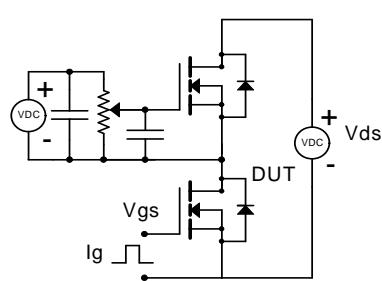


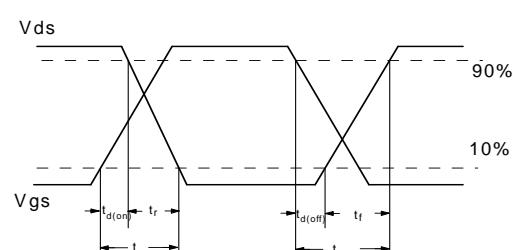
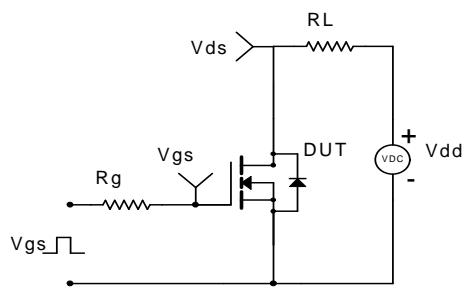
Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

