AO4486

100V N-Channel MOSFET

General Description

The AO4486 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

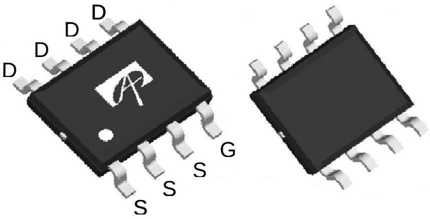
Product Summary

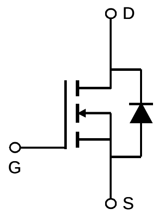
V_{DS}	100V
I_D (at V_{GS}=10V)	4.2A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 79mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 90mΩ

100% UIS Tested
100% R_g Tested

SOIC-8

Top View **Bottom View**





Absolute Maximum Ratings T_A=25℃ unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	4.2	A
	T_A=70℃		3.4	
Pulsed Drain Current [C]		I_{DM}	31	
Avalanche Current [C]		I_{AS}, I_{AR}	14	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	10	mJ
Power Dissipation [B]	T_A=25℃	P_D	3.1	W
	T_A=70℃		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	31	40	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		59	75	℃/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	16	24	℃/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		100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V				1	µA
			T_J=55°C			5	
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		1.6	2.2	2.7	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V		31			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=3A			62.5	79	mΩ
			T_J=125°C		121	151	
		V_{GS}=4.5V, I_D=3A			68.5	90	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=3A			20		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.74	1	V
I_S	Maximum Body-Diode Continuous Current					3.5	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=50V, f=1MHz		620	778	942	pF
C_{oss}	Output Capacitance			38	55	81	pF
C_{rss}	Reverse Transfer Capacitance			13	24	35	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.7	1.45	2.2	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=3.0A		13	16.3	20	nC
Q_g(4.5V)	Total Gate Charge			6.4	8.1	10	nC
Q_{gs}	Gate Source Charge			2.2	2.8	3.4	nC
Q_{gd}	Gate Drain Charge			2.4	4.1	5.8	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=50V, R_L=16.7Ω, R_{GEN}=3Ω			6		ns
t_r	Turn-On Rise Time				2.5		ns
$t_{D(off)}$	Turn-Off DelayTime				21		ns
t_f	Turn-Off Fall Time				2.4		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=3A, dI/dt=500A/µs		14	21	28	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=3A, dI/dt=500A/µs		65	94	123	nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 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 $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ 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 impedence which is measured with the device mounted on 1in^2 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

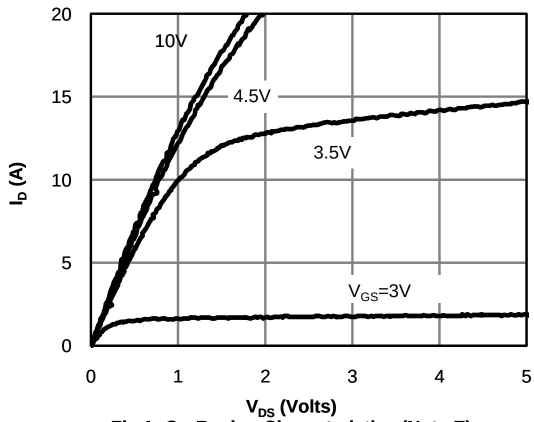


Fig 1: On-Region Characteristics (Note E)

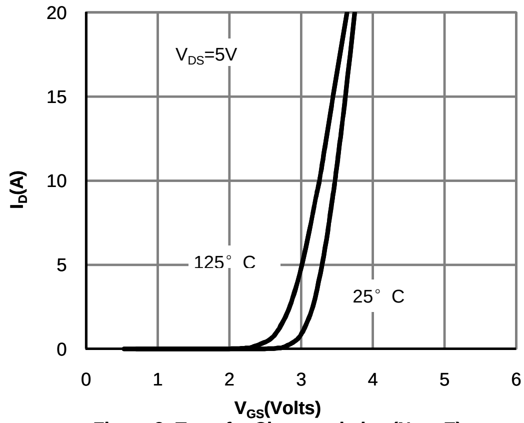


Figure 2: Transfer Characteristics (Note E)

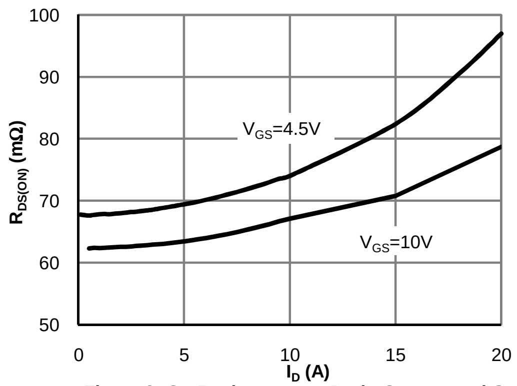


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

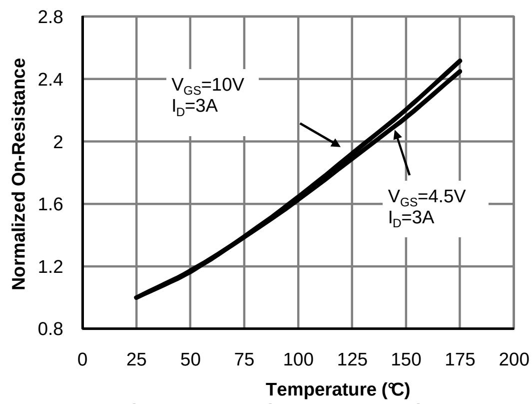


Figure 4: On-Resistance vs. Junction Temperature (Note E)

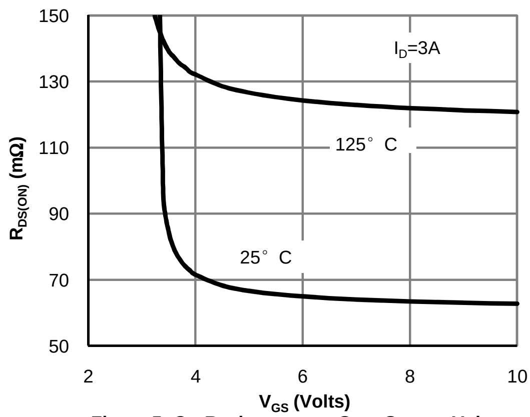


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

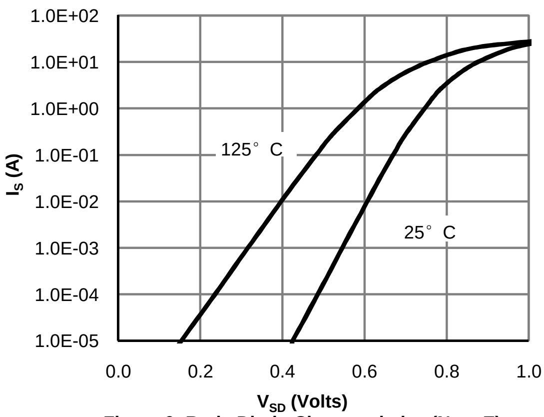


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

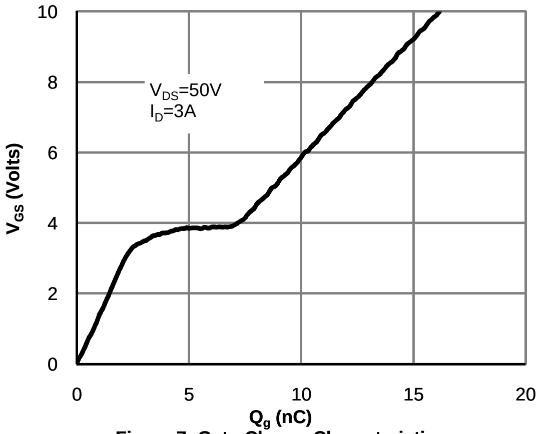


Figure 7: Gate-Charge Characteristics

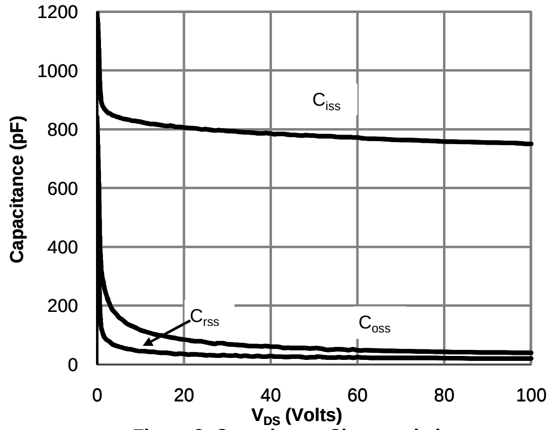


Figure 8: Capacitance Characteristics

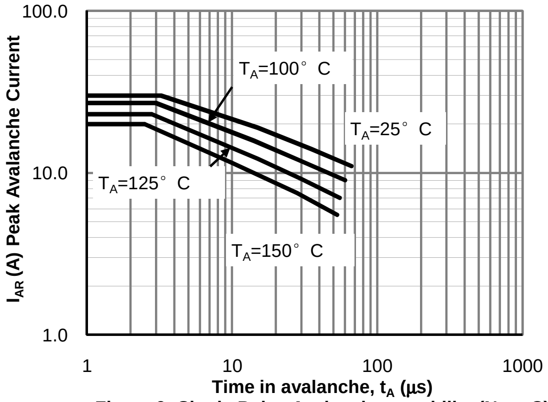


Figure 9: Single Pulse Avalanche capability (Note C)

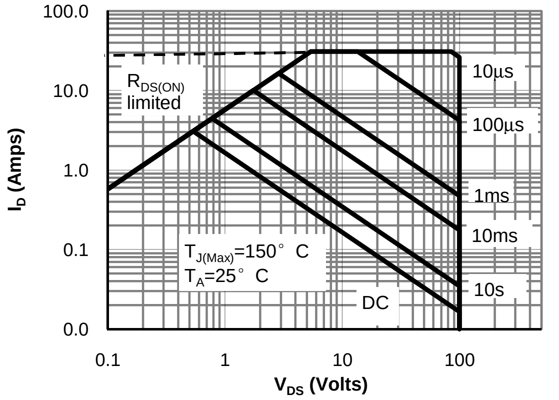


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

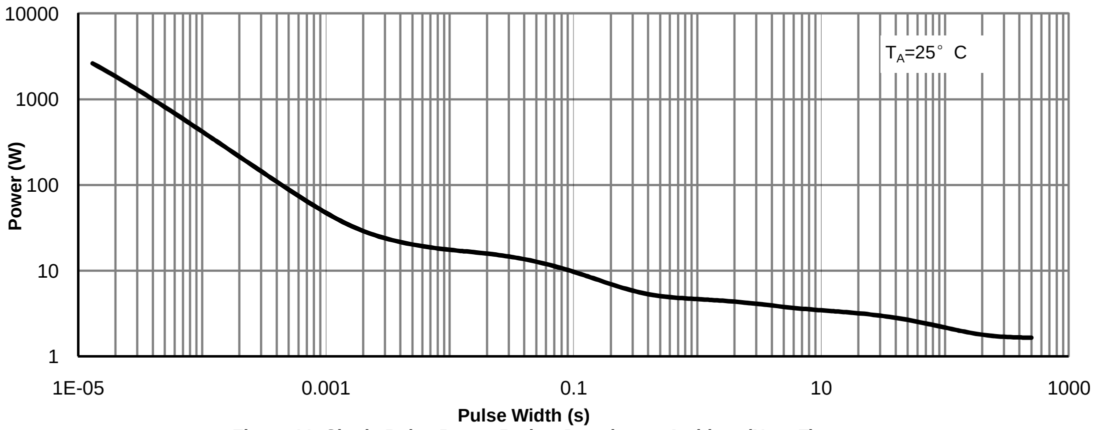


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

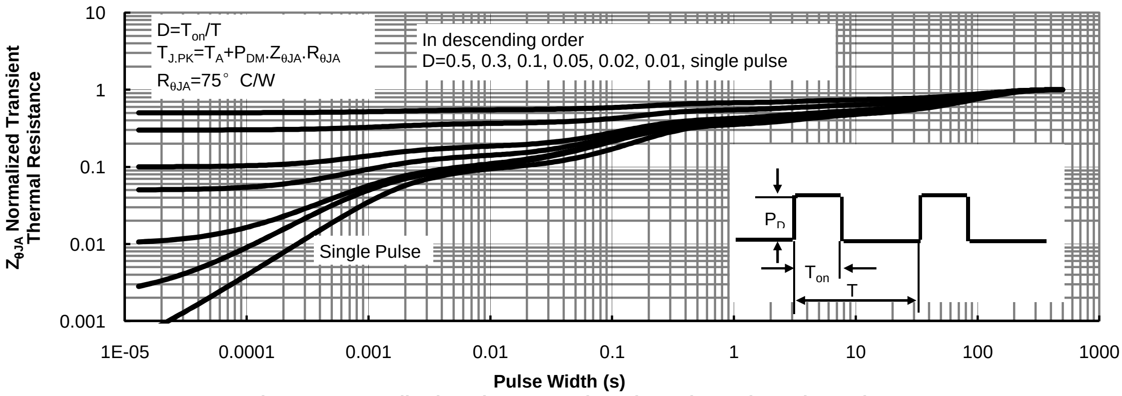
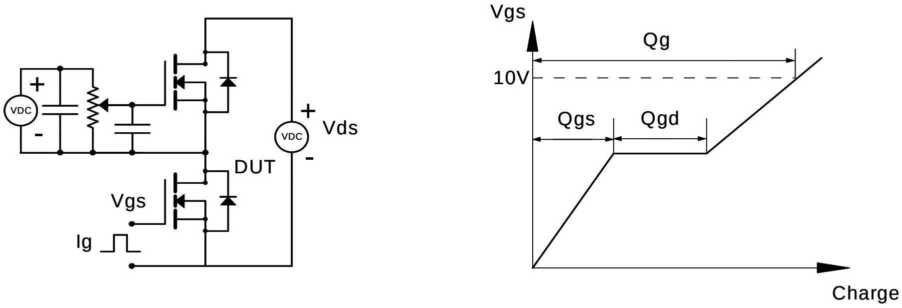
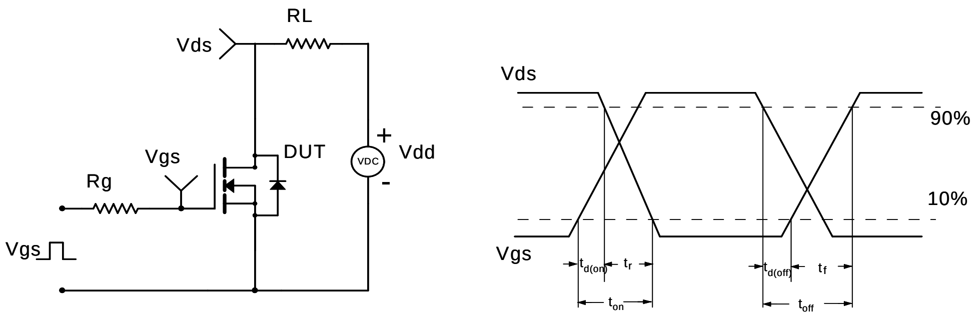


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

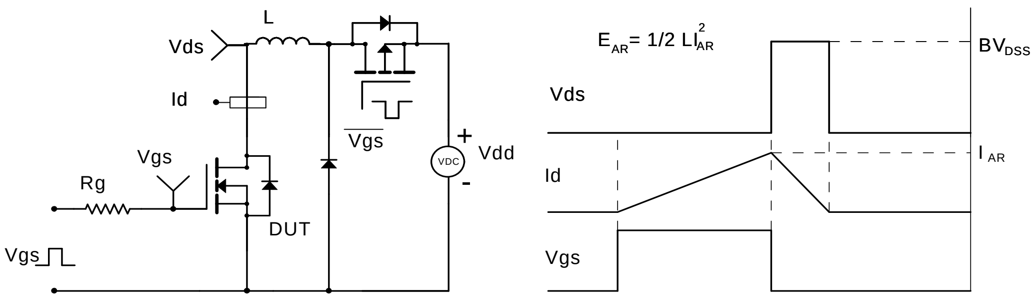
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms