



**AO8803**

**Dual P-Channel Enhancement Mode Field Effect Transistor**

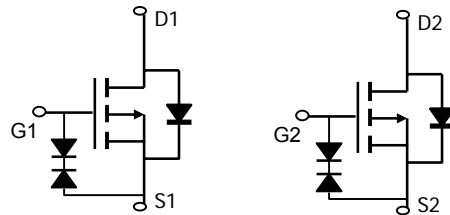
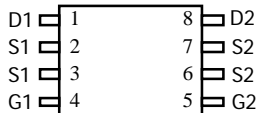
**General Description**

The AO8803/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. It is ESD protected. *AO8803 and AO8803L are electrically identical.*  
-RoHS Compliant  
-AO8803L is Halogen Free

**Features**

$V_{DS}$  (V) = -12V  
 $I_D$  = -7 A ( $V_{GS}$  = -4.5V)  
 $R_{DS(ON)} < 18m\Omega$  ( $V_{GS}$  = -4.5V)  
 $R_{DS(ON)} < 22m\Omega$  ( $V_{GS}$  = -2.5V)  
 $R_{DS(ON)} < 29m\Omega$  ( $V_{GS}$  = -1.8V)  
ESD Rating: 4KV HBM

**TSSOP-8  
Top View**



**Absolute Maximum Ratings  $T_A=25^\circ\text{C}$  unless otherwise noted**

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-12	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>A</sup>	$T_A=25^\circ\text{C}$	-7	A
	$T_A=70^\circ\text{C}$	-5.8	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	-30	
Power Dissipation <sup>A</sup>	$T_A=25^\circ\text{C}$	1.4	W
	$T_A=70^\circ\text{C}$	0.9	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Units	
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	$t \leq 10s$	73	90	$^\circ\text{C/W}$
		Steady-State	96	125	
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	63	75	$^\circ\text{C/W}$	

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-12			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-9.6\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 4.5\text{V}$			$\pm 1$	$\mu\text{A}$
		$V_{DS}=0\text{V}$ , $V_{GS}=\pm 8\text{V}$			$\pm 10$	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-0.3	-0.55	-1	
$I_{D(ON)}$	On state drain current	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-5\text{V}$	-30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$ , $I_D=-7\text{A}$ $T_J=125^\circ\text{C}$		15 19	18 23	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$ , $I_D=-6\text{A}$		18	22	$\text{m}\Omega$
		$V_{GS}=-1.8\text{V}$ , $I_D=-5\text{A}$		22	29	$\text{m}\Omega$
		$V_{GS}=-1.5\text{V}$ , $I_D=-1\text{A}$		28		$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=-5\text{V}$ , $I_D=-7\text{A}$		34		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1\text{A}$ , $V_{GS}=0\text{V}$		-0.78	-1	V
$I_S$	Maximum Body-Diode Continuous Current				-2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance			3960	4750	pF
$C_{oss}$	Output Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=-6\text{V}$ , $f=1\text{MHz}$		910		pF
$C_{riss}$	Reverse Transfer Capacitance			757		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		6.9	8.5	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g$	Total Gate Charge			36.6	44	nC
$Q_{gs}$	Gate Source Charge	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-6\text{V}$ , $I_D=-7\text{A}$		3.4		nC
$Q_{gd}$	Gate Drain Charge			10		nC
$t_{D(on)}$	Turn-On Delay Time			15		ns
$t_r$	Turn-On Rise Time	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-6\text{V}$ , $R_L=0.86\Omega$ , $R_{GEN}=3\Omega$		43		ns
$t_{D(off)}$	Turn-Off Delay Time			158		ns
$t_f$	Turn-Off Fall Time			95		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=-7\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		49	60	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-7\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		19.4		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on  $1\text{in}^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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

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

D: The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on  $1\text{in}^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

Rev 6 : Feb 2008

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

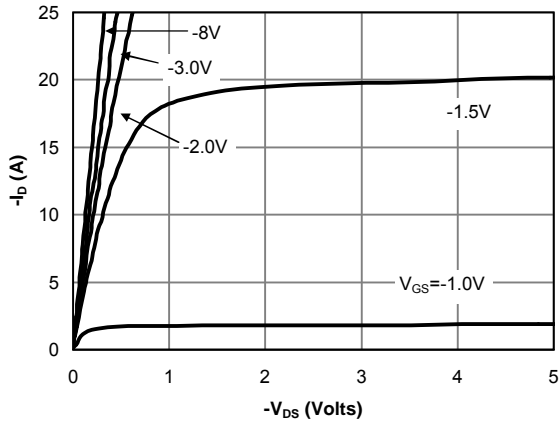


Fig 1: On-Region Characteristics

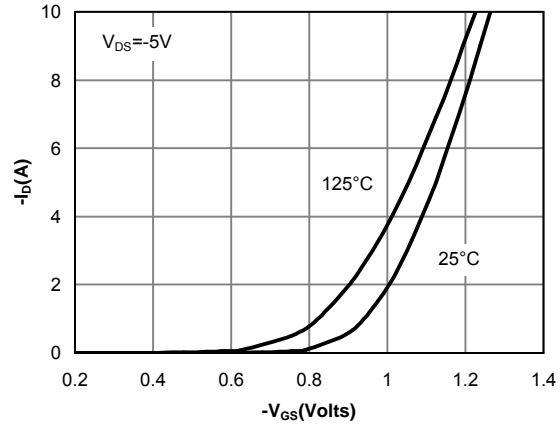


Figure 2: Transfer Characteristics

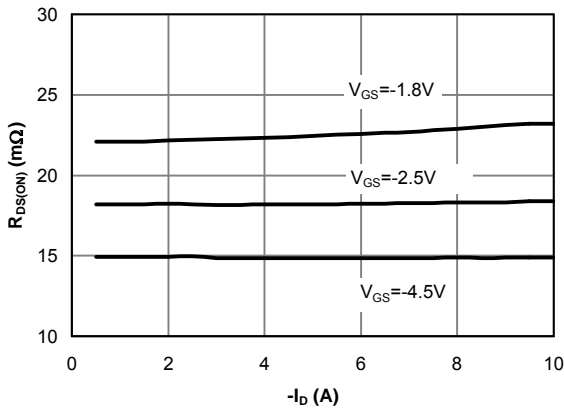


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

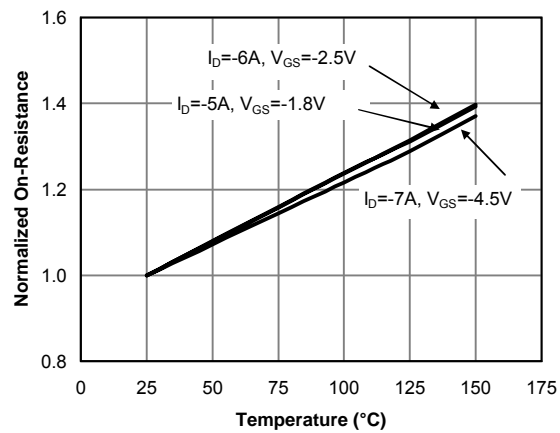


Figure 4: On-Resistance vs. Junction Temperature

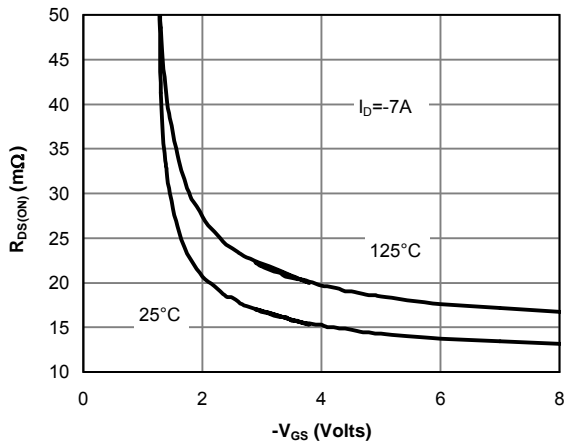


Figure 5: On-Resistance vs. Gate-Source Voltage

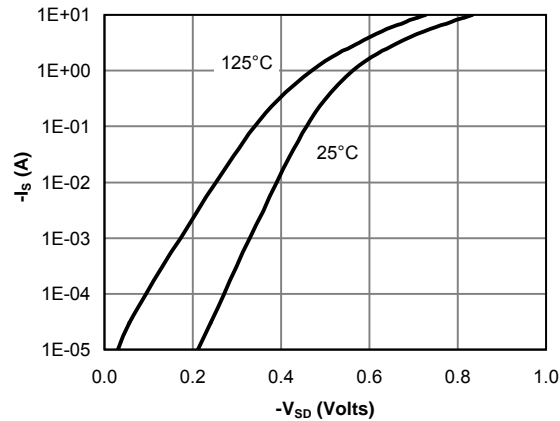


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

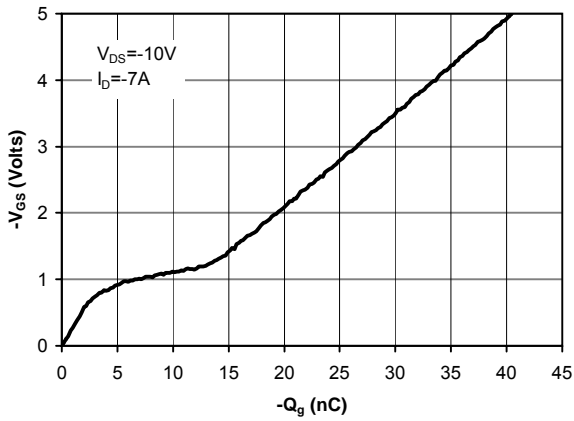


Figure 7: Gate-Charge Characteristics

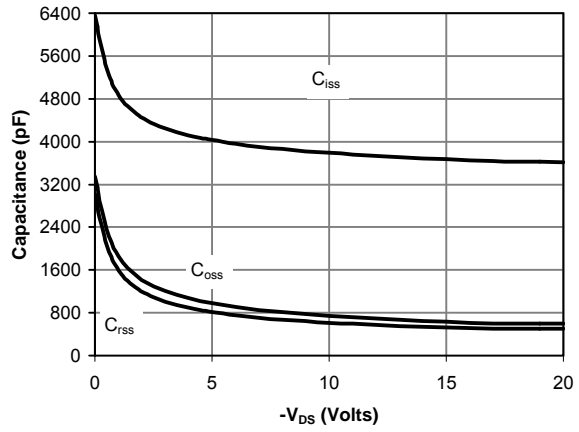


Figure 8: Capacitance Characteristics

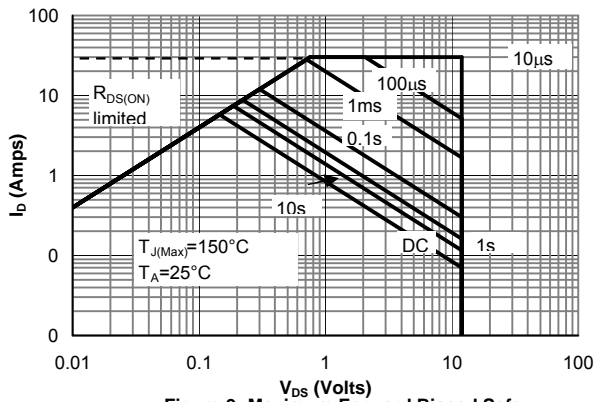


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

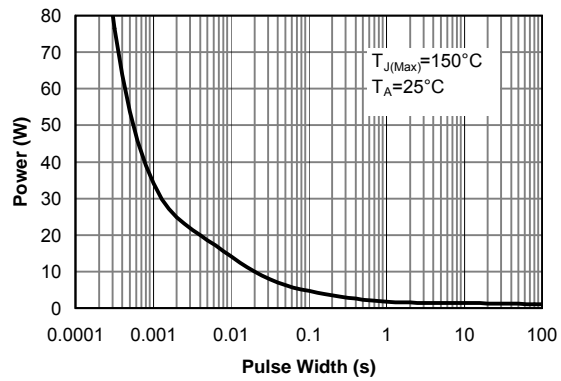


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

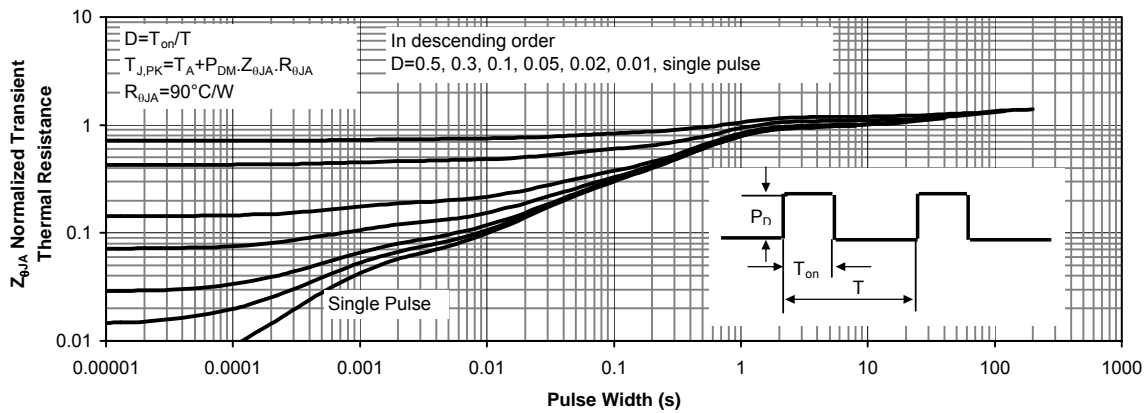


Figure 11: Normalized Maximum Transient Thermal Impedance