



ALPHA & OMEGA
SEMICONDUCTOR

AONS62814T
80V N-Channel AlphaSGT™

General Description

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

Product Summary

V_{DS}	80V
I_D (at $V_{GS}=10V$)	215A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 2.6mΩ
$R_{DS(ON)}$ (at $V_{GS}=6V$)	< 3.5mΩ

Applications

- Secondary Synchronous Rectification MOSFET for Server and Telecom

100% UIS Tested

100% R_g Tested

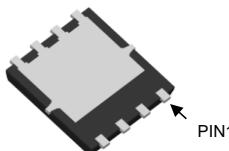
Max $T_j=175^\circ C$



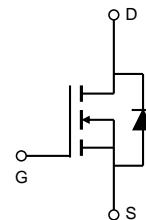
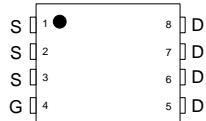
DFN5x6



Bottom View



Top View



Orderable Part Number

AONS62814T

Package Type

DFN 5x6

Form

Tape & Reel

Minimum Order Quantity

3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^A	I_D	215	A
$T_C=100^\circ C$		150	
Pulsed Drain Current ^C	I_{DM}	860	
Continuous Drain Current ^A	I_{DSM}	40	A
$T_A=70^\circ C$		33	
Avalanche Current ^C	I_{AS}	73	A
Avalanche energy ^C	E_{AS}	266	mJ
Power Dissipation ^B	P_D	258	W
$T_C=100^\circ C$		129	
Power Dissipation ^A	P_{DSM}	8.8	W
$T_A=70^\circ C$		6.1	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	R_{QJA}	14	17	°C/W
Maximum Junction-to-Ambient ^{A,D}		40	50	°C/W
Maximum Junction-to-Case	R_{QJC}	0.43	0.58	°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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	80			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=80\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$		1	5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			±100	nA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.1	2.6	3.2	V
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ $T_J=125^\circ\text{C}$		2.2	2.6	$\text{m}\Omega$
		$V_{GS}=6\text{V}, I_D=20\text{A}$		3.7	4.5	
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$		100		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.68	1	V
I_S	Maximum Body-Diode Continuous Current				120	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=40\text{V}, f=1\text{MHz}$		4940		pF
C_{oss}	Output Capacitance			770		pF
C_{rss}	Reverse Transfer Capacitance			40		pF
R_g	Gate resistance	$f=1\text{MHz}$	0.3	0.7	1.2	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=40\text{V}, I_D=20\text{A}$		68	100	nC
Q_{gs}	Gate Source Charge			14.5		nC
Q_{gd}	Gate Drain Charge			14		nC
$t_{D(\text{on})}$	Turn-On DelayTime	$V_{GS}=10\text{V}, V_{DS}=40\text{V}, R_L=2.0\Omega, R_{\text{GEN}}=3\Omega$		14		ns
t_r	Turn-On Rise Time			8.5		ns
$t_{D(\text{off})}$	Turn-Off DelayTime			40		ns
t_f	Turn-Off Fall Time			10		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, di/dt=500\text{A}/\mu\text{s}$		32		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, di/dt=500\text{A}/\mu\text{s}$		168		nC

A. The value of R_{JJA} 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 $R_{\text{JJA}} \leq 10\text{s}$ and the maximum allowed junction temperature of 175°C . The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

B. The power dissipation P_D is based on $T_{J(\text{MAX})}=175^\circ\text{C}$, 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 $T_{J(\text{MAX})}=175^\circ\text{C}$.

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

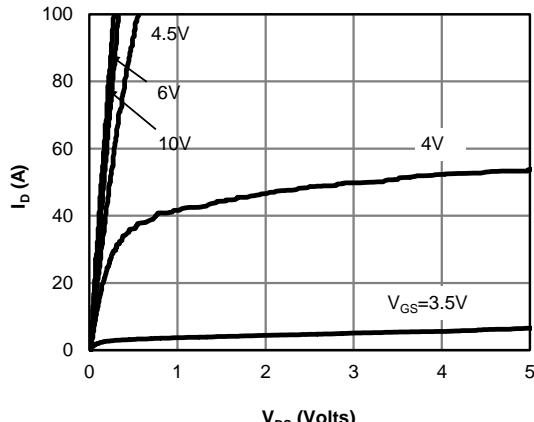
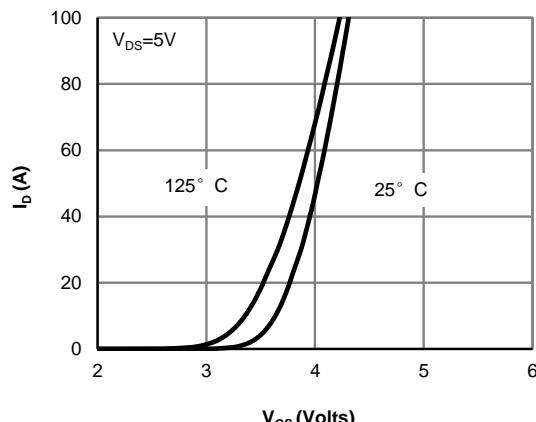
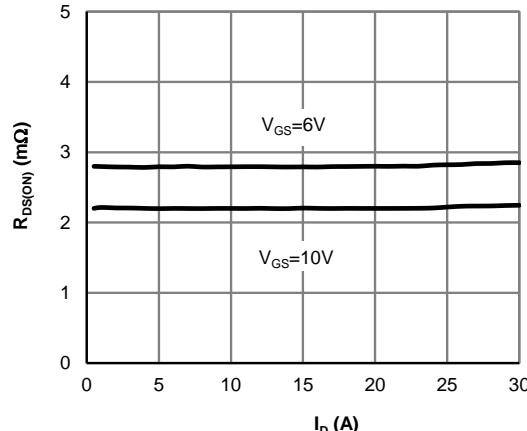
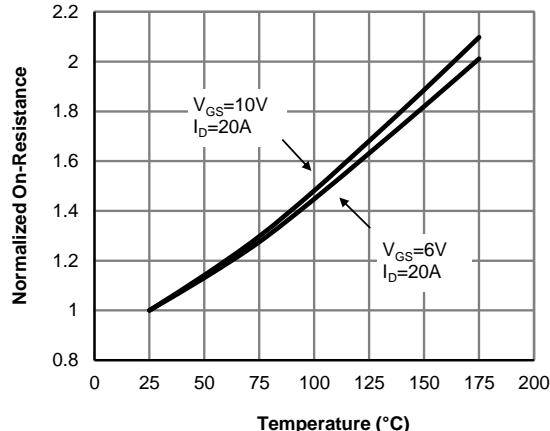
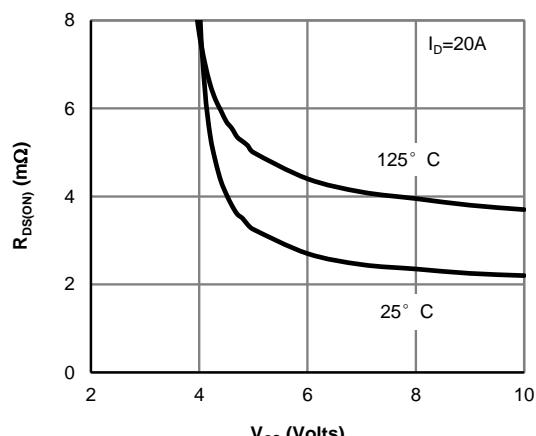
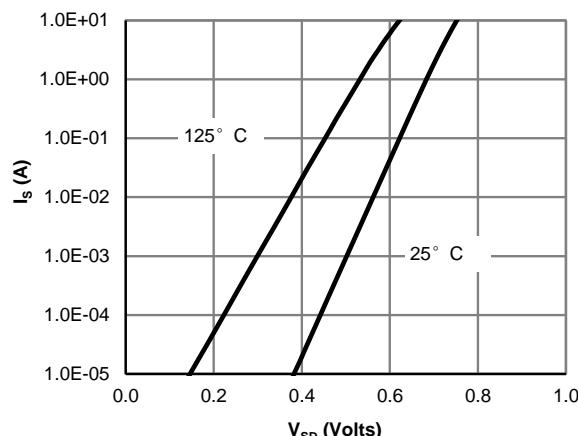
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

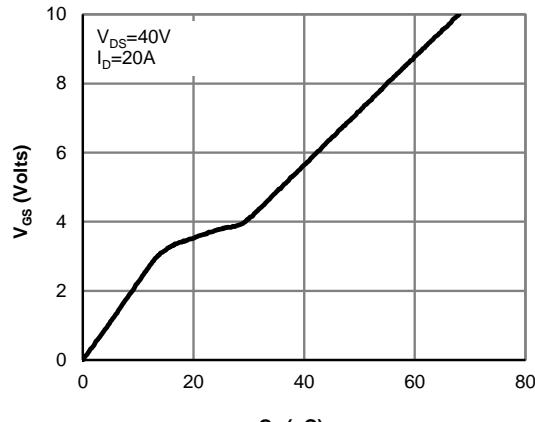
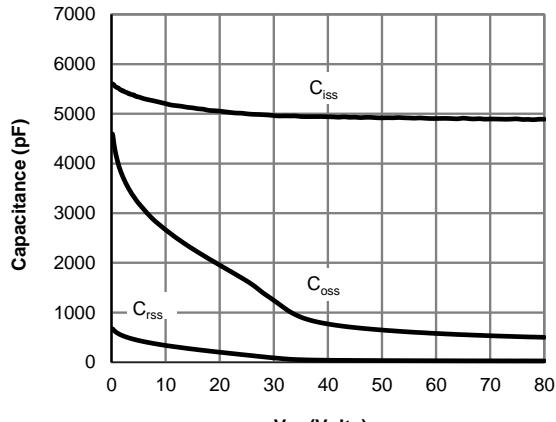
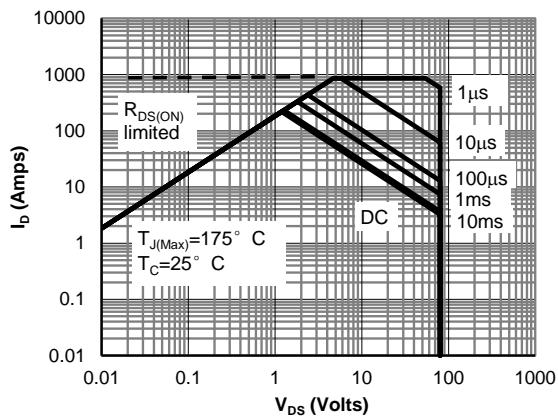
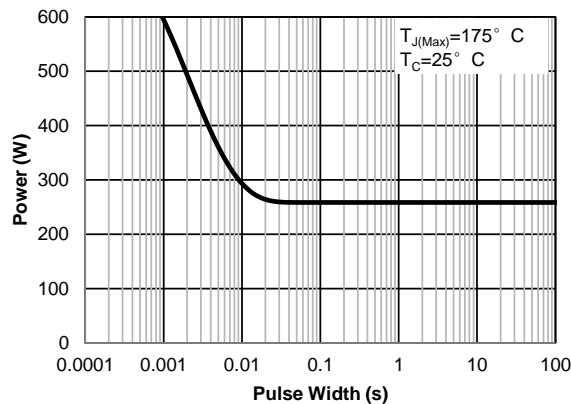
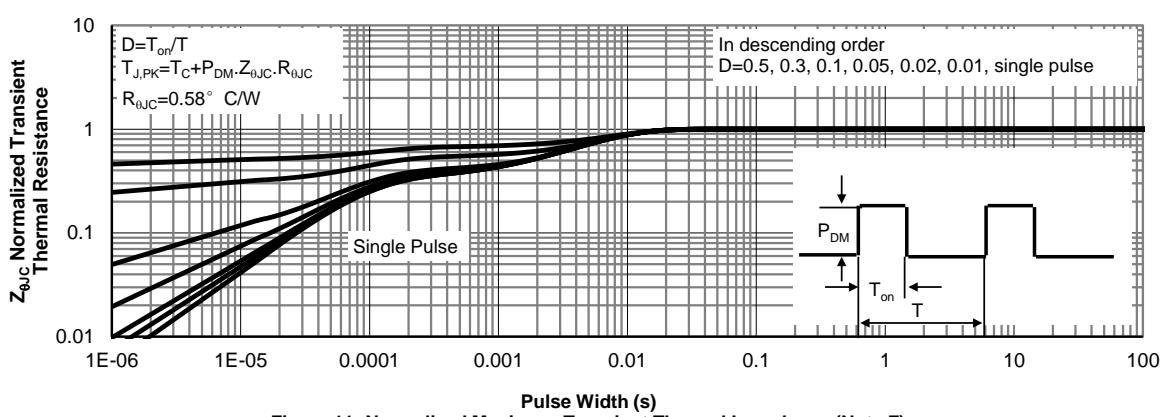
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})}=175^\circ\text{C}$. The SOA curve provides a single pulse rating.

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

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 MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:
http://www.aosmd.com/terms_and_conditions_of_sale

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)

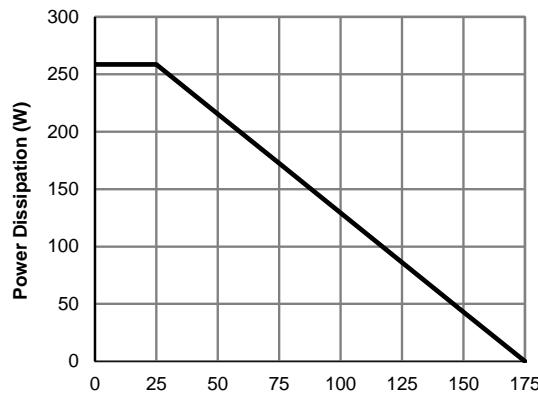
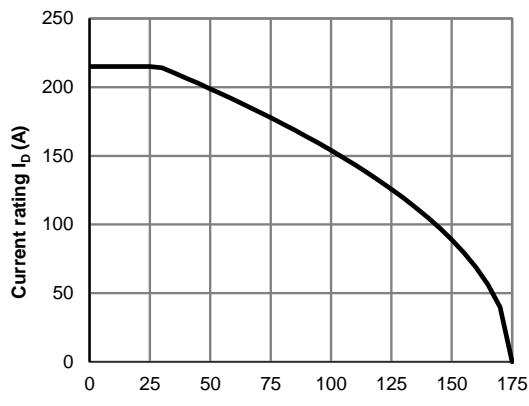
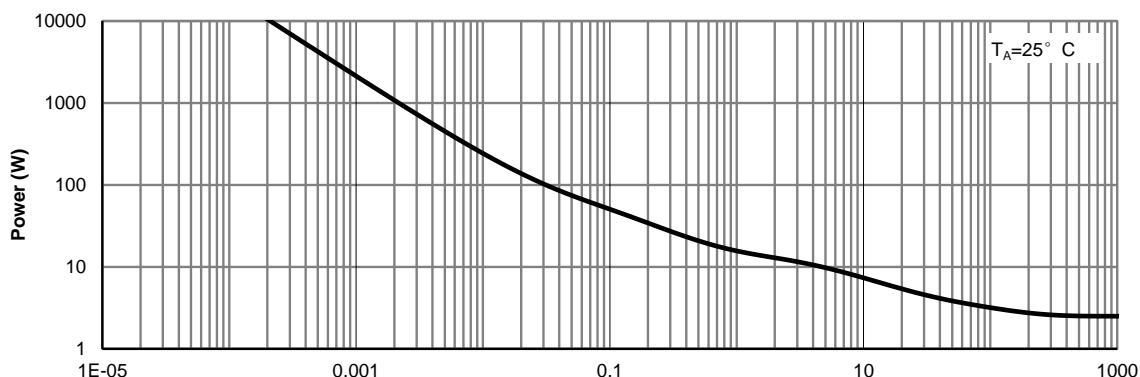
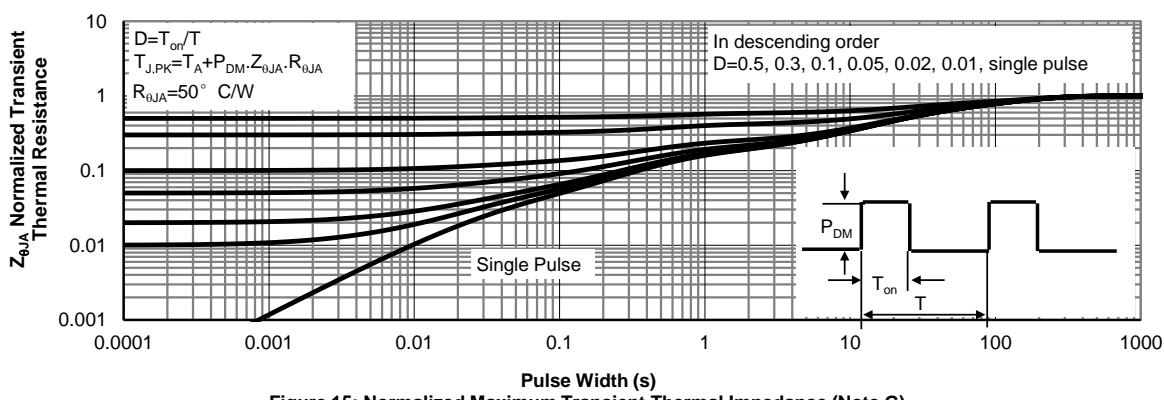
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 12: Power De-rating (Note F)

Figure 13: Current De-rating (Note F)

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

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

Figure A: Gate Charge Test Circuit & Waveforms

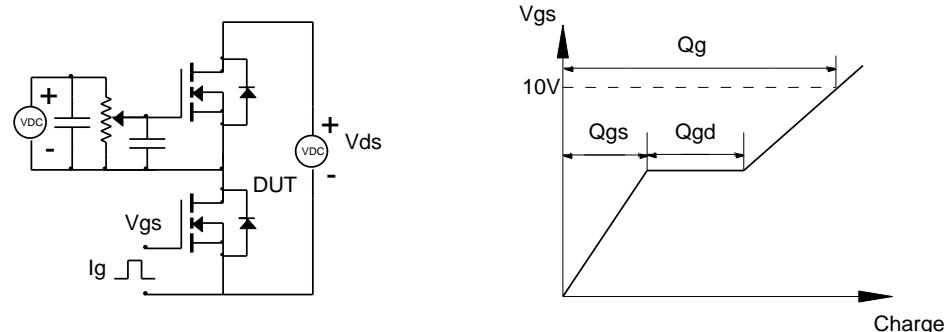


Figure B: Resistive Switching Test Circuit & Waveforms

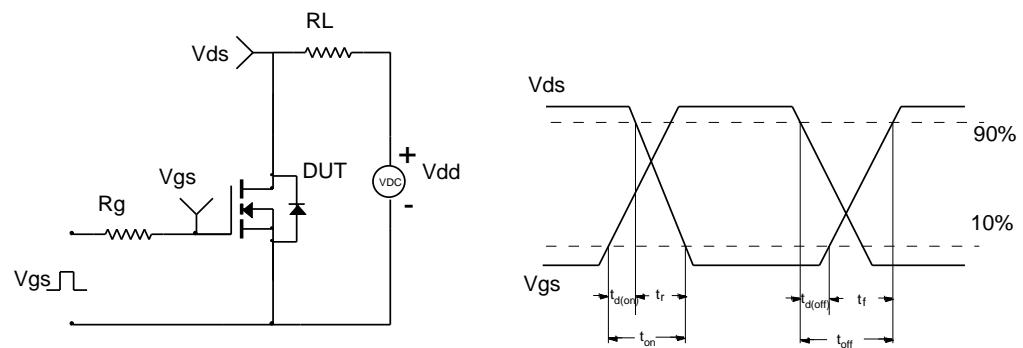


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

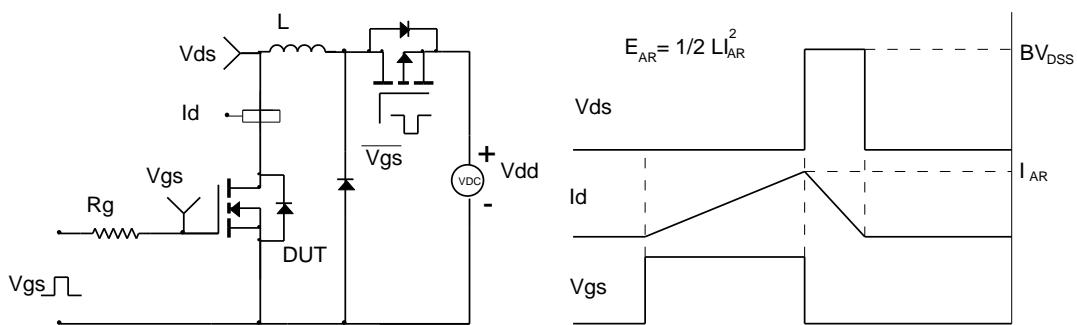


Figure D: Diode Recovery Test Circuit & Waveforms

