AO3162

600V,0.034A N-Channel MOSFET

General Description

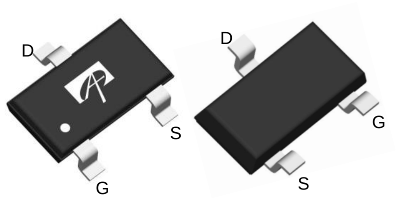
The AO3162 is fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications.
By providing low $R_{DS(on)}$, C_{iss} and C_{rss} along with guaranteed avalanche capability this device can be adopted quickly into new and existing offline power supply designs.

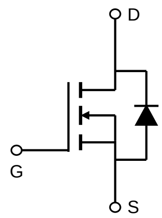
Product Summary

V_{DS}	700V@150℃
I_D (at V_{GS}=10V)	0.034A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 500Ω

SOT23A

Top View   Bottom View





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current[A,F]	T_A=25°C	I_D	0.034	A
	T_A=70°C		0.028	
Pulsed Drain Current [B]		I_{DM}	0.16	
Peak diode recovery dv/dt		dv/dt	5	V/ns
Power Dissipation [A]	T_A=25°C	P_D	1.39	W
	T_A=70°C		0.89	
Junction and Storage Temperature Range		T_J, T_{STG}	-50 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	70	90	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		100	125	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	63	80	°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, T_J=25°C	600	-	-	V
		I_D=250µA, V_{GS}=0V, T_J=150°C	-	700	-	
BV_{DSS} /ΔTJ	Zero Gate Voltage Drain Current	ID=250µA, VGS=0V	-	0.69	-	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V, V_{GS}=0V	-	-	1	µA
		V_{DS}=480V, T_J=125°C	-	-	10	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=5V, I_D=8µA	2.8	3.2	4.1	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=0.016A	-	154	500	Ω
g_{FS}	Forward Transconductance	V_{DS}=40V, I_D=0.016A	-	0.045	-	S
V_{SD}	Diode Forward Voltage	I_S=0.016A,V_{GS}=0V	-	0.74	1	V
I_S	Maximum Body-Diode Continuous Current		-	-	0.034	A
I_{SM}	Maximum Body-Diode Pulsed Current		-	-	0.16	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	4.2	6	pF
C_{oss}	Output Capacitance		-	0.45	0.6	pF
C_{rss}	Reverse Transfer Capacitance		-	0.05	0.07	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	14	28	42	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=400V, I_D=0.01A	-	0.1	0.15	nC
Q_{gs}	Gate Source Charge		-	0.03	0.05	nC
Q_{gd}	Gate Drain Charge		-	0.05	0.08	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=300V, I_D=0.01A, R_G=6Ω	-	13.8	20	ns
t_r	Turn-On Rise Time		-	10	15	ns
$t_{D(off)}$	Turn-Off DelayTime		-	39.2	57	ns
t_f	Turn-Off Fall Time		-	13	19	ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=0.016A,dI/dt=100A/µs,V_{DS}=300V	-	105	160	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=0.016A,dI/dt=100A/µs,V_{DS}=300V	-	9.5	14.3	nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A=25° 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 impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
E. 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.
F. The current rating is based on the t ≤ 10s thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

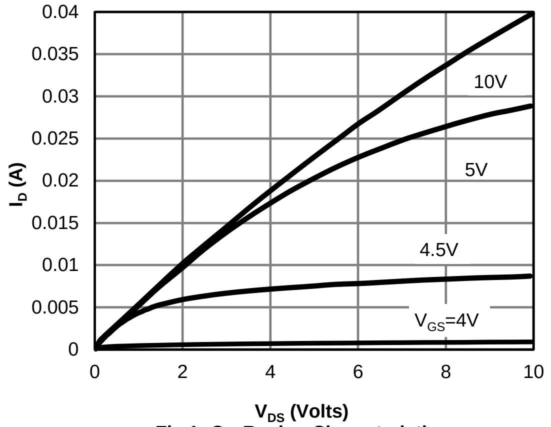


Fig 1: On-Region Characteristics

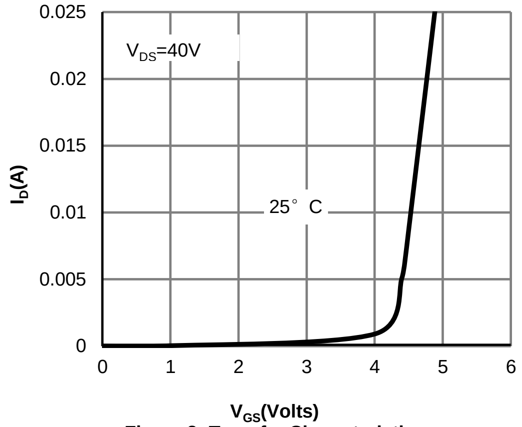


Figure 2: Transfer Characteristics

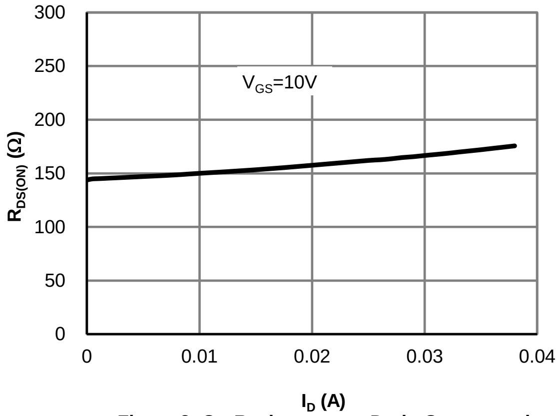


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

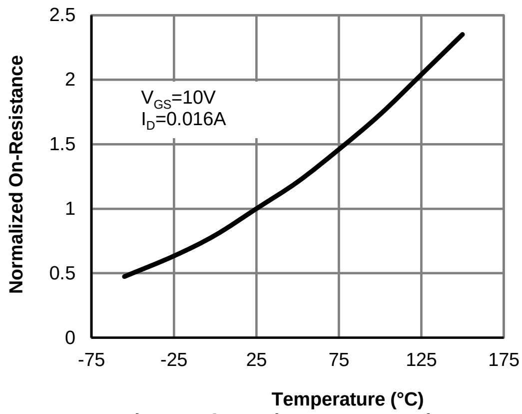


Figure 4: On-Resistance vs. Junction Temperature

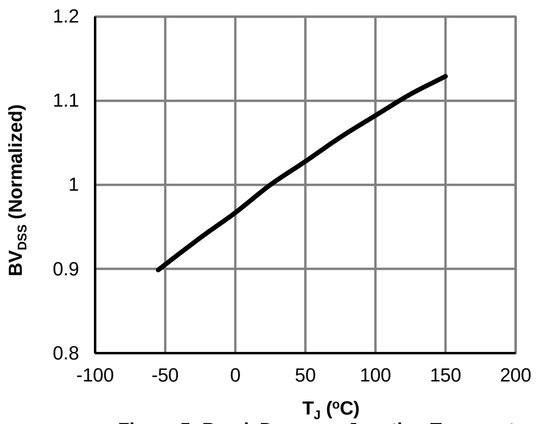


Figure 5: Break Down vs. Junction Temperature

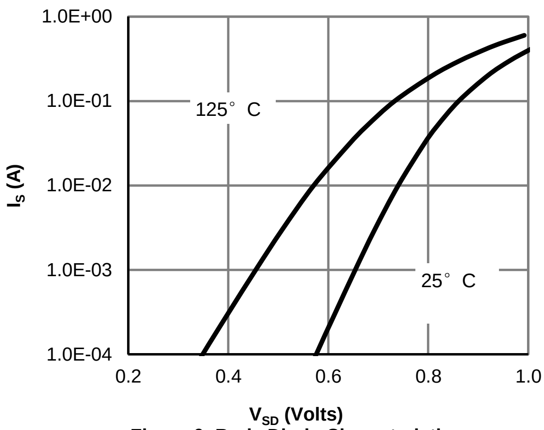


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

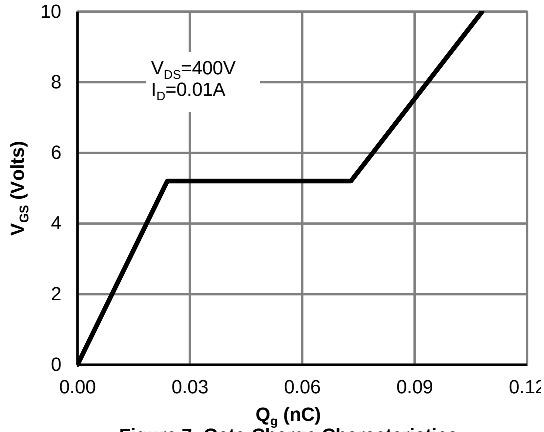


Figure 7: Gate-Charge Characteristics

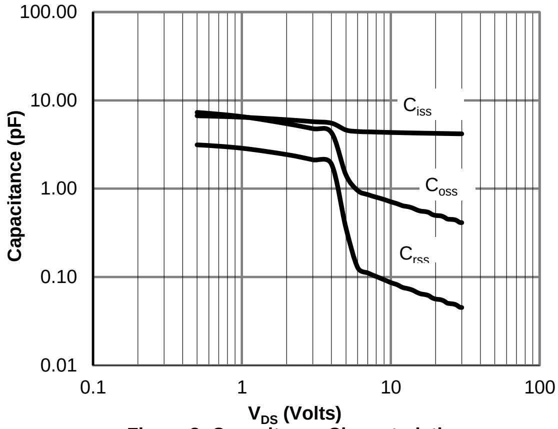


Figure 8: Capacitance Characteristics

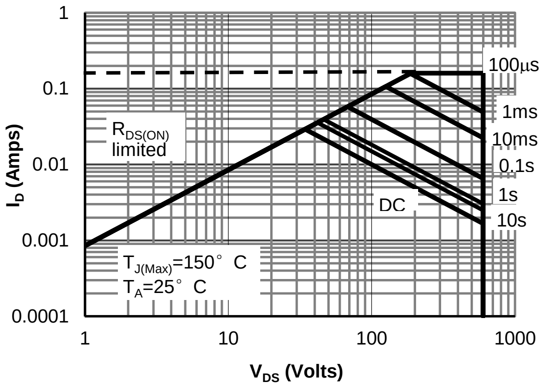


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

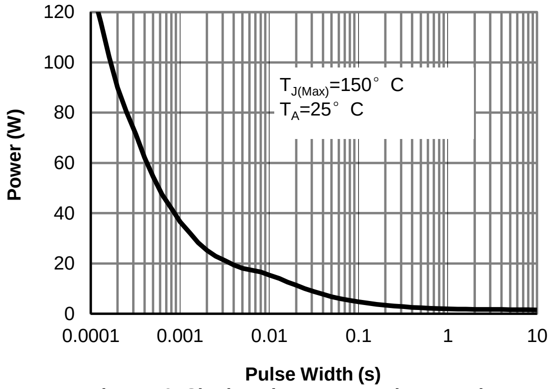


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

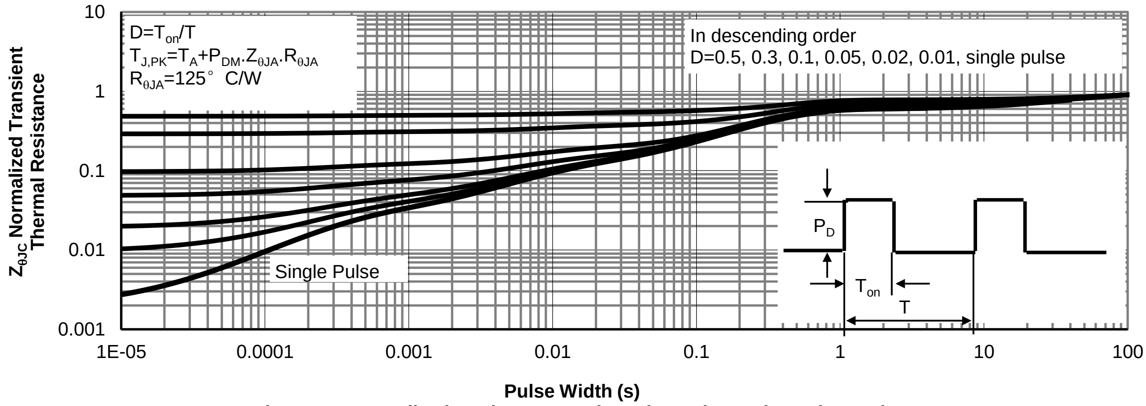
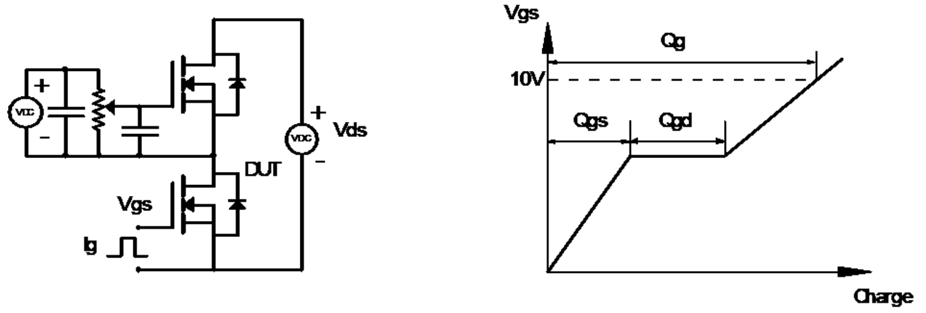
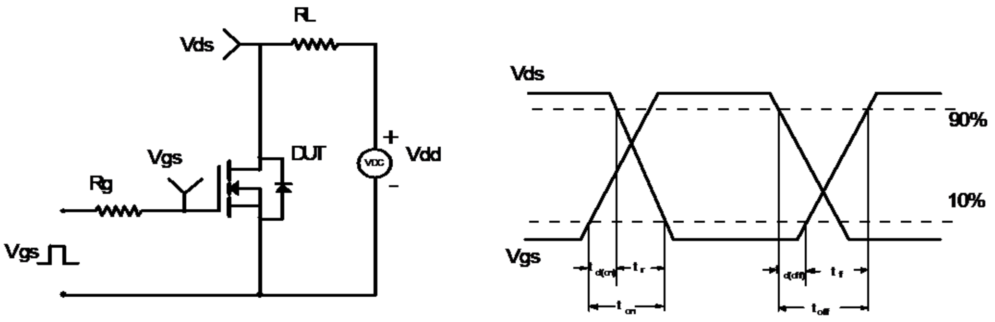


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

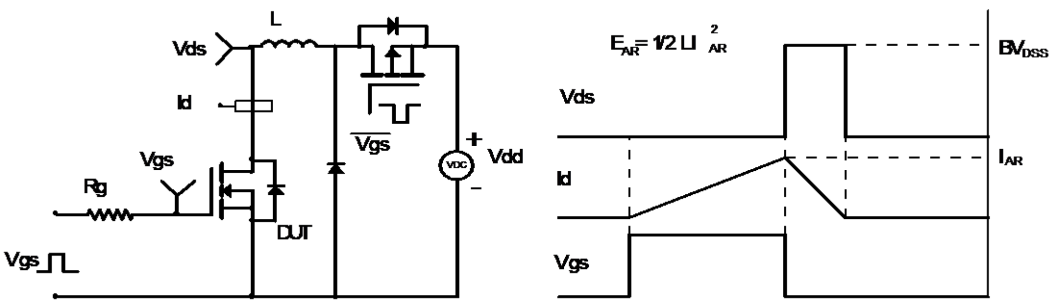
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms