

AON3816
Common-Drain Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

The AON3816/L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. 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. AON3816 and AO3816L are electrically identical.

-RoHS Compliant

-AO3816L is Halogen Free

Features

$V_{DS} (V) = 20V$

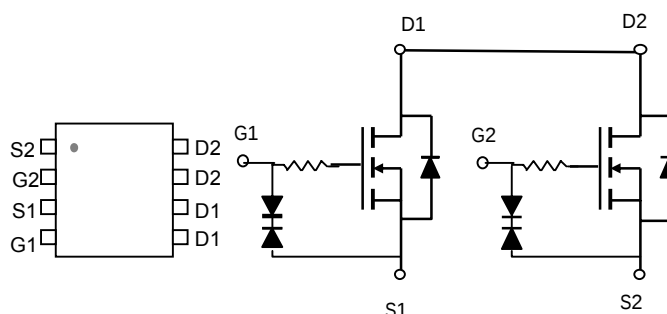
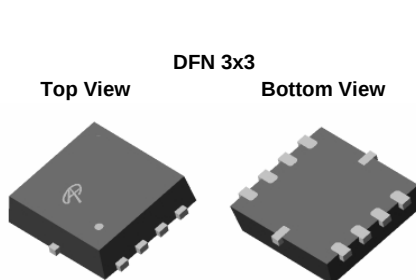
$I_D = 4A (V_{GS} = 4.5V)$

$R_{DS(ON)} < 22m\Omega (V_{GS} = 4.5V)$

$R_{DS(ON)} < 23m\Omega (V_{GS} = 4V)$

$R_{DS(ON)} < 28m\Omega (V_{GS} = 2.5V)$

 ESD Protected


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

Parameter	Symbol	10 Sec	Steady State	Units
Drain-Source Voltage	V_{DS}	20		V
Gate-Source Voltage	V_{GS}	± 12		V
Continuous Drain Current ^{A F}	I_D	4	4	A
$T_A=25^\circ C$				
$T_A=70^\circ C$		4	4	
Pulsed Drain Current ^B	I_{DM}	20		
Power Dissipation ^A	P_D	2.4	1.4	W
$T_A=25^\circ C$				
$T_A=70^\circ C$		1.5	0.9	
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	$R_{\theta JA}$	43	52	$^\circ C/W$
$t \leq 10s$				
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	80	90	$^\circ C/W$
Steady State				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	33	50	$^\circ C/W$
Steady State				

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
BV_{GSO}	Gate-Source Breakdown Voltage	$V_{DS}=0\text{V}$, $I_G=\pm 250\mu\text{A}$	± 12			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.4	0.75	1.1	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5\text{V}$, $I_D=4\text{A}$ $T_J=125^{\circ}\text{C}$	14 18	18 23	22 29	$\text{m}\Omega$
		$V_{GS}=4\text{V}$, $I_D=4\text{A}$	15	19	23	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}$, $I_D=4\text{A}$	17	22.5	28	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=4\text{A}$		21		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.75	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{ISS}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$, $f=1\text{MHz}$		1315		pF
C_{OSS}	Output Capacitance			219		pF
C_{RSS}	Reverse Transfer Capacitance			183		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		2.1		k Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}$, $V_{DS}=10\text{V}$, $I_D=4\text{A}$		15		nC
Q_{gs}	Gate Source Charge			6.7		nC
Q_{gd}	Gate Drain Charge			4.6		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=5\text{V}$, $V_{DS}=10\text{V}$, $R_L=2.5\Omega$, $R_{GEN}=3\Omega$		1		μs
t_r	Turn-On Rise Time			2.8		μs
$t_{D(off)}$	Turn-Off DelayTime			5.6		μs
t_f	Turn-Off Fall Time			5.9		μs

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² 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 continuous current rating is limited by wire-bonding.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

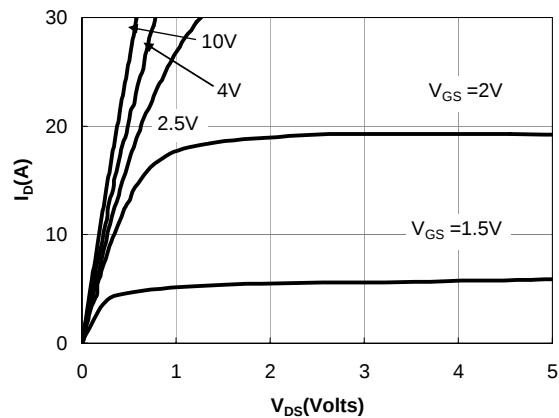


Figure 1: On-Regions Characteristic

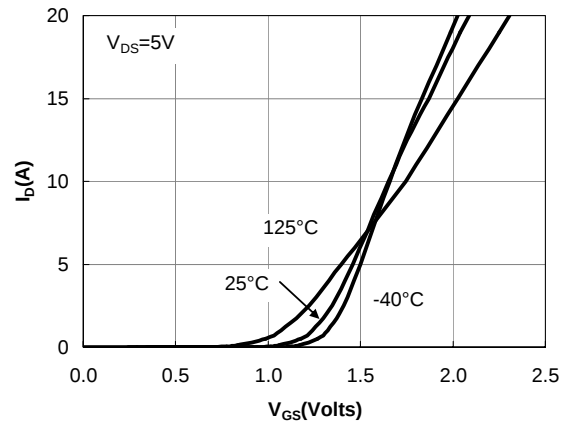


Figure 2: Transfer Characteristics

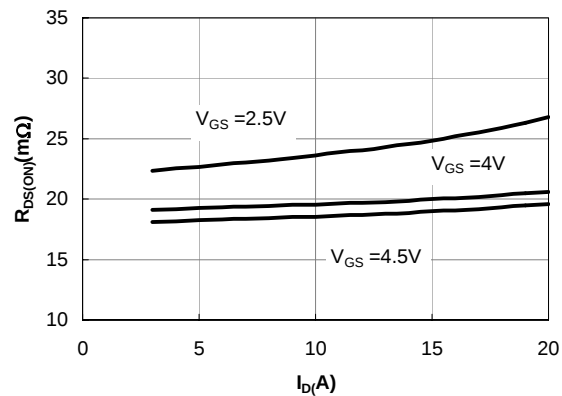


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

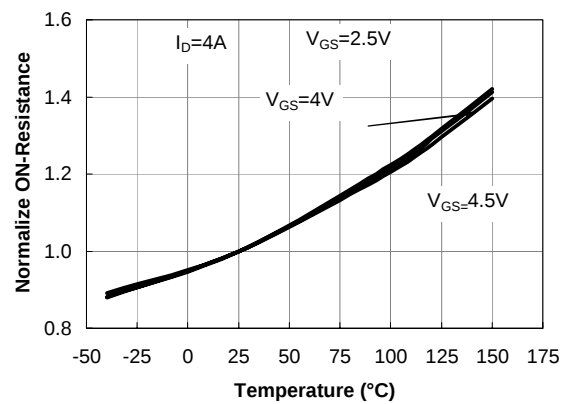


Figure 4: On-Resistance vs. Junction Temperature

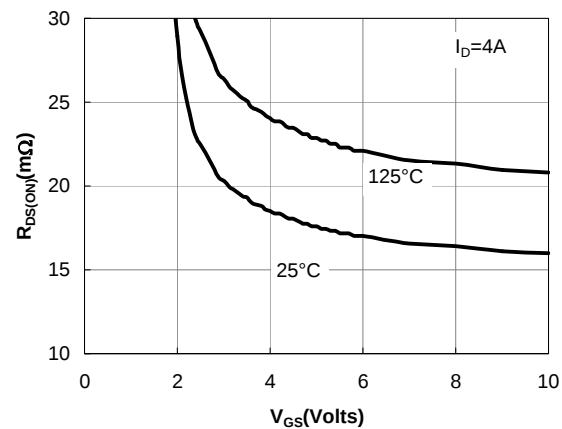


Figure 5: On-Resistance vs. Gate-Source Voltage

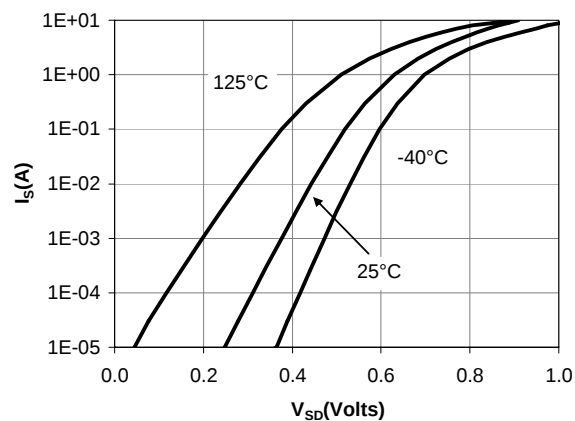


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

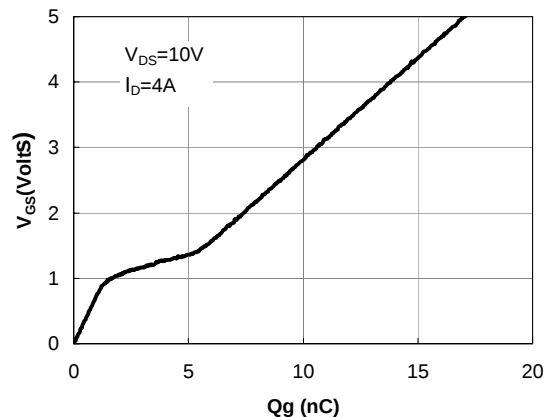


Figure 7: Gate-Charge Characteristics

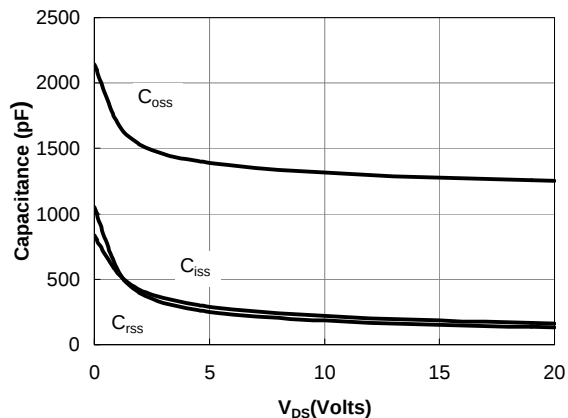


Figure 8: Capacitance Characteristics

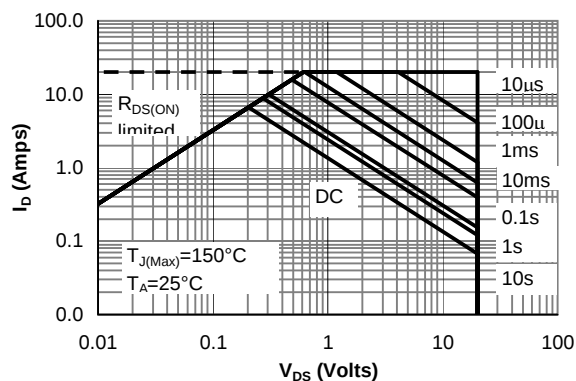


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

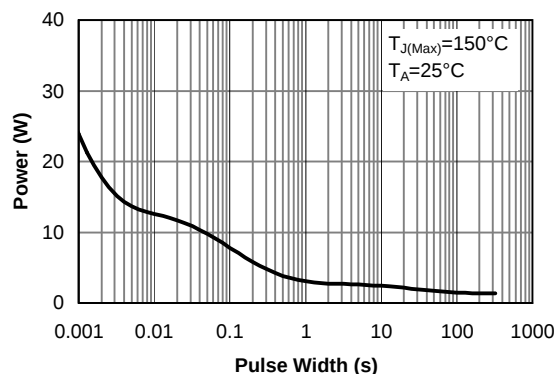


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

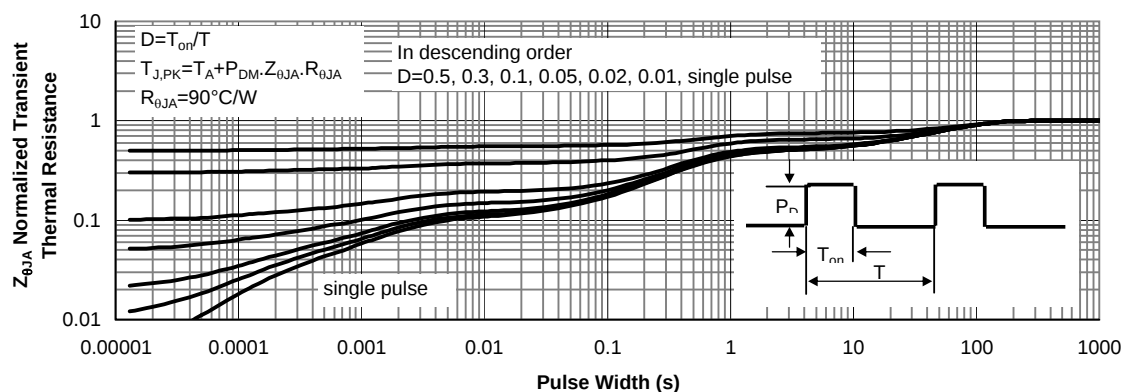


Figure 11: Normalized Maximum Transient Thermal Impedance