ALPHA & OMEGA SEMICONDUCTOR

AO4800

30V Dual N-Channel MOSFET

General Description

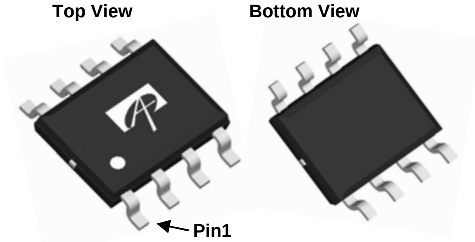
The AO4800 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The two MOSFETs make a compact and efficient switch and synchronous rectifier combination for use in buck converters.

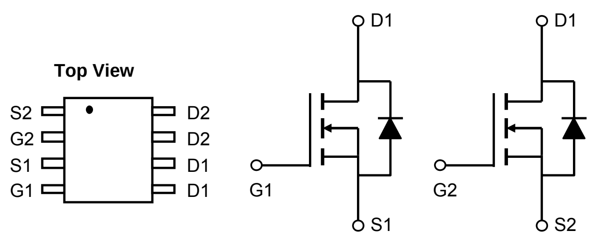
Product Summary

V_{DS}	30V
I_D (at V_{GS}=10V)	6.9A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 27mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 32mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.5V)	< 50mΩ

100% UIS Tested
100% R_g Tested

SOIC-8





Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	6.9	A
	T_A=70°C		5.8	
Pulsed Drain Current [C]		I_{DM}	40	
Avalanche Current [C]		I_{AS}, I_{AR}	14	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	10	mJ
Power Dissipation [B]	T_A=25°C	P_D	2	W
	T_A=70°C		1.3	
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	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		74	90	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	32	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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±12V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	0.7	1.1	1.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=6.9A		17.8	27	mΩ
		T_J=125°C		28	40	
		V_{GS}=4.5V, I_D=6A		19	32	mΩ
		V_{GS}=2.5V, I_D=5A		24	50	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=5A		33		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz	500	630	760	pF
C_{oss}	Output Capacitance		50	75	100	pF
C_{rss}	Reverse Transfer Capacitance		30	50	70	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	1.5	3	4.5	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=15V, I_D=6.9A	4.8	6	7	nC
Q_{gs}	Gate Source Charge		1	1.3	1.6	nC
Q_{gd}	Gate Drain Charge		1	1.8	2.5	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.2Ω, R_{GEN}=3Ω		3		ns
t_r	Turn-On Rise Time			2.5		ns
$t_{D(off)}$	Turn-Off DelayTime			25		ns
t_f	Turn-Off Fall Time			4		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=5A, dI/dt=100A/µs	7	8.5	10	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=5A, dI/dt=100A/µs	2	2.6	3.1	nC

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 initial T_J=25°C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence 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 impedence 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

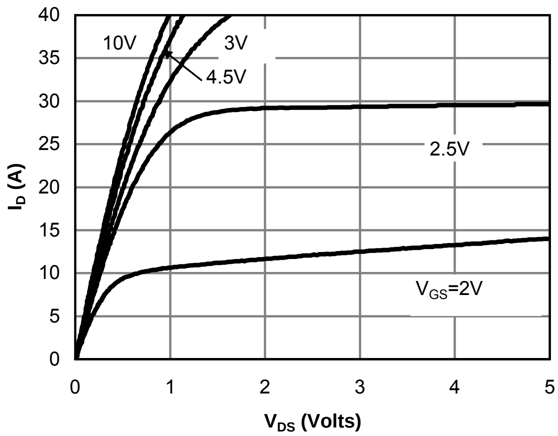

Fig 1: On-Region Characteristics (Note E)

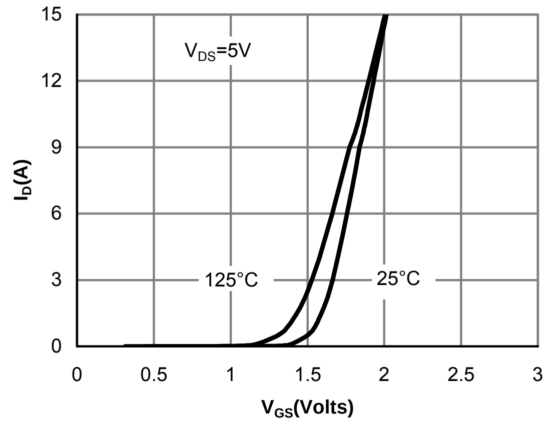

Figure 2: Transfer Characteristics (Note E)

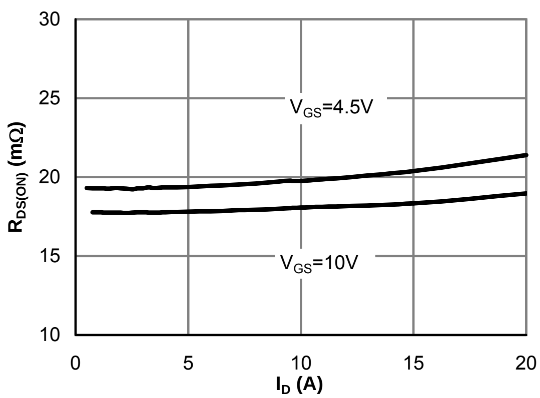

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

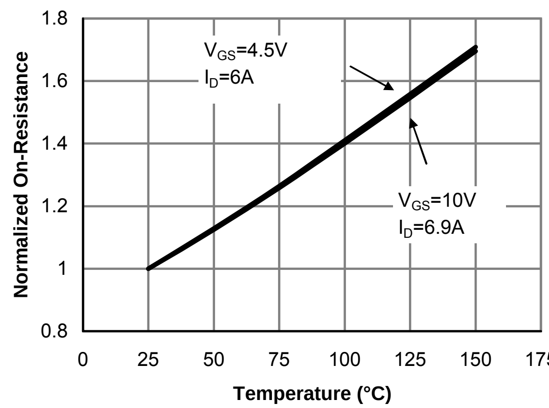

Figure 4: On-Resistance vs. Junction Temperature (Note E)

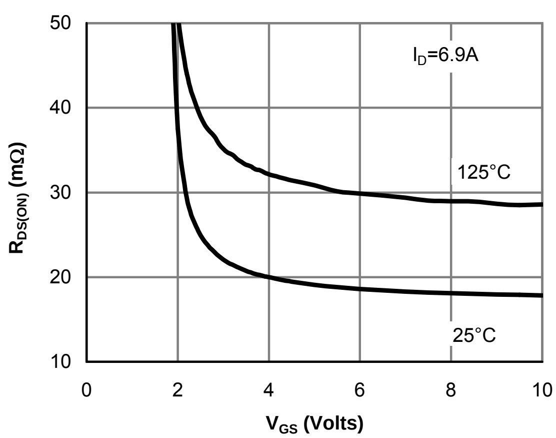

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

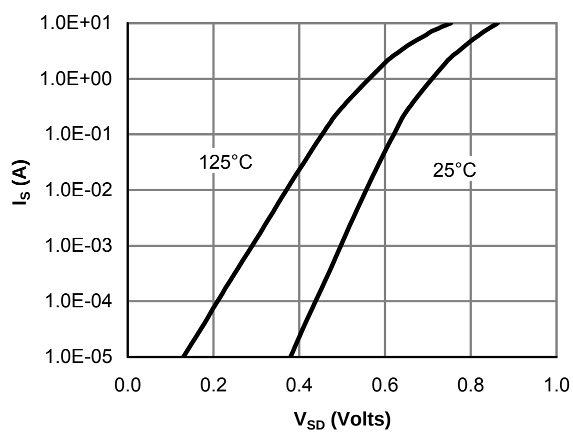

Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

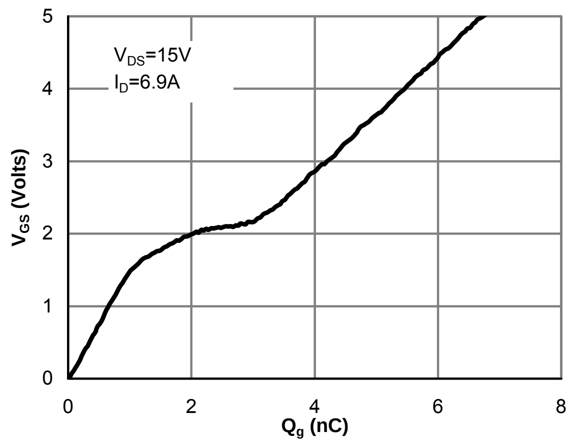

Figure 7: Gate-Charge Characteristics

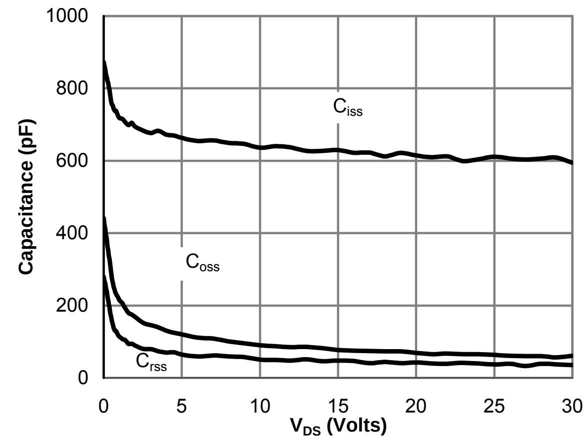

Figure 8: Capacitance Characteristics

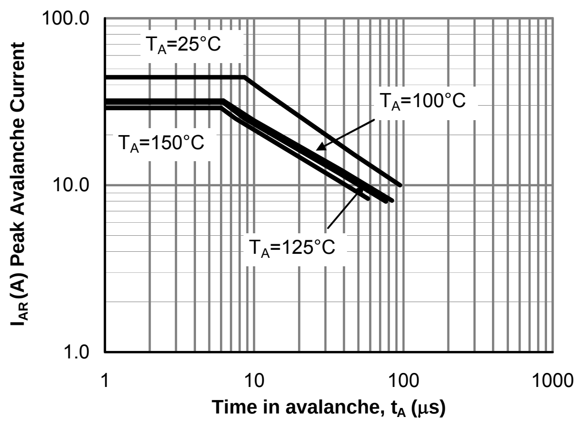

Figure 9: Single Pulse Avalanche capability (Note C)

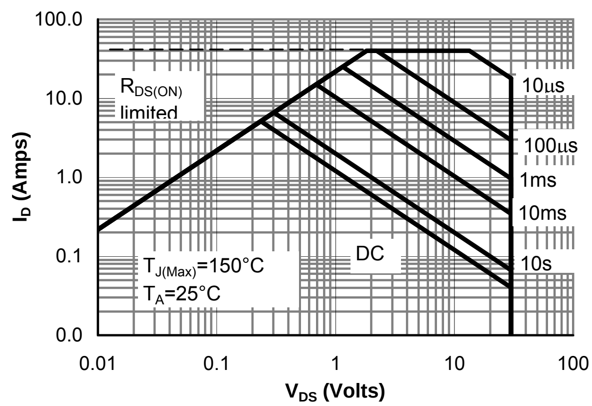

Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

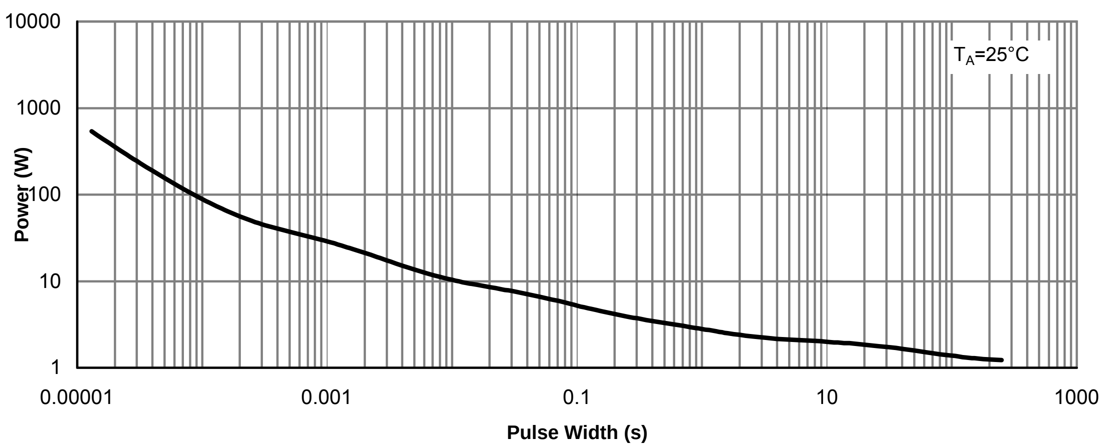

Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

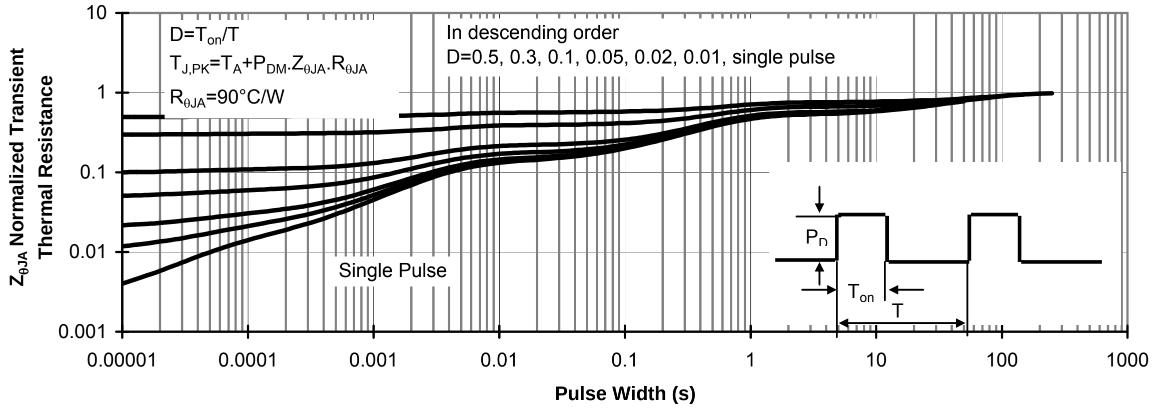

Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

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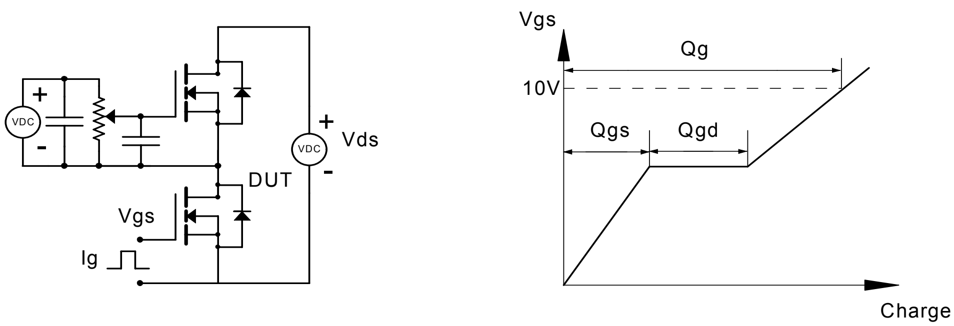
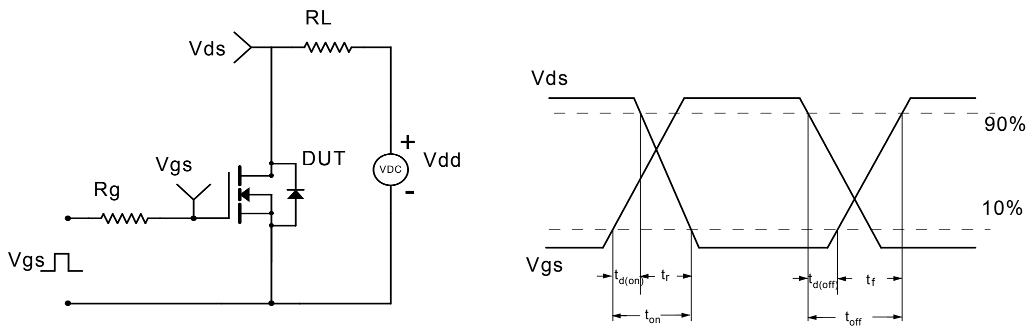
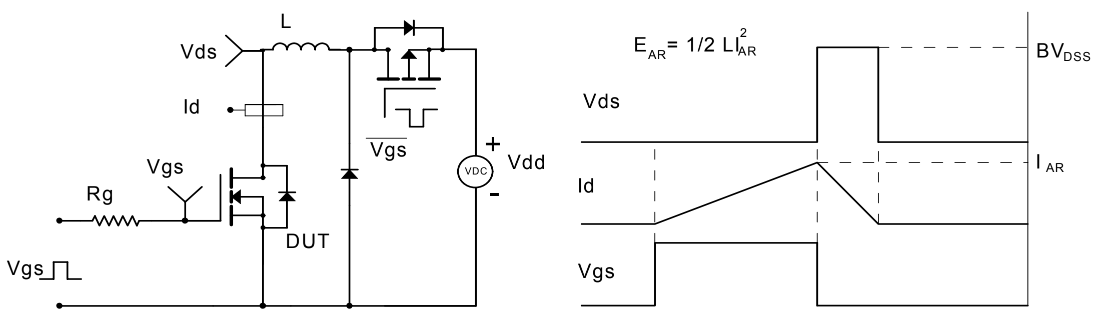
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms