ALPHA & OMEGA SEMICONDUCTOR

AON5802B
Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

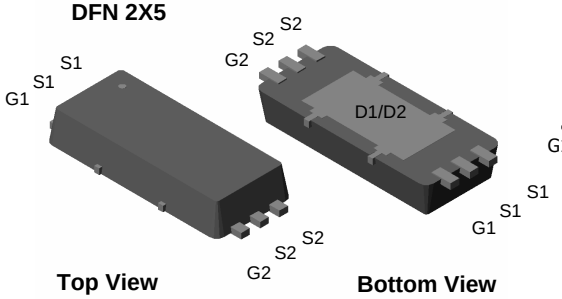
General Description

The AON5802B/L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.
AON5802B and AON5802BL are electrically identical.
-RoHs Compliant
-AON5802BL is Halogen Free

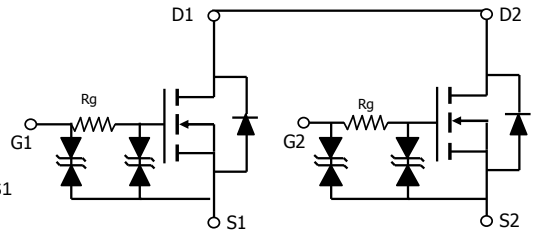
Features

V_{DS} (V) = 30V
I_D = 7.2A (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 19 mΩ (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 20 mΩ (V_{GS} = 4.0V)
$R_{DS(ON)}$ < 23 mΩ (V_{GS} = 3.1V)
$R_{DS(ON)}$ < 30 mΩ (V_{GS} = 2.5V)
ESD Protected

DFN 2X5



Top View **Bottom View**



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current [A]	T_A=25°C	I_D	7.2	A
	T_A=70°C		5.6	
Pulsed Drain Current [B]		I_{DM}	55	
Power Dissipation [A]	T_A=25°C	P_{DSM}	1.6	W
	T_A=70°C		1.0	
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	$R_{\theta JA}$	30	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		61	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	4.5	6	°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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±10V			10	µA
BV_{GSO}	Gate-Source Breakdown Voltage	V_{DS}=0V, I_G=±250uA	±12			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	0.6	1.1	1.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	55			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=7A	12	15.5	19	mΩ
		T_J=125°C	19	23.5	29	
		V_{GS}=4.0V, I_D=5A	13	16	20	
		V_{GS}=3.1V, I_D=5A	14	18	23	
		V_{GS}=2.5V, I_D=4A	17	23	30	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=7A		32		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.71	0.9	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		920	1150	pF
C_{oss}	Output Capacitance			105		pF
C_{rss}	Reverse Transfer Capacitance			52		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.7	2.5	kΩ
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=7A		17.5	24	nC
Q_g(4.5V)	Total Gate Charge			7.5	10	nC
Q_{gs}	Gate Source Charge			2.9		nC
Q_{gd}	Gate Drain Charge			2.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.1Ω, R_{GEN}=3Ω		320	420	ns
t_r	Turn-On Rise Time			550		ns
$t_{D(off)}$	Turn-Off DelayTime			4.35		µs
t_f	Turn-Off Fall Time			2.4		µs
t_{rr}	Body Diode Reverse Recovery Time	I_F=7A, dI/dt=100A/µs		21.6	26	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=7A, dI/dt=100A/µs		10		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 value in any given application depends on the user's specific board design. The current rating is based on the steady state thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

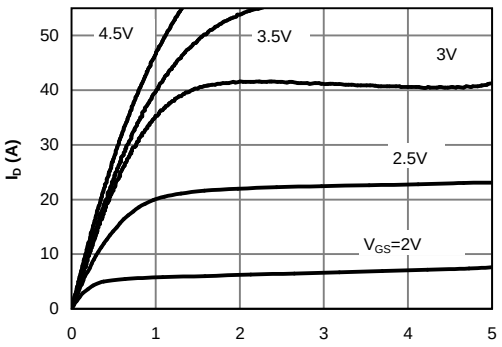


Fig 1: On-Region Characteristics

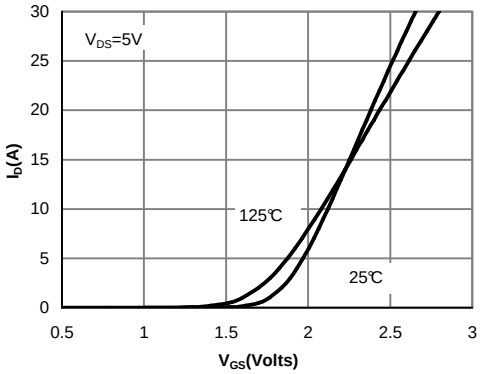


Figure 2: Transfer Characteristics

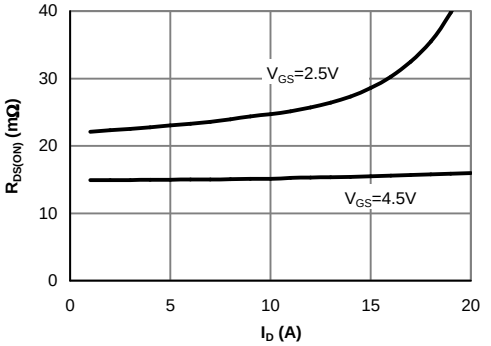


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

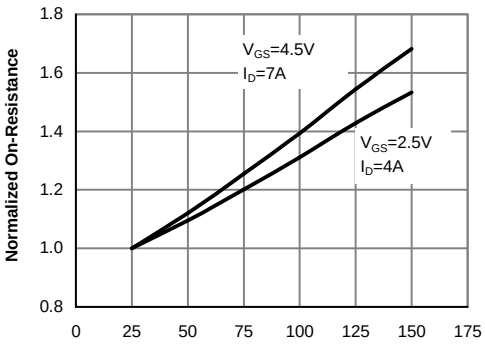


Figure 4: On-Resistance vs. Junction Temperature

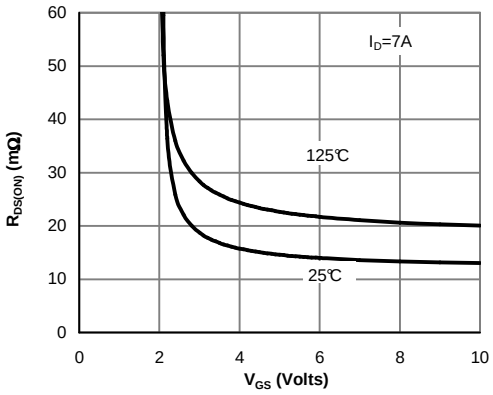


Figure 5: On-Resistance vs. Gate-Source Voltage

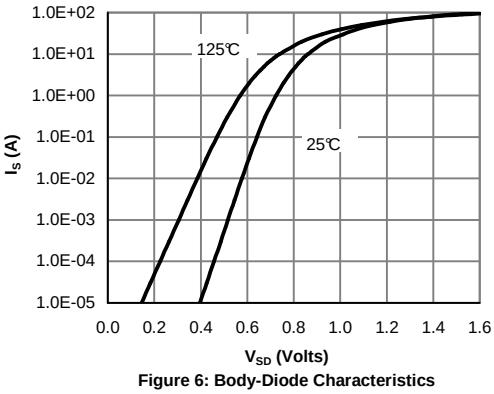


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

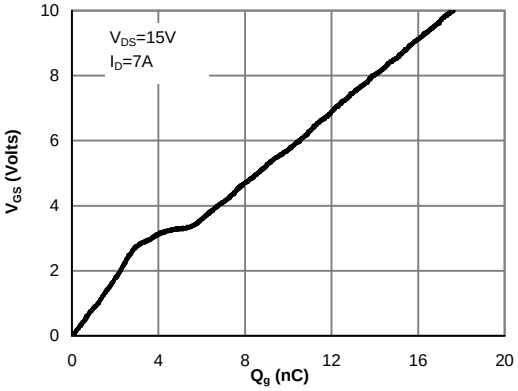


Figure 7: Gate-Charge Characteristics

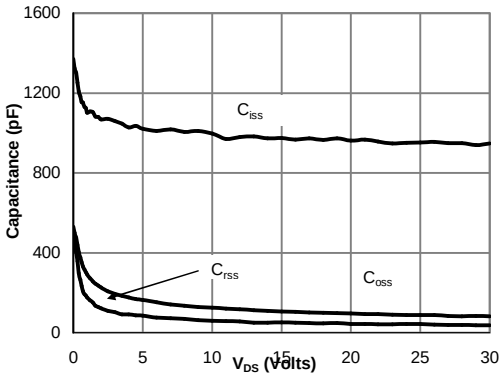


Figure 8: Capacitance Characteristics

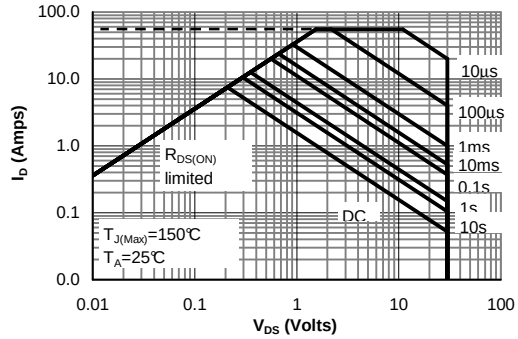


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

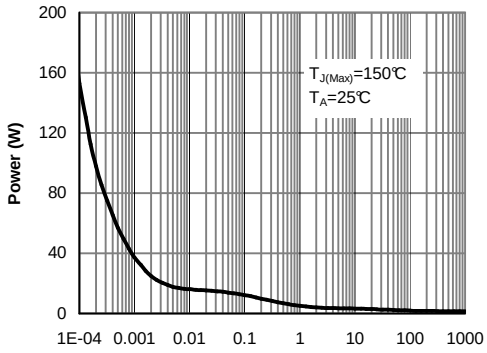


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

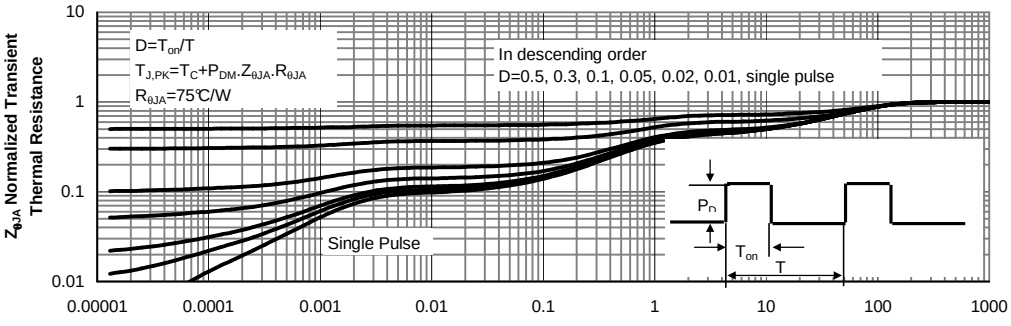
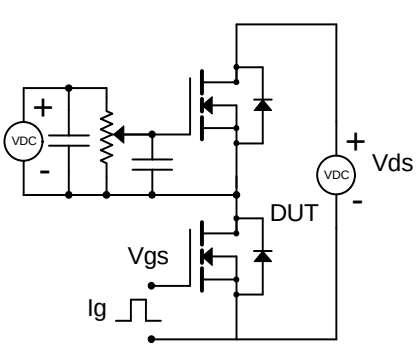
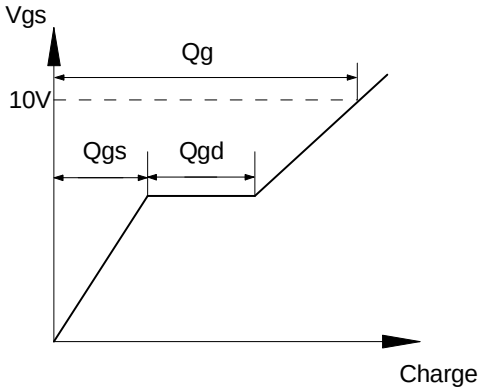


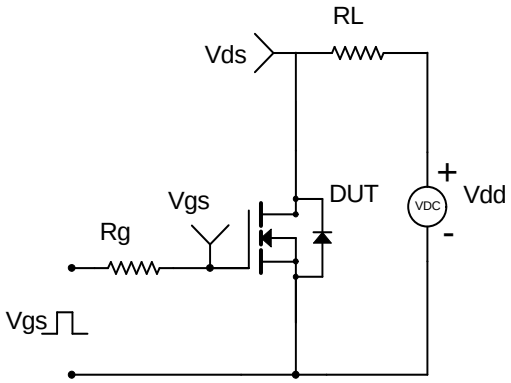
Figure 11: Normalized Maximum Transient Thermal Impedance

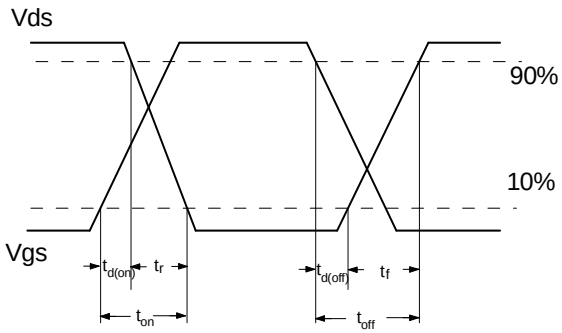
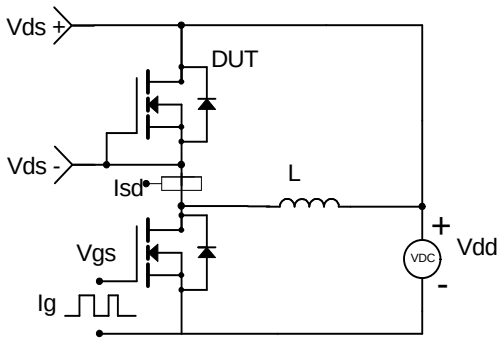
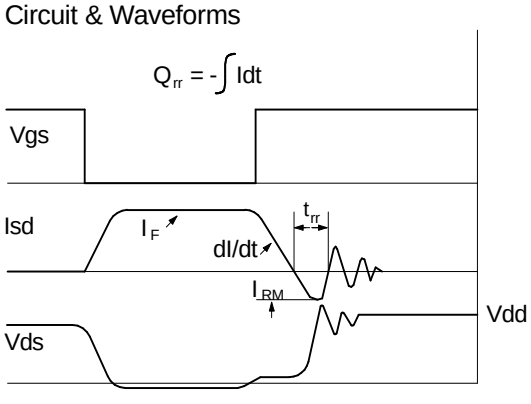
Gate Charge Test Circuit & Waveform





Resistive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms