



AOL1428

N-Channel Enhancement Mode Field Effect Transistor



General Description

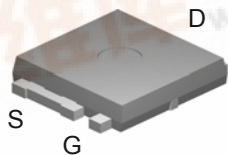
The AOL1428 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a high side switch in SMPS and general purpose applications. *Standard Product AOL1428 is Pb-free (meets ROHS & Sony 259 specifications). AOL1428L is a Green Product ordering option. AOL1428 and AOL1428L are electrically identical.*

Features

$V_{DS} (V) = 30V$
 $I_D = 45A (V_{GS} = 10V)$
 $R_{DS(ON)} < 9.5m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 16m\Omega (V_{GS} = 4.5V)$

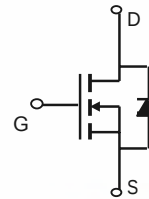
UIS Tested
Rg, Ciss, Coss, Crss Tested

Ultra SO-8™ Top View



Bottom tab
connected to
drain

**Fits SOIC8
footprint !**



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	49	A
$T_C=25^\circ C$		34	
$T_C=100^\circ C$	I_D	34	A
Pulsed Drain Current	I_{DM}	120	A
Continuous Drain Current ^H	I_{DSM}	18	A
$T_A=25^\circ C$		14	
$T_A=70^\circ C$	I_{DSM}	14	A
Avalanche Current ^C	I_{AR}	30	A
Repetitive avalanche energy $L=0.3mH$ ^C	E_{AR}	135	mJ
Power Dissipation ^B	P_D	43	W
$T_C=25^\circ C$		21	
$T_C=100^\circ C$	P_D	21	W
Power Dissipation ^A	P_{DSM}	5	W
$T_A=25^\circ C$		3	
$T_A=70^\circ C$	P_{DSM}	3	W
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	$R_{\theta JA}$	19	25	$^\circ C/W$
$t \leq 10s$		45	55	$^\circ C/W$
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	45	55	$^\circ C/W$
Steady-State		2.5	3.5	$^\circ C/W$
Maximum Junction-to-Case ^C	$R_{\theta JC}$	2.5	3.5	$^\circ C/W$
Steady-State	$R_{\theta JC}$	2.5	3.5	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
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	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			0.1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.9	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	120			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=20\text{A}$ $T_J=125^{\circ}\text{C}$		7.7 11.0	9.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$		13	16.0	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		40		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.74	1.0	V
I_S	Maximum Body-Diode Continuous Current				46	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		1000		pF
C_{oss}	Output Capacitance			340		pF
C_{rss}	Reverse Transfer Capacitance			100		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.3		Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=20\text{A}$		18		nC
$Q_g(4.5\text{V})$	Total Gate Charge			8.5		nC
Q_{gs}	Gate Source Charge			3.1		nC
Q_{gd}	Gate Drain Charge			4.8		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=0.75\Omega$, $R_{GEN}=3\Omega$		5.6		ns
t_r	Turn-On Rise Time			5.5		ns
$t_{D(off)}$	Turn-Off DelayTime			18.5		ns
t_f	Turn-Off Fall Time			5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		29		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		24		nC

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with $T_A=25^{\circ}\text{C}$.

B: The power dissipation P_D is based on $T_J(\text{MAX})=175^{\circ}\text{C}$, 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 $T_J(\text{MAX})=175^{\circ}\text{C}$.

D: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using $<300\text{ ms}$ 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 $T_J(\text{MAX})=175^{\circ}\text{C}$.

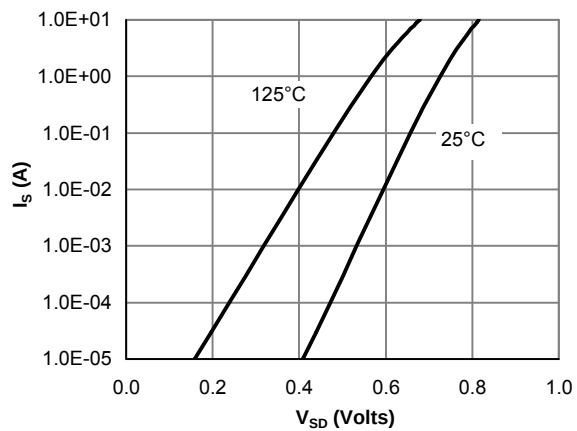
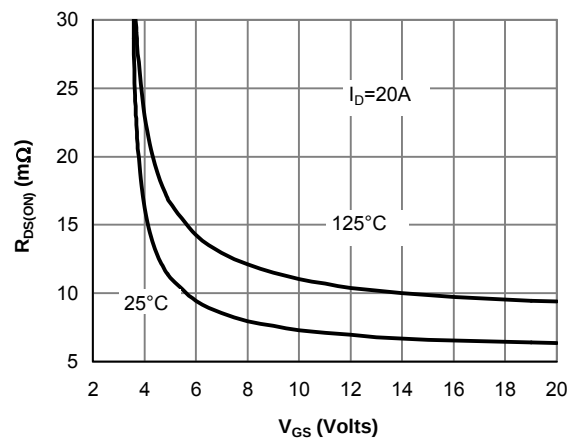
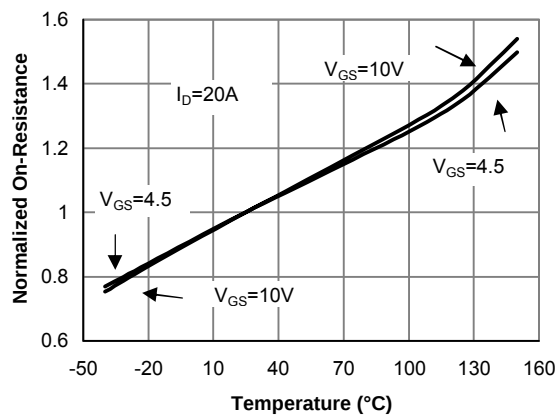
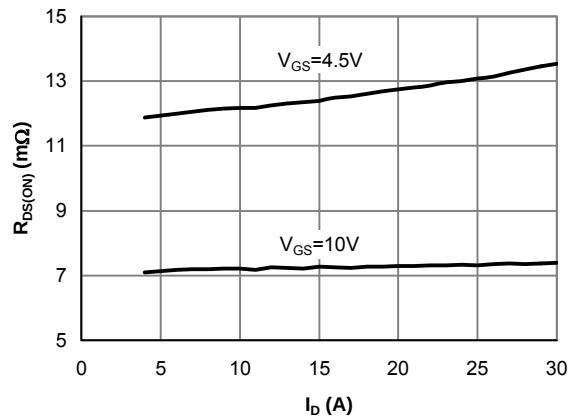
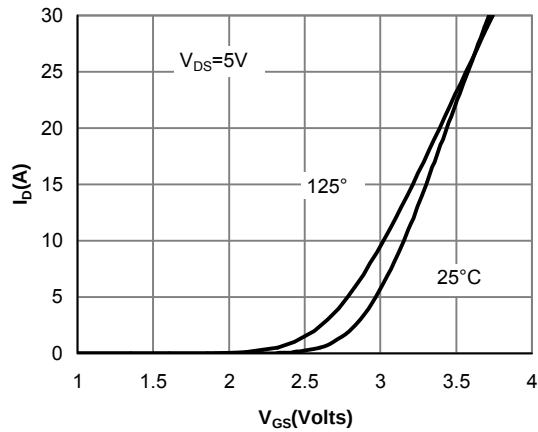
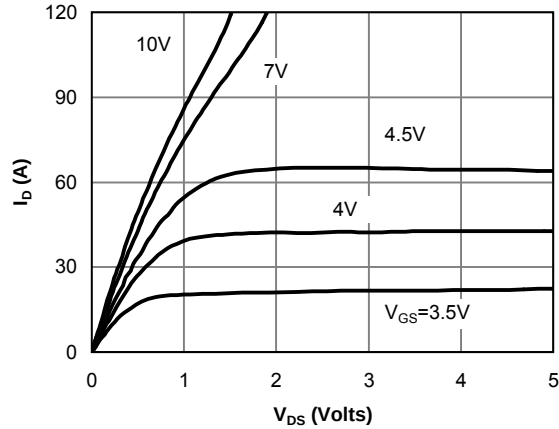
G: These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

H: Surface mounted on a 1 in 2 FR-4 board with 2oz. Copper.

Rev1: May 2006

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



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

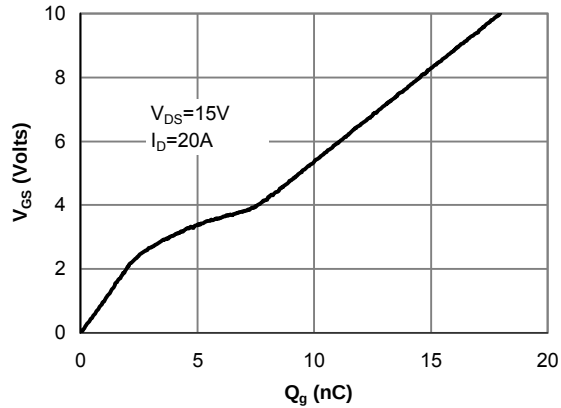


Figure 7: Gate-Charge Characteristics

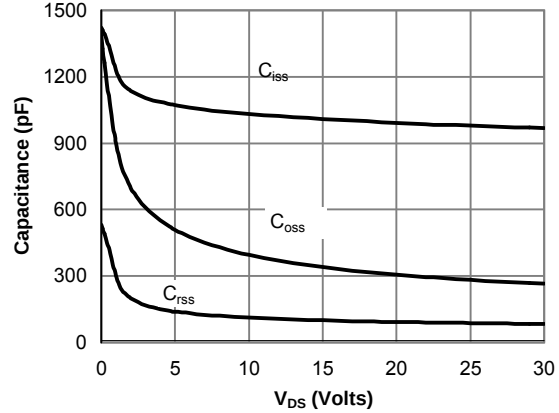


Figure 8: Capacitance Characteristics

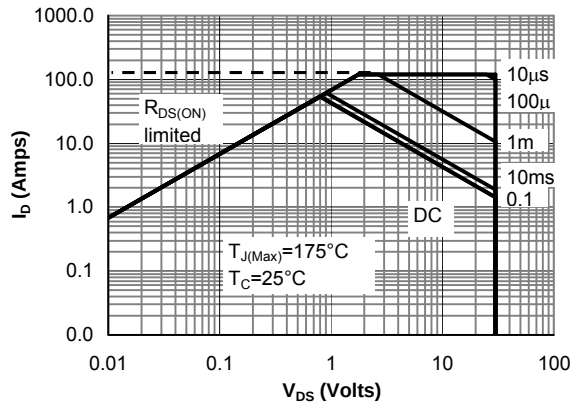


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

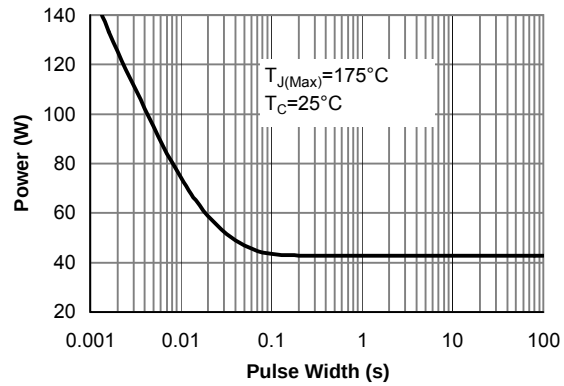


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

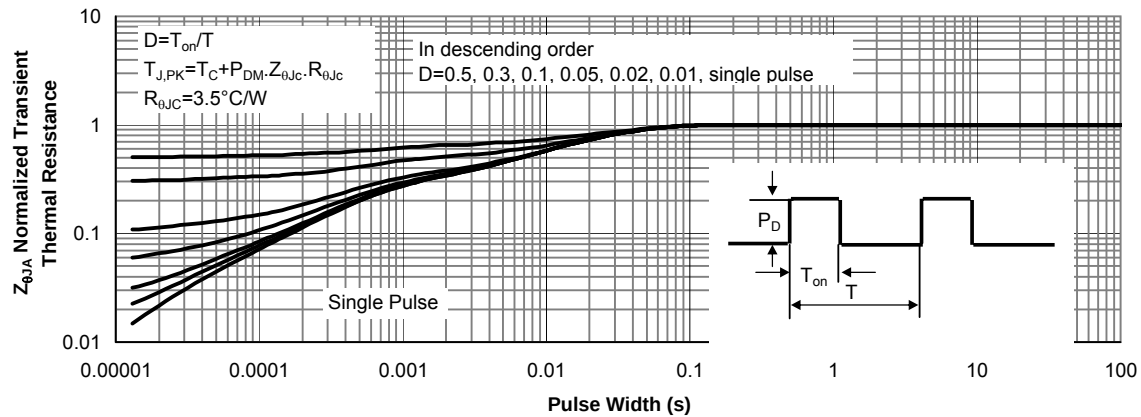


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

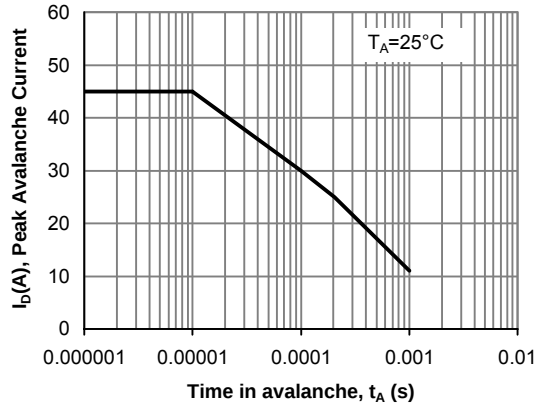


Figure 12: Single Pulse Avalanche capability

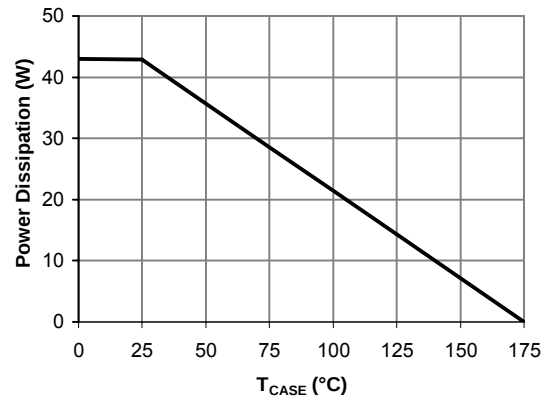


Figure 13: Power De-rating (Note B)

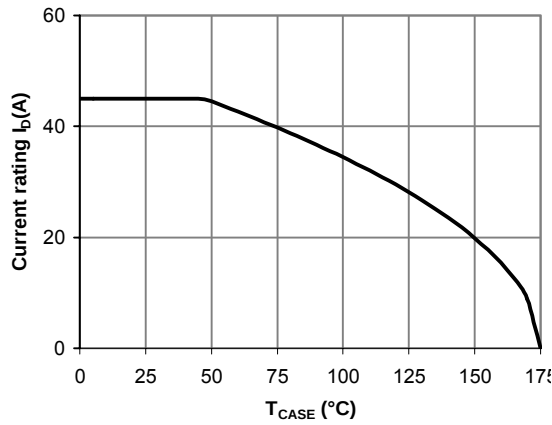


Figure 14: Current De-rating (Note B)

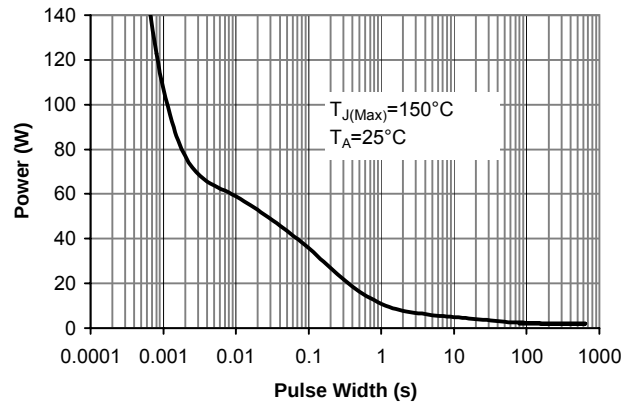


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note G)

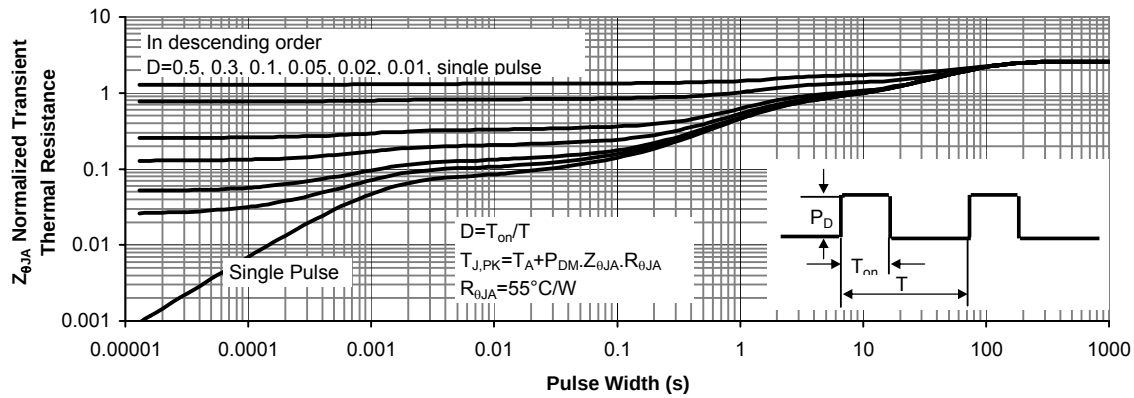


Figure 16: Normalized Maximum Transient Thermal Impedance (Note G)