

AO4812
Dual N-Channel Enhancement Mode Field Effect Transistor
General Description

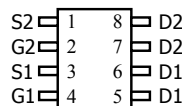
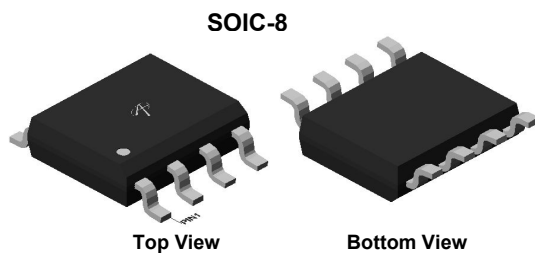
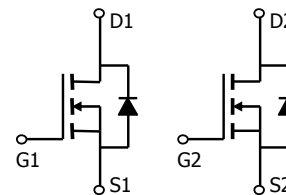
The AO4812/L uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The two MOSFETs make a compact and efficient switch and synchronous rectifier combination for use in buck converters. AO4812 and AO4812L are electrically identical.

- RoHS Compliant
- AO4812L is Halogen Free

Features

- V_{DS} (V) = 30V
- $I_D = 6.9A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 28m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 42m\Omega$ ($V_{GS} = 4.5V$)

100% UIS Tested!
100% Rg Tested!


SOIC-8

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{AF}	I_D	$T_A=25^\circ\text{C}$	A
		$T_A=70^\circ\text{C}$	
Pulsed Drain Current ^B	I_{DM}	30	A
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	W
		$T_A=70^\circ\text{C}$	
Avalanche Current ^B	I_{AR}	15	A
Repetitive avalanche energy 0.3mH ^B	E_{AR}	34	mJ
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	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	74	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	35	40	$^\circ\text{C/W}$

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	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1	1.9	3	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} =10V, I _D =6.9A T _J =125°C		22.5 31.3	28 38	mΩ
		V _{GS} =4.5V, I _D =5.0A		34.5	42	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =6.9A	10	15.4		S
V _{SD}	Diode Forward Voltage	I _S =1A		0.76	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		680	820	pF
C _{oss}	Output Capacitance			102		pF
C _{rss}	Reverse Transfer Capacitance			77	108	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.7	1.2	2	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =6.9A		13.84	17	nC
Q _{g(4.5V)}	Total Gate Charge			6.74	8.1	nC
Q _{gs}	Gate Source Charge			1.82		nC
Q _{gd}	Gate Drain Charge			3.2		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =2.2Ω, R _{GEN} =3Ω		4.6	7	ns
t _r	Turn-On Rise Time			4.1	6.2	ns
t _{D(off)}	Turn-Off Delay Time			20.6	30	ns
t _f	Turn-Off Fall Time			5.2	7.5	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =6.9A, dI/dt=100A/μs		16.5	20	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =6.9A, dI/dt=100A/μs		7.8	10	nC

A: The value of R_{θJA} is measured with the device mounted on 1 in 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: 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 in 2 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 current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

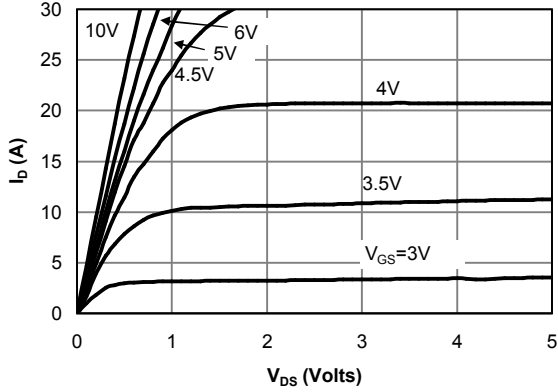


Fig 1: On-Region Characteristics

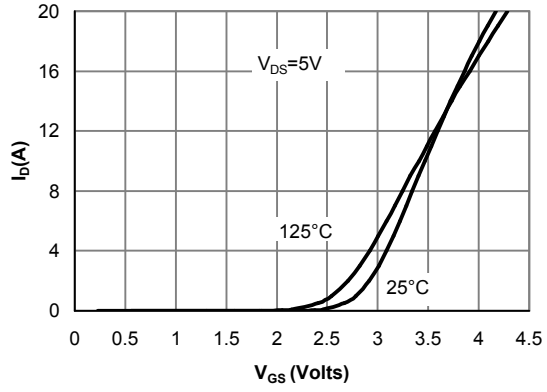


Figure 2: Transfer Characteristics

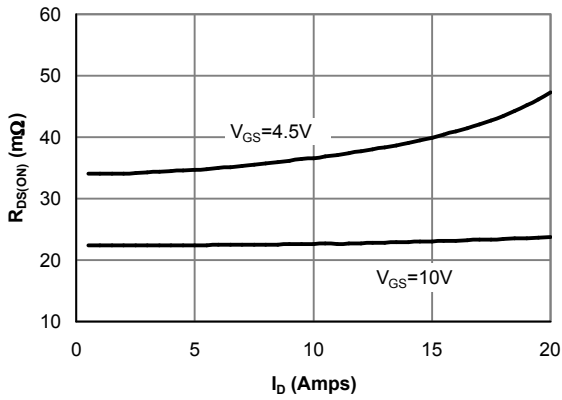


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

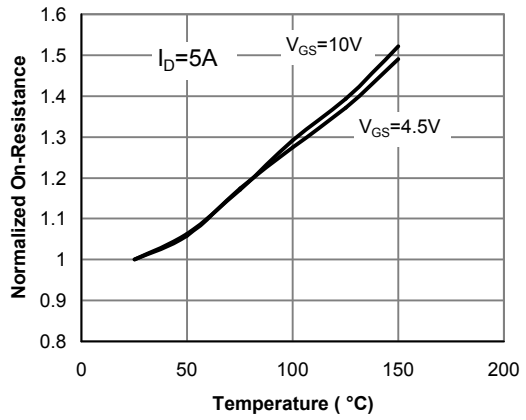


Figure 4: On-Resistance vs. Junction Temperature

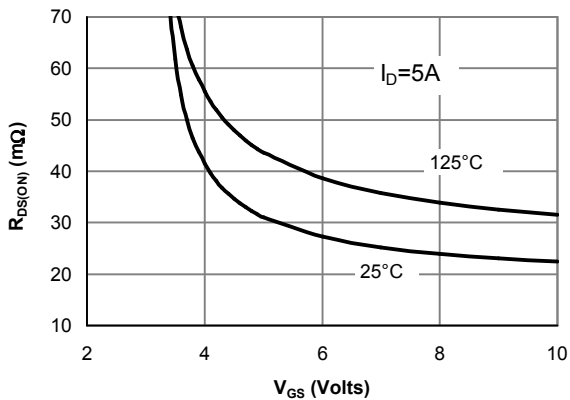


Figure 5: On-Resistance vs. Gate-Source Voltage

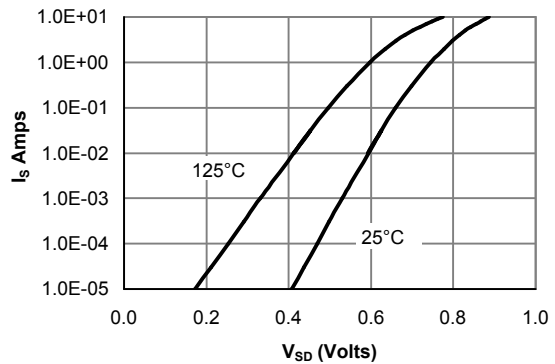


Figure 6: Body diode characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

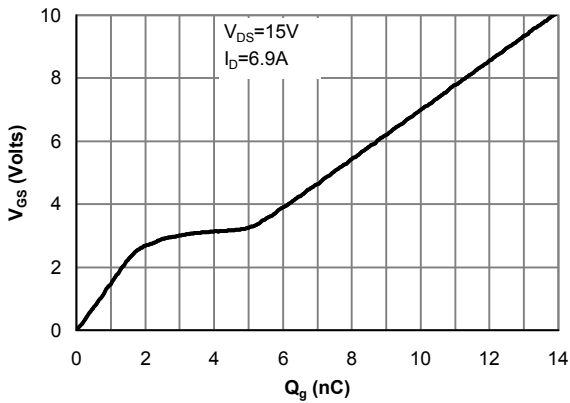


Figure 7: Gate-Charge characteristics

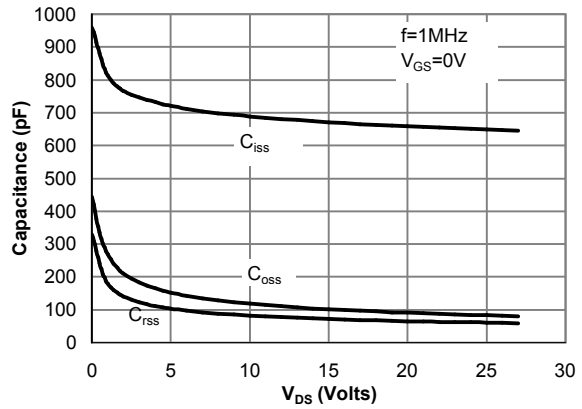


Figure 8: Capacitance Characteristics

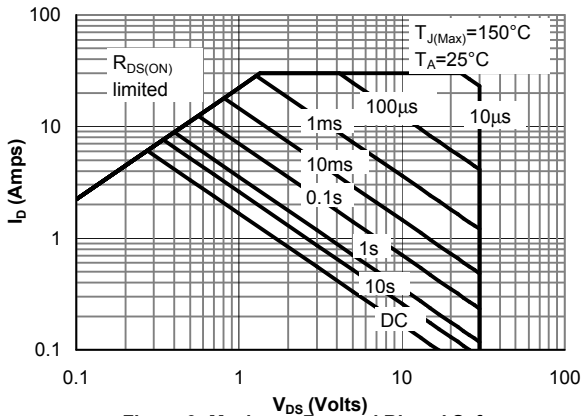


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

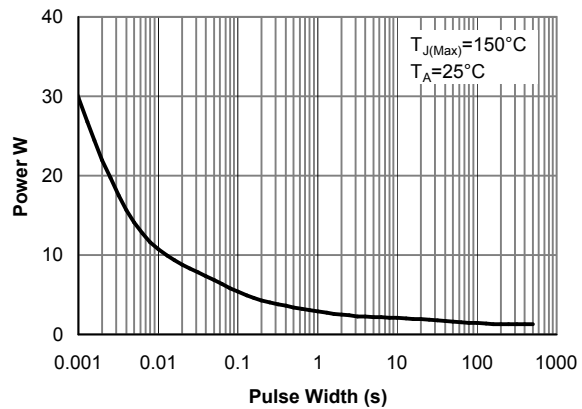


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

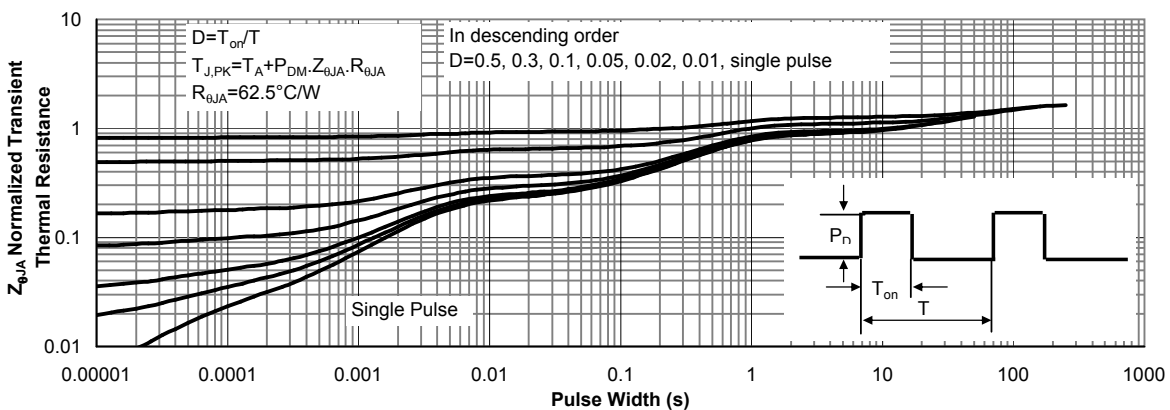
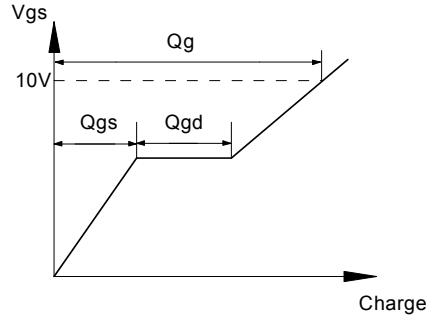
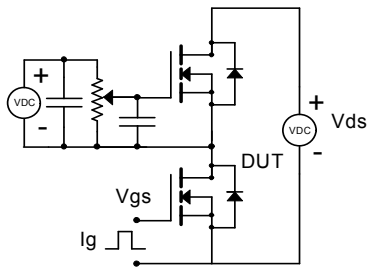
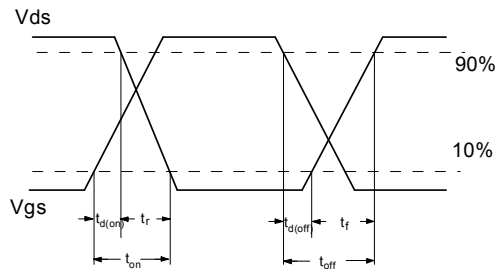
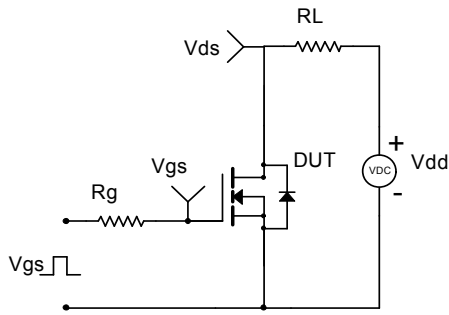


Figure 11: Normalized Maximum Transient Thermal Impedance

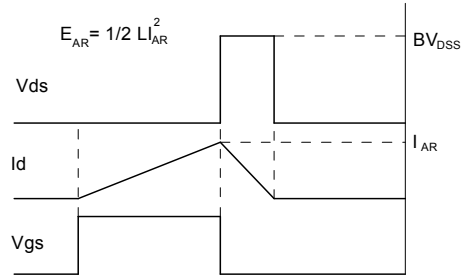
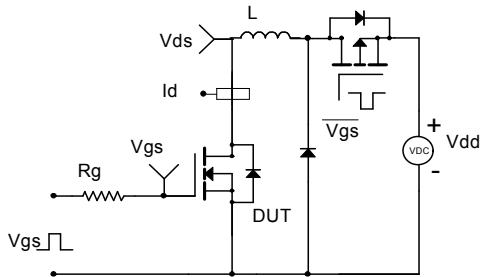
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

