


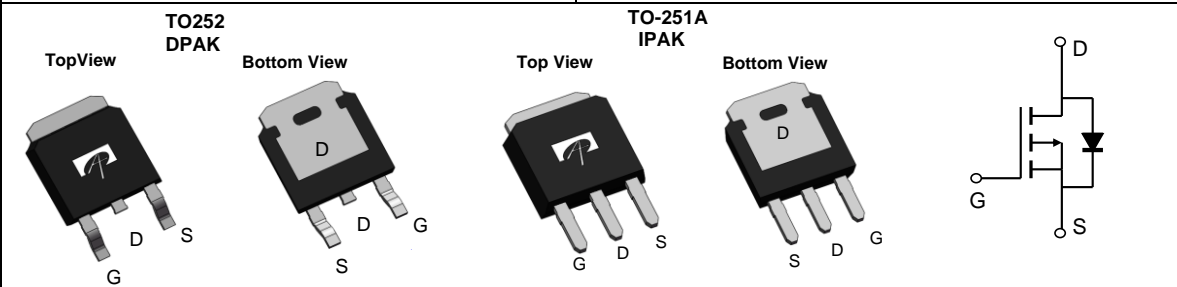


**THE DATASHEET OF
AOD21357**





<p>General Description</p> <ul style="list-style-type: none"> • Latest advanced trench technology • Low $R_{DS(ON)}$ • High Current Capability • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Notebook AC-in load switch • Battery protection charge/discharge 	<p>Product Summary</p> <table border="0"> <tr> <td>V_{DS}</td> <td>-30V</td> </tr> <tr> <td>I_D (at $V_{GS}=-10V$)</td> <td>-70A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-10V$)</td> <td>< 8mΩ</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)</td> <td>< 13mΩ</td> </tr> </table> <p>100% UIS Tested 100% Rg Tested</p> 	V_{DS}	-30V	I_D (at $V_{GS}=-10V$)	-70A	$R_{DS(ON)}$ (at $V_{GS}=-10V$)	< 8m Ω	$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	< 13m Ω
V_{DS}	-30V								
I_D (at $V_{GS}=-10V$)	-70A								
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	< 8m Ω								
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	< 13m Ω								



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOD21357	TO-252	Tape & Reel	2500
AOI21357	TO-251A	Tube	3500

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current ^G	I_D	$T_C=25^\circ C$	-70
		$T_C=100^\circ C$	-50
Pulsed Drain Current ^C	I_{DM}	-180	A
Continuous Drain Current	I_{DSM}	$T_A=25^\circ C$	-23
		$T_A=70^\circ C$	-18
Avalanche Current ^C	I_{AS}	39	A
Avalanche energy $L=0.1mH$ ^C	E_{AS}	76	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ C$	78
		$T_C=100^\circ C$	31
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ C$	6.2
		$T_A=70^\circ C$	4
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A $t \leq 10s$	$R_{\theta JA}$	15	20	$^\circ C/W$
Maximum Junction-to-Ambient ^{A D} Steady-State		40	50	$^\circ C/W$
Maximum Junction-to-Case Steady-State	$R_{\theta JC}$	1.3	1.6	$^\circ C/W$

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	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±25V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.3	-1.7	-2.3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-20A T _J =125°C		6 8.7	8 11.5	mΩ
		V _{GS} =-4.5V, I _D =-18A		9.8	13	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-20A		50		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Maximum Body-Diode Continuous Current ^G				-70	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		2830		pF
C _{oss}	Output Capacitance			430		pF
C _{rss}	Reverse Transfer Capacitance			365		pF
R _g	Gate resistance	f=1MHz		14	28	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-20A		50	70	nC
Q _{g(4.5V)}	Total Gate Charge			25	35	nC
Q _{gs}	Gate Source Charge			9		nC
Q _{gd}	Gate Drain Charge			12		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =0.75Ω, R _{GEN} =3Ω		12.5		ns
t _r	Turn-On Rise Time			18		ns
t _{D(off)}	Turn-Off DelayTime			125		ns
t _f	Turn-Off Fall Time			66		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-20A, di/dt=500A/μs		32		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-20A, di/dt=500A/μs		62		nC

- A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on R_{θJA} ≤ 10s 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° 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° C.
- D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} 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(MAX)}=150° 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 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

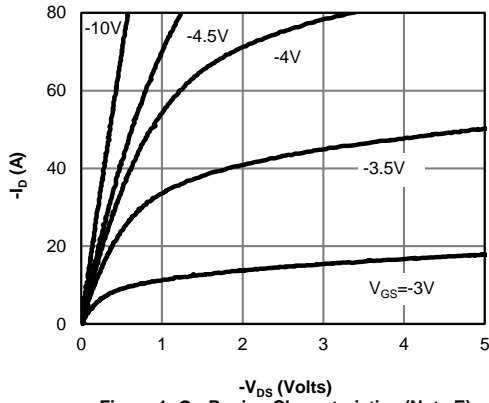


Figure 1: On-Region Characteristics (Note E)

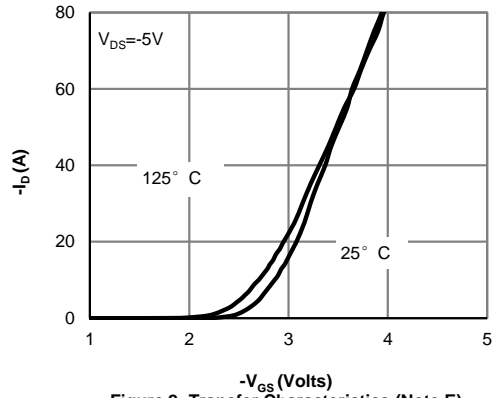


Figure 2: Transfer Characteristics (Note E)

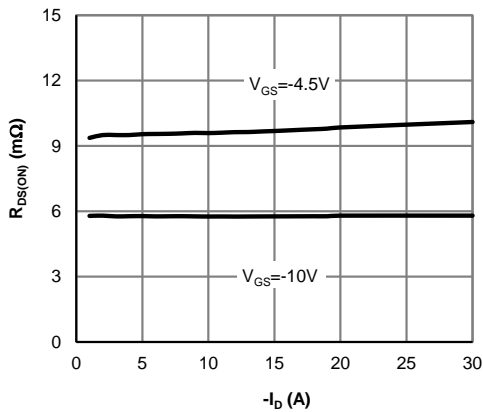


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

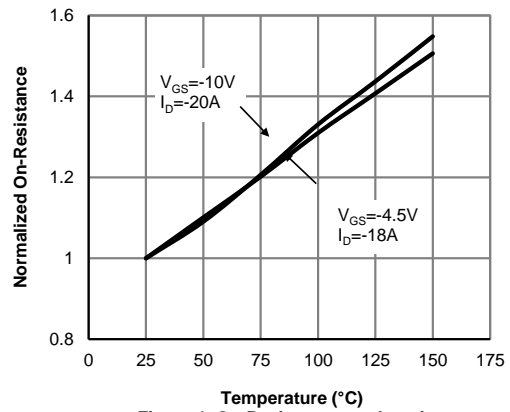


Figure 4: On-Resistance vs. Junction Temperature (Note E)

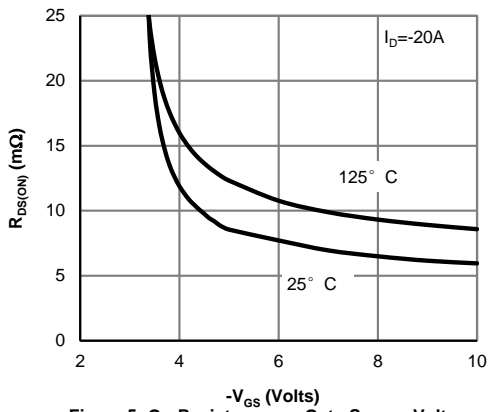


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

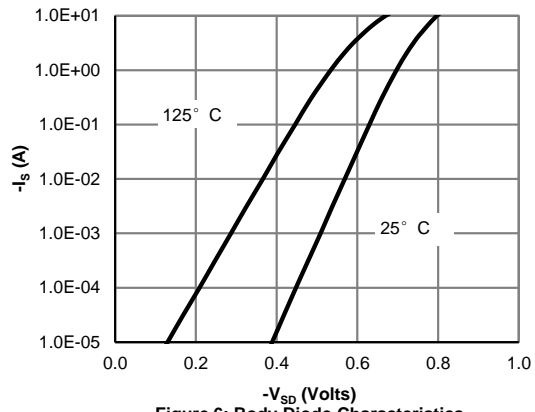


Figure 6: Body-Diode Characteristics (Note E)

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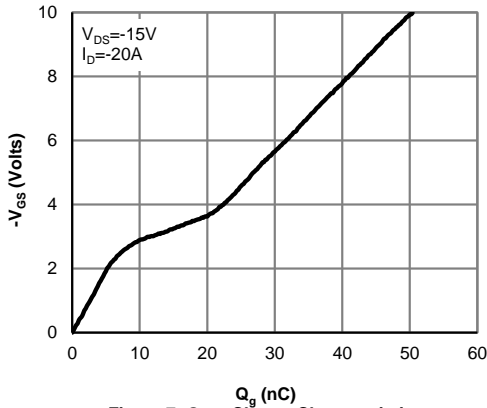


Figure 7: Gate-Charge Characteristics

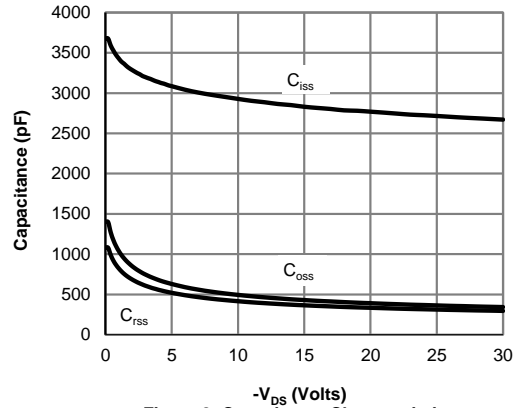


Figure 8: Capacitance Characteristics

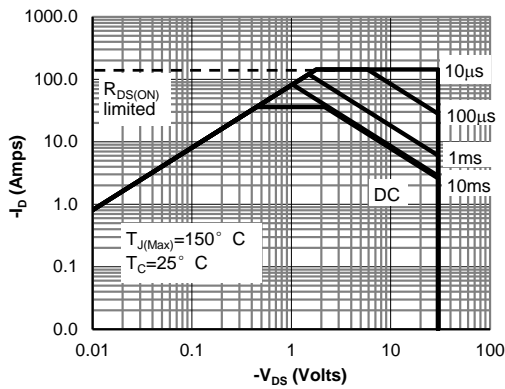


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

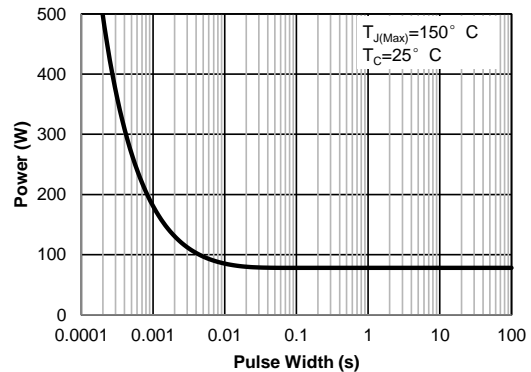


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

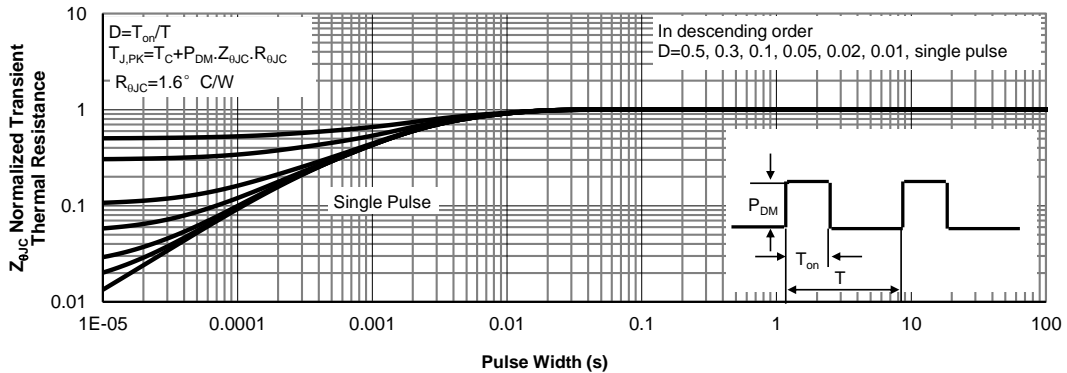


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

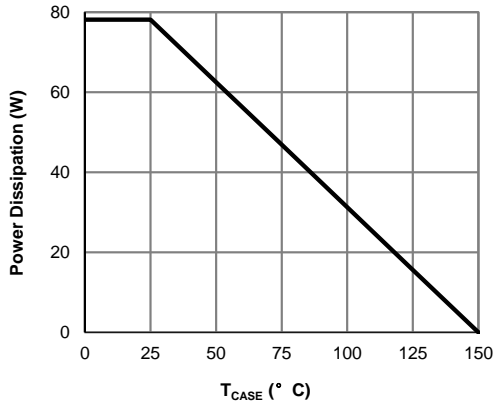


Figure 12: Power De-rating (Note F)

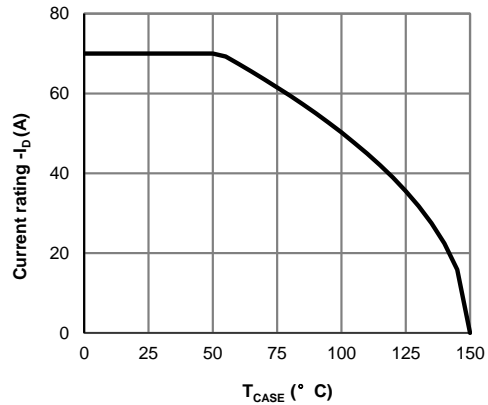


Figure 13: Current De-rating (Note F)

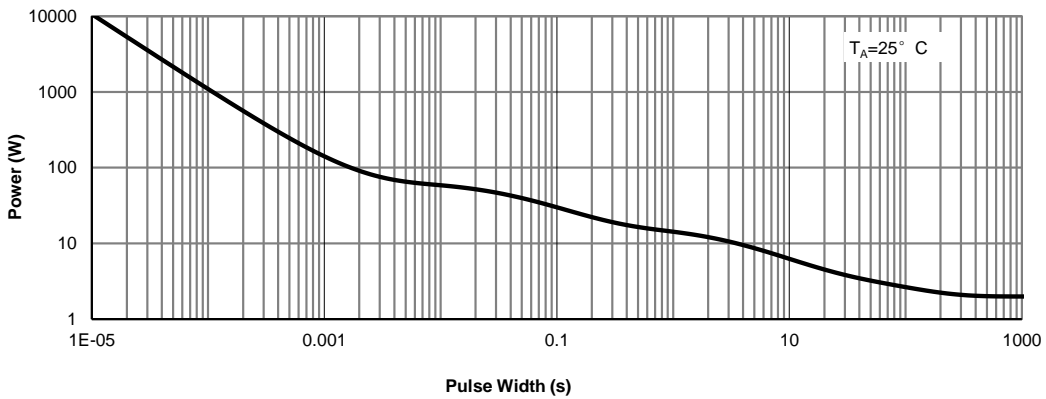


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

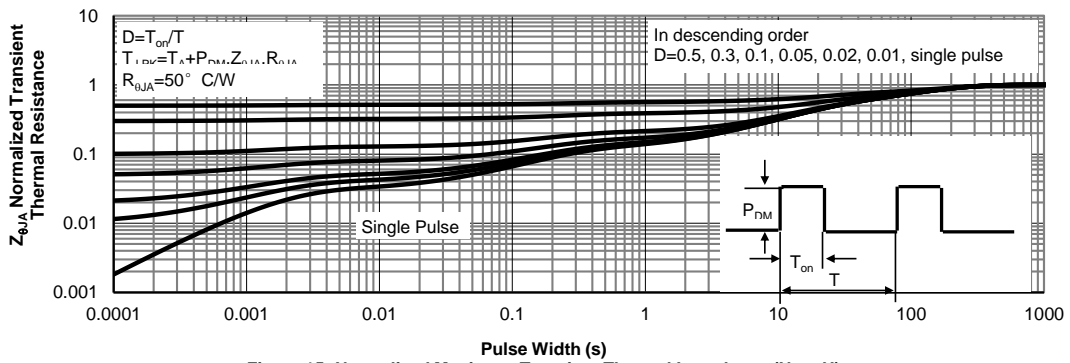
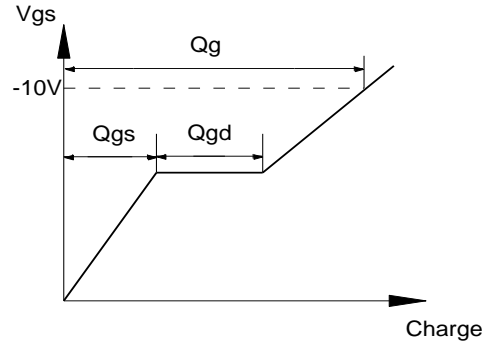
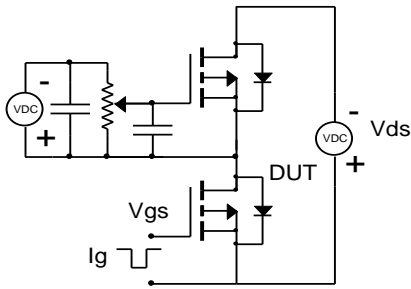
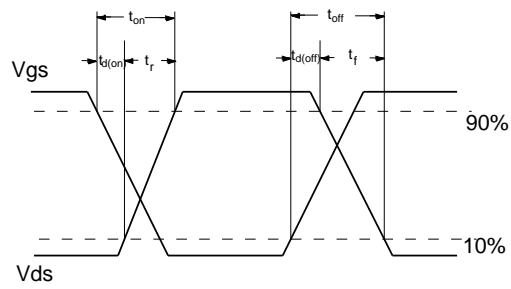
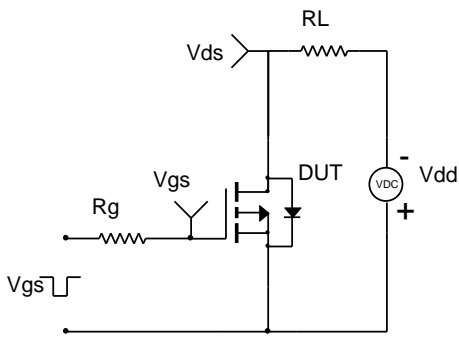


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

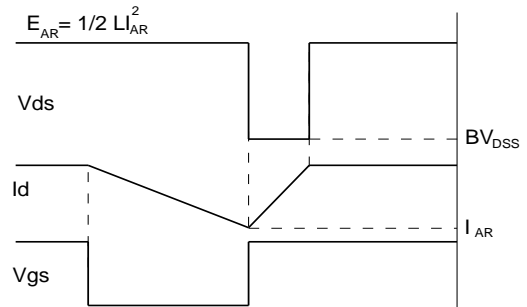
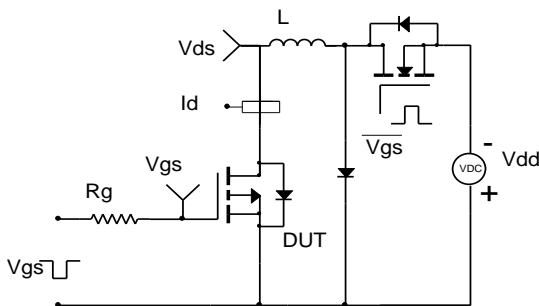
Gate Charge Test Circuit & Waveform



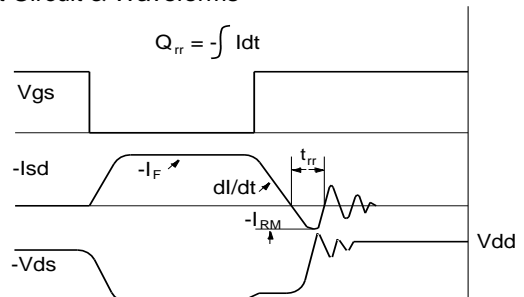
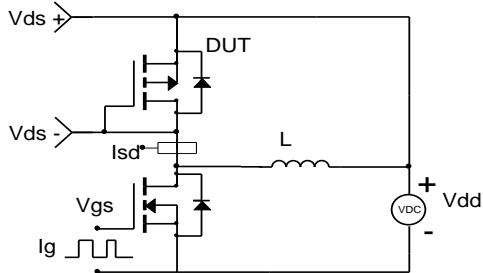
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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