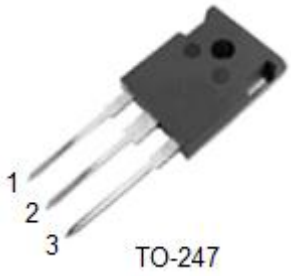
1. Features

- Fast Switching
- $R_{DS(ON)}$=1.2Ω(typ.)@V_{GS}=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

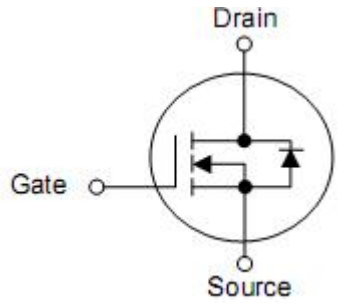
2. Applications

- Adaptor
- Choppers
- SMPS Standby Power

3. Symbol



TO-247



Pin	Function
1	Gate
2	Drain
3	Source

4. Ordering Information

Part Number	Package	Brand
KNM63120A	TO-247	KIA

5. Absolute maximum ratings

T_C=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-source voltage		V_{DSS}	1200	V
Gate-to-Source Voltage		V_{GSS}	±30	V
Continuous drain current	T_C=25°C	I_D	12	A
	T_C=100°C	I_D	7	A
Pulsed Drain Current at V_{GS}=10V [2),4)]		I_{DM}	48	A
Single pulse avalanche energy		E_{AS}	700	mJ
Peak Diode Recovery dv/dt [3)]		dv/dt	5.0	V/ns
Power dissipation		P_D	380	W
Derate above 25°C			3.04	W/°C
Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds		T_L T_{PAK}	300 260	°C
Operating junction and storage temperature range		T_J ,T_{STG}	-55 to150	ºC

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

6. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance junction-case	$R_{\theta JC}$	0.329	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	ºC/W

7. Electrical characteristics

(T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	1200	-	-	V
Drain-source leakage current	I_{DSS}	V_{DS}=1200V, V_{GS}=0V	-	-	10	uA
		V_{DS}=960V, T_C=125°C			250	
Gate-source forward leakage	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Drain-source on-resistance 3)	$R_{DS(on)}$	V_{GS}=10V,I_D=6A	-	1.2	1.4	Ω
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.5	-	4.5	V
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=6A	-	15	-	S
Input capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V f=1MHz	-	3300	-	pF
Reverse transfer capacitance	C_{rss}		-	48	-	pF
Output capacitance	C_{oss}		-	305	-	pF
Total gate charge	Q_g	V_{DD}=600V, I_D=6A V_{GS}=0~10V	-	80	-	nC
Gate-source charge	Q_{gs}		-	19	-	nC
Gate-drain charge	Q_{gd}		-	36	-	nC
Turn-on delay time	$t_{d(on)}$	V_{DD}=600V,V_{GS}=15V, R_G=4.7Ω, I_D=6A		16		ns
Rise time	t_r			10		ns
Turn-off delay time	$t_{d(off)}$			52		ns
Fall time	t_f			34		ns
Continuous Source Current 2)	I_{SD}	Integral PN-diode in MOSFET			12	A
Pulsed Source Current2)	I_{SM}		-	-	48	
Diode forward voltage	V_{SD}	I_S=12A,V_{GS}=0V,	-	-	1.5	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_F=12A, dI_F/dt=100A/μs	-	1400	-	nS
Reverse Recovery Charge	Q_{rr}		-	18	-	uC

Note:
1) T_J=+25°C to +150°C.
2) Silicon limited current only.
3) Package limited current.
4) Repetitive rating; pulse width limited by maximum junction temperature.
5) Pulse width≤380Us; duty cycle≤2%.

8. Typical operating characteristics

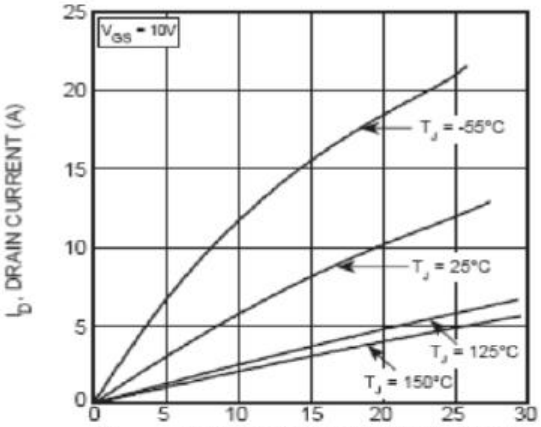


Figure 1, Output Characteristics

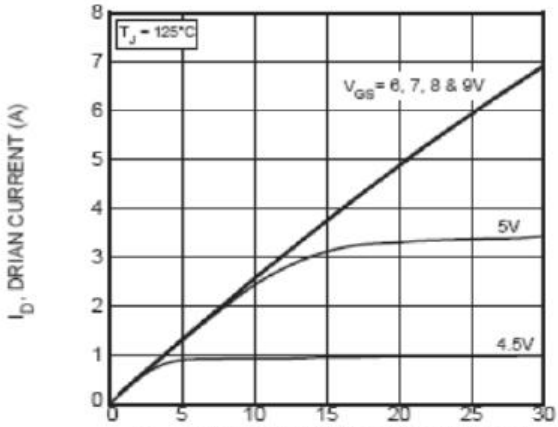


Figure 2, Output Characteristics

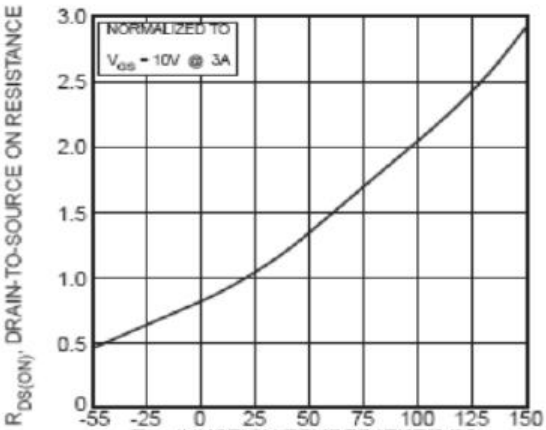


Figure 3, $R_{DS(ON)}$ vs Junction Temperature

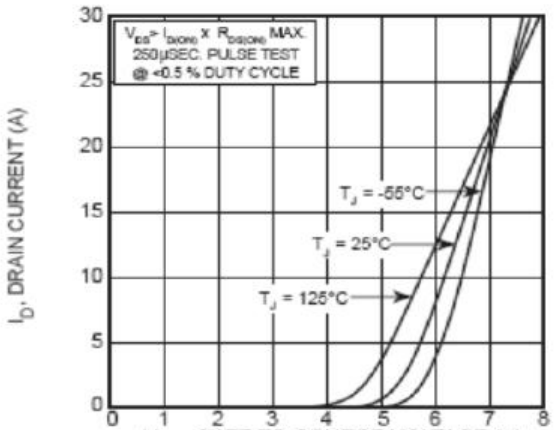


Figure 4, Transfer Characteristics

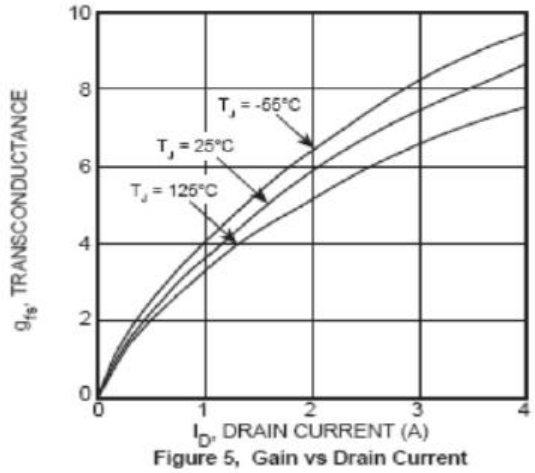


Figure 5, Gain vs Drain Current

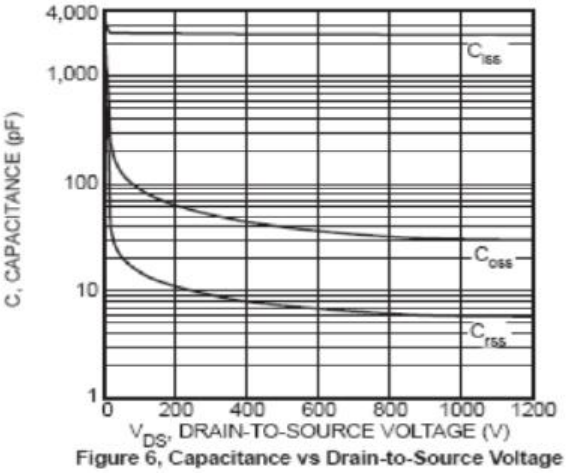


Figure 6, Capacitance vs Drain-to-Source Voltage

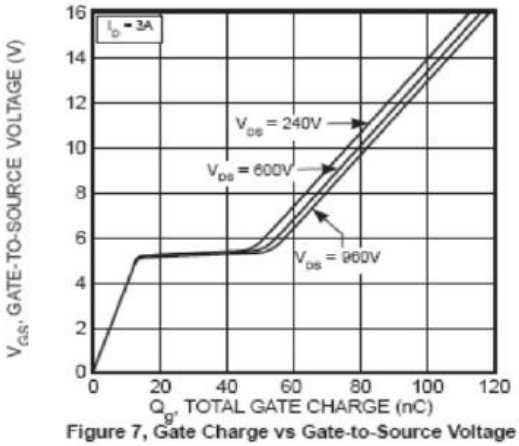


Figure 7, Gate Charge vs Gate-to-Source Voltage

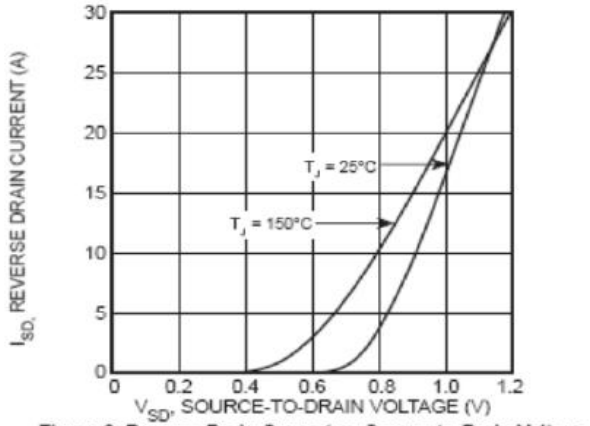


Figure 8, Reverse Drain Current vs Source-to-Drain Voltage

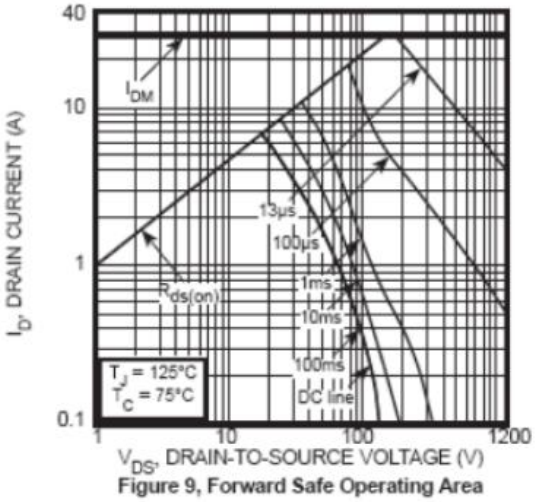


Figure 9, Forward Safe Operating Area

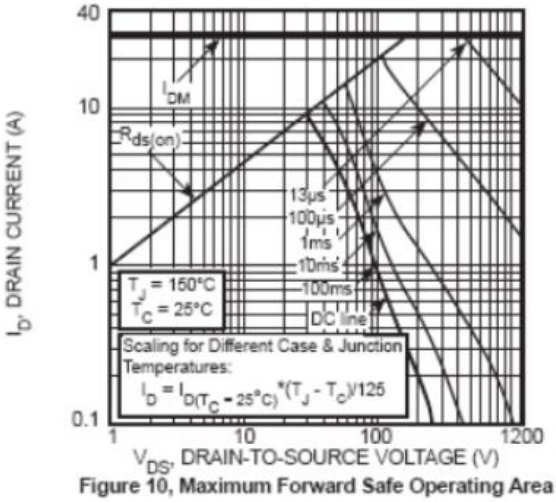


Figure 10, Maximum Forward Safe Operating Area

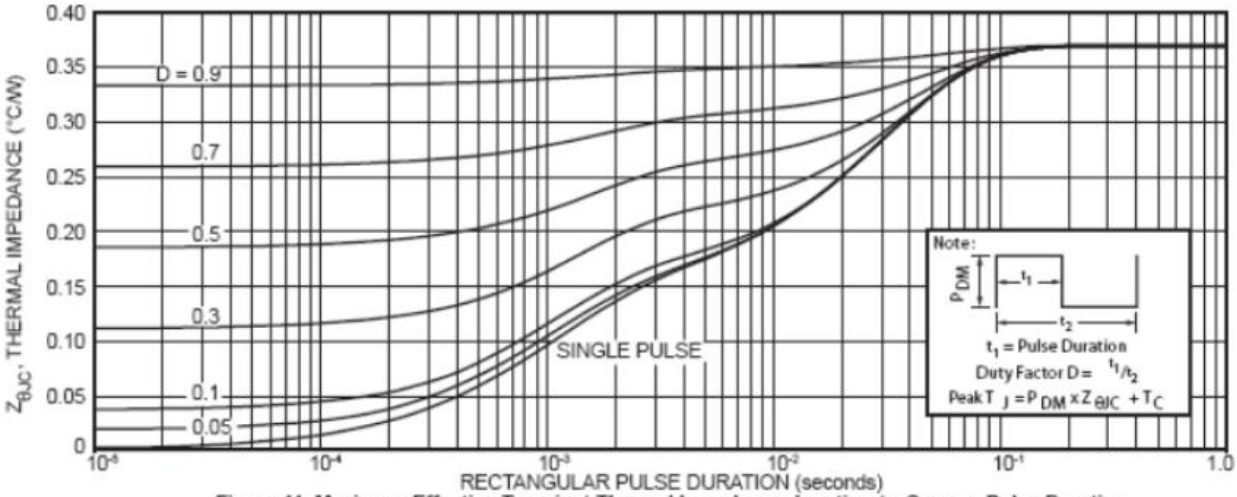


Figure 11. Maximum Effective Transient Thermal Impedance Junction-to-Case vs Pulse Duration

9. Test Circuits and Waveforms

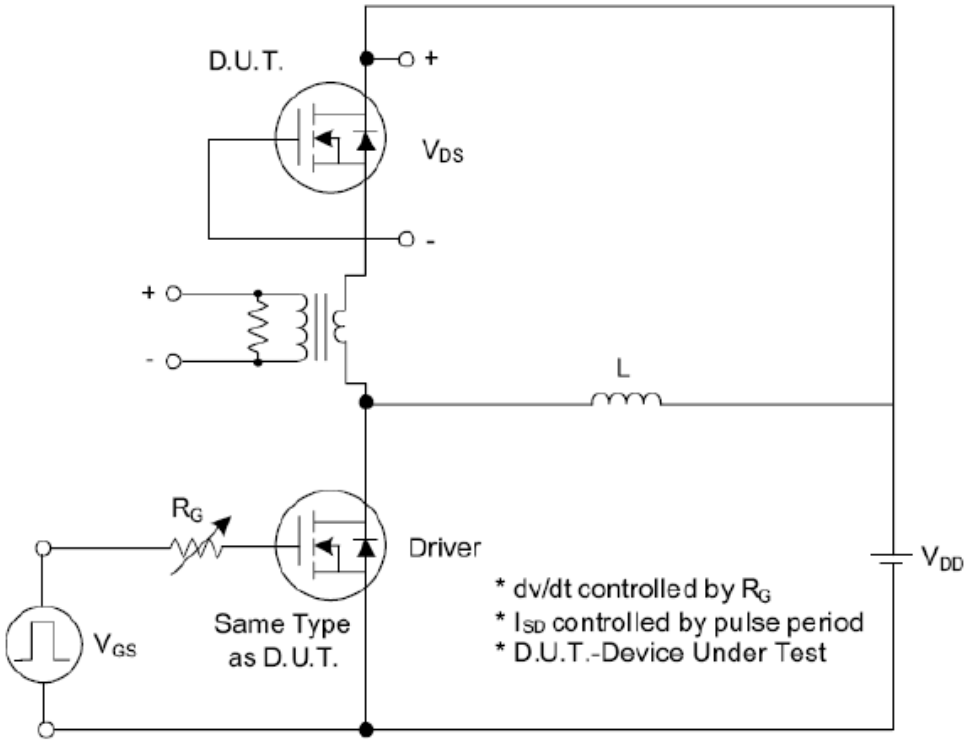


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

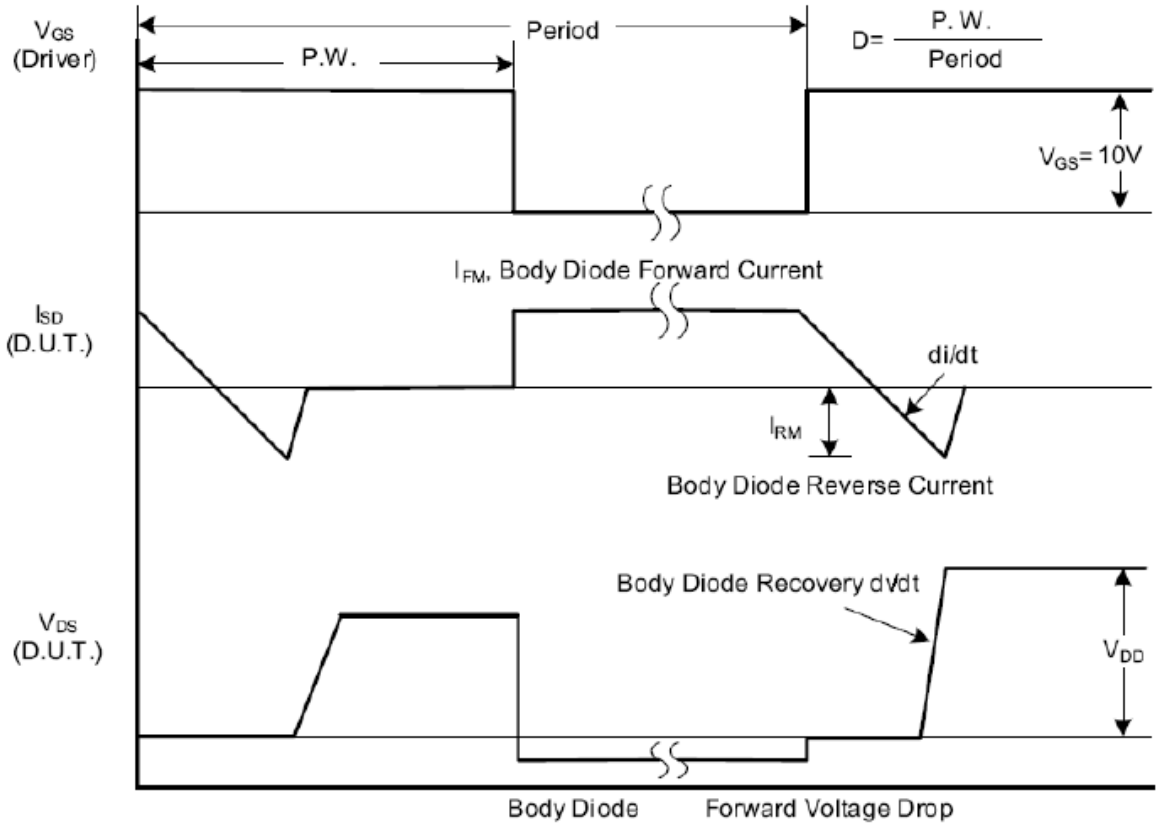


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

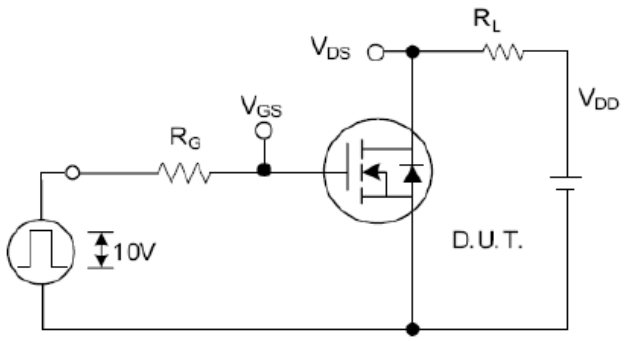


Fig. 2.1 Switching Test Circuit

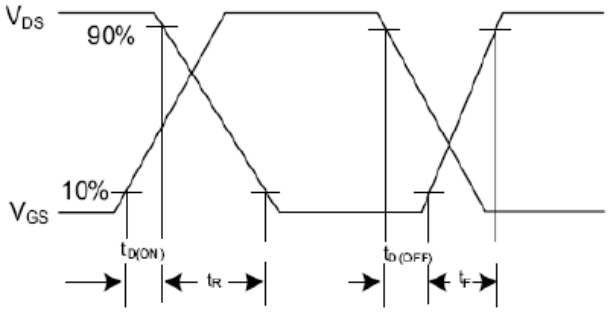


Fig. 2.2 Switching Waveforms

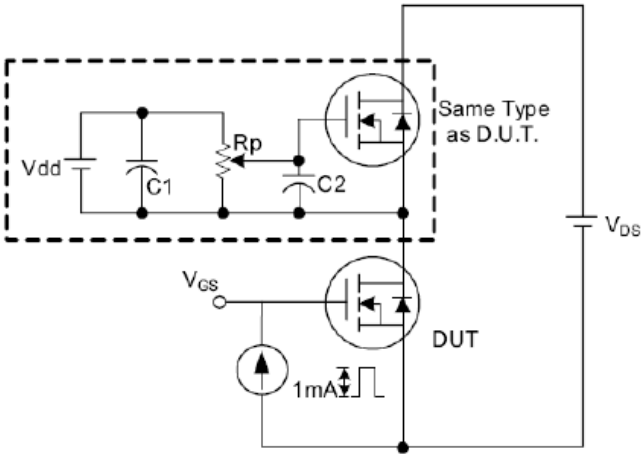


Fig. 3 . 1 Gate Charge Test Circuit

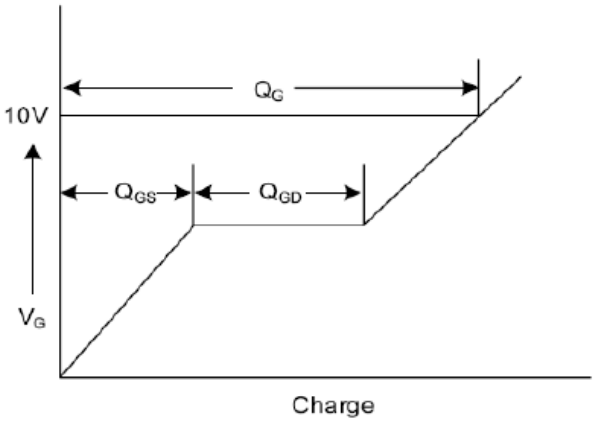


Fig. 3 . 2 Gate Charge Waveform

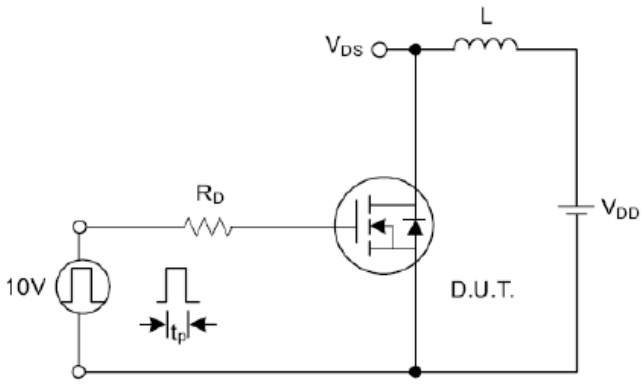


Fig. 4.1 Unclamped Inductive Switching Test Circuit

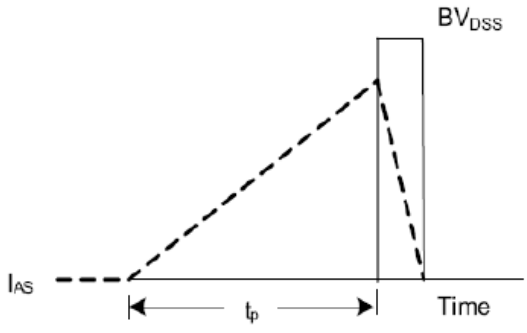


Fig. 4.2 Unclamped Inductive Switching Waveforms