ALPHA & OMEGA
SEMICONDUCTOR

AO4466
N-Channel Enhancement Mode Field Effect Transistor

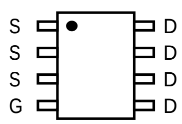
General Description

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. *Standard Product AO4466 is Pb-free (meets ROHS & Sony 259 specifications).*

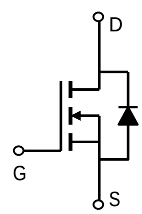
Features

V_{DS} (V) = 30V
I_D = 9.4A (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 23mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 35mΩ (V_{GS} = 4.5V)

UIS TESTED!
Rg,Ciss,Coss,Crss Tested



SOIC-8



Absolute Maximum Ratings T_A=25°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 [AF]	T_A=25°C	I_D	9.4	A
	T_A=70°C		7.7	
Pulsed Drain Current [B]		I_{DM}	50	
Power Dissipation	T_A=25°C	P_D	3.1	W
	T_A=70°C		2.1	
Avalanche Current [B]		I_{AR}	13	A
Repetitive avalanche energy 0.3mH [B]		E_{AR}	25	mJ
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	34	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		62	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	18	24	°C/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	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30 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	1.6	3	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=9.4A		17	23	mΩ
		T_J=125°C		24	30	
		V_{GS}=4.5V, I_D=5A		27	35	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=9.4A	10	24		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.75	1	V
I_S	Maximum Body-Diode Continuous Current				4.3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		621	820	pF
C_{oss}	Output Capacitance			118		pF
C_{rss}	Reverse Transfer Capacitance			85	119	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.4	0.8	1.5	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=9.4A		11.3	17	nC
Q_g(4.5V)	Total Gate Charge			5.7	8	nC
Q_{gs}	Gate Source Charge			2.1		nC
Q_{gd}	Gate Drain Charge			3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.6Ω, R_{GEN}=3Ω		4.5	6.5	ns
t_r	Turn-On Rise Time			3.1	5	ns
$t_{D(off)}$	Turn-Off DelayTime			15.1	23	ns
t_f	Turn-Off Fall Time			2.7	5	ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=9.4A, dI/dt=100A/µs		15.5	21	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=9.4A, dI/dt=100A/µs		7.1	10	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.
Rev1: Dec 2006

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL 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

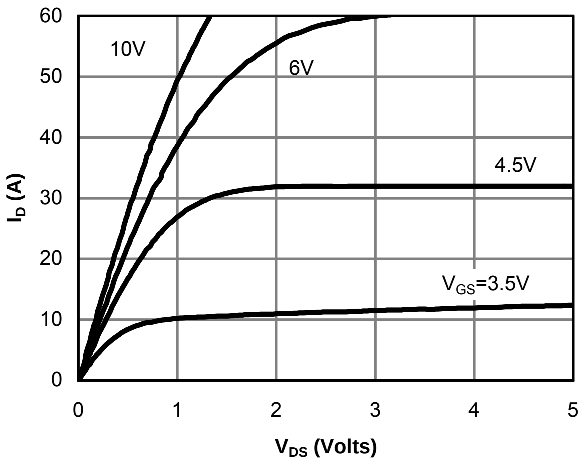


Fig 1: On-Region Characteristics

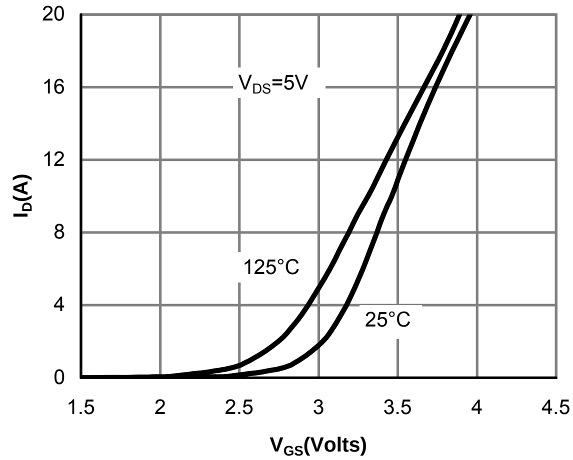


Figure 2: Transfer Characteristics

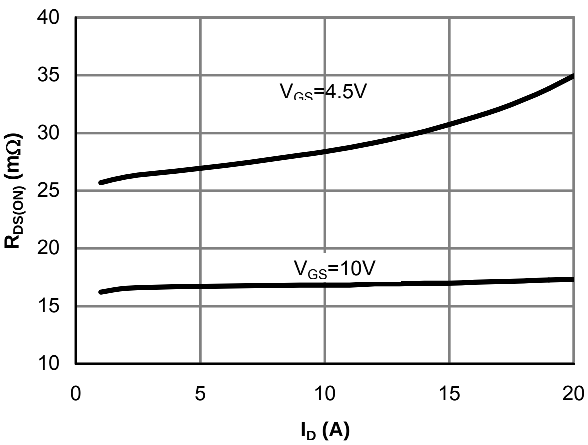


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

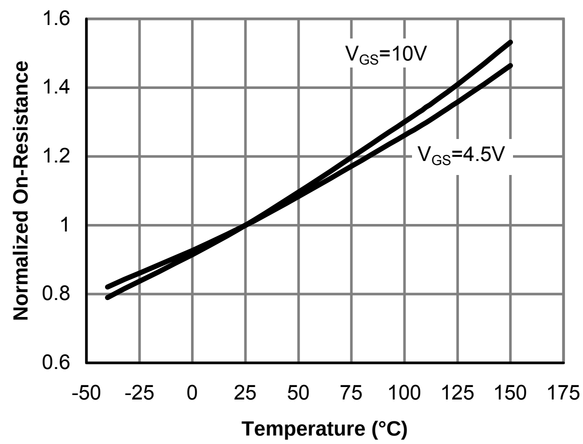


Figure 4: On-Resistance vs. Junction Temperature

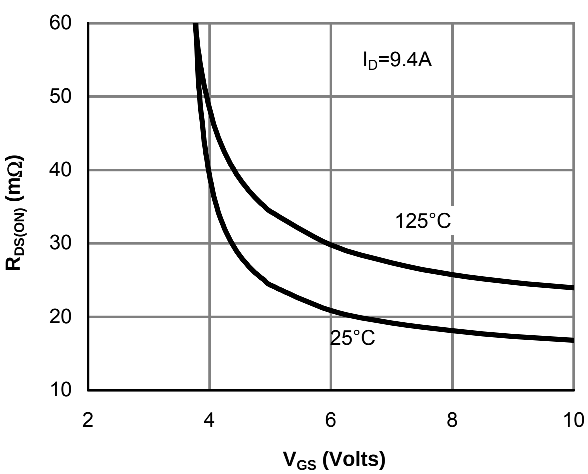


Figure 5: On-Resistance vs. Gate-Source Voltage

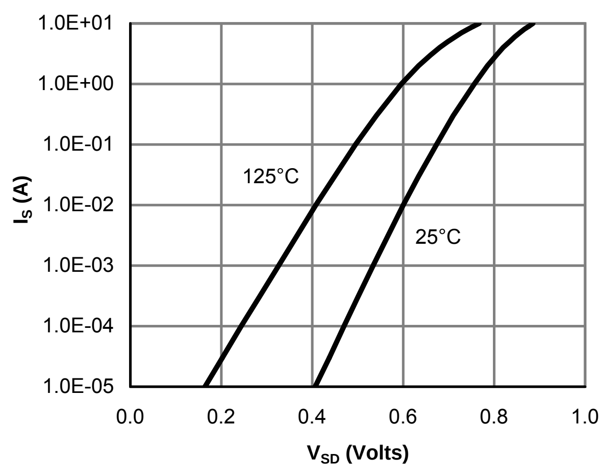


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

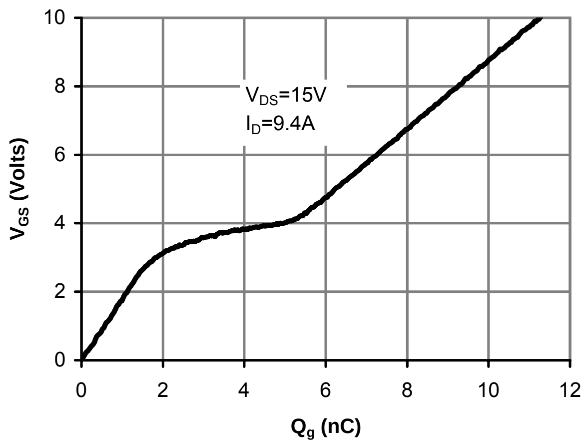


Figure 7: Gate-Charge Characteristics

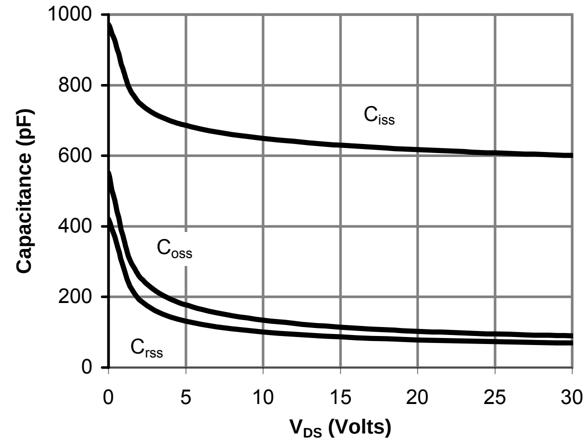


Figure 8: Capacitance Characteristics

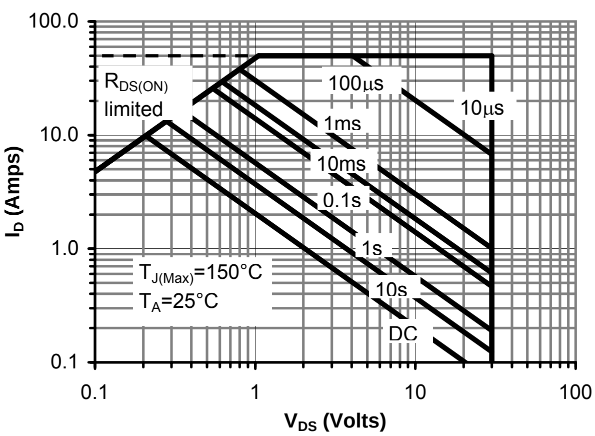


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

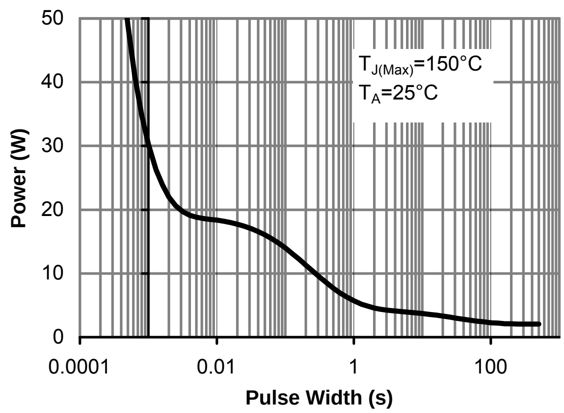


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

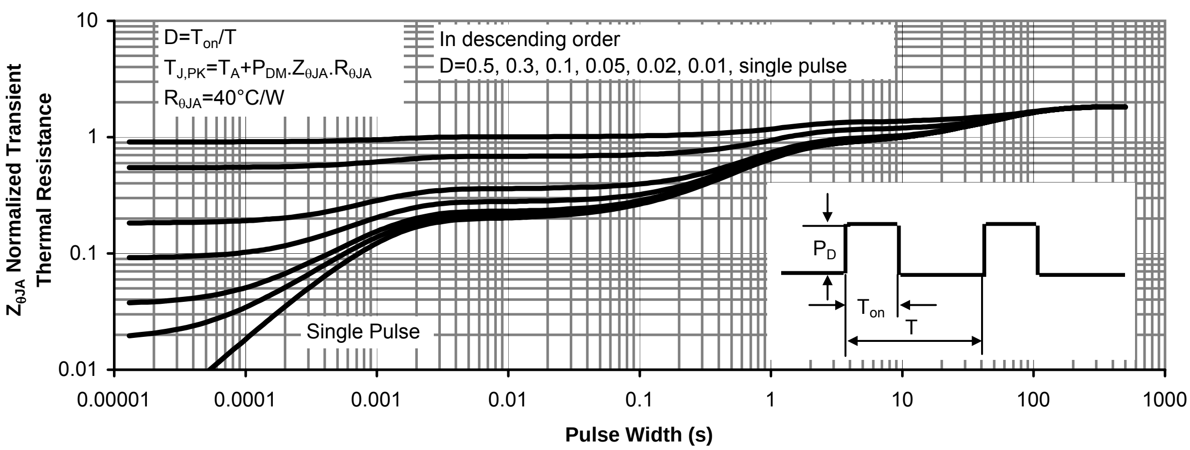


Figure 11: Normalized Maximum Transient Thermal Impedance