



ALPHA & OMEGA
SEMICONDUCTOR



AO4492L

N-Channel Enhancement Mode Field Effect Transistor

General Description

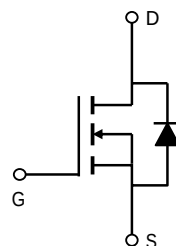
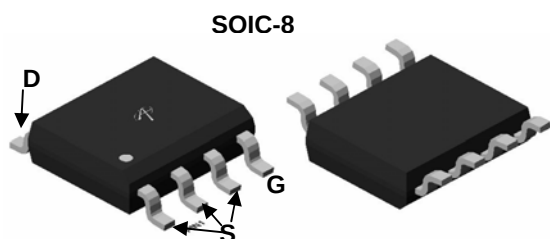
The AO4492L uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for high side switch in SMPS and general purpose applications.

- RoHS Compliant
- Halogen Free

Features

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

100% UIS Tested!
100% R_g Tested!



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	I_D	13	A
$T_C=25^\circ\text{C}$			
$T_C=70^\circ\text{C}$		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	P_D	3.1	W
$T_C=25^\circ\text{C}$			
$T_C=70^\circ\text{C}$		2	
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	$t \leq 10s$	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}	Steady-State		59	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

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	1.2	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 T _J =125°C		7.6 11	9.5 13	mΩ
		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_{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 initial T_J=25°C.

D. The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 impedance 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.

Rev0 : Dec-08

COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

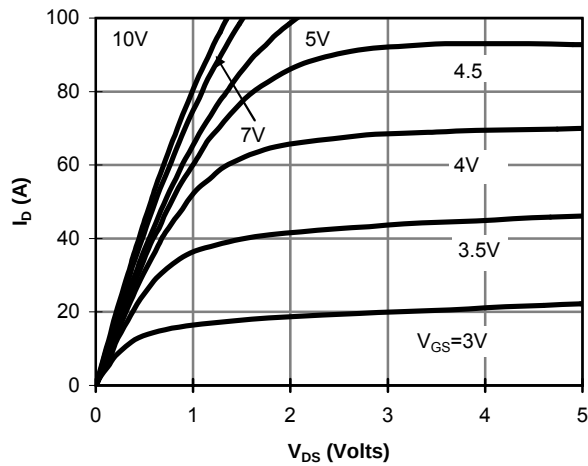


Fig 1: On-Region Characteristics (Note E)

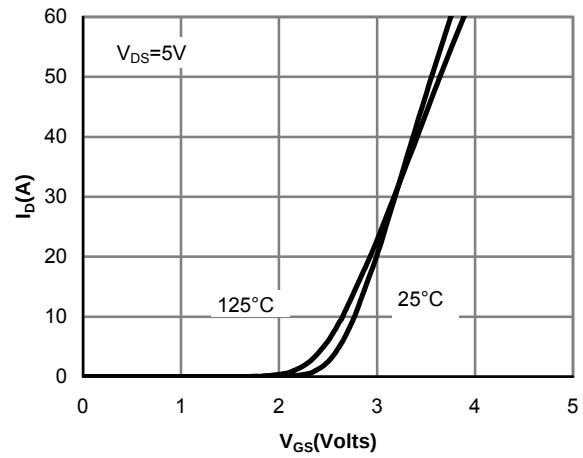


Figure 2: Transfer Characteristics (Note E)

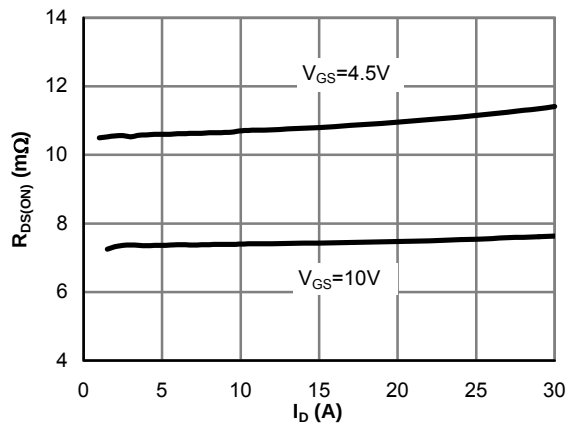


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

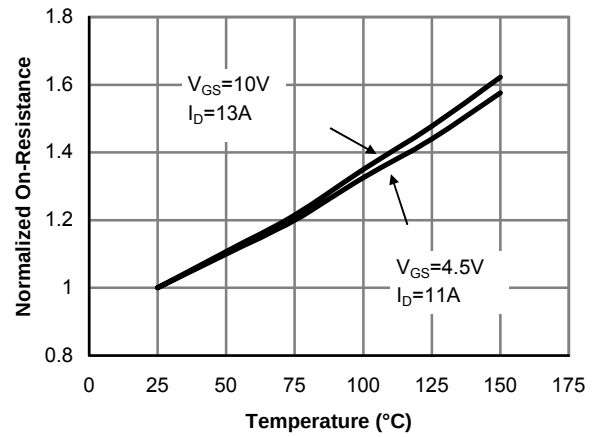


Figure 4: On-Resistance vs. Junction Temperature (Note E)

