AOD2C60

General Description

- Trench Power AlphaMOS-II technology
- Low $R_{DS(ON)}$
- Low Ciss and Crss
- High Current Capability
- RoHS and Halogen Free Compliant

Applications

- General Lighting for LED and CCFL
- AC/DC Power supplies for Industrial, Consumer, and Telecom

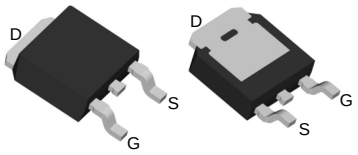
Product Summary

V_{DS} @ $T_{j,max}$	700V
I_{DM}	8A
$R_{DS(ON),max}$	< 3.3Ω
$Q_{g,typ}$	5.1nC
E_{oss} @ 400V	1.2µJ

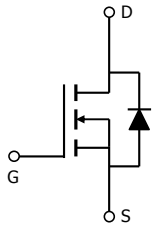
100% UIS Tested
100% R_g Tested

TO-252
DPAK

Top View **Bottom View**



AOD2C60



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOD2C60	TO-252	Tape & Reel	2500

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C=25℃	I_D	2	A
	T_C=100℃		1.6	
Pulsed Drain Current [C]		I_{DM}	8	
Avalanche Current [C] L=1mH		I_{AR}	2	A
Repetitive avalanche energy [C]		E_{AR}	2	mJ
Single pulsed avalanche energy [H]		E_{AS}	87	mJ
MOSFET dv/dt ruggedness		dv/dt	100	V/ns
Peak diode recovery dv/dt			20	
Power Dissipation [B]	T_C=25℃	P_D	52	W
	Derate above 25°C		0.4	W/℃
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		T_L	300	℃

Thermal Characteristics

Parameter	Symbol	Typical	Maximum	Units
Maximum Junction-to-Ambient [A,D]	$R_{\theta JA}$	45	55	℃/W
Maximum Case-to-sink [A]	$R_{\theta CS}$	-	0.5	℃/W
Maximum Junction-to-Case[D,F]	$R_{\theta JC}$	2	2.4	℃/W

Electrical Characteristics (T_J=25℃ 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℃	600			V
		I_D=250μA, V_{GS}=0V, T_J=150℃		700		
BV_{DSS} /ΔTJ	Breakdown Voltage Temperature Coefficient	I_D=250μA, V_{GS}=0V		0.59		V/ °C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V, V_{GS}=0V			1	μA
		V_{DS}=480V, T_J=125℃			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=250μA	3	4.5	5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=0.5A		2.7	3.3	Ω
g_{FS}	Forward Transconductance	V_{DS}=40V, I_D=1A		1.8		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.81	1	V
I_S	Maximum Body-Diode Continuous Current				2	A
I_{SM}	Maximum Body-Diode Pulsed Current [C]				8	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz		304		pF
C_{oss}	Output Capacitance			15		pF
$C_{o(er)}$	Effective output capacitance, energy related [I]	V_{GS}=0V, V_{DS}=0 to 480V, f=1MHz		15		pF
$C_{o(tr)}$	Effective output capacitance, time related [J]			22		pF
C_{rss}	Reverse Transfer Capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz		1		pF
R_g	Gate resistance	f=1MHz		6.8		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=480V, I_D=2A		5.1	10	nC
Q_{gs}	Gate Source Charge			2.3		nC
Q_{gd}	Gate Drain Charge			1		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=300V, I_D=2A, R_G=25Ω		18		ns
t_r	Turn-On Rise Time			13		ns
$t_{D(off)}$	Turn-Off DelayTime			21		ns
t_f	Turn-Off Fall Time			16		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=2A,dI/dt=100A/μs,V_{DS}=100V		224		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=2A,dI/dt=100A/μs,V_{DS}=100V		1.3		μC

A. The value of R_{qJA} is measured with the device in a still air environment with T_A=25℃.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150℃ in a TO252 package, 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℃.

D. The R_{qJA} is the sum of the thermal impedance from junction to case R_{qJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300 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 $T_{J(MAX)}$=150℃.

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℃.

H. L=60mH, I_{AS}=1.7A, V_{DD}=150V, R_G=10Ω, Starting T_J=25℃.

I. $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.

J. $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

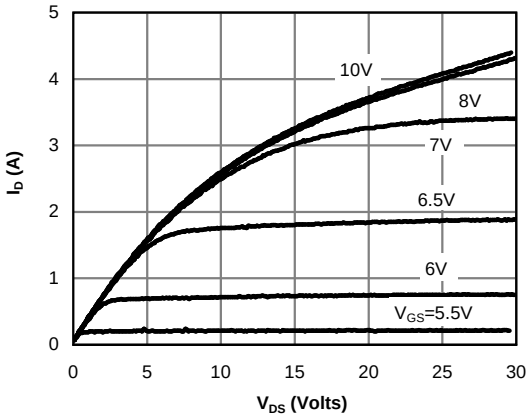


Figure 1: On-Region Characteristics

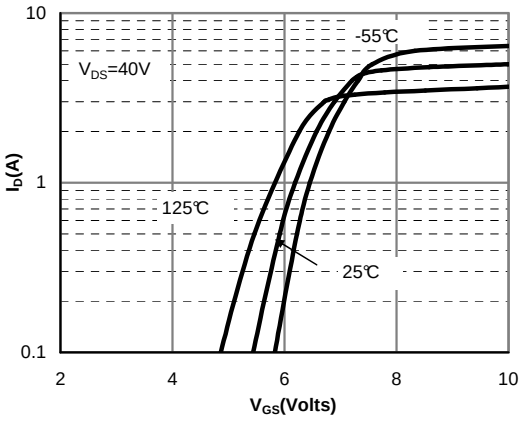


Figure 2: Transfer Characteristics

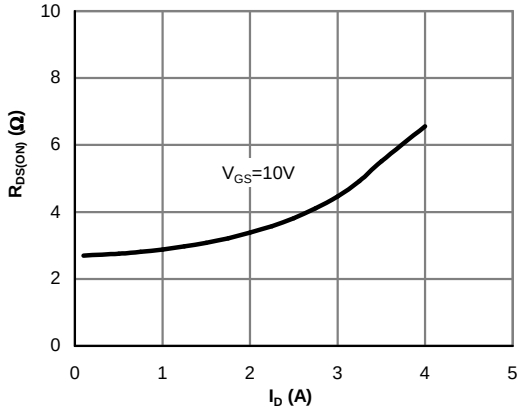


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

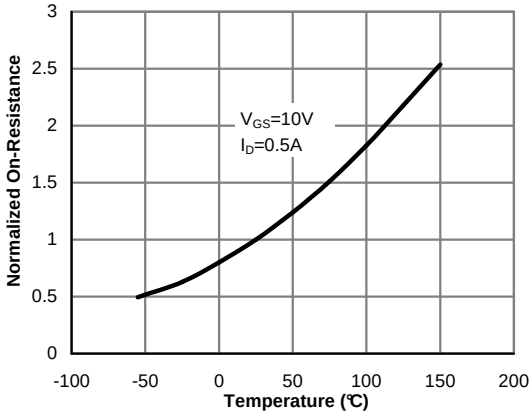


Figure 4: On-Resistance vs. Junction Temperature

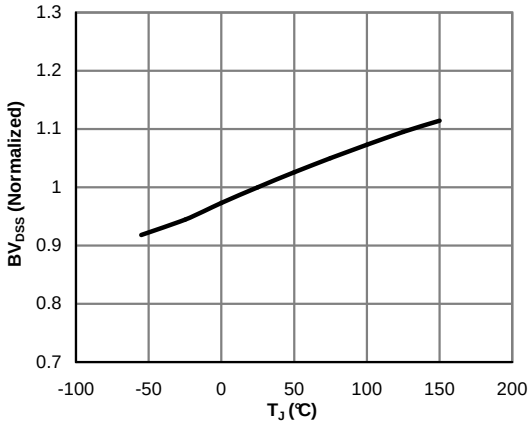


Figure 5: Break Down vs. Junction Temparature

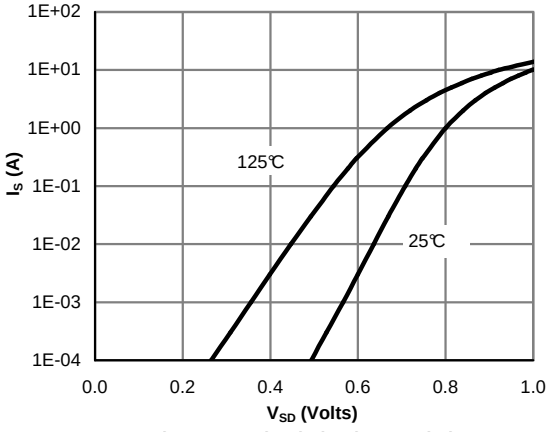


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

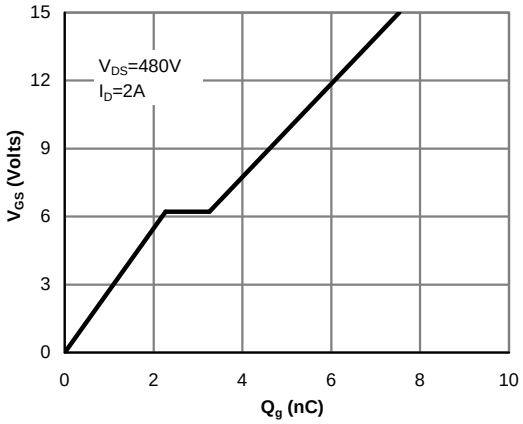


Figure 7: Gate-Charge Characteristics

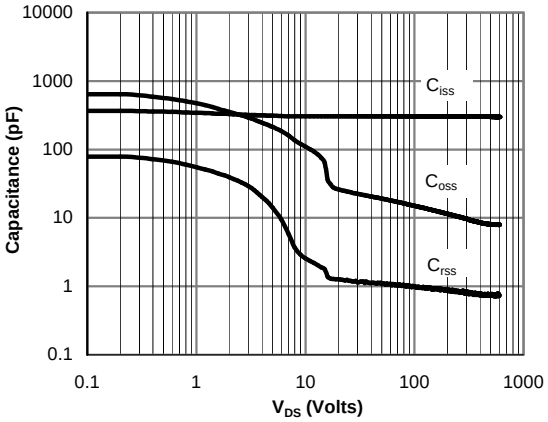


Figure 8: Capacitance Characteristics

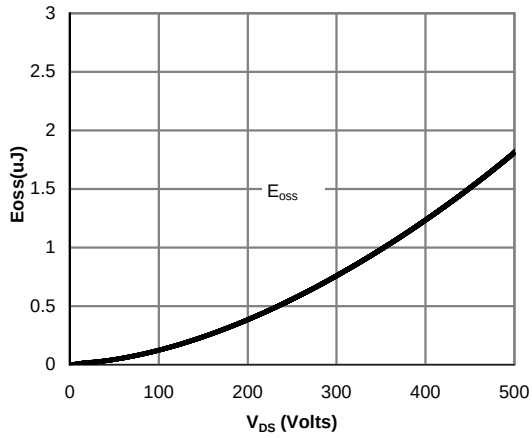


Figure 9: Coss stored Energy

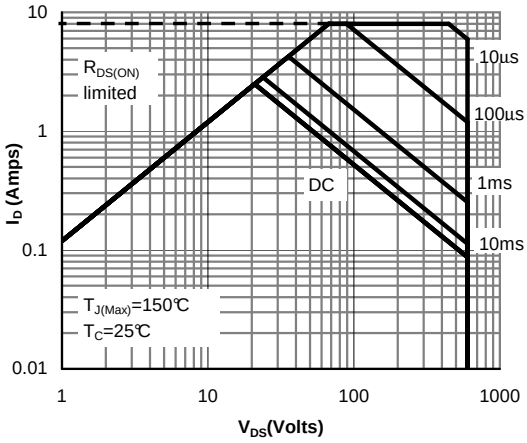


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

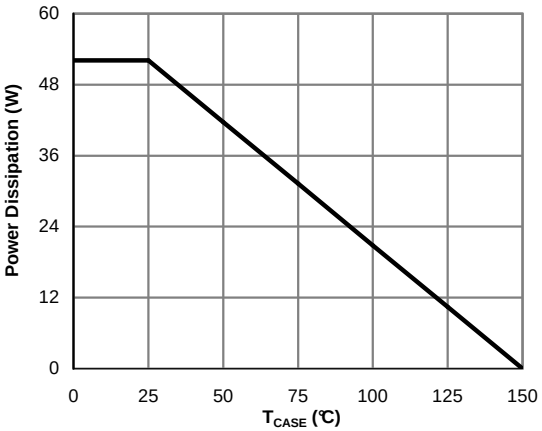


Figure 11: Power De-rating (Note B)

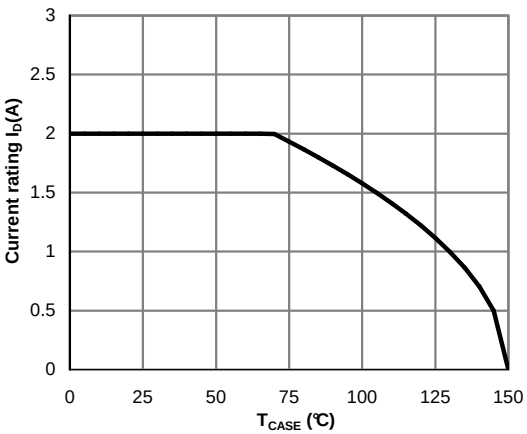


Figure 12: Current De-rating (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

AOD2C60

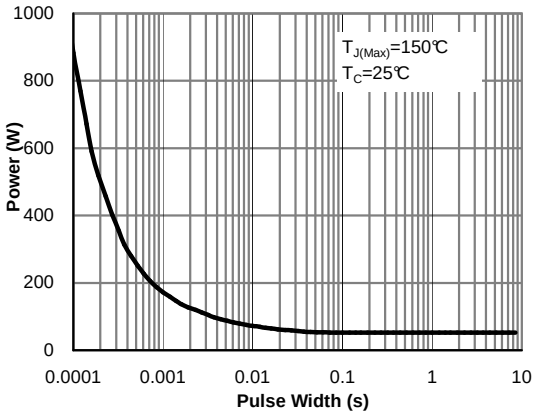


Figure 13: Single Pulse Power Rating Junction-to-Case (Note F)

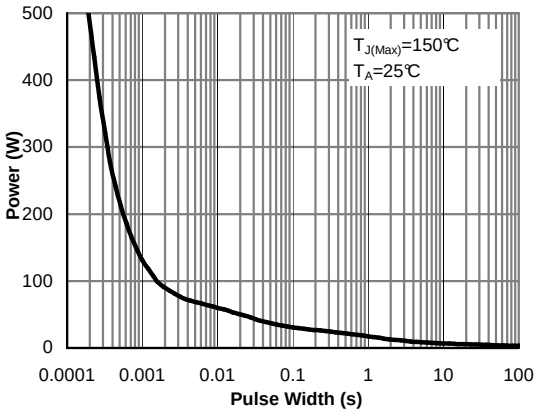


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

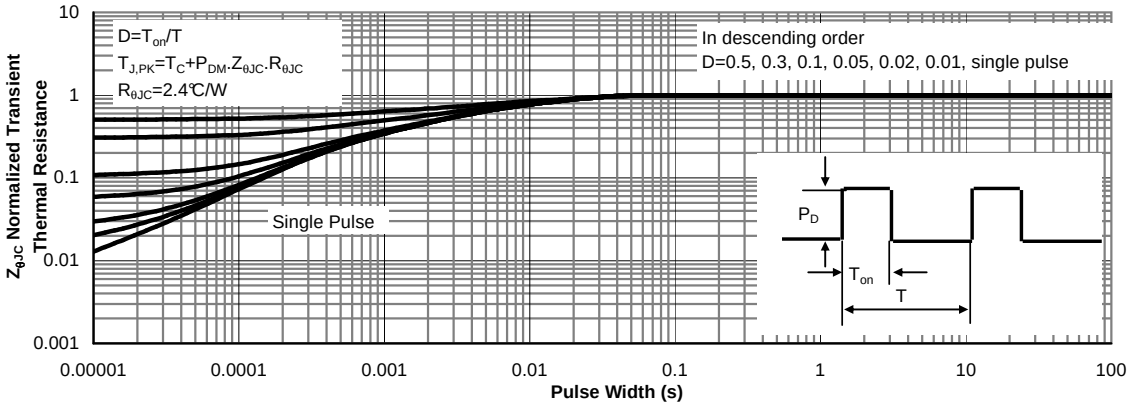


Figure 15: Normalized Maximum Transient Thermal Impedance (Note F)

