

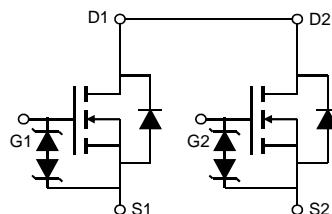
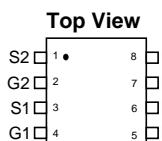
General Description

The AON3806 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V 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 $V_{GS}=4.5V$)	6A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 22mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.0V$)	< 24mΩ
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 33mΩ



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 ^G	I_D	6	A
		4.7	
Pulsed Drain Current ^C	I_{DM}	24	
Power Dissipation ^B	P_D	2.5	W
		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	$R_{\theta JA}$	40	50	°C/W
Maximum Junction-to-Ambient ^{A,D} Steady-State		75	95	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	30	40	°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	$V_{DS}=0\text{V}, V_{GS}=\pm10\text{V}$			±10	μA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.5	0.85	1.1	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=4.5\text{V}, V_{DS}=5\text{V}$	24			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=4.5\text{V}, I_D=6\text{A}$	13.5	17.5	22	$\text{m}\Omega$
		$T_J=125^\circ\text{C}$	20.5	26	33	
		$V_{GS}=4.0\text{V}, I_D=5\text{A}$	14	18	24	
g_{FS}	Forward Transconductance	$V_{GS}=2.5\text{V}, I_D=4\text{A}$	19	24	33	$\text{m}\Omega$
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.65	1	V
I_S	Maximum Body-Diode Continuous Current				3.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=10\text{V}, f=1\text{MHz}$		500		pF
C_{oss}	Output Capacitance			100		pF
C_{rss}	Reverse Transfer Capacitance			52		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		2.6		$\text{k}\Omega$
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}, V_{DS}=10\text{V}, I_D=6\text{A}$		6	9	nC
Q_{gs}	Gate Source Charge			2		nC
Q_{gd}	Gate Drain Charge			1		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=5\text{V}, V_{DS}=10\text{V}, R_L=1.67\Omega, R_{\text{GEN}}=3\Omega$		0.2		us
t_r	Turn-On Rise Time			1.5		us
$t_{\text{D(off)}}$	Turn-Off Delay Time			7.4		us
t_f	Turn-Off Fall Time			18		us
t_{rr}	Body Diode Reverse Recovery Time	$I_F=6\text{A}, dI/dt=100\text{A}/\mu\text{s}$		9		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=6\text{A}, dI/dt=100\text{A}/\mu\text{s}$		10		nC

A. The value of R_{vJA} 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. The power dissipation P_D is based on $T_{J(\text{MAX})}=150^\circ\text{C}$, using $\leqslant 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The R_{vJA} is the sum of the thermal impedance from junction to lead R_{vJL} 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 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(\text{MAX})}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

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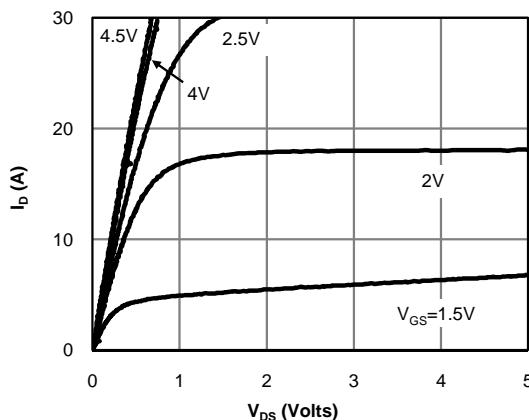
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Fig 1: On-Region Characteristics (Note E)

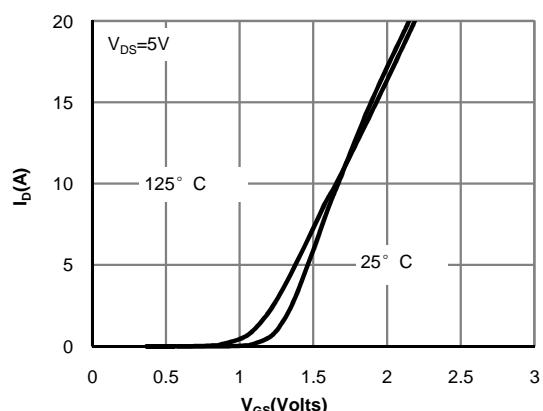


Figure 2: Transfer Characteristics (Note E)

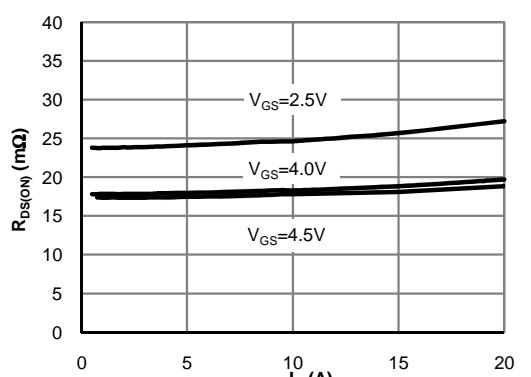


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

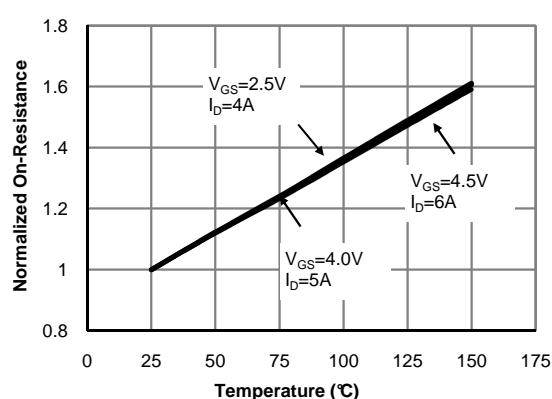


Figure 4: On-Resistance vs. Junction Temperature (Note E)

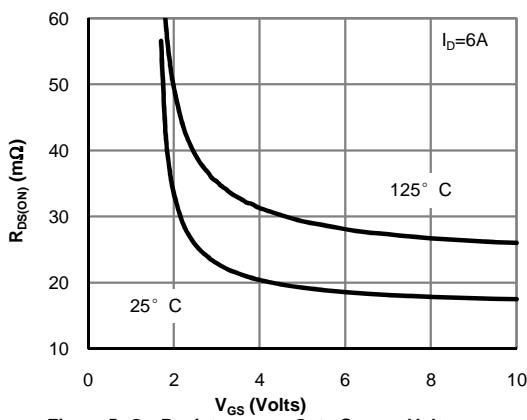


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

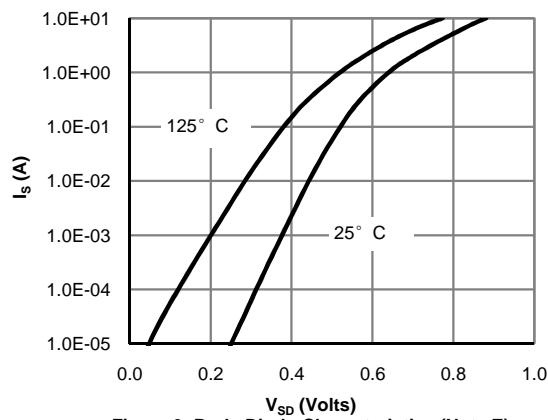


Figure 6: Body-Diode Characteristics (Note E)

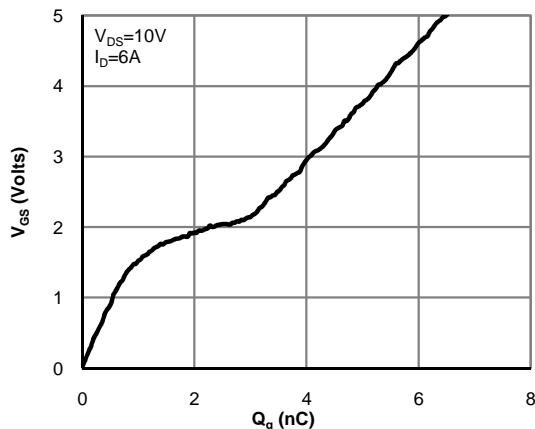
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Figure 7: Gate-Charge Characteristics

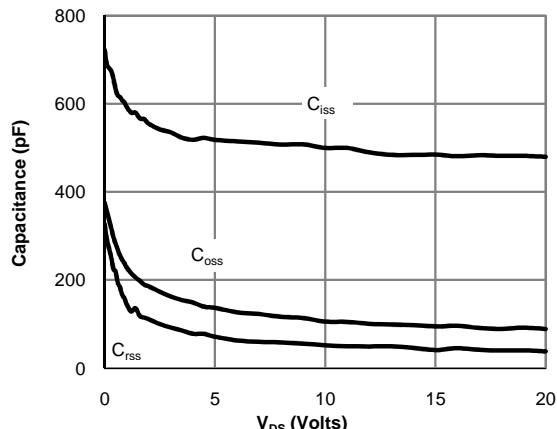


Figure 8: Capacitance Characteristics

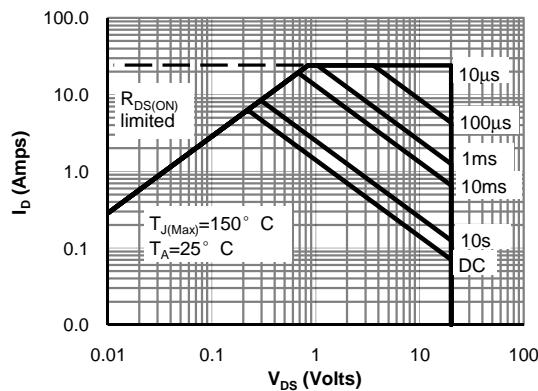


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

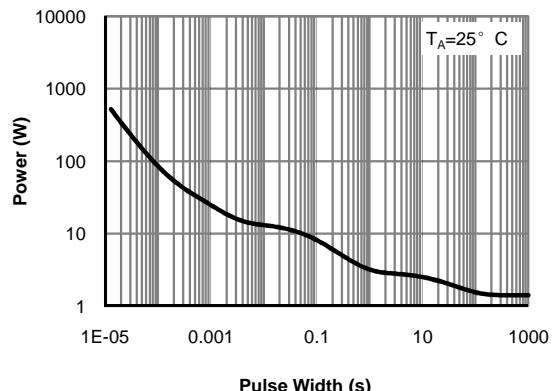


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

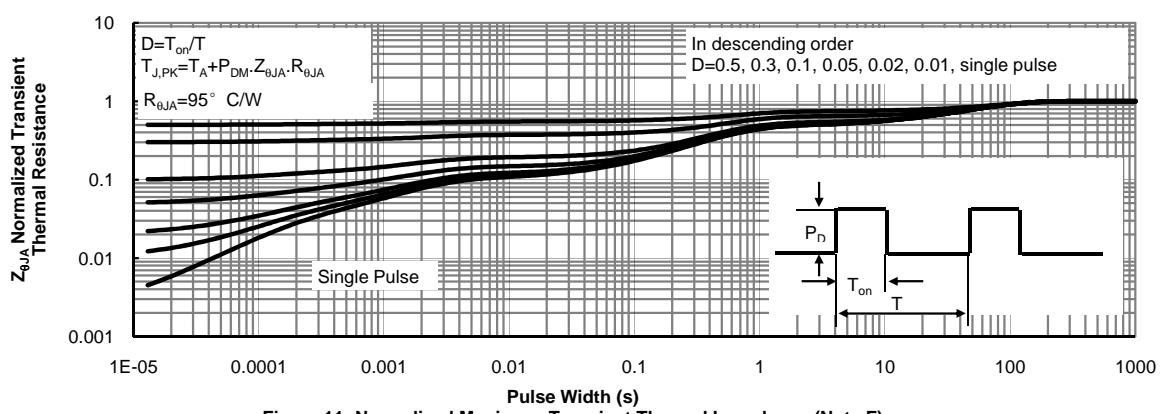
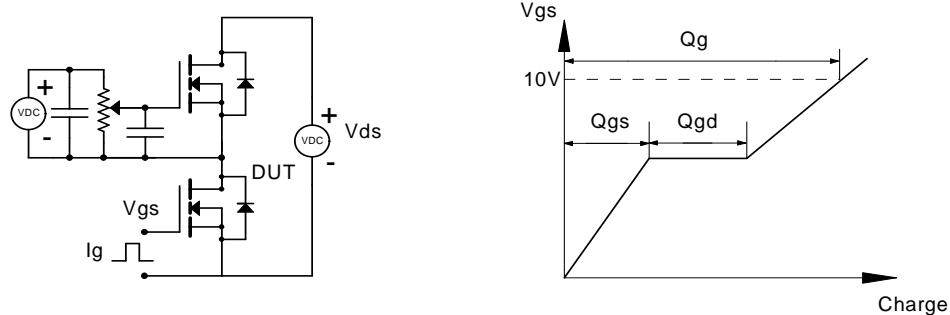
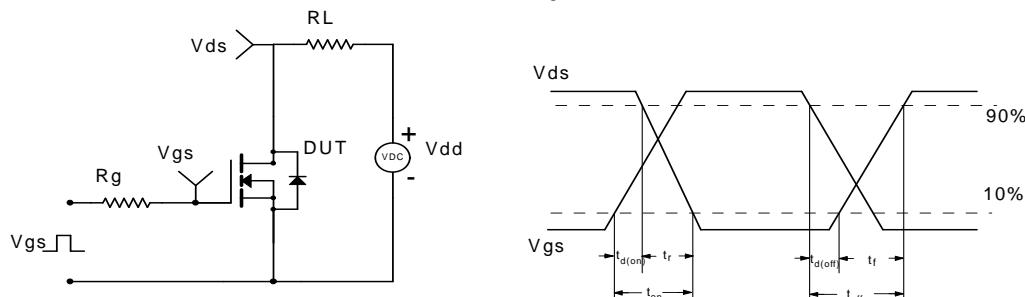


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

