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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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General Description

- Trench Power MV MOSFET technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications

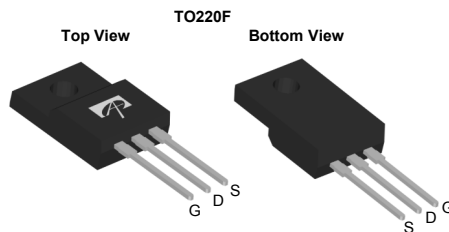
Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

Product Summary

V_{DS}	100V
I_D (at $V_{GS}=10V$)	41A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 10m Ω
$R_{DS(ON)}$ (at $V_{GS}=6V$)	< 12.5m Ω

100% UIS Tested
 100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOTF296L	TO-220F	Tube	1000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	41
		$T_C=100^\circ\text{C}$	29
Pulsed Drain Current ^C	I_{DM}	160	A
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$	10
		$T_A=70^\circ\text{C}$	8
Avalanche Current ^C	I_{AS}	40	A
Avalanche energy L=0.1mH ^C	E_{AS}	80	mJ
V_{DS} Spike	V_{SPIKE}	120	V
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	36.5
		$T_C=100^\circ\text{C}$	18
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ\text{C}$	2.2
		$T_A=70^\circ\text{C}$	1.4
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	10	15	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		Steady-State	45	55
Maximum Junction-to-Case	$R_{\theta JC}$	3.4	4.1	$^\circ\text{C/W}$

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	100			V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =100V, V _{GS} =0V T _J =55°C			1 5	μA	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±100	nA	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.3	2.9	3.4	V	
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		8.2	10	mΩ	
		V _{GS} =6V, I _D =20A		14.2	17.2		
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		62		S	
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V	
I _S	Maximum Body-Diode Continuous Current				41	A	
DYNAMIC PARAMETERS							
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, f=1MHz		2785		pF	
C _{oss}	Output Capacitance				238		pF
C _{riss}	Reverse Transfer Capacitance				12		pF
R _g	Gate resistance	f=1MHz	0.25	0.55	0.85	Ω	
SWITCHING PARAMETERS							
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A		37	52	nC	
Q _{gs}	Gate Source Charge			11.5		nC	
Q _{gd}	Gate Drain Charge			5		nC	
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =50V, R _L =2Ω, R _{GEN} =3Ω		13		ns	
t _r	Turn-On Rise Time			8.5		ns	
t _{D(off)}	Turn-Off DelayTime			29		ns	
t _f	Turn-Off Fall Time			4		ns	
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=500A/μs		35		ns	
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=500A/μs		210		nC	

A. The value of R_{θJA} is measured with the device mounted on 1 in² 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, 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(MAX)}=175° 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)}=175° 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)}=175° 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

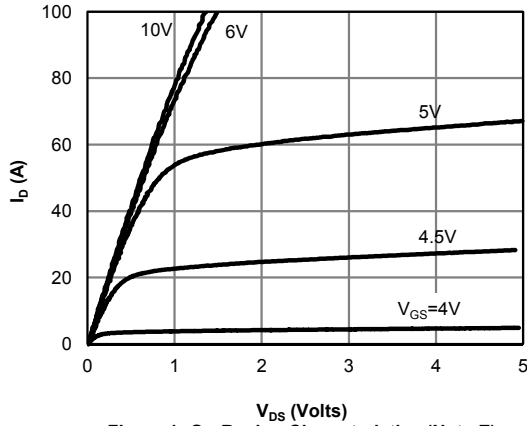


Figure 1: On-Region Characteristics (Note E)

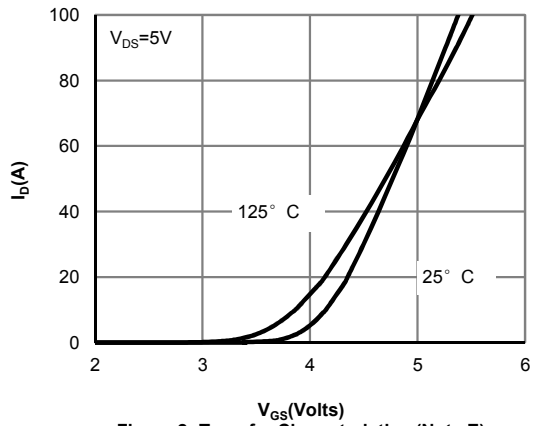


Figure 2: Transfer Characteristics (Note E)

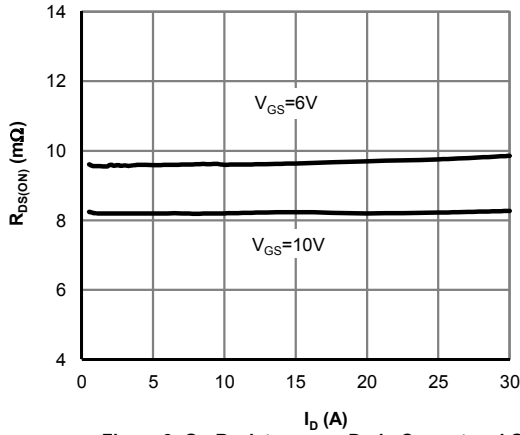


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

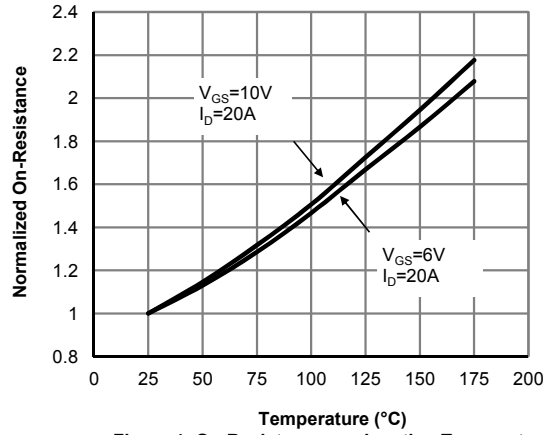


Figure 4: On-Resistance vs. Junction Temperature (Note E)

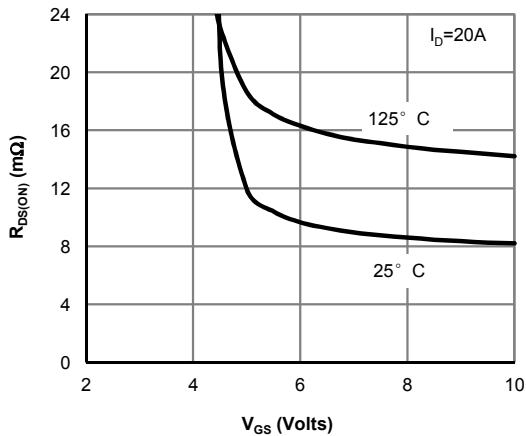


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

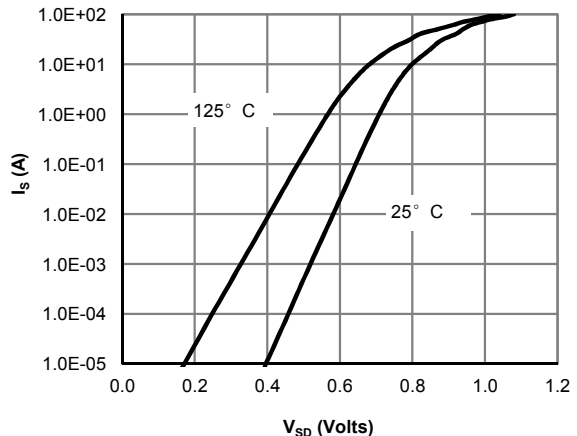


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

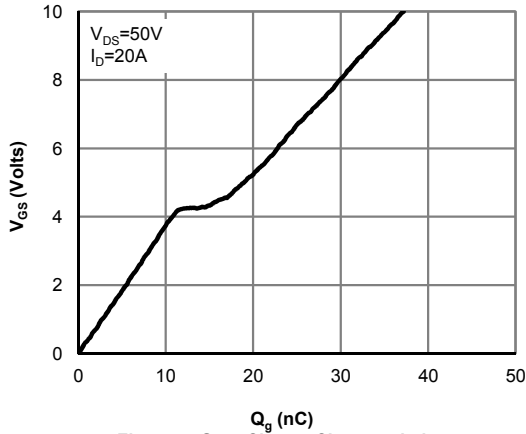


Figure 7: Gate-Charge Characteristics

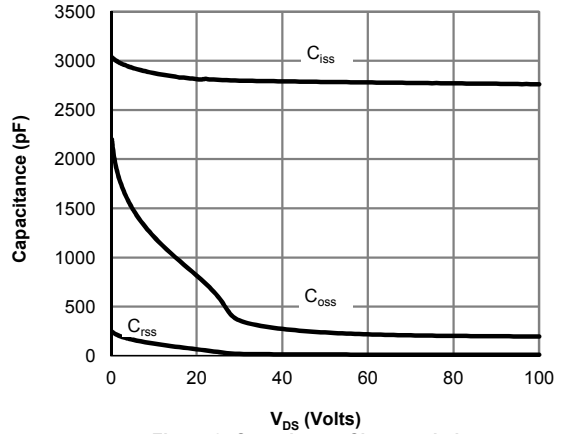


Figure 8: Capacitance Characteristics

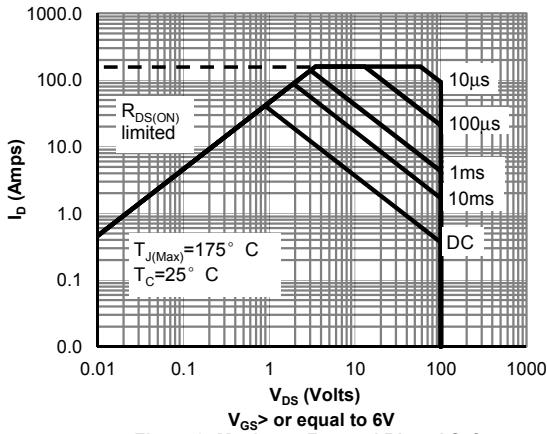


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

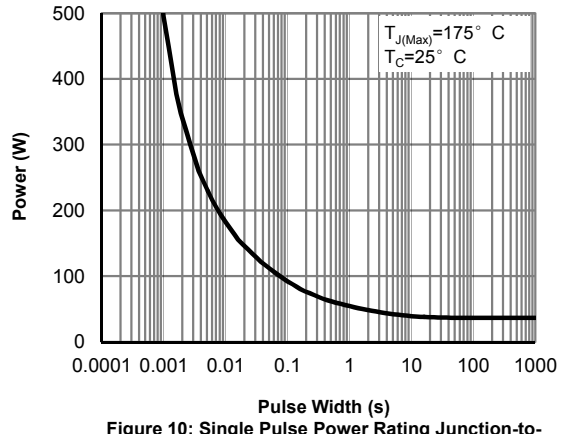


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

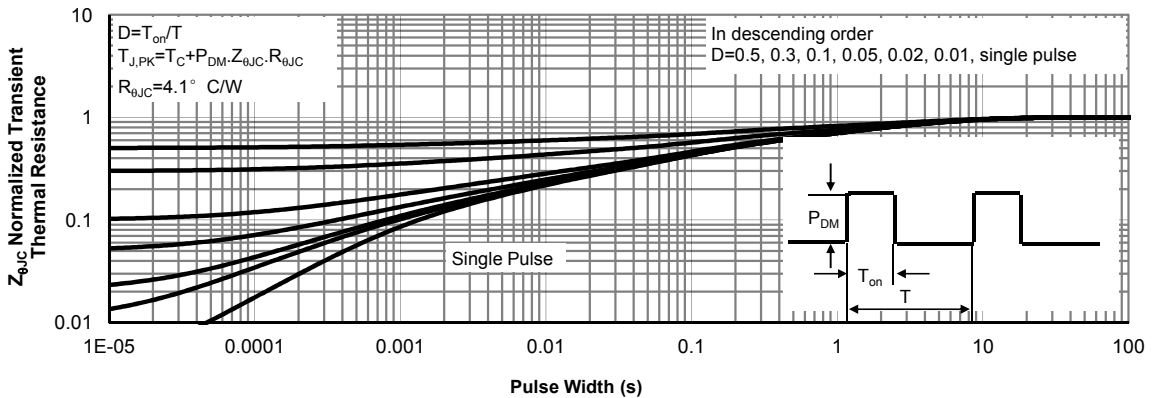


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

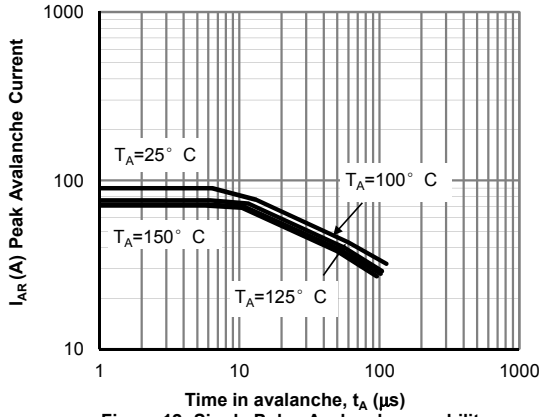


Figure 12: Single Pulse Avalanche capability (Note C)

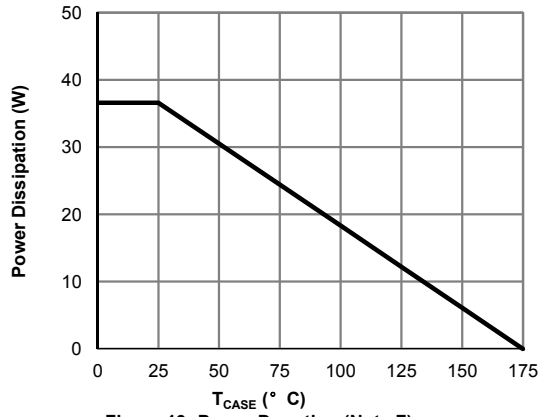


Figure 13: Power De-rating (Note F)

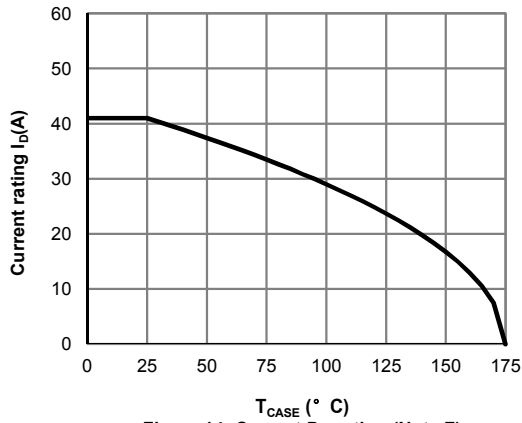


Figure 14: Current De-rating (Note F)

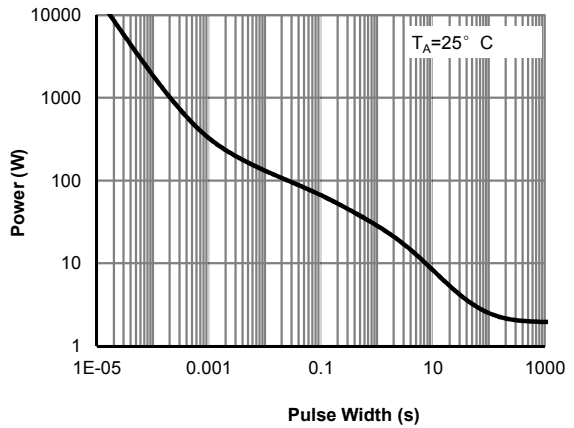


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

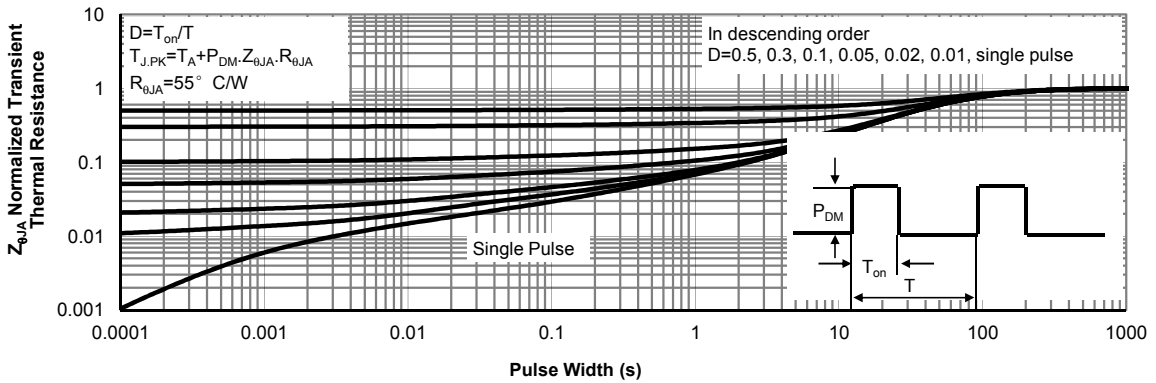
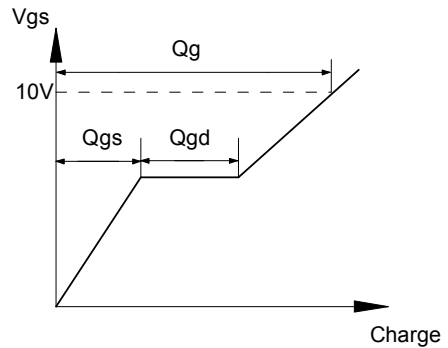
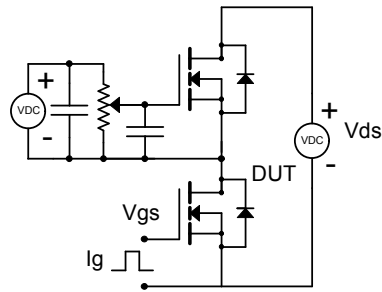
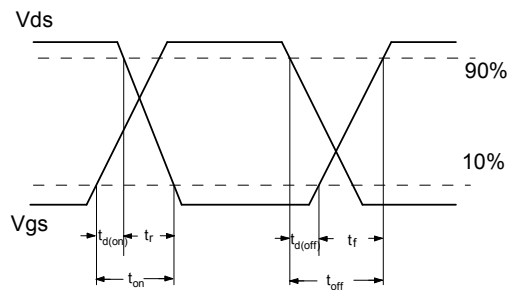
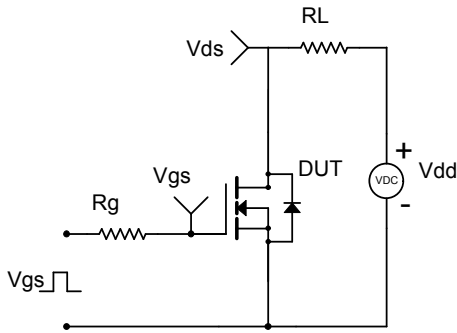


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

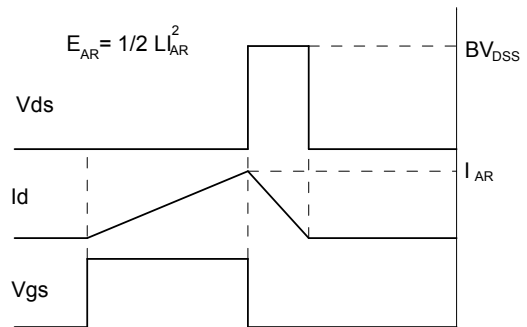
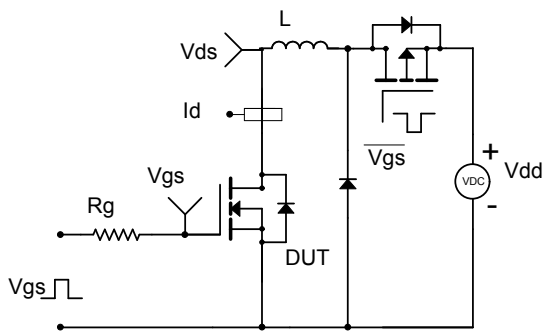
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

