AO3407A
P-Channel Enhancement Mode Field Effect Transistor

General Description

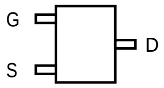
The AO3407A/L uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a load switch or in PWM applications. *AO3407A and AO3407AL are electrically identical.*
-RoHS Compliant
-AO3407AL is Halogen Free

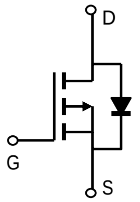
Features

V_{DS} (V) = -30V
I_D = -4.3A (V$_{GS}$ = -10V)
$R_{DS(ON)}$ < 48mΩ (V_{GS} = -10V)
$R_{DS(ON)}$ < 78mΩ (V_{GS} = -4.5V)

Rg,Ciss,Coss,Crss Tested

TO-236
(SOT-23)
Top View





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 [A,F]	T_A=25°C	I_D	-4.3	A
	T_A=70°C		-3.5	
Pulsed Drain Current [B]		I_{DM}	-20	
Power Dissipation [A]	T_A=25°C	P_D	1.4	W
	T_A=70°C		0.9	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [AF]	t ≤ 10s	$R_{\theta JA}$	70	90	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		100	125	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	63	80	°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}=-30V, 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	-1.5	-2	-2.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-4.3A		39	48	mΩ
		T_J=125°C		55	68	
		V_{GS}=-4.5V, I_D=-3A		61	78	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-4.3A		11		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.78	-1	V
I_S	Maximum Body-Diode Continuous Current				-2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		668	830	pF
C_{oss}	Output Capacitance			126		pF
C_{rss}	Reverse Transfer Capacitance			92		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		6	9	Ω
SWITCHING PARAMETERS						
Q_g (10V)	Total Gate Charge (10V)	V_{GS}=-10V, V_{DS}=-15V, I_D=-4.3A		12.7	16	nC
Q_g (4.5V)	Total Gate Charge (4.5V)			6.4		nC
Q_{gs}	Gate Source Charge			2		nC
Q_{gd}	Gate Drain Charge			4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=3.5Ω, R_{GEN}=3Ω		7.7		ns
t_r	Turn-On Rise Time			6.8		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
t_f	Turn-Off Fall Time			10		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-4.3A, dI/dt=100A/µs		22	30	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-4.3A, dI/dt=100A/µs		15		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 < 300µs 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 thermal resistance rating.
Rev1: May. 2008

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

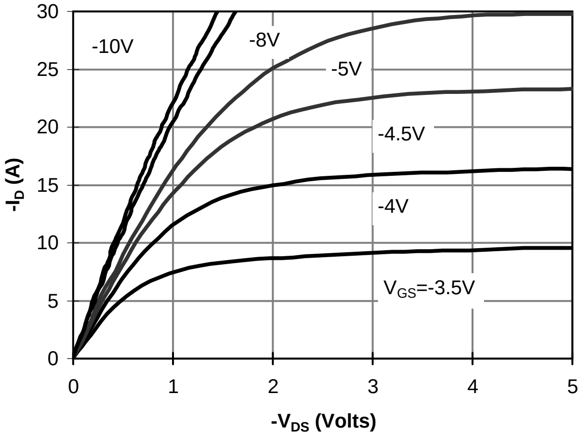


Figure 1: On-Region Characteristics

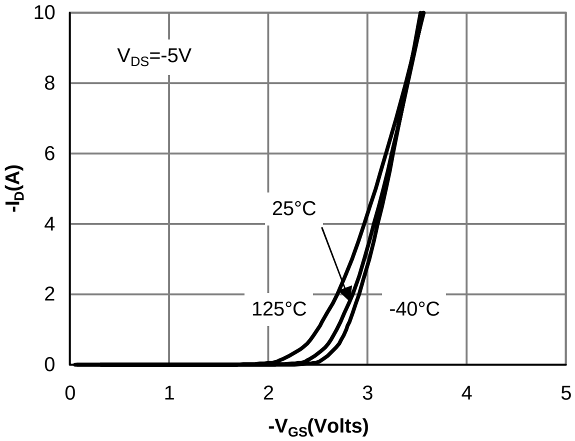


Figure 2: Transfer Characteristics

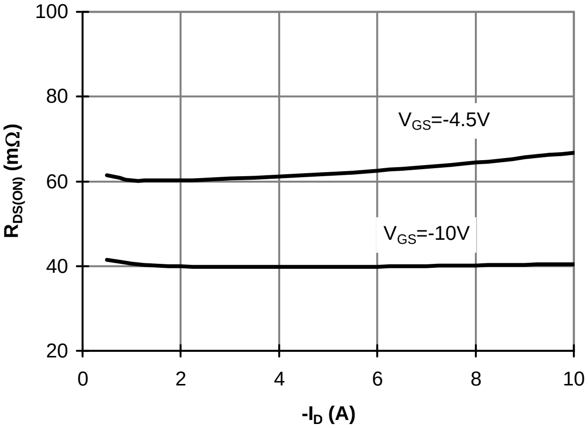


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

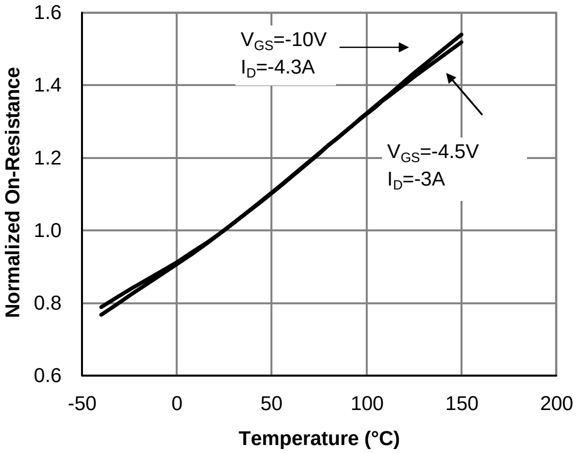


Figure 4: On-Resistance vs. Junction Temperature

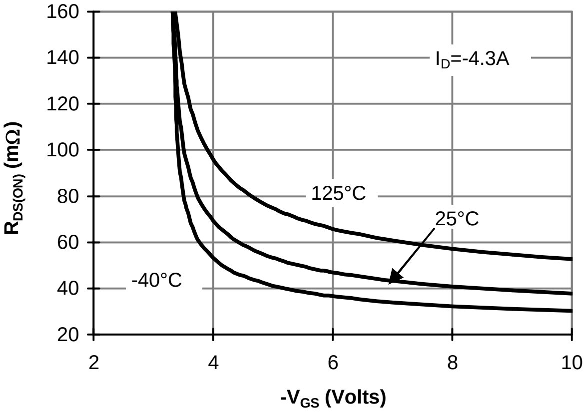


Figure 5: On-Resistance vs. Gate-Source Voltage

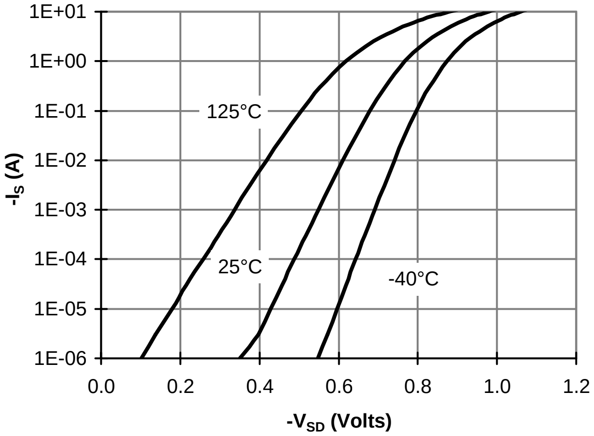


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

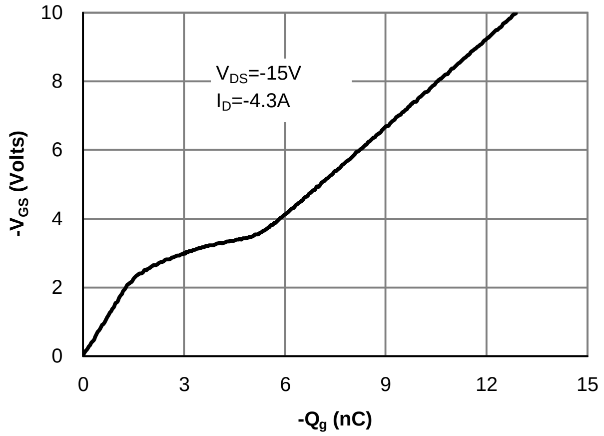


Figure 7: Gate-Charge Characteristics

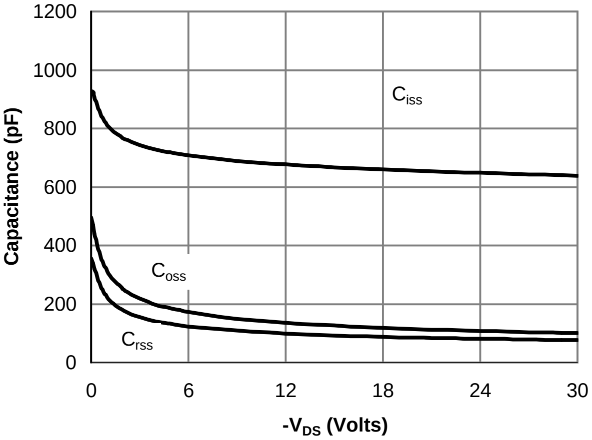


Figure 8: Capacitance Characteristics

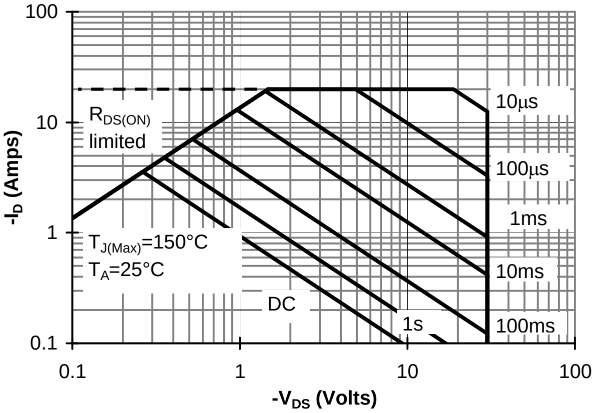


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

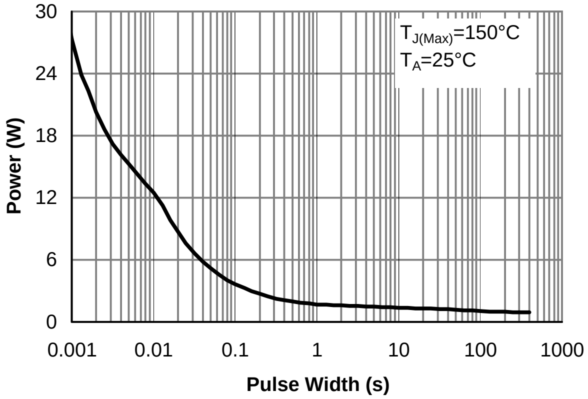


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

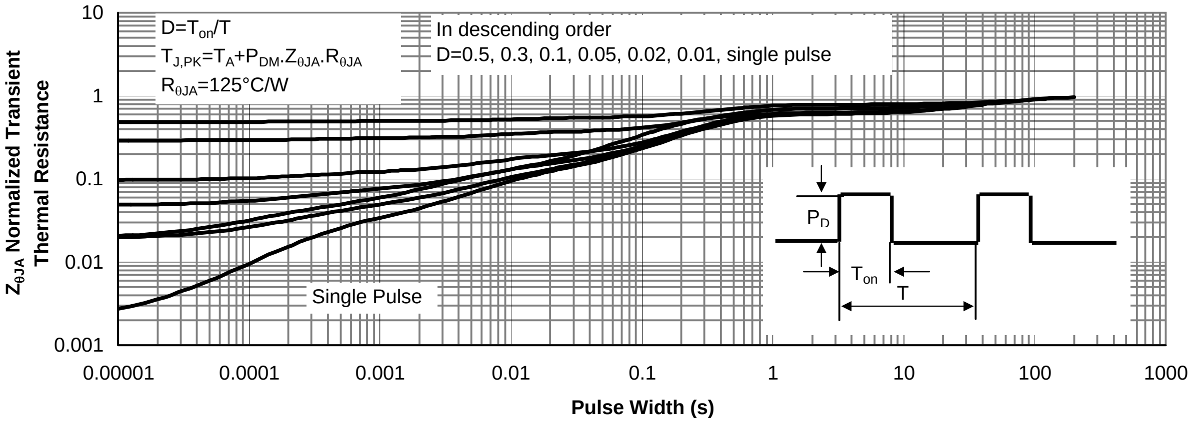


Figure 11: Normalized Maximum Transient Thermal Impedance(Note E)