

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.*

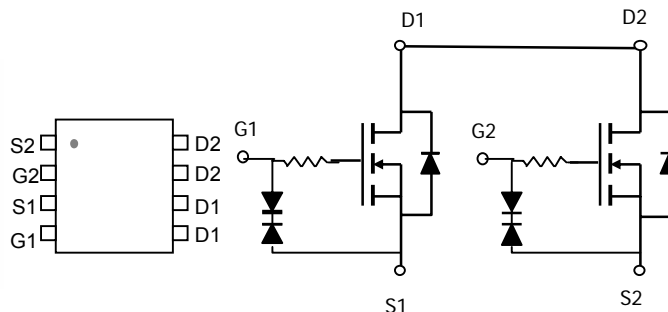
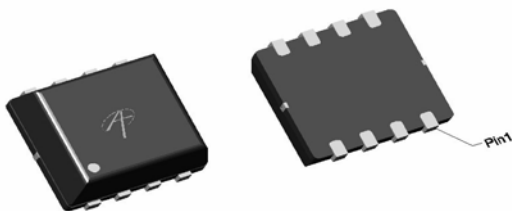
- RoHS Compliant
- AO3816L is Halogen Free

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



DFN 3x3
Top View Bottom View



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	$T_A=25^\circ C$	4	A
		$T_A=70^\circ C$	4	
Pulsed Drain Current ^B	I_{DM}	20		
Power Dissipation ^A	P_D	$T_A=25^\circ C$	2.4	W
		$T_A=70^\circ C$	1.5	
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	$^\circ C/W$
Maximum Junction-to-Ambient ^A		80	90	$^\circ C/W$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	33	50	$^\circ C/W$

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} =20V, 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	0.4	0.75	1.1	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =4A T _J =125°C	14 18	18 23	22 29	mΩ
		V _{GS} =4V, I _D =4A	15	19	23	mΩ
		V _{GS} =2.5V, I _D =4A	17	22.5	28	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =4A		21		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.75	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		1315		pF
C _{oss}	Output Capacitance		219		pF	
C _{rss}	Reverse Transfer Capacitance		183		pF	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.1		kΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =4A		15		nC
Q _{gs}	Gate Source Charge		6.7		nC	
Q _{gd}	Gate Drain Charge		4.6		nC	
t _{D(on)}	Turn-On Delay Time	V _{GS} =5V, V _{DS} =10V, R _L =2.5Ω, R _{GEN} =3Ω		1		μs
t _r	Turn-On Rise Time		2.8		μs	
t _{D(off)}	Turn-Off Delay Time		5.6		μs	
t _f	Turn-Off Fall Time		5.9		μs	

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.

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 <300μs 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.

F: The continuous current rating is limited by wire-bonding.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

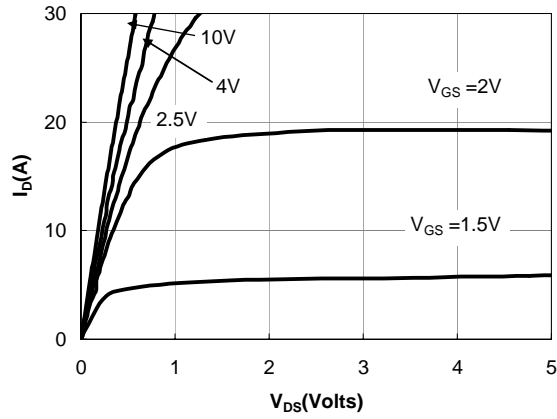


Figure 1: On-Regions Characteristics

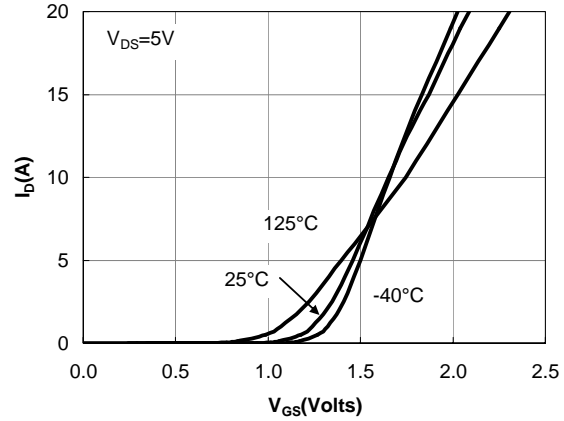


Figure 2: Transfer Characteristics

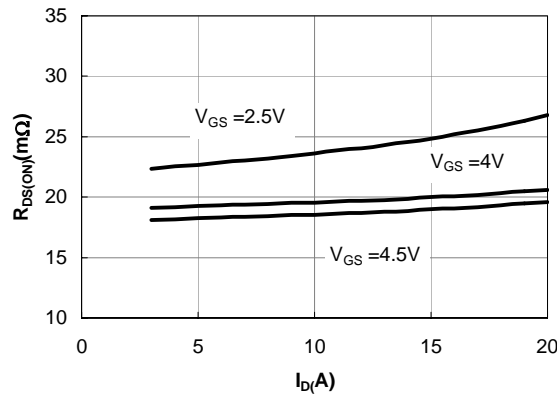


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

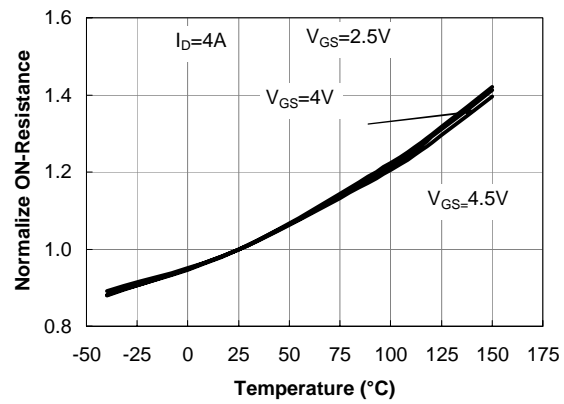


Figure 4: On-Resistance vs. Junction Temperature

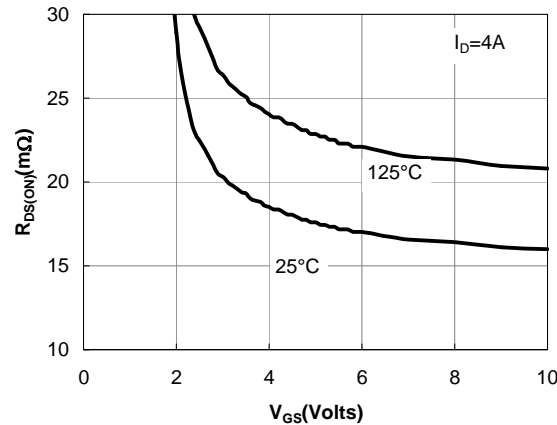


Figure 5: On-Resistance vs. Gate-Source Voltage

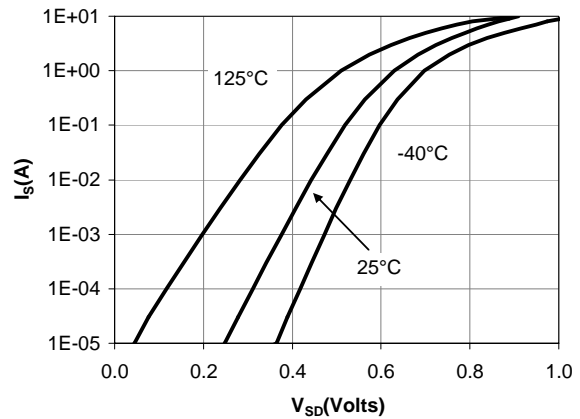


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

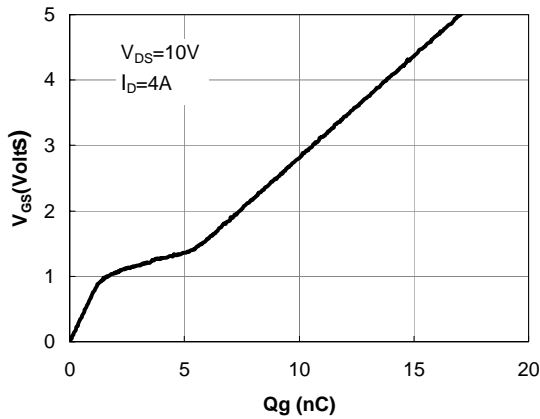


Figure 7: Gate-Charge Characteristics

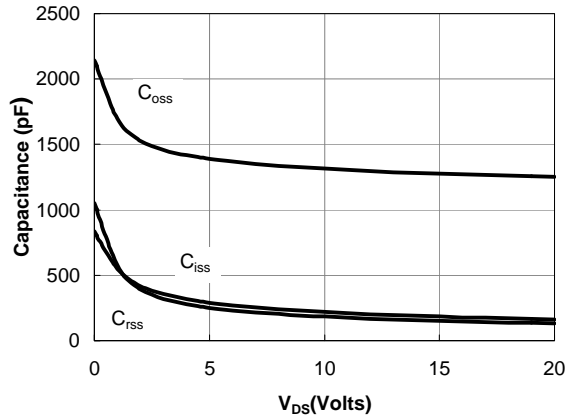


Figure 8: Capacitance Characteristics

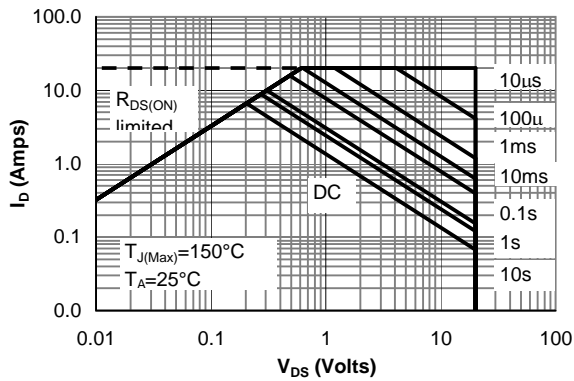


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

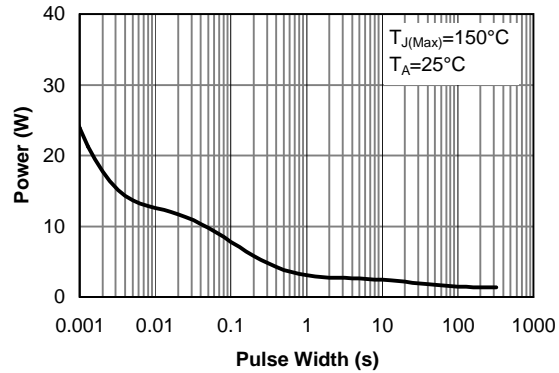


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

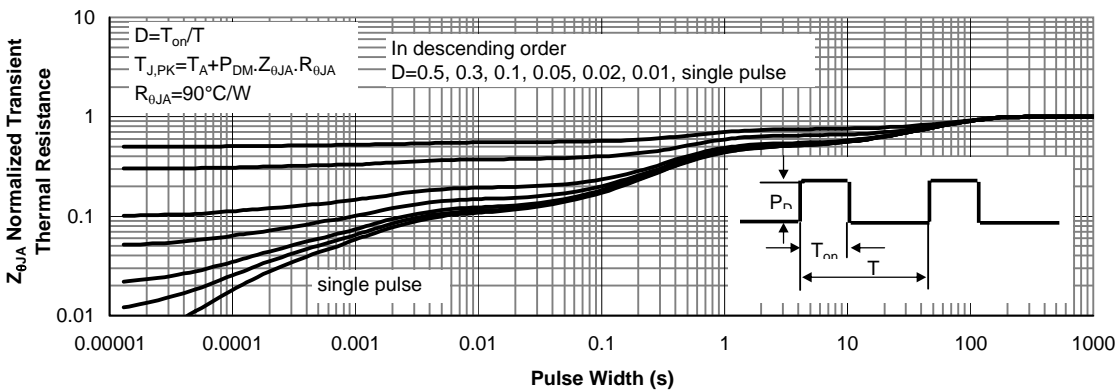


Figure 11: Normalized Maximum Transient Thermal Impedance