ALPHA & OMEGA SEMICONDUCTOR

AON5802B

30V Common-Drain Dual N-Channel MOSFET

General Description

The AON5802B 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. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

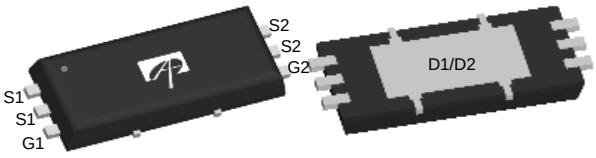
Product Summary

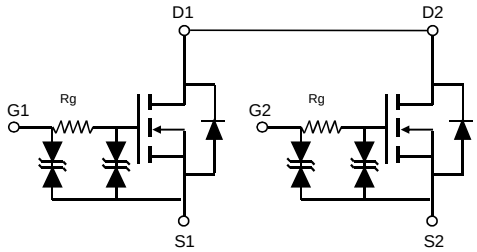
V_{DS}	30V
I_D (at V_{GS}=4.5V)	7.2A
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 19mΩ
$R_{DS(ON)}$ (at V_{GS}=4.0V)	< 20mΩ
$R_{DS(ON)}$ (at V_{GS}=3.1V)	< 23mΩ
$R_{DS(ON)}$ (at V_{GS}=2.5V)	< 30mΩ
Typical ESD protection	**HBM Class 3A**

Green Product

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	V
Continuous Drain Current	T_C=25°C	I_D	7.2	A
	T_C=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	
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 [AC]	Steady-State		61	75	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	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	mΩ
		V_{GS}=3.1V, I_D=5A	14	18	23	mΩ
		V_{GS}=2.5V, I_D=4A	17	23	30	mΩ
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		0.32	0.42	µs
t_r	Turn-On Rise Time			0.55		µs
$t_{D(off)}$	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 1in² 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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

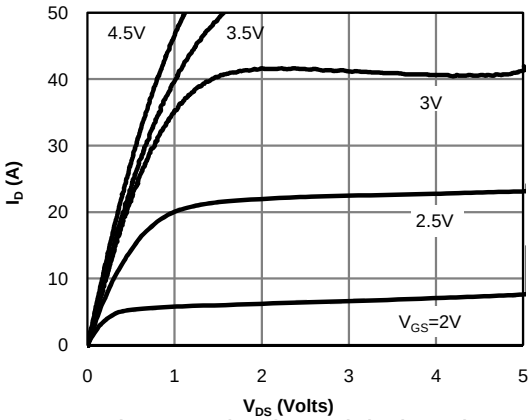


Fig 1: On-Region Characteristics (Note D)

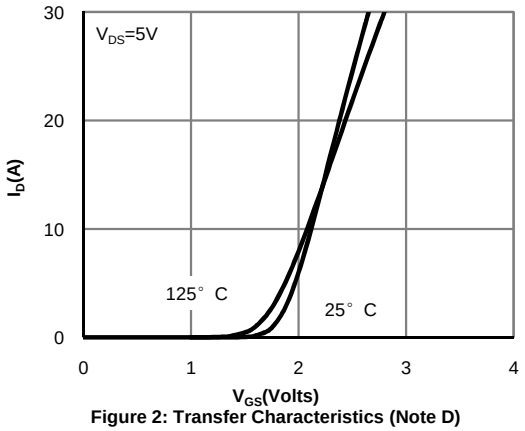


Figure 2: Transfer Characteristics (Note D)

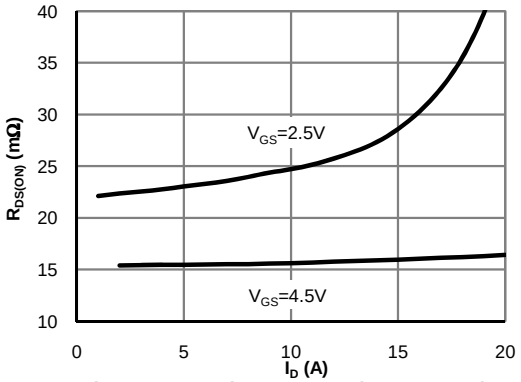


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note D)

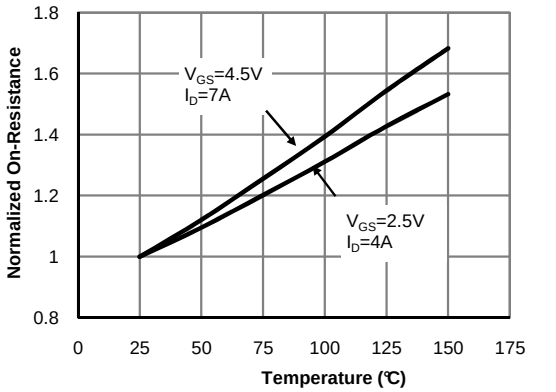


Figure 4: On-Resistance vs. Junction Temperature (Note D)

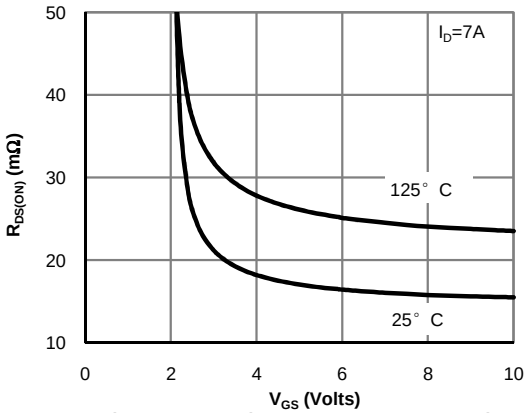


Figure 5: On-Resistance vs. Gate-Source Voltage (Note D)

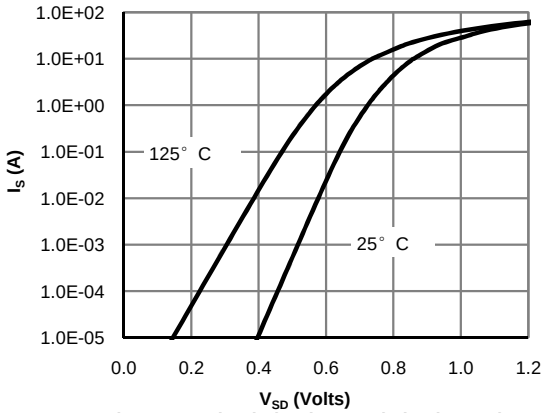


Figure 6: Body-Diode Characteristics (Note D)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

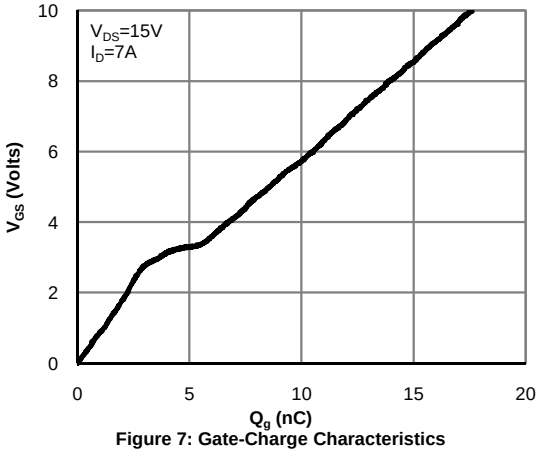


Figure 7: Gate-Charge Characteristics

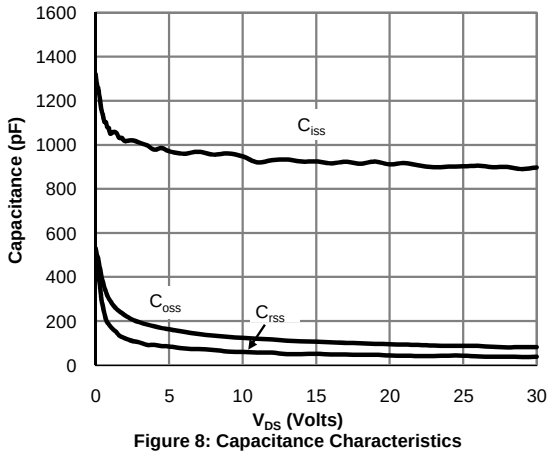


Figure 8: Capacitance Characteristics

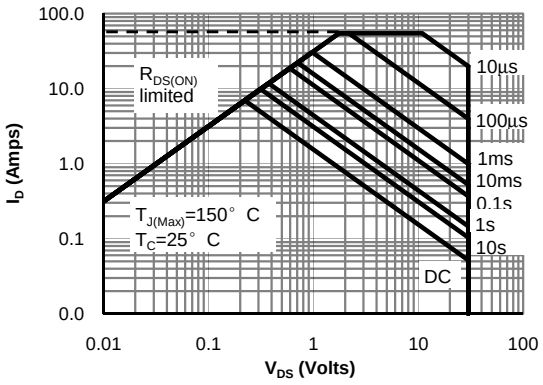


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

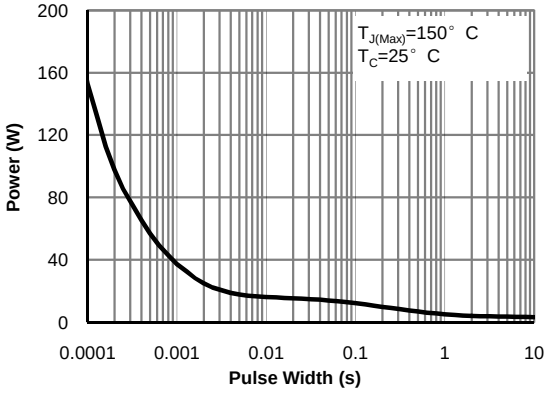


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

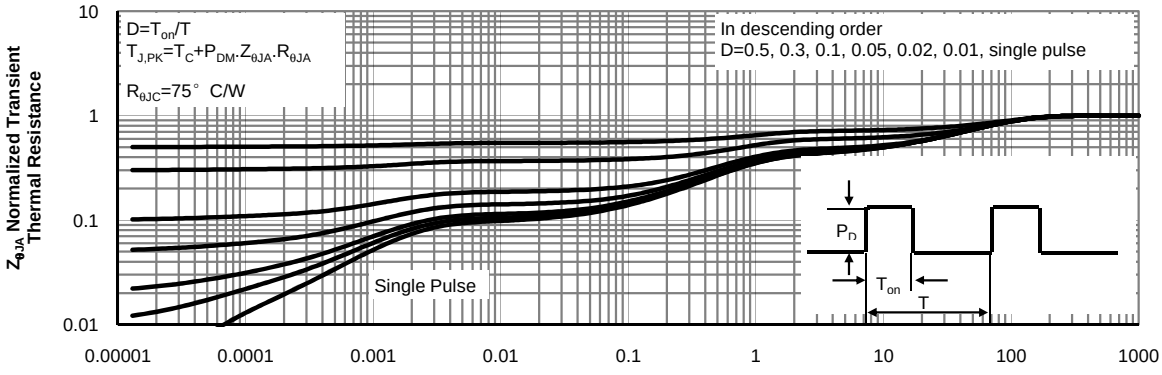
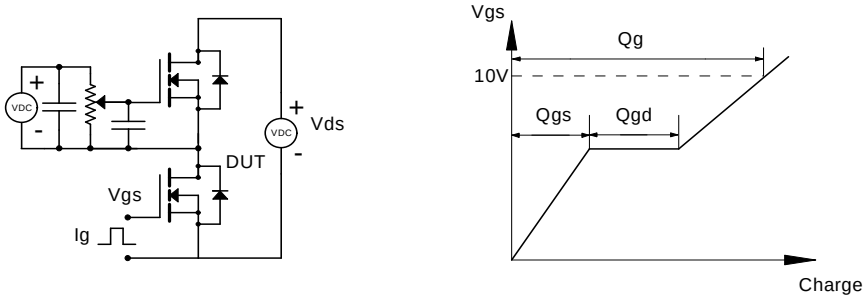
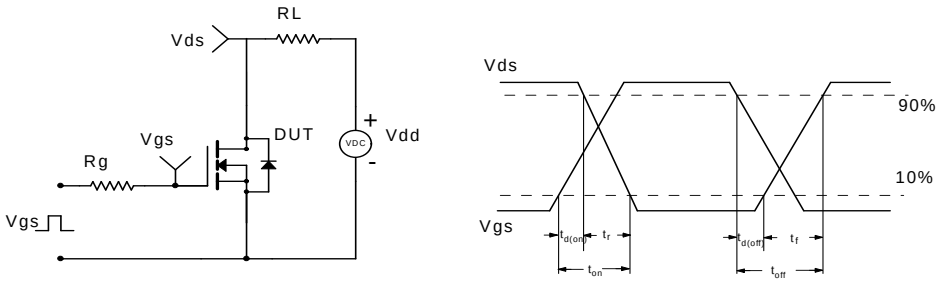


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms