ALPHA & OMEGA SEMICONDUCTOR

AON2801
Dual P-Channel Enhancement Mode Field Effect Transistor

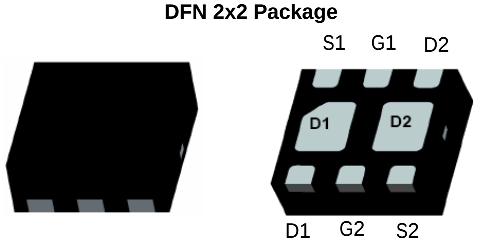
General Description

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
-AON2801L is Halogen Free

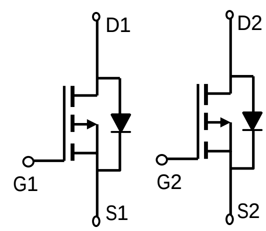
Features

V_{DS} (V) = -20V
I_D = -3A (V$_{GS}$ = -4.5V)
$R_{DS(ON)}$ < 120mΩ (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 160mΩ (V_{GS} = -2.5V)
$R_{DS(ON)}$ < 200mΩ (V_{GS} = -1.8V)

DFN 2x2 Package



Top **Bottom**



Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current[A]	T_A=25°C	I_D	-3	A
	T_A=70°C		-2.3	
Pulsed Drain Current [C]		I_{DM}	-15	
Power Dissipation [A]	T_A=25°C	P_{DSM}	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				±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			100	120	mΩ
			T_J=125°C		135	170	
		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 $R_{\theta JA}$ 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.
Rev 1: July 2008

