AO4480
N-Channel Enhancement Mode Field Effect Transistor

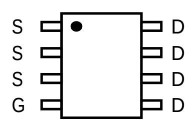
General Description

The AO4480 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It is ESD Protected. This device is suitable for use as a low side switch in SMPS and general purpose applications.
Standard Product AO4480 is Pb-free (meets ROHS & Sony 259 specifications).

Features

V_{DS} (V) = 40V
I_D = 14A (V_{GS} = 10V)
$R_{DS(ON)}$ < 11.5mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 15.5mΩ (V_{GS} = 4.5V)
ESD Rating: 4KV HBM

UIS Tested
Rg,Ciss,Coss,Crss Tested



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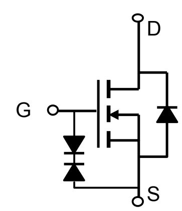

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [AF]	T_A=25°C	I_{DSM}	14	A
	T_A=70°C		11	
Pulsed Drain Current [B]		I_{DM}	70	
Power Dissipation	T_A=25°C	P_D	3.1	W
	T_A=70°C		2.0	
Avalanche Current [B]		I_{AR}	30	A
Repetitive avalanche energy 0.3mH [B]		E_{AR}	135	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	$R_{\theta JA}$	30	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		59	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	16	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=250uA, V_{GS}=0V	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V			1	uA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			±100	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	1	2	3	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	70			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=14A		9	11.5	mΩ
		T_J=125°C		13		
		V_{GS}=4.5V, I_D=5A		12	15.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=14A		50		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, f=1MHz		1600	1920	pF
C_{oss}	Output Capacitance			320		pF
C_{rss}	Reverse Transfer Capacitance			100		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3.4		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=20V, I_D=14A		22		nC
Q_g(4.5V)	Total Gate Charge			10.5		nC
Q_{gs}	Gate Source Charge			4.2		nC
Q_{gd}	Gate Drain Charge			4.8		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=20V, R_L=1.5Ω, R_{GEN}=3Ω		3.5		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(off)}$	Turn-Off DelayTime			13.2		ns
t_f	Turn-Off Fall Time			3.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=14A, dI/dt=100A/µs		31		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=14A, dI/dt=100A/µs		33		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.
Rev0: Oct 2006

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

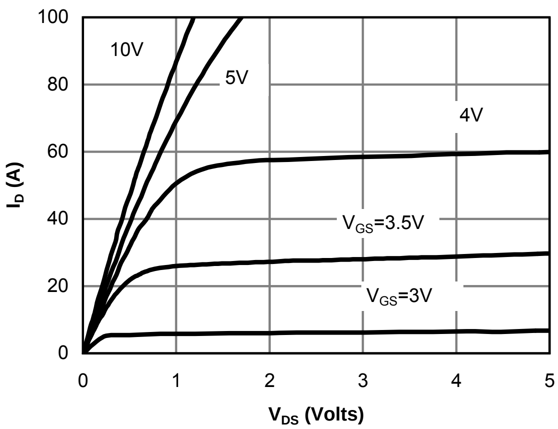

Figure 1: On-Region Characteristics

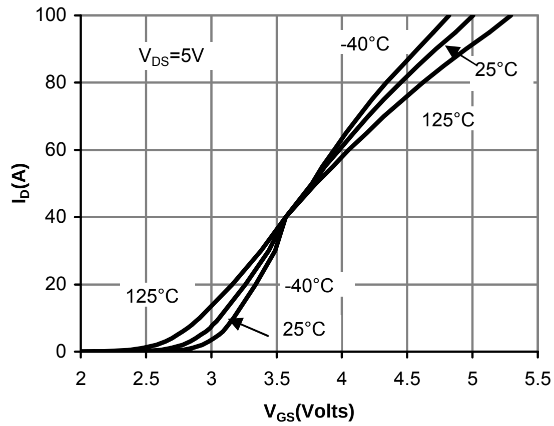

Figure 2: Transfer Characteristics

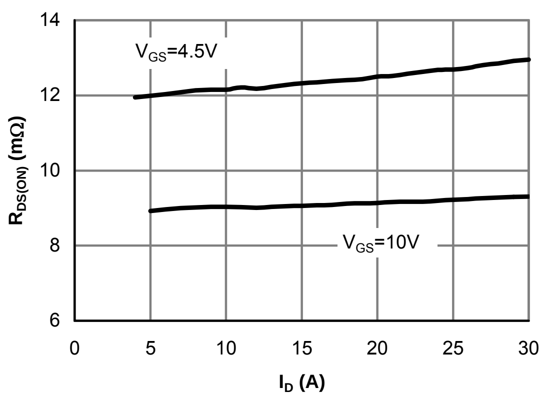

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

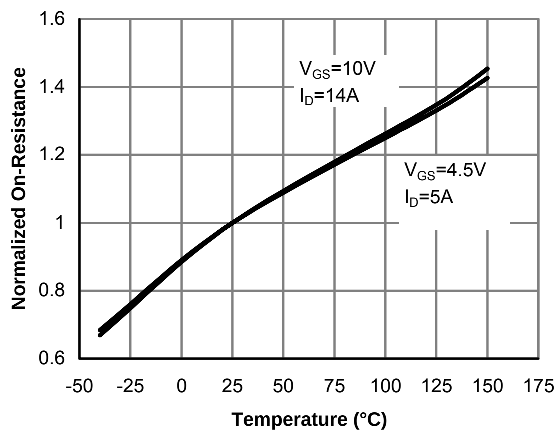

Figure 4: On-Resistance vs. Junction Temperature

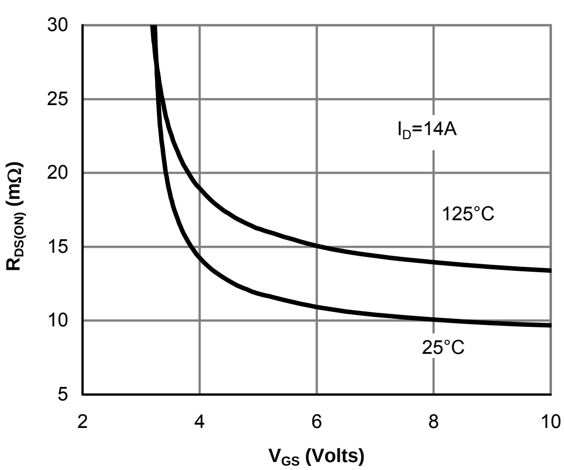

Figure 5: On-Resistance vs. Gate-Source Voltage

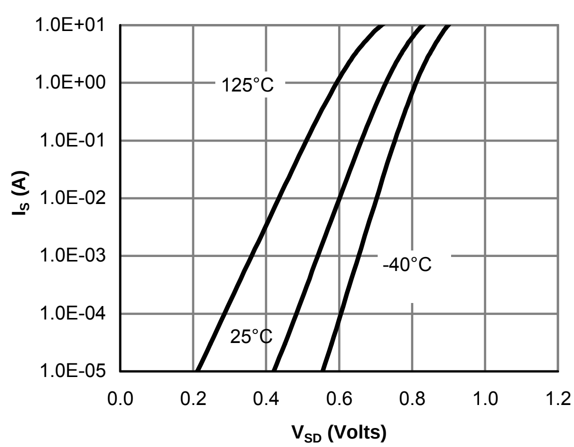

Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

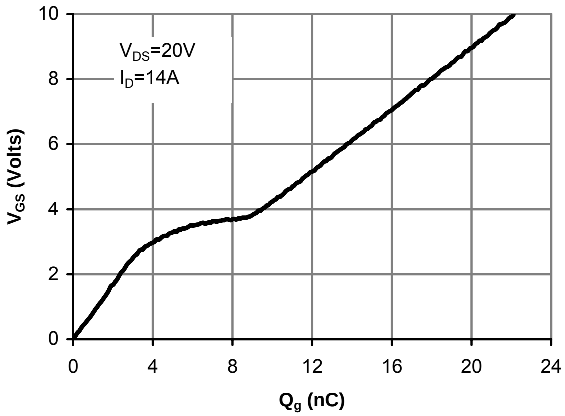

Figure 7: Gate-Charge Characteristics

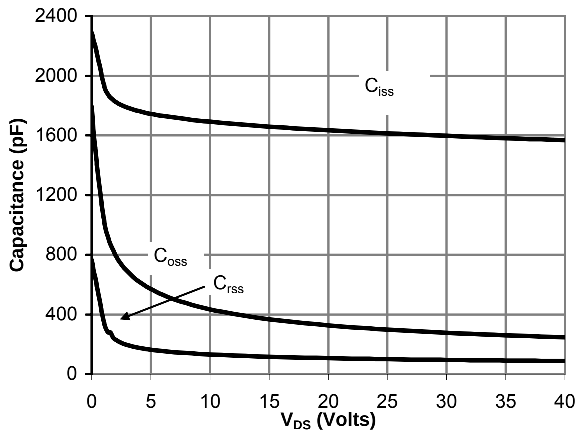

Figure 8: Capacitance Characteristics

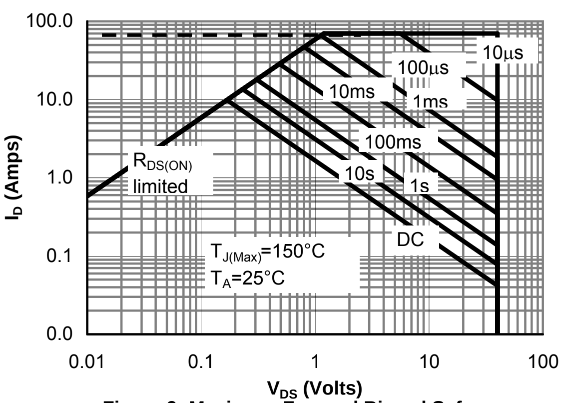

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

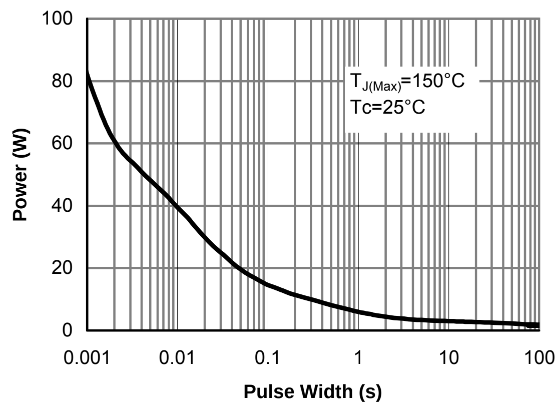

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

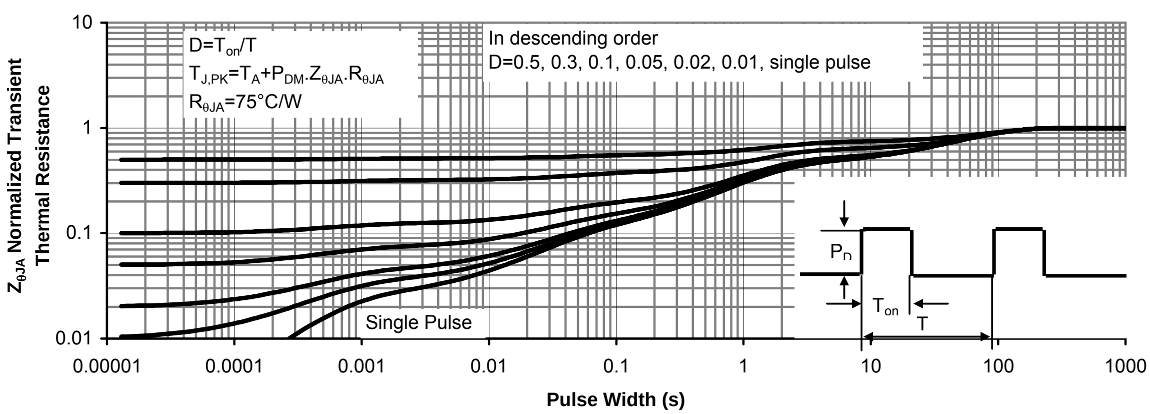

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)