

AON5810

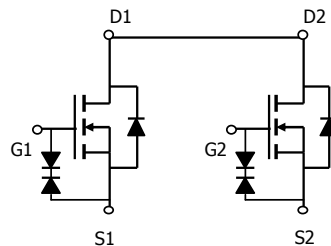
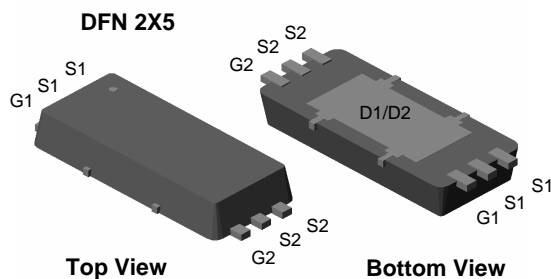
Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

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



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}	± 12	
Continuous Drain Current $R_{\theta JA}=75^\circ C/W$	I_D	$T_A=25^\circ C$ 7.7	A
		$T_A=70^\circ C$ 6.1	
Pulsed Drain Current ^B	I_{DM}	30	
Power Dissipation ^A $R_{\theta JA}=75^\circ C/W$	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 ^A $t \leq 10s$	$R_{\theta JA}$	30	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A Steady-State		61	75	$^\circ C/W$
Maximum Junction-to-Case ^B Steady-State	$R_{\theta JC}$	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	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, 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	0.5	0.73	1	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	30			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =7.7A T _J =125°C	11 16	14 21	18 26	mΩ
		V _{GS} =4.0V, I _D =6A	11	14.5	19	mΩ
		V _{GS} =3.1V, I _D =6A	13	16.7	21	mΩ
		V _{GS} =2.5V, I _D =5A	15	20	25	mΩ
		V _{GS} =1.8V, I _D =4A	25	32	40	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =7.7A		28		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V	0.5	0.74	1	V
I _S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		1360		pF
C _{oss}	Output Capacitance			200		pF
C _{rss}	Reverse Transfer Capacitance			178		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} =10V, I _D =7.7A		13.1		nC
Q _{gs}	Gate Source Charge			2		nC
Q _{gd}	Gate Drain Charge			3.9		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =5V, V _{DS} =10V, R _L =1.4Ω, R _{GEN} =3Ω		6.2		ns
t _r	Turn-On Rise Time			11		ns
t _{D(off)}	Turn-Off DelayTime			40.5		ns
t _f	Turn-Off Fall Time			10		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =7.7A, dI/dt=100A/μs		18.8		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =7.7A, dI/dt=100A/μs		8.1		nC

A: The value of R_{θJA} 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 t ≤ 10s 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 80 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

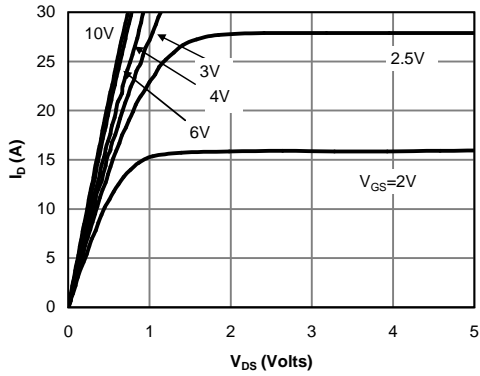


Fig 1: On-Region Characteristics

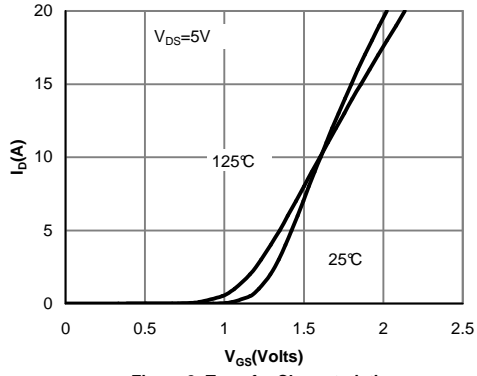


Figure 2: Transfer Characteristics

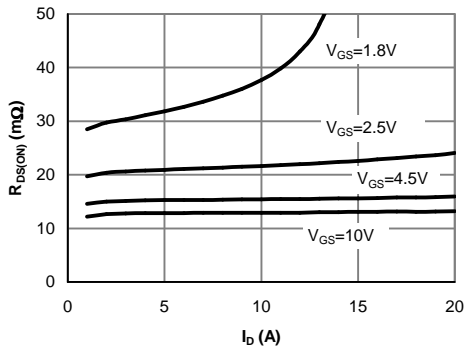


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

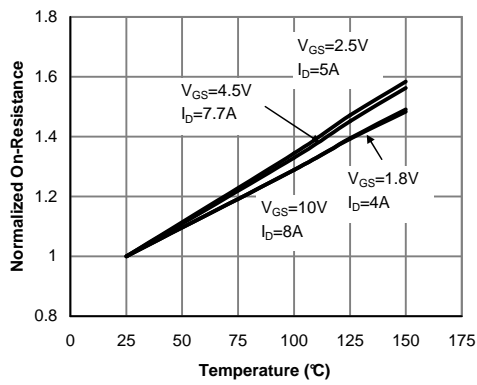


Figure 4: On-Resistance vs. Junction Temperature

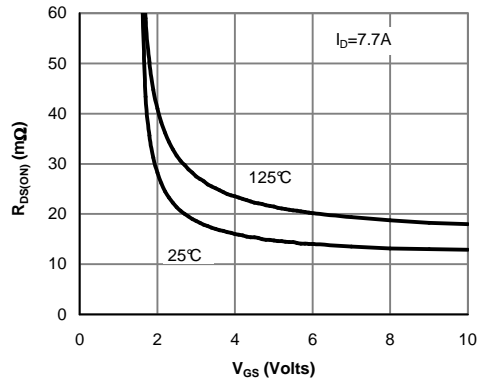


Figure 5: On-Resistance vs. Gate-Source Voltage

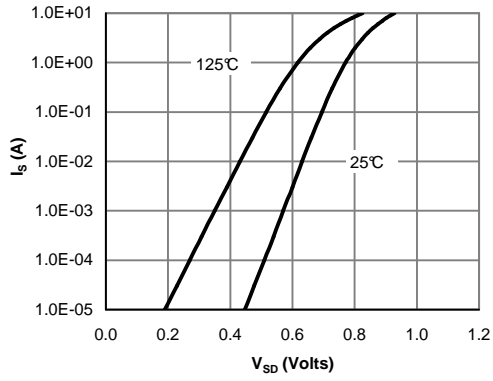


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

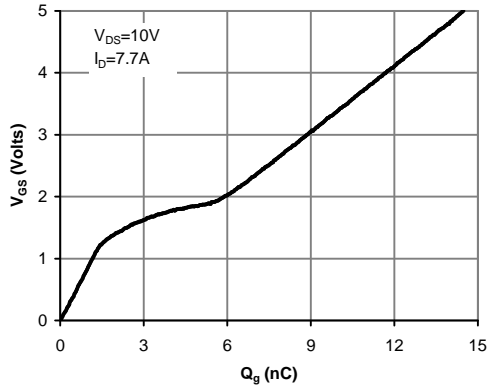


Figure 7: Gate-Charge Characteristics

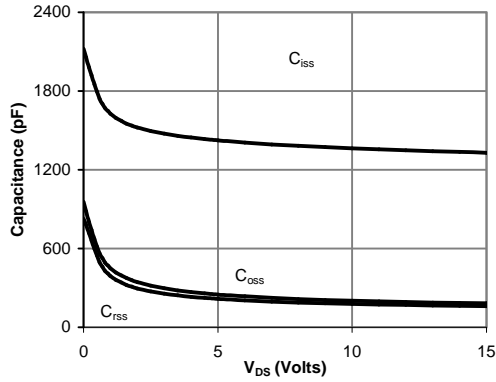


Figure 8: Capacitance Characteristics

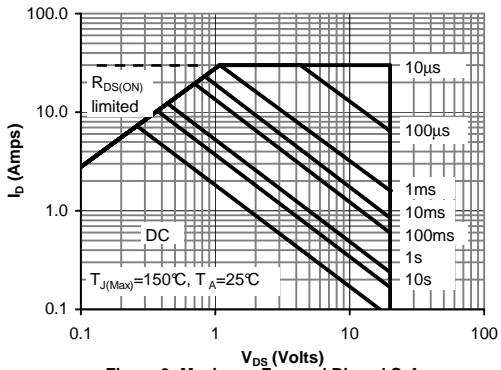


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

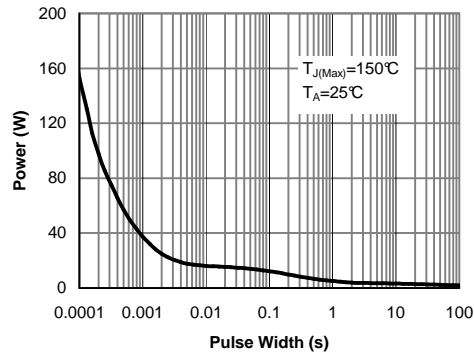


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

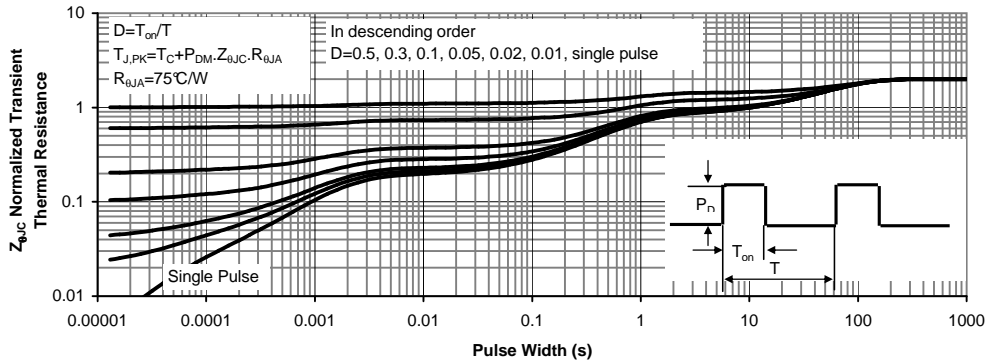


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)