AON3814

20V Dual N-Channel MOSFET

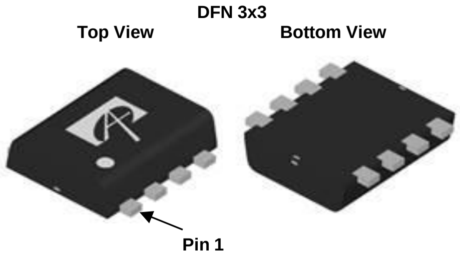
General Description

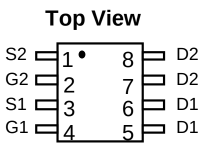
The AON3814 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

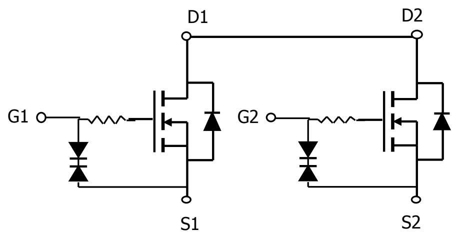
Product Summary

V_{DS}	20V
I_D (at V_{GS}=4.5V)	6A
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 17mΩ
$R_{DS(ON)}$ (at V_{GS} = 4V)	< 18.5mΩ
$R_{DS(ON)}$ (at V_{GS} = 3.1V)	< 23mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.5V)	< 24mΩ

ESD Protected







Absolute Maximum Ratings T_A=25°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]	T_C=25°C	I_D	6	A
	T_C=70°C		5.3	
Pulsed Drain Current [B]		I_{DM}	40	
Power Dissipation [F]	T_C=25°C	P_D	2.5	W
	T_C=70°C		1.6	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	40	50	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		75	95	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	30	40	°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			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±10V			10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	0.3	0.7	1.1	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=6A		12.5	17	mΩ
		T_J=125°C		18.5	24	
		V_{GS}=4V, I_D=6A		12.9	18.5	mΩ
		V_{GS}=3.1V, I_D=6A		14	23	mΩ
		V_{GS}=2.5V, I_D=6A		15.6	24	mΩ
		V_{GS}=1.8V, I_D=6A		23		mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=6A		33		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.6	1	V
I_S	Maximum Body-Diode Continuous Current				3.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz	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}=0V, V_{DS}=0V, f=1MHz		2.4		kΩ
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=6A	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}=5V, V_{DS}=10V, R_L=1.7Ω, R_{GEN}=3Ω		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 1in^2 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. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

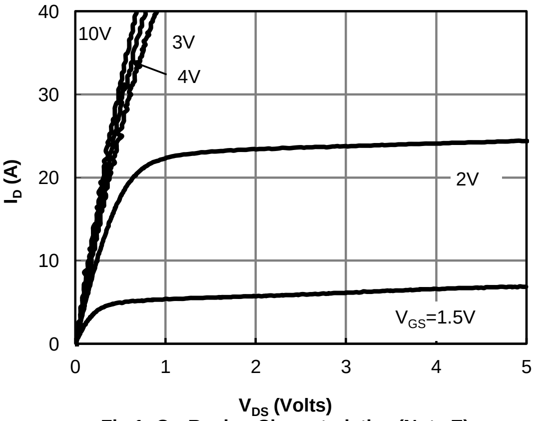


Fig 1: On-Region Characteristics (Note E)

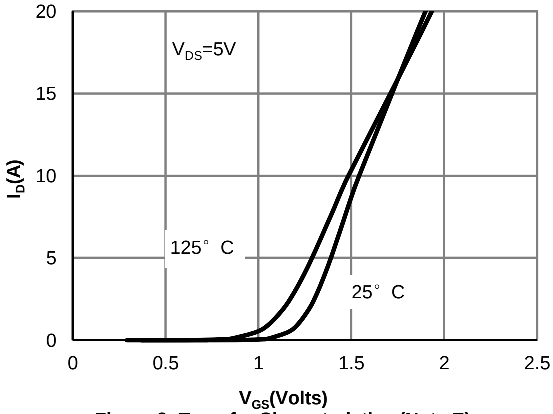


Figure 2: Transfer Characteristics (Note E)

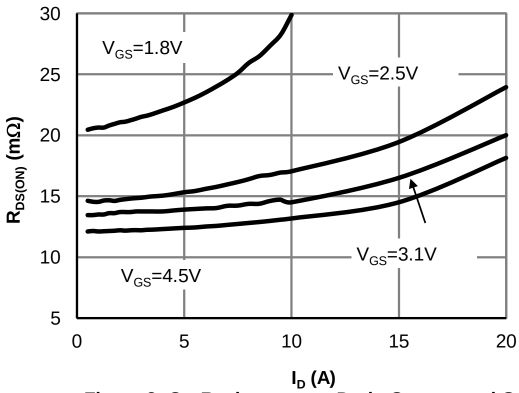


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

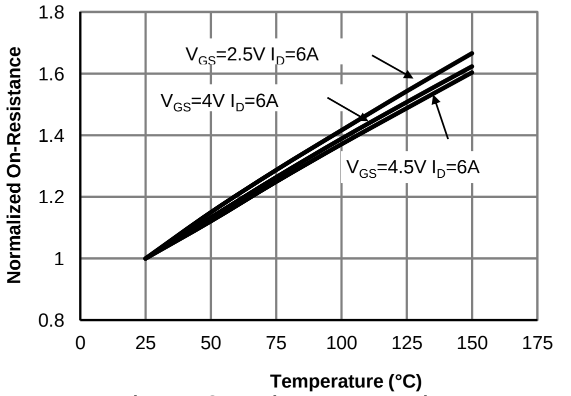


Figure 4: On-Resistance vs. Junction Temperature (Note E)

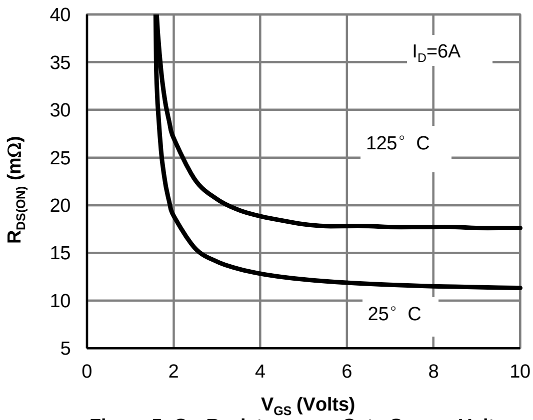


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

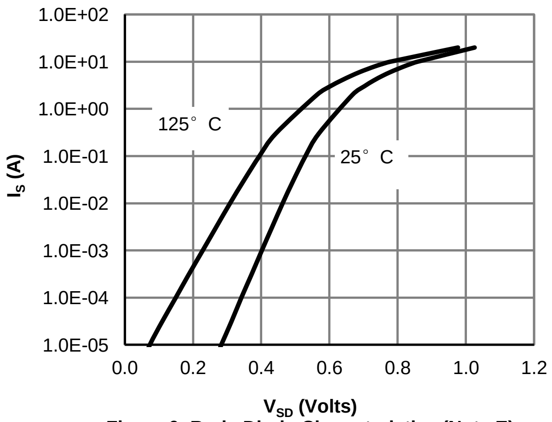


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

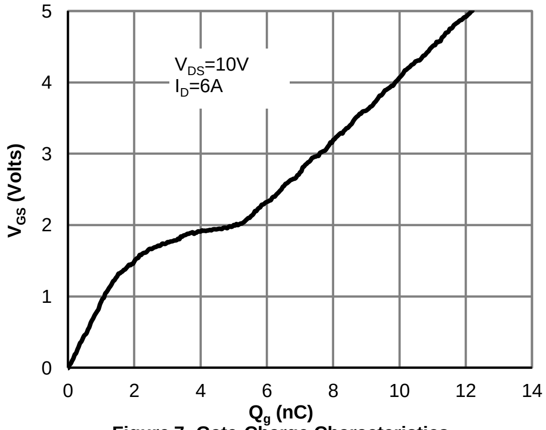


Figure 7: Gate-Charge Characteristics

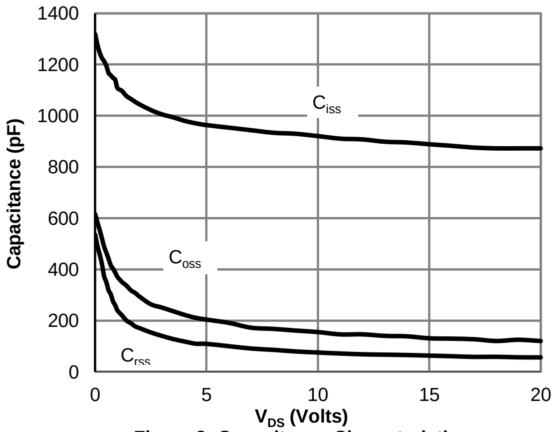


Figure 8: Capacitance Characteristics

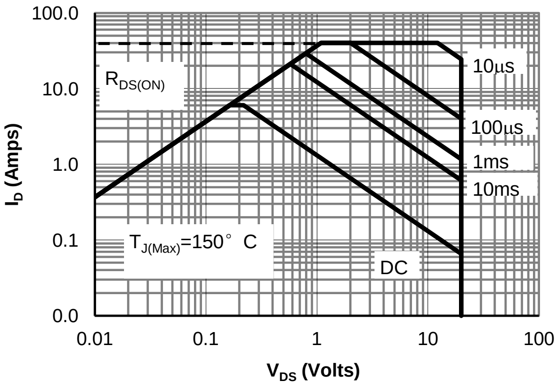


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

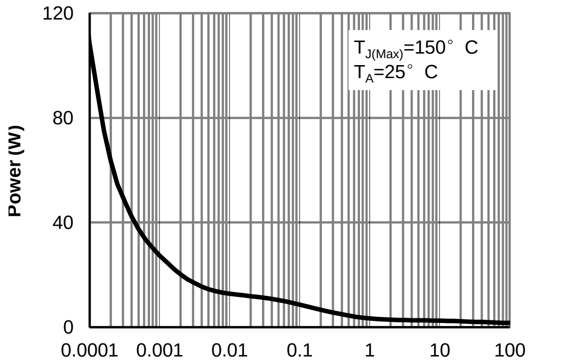


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

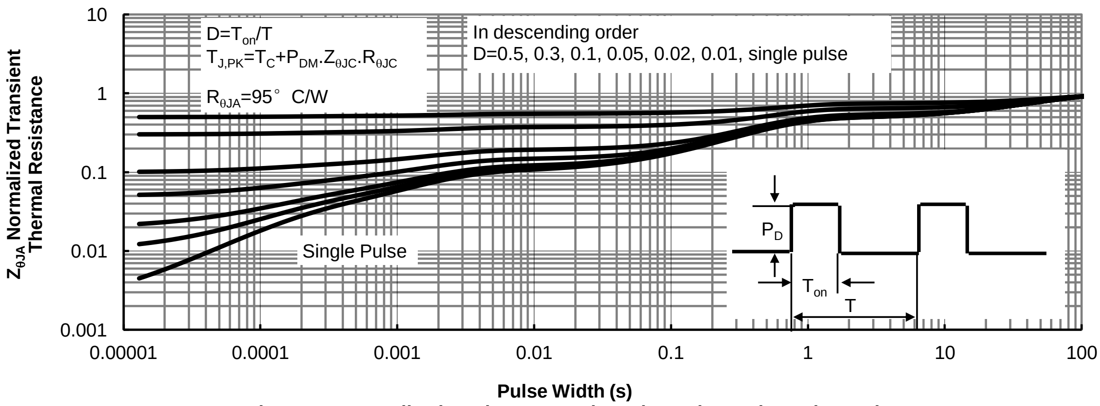
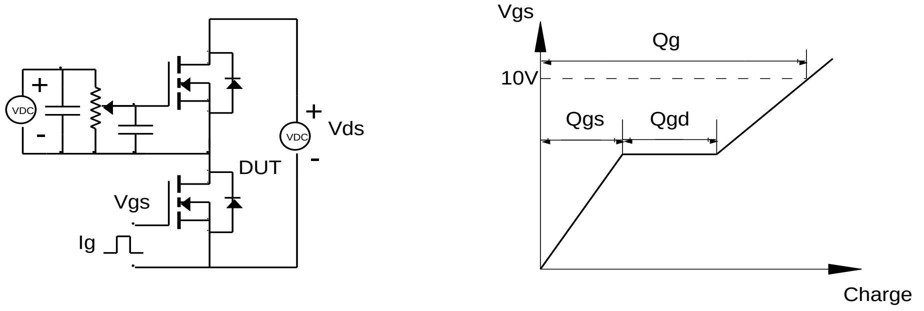
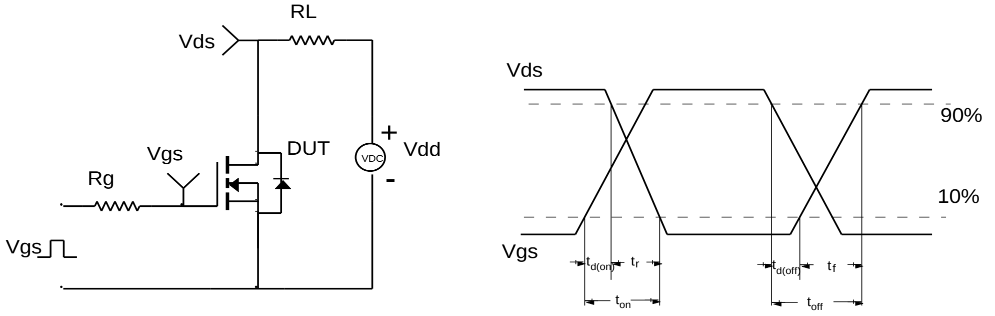


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

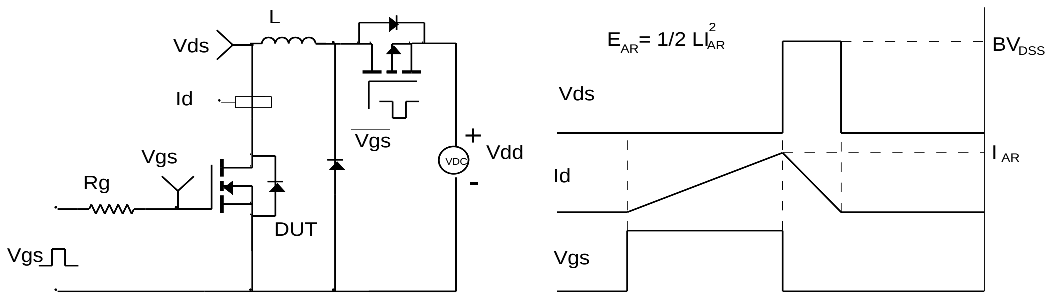
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms