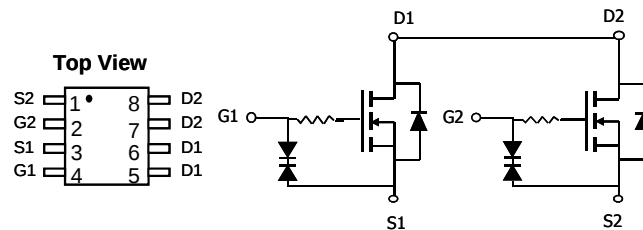


General Description

The AON3816 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.

Features

V_{DS}	20V
I_D (at $V_{GS}=4.5V$)	4A
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$)	< 22m Ω
$R_{DS(ON)}$ (at $V_{GS} = 4V$)	< 23m Ω
$R_{DS(ON)}$ (at $V_{GS} = 2.5V$)	< 28m Ω
ESD Protected	



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^F	I_D	4	A
		3.1	
Pulsed Drain Current ^B	I_{DM}	40	
Power Dissipation ^F	P_D	2.5	W
		1.6	
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 ^A	$R_{\theta JA}$	40	50	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		75	95	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	30	40	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
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	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 10\text{V}$			10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.3	0.7	1.1	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5\text{V}$, $I_D=4\text{A}$ $T_J=125^\circ\text{C}$		18 23	22 29	$\text{m}\Omega$
		$V_{GS}=4\text{V}$, $I_D=4\text{A}$		19	23	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$, $I_D=4\text{A}$		22.5	28	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=4\text{A}$		33		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.6	1	V
I_S	Maximum Body-Diode Continuous Current				3.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$, $f=1\text{MHz}$	730	920	1100	pF
C_{oss}	Output Capacitance		110	155	200	pF
C_{rss}	Reverse Transfer Capacitance		45	75	105	pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		2.4		k Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}$, $V_{DS}=10\text{V}$, $I_D=4\text{A}$	8.8	11	13	nC
Q_{gs}	Gate Source Charge		1.6	2	2.4	nC
Q_{gd}	Gate Drain Charge		1.9	3.2	4.5	nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=5\text{V}$, $V_{DS}=10\text{V}$, $R_L=2.5\Omega$, $R_{GEN}=3\Omega$		0.3		μs
t_r	Turn-On Rise Time			0.6		μs
$t_{D(off)}$	Turn-Off DelayTime			7.9		μs
t_f	Turn-Off Fall Time			4.4		μs

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² 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.

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 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

$T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

F: The power dissipation and current rating is based on the $t \leq 10\text{s}$ thermal resistance, and current rating is also limited by wire-bonding.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

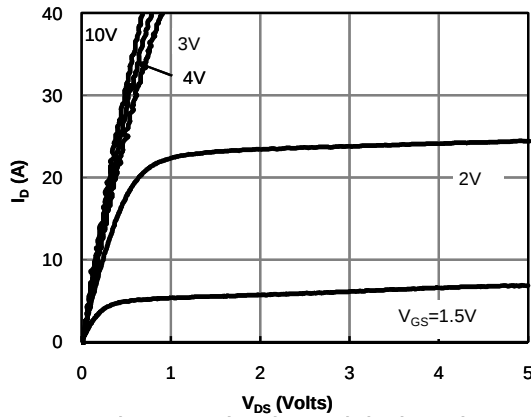


Fig 1: On-Region Characteristics (Note E)

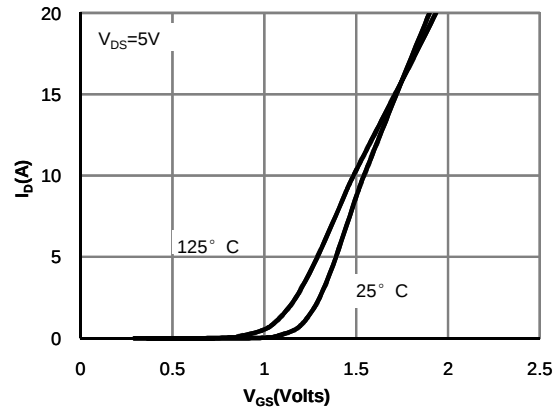


Figure 2: Transfer Characteristics (Note E)

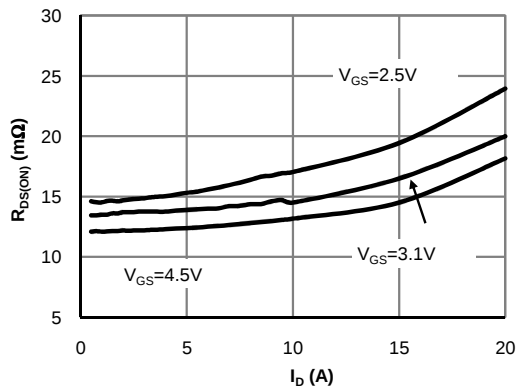


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

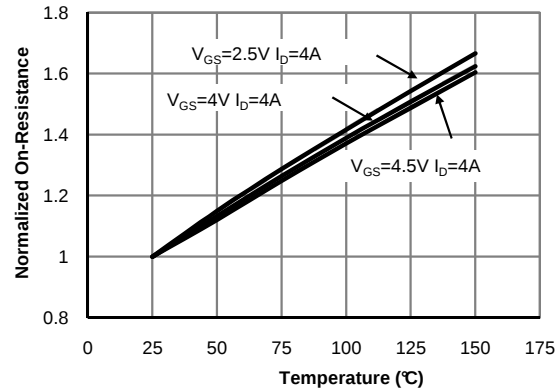


Figure 4: On-Resistance vs. Junction Temperature (Note E)

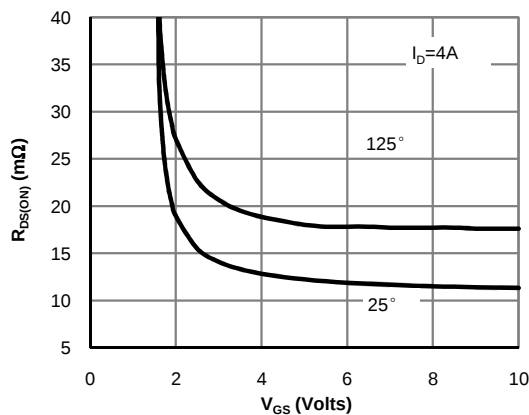


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

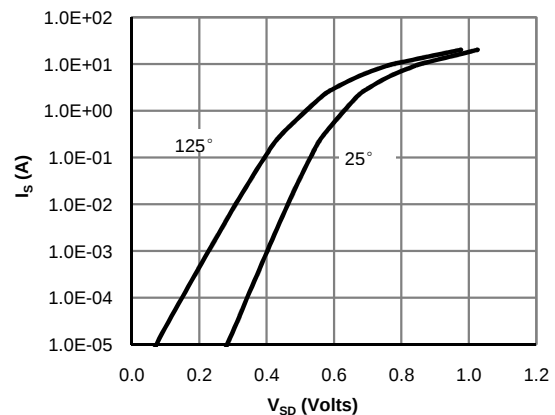
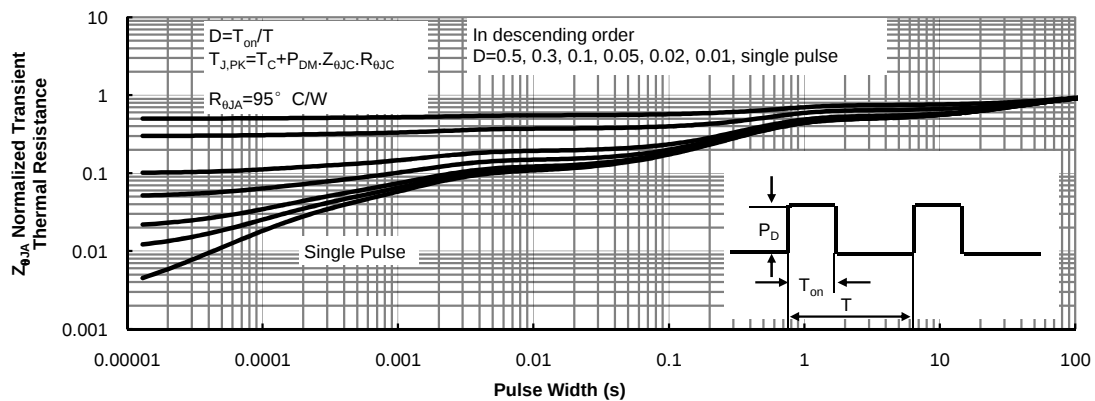
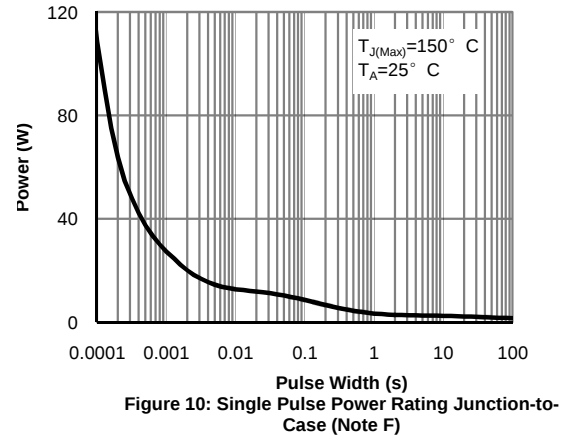
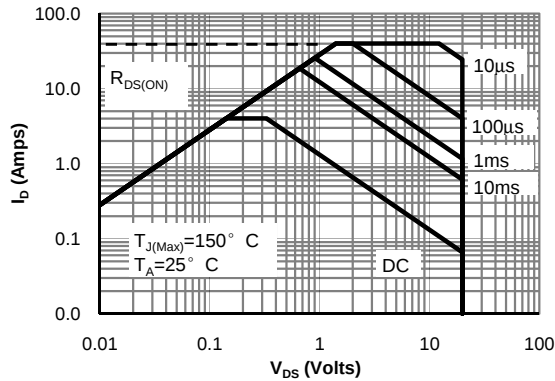
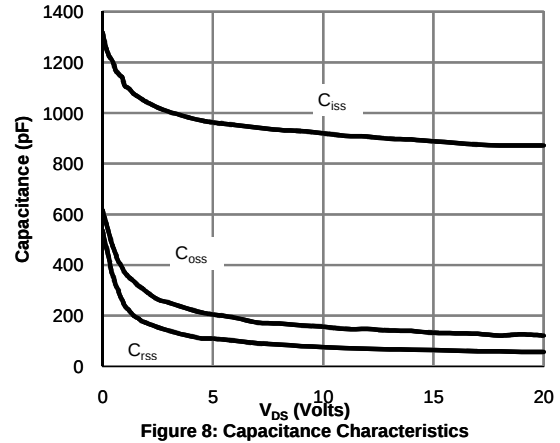
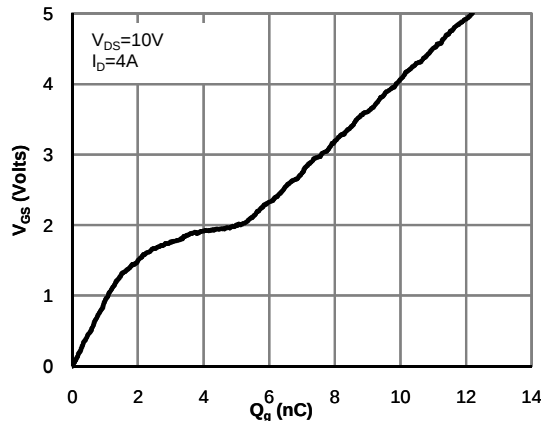
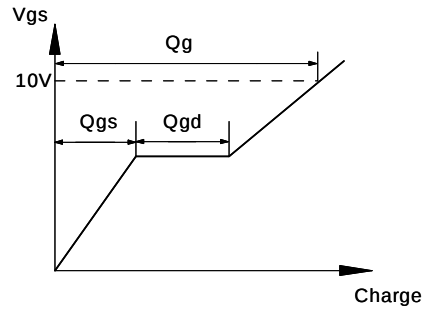
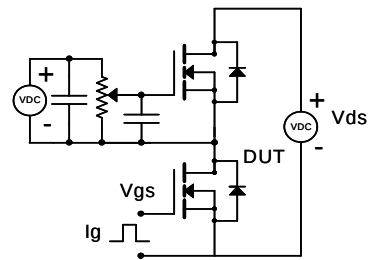


Figure 6: Body-Diode Characteristics (Note E)

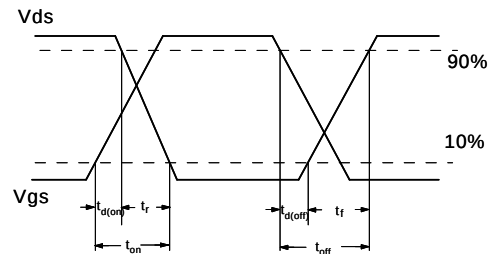
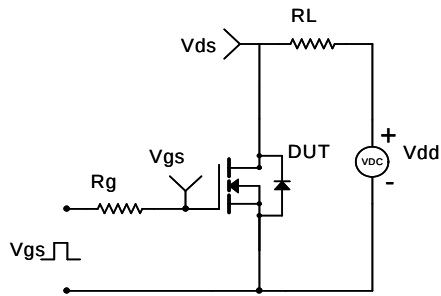
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



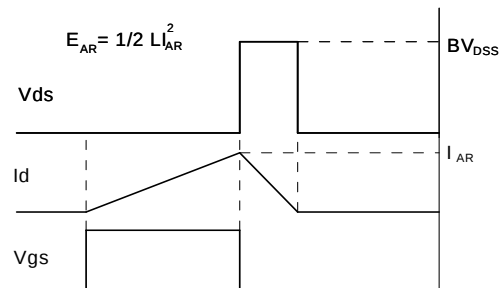
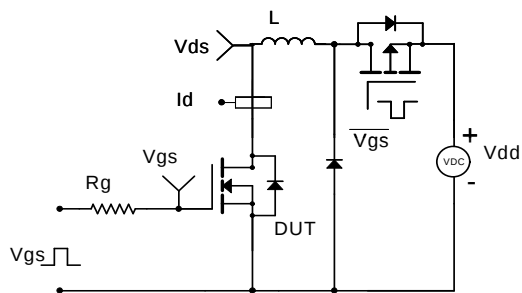
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