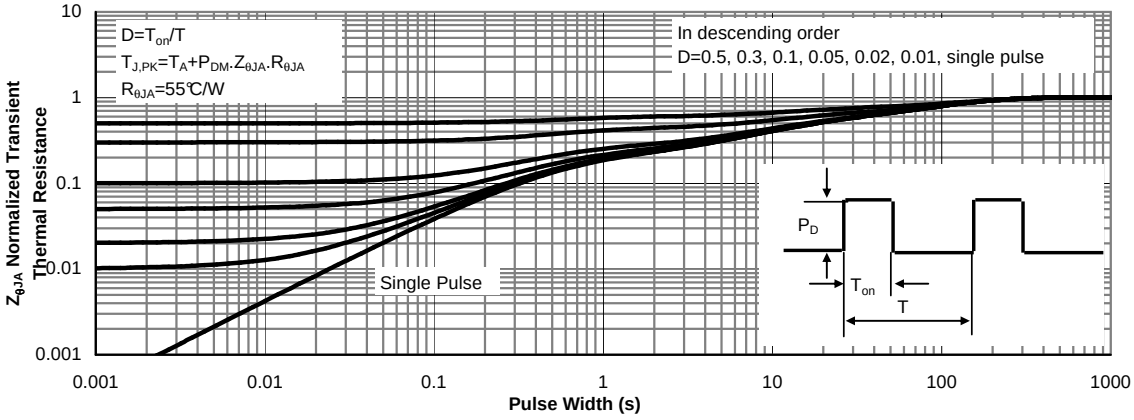
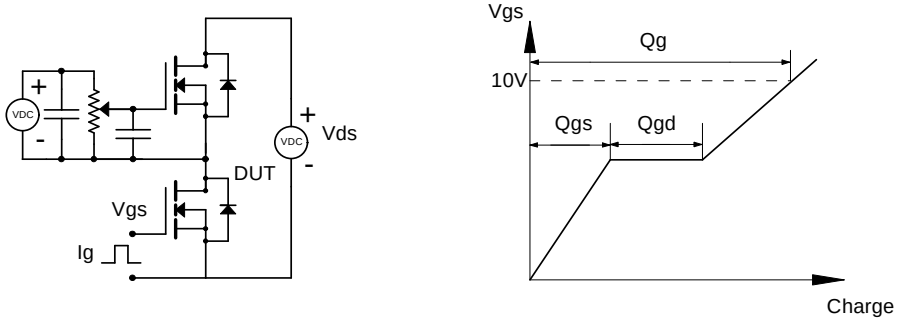
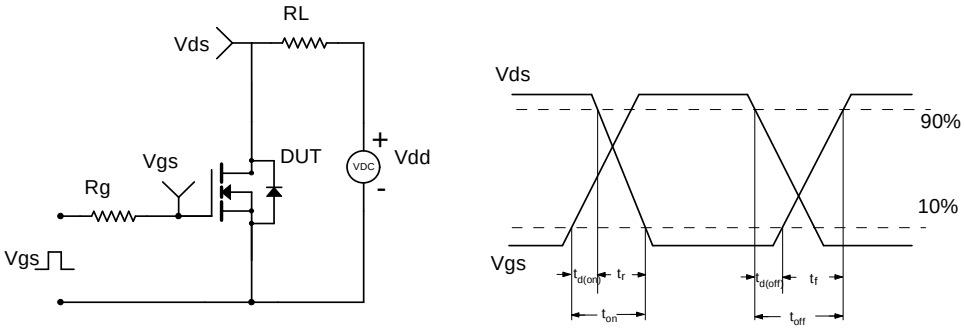


Figure 16: Normalized Maximum Transient Thermal Impedance (Note G)

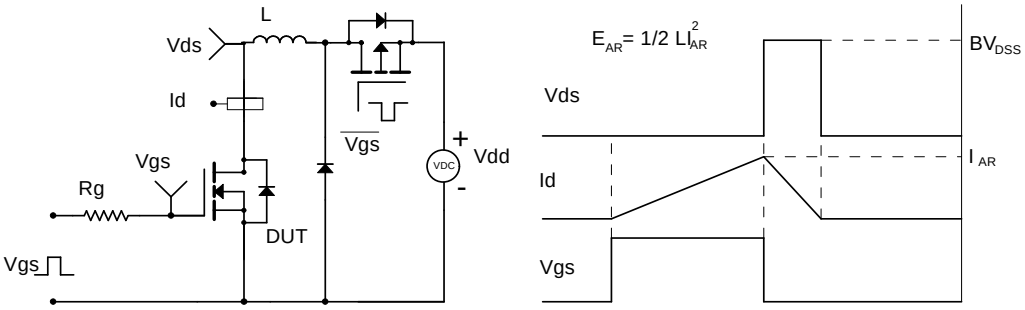
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms