



**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.

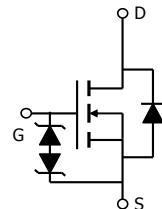
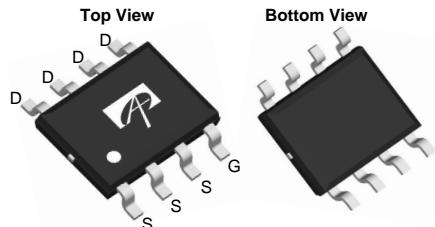
### Product Summary

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

ESD Protected  
100% UIS Tested  
100%  $R_g$  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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <small><math>T_A=25^\circ\text{C}</math></small>	$I_D$	18	A
		14	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	120	
Power Dissipation <sup>B</sup> <small><math>T_A=25^\circ\text{C}</math></small>	$P_D$	3.1	W
		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 <sup>A</sup> <small><math>t \leq 10\text{s}</math></small>	$R_{\theta JA}$	31	40	°C/W
Maximum Junction-to-Ambient <sup>A,D</sup> <small>Steady-State</small>		59	75	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	16	24	°C/W

**Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30	36		V
$I_{\text{DSS}}$	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{\text{GSS}}$	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			$\pm 10$	$\mu\text{A}$
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.3	1.8	2.3	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	120			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=18\text{A}$ $T_J=125^\circ\text{C}$		4.8 7.4	5.8 8.9	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=16\text{A}$		6.8	8.5	$\text{m}\Omega$
$g_{\text{FS}}$	Forward Transconductance	$V_{DS}=5\text{V}, I_D=18\text{A}$		50		S
$V_{\text{SD}}$	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.7	1	V
$I_S$	Maximum Body-Diode Continuous Current				4	A
<b>DYNAMIC PARAMETERS</b>						
$C_{\text{iss}}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$	1840	2300	2760	pF
$C_{\text{oss}}$	Output Capacitance		230	330	430	pF
$C_{\text{rss}}$	Reverse Transfer Capacitance		145	240	340	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.6	1.25	1.9	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=18\text{A}$	34	42	50	nC
$Q_g(4.5\text{V})$	Total Gate Charge		16	20	24	nC
$Q_{\text{gs}}$	Gate Source Charge		5.6	7	8.4	nC
$Q_{\text{gd}}$	Gate Drain Charge		6	10	14	nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, R_L=0.83\Omega, R_{\text{GEN}}=3\Omega$		8		ns
$t_r$	Turn-On Rise Time			10		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			33		ns
$t_f$	Turn-Off Fall Time			8		ns
$t_{\text{rr}}$	Body Diode Reverse Recovery Time	$I_F=18\text{A}, dI/dt=500\text{A}/\mu\text{s}$	10	12.5	15	ns
$Q_{\text{rr}}$	Body Diode Reverse Recovery Charge	$I_F=18\text{A}, dI/dt=500\text{A}/\mu\text{s}$	22	27	32	nC

A. The value of  $R_{\text{QJA}}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

B. The power dissipation  $P_D$  is based on  $T_{J(\text{MAX})}=150^\circ\text{C}$ , using  $\leq 10\text{s}$  junction-to-ambient thermal resistance.

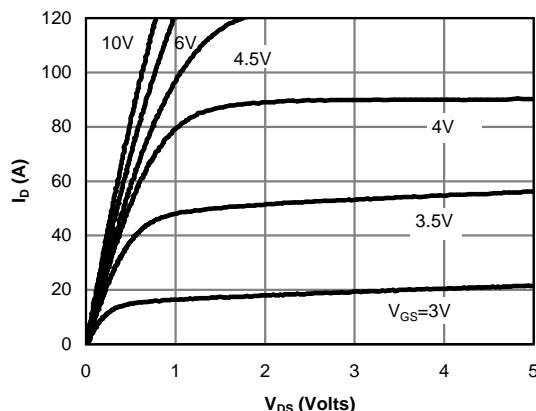
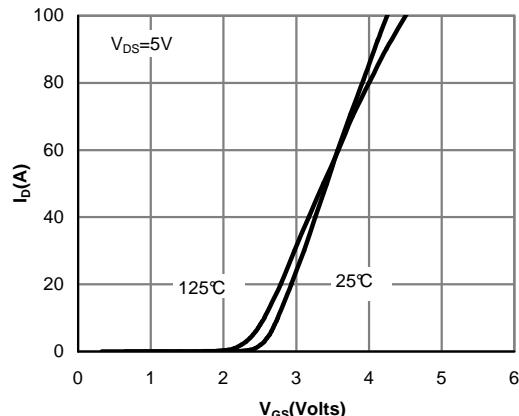
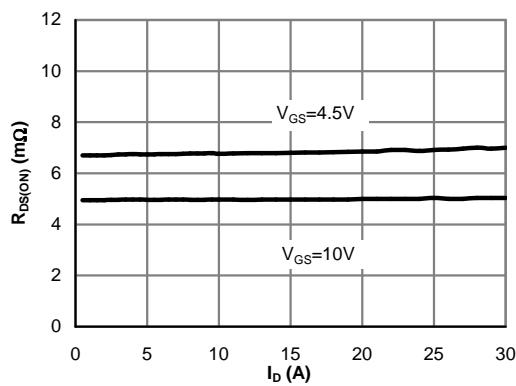
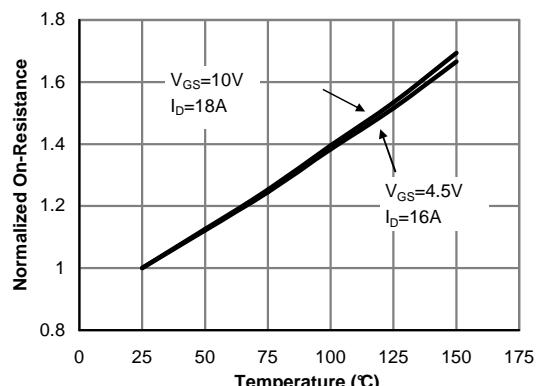
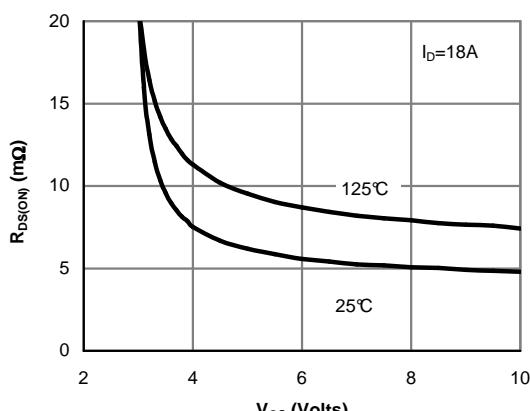
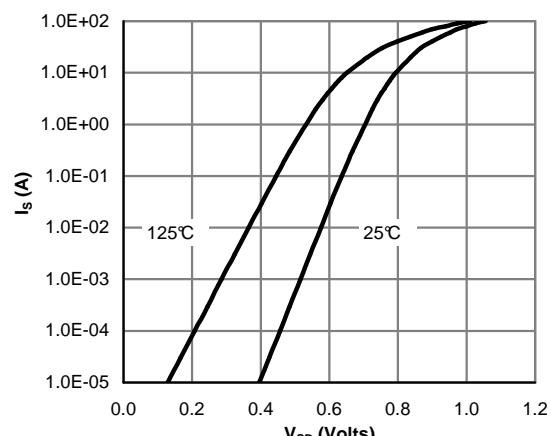
C. Repetitive rating, pulse width limited by junction temperature  $T_{J(\text{MAX})}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .

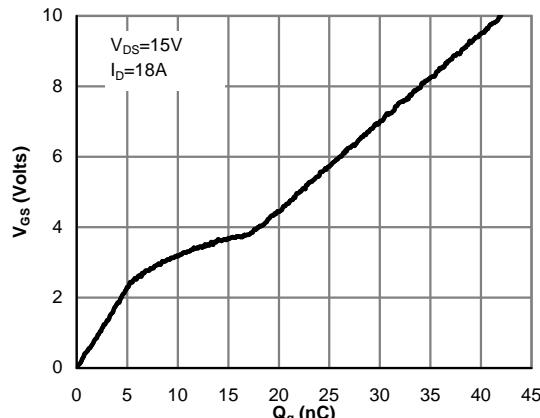
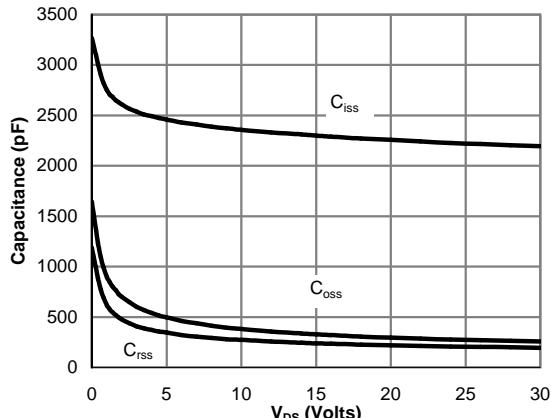
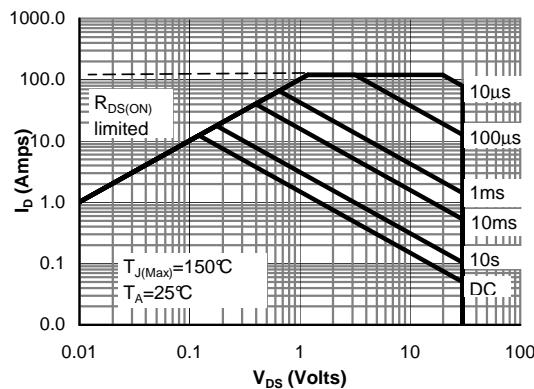
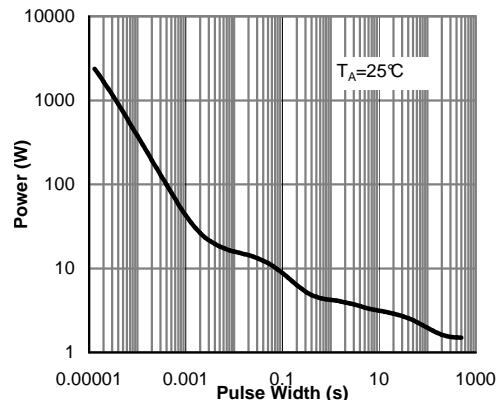
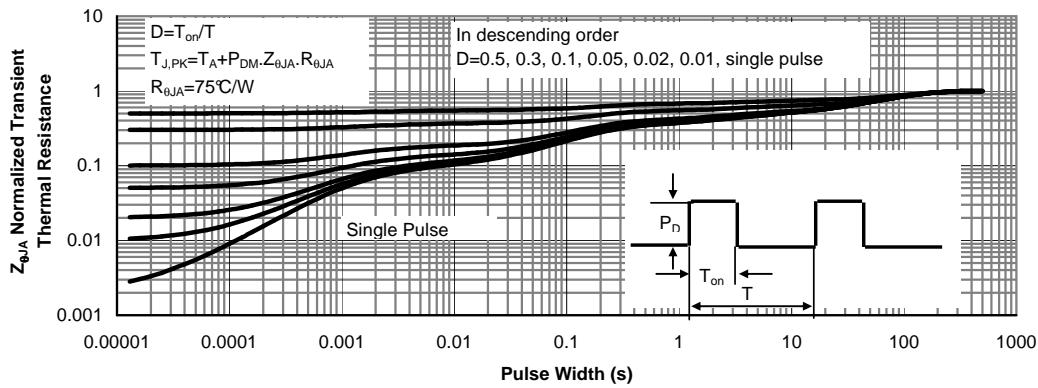
D. The  $R_{\text{QJA}}$  is the sum of the thermal impedance from junction to lead  $R_{\text{QUL}}$  and lead to ambient.

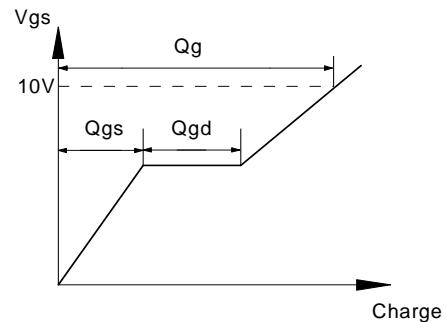
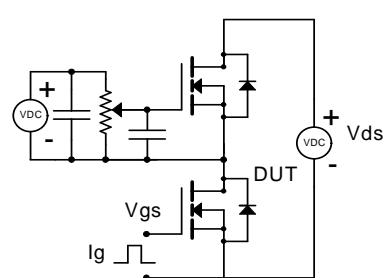
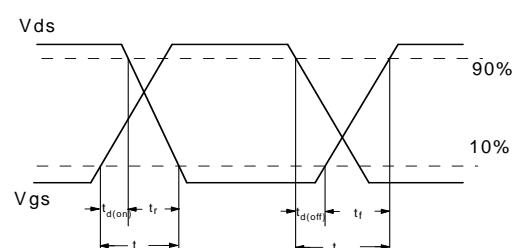
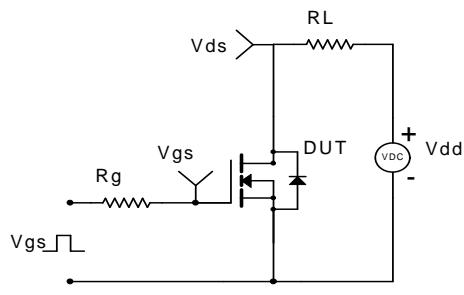
E. The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, assuming a maximum junction temperature of  $T_{J(\text{MAX})}=150^\circ\text{C}$ . The SOA curve provides a single pulse rating g.

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 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**
