



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

$I_D = 7.2A$ ($V_{GS} = 4.5V$)

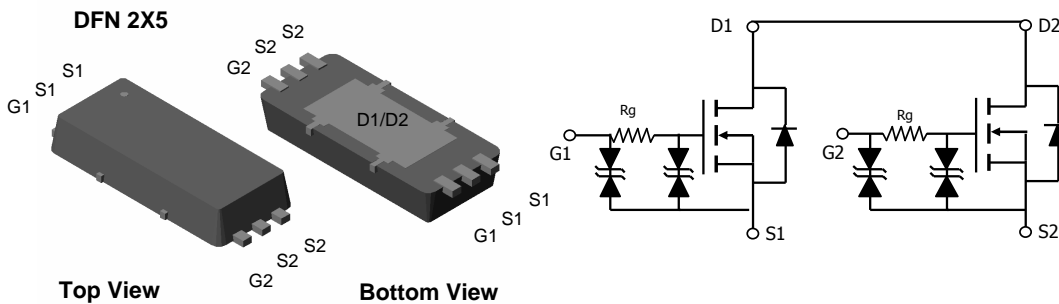
$R_{DS(ON)} < 19 m\Omega$ ($V_{GS} = 4.5V$)

$R_{DS(ON)} < 20 m\Omega$ ($V_{GS} = 4.0V$)

$R_{DS(ON)} < 23 m\Omega$ ($V_{GS} = 3.1V$)

$R_{DS(ON)} < 30 m\Omega$ ($V_{GS} = 2.5V$)

ESD Protected



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current ^A	I_D	$T_A=25^\circ C$	A
		$T_A=70^\circ C$	
Pulsed Drain Current ^B	I_{DM}	55	
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$	30	$^\circ C/W$
		Steady-State	40	
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	61	75	$^\circ C/W$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	4.5	6	$^\circ C/W$

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 T _J =55°C			1 5	μA
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 =±250μA	±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 T _J =125°C	12 19	15.5 23.5	19 29	mΩ
		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			920	1150	pF
C _{oss}	Output Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		105		pF
C _{riss}	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			17.5	24	nC
Q _g (4.5V)	Total Gate Charge			7.5	10	nC
Q _{gs}	Gate Source Charge	V _{GS} =10V, V _{DS} =15V, I _D =7A		2.9		nC
Q _{gd}	Gate Drain Charge			2.5		nC
t _{D(on)}	Turn-On Delay Time			320	420	ns
t _r	Turn-On Rise Time	V _{GS} =10V, V _{DS} =15V, R _L =2.1Ω,		550		ns
t _{D(off)}	Turn-Off Delay Time	R _{GEN} =3Ω		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_{θJA} is measured with the device mounted on 1 in² 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_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

Rev5: July2011

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

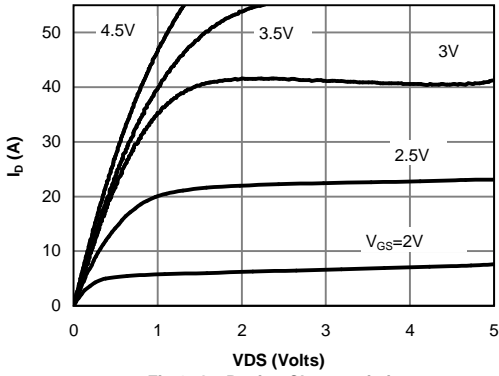


Fig 1: On-Region Characteristics

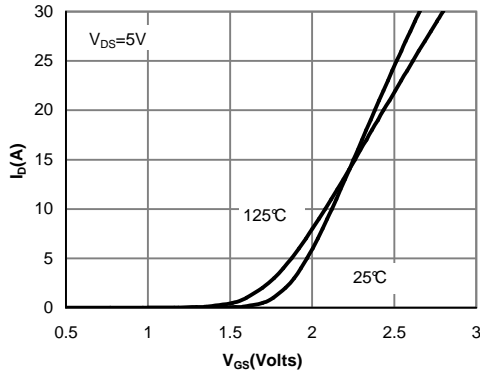


Figure 2: Transfer Characteristics

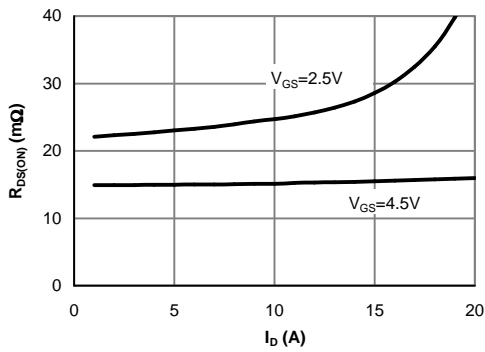


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

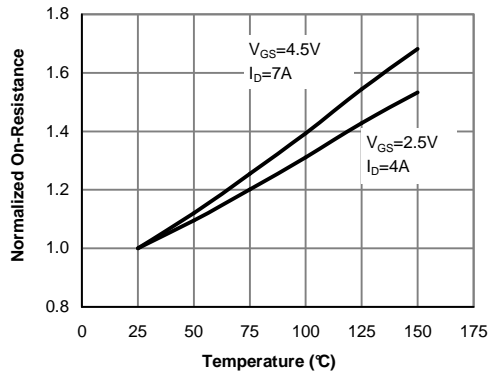


Figure 4: On-Resistance vs. Junction Temperature

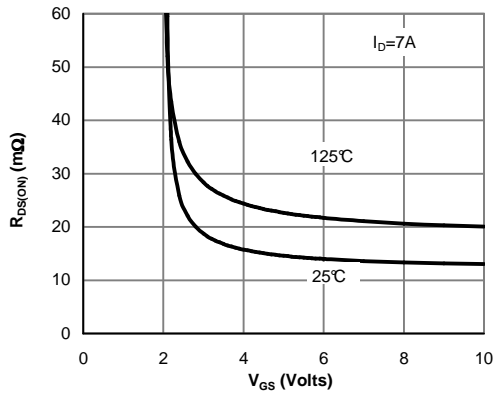


Figure 5: On-Resistance vs. Gate-Source Voltage

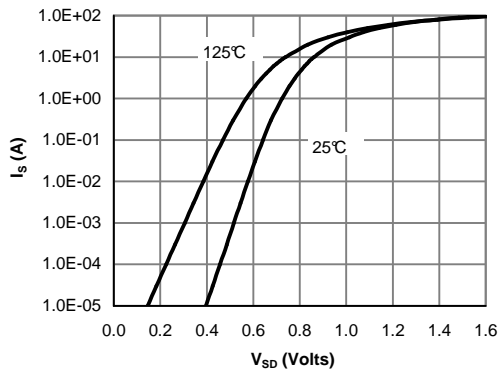


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

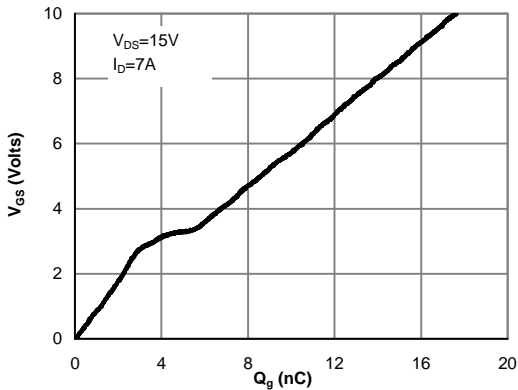


Figure 7: Gate-Charge Characteristics

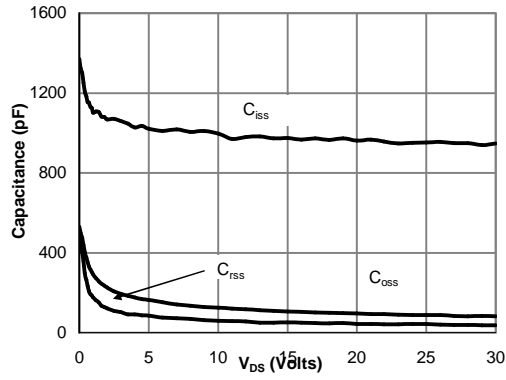


Figure 8: Capacitance Characteristics

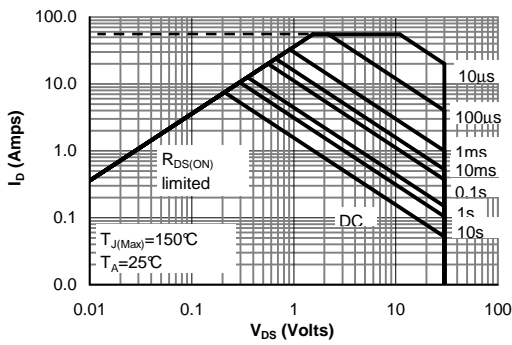


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

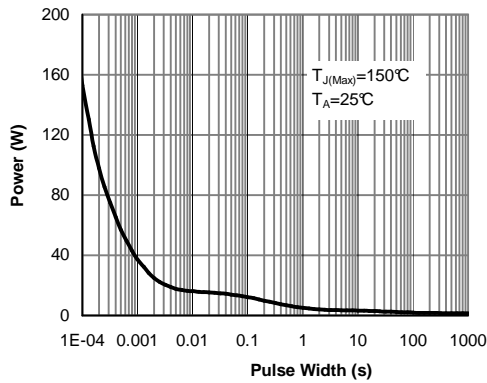


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

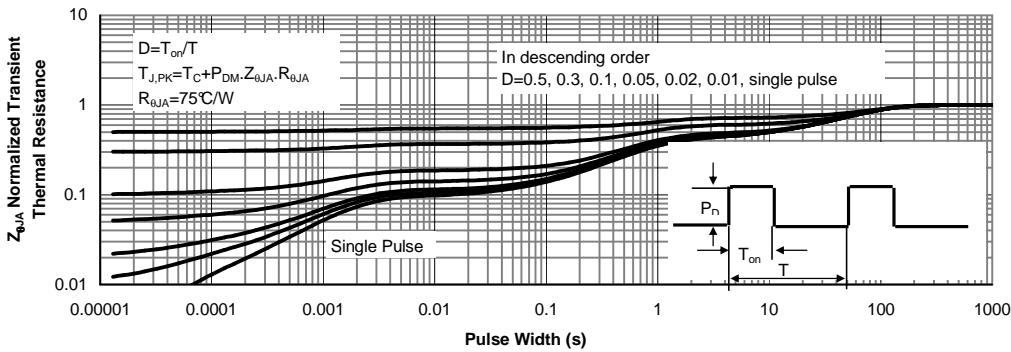
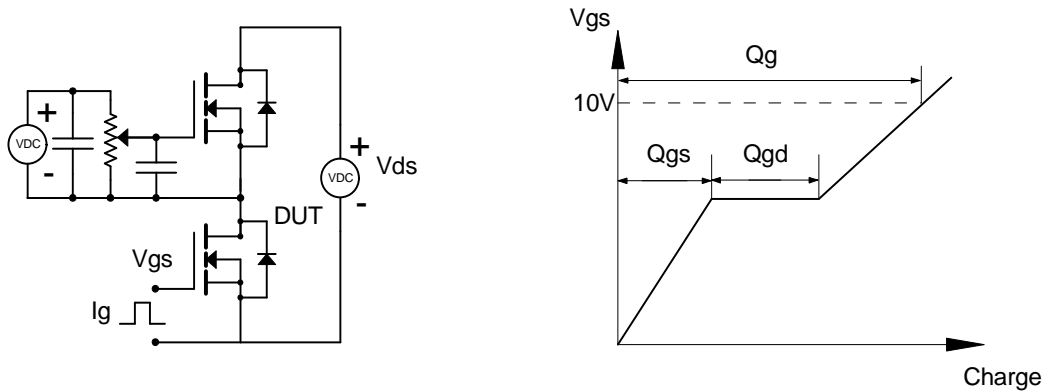
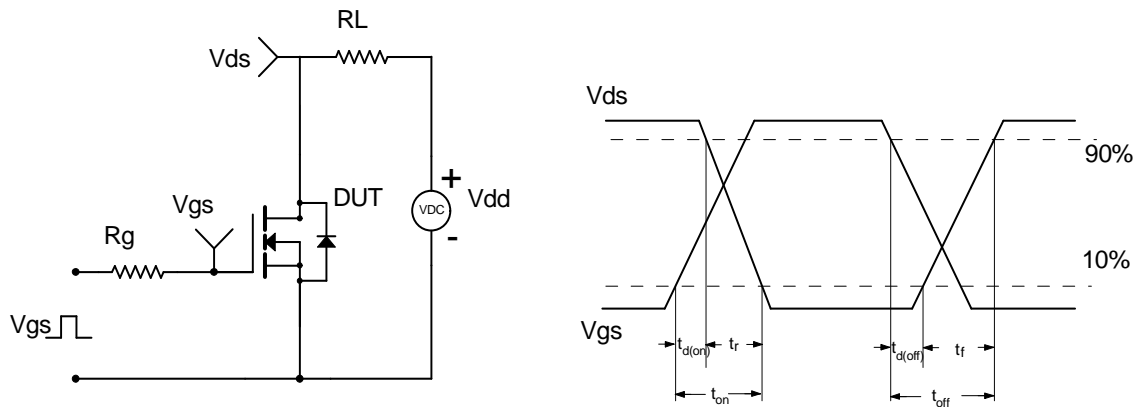


Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