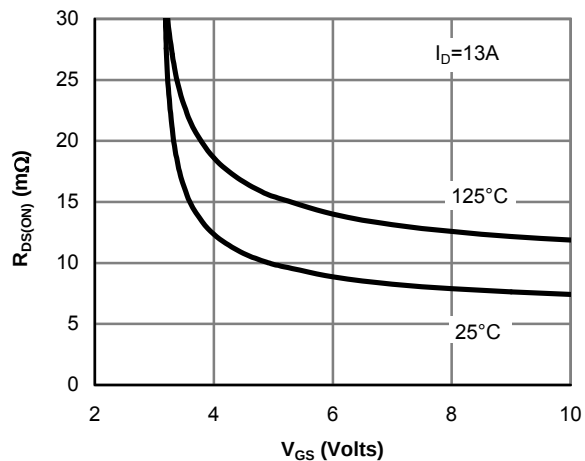


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

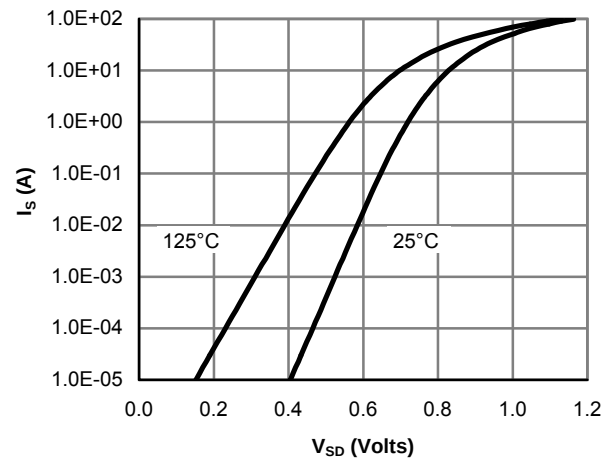


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

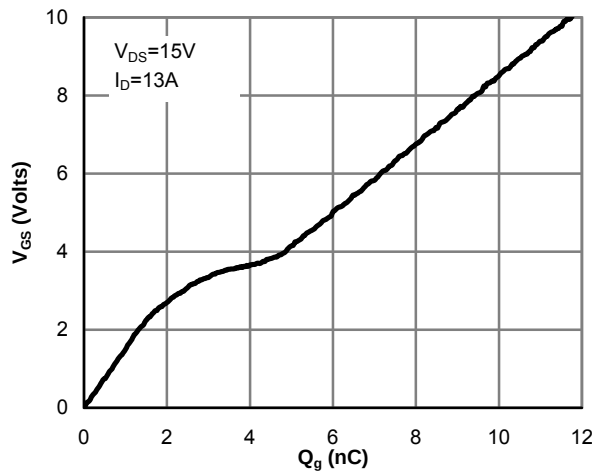


Figure 7: Gate-Charge Characteristics

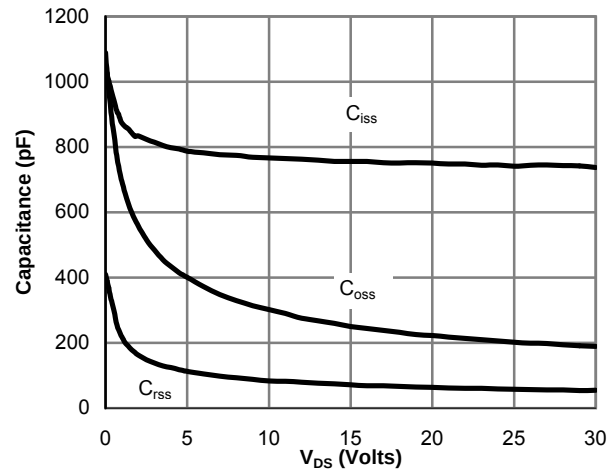
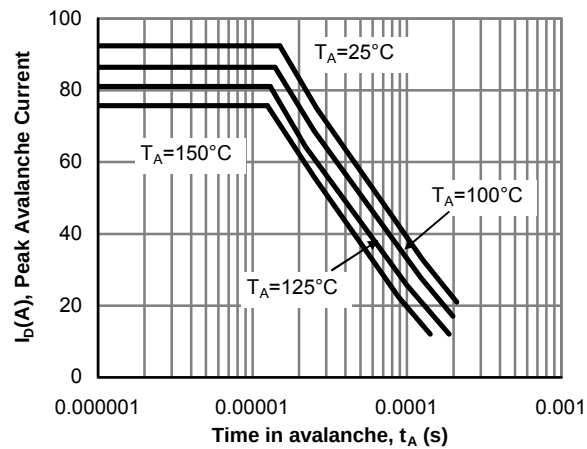


Figure 8: Capacitance Characteristics



**Figure 12: Single Pulse Avalanche capability
(Note C)**

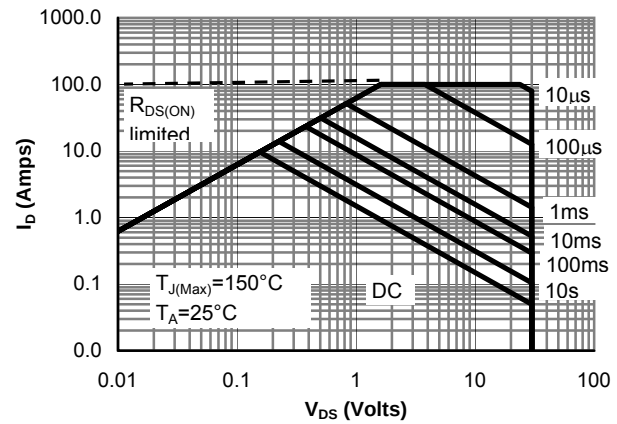


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

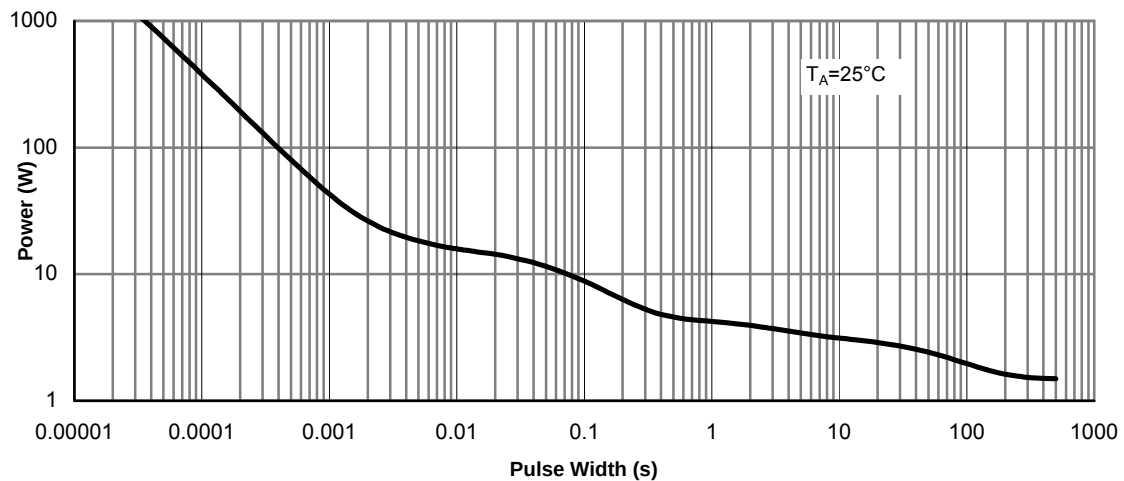


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

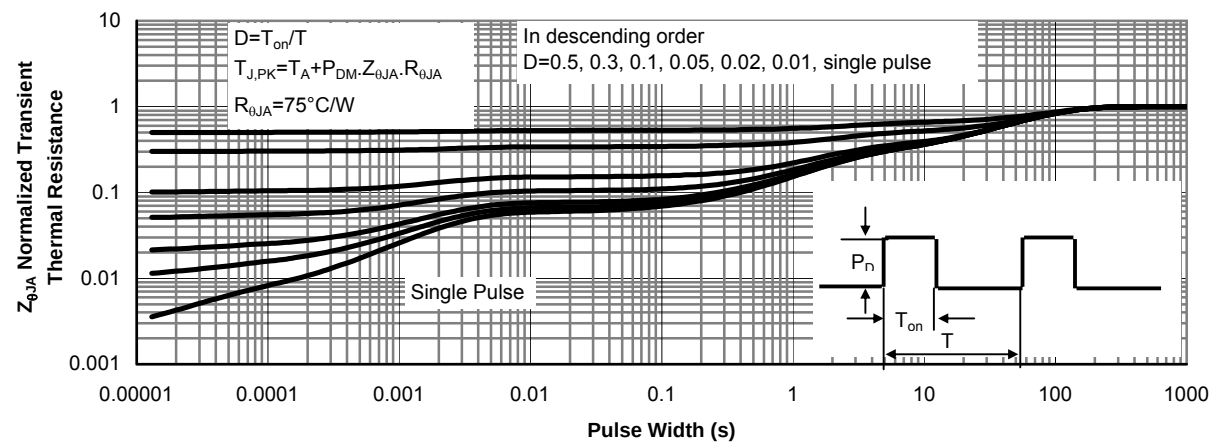
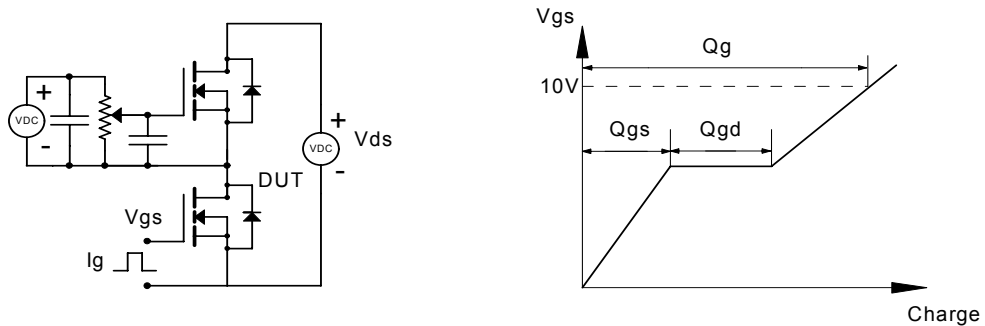
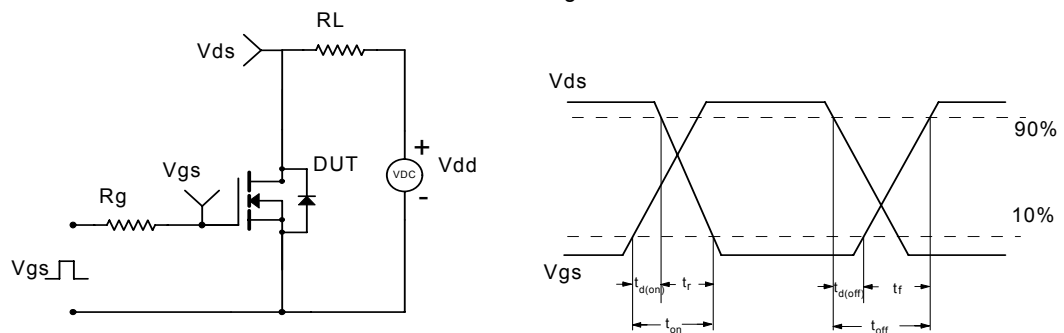


Figure 16: Normalized Maximum Transient Thermal Impedance (Note F)

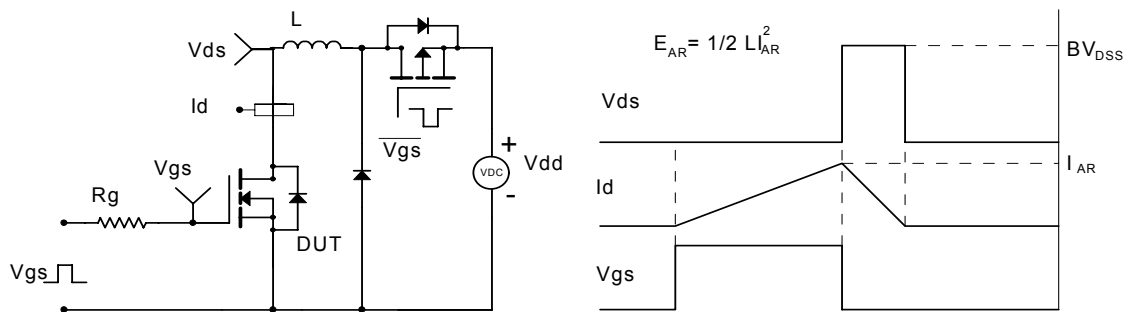
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