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

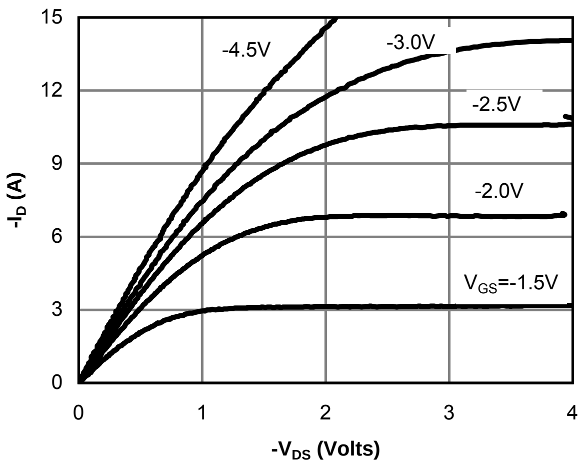


Figure 1: On-Region Characteristics

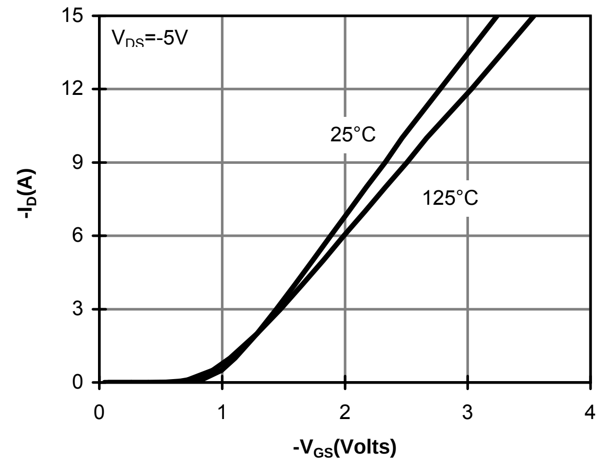


Figure 2: Transfer Characteristics

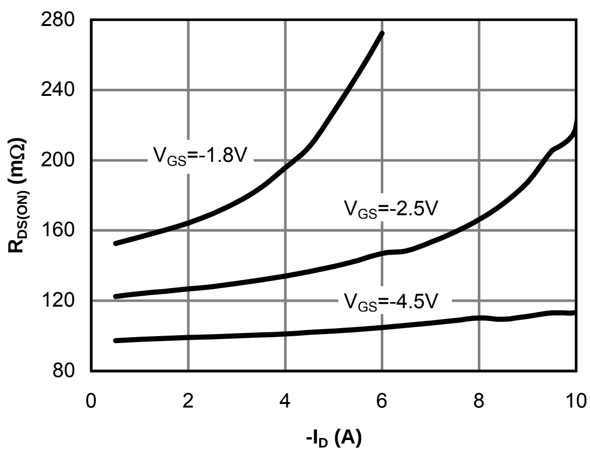


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

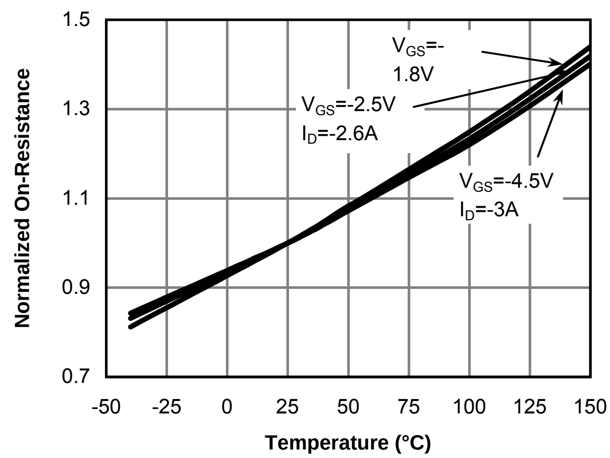


Figure 4: On-Resistance vs. Junction Temperature

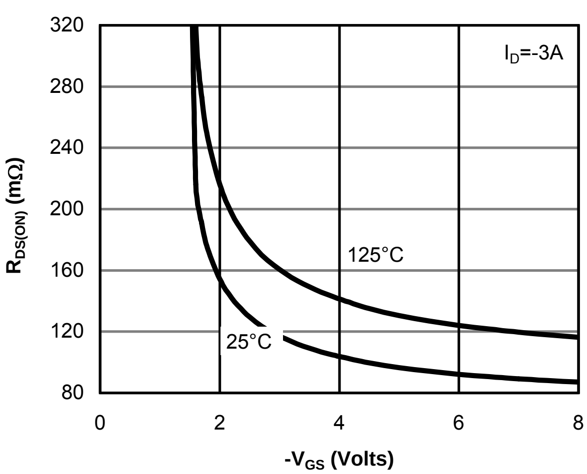


Figure 5: On-Resistance vs. Gate-Source Voltage

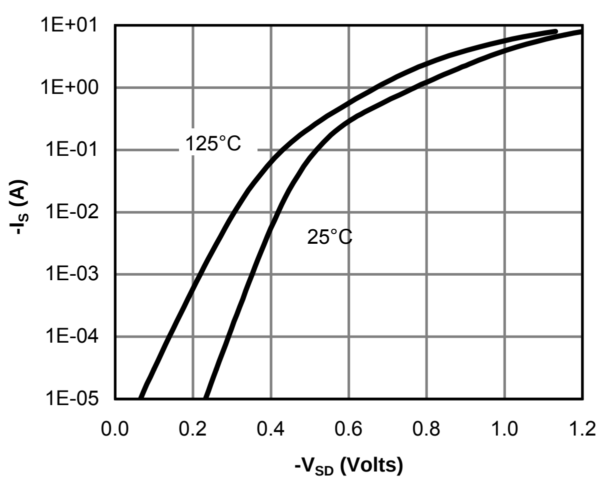


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

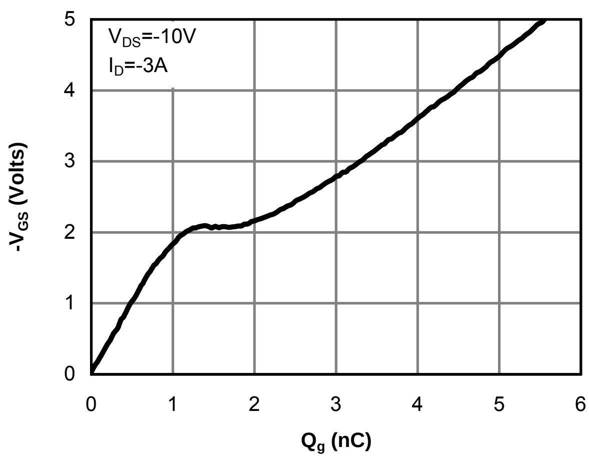


Figure 7: Gate-Charge Characteristics

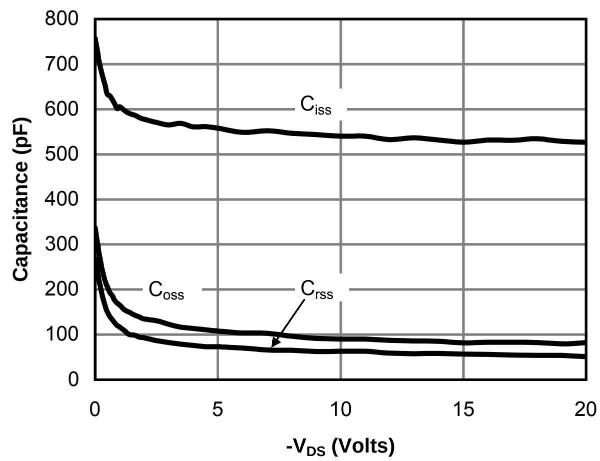


Figure 8: Capacitance Characteristics

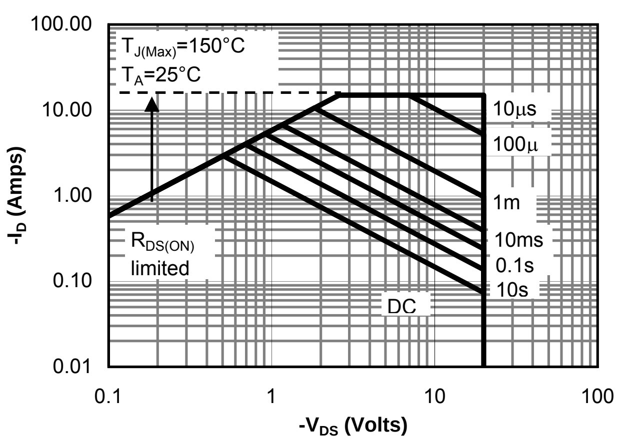


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

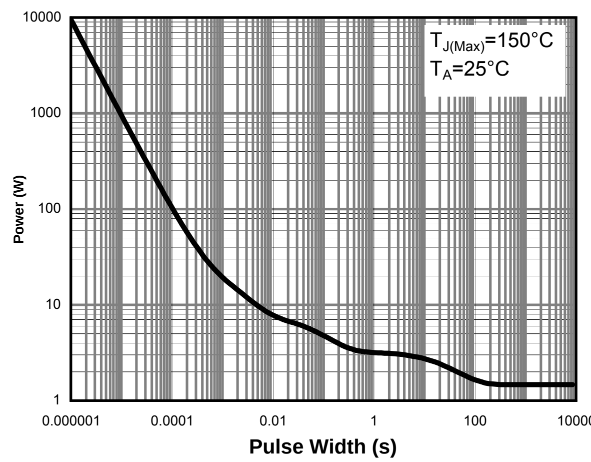


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

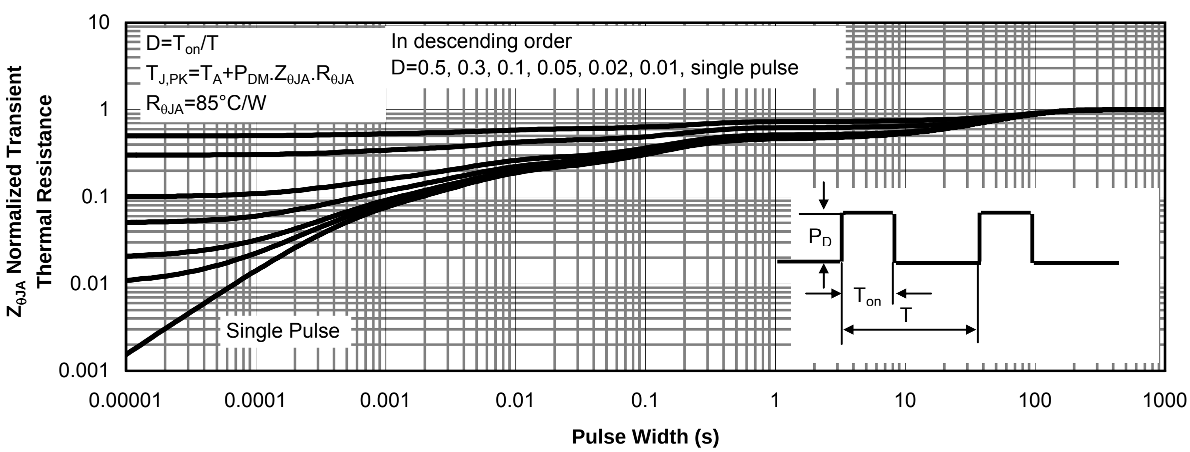


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)