



AOL1418

N-Channel Enhancement Mode Field Effect Transistor

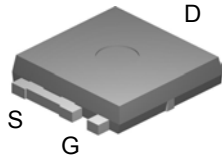
General Description

The AOL1418 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and low gate resistance. This device is ideally suited for use as a high side switch in CPU core power conversion. *Standard Product AOL1418 is Pb-free (meets ROHS & Sony 259 specifications). AOL1418L is a Green Product ordering option. AOL1418 and AOL1418L are electrically identical.*

Features

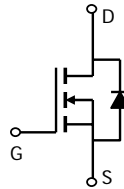
$V_{DS} (V) = 30V$
 $I_D = 85A (V_{GS} = 10V)$
 $R_{DS(ON)} < 6.5m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 10.5m\Omega (V_{GS} = 4.5V)$

Ultra SO-8™ Top View



Fits SOIC8 footprint !

Bottom tab connected to drain



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}	± 20	V
Continuous Drain Current ^B	I_D	$T_C=25^\circ C$ ^G	85
		$T_C=100^\circ C$	70
Pulsed Drain Current	I_{DM}	200	A
Continuous Drain Current ^G	I_{DSM}	$T_A=25^\circ C$	15
		$T_A=70^\circ C$	12
Avalanche Current ^C	I_{AR}	30	A
Repetitive avalanche energy $L=0.3mH$ ^C	E_{AR}	135	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ C$	100
		$T_C=100^\circ C$	50
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ C$	2.5
		$T_A=70^\circ C$	1.6
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$	19.5	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady-State	48	$^\circ C/W$
Maximum Junction-to-Case ^C	$R_{\theta JC}$	1	1.5	$^\circ C/W$

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} =24V, V _{GS} =0V T _J =55°C		0.005	1	μA
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	2.2	3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	100			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		5	6.5	mΩ
		V _{GS} =4.5V, I _D =20A		6.7	8.1	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		60		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				85	A
DYNAMIC PARAMETERS						
C _{ISS}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		1320	1600	pF
C _{OSS}	Output Capacitance			533		pF
C _{RSS}	Reverse Transfer Capacitance			154		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		0.95	1.5	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =20A		26	32	nC
Q _g (4.5V)	Total Gate Charge			13.3	16.2	nC
Q _{gs}	Gate Source Charge			3.2		nC
Q _{gd}	Gate Drain Charge			6.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		7.2	10	ns
t _r	Turn-On Rise Time			12.5	18	ns
t _{D(off)}	Turn-Off DelayTime			22	33	ns
t _f	Turn-Off Fall Time			6	9	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=100A/μs		29.7	36	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=100A/μs		29	36	nC

A: The value of R_{θJA} is measured with the device in a still air environment with T_A =25°C.

B: The power dissipation PD is based on T_J(MAX)=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature T_J(MAX)=175°C.

D: The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using <300 ms pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_J(MAX)=175°C.

G: The maximum current rating is limited by bond-wires.

H: 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.

Rev1: Dec 2005

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

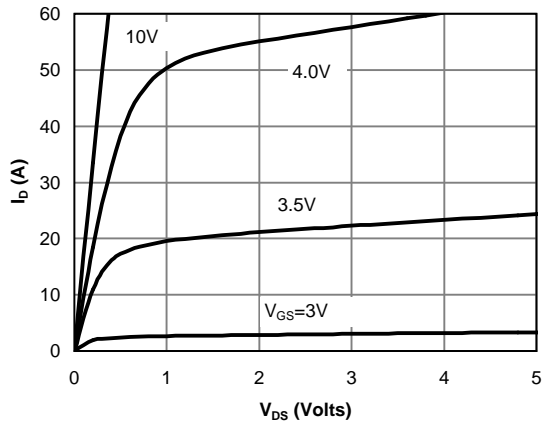


Fig 1: On-Region Characteristics

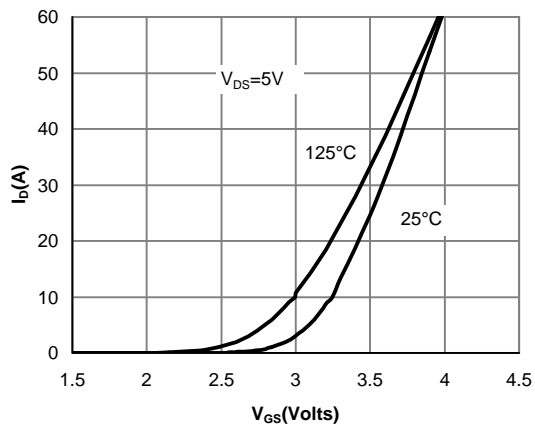


Figure 2: Transfer Characteristics

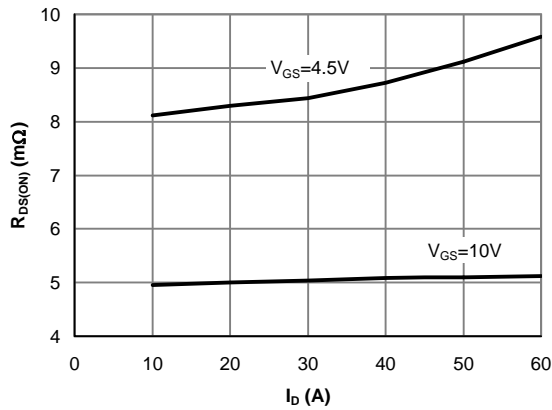


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

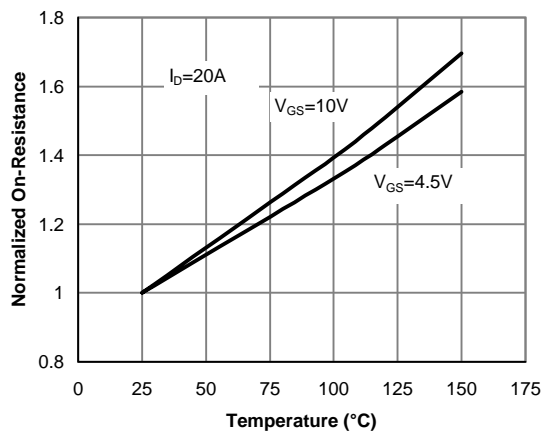


Figure 4: On-Resistance vs. Junction Temperature

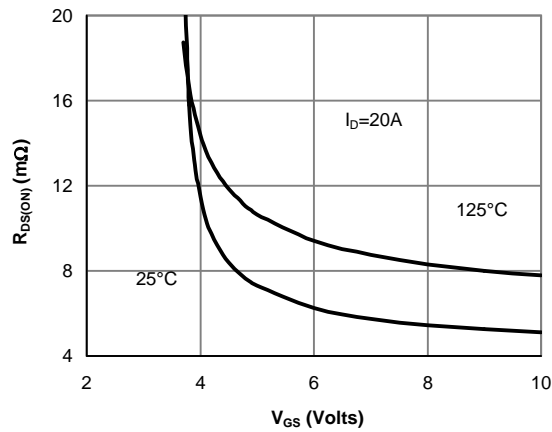


Figure 5: On-Resistance vs. Gate-Source Voltage

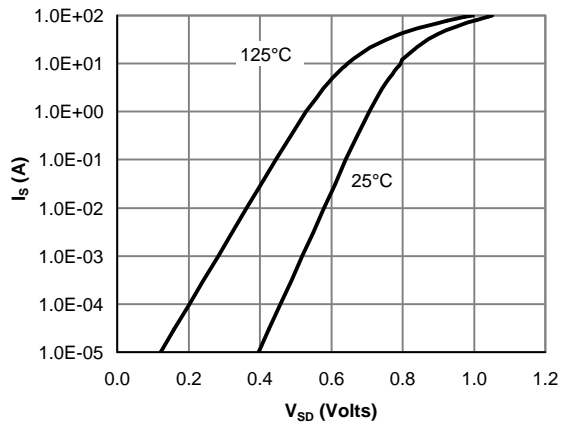


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

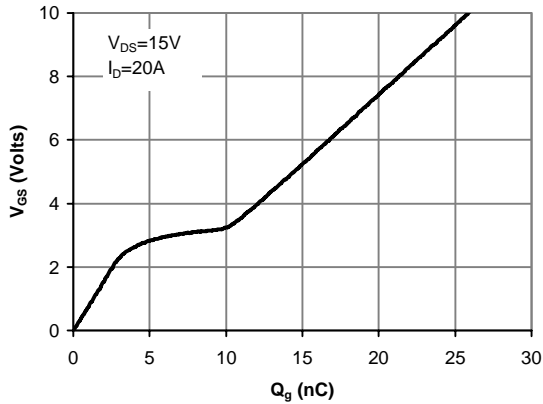


Figure 7: Gate-Charge Characteristics

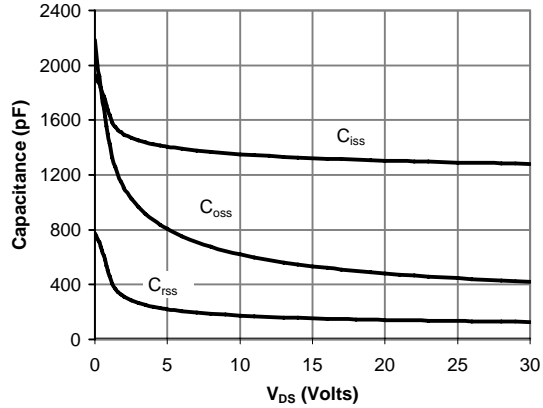


Figure 8: Capacitance Characteristics

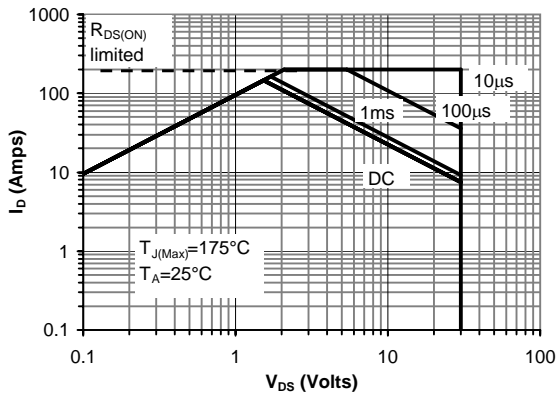


Figure 9: Maximum Forward Biased Safe Operating Area (Note H)

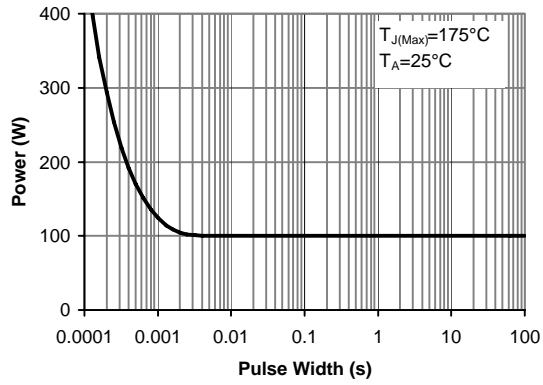


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

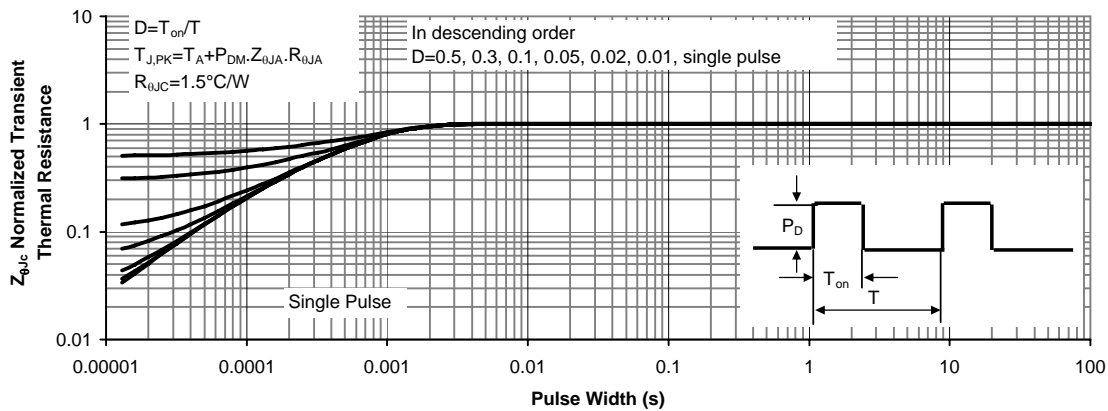


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

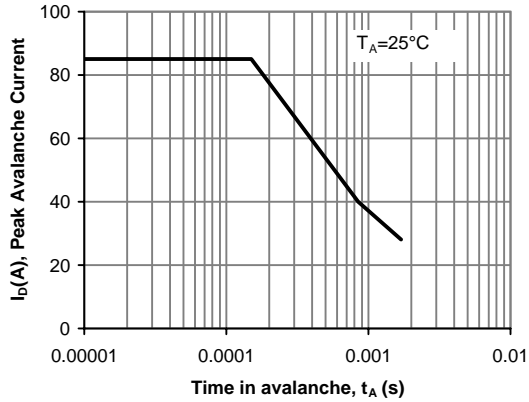


Figure 12: Single Pulse Avalanche capability

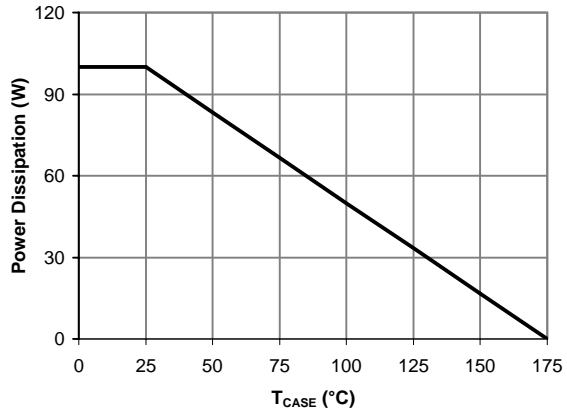


Figure 13: Power De-rating (Note B)

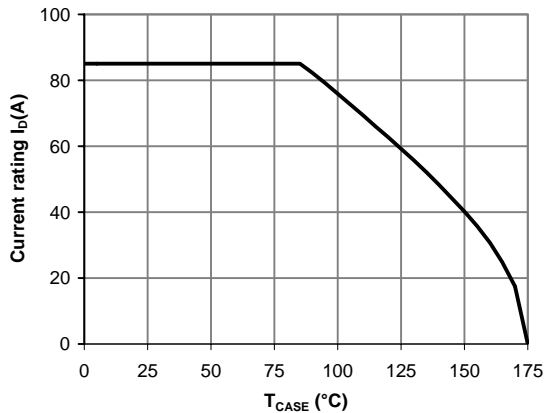


Figure 14: Current De-rating (Note B)

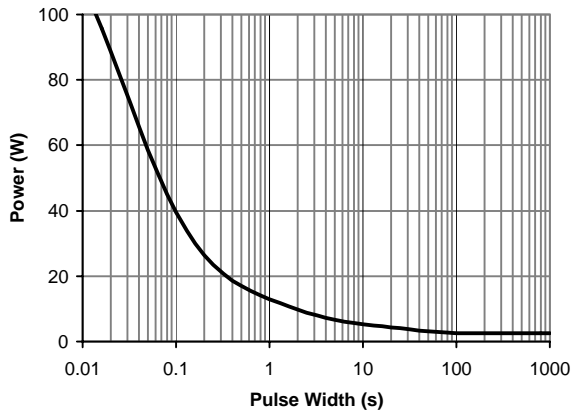


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

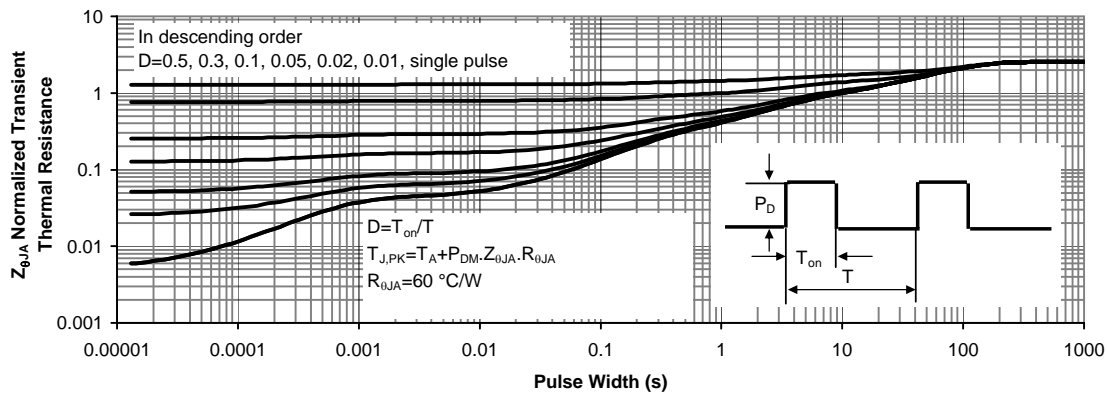


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)