



ALPHA & OMEGA
SEMICONDUCTOR, LTD.

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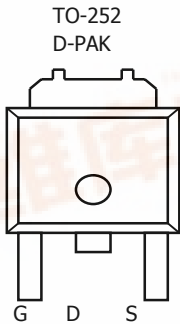
AOD422, AOD422L (Green Product)
N-Channel Enhancement Mode Field Effect Transistor

General Description

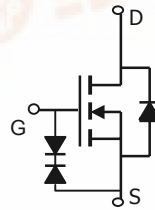
The AOD422 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected. AOD422L (Green Product) is offered in a Lead Free package.

Features

- V_{DS} (V) = 20V
- I_D = 10 A
- $R_{DS(ON)} < 22m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 26m\Omega$ ($V_{GS} = 2.5V$)
- $R_{DS(ON)} < 34m\Omega$ ($V_{GS} = 1.8V$)
- ESD Rating: 2000V HBM



Top View
Drain Connected to
Tab



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ^G	I_D	$T_C=25^\circ C$	10
		$T_C=100^\circ C$	10
Pulsed Drain Current ^C	I_{DM}	30	A
Avalanche Current ^C	I_{AR}	15	A
Repetitive avalanche energy $L=0.1mH$ ^C	E_{AR}	26	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ C$	50
		$T_C=100^\circ C$	20
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 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	16.7	25	$^\circ C/W$
Maximum Junction-to-Ambient ^A		Steady-State	40	50
Maximum Junction-to-Case ^C	$R_{\theta JL}$	1.9	2.5	$^\circ C/W$

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	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V T _J =55°C			1	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±4.5V			±1	μA
		V _{DS} =0V, V _{GS} =±8V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	0.4	0.6	1	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	30			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =10A T _J =125°C		18	22	mΩ
				25	31	
		V _{GS} =2.5V, I _D =8A		21	26	mΩ
	V _{GS} =1.8V, I _D =5A		26	34	mΩ	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A		30		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.76	1	V
I _S	Maximum Body-Diode Continuous Current ^G				10	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		1160		pF
C _{oss}	Output Capacitance			187		pF
C _{rss}	Reverse Transfer Capacitance			146		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =10A		16		nC
Q _{gs}	Gate Source Charge			0.8		nC
Q _{gd}	Gate Drain Charge			3.8		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =5V, V _{DS} =10V, R _L =1Ω, R _{GEN} =3Ω		6.2		ns
t _r	Turn-On Rise Time			12.7		ns
t _{D(off)}	Turn-Off DelayTime			51.7		ns
t _f	Turn-Off Fall Time			16		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=100A/μs		17.6		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=100A/μs		6.5		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 Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any a given application depends on the user's specific board design, and the maximum temperature of 150°C may be used if the PCB allows it to.

B. The power dissipation P_B is based on T_{J(MAX)}=150°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)}=150°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 <300μs pulses, duty cycle 0.5% max.

F. 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.

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

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

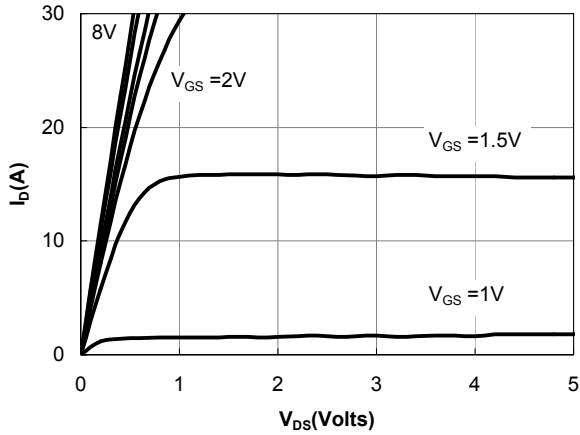


Figure 1: On-Regions Characteristics

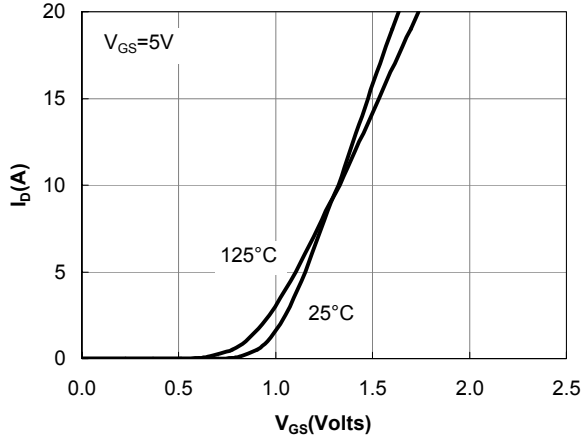


Figure 2: Transfer Characteristics

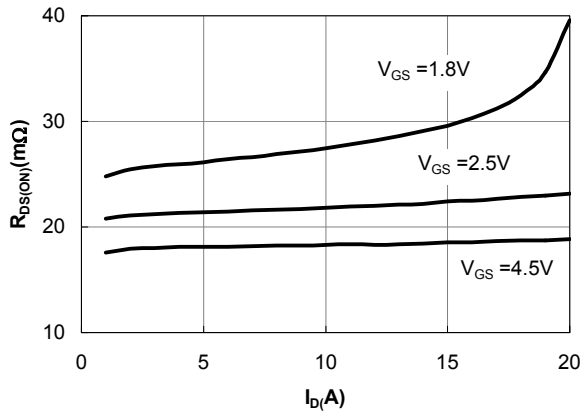


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

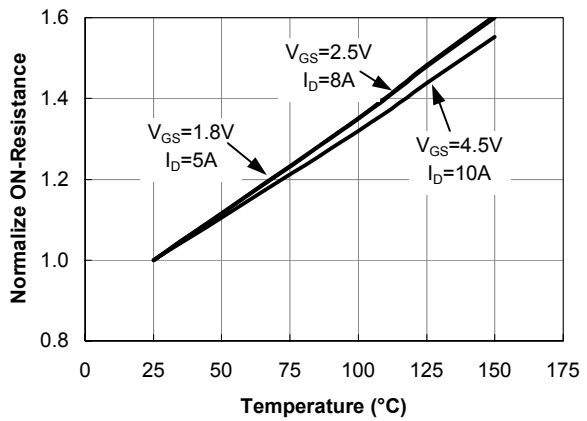


Figure 4: On-Resistance vs. Junction Temperature

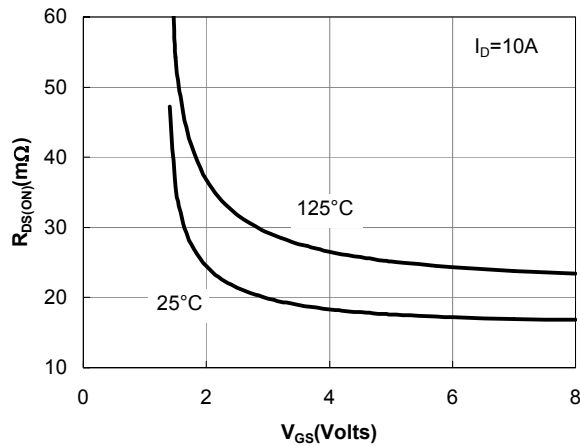


Figure 5: On-Resistance vs. Gate-Source Voltage

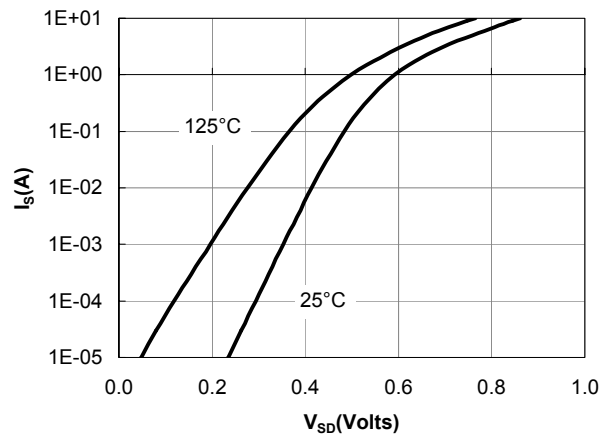


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

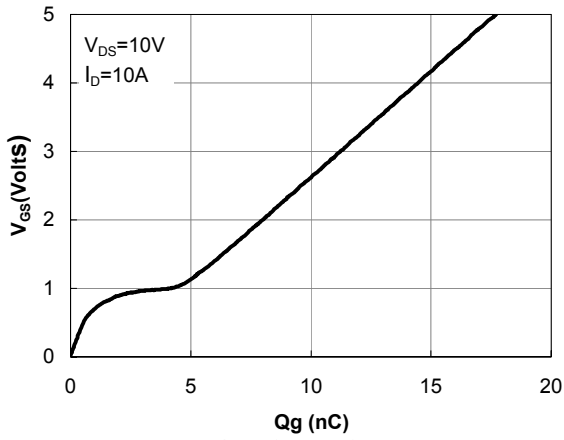


Figure 7: Gate-Charge Characteristics

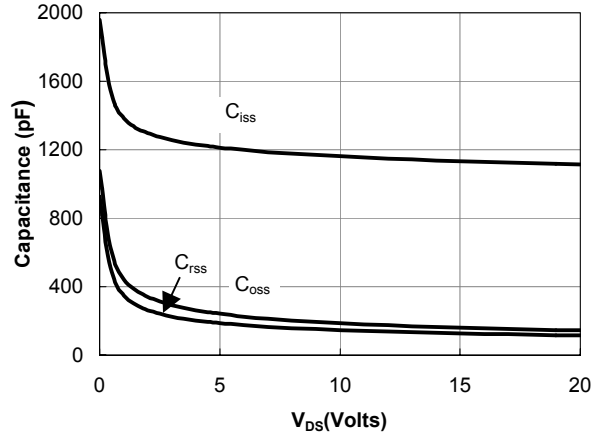


Figure 8: Capacitance Characteristics

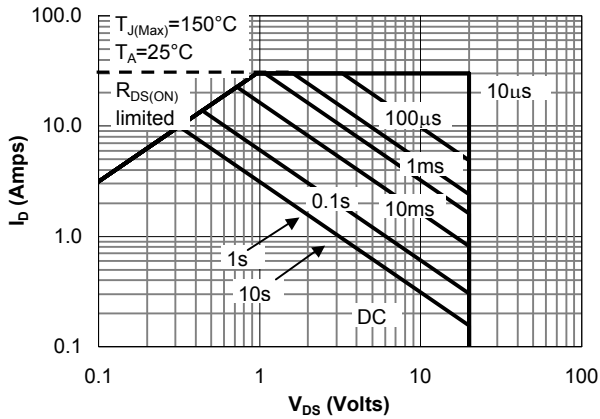


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

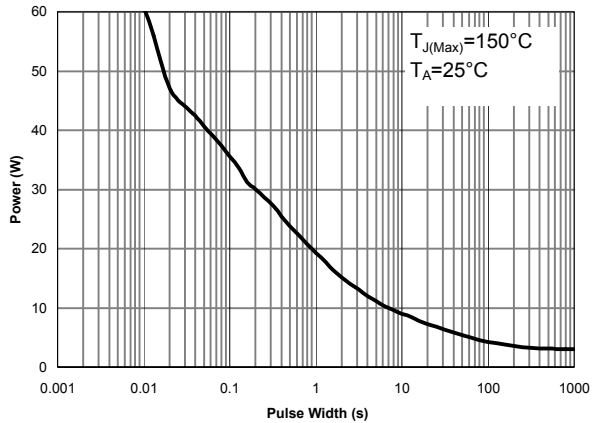


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

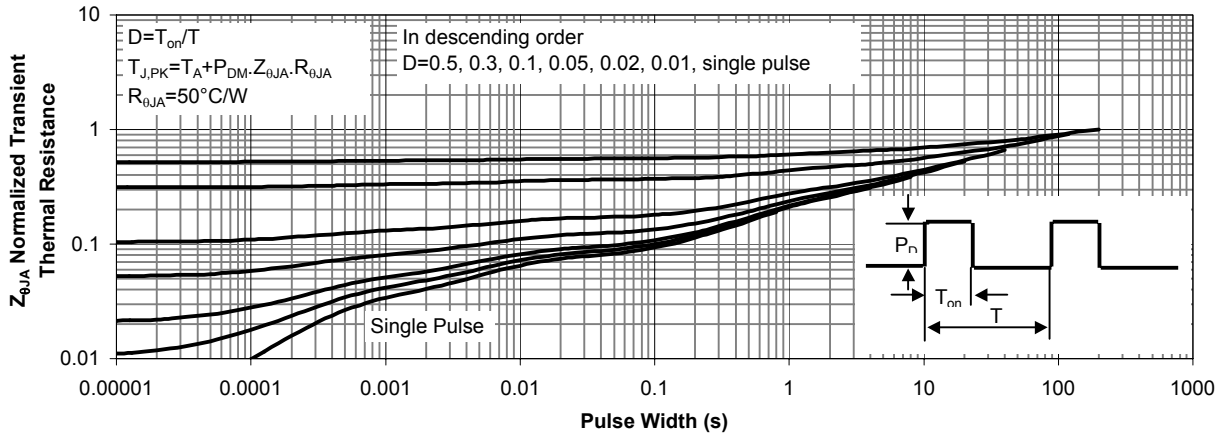


Figure 11: Normalized Maximum Transient Thermal Impedance