

## AON4420L

### N-Channel Enhancement Mode Field Effect Transistor

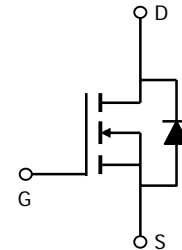
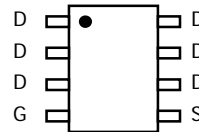
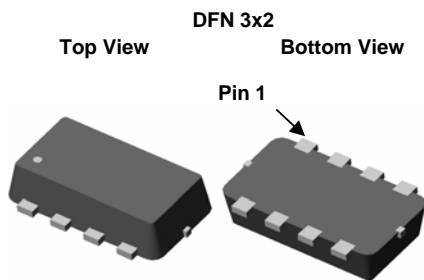
#### General Description

The AON4420L combines advanced trench MOSFET technology with a small footprint package to provide low  $R_{DS(ON)}$  per unit area. This device is ideal for load switch and high speed switching applications.

- RoHS Compliant
- Halogen Free

#### Features

$V_{DS}$  (V) = 30V  
 $I_D$  = 10A ( $V_{GS} = 10V$ )  
 $R_{DS(ON)} < 19m\Omega$  ( $V_{GS} = 10V$ )  
 $R_{DS(ON)} < 25m\Omega$  ( $V_{GS} = 4.5V$ )



#### Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	50	
Continuous Drain Current <sup>A</sup>	$I_D$	$T_A=25^\circ\text{C}$	10
		$T_A=70^\circ\text{C}$	8
Power Dissipation <sup>A</sup>	$P_D$	$T_A=25^\circ\text{C}$	1.6
		$T_A=70^\circ\text{C}$	1
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

#### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	$t \leq 10s$	34	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	66	$^\circ\text{C/W}$
Maximum Junction-to-Lead <sup>B</sup>	$R_{\theta JL}$	20	25	$^\circ\text{C/W}$

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{V}$ , $V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS} = 0\text{V}$ , $V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	1.4	1.9	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS} = 10\text{V}$ , $V_{DS} = 5\text{V}$	50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{V}$ , $I_D = 10\text{A}$ $T_J = 125^\circ\text{C}$ $V_{GS} = 4.5\text{V}$ , $I_D = 8\text{A}$		16 27 21	20 26	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{V}$ , $I_D = 10\text{A}$		30		S
$V_{SD}$	Diode Forward Voltage	$I_S = 1\text{A}$ , $V_{GS} = 0\text{V}$		0.75	1	V
$I_S$	Maximum Body-Diode Continuous Current				3	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$	440	550	660	pF
$C_{oss}$	Output Capacitance		80	110	140	pF
$C_{rss}$	Reverse Transfer Capacitance		35	55	80	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$	2	4	6	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge (10V)	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=10\text{A}$	8	9.8	12	nC
$Q_g(4.5\text{V})$	Total Gate Charge (4.5V)		4	4.6	5.5	nC
$Q_{gs}$	Gate Source Charge		1.5	1.8	2.2	nC
$Q_{gd}$	Gate Drain Charge		1.3	2.2	3	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=1.5\Omega$ , $R_{GEN}=3\Omega$		5		ns
$t_r$	Turn-On Rise Time			3.2		ns
$t_{D(off)}$	Turn-Off Delay Time			24		ns
$t_f$	Turn-Off Fall Time			6		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=10\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$	8	11	14	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=10\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$	11	13	16	nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . 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 impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using  $t \leq 300\mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

F: The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

Rev0: July 2008

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

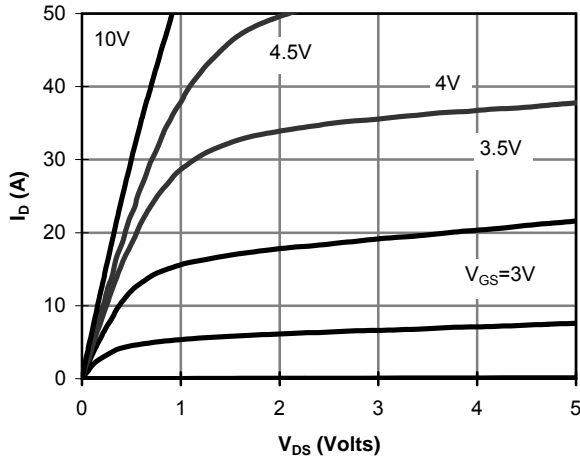


Figure 1: On-Region Characteristics

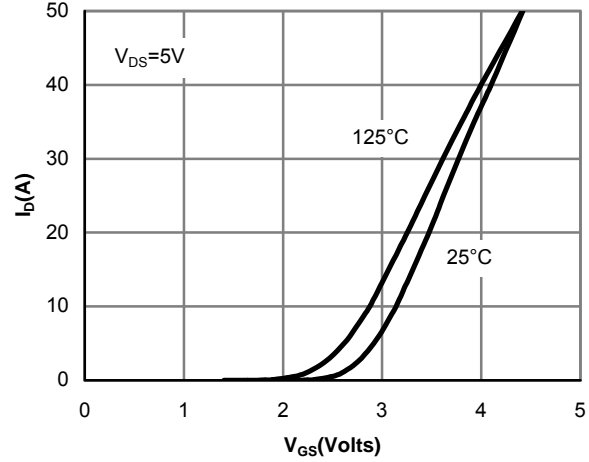


Figure 2: Transfer Characteristics

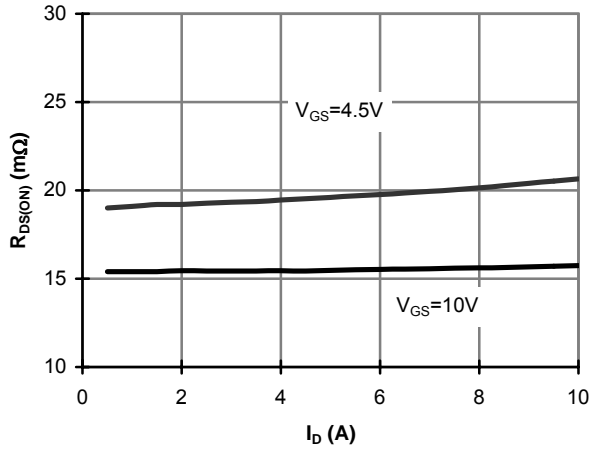


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

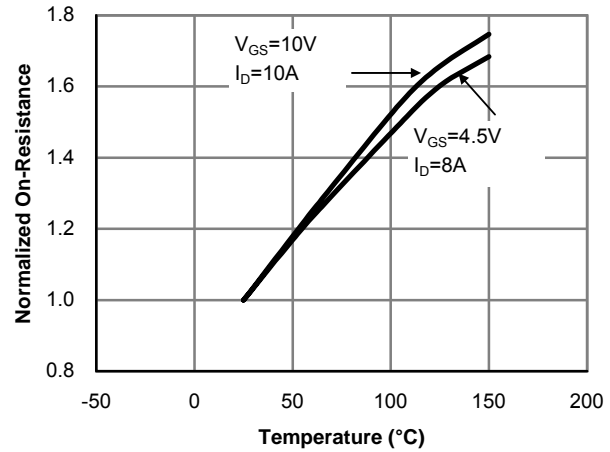


Figure 4: On-Resistance vs. Junction Temperature

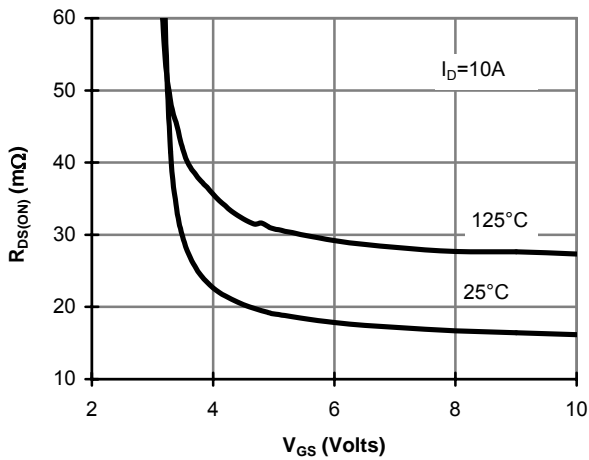


Figure 5: On-Resistance vs. Gate-Source Voltage

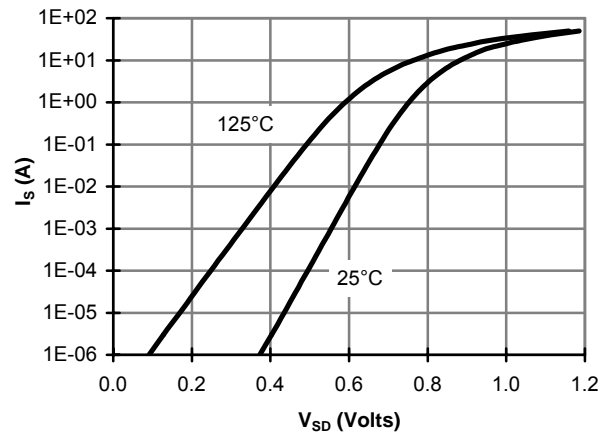


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

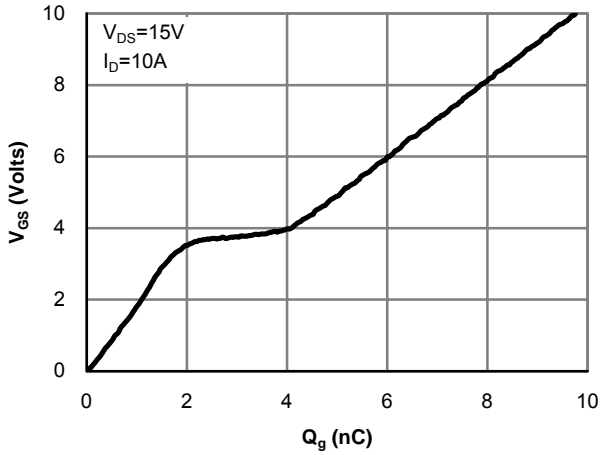


Figure 7: Gate-Charge Characteristics

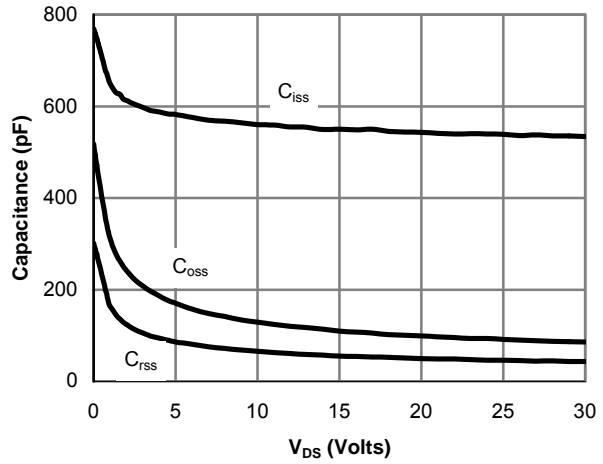


Figure 8: Capacitance Characteristics

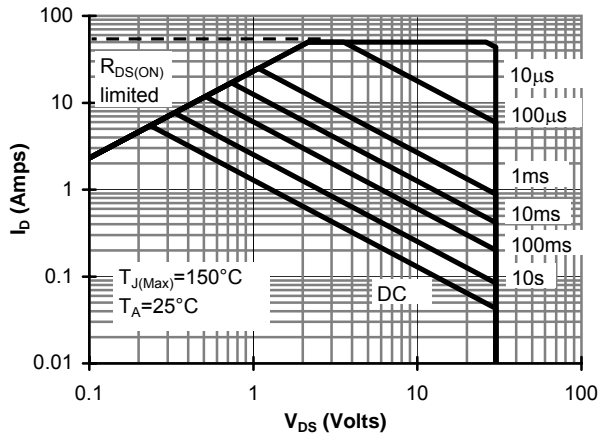


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

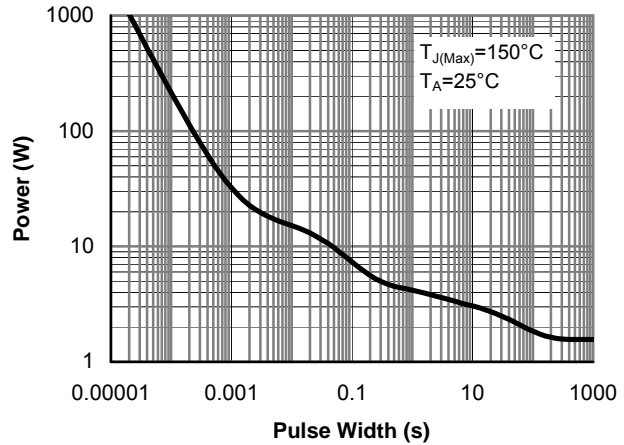


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

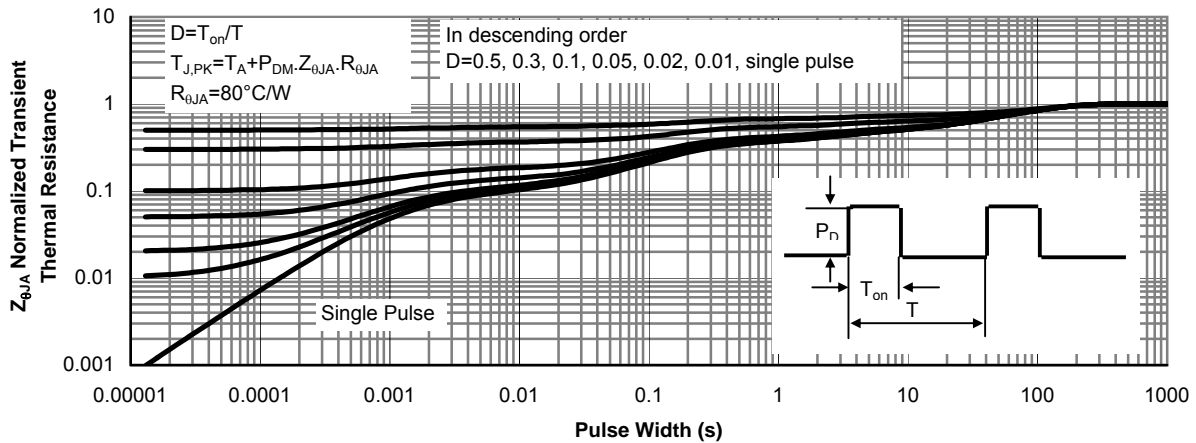
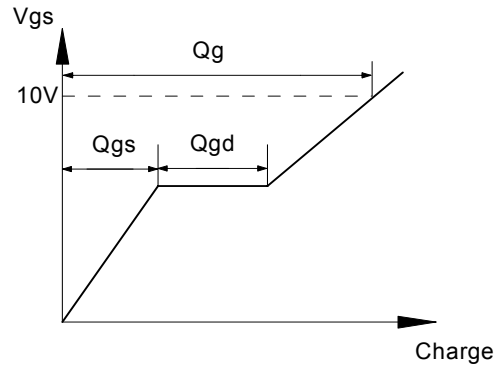
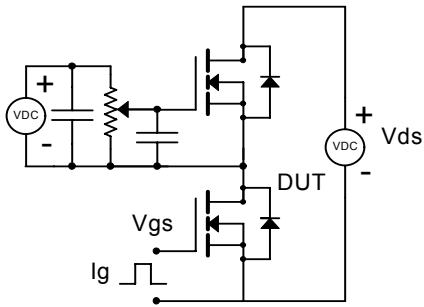
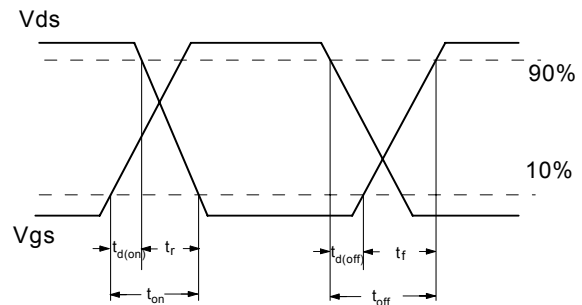
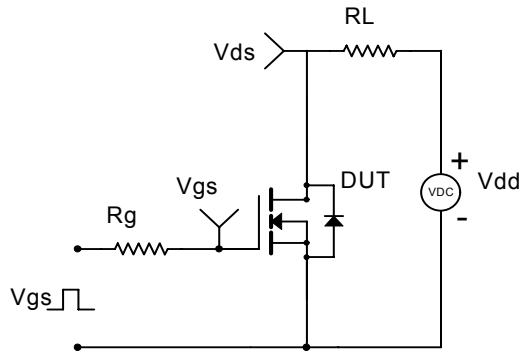


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

