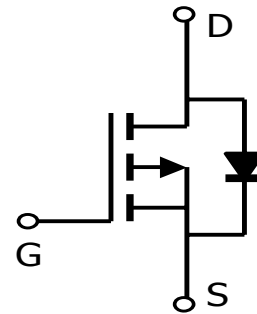


General Description

The AO4409 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge. This device is suitable for use as a load switch or in PWM applications.



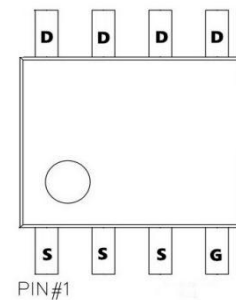
Features

V_{DS} (V) = -30V

I_D = -15 A

Max $R_{DS(ON)}$ < 7.5m Ω (V_{GS} = -10V)

Max $R_{DS(ON)}$ < 12m Ω (V_{GS} = -4.5V)



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 ^A	$T_A=25^\circ\text{C}$	-15	A
	$T_A=70^\circ\text{C}$	-12.8	
Pulsed Drain Current ^B	I_{DM}	-80	
Power Dissipation ^A	$T_A=25^\circ\text{C}$	3	W
	$T_A=70^\circ\text{C}$	2.1	
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	$R_{\theta JA}$	26	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	50	
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	14	24	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-5	μA
					-25	
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.4	-1.9	-2.7	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-10\text{V}$, $V_{DS}=-5\text{V}$	80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-15\text{A}$		6.2	7.5	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}$, $I_D=-10\text{A}$		9.5	12	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-15\text{A}$	35	50		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		-0.71	-1	V
I_S	Maximum Body-Diode Continuous Current				-5	A
C_{ISS}	Input Capacitance			5270		pF
C_{OSS}	Output Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$		945		pF
C_{RSS}	Reverse Transfer Capacitance			745		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		2		Ω
Q_g	Total Gate Charge			100		nC
$Q_{g(4.5V)}$	Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-15\text{A}$		51.5		nC
Q_{gs}	Gate Source Charge			14.5		nC
Q_{gd}	Gate Drain Charge			23		nC
$t_{D(on)}$	Turn-On DelayTime			14		ns
t_r	Turn-On Rise Time	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=1\Omega$, $R_{GEN}=3\Omega$		16.5		ns
$t_{D(off)}$	Turn-Off DelayTime			76.5		ns
t_f	Turn-Off Fall Time			37.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-15\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		36.7		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-15\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		28		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any a given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6,12,14 are obtained using 80 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

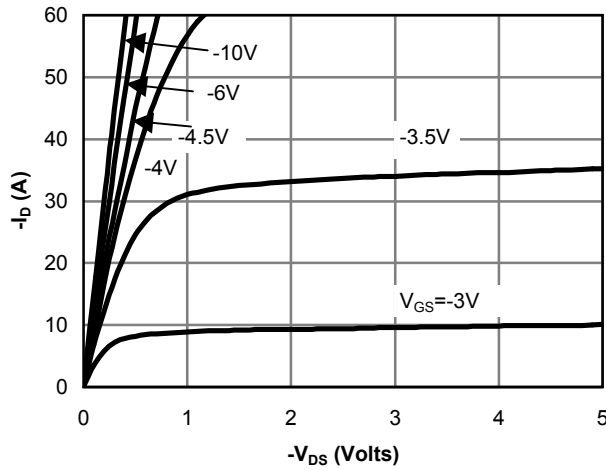


Fig 1: On-Region Characteristics

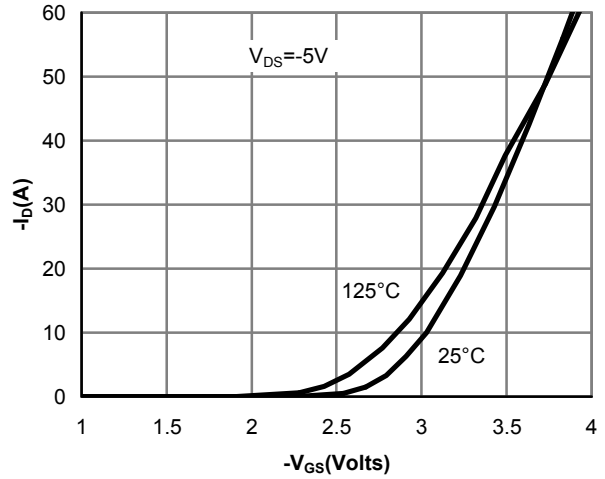


Figure 2: Transfer Characteristics

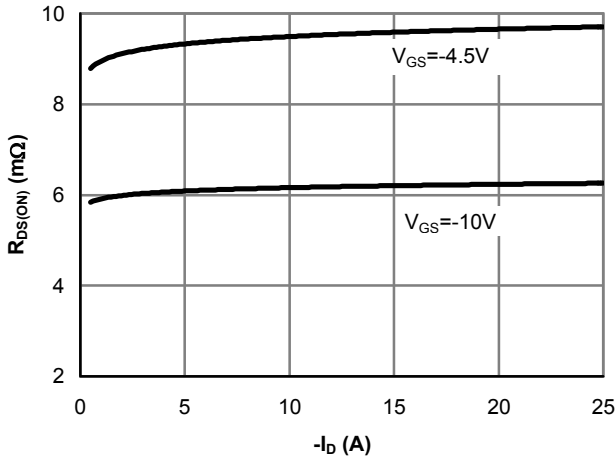


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

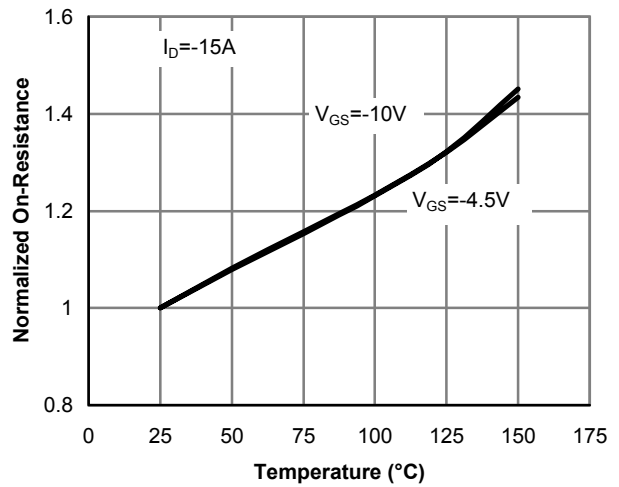


Figure 4: On-Resistance vs. Junction Temperature

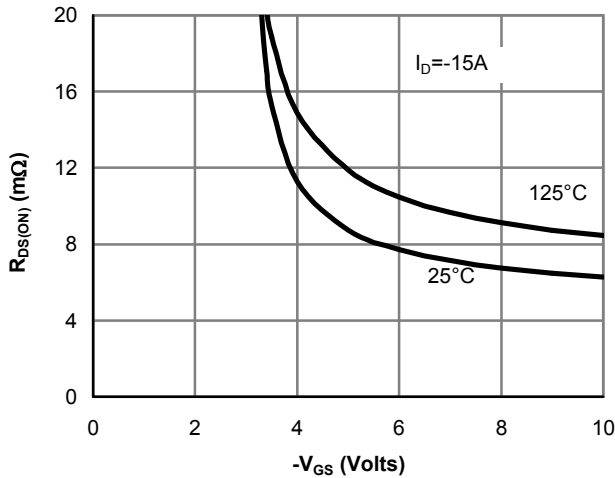


Figure 5: On-Resistance vs. Gate-Source Voltage

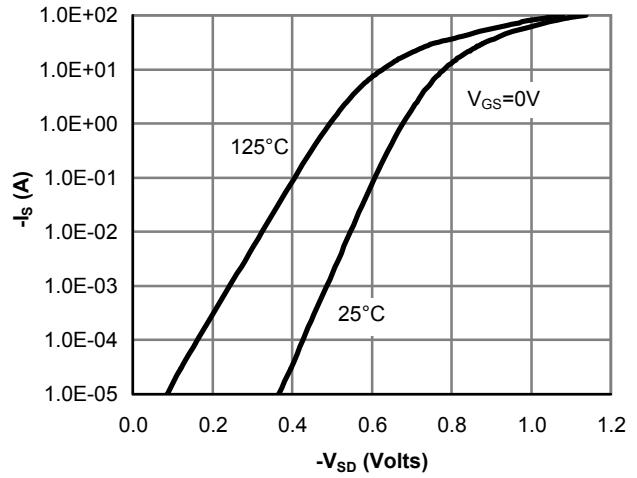


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

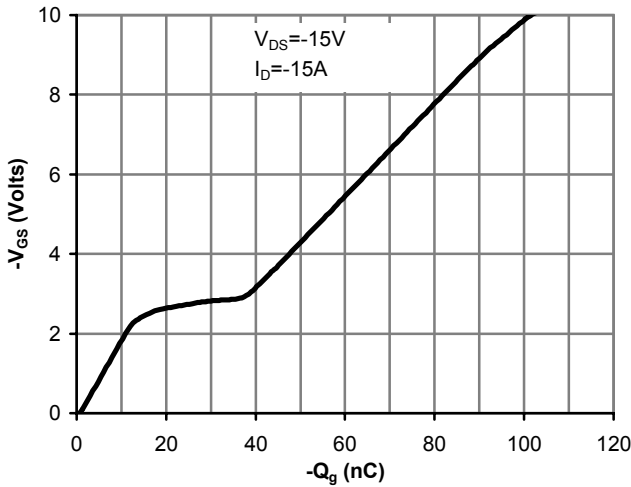


Figure 7: Gate-Charge Characteristics

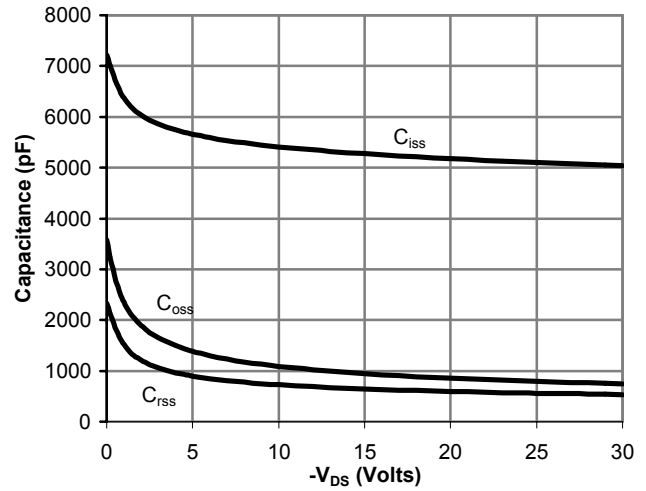


Figure 8: Capacitance Characteristics

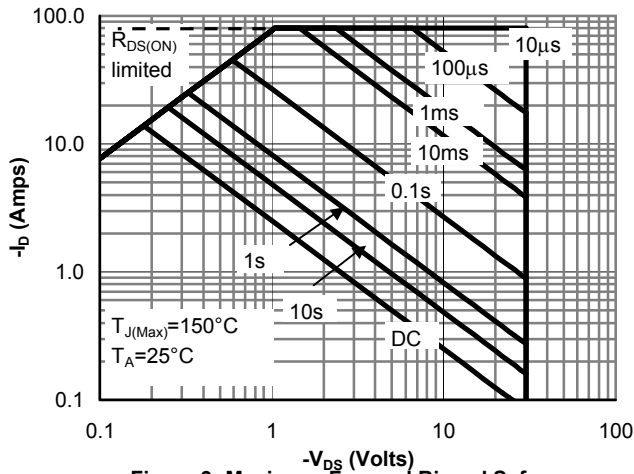


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

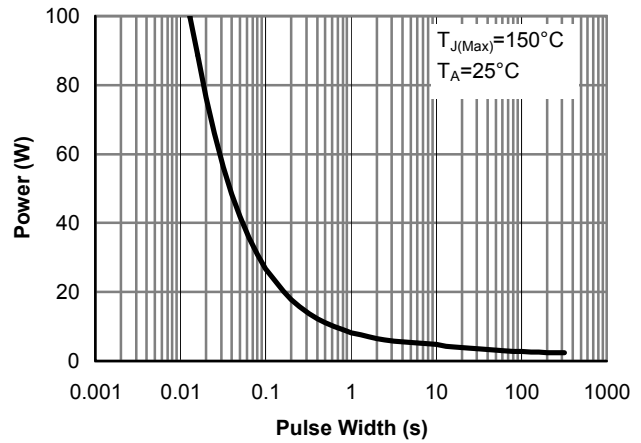


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

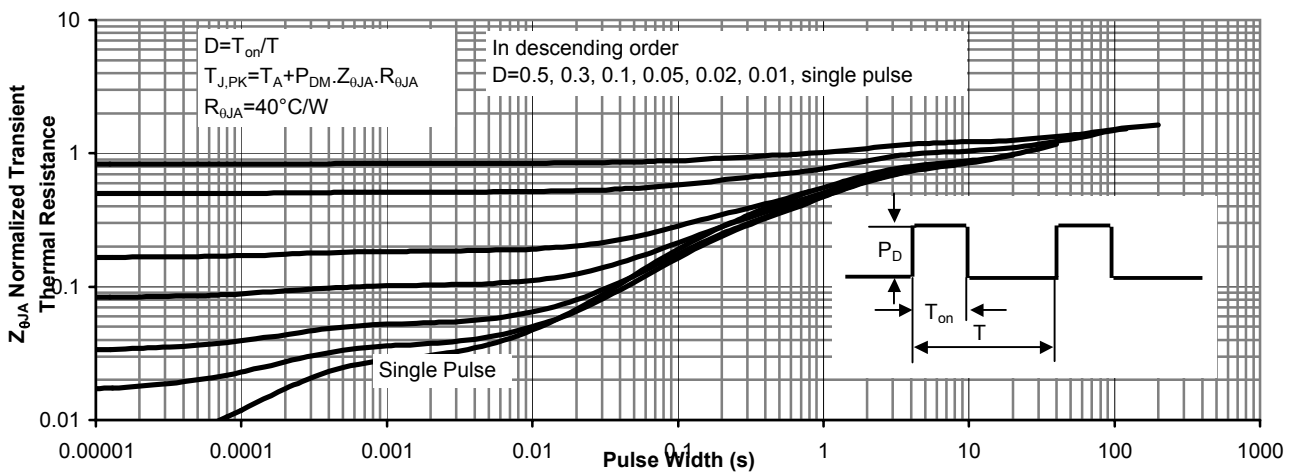
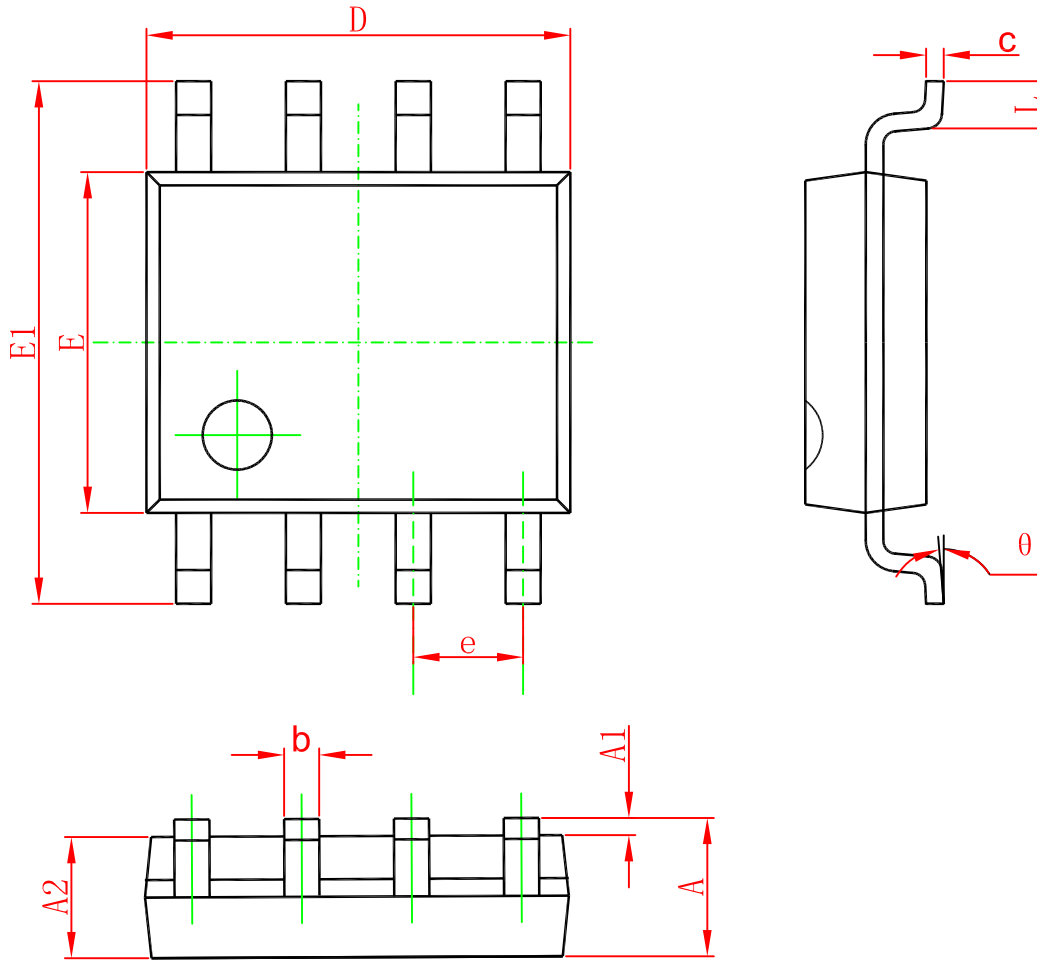


Figure 11: Normalized Maximum Transient Thermal Impedance

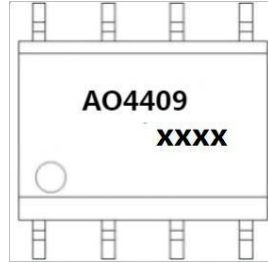
PACKAGE OUTLINE DIMENSIONS

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



("xxxx"代表年份周期)

Ordering information

Order code	Package	Baseqty	Deliverymode
AO4409	SOP-8	3000	Tape and reel