

## AON5810

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

#### General Description

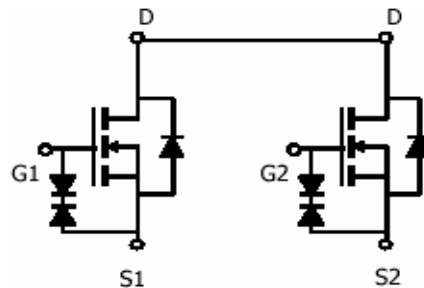
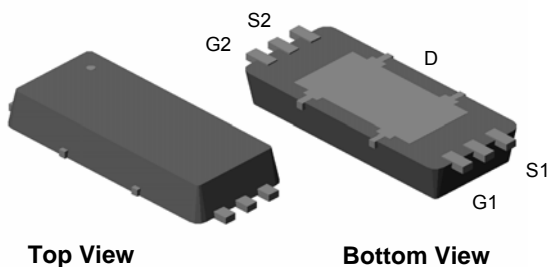
The AON5810 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 1.8V while retaining a 12V  $V_{GS(MAX)}$  rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration. *Standard Product AON5810 is Pb-free (meets ROHS & Sony 259 specifications). AON5810L is a Green Product ordering option. AON5810 and AON5810L are electrically identical.*

#### Features

$V_{DS} (V) = 20V$   
 $I_D = 7.7 A (V_{GS} = 4.5V)$

$R_{DS(ON)} < 18 m\Omega (V_{GS} = 4.5V)$   
 $R_{DS(ON)} < 19 m\Omega (V_{GS} = 4.0V)$   
 $R_{DS(ON)} < 21 m\Omega (V_{GS} = 3.1V)$   
 $R_{DS(ON)} < 25 m\Omega (V_{GS} = 2.5V)$   
 $R_{DS(ON)} < 40 m\Omega (V_{GS} = 1.8V)$   
 ESD Rating: 2000V HBM

#### DFN 2X5



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	
Continuous Drain Current $R_{\theta JA}=75^\circ C/W$	$I_D$	$T_A=25^\circ C$ 7.7	A
Current $T_A=70^\circ C$		6.1	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	30	
Power Dissipation <sup>A</sup> $R_{\theta JA}=75^\circ C/W$	$P_{DSM}$	$T_A=25^\circ C$ 1.6	W
		$T_A=70^\circ C$ 1.0	
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 <sup>A</sup> $t \leq 10s$	$R_{\theta JA}$	30	40	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup> Steady-State		61	75	$^\circ C/W$
Maximum Junction-to-Case <sup>B</sup> Steady-State	$R_{\theta JC}$	4.5	6	$^\circ C/W$

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	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	20			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=16\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1	$\mu\text{A}$
					5	
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 10\text{V}$			10	$\mu\text{A}$
$BV_{GSO}$	Gate-Source Breakdown Voltage	$V_{DS}=0\text{V}$ , $I_G=\pm 250\mu\text{A}$	$\pm 12$			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	0.5	0.73	1	V
$I_{D(ON)}$	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	$V_{GS}=4.5\text{V}$ , $I_D=7.7\text{A}$ $T_J=125^\circ\text{C}$		14	18	$\text{m}\Omega$
				21	26	
		$V_{GS}=4.0\text{V}$ , $I_D=6\text{A}$		14.5	19	$\text{m}\Omega$
		$V_{GS}=3.1\text{V}$ , $I_D=6\text{A}$		16.7	21	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$ , $I_D=5\text{A}$		20	25	$\text{m}\Omega$
		$V_{GS}=1.8\text{V}$ , $I_D=4\text{A}$		32	40	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=7.7\text{A}$		28		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$	0.5	0.74	1	V
$I_S$	Maximum Body-Diode Continuous Current				2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=10\text{V}$ , $f=1\text{MHz}$		1360		pF
$C_{oss}$	Output Capacitance			200		pF
$C_{rss}$	Reverse Transfer Capacitance			178		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		1.5		$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(4.5\text{V})$	Total Gate Charge	$V_{GS}=4.5\text{V}$ , $V_{DS}=10\text{V}$ , $I_D=7.7\text{A}$		13.1		nC
$Q_{gs}$	Gate Source Charge			2		nC
$Q_{gd}$	Gate Drain Charge			3.9		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=5\text{V}$ , $V_{DS}=10\text{V}$ , $R_L=1.4\Omega$ , $R_{GEN}=3\Omega$		6.2		ns
$t_r$	Turn-On Rise Time			11		ns
$t_{D(off)}$	Turn-Off Delay Time			40.5		ns
$t_f$	Turn-Off Fall Time			10		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=7.7\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		18.8		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=7.7\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		8.1		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> 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 80  $\mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in<sup>2</sup> 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

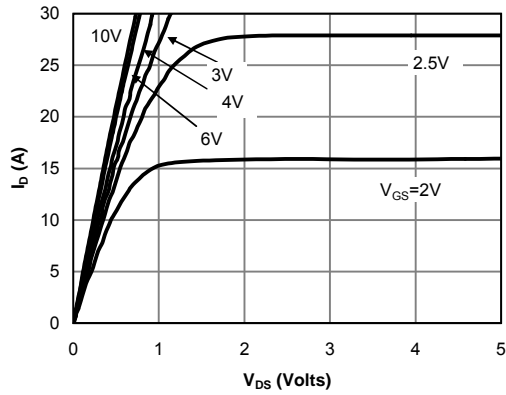


Fig 1: On-Region Characteristics

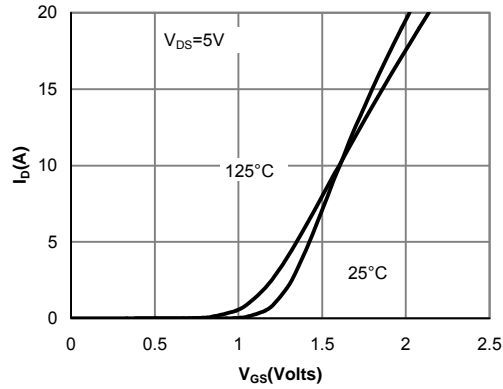


Figure 2: Transfer Characteristics

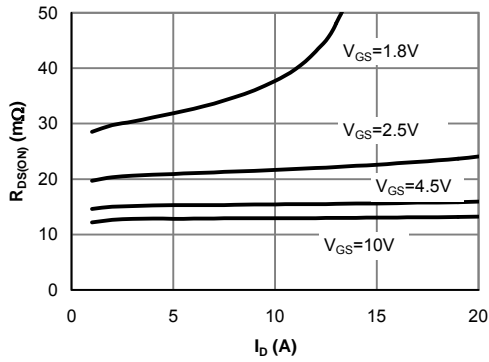


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

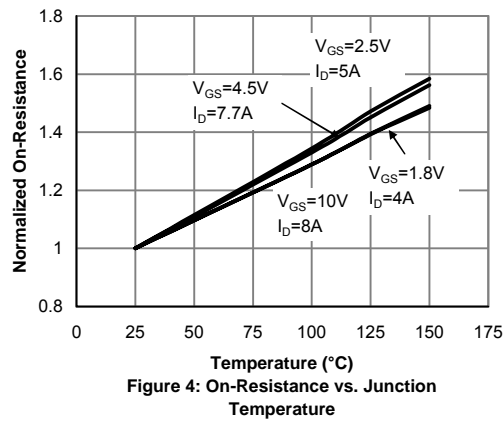


Figure 4: On-Resistance vs. Junction Temperature

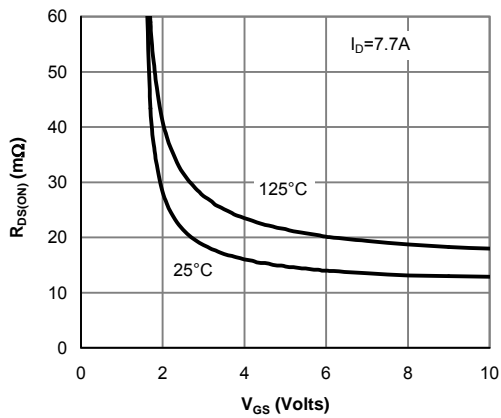


Figure 5: On-Resistance vs. Gate-Source Voltage

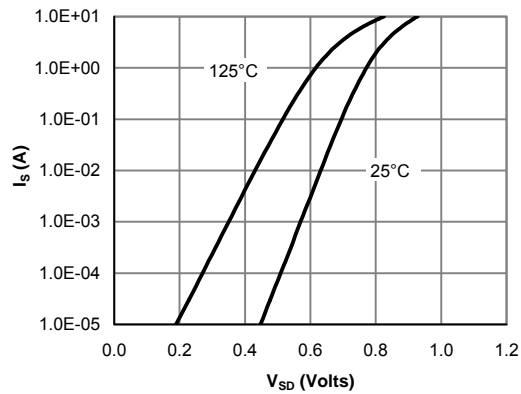


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

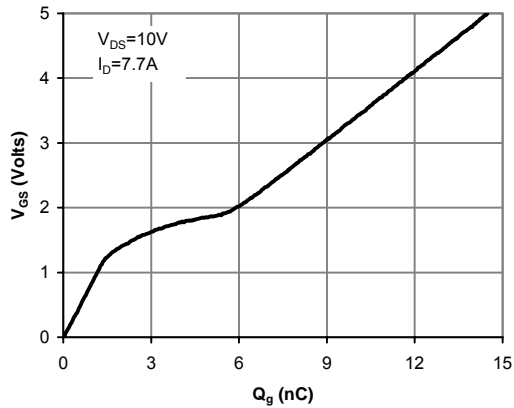


Figure 7: Gate-Charge Characteristics

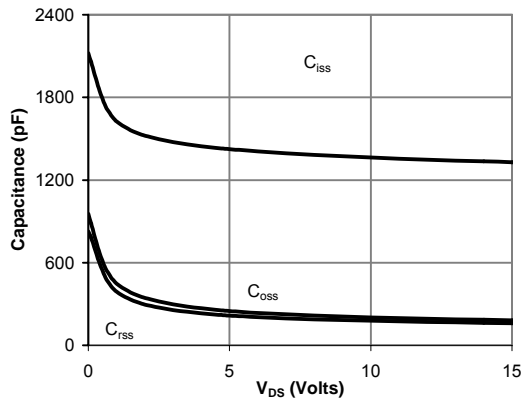


Figure 8: Capacitance Characteristics

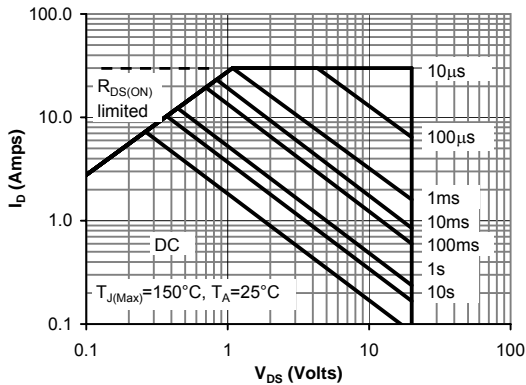


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

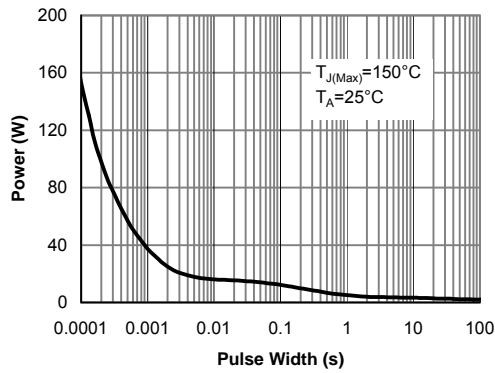


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

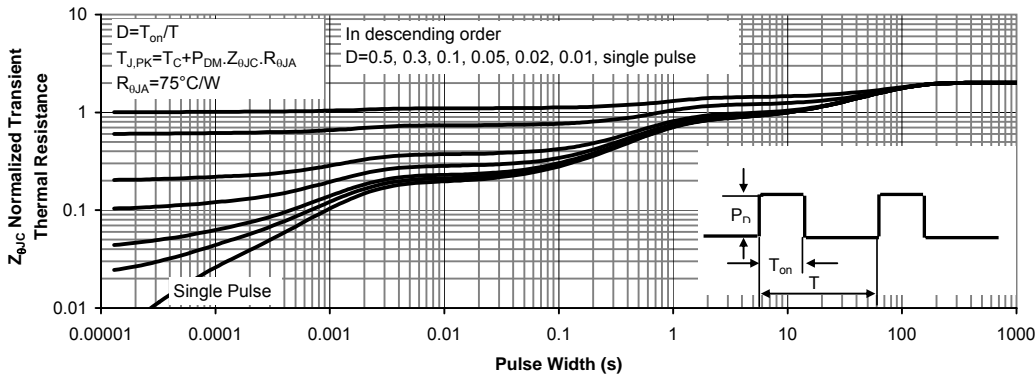


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)