ALPHA & OMEGA
SEMICONDUCTOR

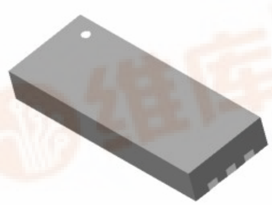
AON5802
Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

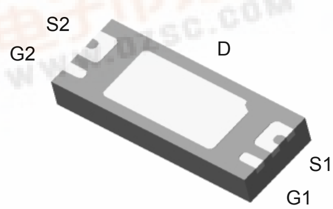
The AON5800 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration. *Standard Product AON5802 is Pb-free (meets ROHS & Sony 259 specifications). AON5802L is a Green Product ordering option. AON5802 and AON5802L are electrically identical.*

Features

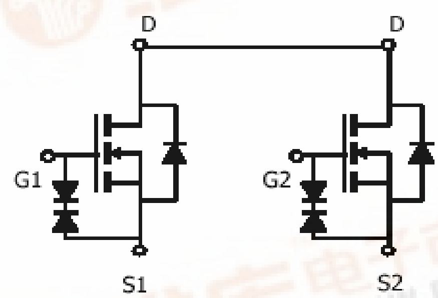
V_{DS} (V) = 30V
I_D = 8 A (V_{GS} = 10V)
$R_{DS(ON)}$ < 17 mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 20 mΩ (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 22 mΩ (V_{GS} = 4.0V)
$R_{DS(ON)}$ < 24 mΩ (V_{GS} = 3.1V)
$R_{DS(ON)}$ < 30 mΩ (V_{GS} = 2.5V)
ESD Rating: 2000V HBM



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 $R_{\theta JA}$=75°C/W	T_A=25°C	I_D	8	A
	T_A=70°C		6	
Pulsed Drain Current [C]		I_{DM}	45	
Power Dissipation [A] $R_{\theta JA}$=75°C/W	T_A=25°C	P_{DSM}	1.7	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 [B]	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}=24V, 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	1.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=8A		14	17	mΩ
		T_J=125°C		23	28	
		V_{GS}=4.5V, I_D=6A		17	20	
		V_{GS}=4.0V, I_D=4A		18	22	
		V_{GS}=3.1V, I_D=4A		20	24	
		V_{GS}=2.5V, I_D=3A		23	30	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=8A		37		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V	0.5	0.76	0.9	V
I_S	Maximum Body-Diode Continuous Current				4.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		869		pF
C_{oss}	Output Capacitance			129		pF
C_{rss}	Reverse Transfer Capacitance			104		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Q_g(4.5V)	Total Gate Charge	V_{GS}=4.5V, V_{DS}=15V, I_D=8A		10.7		nC
Q_{gs}	Gate Source Charge			2.1		nC
Q_{gd}	Gate Drain Charge			4.3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.25Ω, R_{GEN}=3Ω		3.4		ns
t_r	Turn-On Rise Time			11.2		ns
$t_{D(off)}$	Turn-Off DelayTime			27.2		ns
t_f	Turn-Off Fall Time			6.7		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=8A, dI/dt=100A/µs		24.6		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=8A, dI/dt=100A/µs		12.9		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 t ≤ 10s 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 80 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.
Rev2: June 2005

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

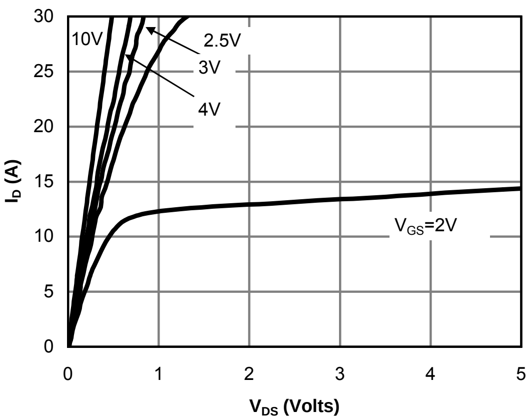


Fig 1: On-Region Characteristics

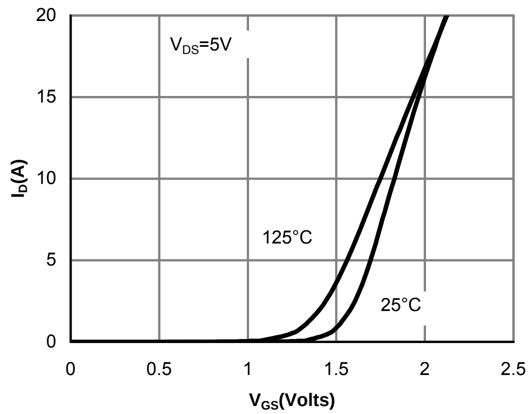


Figure 2: Transfer Characteristics

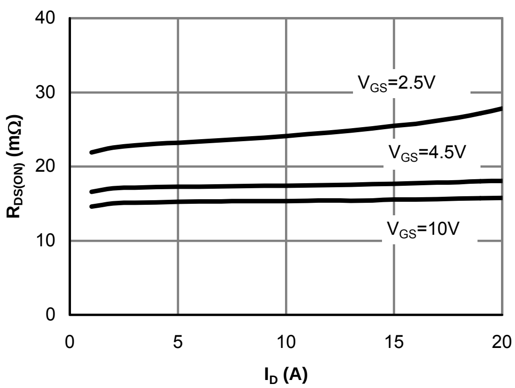


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

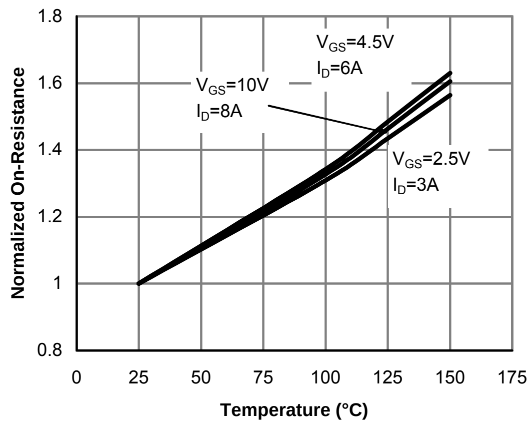


Figure 4: On-Resistance vs. Junction Temperature

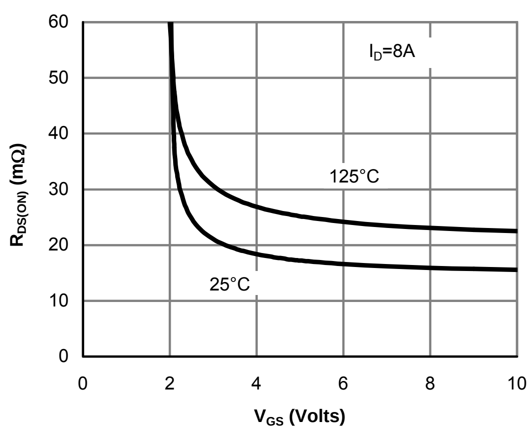


Figure 5: On-Resistance vs. Gate-Source Voltage

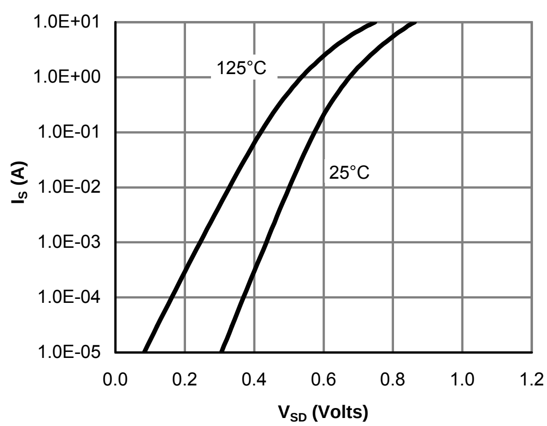


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

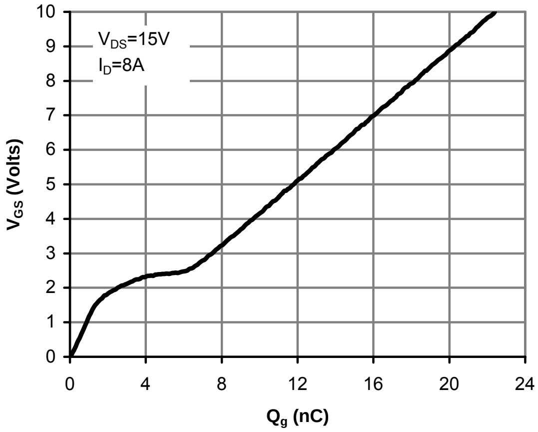


Figure 7: Gate-Charge Characteristics

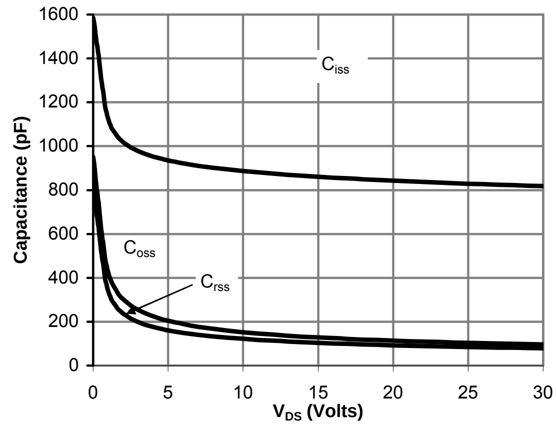


Figure 8: Capacitance Characteristics

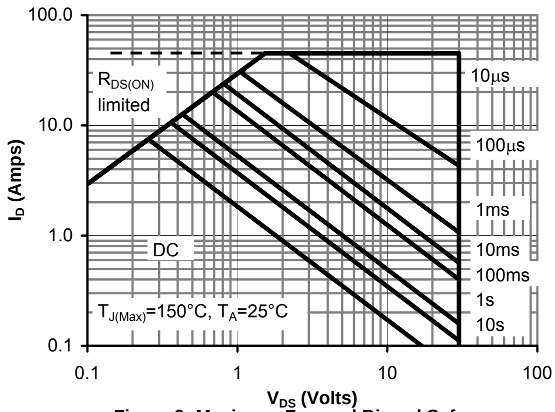


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

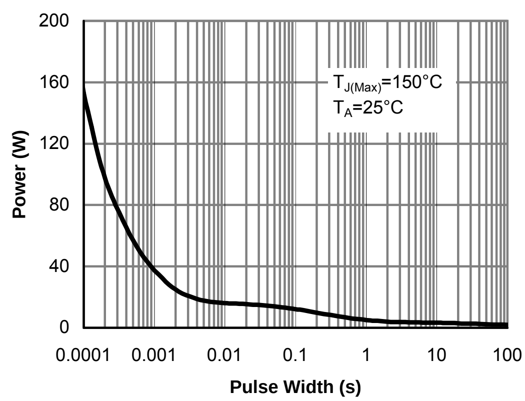


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

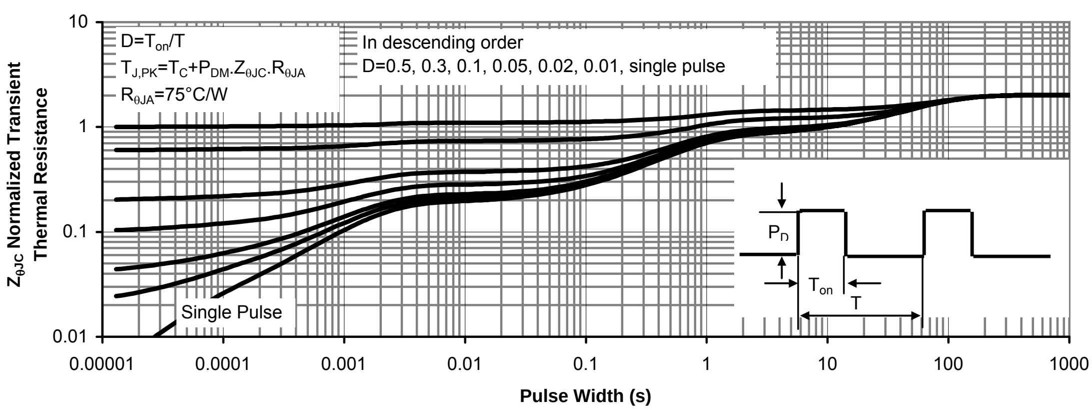


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)