

General Description

- Logic Level Driving 4.5V
- ESD Protection
- RoHS and Halogen Free Compliant

Applications

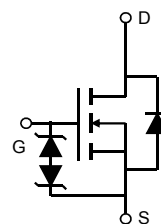
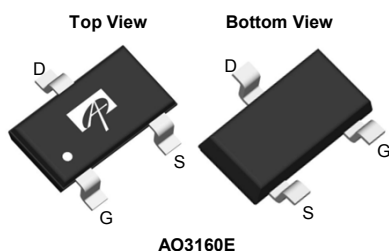
- Load Switch

Product Summary

$V_{DS} @ T_{j,max}$	700V
I_D (at $V_{GS}=10V$)	0.04A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 500 Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 600 Ω

Typical ESD protection

HBM Class 2



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AO3160E	SOT23A	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{A,F}	I_D	$T_A=25^\circ\text{C}$	0.04
		$T_A=70^\circ\text{C}$	0.03
Pulsed Drain Current ^B	I_{DM}	0.12	A
Peak diode recovery dv/dt	dv/dt	5	V/ns
Power Dissipation ^A	P_D	$T_A=25^\circ\text{C}$	1.39
		$T_A=70^\circ\text{C}$	0.89
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	T_L	300	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typical	Maximum	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	70	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	100	125
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	63	80	$^\circ\text{C/W}$

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, T _J =25°C	600	-	-	V
		I _D =250μA, V _{GS} =0V, T _J =150°C	-	700	-	
BV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, V _{GS} =0V	-	0.68	-	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} =±20V	-	-	±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =8μA	1.4	2	3.2	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =0.016A	-	176	500	Ω
		V _{GS} =4.5V, I _D =0.016A	-	178	600	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =0.016A	-	0.125	-	S
V _{SD}	Diode Forward Voltage	I _S =0.016A, V _{GS} =0V	-	0.76	1	V
I _S	Maximum Body-Diode Continuous Current		-	-	0.04	A
I _{SM}	Maximum Body-Diode Pulsed Current ^C		-	-	0.12	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	9.5	-	pF
C _{oss}	Output Capacitance		-	1.7	-	pF
C _{rss}	Reverse Transfer Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	0.6	-	pF
R _g	Gate resistance	f=1MHz	-	20	-	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =400V, I _D =0.01A	-	0.9	-	nC
Q _{gs}	Gate Source Charge		-	0.09	-	nC
Q _{gd}	Gate Drain Charge		-	0.49	-	nC
T _{d(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =300V, I _D =0.01A, R _G =6Ω	-	4	-	ns
T _r	Turn-On Rise Time		-	5	-	ns
T _{d(off)}	Turn-Off DelayTime		-	13	-	ns
T _f	Turn-Off Fall Time		-	55	-	ns
T _{rr}	Body Diode Reverse Recovery Time		I _F =0.016A, dI/dt=100A/μs,	-	105	-
Q _{rr}	Body Diode Reverse Recovery Charge	V _{DS} =300V	-	9.5	-	nC

A. The value of R_{qJA} is measured with the device mounted on 1 in² 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_{qJA} is the sum of the thermal impedance from junction to lead R_{qJL} and lead to ambient.

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

E. 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.

F. The current rating is based on the t ≤ 10s thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

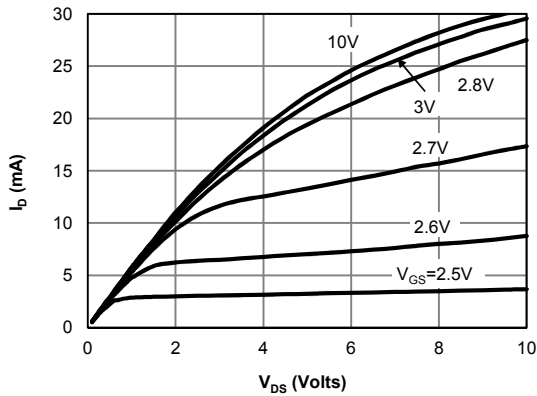


Figure 1: On-Region Characteristics

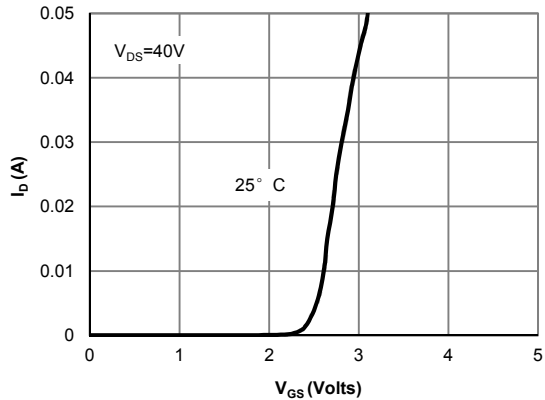


Figure 2: Transfer Characteristics

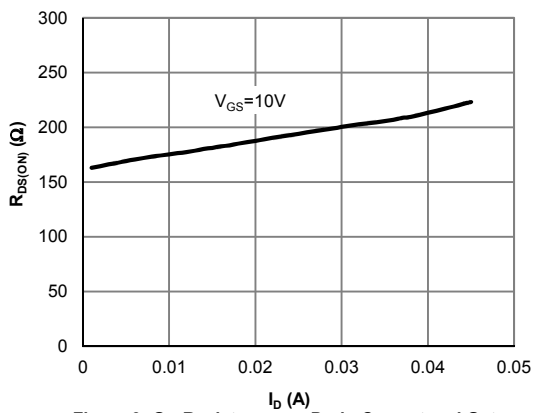


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

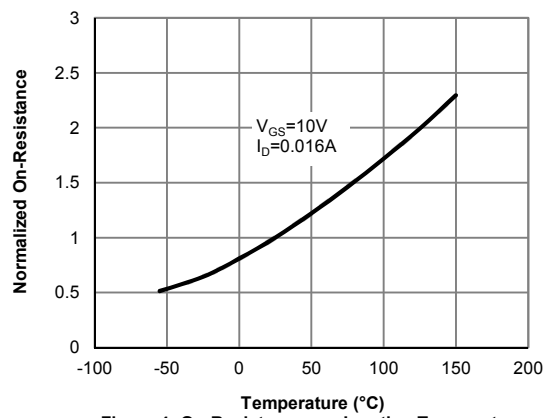


Figure 4: On-Resistance vs. Junction Temperature

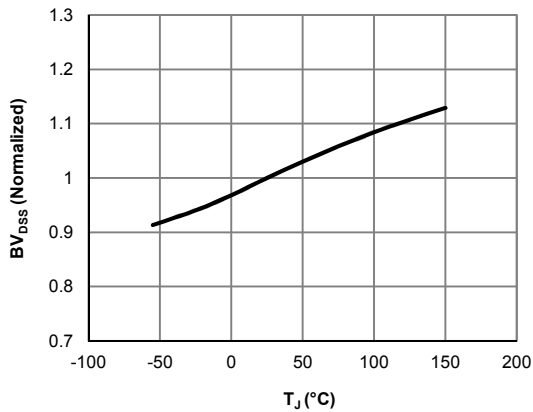


Figure 5: Break Down vs. Junction Temperature

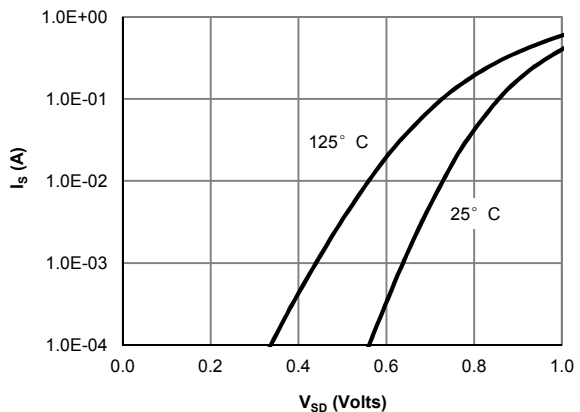


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

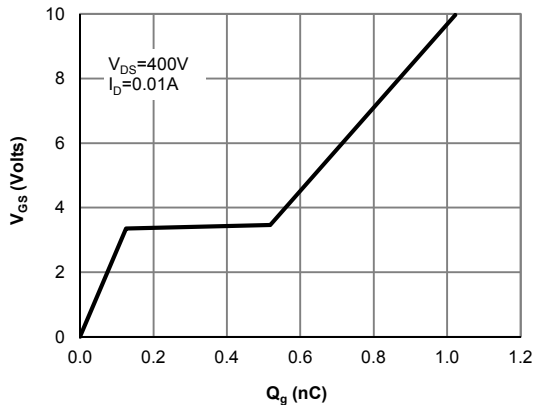


Figure 7: Gate-Charge Characteristics

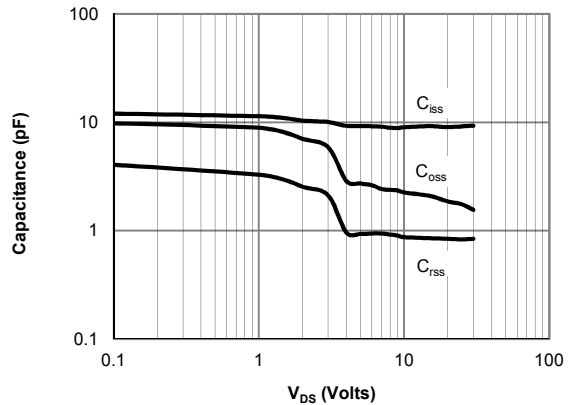


Figure 8: Capacitance Characteristics

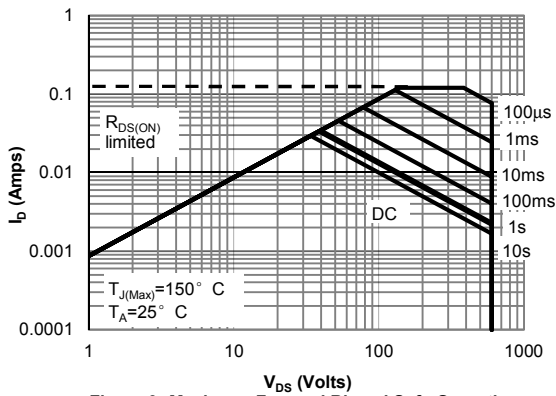


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

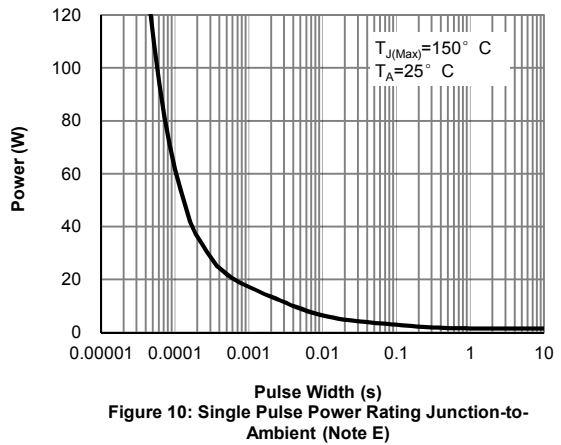


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

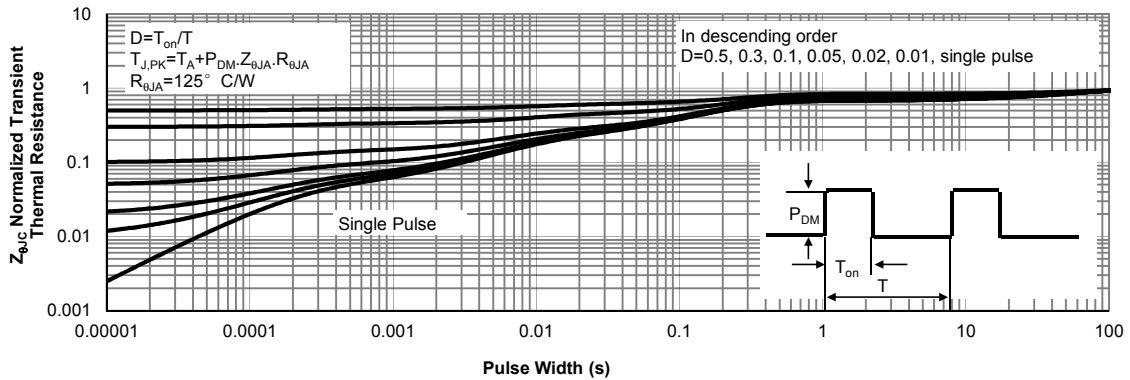
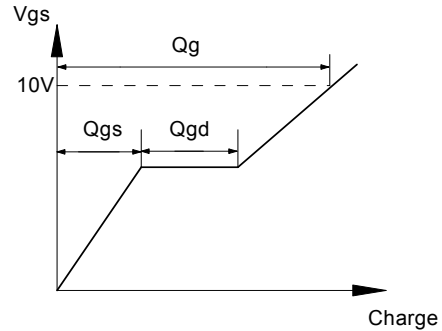
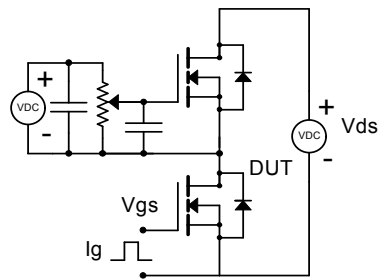
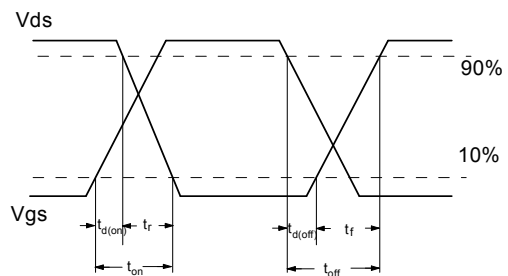
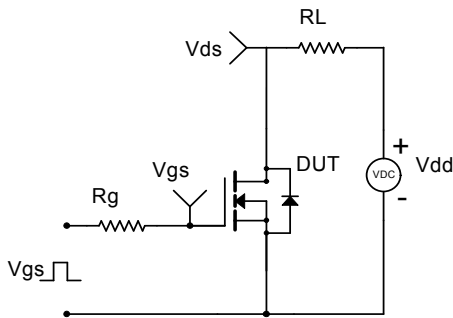


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

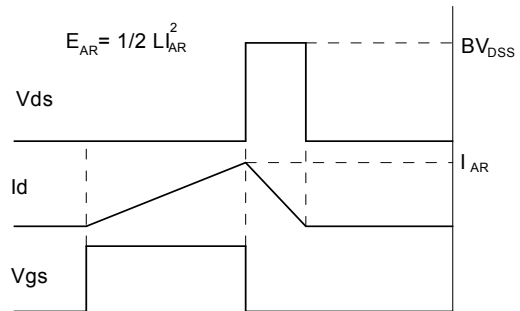
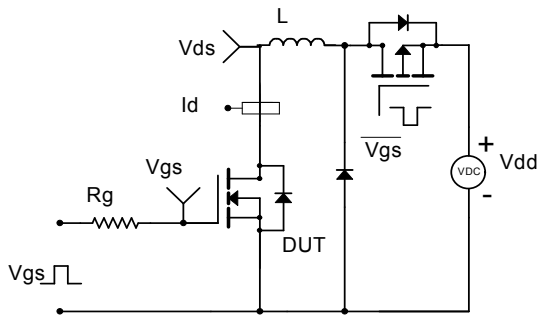
Gate Charge Test Circuit & Waveform



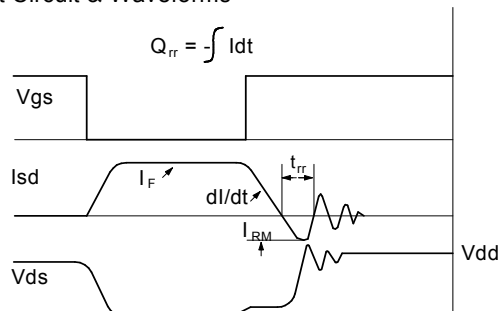
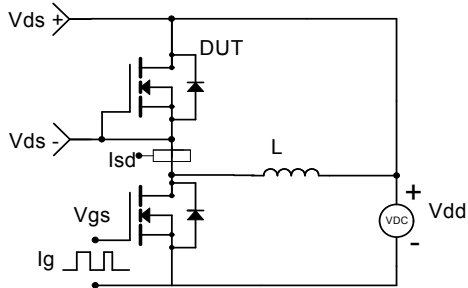
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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