ALPHA & OMEGA
SEMICONDUCTOR, LTD

AO4840
Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

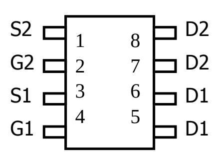
The AO4840/L uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. This dual device is suitable for use as a load switch or in PWM applications. *AO4840 and AO4840L are electrically identical.*

-RoHS Compliant
-AO4840L is Halogen Free(Green Product)

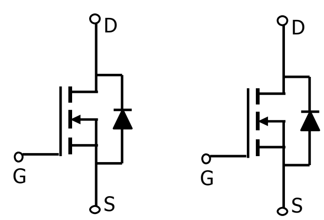
Features

V_{DS} (V) = 40V
I_D = 6A (V_{GS}=10V)
$R_{DS(ON)}$ < 31mΩ (V_{GS}=10V)
$R_{DS(ON)}$ < 45mΩ (V_{GS}=4.5V)

100% UIS tested!
100% Rg tested!



SOIC-8



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Max n-channel	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [A]	T_A=25°C	I_D	6	A
	T_A=70°C		5	
Pulsed Drain Current [B]		I_{DM}	20	
Avalanche Current [B]		I_{AS}, I_{AR}	12	A
Avalanche energy L=0.1mH [B]		E_{AS}, E_{AR}	21.6	mJ
Power Dissipation	T_A=25°C	P_D	2	W
	T_A=70°C		1.28	
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	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		74	110	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	35	50	°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=10mA, V_{GS}=0V	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, 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	2.3	3	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=6A		25	31	mΩ
		T_J=125°C		36	48	
		V_{GS}=4.5V, I_D=5A		34.5	45	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=6A		22		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.77	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, f=1MHz		404		pF
C_{oss}	Output Capacitance			95		pF
C_{rss}	Reverse Transfer Capacitance			37		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.7		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=20V, I_D=6A		8.3		nC
Q_g(4.5V)	Total Gate Charge			4.2		nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			2.3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=20V, R_L=3.3Ω, R_{GEN}=3Ω		4.2		ns
t_r	Turn-On Rise Time			3.3		ns
$t_{D(off)}$	Turn-Off DelayTime			15.6		ns
t_f	Turn-Off Fall Time			3		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=6A, dI/dt=100A/µs		20.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=6A, dI/dt=100A/µs		14.5		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. The current rating is based on the t ≤ 10s thermal resistance rating.
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.
Rev 3 : May 2010

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

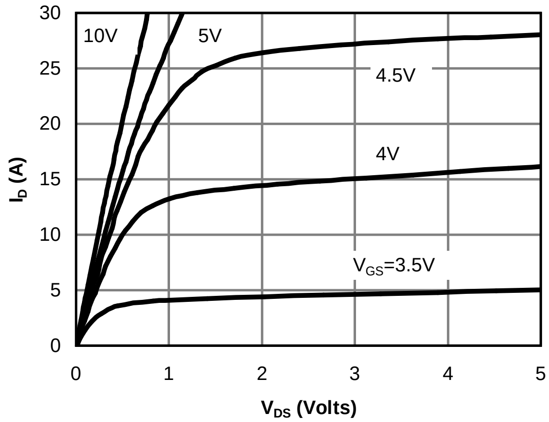


Fig 1: On-Region Characteristics

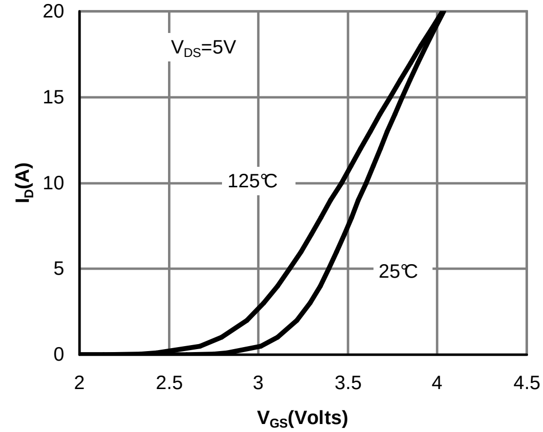


Figure 2: Transfer Characteristics

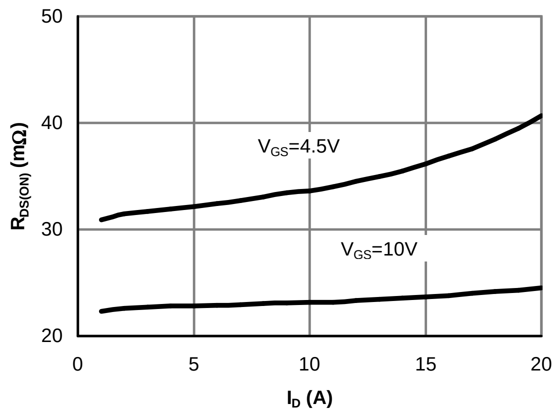


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

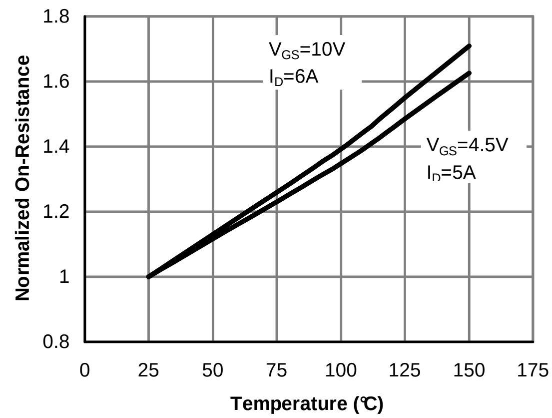


Figure 4: On-Resistance vs. Junction Temperature

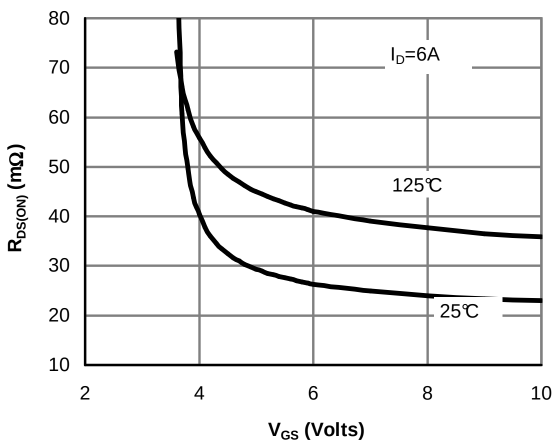


Figure 5: On-Resistance vs. Gate-Source Voltage

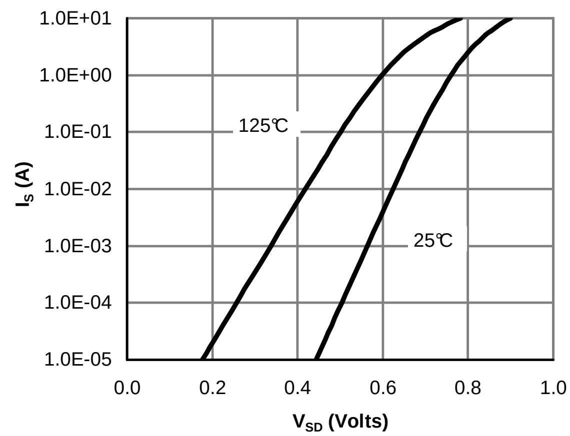


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

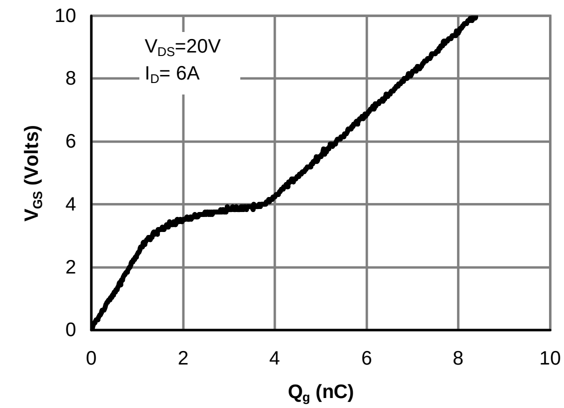


Figure 7: Gate-Charge Characteristics

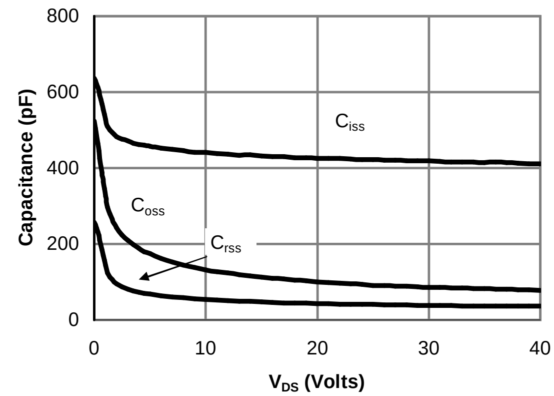


Figure 8: Capacitance Characteristics

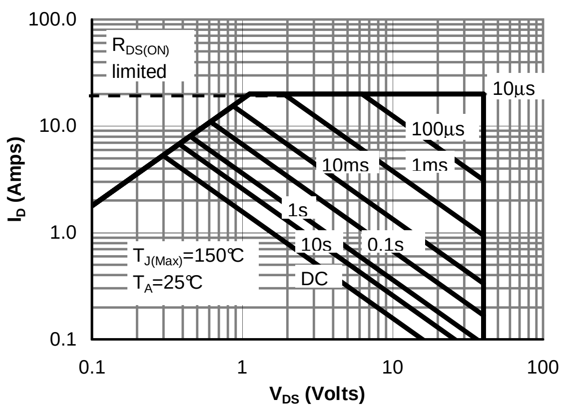


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

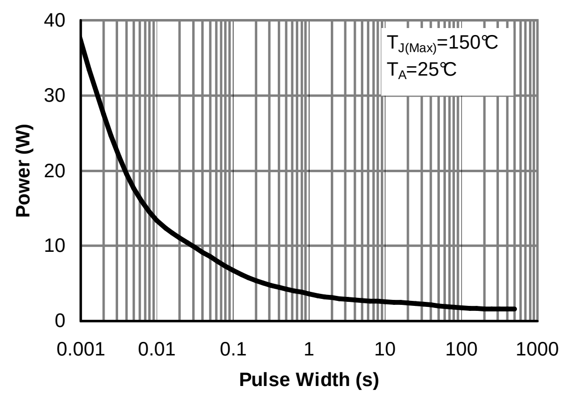


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

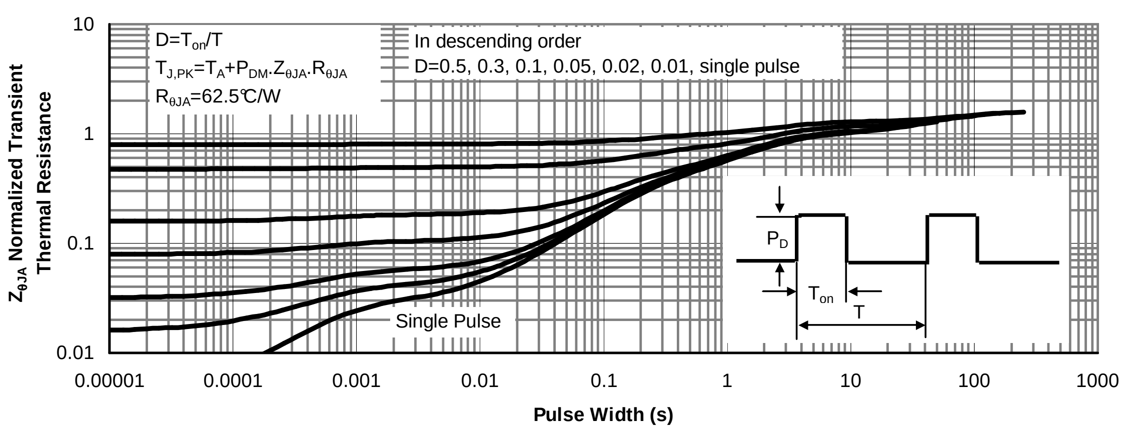


Figure 11: Normalized Maximum Transient Thermal Impedance