

General Description

- Latest Trench Power MOSFET technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Application

- BLDC motors and Battery Management

Product Summary

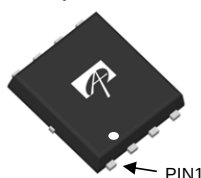
V_{DS}	30V
I_D (at $V_{GS}=10V$)	440A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 0.68m Ω
$R_{DS(ON)}$ (at $V_{GS}=6.5V$)	< 0.75m Ω

100% UIS Tested
100% Rg Tested

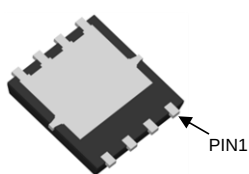


DFN5x6

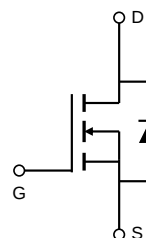
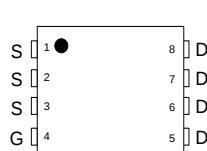
Top View



Bottom View



Top View



Orderable Part Number

AONS74304

Package Type

DFN 5x6

Form

Tape & Reel

Minimum Order Quantity

3000

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}	± 20	V
Continuous Drain Current (silicon)	I_D	440	A
		280	
Pulsed Drain Current ^C	I_{DM}	800	
Continuous Drain Current	I_{DSM}	84	A
		67	
Avalanche Current ^C	I_{AS}	80	A
Avalanche energy $L=0.05\text{mH}$ ^C	E_{AS}	160	mJ
V_{DS} Spike	V_{SPIKE}	36	V
Power Dissipation ^B	P_D	208	W
		83	
Power Dissipation ^A	P_{DSM}	7.3	W
		4.7	
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 ^A	$R_{\theta JA}$	14	17	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		40	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	0.46	0.6	$^\circ\text{C/W}$

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} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.4	1.8	2.2	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		0.55 0.8	0.68 1	mΩ
		V _{GS} =6.5V, I _D =20A		0.57	0.75	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		115		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.65	1	V
I _S	Maximum Body-Diode Continuous Current ^G				200	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		9000		pF
C _{oss}	Output Capacitance			2300		pF
C _{rss}	Reverse Transfer Capacitance			2100		pF
R _g	Gate resistance	f=1MHz		2.2	3.3	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =20A		180	325	nC
Q _{gs}	Gate Source Charge			18		nC
Q _{gd}	Gate Drain Charge			70		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		14		ns
t _r	Turn-On Rise Time			24		ns
t _{D(off)}	Turn-Off DelayTime			106		ns
t _f	Turn-Off Fall Time			68		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=500A/μs		26		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=500A/μs		75		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} ≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.
- B. The power dissipation P_D 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. Single pulse width 260us 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 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)}=150° C. The SOA curve provides a single pulse rating.
- G. 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

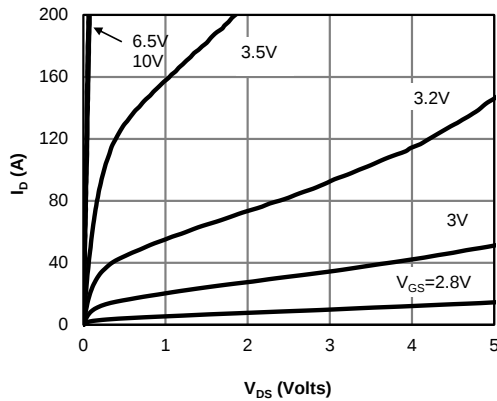


Figure 1: On-Region Characteristics (Note E)

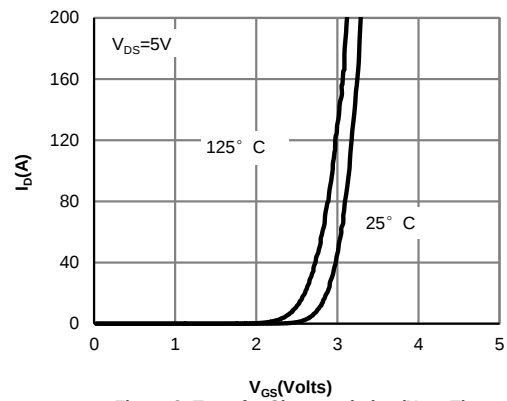


Figure 2: Transfer Characteristics (Note E)

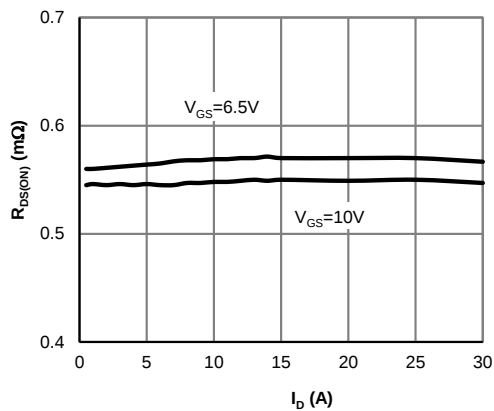


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

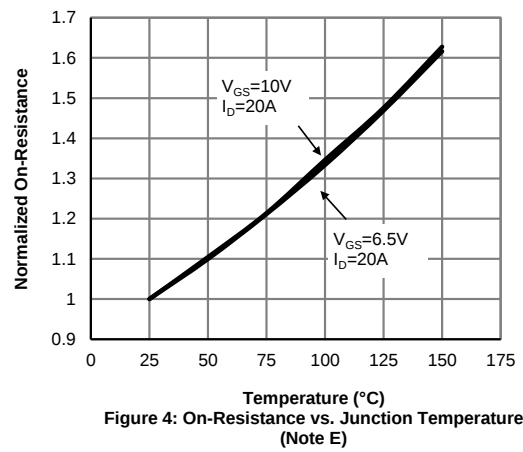


Figure 4: On-Resistance vs. Junction Temperature (Note E)

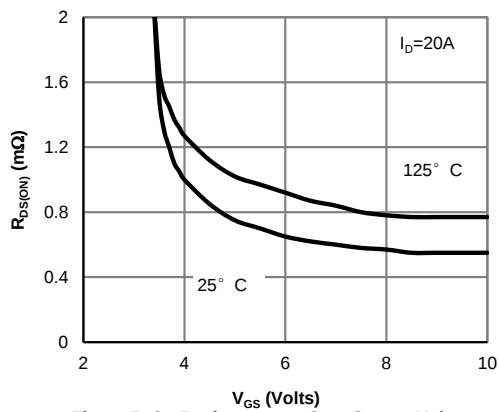


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

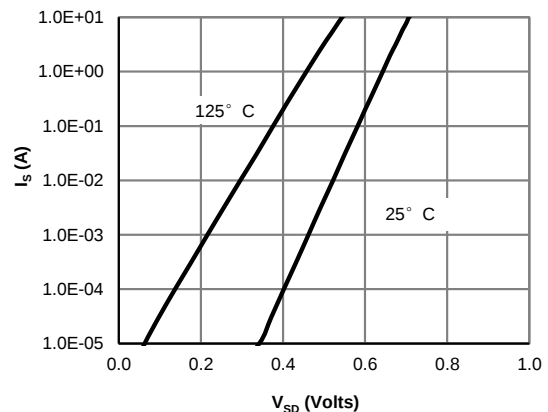
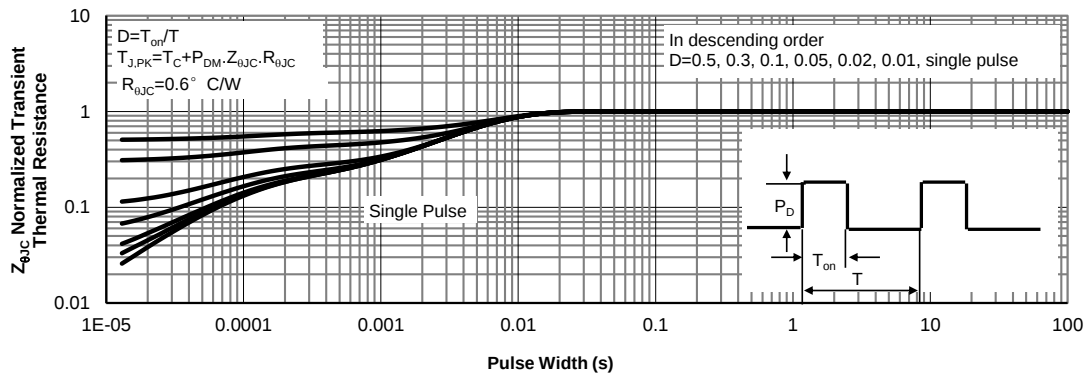
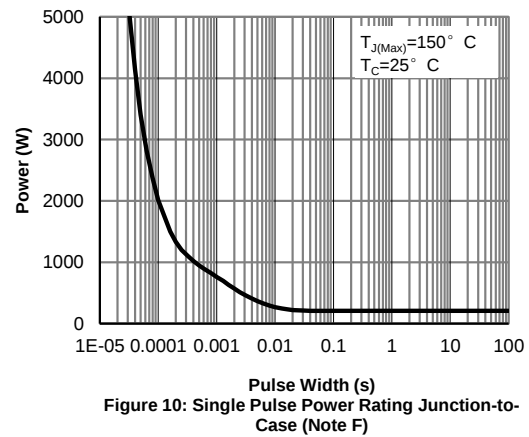
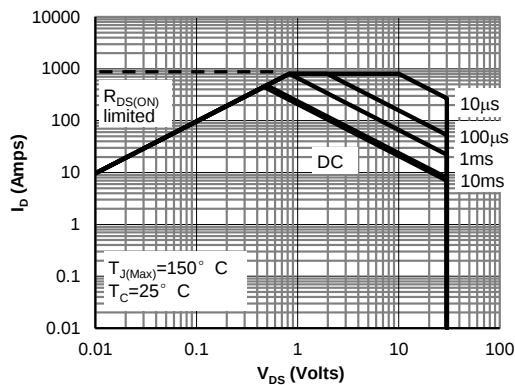
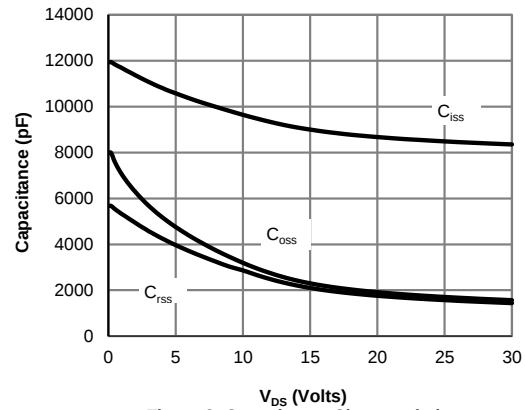
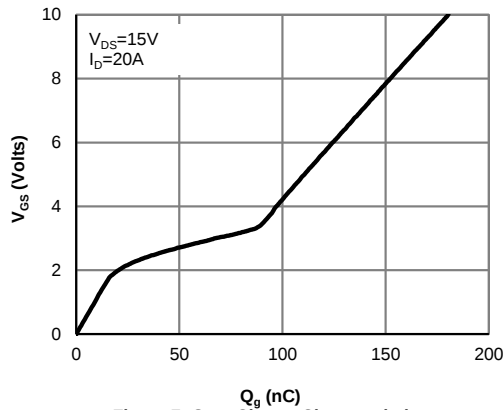


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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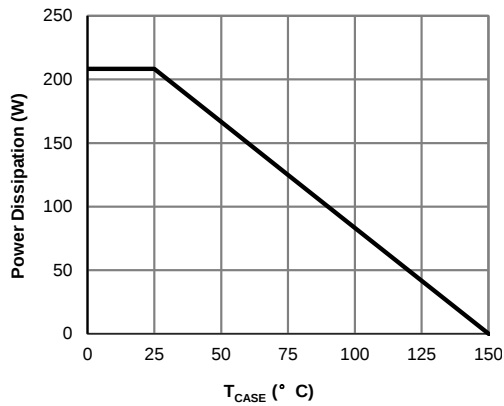


Figure 12: Power De-rating (Note F)

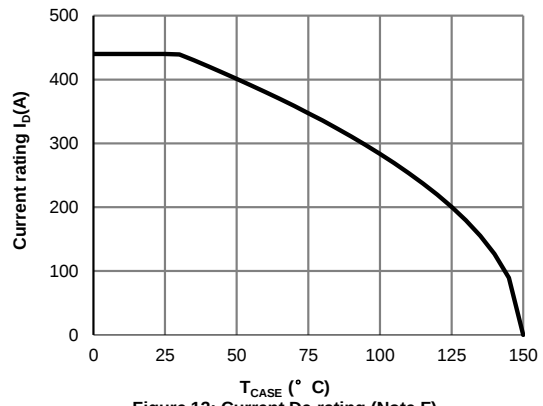


Figure 13: Current De-rating (Note F)

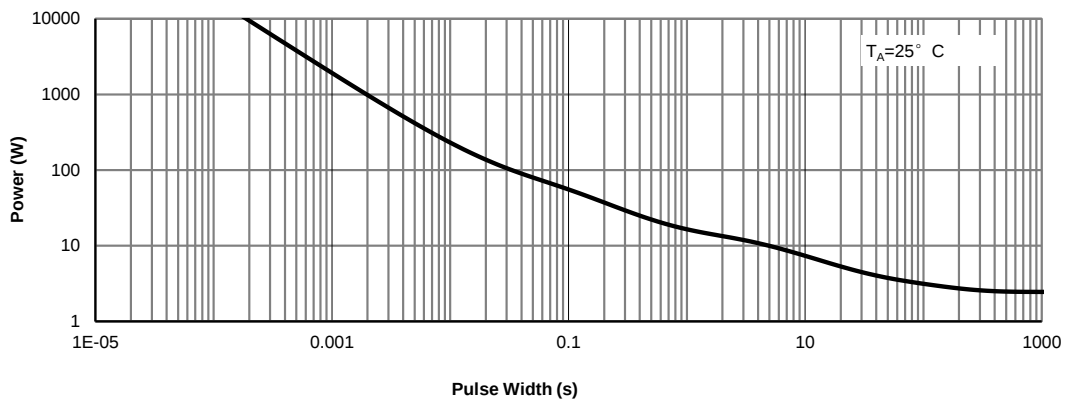


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

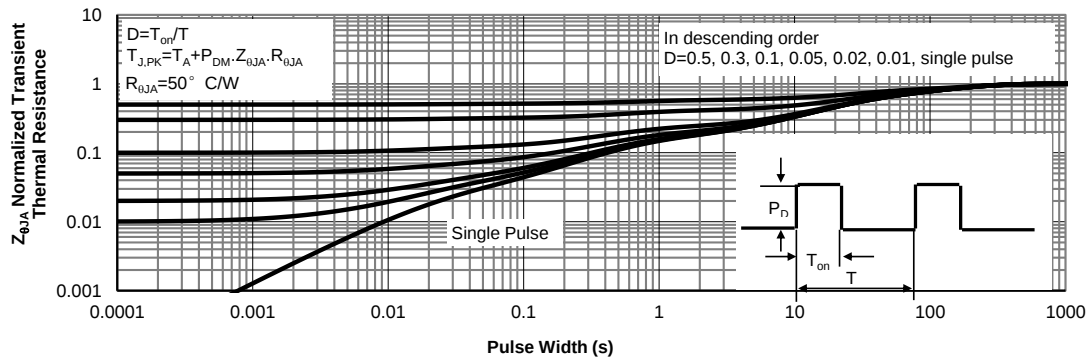
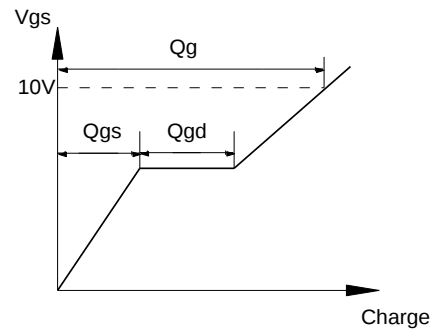
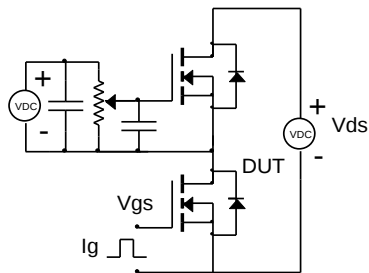
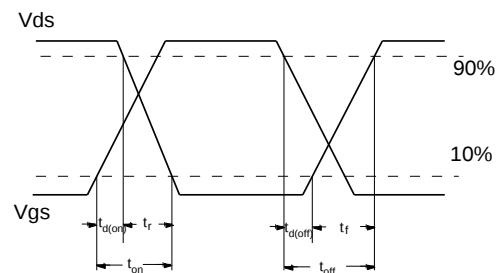
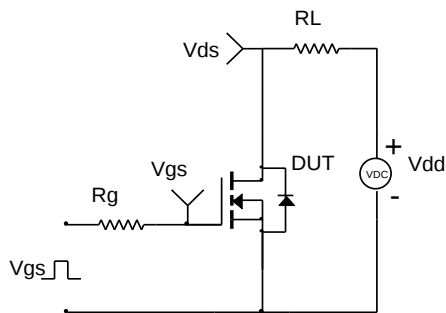


Figure 15: Normalized Maximum Transient Thermal Impedance (Note G)

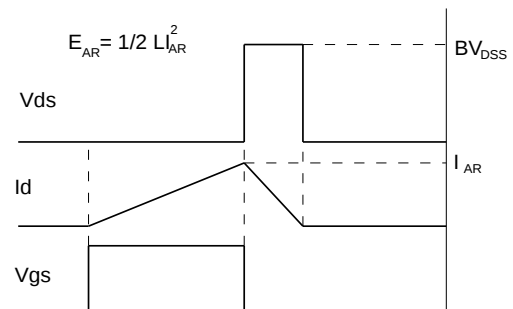
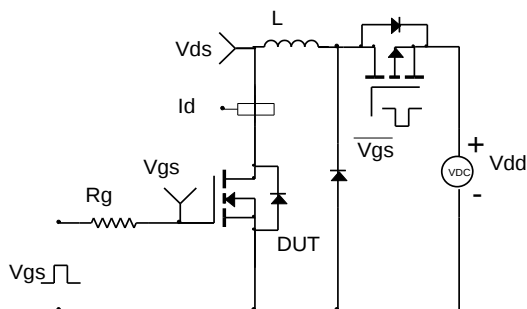
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

