

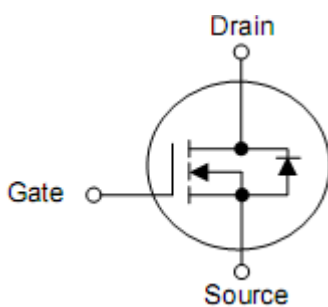
1. Features

- $R_{DS(ON)}=3.6m\Omega(\text{typ.})@V_{GS}=10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

2. Application

- PWM Application
- Load Switch
- Power Management

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KND3903A	TO-252	KIA

5. Absolute maximum ratings

$T_C=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DSS}	30	V
Continuous drain current	$T_C=25^{\circ}\text{C}$ I_D	85	A
	$T_C=100^{\circ}\text{C}$ I_D	55	A
Pulsed drain current -Pulsed ¹⁾	I_{DM}	360	A
Gate-source voltage	V_{GS}	± 20	V
Single pulse avalanche energy ²⁾	E_{AS}	90	mJ
Power dissipation ($T_C=25^{\circ}\text{C}$)	P_D	90	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to 175	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	$^{\circ}\text{C}$

*Drain current limited by maximum junction temperature.

6. Thermal Data

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	1.67	$^{\circ}\text{C/W}$

7. Electrical characteristics

($T_C=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-source leakage current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=24V, T_C=125^{\circ}\text{C}$	-	-	10	μA
Gate-source forward leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	3.6	5.0	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	5.2	7.0	m Ω
Input capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V$ $f=1\text{MHz}$	-	2705	-	pF
Output capacitance	C_{oss}		-	322	-	pF
Reverse transfer capacitance	C_{rss}		-	240	-	pF
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=15V$ $R_L=3\Omega, I_D=30A$ ³⁾	-	12	-	ns
Rise time	t_r		-	35	-	ns
Turn-off delay time	$t_{d(off)}$		-	42	-	ns
Fall time	t_f		-	15	-	ns
Total gate charge(10V)	Q_g	$V_{DS}=15V, I_D=30A$ $V_{GS}=10V$ ³⁾	-	40	-	nC
Gate-source charge	Q_{gs}		-	4	-	nC
Gate-drain charge	Q_{gd}		-	12	-	nC
Maximum Continuous Drain-Source Diode Forward Current	I_S	—	-	-	90	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	—	-	-	360	A
Diode forward voltage	V_{SD}	$I_{SD}=30A, V_{GS}=0V,$ $T_J=25^{\circ}\text{C}$	-	-	1.2	V
Reverse recovery time	T_{rr}	$I_F=20A$ $di/dt=100A/\mu s$	-	16	-	ns
Reverse recovery charge	Q_{rr}	$I_F=20A$ $dI_F/dt=100A/\mu s$	-	5	-	nC

Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=15V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=19A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

8. Typical Electrical Characteristics

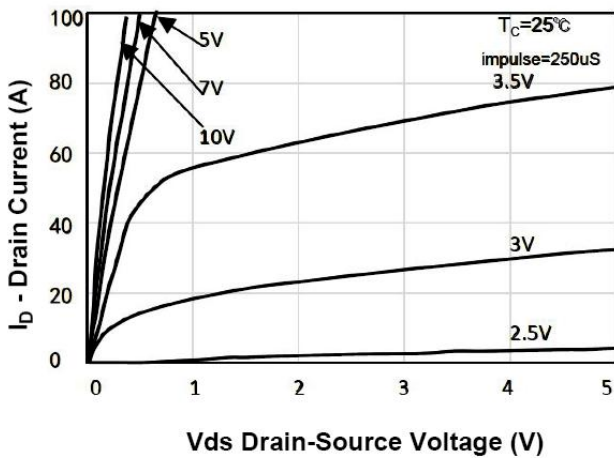


Figure 1. On-Region Characteristics

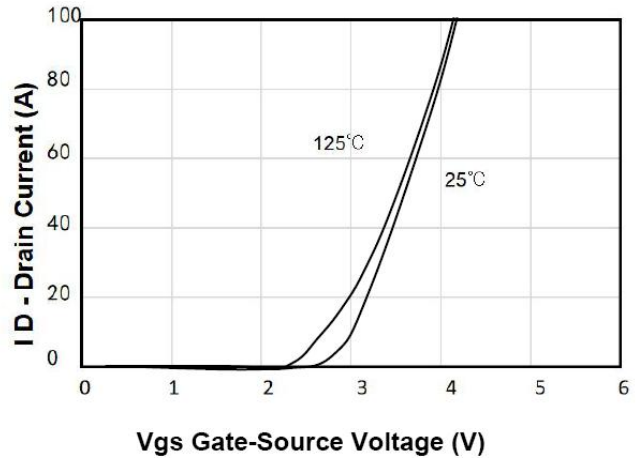


Figure 2. Transfer Characteristics

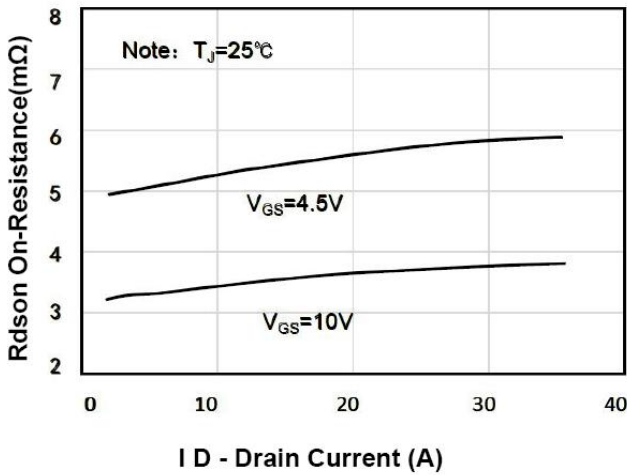


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

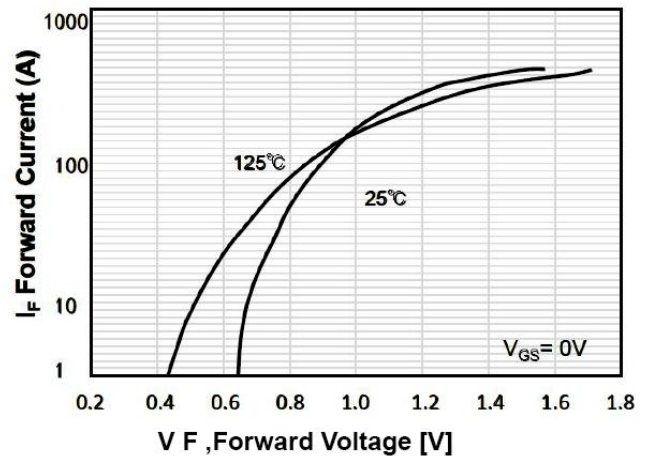


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

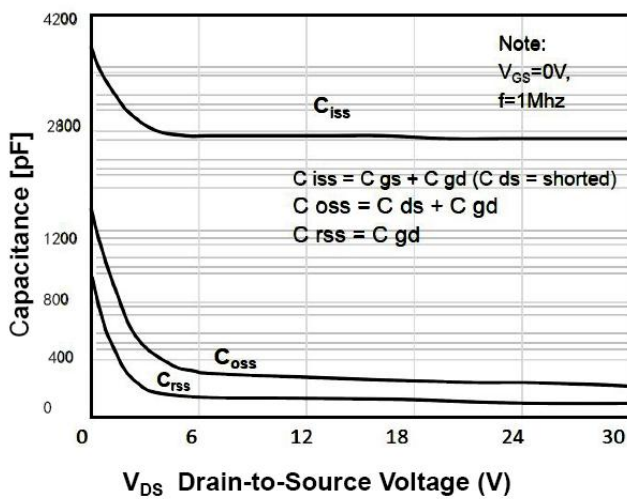


Figure 5. Capacitance Characteristics

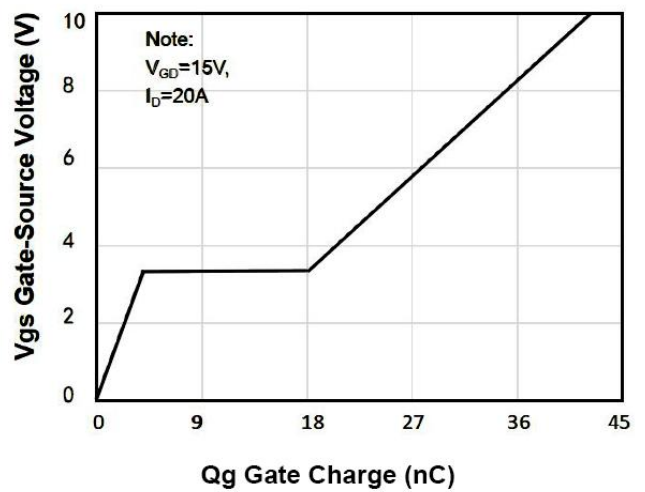


Figure 6. Gate Charge Characteristics

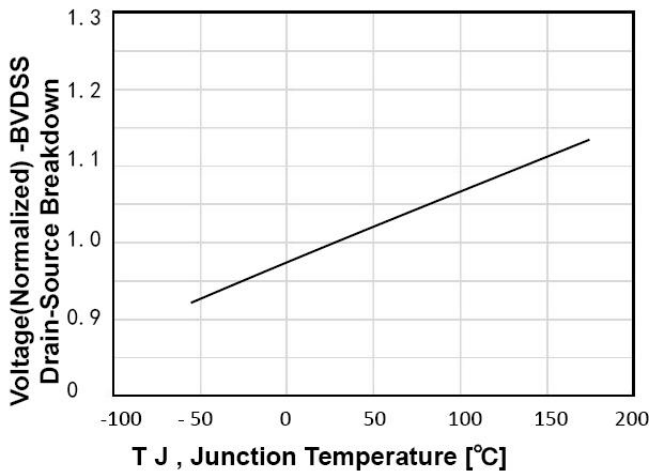


Figure 7. Breakdown Voltage Variation vs Temperature

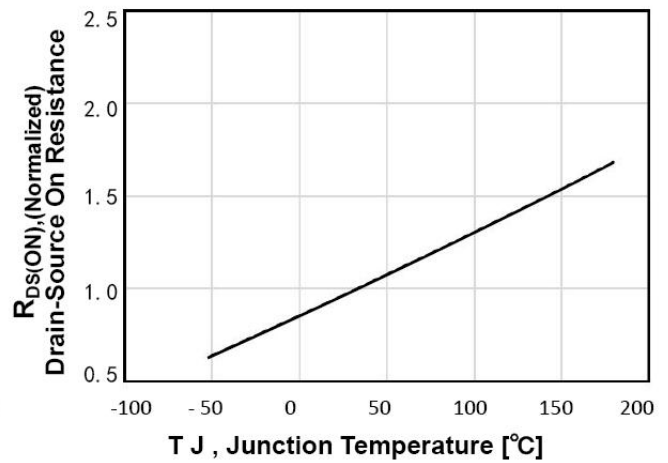


Figure 8. On-Resistance Variation vs Temperature

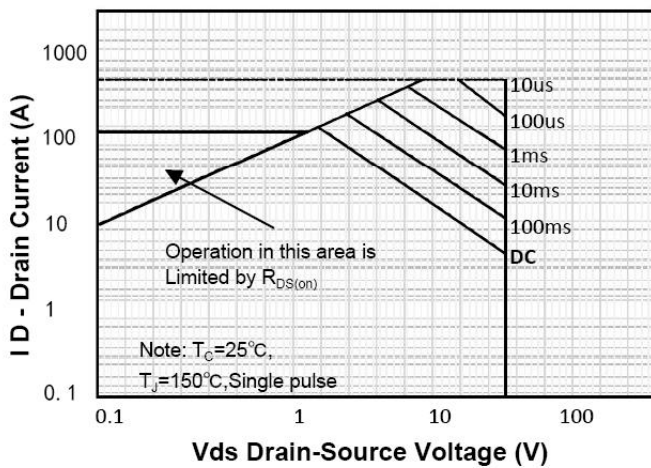


Figure 9. Maximum Safe Operating Area

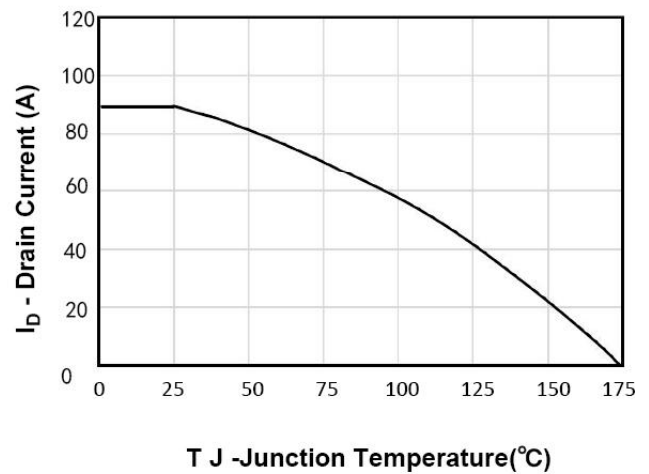


Figure 10. Maximum PContinuous Drain Current vs Case Temperature

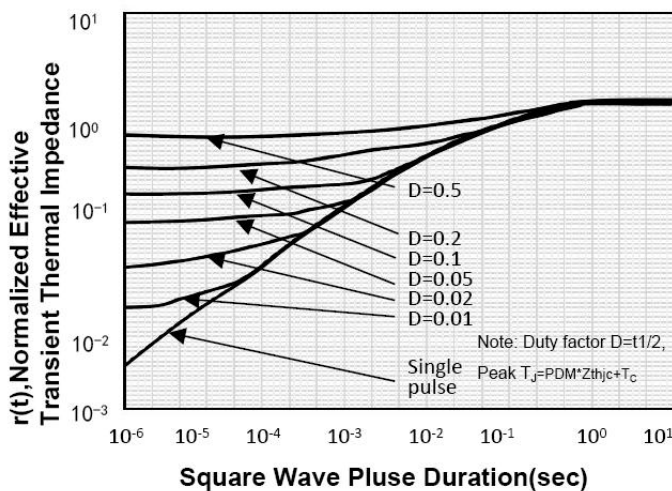
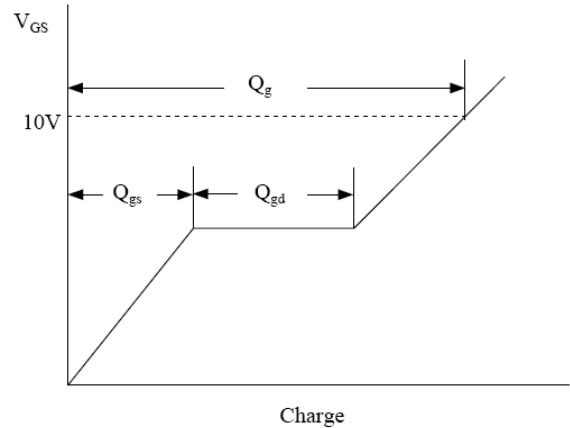
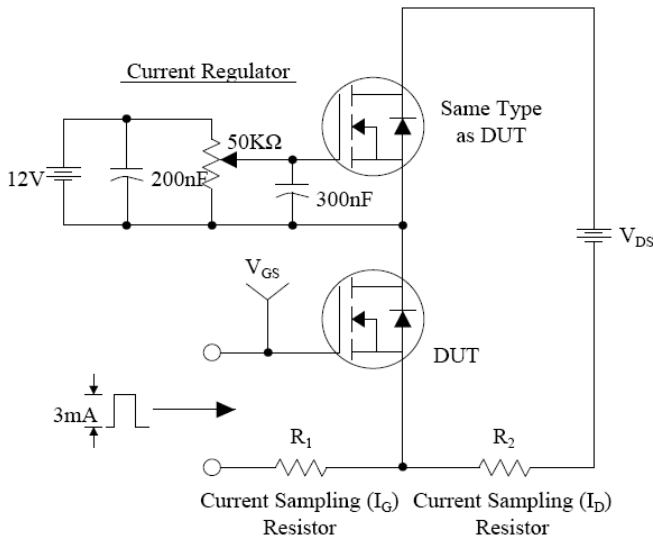


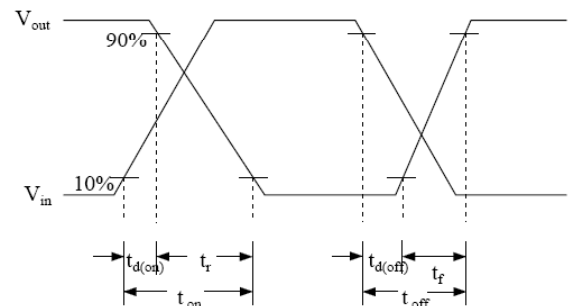
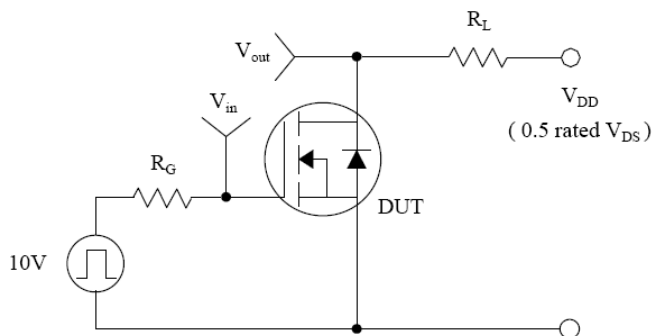
Figure 11. Transient Thermal Response Curve

9. Test Circuits and Waveforms

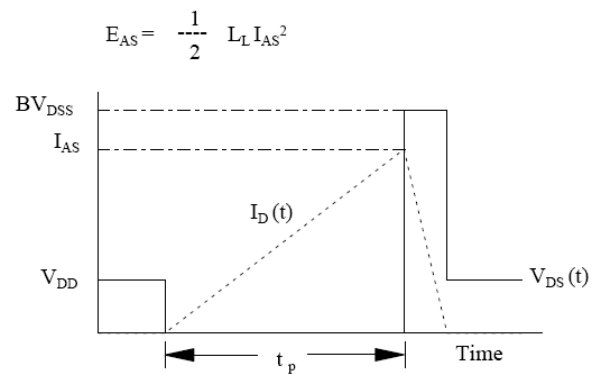
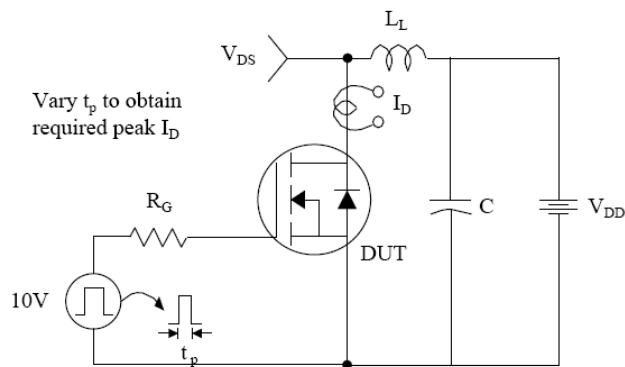
Gate Charge Test Circuit & Waveform



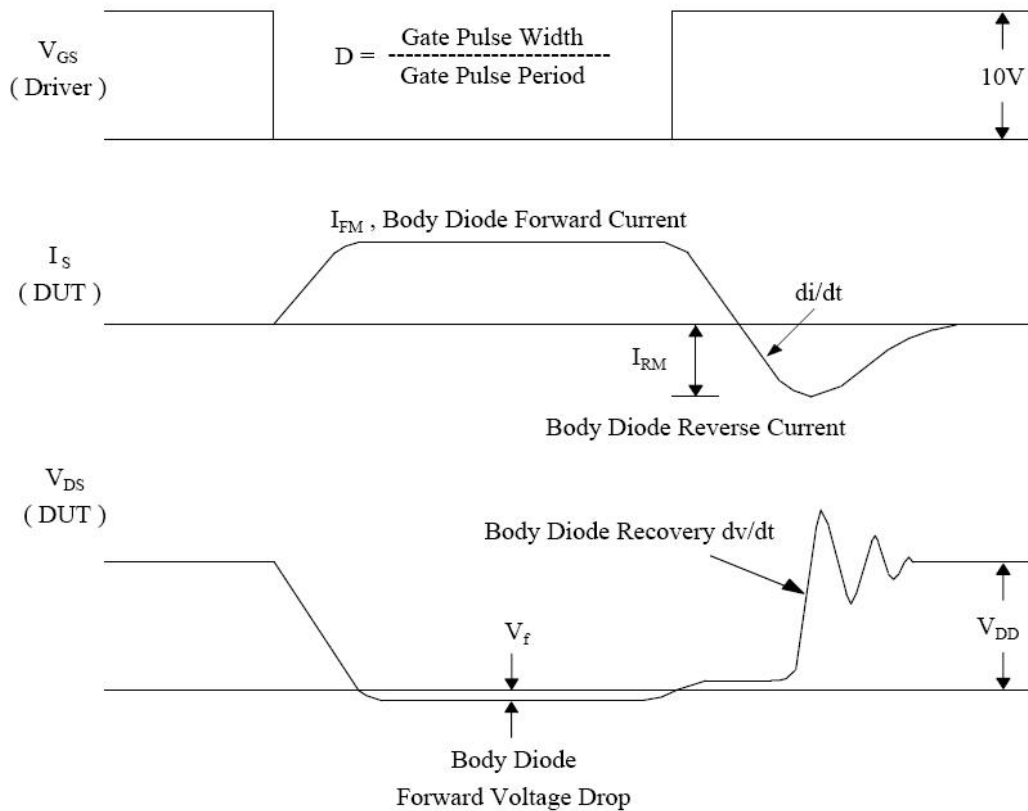
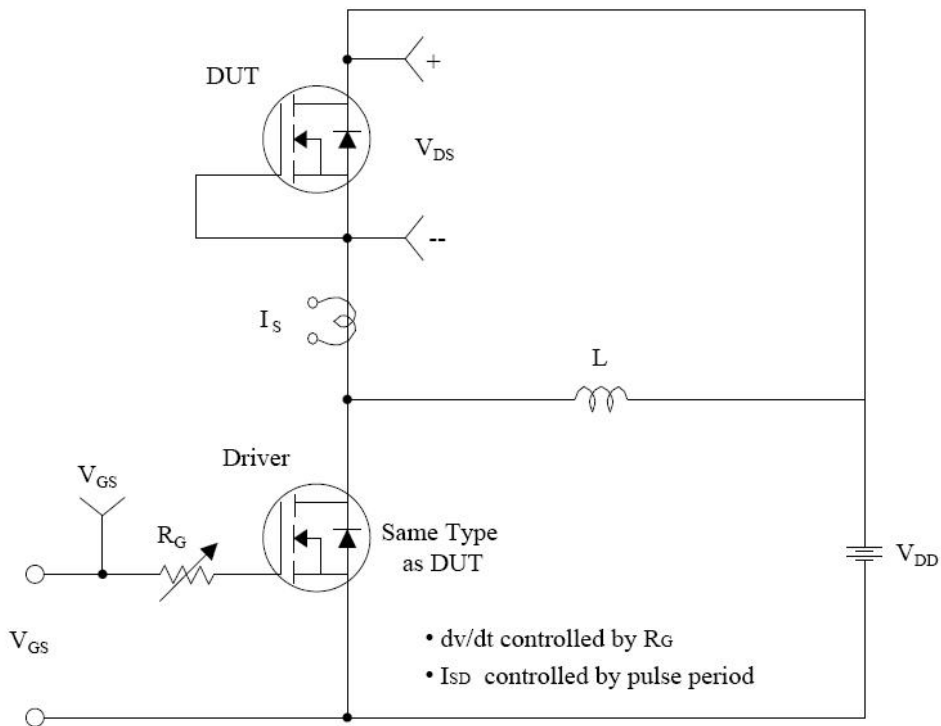
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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