



AON6262E

60V N-Channel AlphaSGT™

General Description

- Trench Power AlphaSGT™ technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- ESD protected

Applications

- High efficiency power supply
- Secondary synchronus rectifier

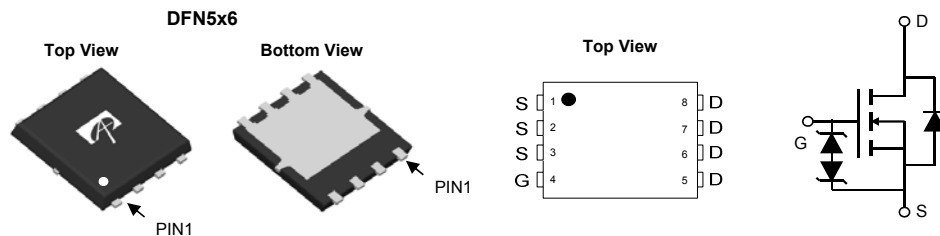
Product Summary

V_{DS}	60V
I_D (at $V_{GS}=10V$)	40A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 6.2mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 8.5mΩ

Typical ESD protection

HBM Class 2

100% UIS Tested
 100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AON6262E	DFN 5x6	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^G	I_D	40	A
	$T_C=25^\circ\text{C}$	40	
	$T_C=100^\circ\text{C}$	40	
Pulsed Drain Current ^C	I_{DM}	145	A
Continuous Drain Current	I_{DSM}	23.5	A
	$T_A=25^\circ\text{C}$	18.5	
	$T_A=70^\circ\text{C}$	18.5	
Avalanche Current ^C	I_{AS}	23	A
Avalanche energy $L=0.3\text{mH}$ ^C	E_{AS}	79	mJ
V_{DS} Spike ^I	V_{SPIKE}	72	V
	$10\mu\text{s}$	72	
Power Dissipation ^B	P_D	48	W
	$T_C=25^\circ\text{C}$	19	
	$T_C=100^\circ\text{C}$	19	
Power Dissipation ^A	P_{DSM}	6.2	W
	$T_A=25^\circ\text{C}$	4.0	
	$T_A=70^\circ\text{C}$	4.0	
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	$R_{\theta JA}$	15	20	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		40	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	2.1	2.6	$^\circ\text{C/W}$

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	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.2	1.65	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=20\text{A}$		4.8	6.2	$\text{m}\Omega$
		$T_J=125^{\circ}\text{C}$		7.8	10	
		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$		6.2	8.5	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		75		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.7	1	V
I_S	Maximum Body-Diode Continuous Current ^G				40	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1\text{MHz}$		1650		pF
C_{oss}	Output Capacitance			520		pF
C_{rss}	Reverse Transfer Capacitance			52		pF
R_g	Gate resistance	$f=1\text{MHz}$	0.6	1.3	2.0	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $I_D=20\text{A}$		30	45	nC
$Q_g(4.5\text{V})$	Total Gate Charge			15	25	nC
Q_{gs}	Gate Source Charge			3.5		nC
Q_{gd}	Gate Drain Charge			6.5		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $R_L=1.5\Omega$, $R_{GEN}=3\Omega$		6		ns
t_r	Turn-On Rise Time			5		ns
$t_{D(off)}$	Turn-Off DelayTime			29		ns
t_f	Turn-Off Fall Time			7		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		19		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		60		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} \leq 10\text{s}$ 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 $T_{J(MAX)}=150^{\circ}\text{C}$, 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 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 $T_{J(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

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

I. The spike duty cycle 5% max, limited by junction temperature $T_J(MAX)=125^{\circ}\text{C}$.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

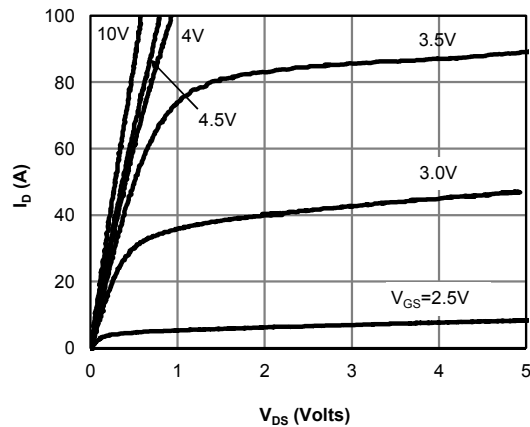


Figure 1: On-Region Characteristics (Note E)

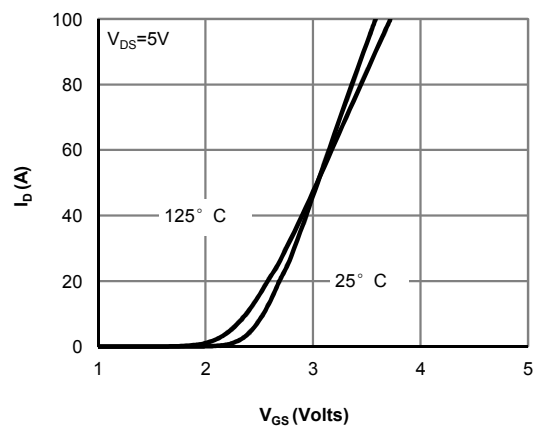


Figure 2: Transfer Characteristics (Note E)

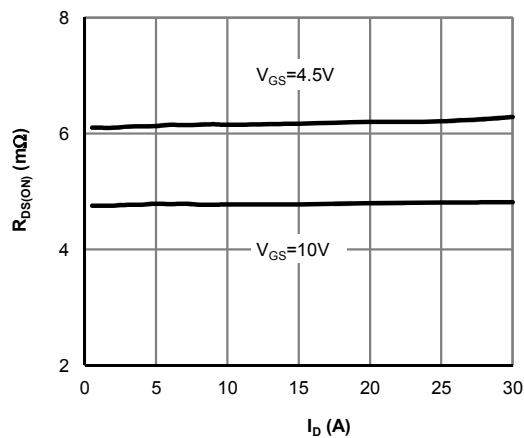


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

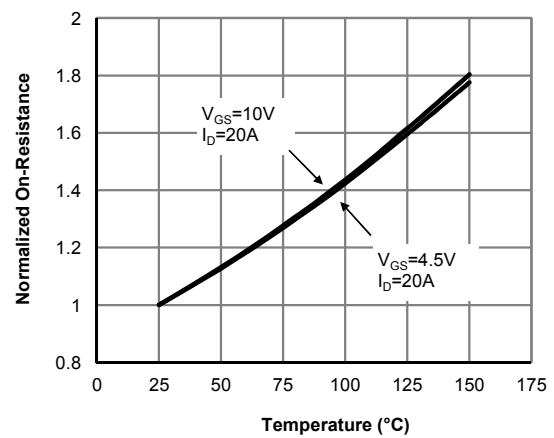


Figure 4: On-Resistance vs. Junction Temperature (Note E)

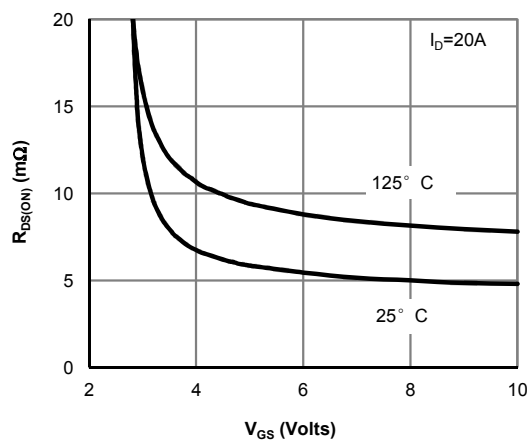


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

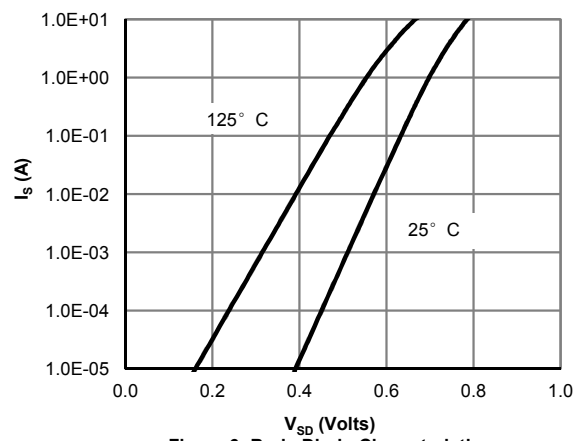


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

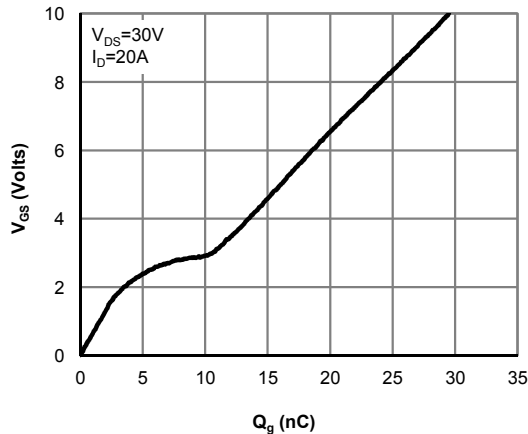


Figure 7: Gate-Charge Characteristics

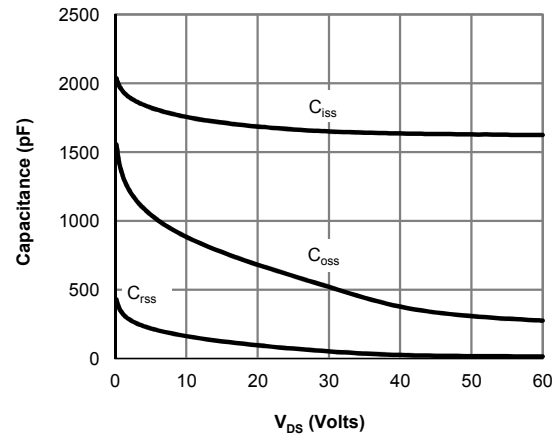


Figure 8: Capacitance Characteristics

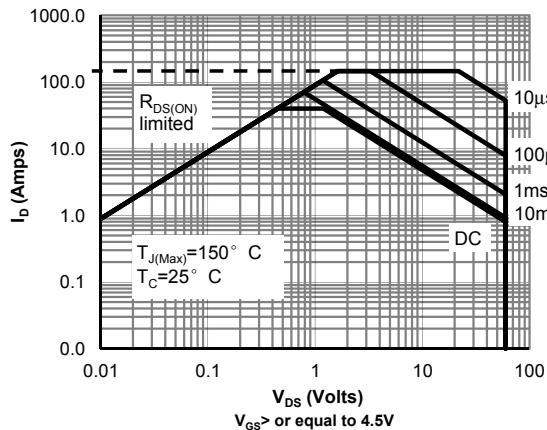


