

General Description

The AO4496 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a DC-DC converter application.

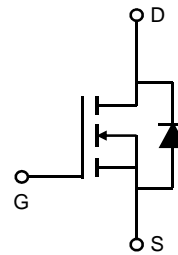
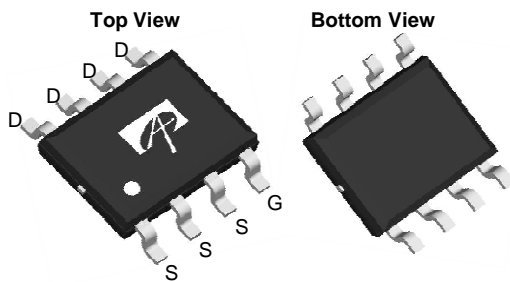
Product Summary

V_{DS} (V) = 30V
 I_D = 10A ($V_{GS} = 10V$)
 $R_{DS(ON)} < 19.5m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 26m\Omega$ ($V_{GS} = 4.5V$)

100% UIS Tested
 100% Rg Tested



SOIC-8



Absolute Maximum Ratings $T_J=25^\circ\text{C}$ 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	I_D	$T_A=25^\circ\text{C}$	A
		$T_A=70^\circ\text{C}$	
Pulsed Drain Current ^B	I_{DM}	50	
Avalanche Current ^G	I_{AR}	17	
Repetitive avalanche energy $L=0.1\text{mH}$ ^G	E_{AR}	14	mJ
Power Dissipation ^A	P_D	$T_A=25^\circ\text{C}$	W
		$T_A=70^\circ\text{C}$	
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		Steady State	59	75
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
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	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1 5	μA
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	1.8	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS} = 10\text{V}$, $V_{DS} = 5\text{V}$	50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{V}$, $I_D = 10\text{A}$ $T_J = 125^\circ\text{C}$ $V_{GS} = 4.5\text{V}$, $I_D = 7.5\text{A}$		16 24 21	19.5 29 26	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{V}$, $I_D = 10\text{A}$		30		S
V_{SD}	Diode Forward Voltage	$I_S = 1\text{A}$, $V_{GS} = 0\text{V}$		0.76	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		550	715	pF
C_{oss}	Output Capacitance			110		pF
C_{rss}	Reverse Transfer Capacitance			55		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	3	4	4.9	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=10\text{A}$		9.8	13	nC
$Q_g(4.5\text{V})$	Total Gate Charge			4.6	6.1	nC
Q_{gs}	Gate Source Charge			1.8		nC
Q_{gd}	Gate Drain Charge			2.2		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.5\Omega$, $R_{GEN}=3\Omega$		5		ns
t_r	Turn-On Rise Time			3.2		ns
$t_{D(off)}$	Turn-Off Delay Time			24		ns
t_f	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=10\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$		22	29	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=10\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$		14		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 given application depends on the user's specific board design.

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 are obtained using $t \leq 300\mu\text{s}$ 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.

F: The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

G: E_{AR} and I_{AR} ratings are based on low frequency and duty cycles to keep $T_J=25\text{C}$.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

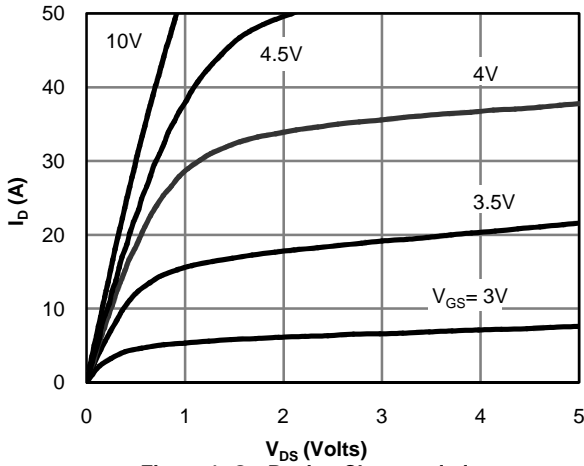


Figure 1: On-Region Characteristics

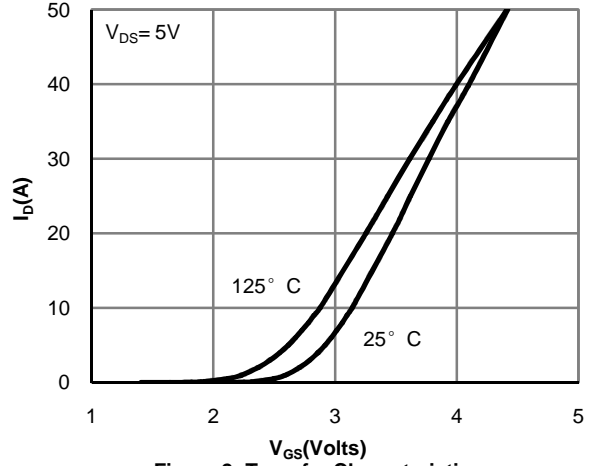


Figure 2: Transfer Characteristics

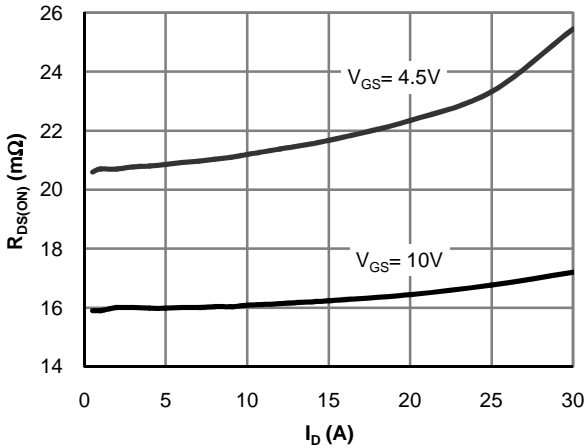


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

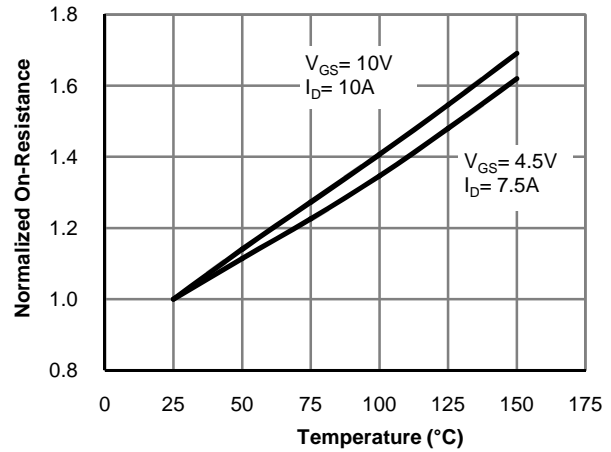


Figure 4: On-Resistance vs. Junction Temperature

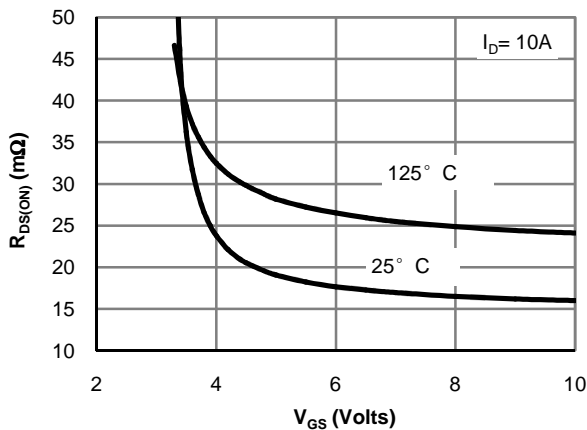


Figure 5: On-Resistance vs. Gate-Source Voltage

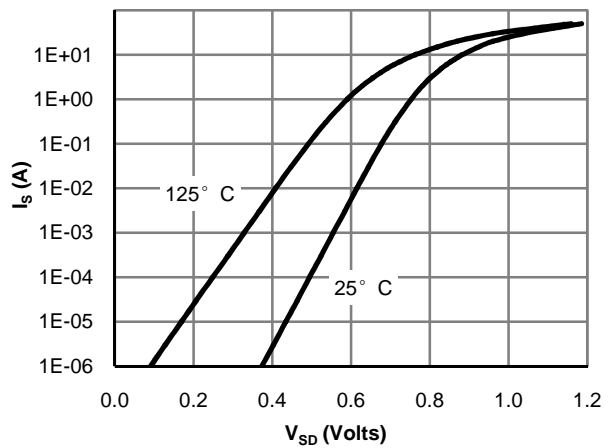


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

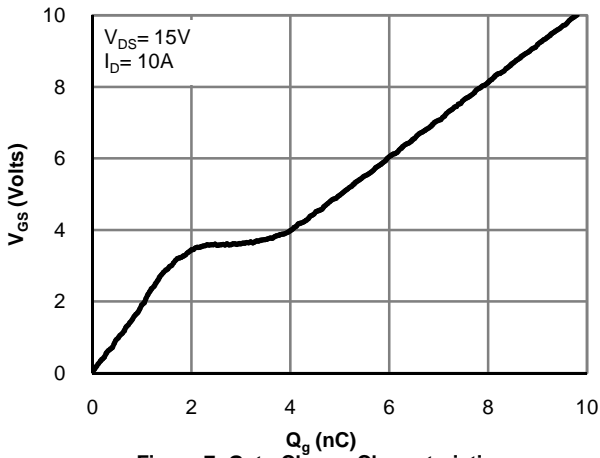


Figure 7: Gate-Charge Characteristics

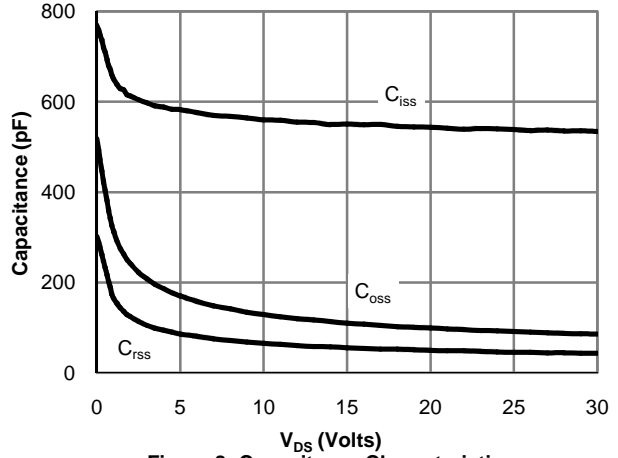


Figure 8: Capacitance Characteristics

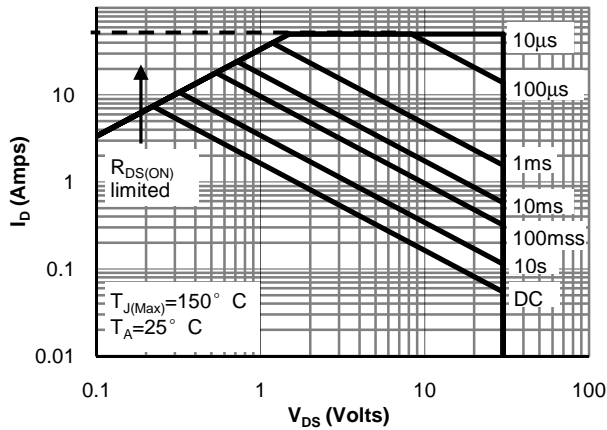


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

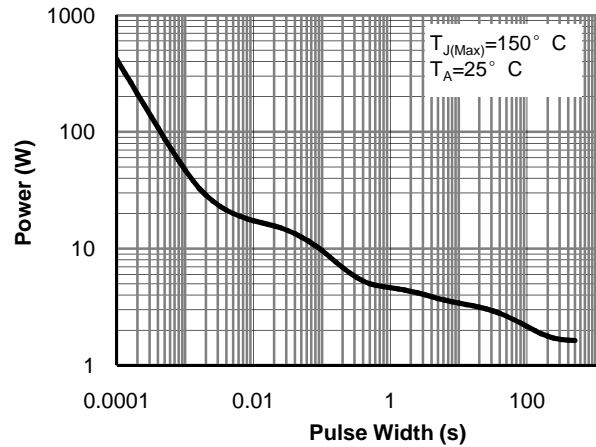


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

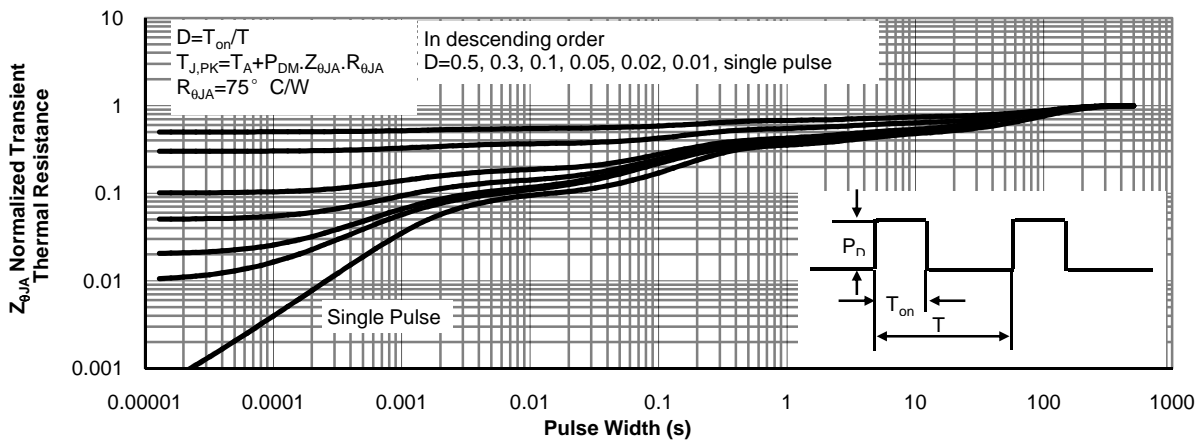
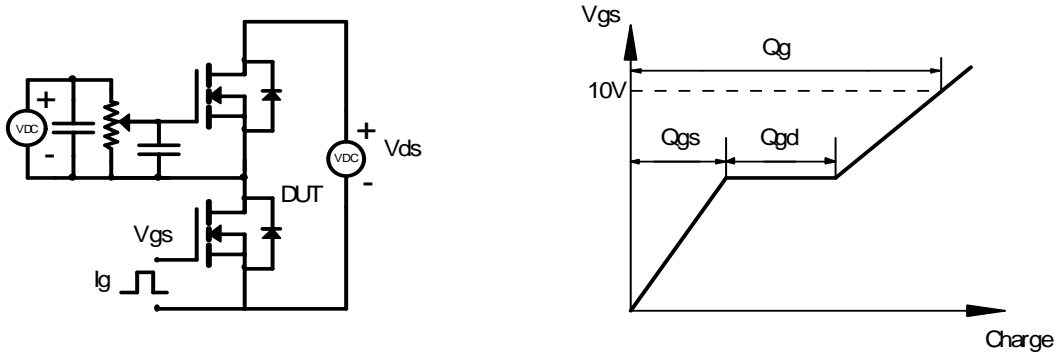
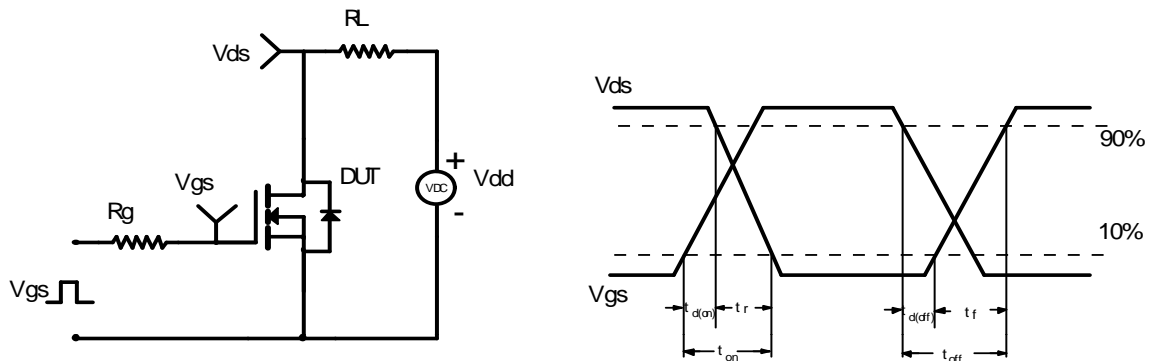


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

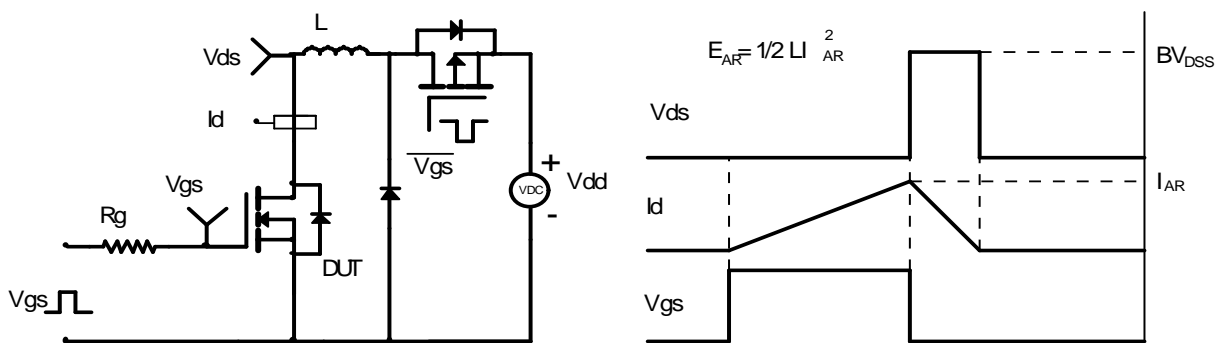
Gate Charge Test Circuit & Waveform



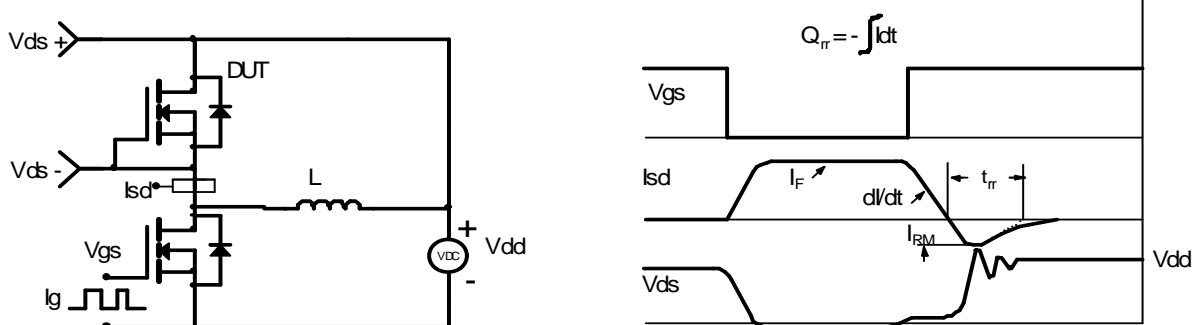
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



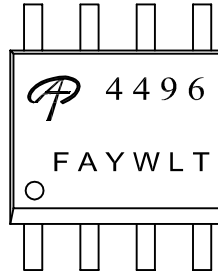
Diode Recovery Test Circuit & Waveforms





Document No.	PD-00803
Version	B
Title	AO4496 Marking Description

SO-8 PACKAGE MARKING DESCRIPTION



Green product

NOTE:

- LOGO - AOS Logo
- 4496 - Part number code
- F - Fab code
- A - Assembly location code
- Y - Year code
- W - Week code
- L&T - Assembly lot code

PART NO.	DESCRIPTION	CODE
AO4496	Green product	4496
AO4496L	Green product	4496