

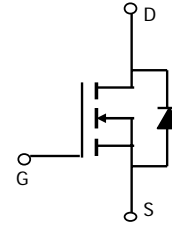
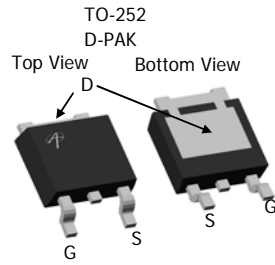
AOD2N60
2A, 600V N-Channel MOSFET
General Description

The AOD2N60 has been 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 these parts can be adopted quickly into new and existing offline power supply designs.

Features

V_{DS} (V) = 700V @ 150°C
 I_D = 2A
 $R_{DS(ON)} < 4.4\Omega$ ($V_{GS} = 10V$)

100% UIS Tested!
100% R_g Tested!
 C_{iss} , C_{oss} , C_{rss} Tested!


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}	± 30	V
Continuous Drain Current ^B	I_D	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	
Pulsed Drain Current ^C	I_{DM}	8.0	
Avalanche Current ^C	I_{AR}	2.0	A
Repetitive avalanche energy ^C	E_{AR}	60	mJ
Single pulsed avalanche energy ^H	E_{AS}	120	mJ
Peak diode recovery dv/dt	dv/dt	5	V/ns
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	W
		Derate above 25°C	W/°C
Junction and Storage Temperature Range	T_J, T_{STG}	-50 to 150	°C
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	T_L	300	°C

Thermal Characteristics

Parameter	Symbol	Typical	Maximum	Units
Maximum Junction-to-Ambient ^{A,G}	$R_{\theta JA}$	45	55	°C/W
Maximum Case-to-Sink ^A	$R_{\theta CS}$	-	0.5	°C/W
Maximum Junction-to-Case ^{D,F}	$R_{\theta JC}$	1.8	2.2	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$	600			V
		$I_D=250\mu\text{A}, V_{GS}=0\text{V}, T_J=125^\circ\text{C}$		700		V
$BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$		0.56		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=600\text{V}, V_{GS}=0\text{V}$			1	μA
		$V_{DS}=480\text{V}, T_J=125^\circ\text{C}$			10	
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 30\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	3	4	5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=0.65\text{A}$		3.6	4.4	Ω
g_{FS}	Forward Transconductance	$V_{DS}=40\text{V}, I_D=0.65\text{A}$		3.5		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.79	1	V
I_S	Maximum Body-Diode Continuous Current				2	A
I_{SM}	Maximum Body-Diode Pulsed Current				8	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1\text{MHz}$	215	270	325	pF
C_{oss}	Output Capacitance		23	29	35	pF
C_{rss}	Reverse Transfer Capacitance		2.2	2.8	3.4	pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	3.5	4.4	6.6	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=480\text{V}, I_D=2\text{A}$	7.8	9.5	11	nC
Q_{gs}	Gate Source Charge		1.5	1.9	2	nC
Q_{gd}	Gate Drain Charge		3.9	4.7	6	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=300\text{V}, I_D=2\text{A}, R_G=25\Omega$		17.2		ns
t_r	Turn-On Rise Time			14.3		ns
$t_{D(off)}$	Turn-Off Delay Time			27		ns
t_f	Turn-Off Fall Time			17		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=2\text{A}, dI/dt=100\text{A}/\mu\text{s}, V_{DS}=100\text{V}$	128	154	185	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=2\text{A}, dI/dt=100\text{A}/\mu\text{s}, V_{DS}=100\text{V}$	0.6	0.8	0.96	μC

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with $T_A=25^\circ\text{C}$.

B: The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$ 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 $T_{J(MAX)}=150^\circ\text{C}$.

D: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_{J(MAX)}=150^\circ\text{C}$.

G: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

H: $L=60\text{mH}, I_{AS}=2\text{A}, V_{DD}=50\text{V}, R_G=10\Omega$, Starting $T_J=25^\circ\text{C}$