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

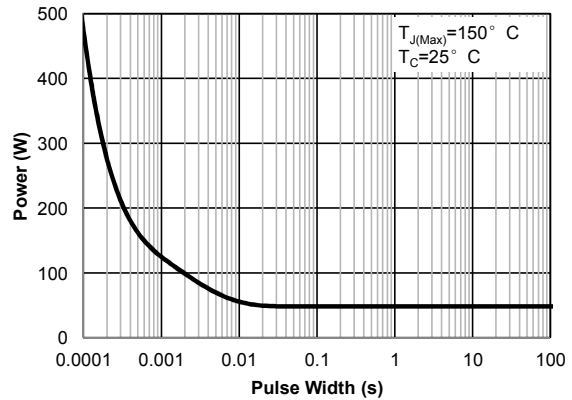


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

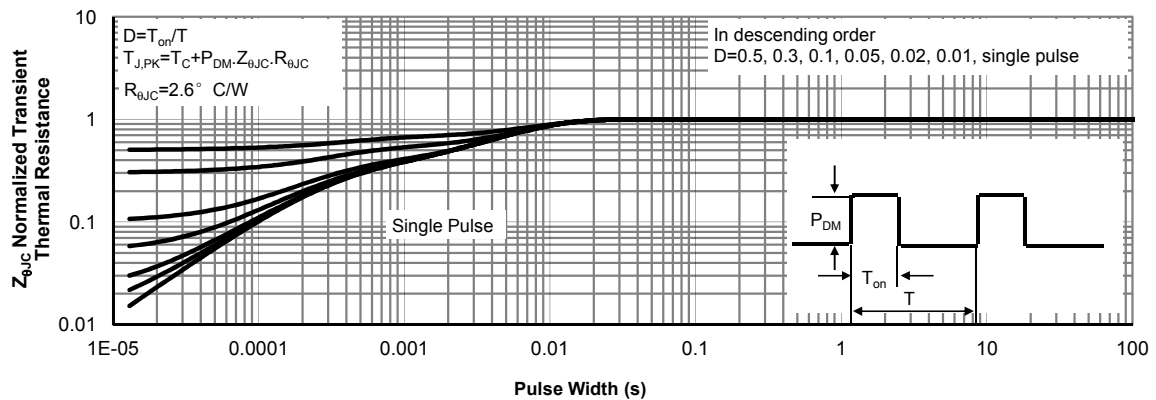


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

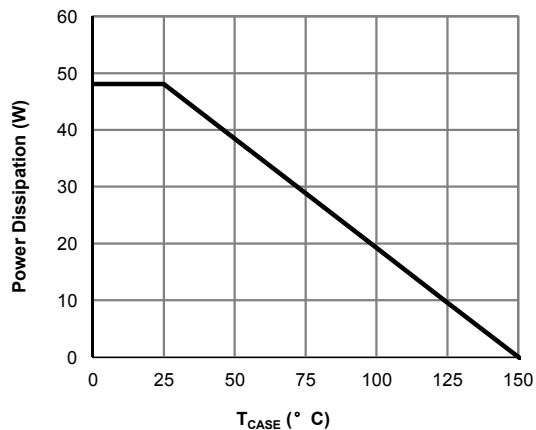


Figure 12: Power De-rating (Note F)

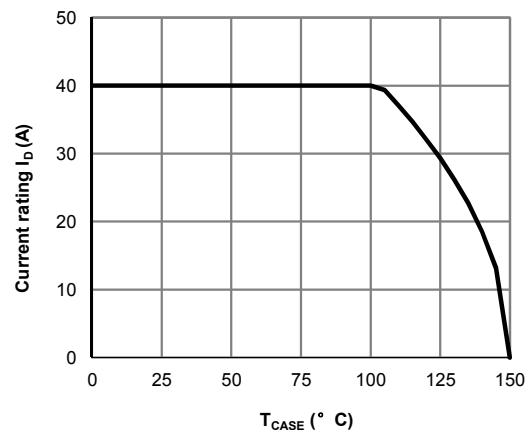


Figure 13: Current De-rating (Note F)

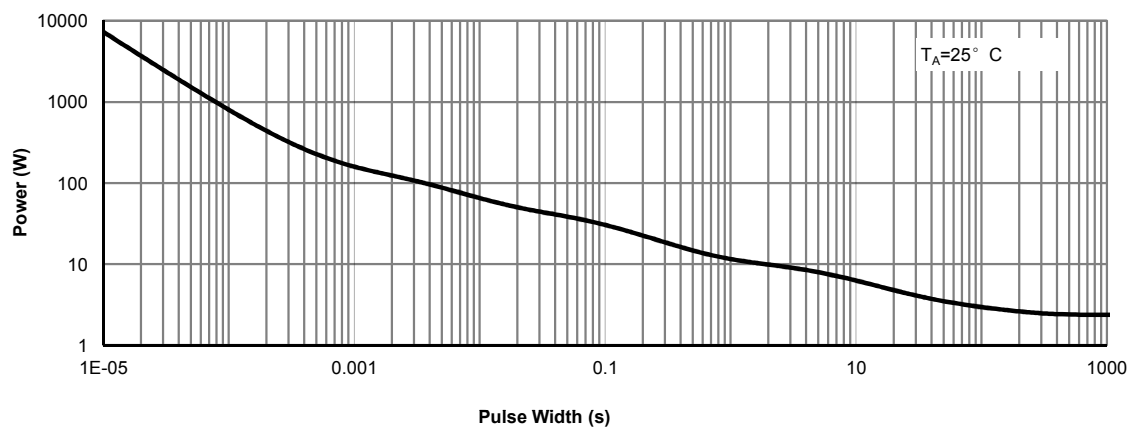


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

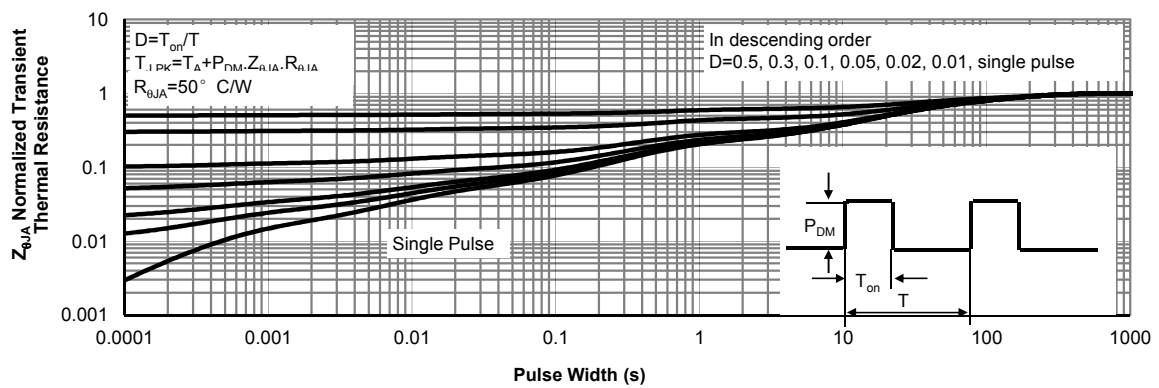


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Figure A: Gate Charge Test Circuit & Waveforms

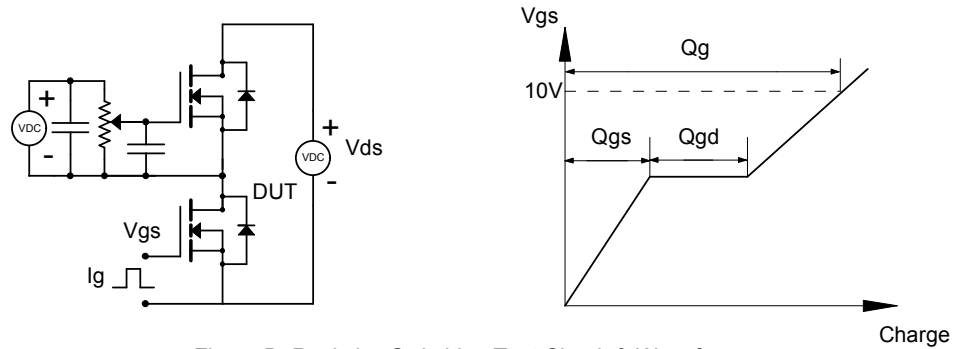


Figure B: Resistive Switching Test Circuit & Waveforms

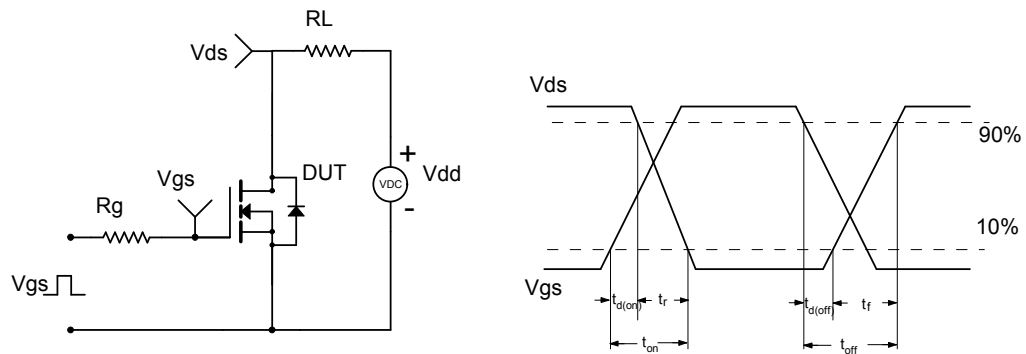


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

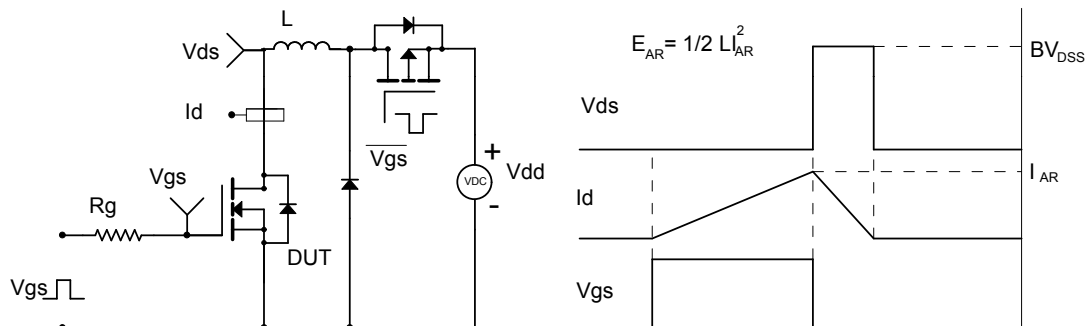


Figure D: Diode Recovery Test Circuit & Waveforms

