

### General Description

- Latest Advanced Trench Technology
- Low  $R_{DS(ON)}$
- High Current Capability
- RoHS and Halogen-Free Compliant

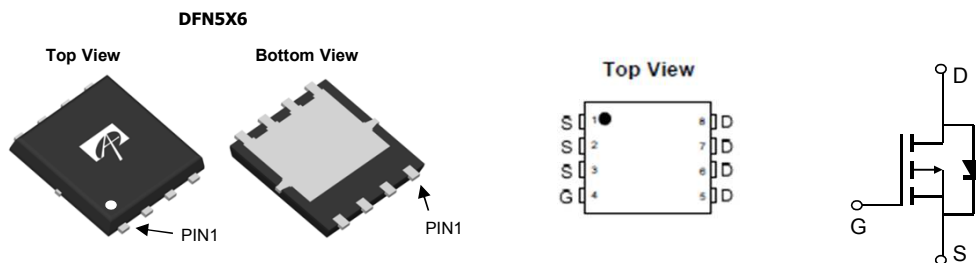
### Applications

- Notebook AC-in load switch
- Battery Protection Charge/Discharge

### Product Summary

$V_{DS}$	-30V
$I_D$ (at $V_{GS}=-10V$ )	-24A
$R_{DS(ON)}$ (at $V_{GS}=-10V$ )	< 11m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ )	< 18.5m $\Omega$

100% UIS Tested  
 100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AONS21307	DFN 5x6	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Continuous Drain Current <sup>G</sup>	$T_C=25^\circ\text{C}$	-24	A
	$T_C=100^\circ\text{C}$	-24	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	-96	
Continuous Drain Current	$T_A=25^\circ\text{C}$	-17	A
	$T_A=70^\circ\text{C}$	-14	
Avalanche Current <sup>C</sup>	$I_{AS}$	33	A
Avalanche energy	$L=0.1\text{mH}$ <sup>C</sup> $E_{AS}$	54	mJ
Power Dissipation <sup>B</sup>	$T_C=25^\circ\text{C}$	38	W
	$T_C=100^\circ\text{C}$	15	
Power Dissipation <sup>A</sup>	$T_A=25^\circ\text{C}$	5.0	W
	$T_A=70^\circ\text{C}$	3.2	
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 <sup>A</sup>	$R_{\theta JA}$	20	25	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A,D</sup>		45	55	$^\circ\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	2.7	3.3	$^\circ\text{C/W}$

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-1 -5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.3	-1.8	-2.3	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A T <sub>J</sub> =125°C		9.2	11	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A		12.7	15.2	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A		45		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.7	-1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current <sup>G</sup>				-24	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		1995		pF
C <sub>oss</sub>	Output Capacitance			300		pF
C <sub>riss</sub>	Reverse Transfer Capacitance			260		pF
R <sub>g</sub>	Gate resistance	f=1MHz		4.5	9	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g(10V)</sub>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A		35	50	nC
Q <sub>g(4.5V)</sub>	Total Gate Charge			17	25	
Q <sub>gs</sub>	Gate Source Charge			5.7		
Q <sub>gd</sub>	Gate Drain Charge			8.8		
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3Ω		11		ns
t <sub>r</sub>	Turn-On Rise Time			7.5		
t <sub>D(off)</sub>	Turn-Off DelayTime			43.5		
t <sub>f</sub>	Turn-Off Fall Time			17.5		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-20A, di/dt=500A/μs		13.3		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-20A, di/dt=500A/μs		20		nC

- A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C. The Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> t<sub>s</sub> ≤ 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<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<sub>J(MAX)</sub>=150° C.
- D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> 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<sub>J(MAX)</sub>=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 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C.

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**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

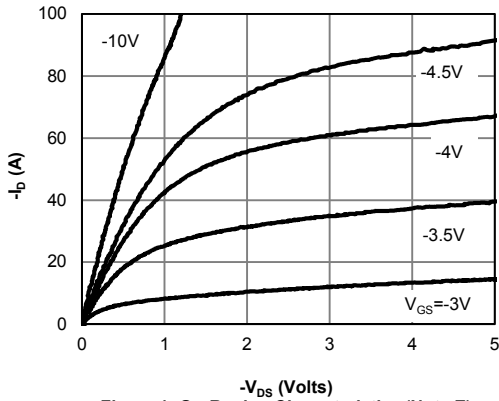


Figure 1: On-Region Characteristics (Note E)

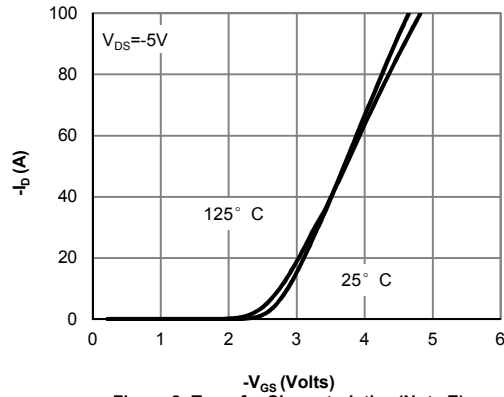


Figure 2: Transfer Characteristics (Note E)

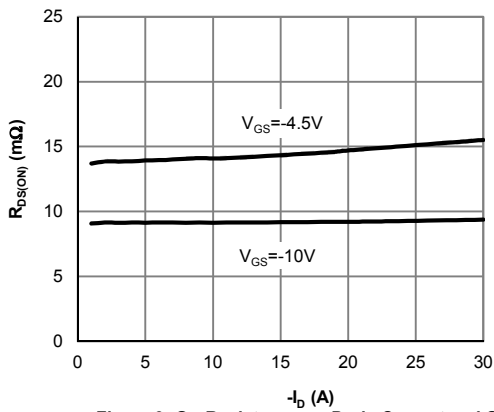


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

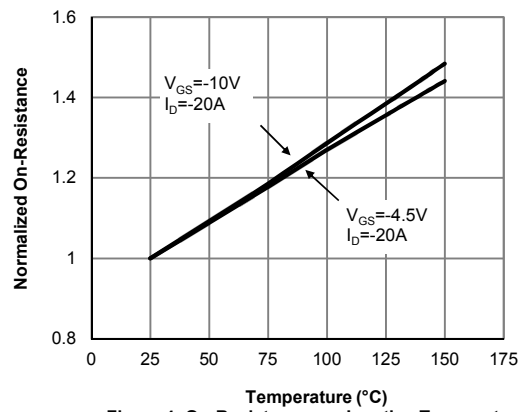


Figure 4: On-Resistance vs. Junction Temperature (Note E)

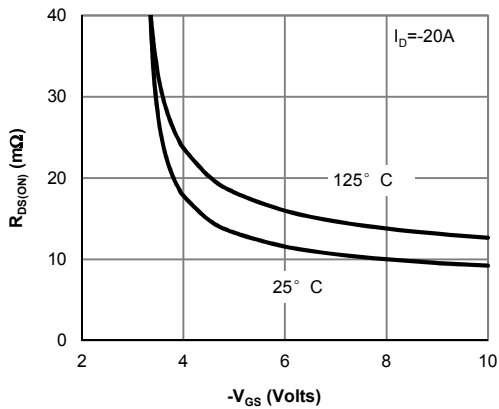


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

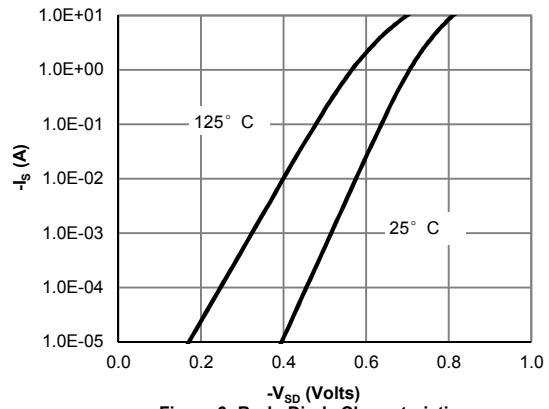


Figure 6: Body-Diode Characteristics (Note E)

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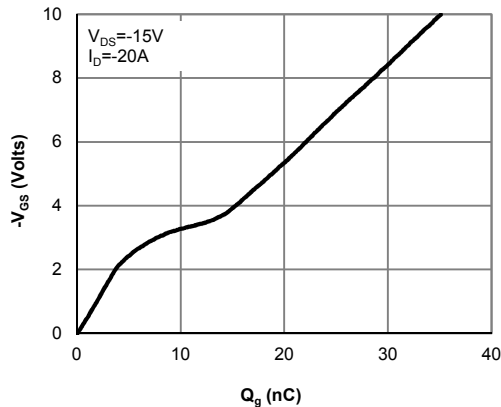


Figure 7: Gate-Charge Characteristics

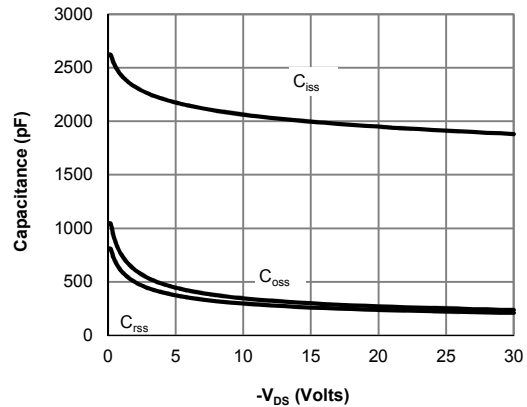


Figure 8: Capacitance Characteristics

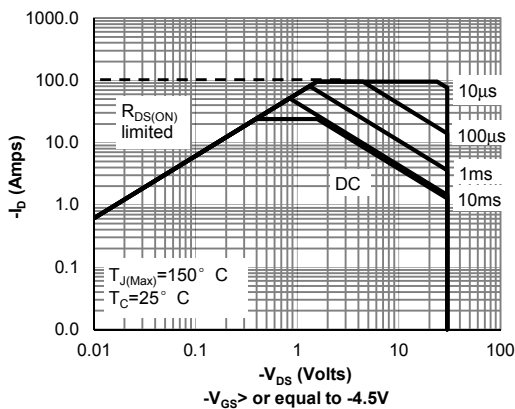


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

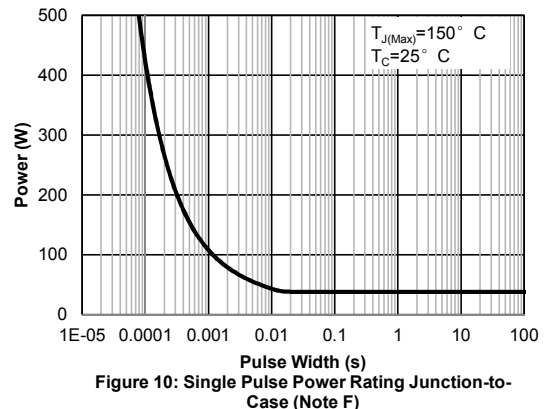


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

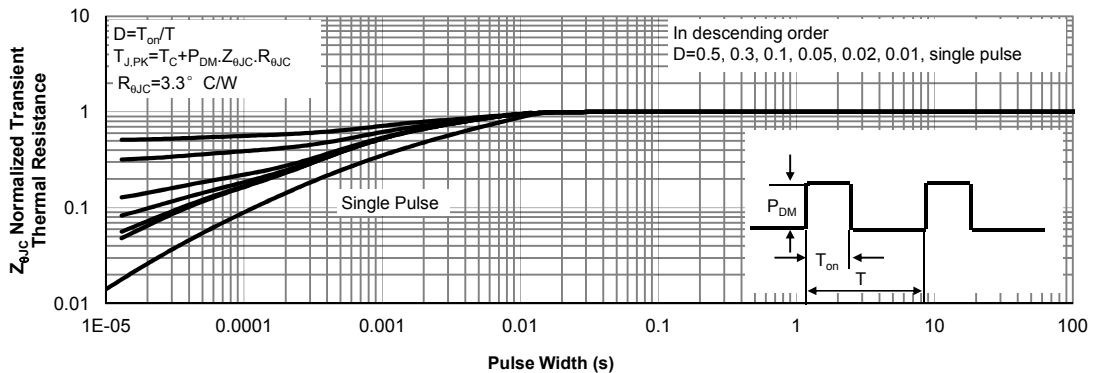


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

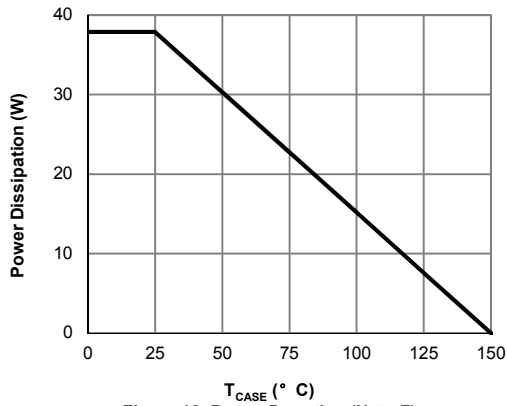


Figure 12: Power De-rating (Note F)

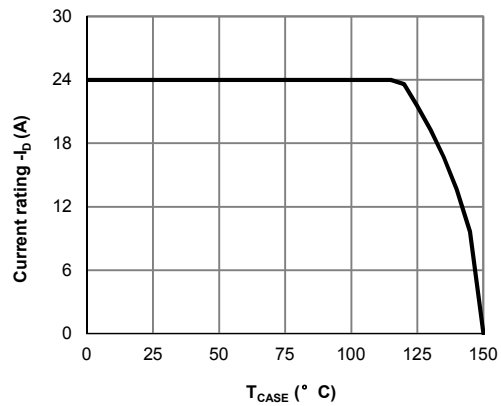


Figure 13: Current De-rating (Note F)

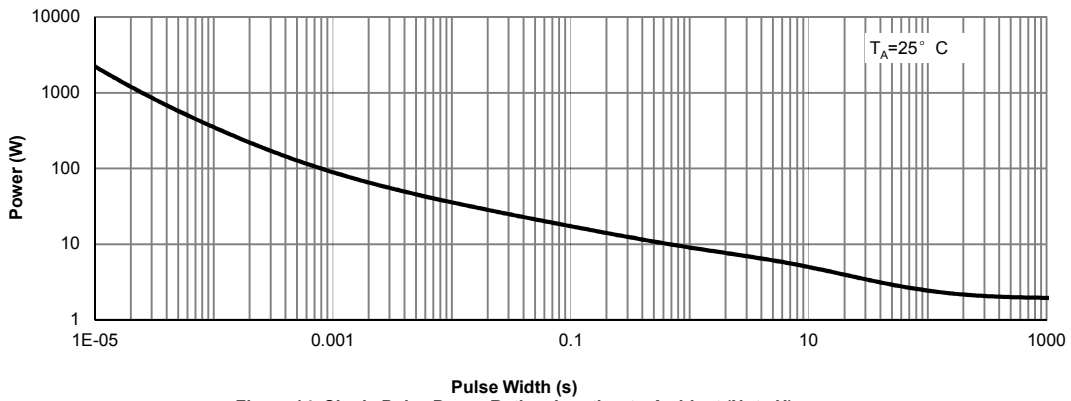


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

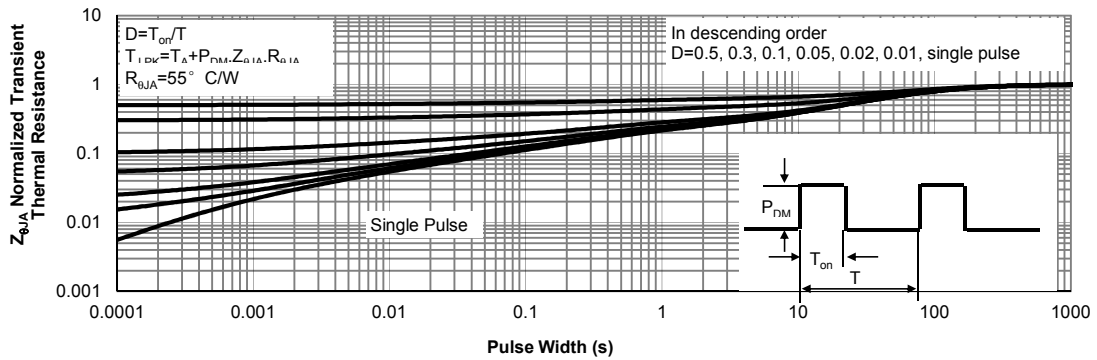
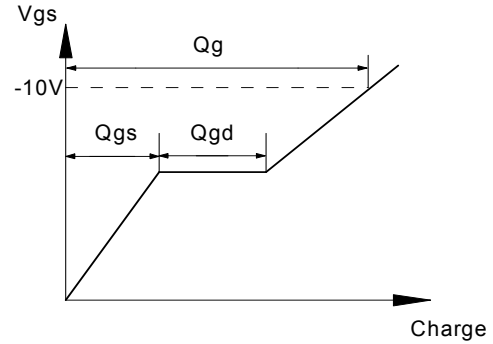
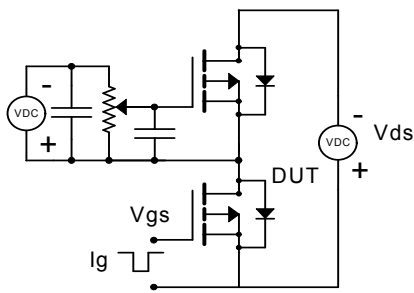
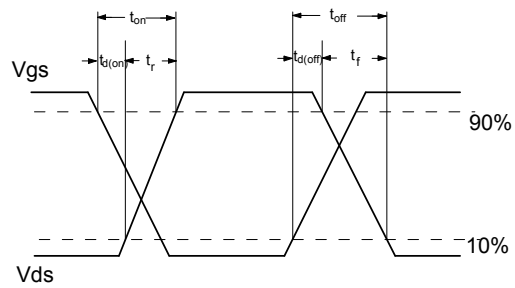
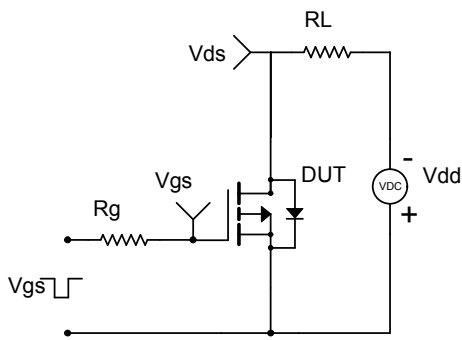


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

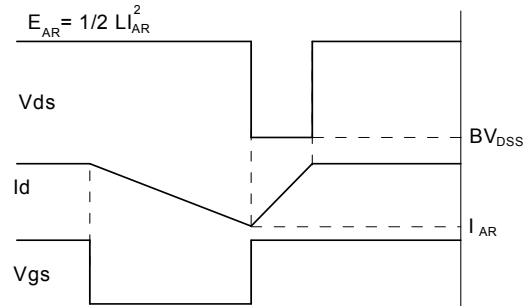
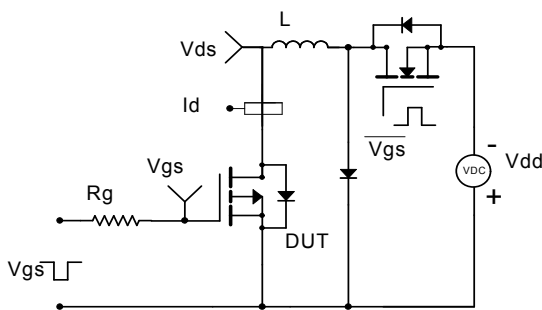
Gate Charge Test Circuit & Waveform



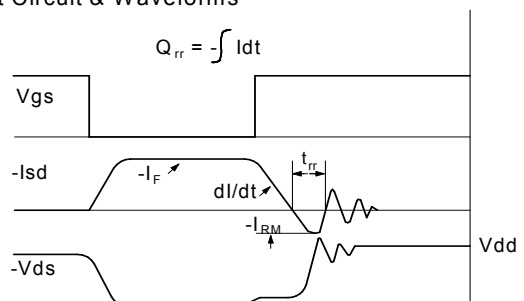
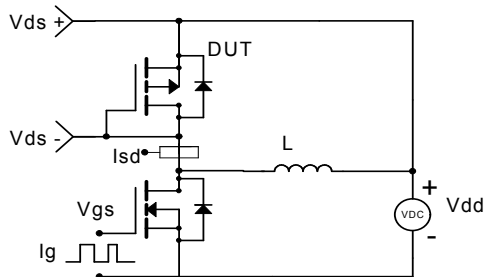
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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