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ALPHA & OMEGA SEMICONDUCTOR
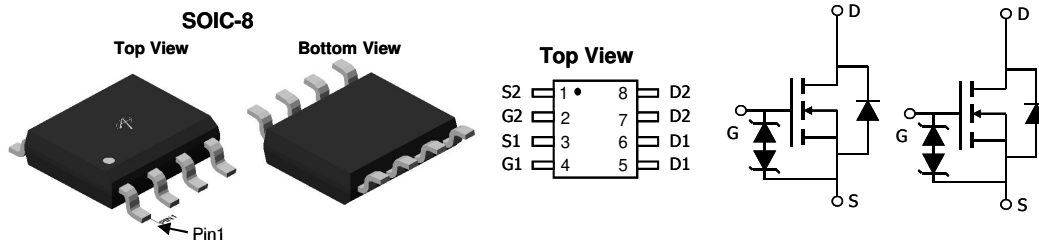
AO4822A
30V *Dual N-channel MOSFET*

General Description

The AO4822A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

Product Summary

V_{DS}	30V
I_D (at V_{GS}=10V)	8A
$R_{DS(ON)}$ (at V_{GS}=10V)	<19mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 26mΩ

 ESD Protected
100% UIS Tested
100% R_g Tested

Green Product

SOIC-8

Top View   Bottom View

Top View

S2	1	8	D2
G2	2	7	D2
S1	3	6	D1
G1	4	5	D1

Pin1

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}	±20	V
Continuous Drain Current	T_A=25°C	I_D	8	A
	T_A=70°C		6.5	
Pulsed Drain Current [C]		I_{DM}	48	
Avalanche Current [C]		I_{AS}, I_{AR}	19	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	18	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℃ 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℃			5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$=0V, V$_{GS}$= ±20V				10	µA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$ I$_D$=250µA		1.2	1.8	2.4	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=10V, V$_{DS}$=5V		48			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=8A			15.5	19	mΩ
			T$_J$=125℃		21	25	
		V$_{GS}$=4.5V, I$_D$=6A			18.5	26	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=5V, I$_D$=8A			30		S
V$_{SD}$	Diode Forward Voltage	I$_S$=1A,V$_{GS}$=0V			0.75	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		600	740	888	pF
C$_{oss}$	Output Capacitance			77	110	145	pF
C$_{rss}$	Reverse Transfer Capacitance			50	82	115	pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz		0.5	1.1	1.7	Ω
SWITCHING PARAMETERS							
Q$_g$(10V)	Total Gate Charge	V$_{GS}$=10V, V$_{DS}$=15V, I$_D$=8A		12	15	18	nC
Q$_g$(4.5V)	Total Gate Charge			6	7.5	9	nC
Q$_{gs}$	Gate Source Charge			2	2.5	3	nC
Q$_{gd}$	Gate Drain Charge			2	3	5	nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=10V, V$_{DS}$=15V, R$_L$=1.8Ω, R$_{GEN}$=3Ω			5		ns
t$_r$	Turn-On Rise Time				3.5		ns
t$_{D(off)}$	Turn-Off DelayTime				19		ns
t$_f$	Turn-Off Fall Time				3.5		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=8A, dI/dt=500A/µs		6	8	10	ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=8A, dI/dt=500A/µs		14	18	22	nC

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. 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$_{θJA}$ is the sum of the thermal impedence from junction to lead R$_{θJL}$ 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 1in² 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.

ALPHA & OMEGA
SEMICONDUCTOR
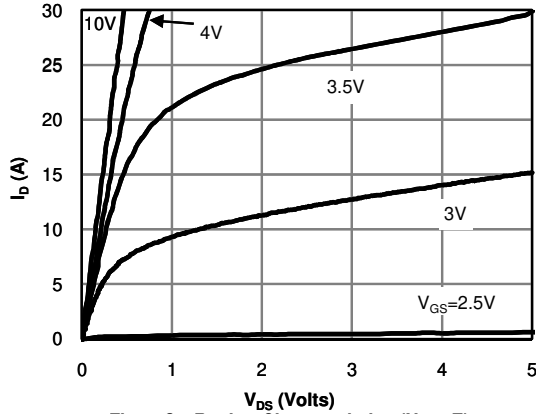
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

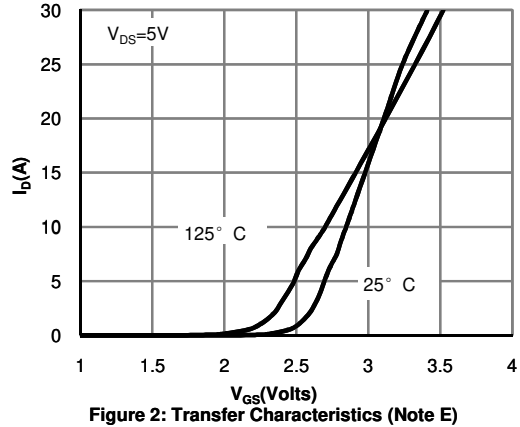Fig 1: On-Region Characteristics (Note E)
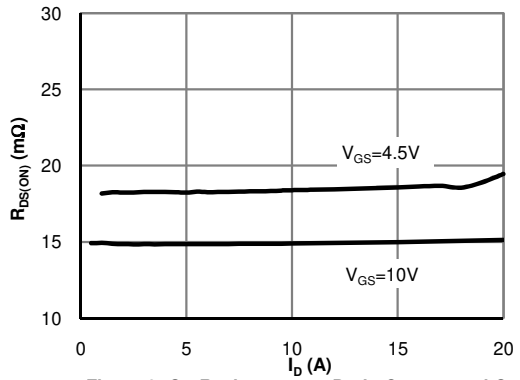

Figure 2: Transfer Characteristics (Note E)

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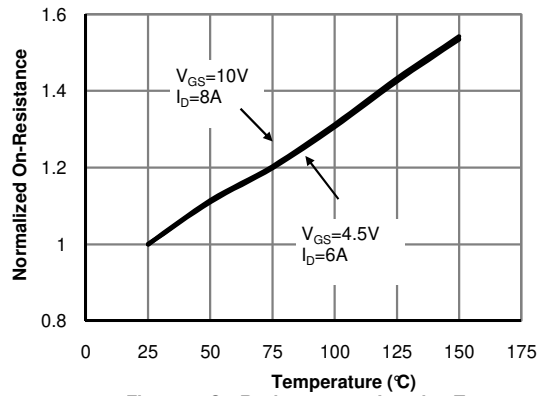

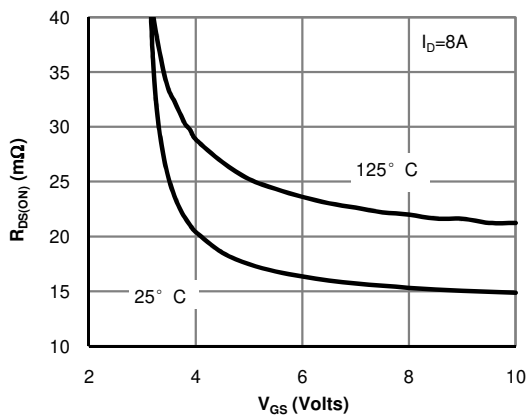Figure 4: On-Resistance vs. Junction Temperature (Note E)

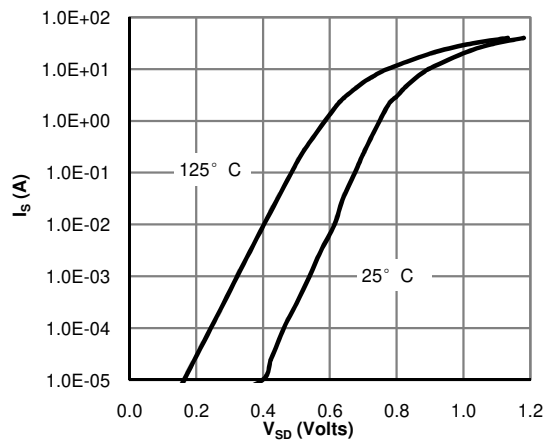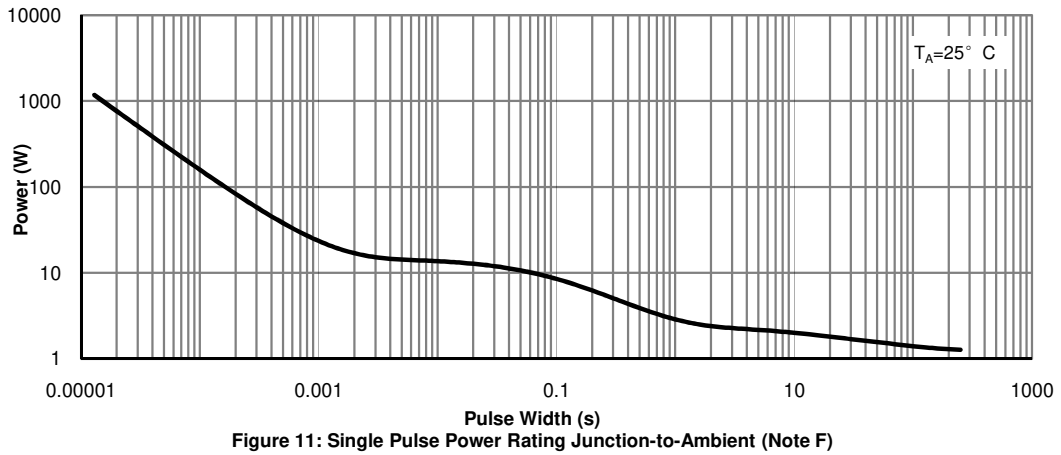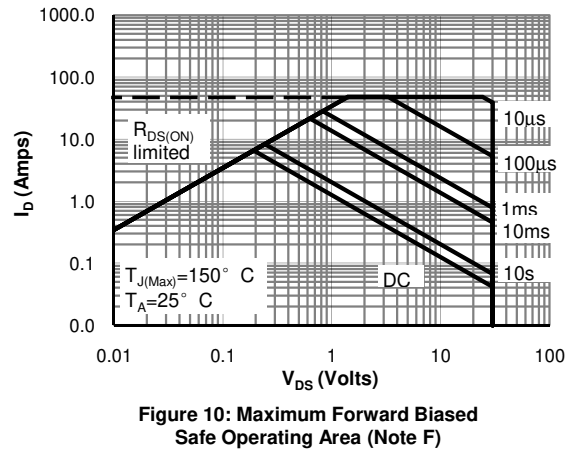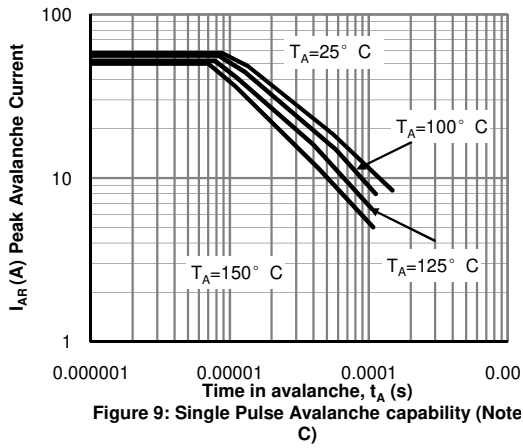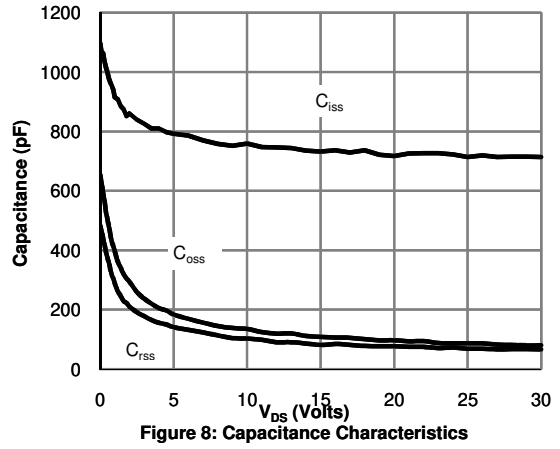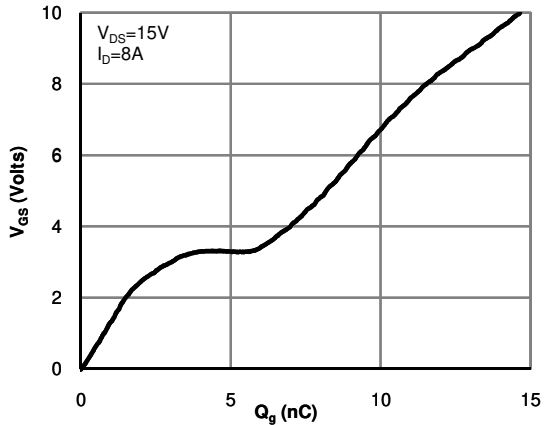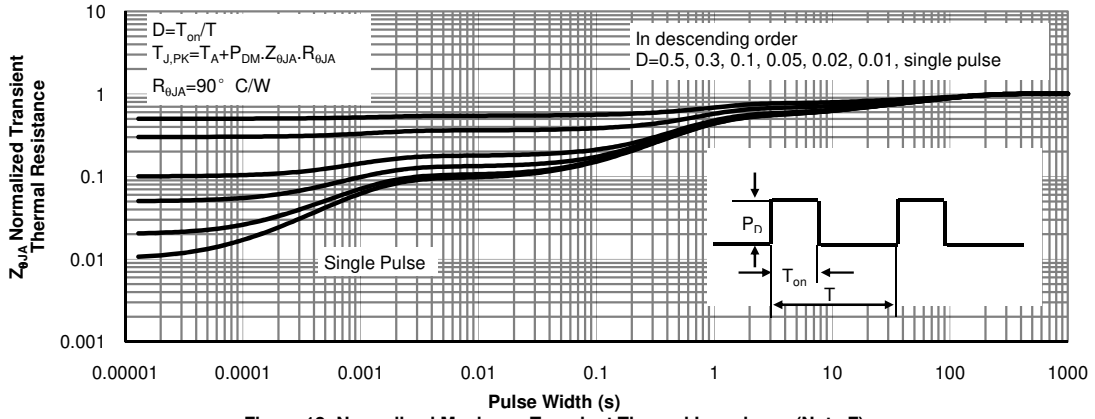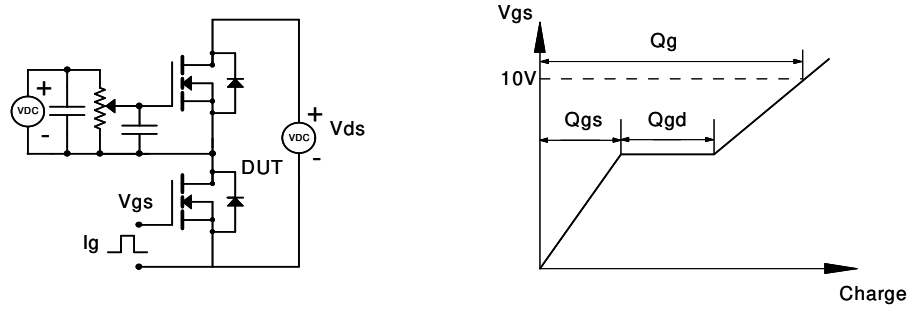Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

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

$D=T_{on}/T$
$T_{J,PK}=T_A+P_{DM} \cdot Z_{\theta JA} \cdot R_{\theta JA}$
$R_{\theta JA}=90°$ C/W

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Single Pulse

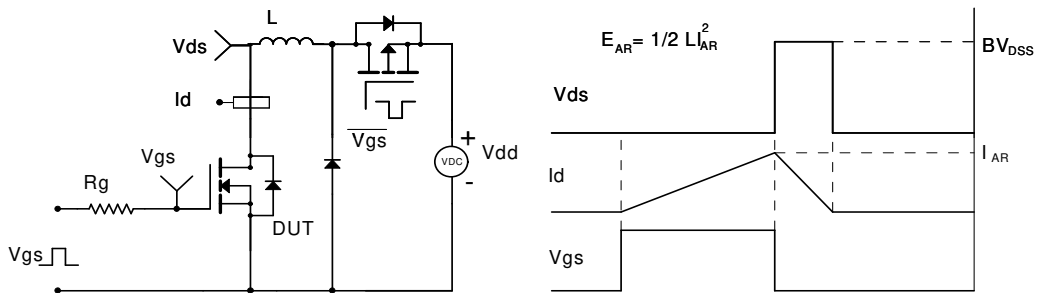**Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)**

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms
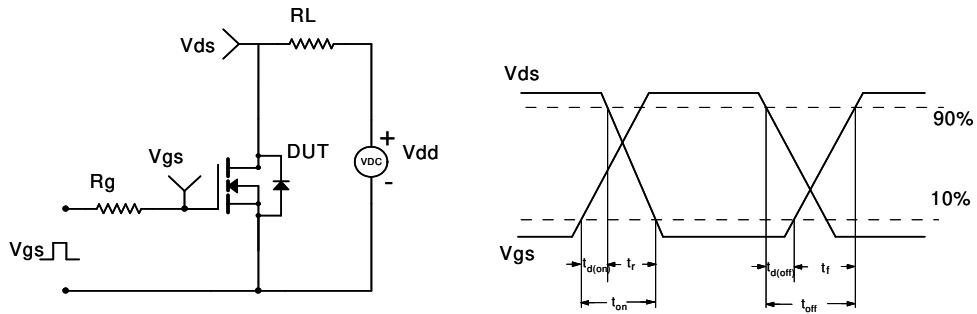
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$$E_{AR} = 1/2\ LI_{AR}^2$$

Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int Idt$$