Rev0: Oct. 2008

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKI -50 to 175

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

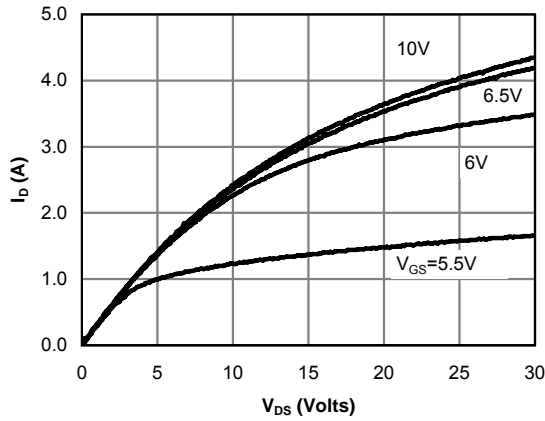


Fig 1: On-Region Characteristics

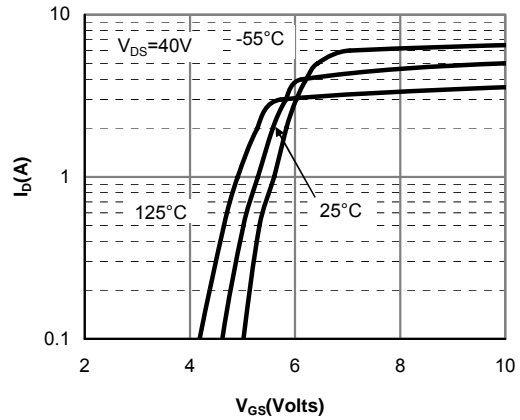


Figure 2: Transfer Characteristics

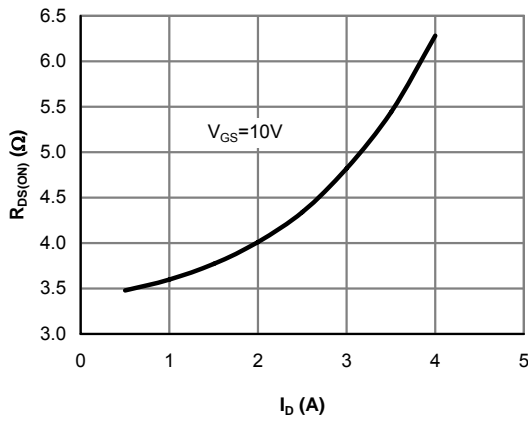


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

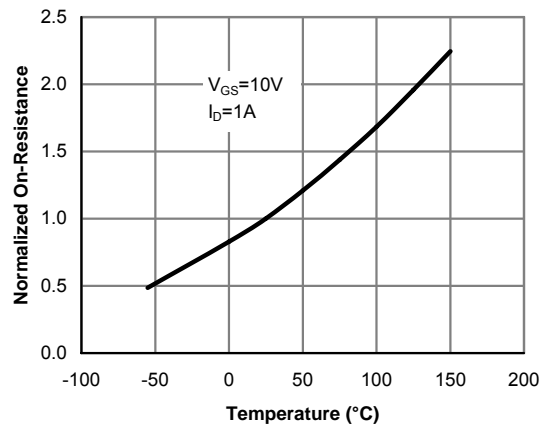


Figure 4: On-Resistance vs. Junction Temperature

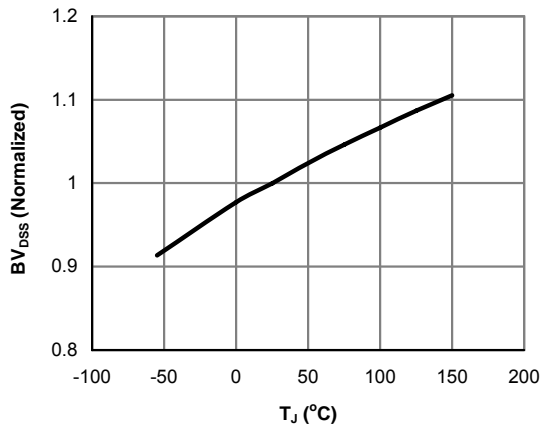


Figure 5: Break Down vs. Junction Temperature

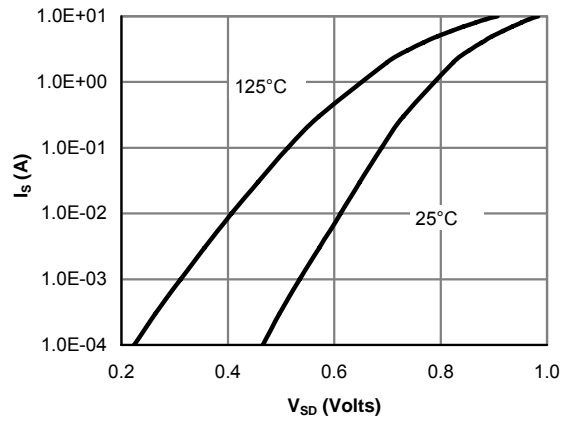


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

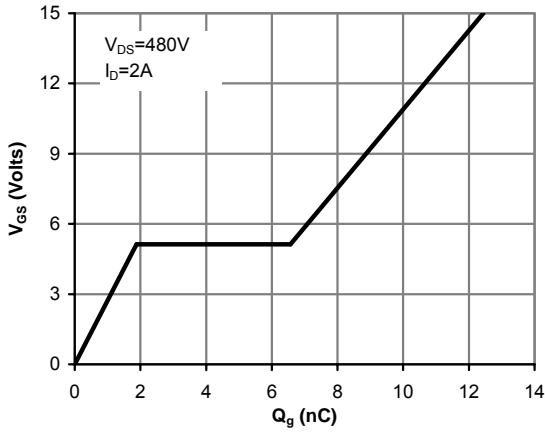


Figure 7: Gate-Charge Characteristics

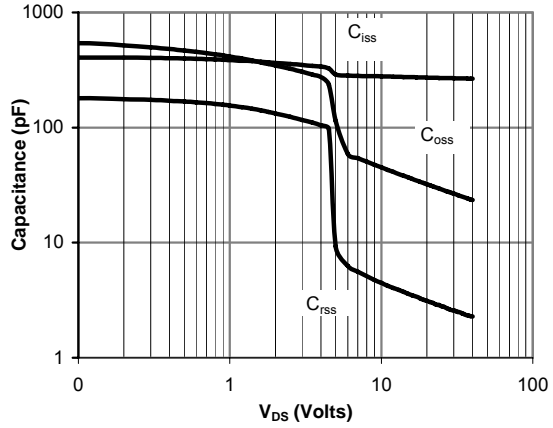


Figure 8: Capacitance Characteristics

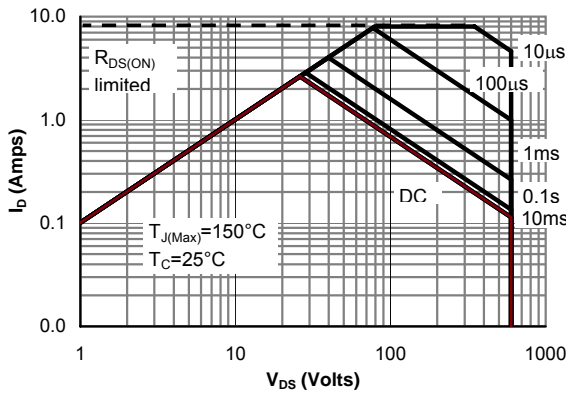


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

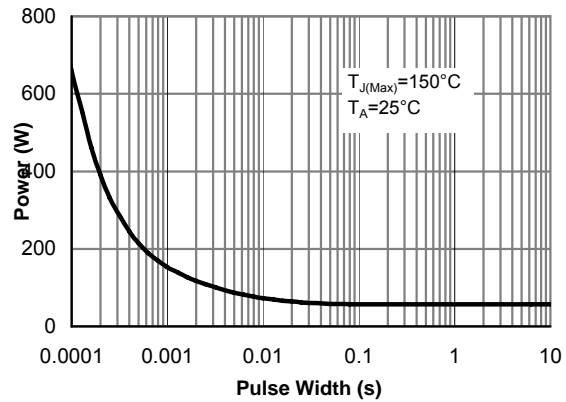


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

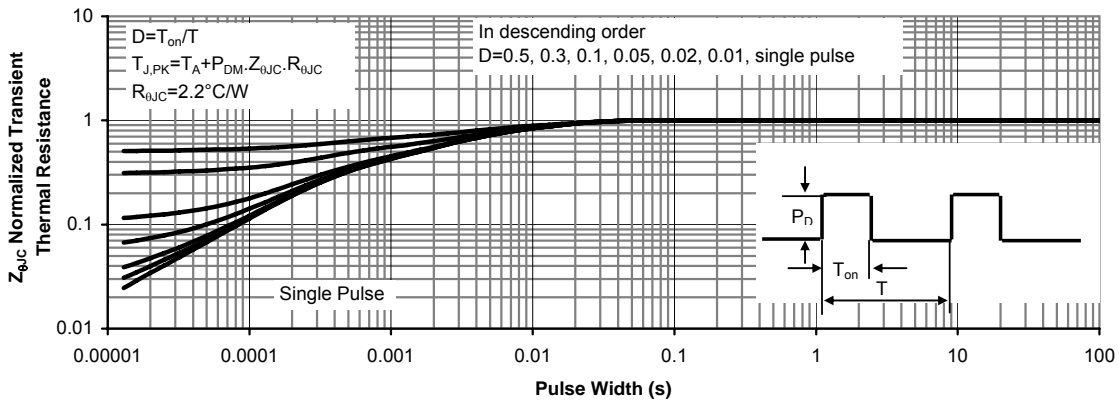


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

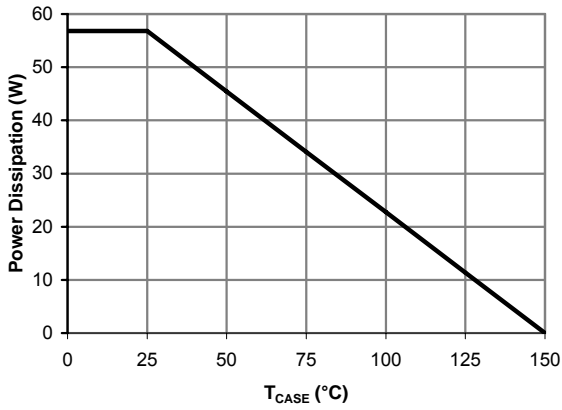


Figure 12: Power De-rating (Note B)

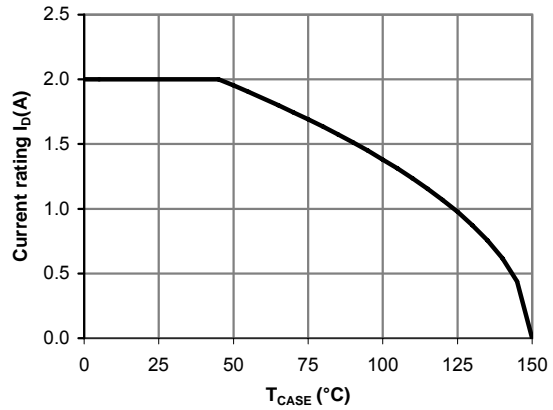


Figure 13: Current De-rating (Note B)

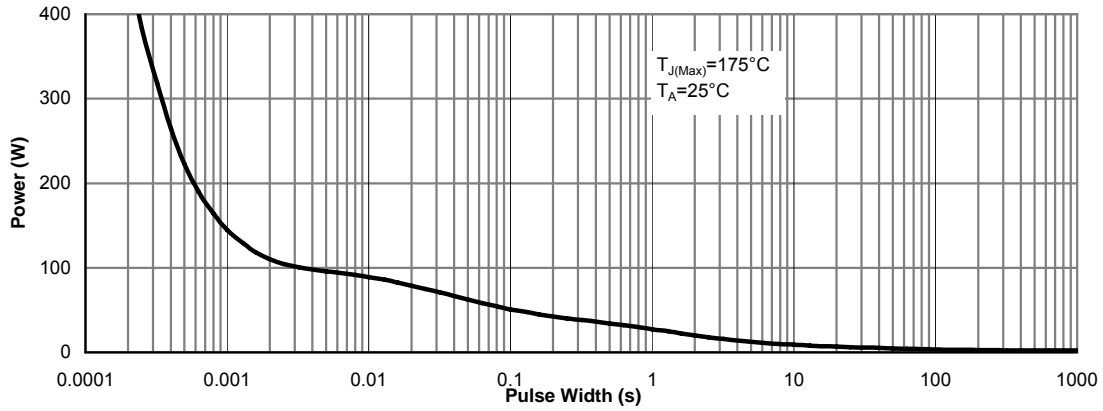


Figure 14: Single Pulse Power Rating Junction-to-Case (Note G)

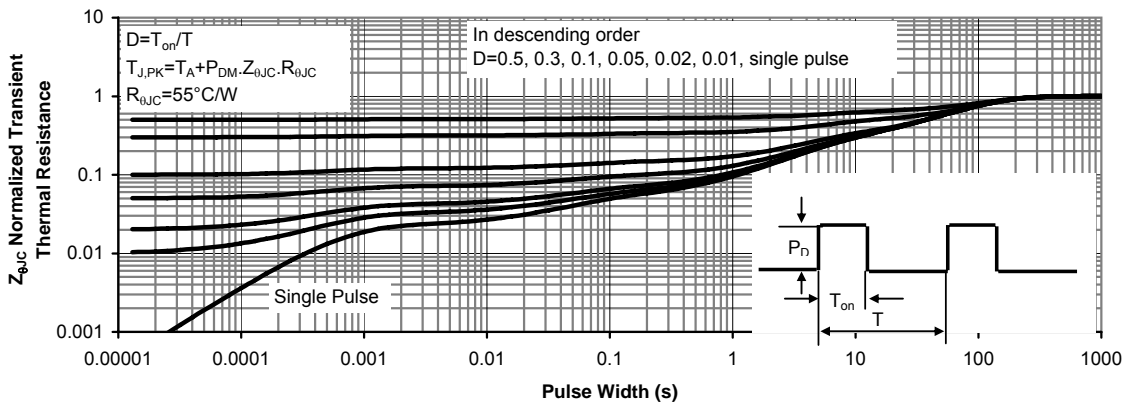
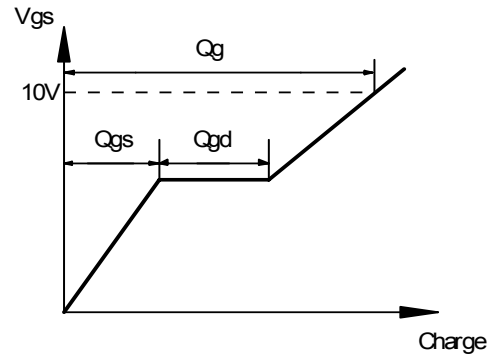
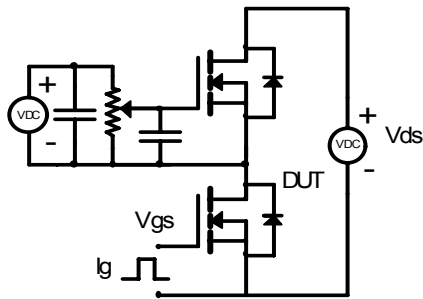
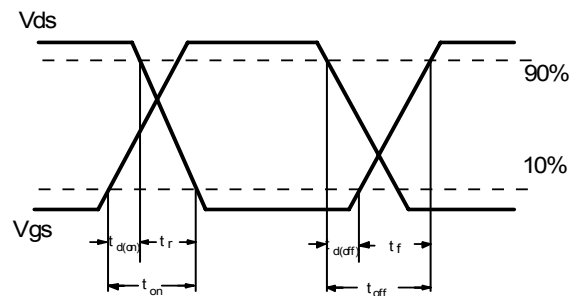
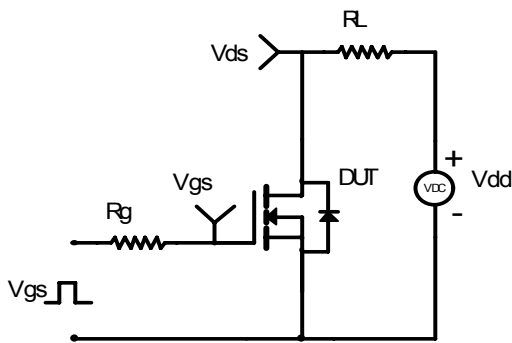


Figure 15: Normalized Maximum Transient Thermal Impedance (Note G)

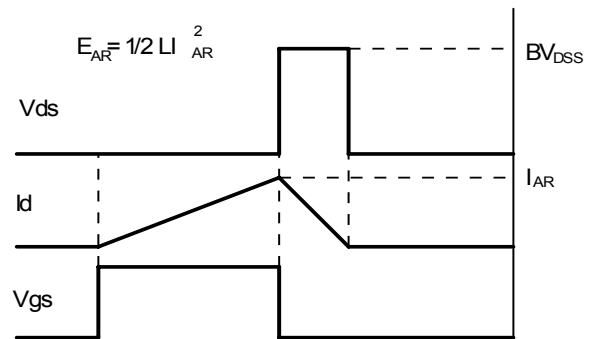
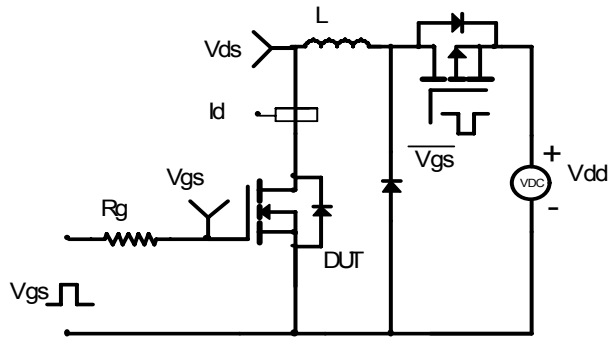
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

