



ALPHA & OMEGA
SEMICONDUCTOR

AO4498E

30V N-Channel MOSFET

General Description

The AO4498E combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

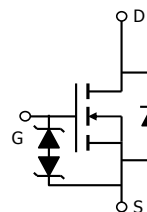
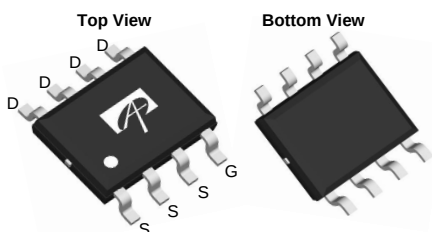
Product Summary

V_{DS}	30V
I_D (at $V_{GS}=10V$)	18A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 5.8m Ω
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$)	< 8.5m Ω

ESD Protected
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	I_D	18	A
		14	
Pulsed Drain Current ^C	I_{DM}	120	
Power Dissipation ^B	P_D	3.1	W
		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	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A D}		59	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead	$R_{\theta JL}$	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	36		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			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.3	1.8	2.3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	120			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =18A T _J =125°C		4.8 7.4	5.8 8.9	mΩ
		V _{GS} =4.5V, I _D =16A		6.8	8.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =18A		50		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current				4	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz	1840	2300	2760	pF
C _{oss}	Output Capacitance		230	330	430	pF
C _{rss}	Reverse Transfer Capacitance		145	240	340	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.6	1.25	1.9	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =18A	34	42	50	nC
Q _{g(4.5V)}	Total Gate Charge		16	20	24	nC
Q _{gs}	Gate Source Charge		5.6	7	8.4	nC
Q _{gd}	Gate Drain Charge		6	10	14	nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.83Ω, R _{GEN} =3Ω		8		ns
t _r	Turn-On Rise Time			10		ns
t _{D(off)}	Turn-Off DelayTime			33		ns
t _f	Turn-Off Fall Time			8		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =18A, dI/dt=500A/μs	10	12.5	15	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =18A, dI/dt=500A/μs	22	27	32	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 <300μs 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

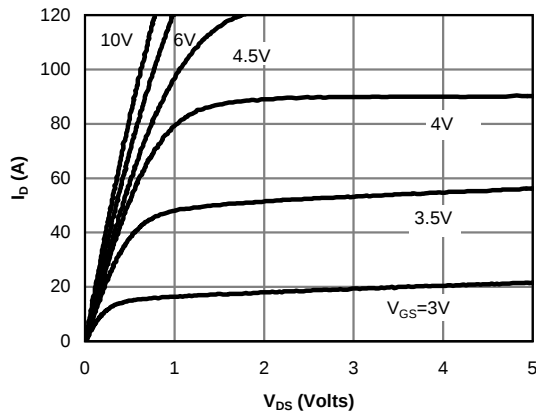


Fig 1: On-Region Characteristics (Note E)

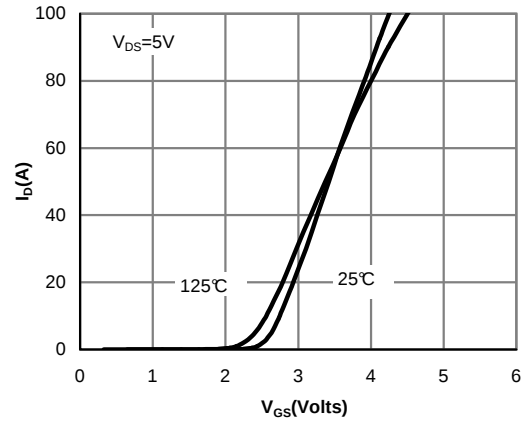


Figure 2: Transfer Characteristics (Note E)

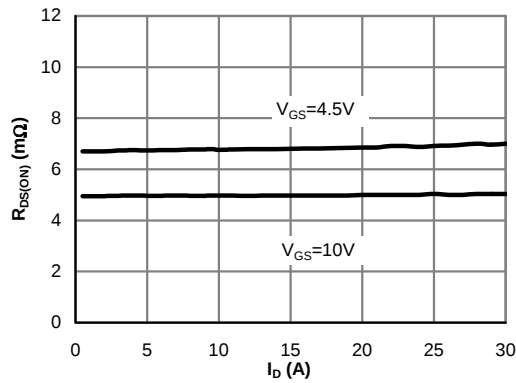


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

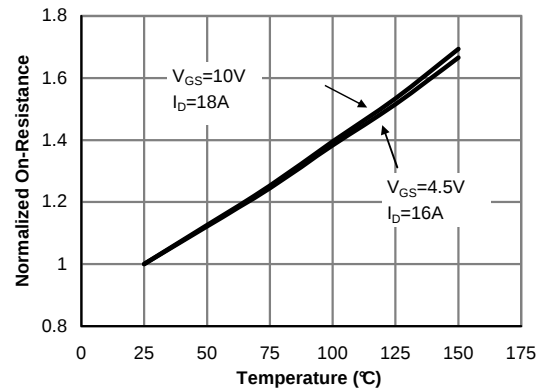


Figure 4: On-Resistance vs. Junction Temperature (Note E)

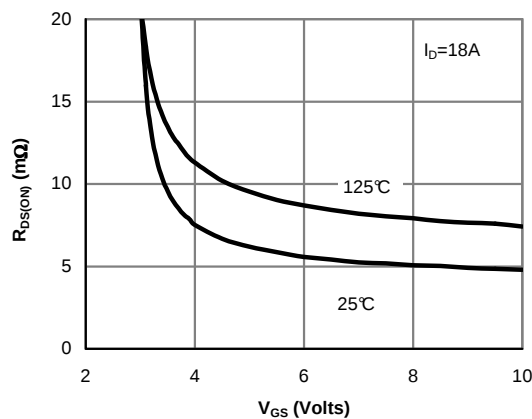


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

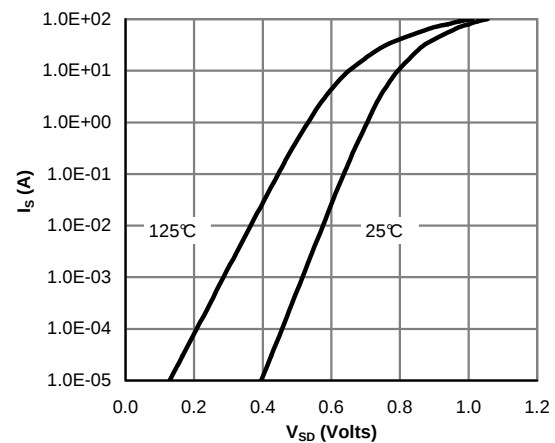


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

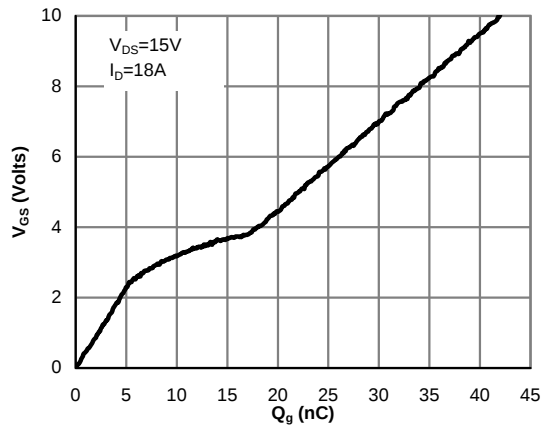


Figure 7: Gate-Charge Characteristics

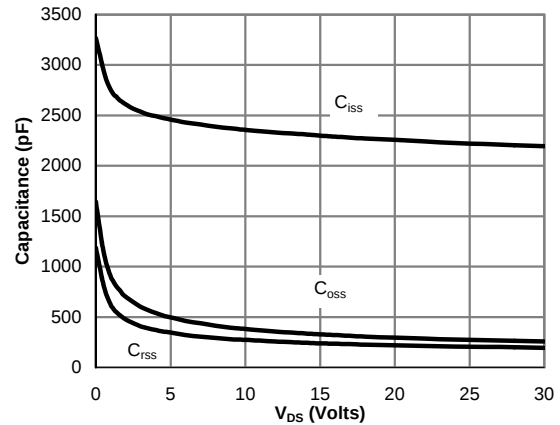


Figure 8: Capacitance Characteristics

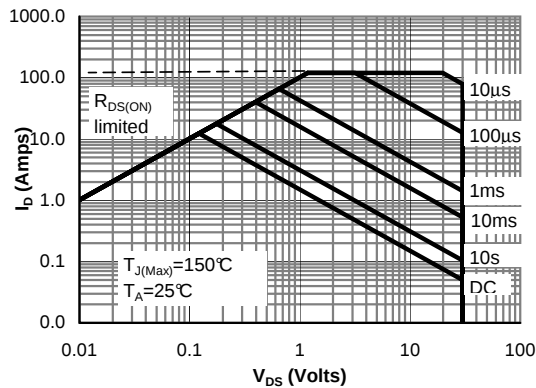


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

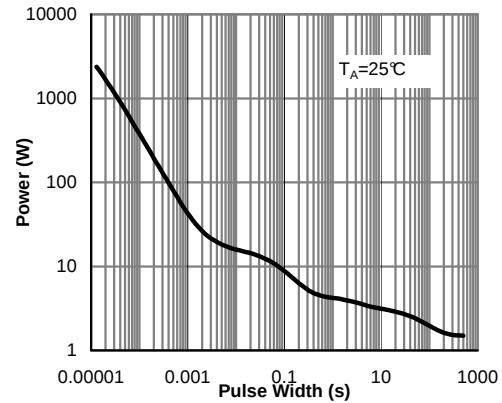


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

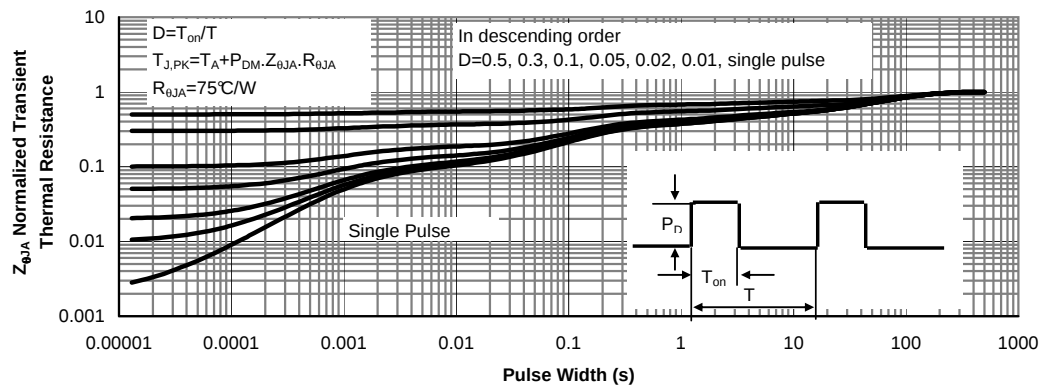
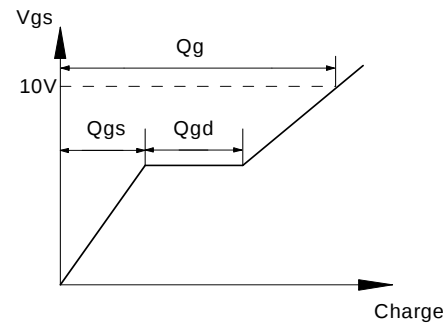
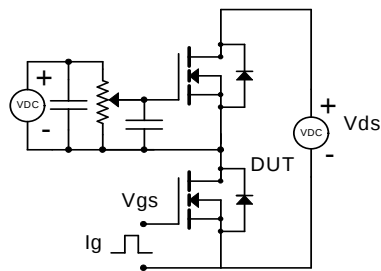
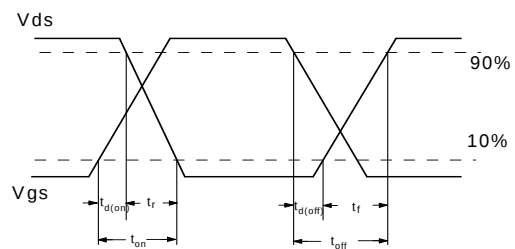
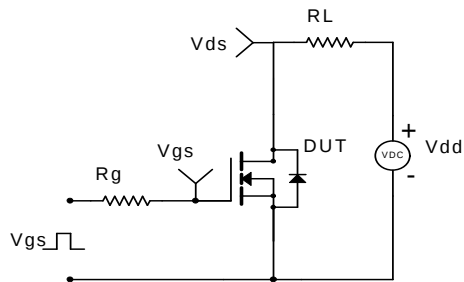


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

