ALPHA & OMEGA SEMICONDUCTOR

AO4492L
N-Channel Enhancement Mode Field Effect Transistor

General Description

The AO4492L uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge.
This device is suitable for high side switch in SMPS and general purpose applications.

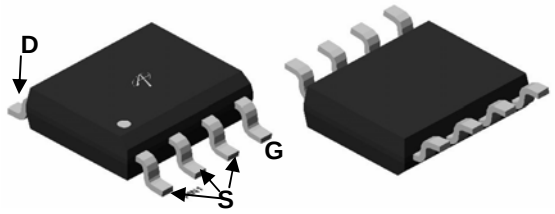
- RoHS Compliant
- Halogen Free

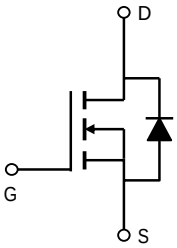
Features

V_{DS} (V) = 30V
I_D = 13A (V_{GS} = 10V)
$R_{DS(ON)}$ < 9.5mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 14mΩ (V_{GS} = 4.5V)

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}	±20	V
Continuous Drain Current	T_C=25°C	I_D	13	A
	T_C=70°C		11	
Pulsed Drain Current [C]		I_{DM}	100	
Avalanche Current [C]		I_{AR}	20	A
Repetitive avalanche energy L=0.1mH [C]		E_{AR}	20	mJ
Power Dissipation [B]	T_C=25°C	P_D	3.1	W
	T_C=70°C		2	
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	$R_{\theta JA}$	31	40	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		59	75	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	16	24	°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}= ±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	1.2	1.7	2.2	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	100			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=13A		7.6	9.5	mΩ
		T_J=125°C		11	13	
		V_{GS}=4.5V, I_D=11A		11	14	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=13A		43		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.74	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	600	750	980	pF
C_{oss}	Output Capacitance		200	245	365	pF
C_{rss}	Reverse Transfer Capacitance		40	70	100	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.4	0.8	1.4	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=13A	9	11.5	14	nC
Q_g(4.5V)	Total Gate Charge		4	5	6	nC
Q_{gs}	Gate Source Charge		1.6	2	2.4	nC
Q_{gd}	Gate Drain Charge		1.5	2.5	3.5	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.2Ω, R_{GEN}=3Ω		5		ns
t_r	Turn-On Rise Time			3		ns
$t_{D(off)}$	Turn-Off DelayTime			18		ns
t_f	Turn-Off Fall Time			3		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=13A, dI/dt=500A/µs	9	11	13	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=13A, dI/dt=500A/µs	18	23	28	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 initialT_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 <300 µs 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.

Rev0 : Dec-08

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

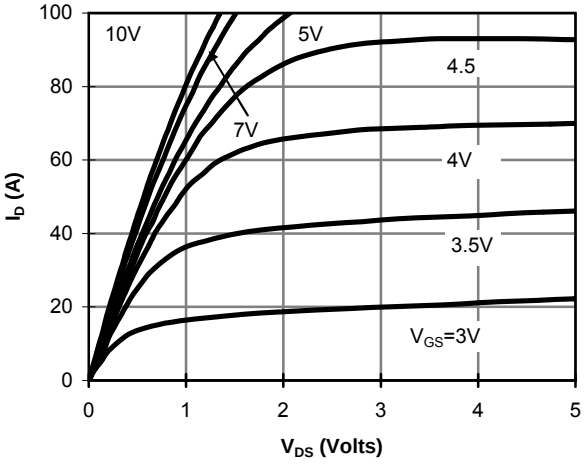


Fig 1: On-Region Characteristics (Note E)

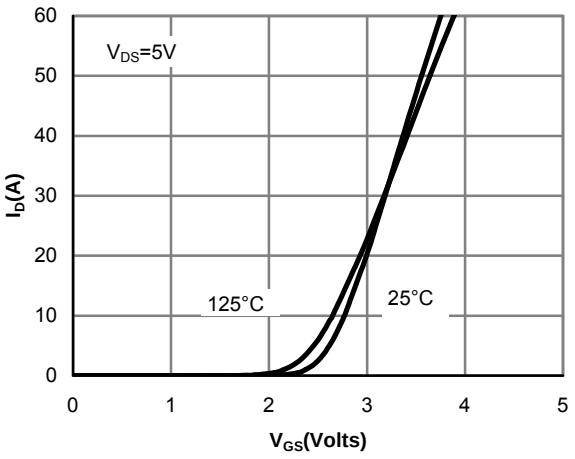


Figure 2: Transfer Characteristics (Note E)

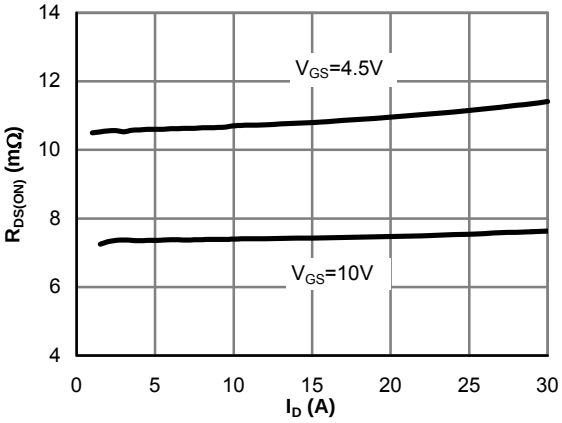


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

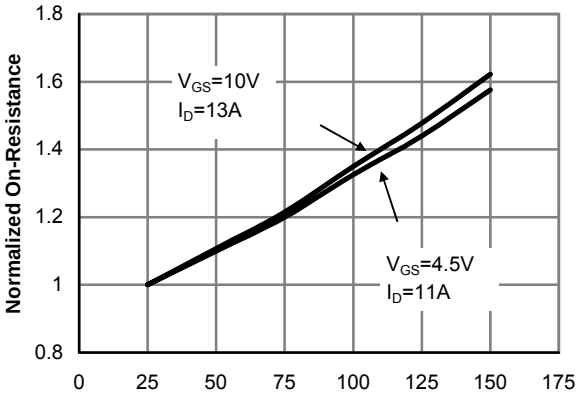


Figure 4: On-Resistance vs. Junction Temperature (Note E)

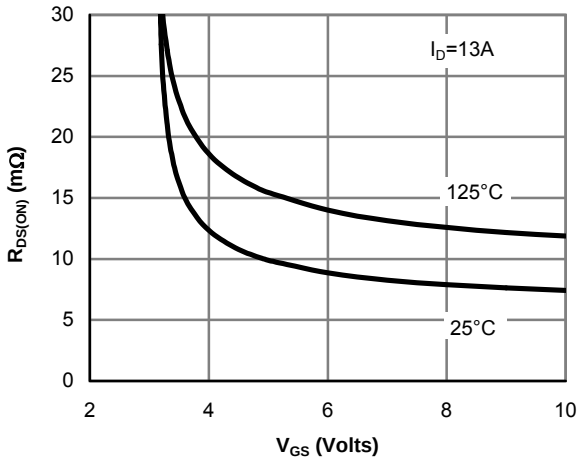


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

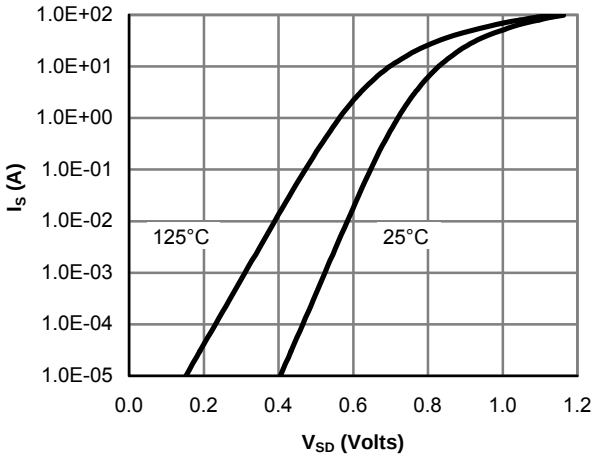


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

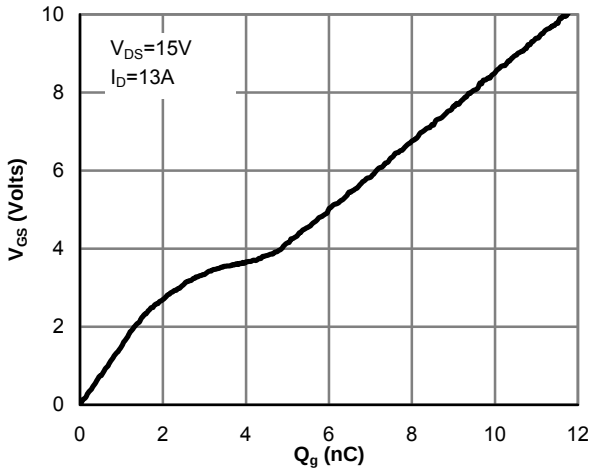


Figure 7: Gate-Charge Characteristics

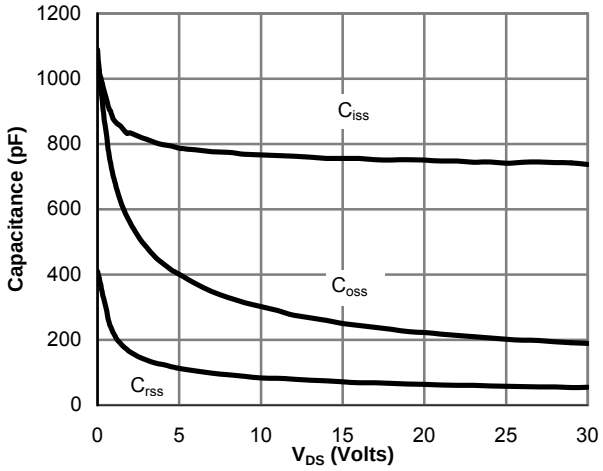


Figure 8: Capacitance Characteristics

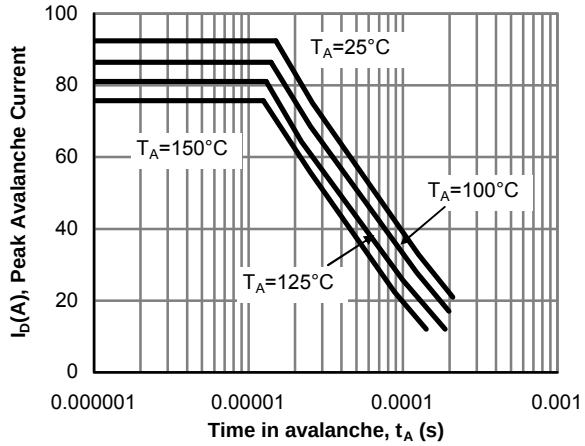


Figure 12: Single Pulse Avalanche capability (Note C)

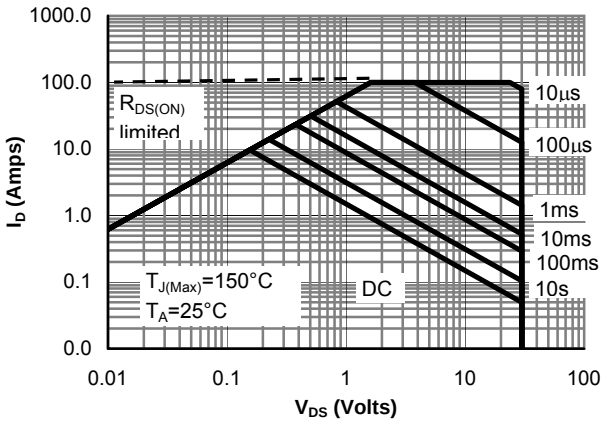


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

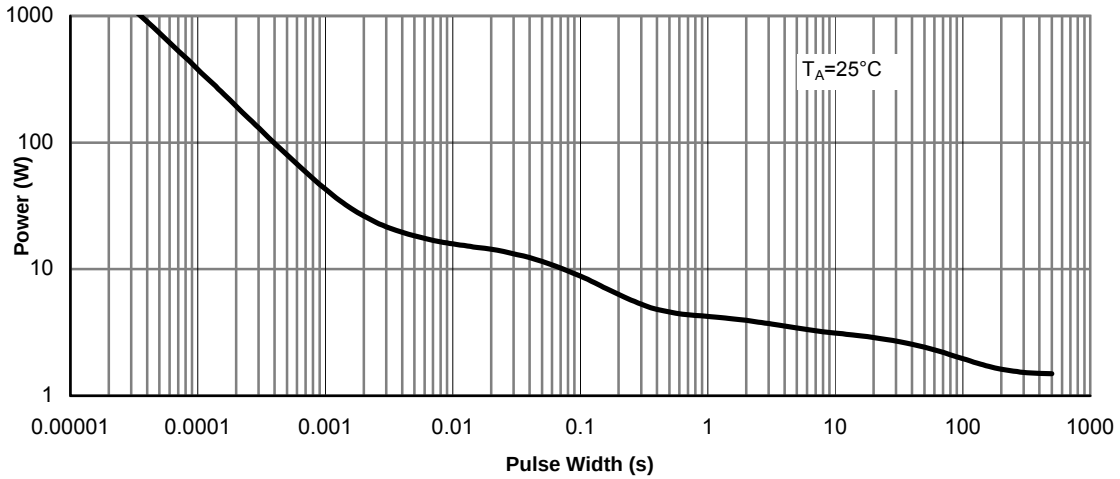


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

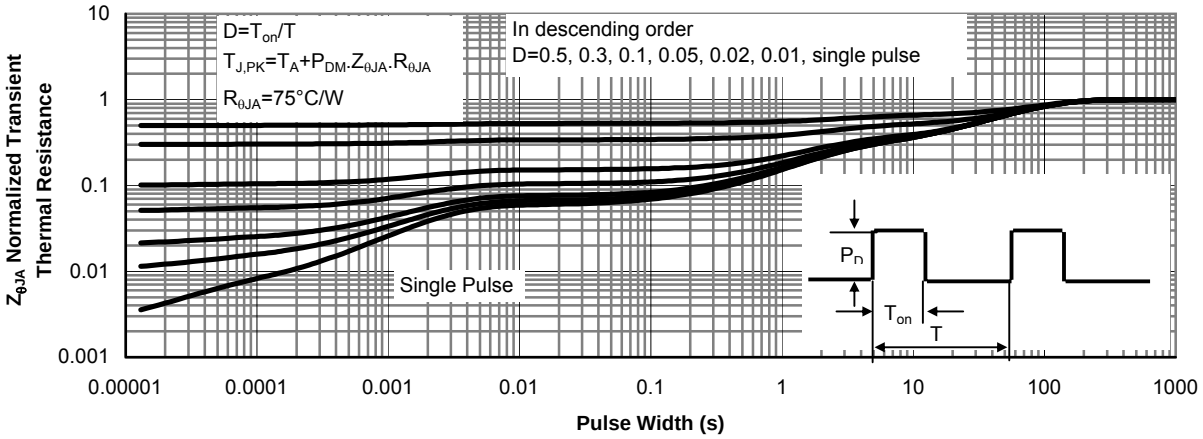
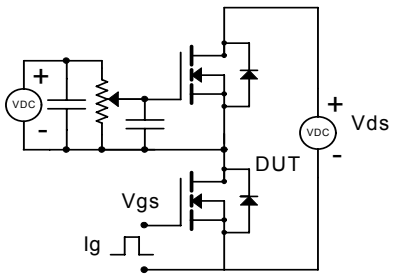
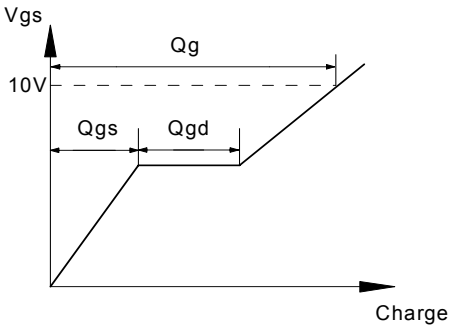


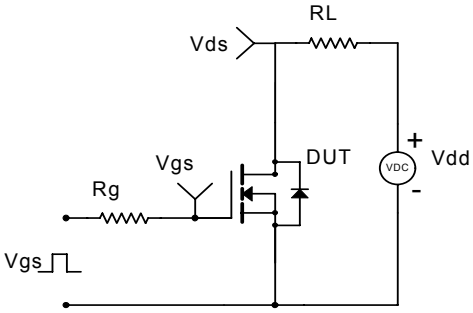
Figure 16: Normalized Maximum Transient Thermal Impedance (Note F)

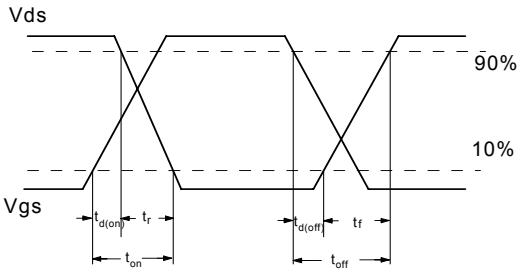
Gate Charge Test Circuit & Waveform



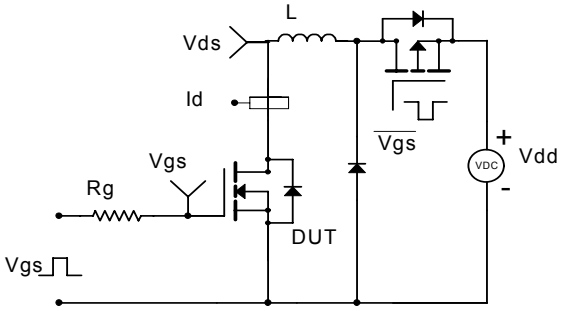


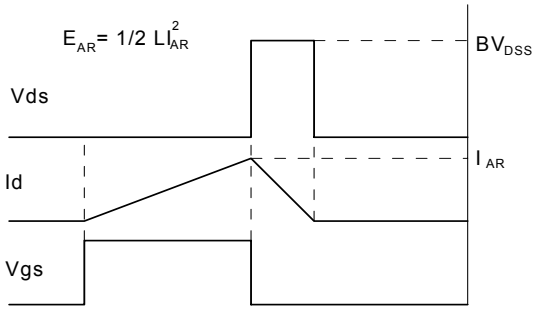
Resistive Switching Test Circuit & Waveforms





Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms