AO4466

30V N-Channel MOSFET

General Description

The AO4466 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance.

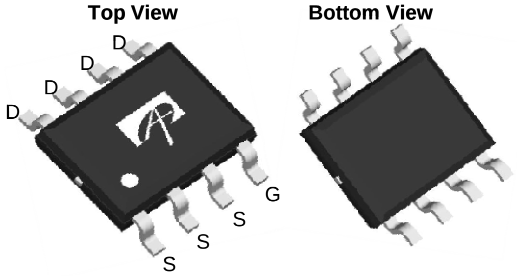
Product Summary

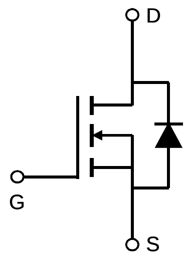
V_{DS} (V) = 30V
I_D = 10A (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 23mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 35mΩ (V_{GS} = 4.5V)

100% UIS Tested
100% Rg 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}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [AF]	T_A=25℃	I_D	10	A
	T_A=70℃		7	
Pulsed Drain Current [B]		I_{DM}	64	
Power Dissipation	T_A=25℃	P_D	3.1	W
	T_A=70℃		2	
Avalanche Current [B, G]		I_{AR}	12	A
Repetitive avalanche energy 0.1mH [B, G]		E_{AR}	7	mJ
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	$R_{\theta JA}$	34	40	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		62	75	℃/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	18	24	℃/W

Electrical Characteristics (T_J=25℃ 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			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30 V_{GS}=0V				1	µA
			T_J=55℃			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		1.5	2.1	2.6	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V		64			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=10A			16.7	23	mΩ
			T_J=125℃		24.3	30	
		V_{GS}=4.5V, I_D=5A			23.7	35	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=10A			17		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.75	1	V
I_S	Maximum Body-Diode Continuous Current					2.4	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		298	373	448	pF
C_{oss}	Output Capacitance			46	67	88	pF
C_{rss}	Reverse Transfer Capacitance			24	41	58	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.6	1.8	2.8	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=10A		5.7	7.1	8.6	nC
Q_g(4.5V)	Total Gate Charge			2.7	3.5	4.2	nC
Q_{gs}	Gate Source Charge				1.2		nC
Q_{gd}	Gate Drain Charge				1.6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.5Ω, R_{GEN}=3Ω			4.3		ns
t_r	Turn-On Rise Time				2.8		ns
$t_{D(off)}$	Turn-Off DelayTime				15.8		ns
t_f	Turn-Off Fall Time				3		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=10A, dI/dt=100A/µs		8.4	10.5	12.6	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=10A, dI/dt=100A/µs		3.6	4.5	5.4	nC
t_{rr}	Body Diode Reverse Recovery Time	I_F=10A, dI/dt=500A/µs		4.7	6.0	7.2	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=10A, dI/dt=500A/µs		5.3	6.6	8	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: Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.
F. The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.
G: L=100uH, V_{DD}=0V, R_G=0Ω, rated V_{DS}=30V and V_{GS}=10V
Rev 9: May. 2012

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

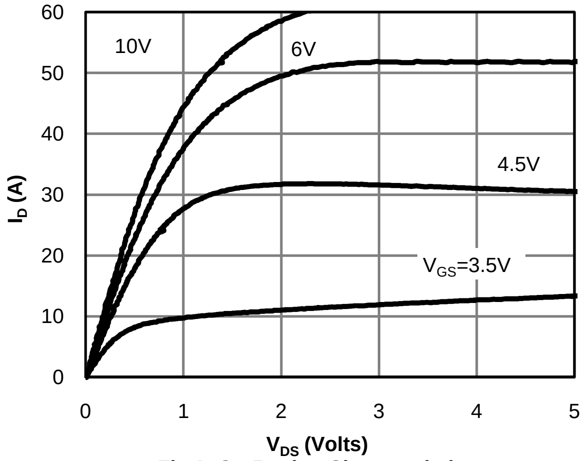


Fig 1: On-Region Characteristics

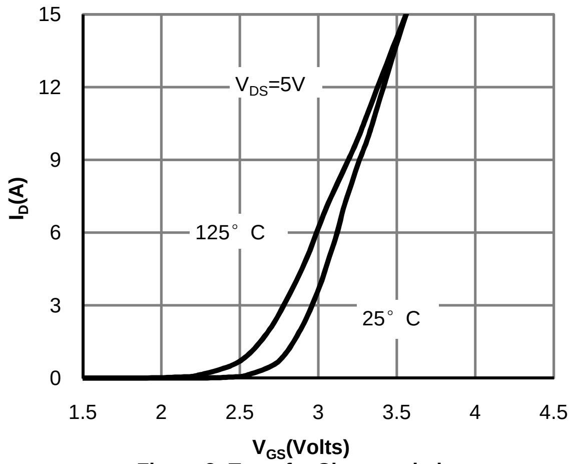


Figure 2: Transfer Characteristics

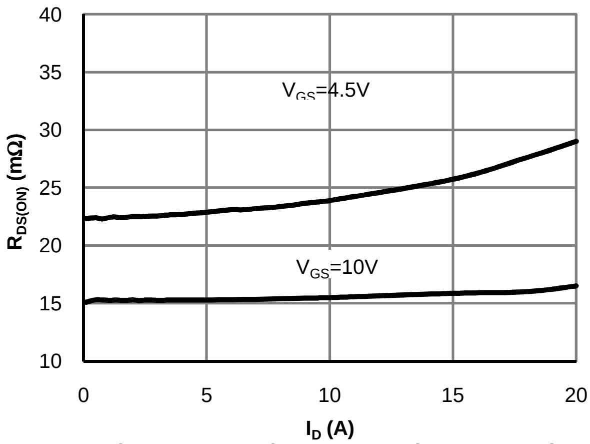


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

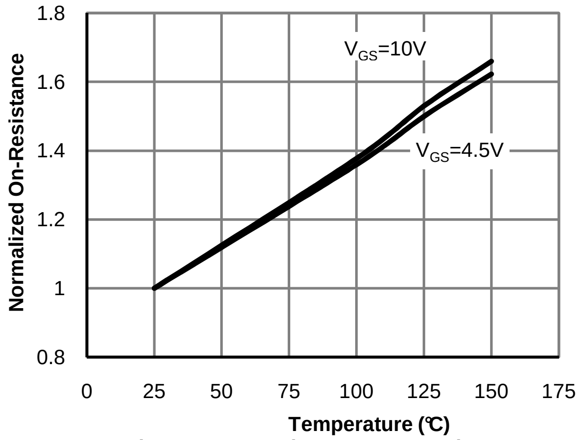


Figure 4: On-Resistance vs. Junction Temperature

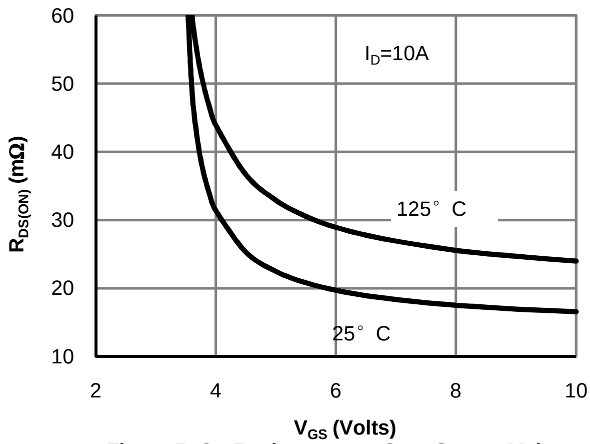


Figure 5: On-Resistance vs. Gate-Source Voltage

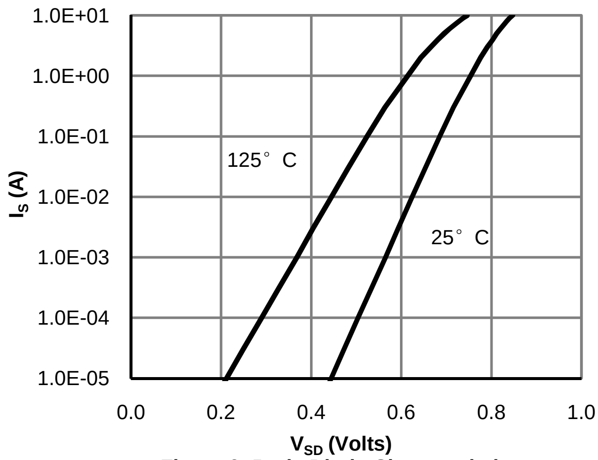


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

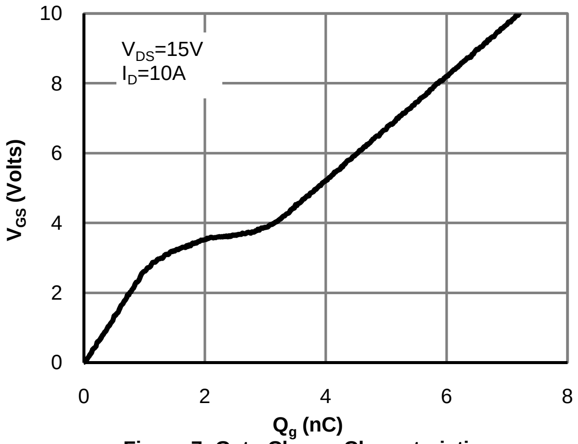


Figure 7: Gate-Charge Characteristics

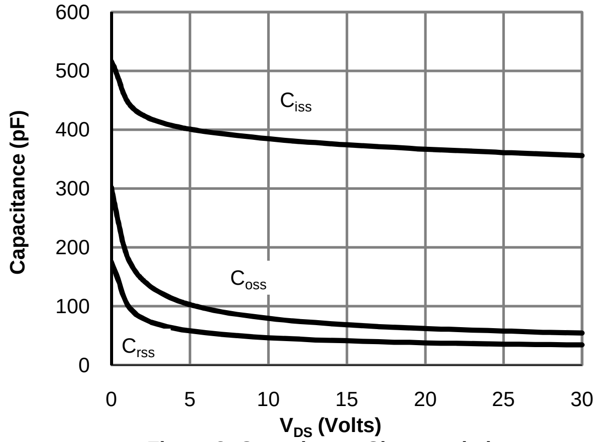


Figure 8: Capacitance Characteristics

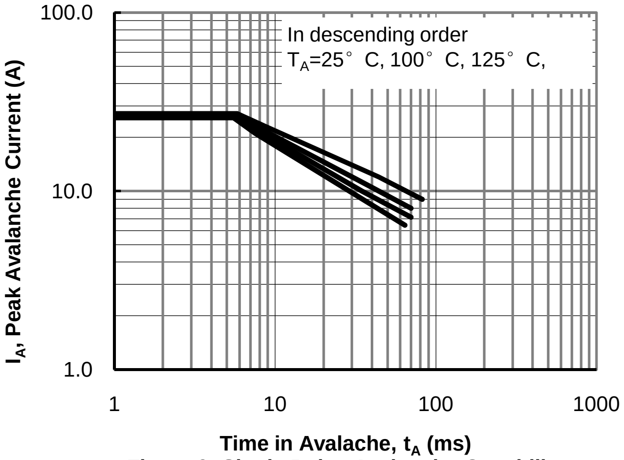


Figure 9: Single Pulse Avalanche Capability

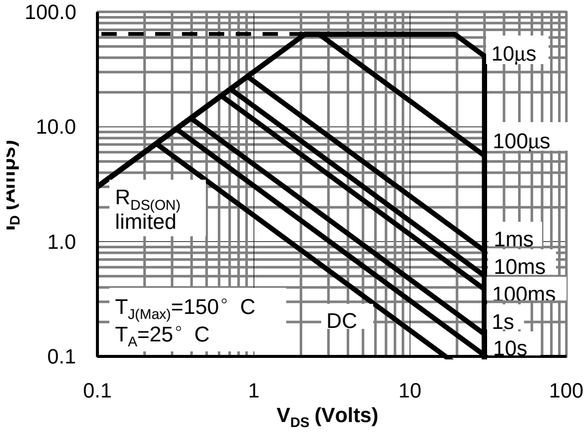


Figure 10: Maximum Forward Biased Safe Operating Area (Note E)

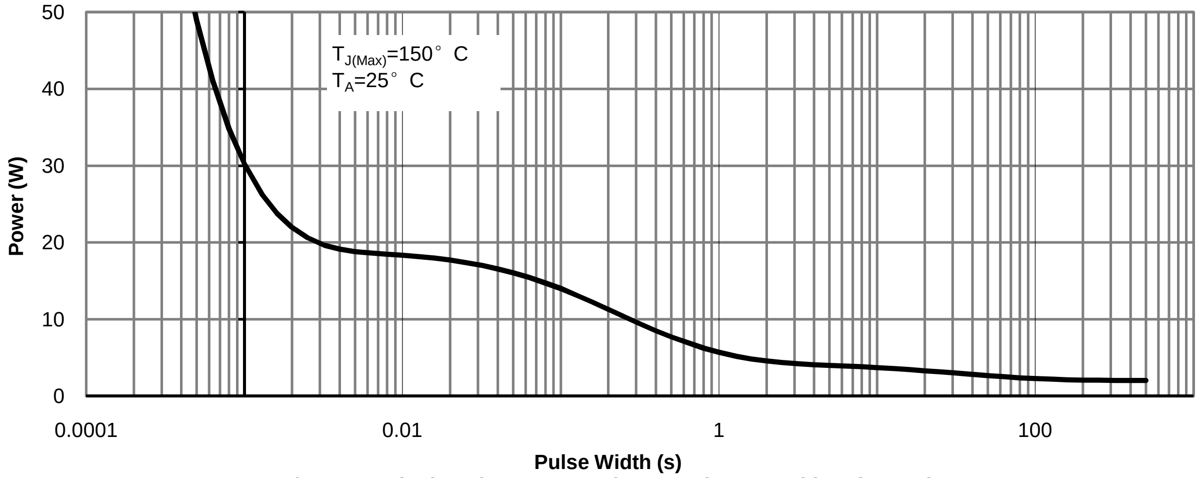


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

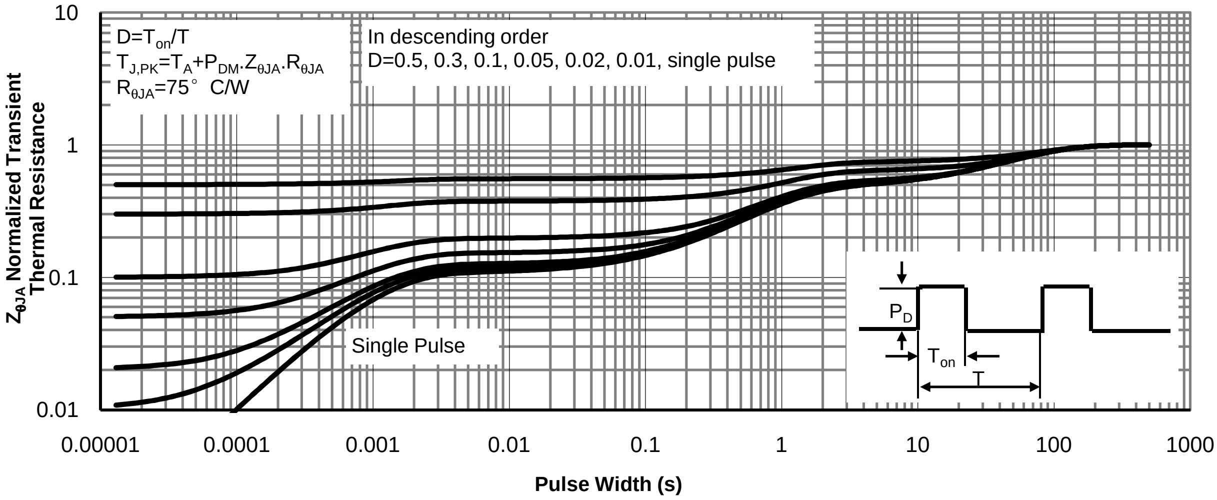
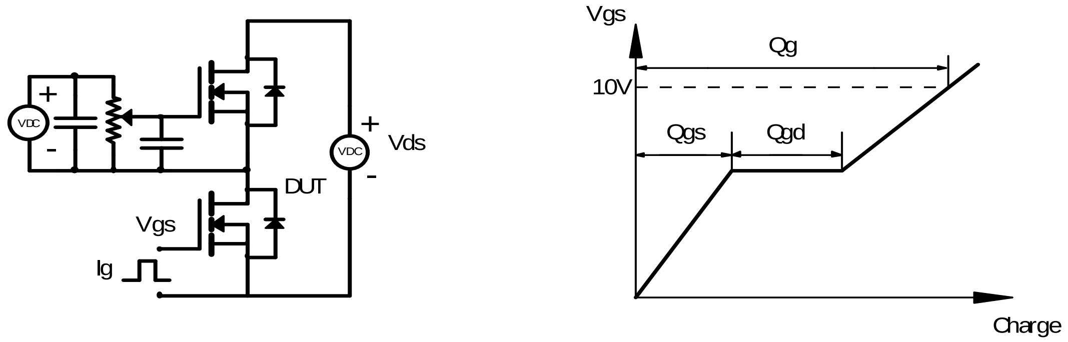
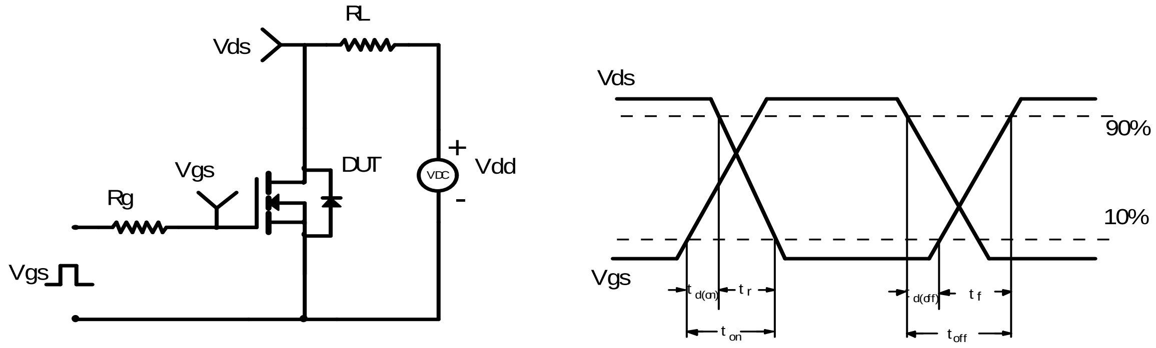


Figure 12: Normalized Maximum Transient Thermal Impedance

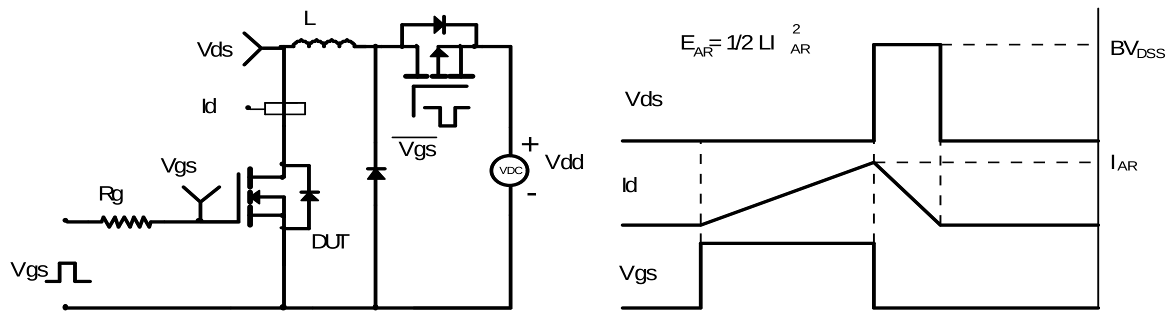
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms