

AO4418
N-Channel Enhancement Mode Field Effect Transistor

General Description

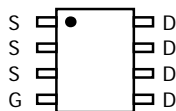
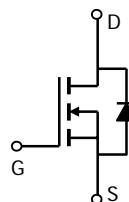
The AO4418 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

Standard Product AO4418 is Pb-free (meets ROHS & Sony 259 specifications).

Features

$V_{DS} (V) = 30V$
 $I_D = 11.5A (V_{GS} = 20V)$
 $R_{DS(ON)} < 14m\Omega (V_{GS} = 20V)$
 $R_{DS(ON)} < 17m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 40m\Omega (V_{GS} = 4.5V)$

UIS TESTED!
Rg, Ciss, Coss, Crss Tested


SOIC-8

Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current ^{AF}	I_D	$T_A=25^\circ C$	A
		$T_A=70^\circ C$	
Pulsed Drain Current ^B	I_{DM}	40	
Power Dissipation	P_D	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Avalanche Current ^B	I_{AR}	20	A
Repetitive avalanche energy 0.3mH ^B	E_{AR}	60	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^{AF}	$R_{\theta JA}$	31	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady-State	59	75
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	16	24	$^\circ C/W$

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 T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±25V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.5	2.4	3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	40			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =20V, I _D =11.5A T _J =125°C		9.8 14.2	14 18	mΩ
		V _{GS} =10V, I _D =10A		12.3	17	mΩ
		V _{GS} =4.5V, I _D =5A		32	40	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A	14	22		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.76	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		758	910	pF
C _{oss}	Output Capacitance			180		pF
C _{rss}	Reverse Transfer Capacitance			128	180	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.3	0.7	1.1	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =11.5A		16.6	20	nC
Q _g (4.5V)	Total Gate Charge			8.6		nC
Q _{gs}	Gate Source Charge			2.5		nC
Q _{gd}	Gate Drain Charge			4.9		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =1.3Ω, R _{GEN} =3Ω		5.4		ns
t _r	Turn-On Rise Time			5.1		ns
t _{D(off)}	Turn-Off Delay Time			14.4		ns
t _f	Turn-Off Fall Time			3.7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =11.5A, dI/dt=100A/μs		16.9	22	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =11.5A, dI/dt=100A/μs		6.6		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² 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_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 in² 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

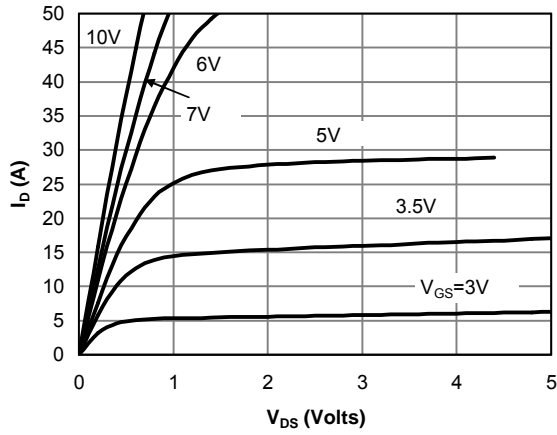


Fig 1: On-Region Characteristics

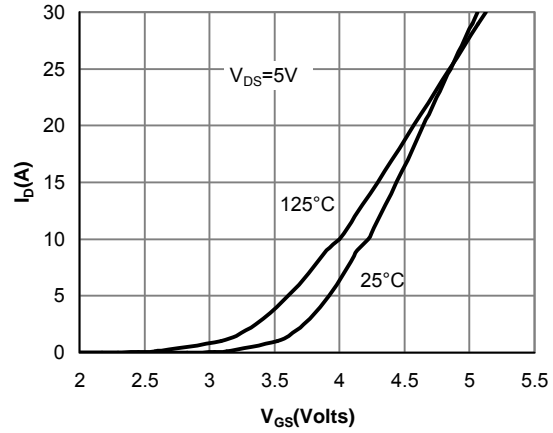


Figure 2: Transfer Characteristics

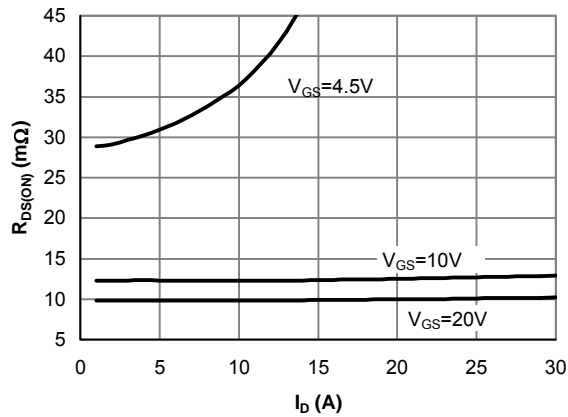


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

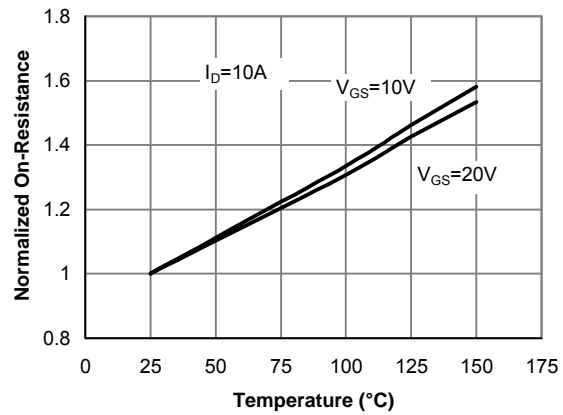


Figure 4: On-Resistance vs. Junction Temperature

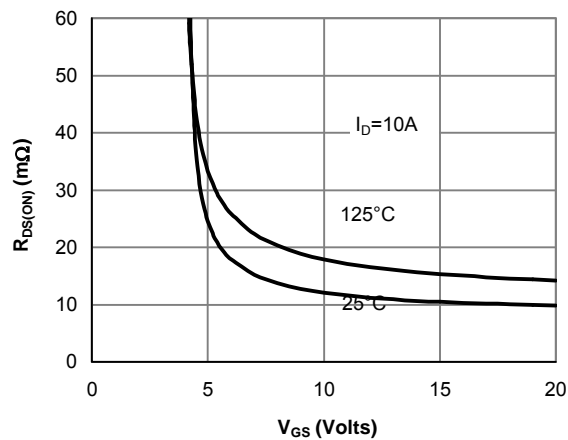


Figure 5: On-Resistance vs. Gate-Source Voltage

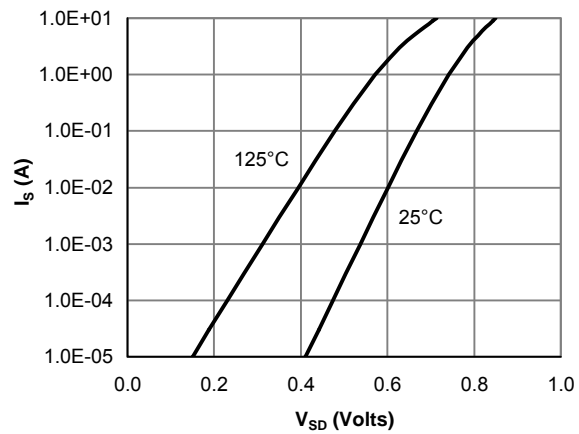


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

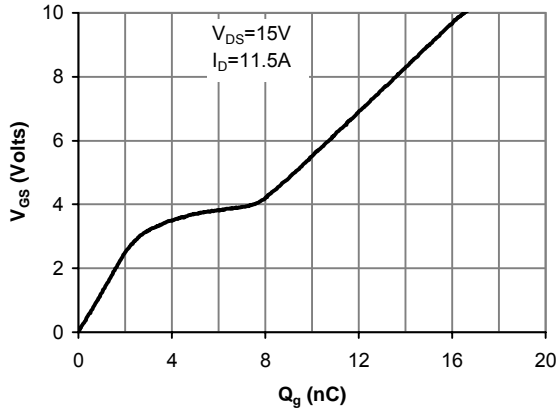


Figure 7: Gate-Charge Characteristics

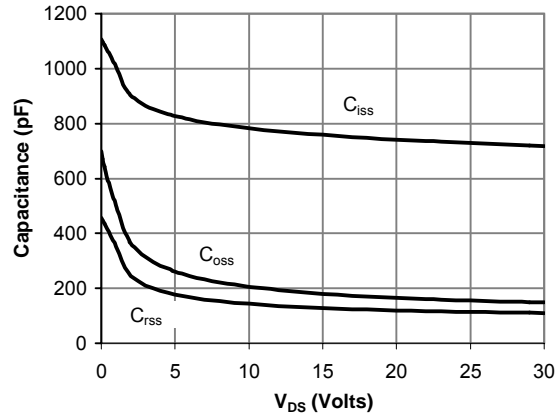


Figure 8: Capacitance Characteristics

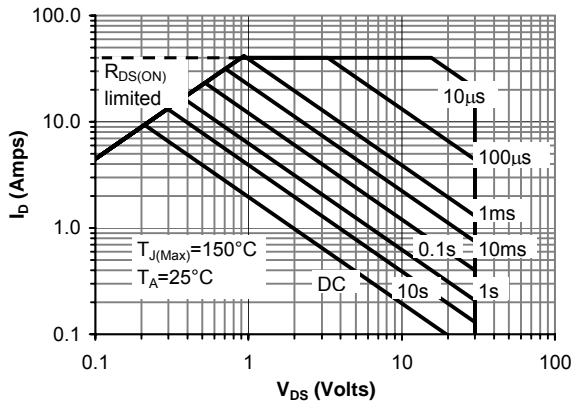


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

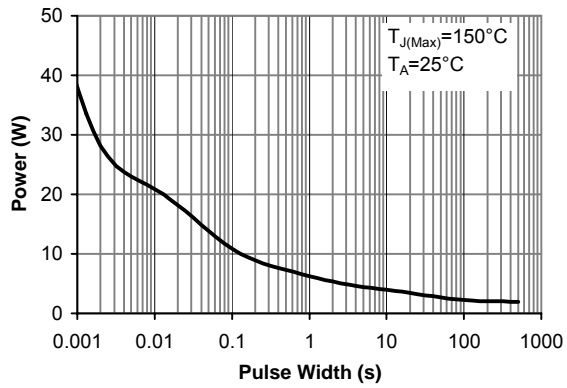


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

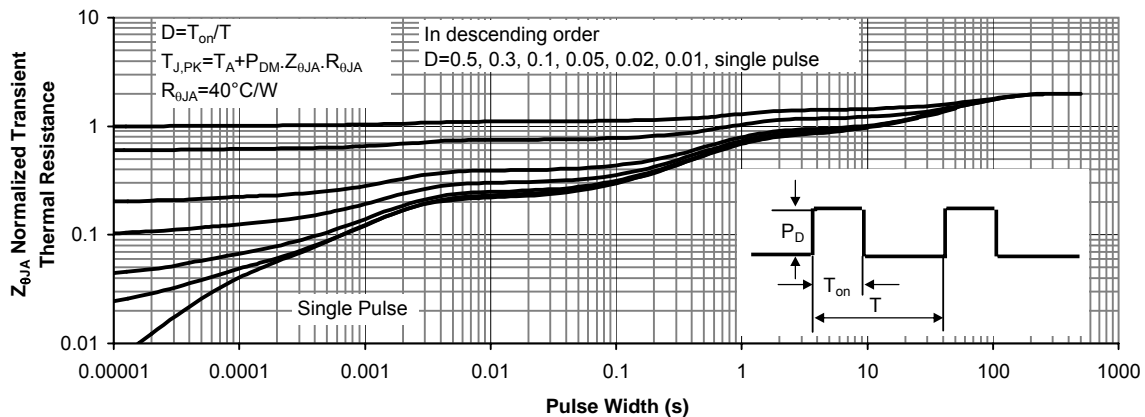
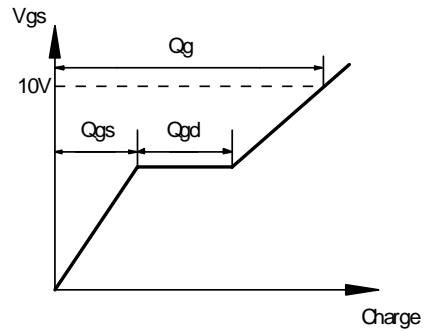
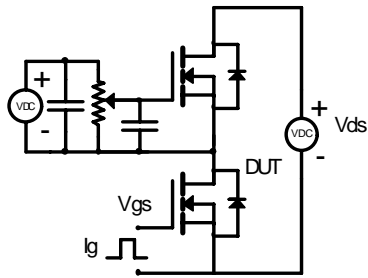
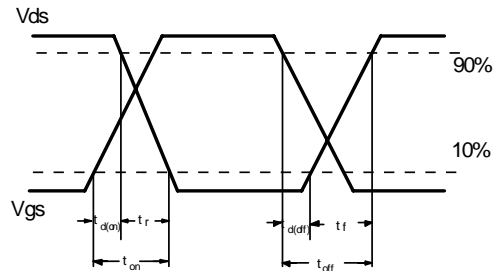
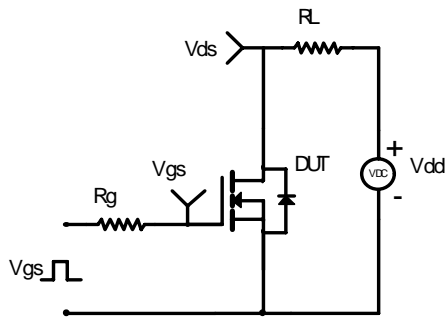


Figure 11: Normalized Maximum Transient Thermal Impedance

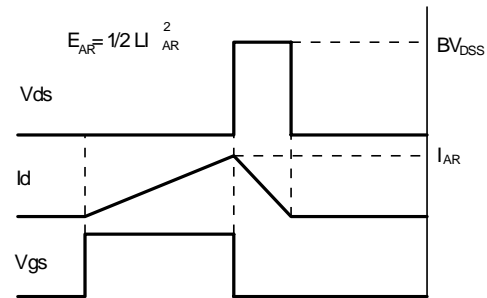
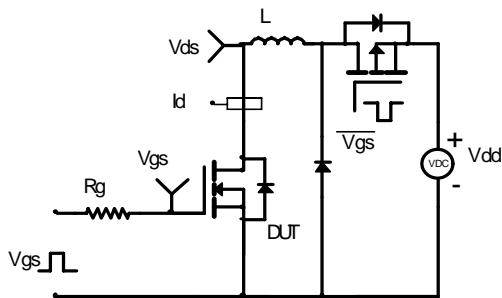
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

