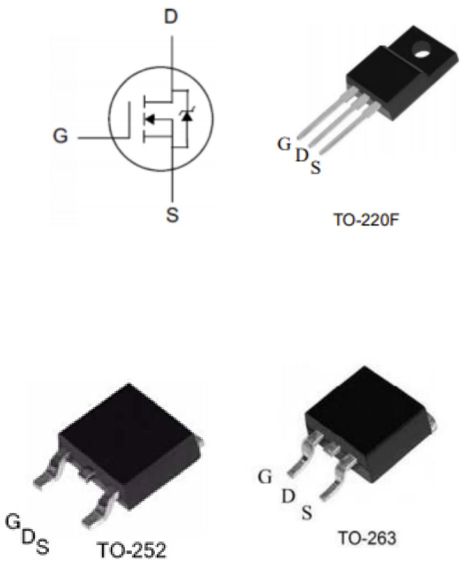
1200V N-Channel MOSFET

封装 Package



Product Description

BV_{DSS}	1200	V
I_D	3.0	A
$R_{DS(ON),Typ.}$	6	Ω

General Features

- RoHS Compliant
- $R_{DS(ON),typ.}$=6Ω @V_{GS}=10V
- Fast Recovery Body Diode
- Low Gate Charge Minimize Switching Loss

Applications

- Charger
- Adaptor
- SMPS Standby Power

Part Number	Package
HYA03N120	TO-220F
HYD03N120	TO-252
HYB03N120	TO-263

Absolute Maximum Ratings T_j=25℃

Symbol	Parameter	Value			Unit
		TO-252	TO-220F	TO-263	
V_{DSS}	Drain-to-Source Voltage	1200			V
V_{GSS}	Gate-to-Source Voltage	±30			
I_D	Continuous Drain Current	3			A
I_{DM}	Pulsed Drain Current at V_{GS}=10V	12			
E_{AS}	Single Pulse Avalanche Energy	100			mJ
P_D	Power Dissipation	75	30	90	W
	Derating Factor above 25℃	0.6	0.24	0.72	W/℃
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300			℃
T_J& T_{STG}	Operating and Storage Temperature Range	-55 to 150			

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

Thermal Characteristics

Symbol	Parameter	Value			Unit
		TO-252	TO-220F	TO-263	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.67	4.17	1.38	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	75	100	65	℃/W

Electrical Characteristics T_j=25℃

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	1200	-	-	V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	uA	V_{DS}=1200V, V_{GS}=0V
		-	-	100		V_{DS}=960V, V_{GS}=0V, T_J =125℃
I_{GSS}	Gate-to-Source Leakage Current	-	-	+100	nA	V_{GS}=+30V, V_{DS}=0V
		-	-	-100		V_{GS}=-30V, V_{DS}=0V

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	6.0	7.5	Ω	V_{GS}=10V, I_D=1.5A
$V_{GS(TH)}$	Gate Threshold Voltage	2.5	-	4.5	V	V_{DS}=V_{GS}, I_D=250uA
gfs	Forward Transconductance	-	4	-	S	V_{DS}=20V,I_D=1.5A

Dynamic Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	860	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{rss}	Reverse Transfer Capacitance	-	22	-		
C_{oss}	Output Capacitance	-	60	-		
Q_g	Total Gate Charge	-	17.5	-	nC	V_{DD}=600V, I_D=3A, V_{GS}=0 to 10V
Q_{gs}	Gate-to-Source Charge	-	5	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	5.5	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	17	-	ns	V_{DD}=600V, I_D=3A, V_{GS}=10V Rg=4.7Ω
t_{rise}	Rise Time	-	6	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	23	-		
t_{fall}	Fall Time	-	11	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current[1]	-	-	3	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current[1]	-	-	12		
V_{SD}	Diode Forward Voltage	-	-	1.5	V	I_S=3A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	-	200	-	ns	V_{GS}=0V I_F= I_S, di_F/dt=100A/μs
Q_{rr}	Reverse Recovery Charge	-	760	-	nC	

[1] Pulse width≤380μs; duty cycle≤2%

Typical Characteristics

Fig. 1. Output Characteristics @ T_J = 25°C

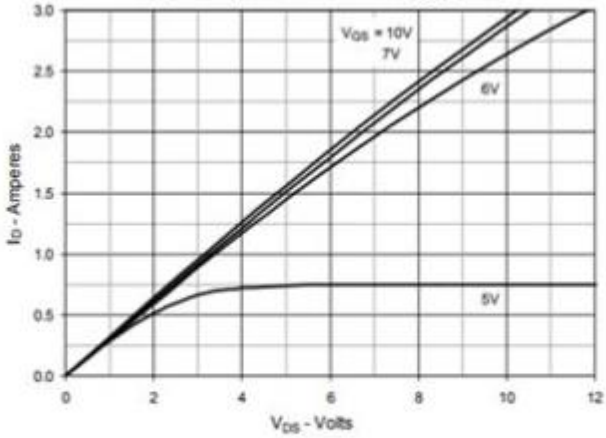


Fig. 2. Extended Output Characteristics @ T_J = 25°C

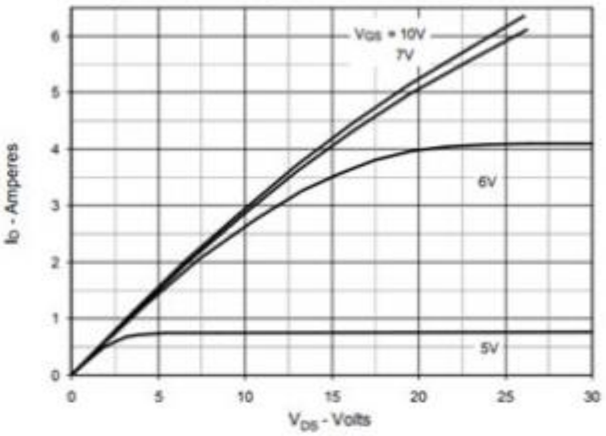


Fig. 3. Output Characteristics @ T_J = 125°C

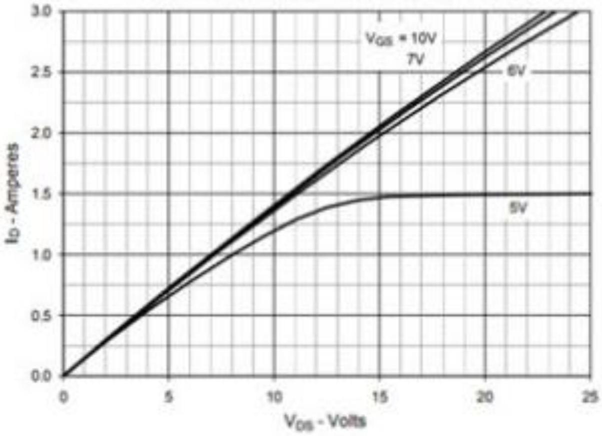


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 1.5A Value vs. Junction Temperature

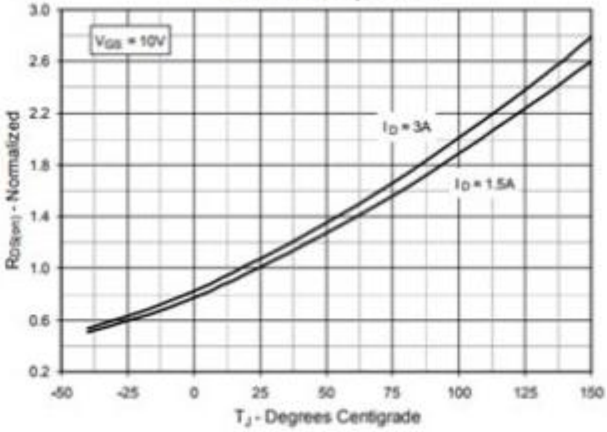


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 1.5A Value vs. Drain Current

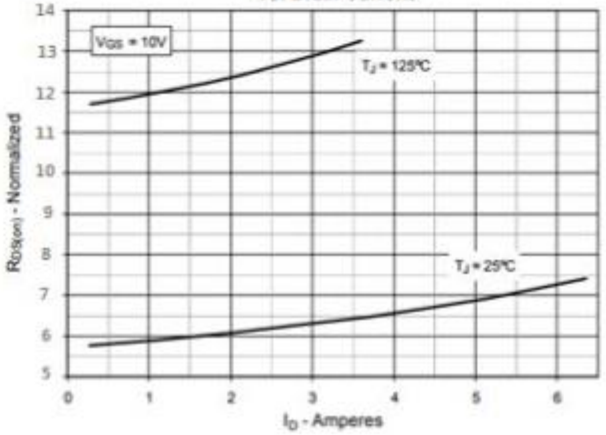
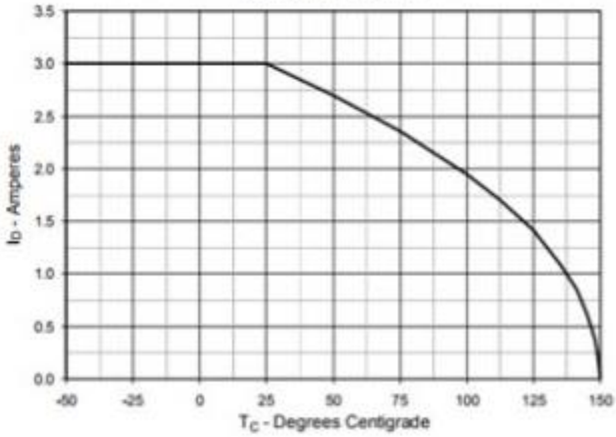


Fig. 6. Maximum Drain Current vs. Case Temperature



Typical Characteristics

Fig. 7. Input Admittance

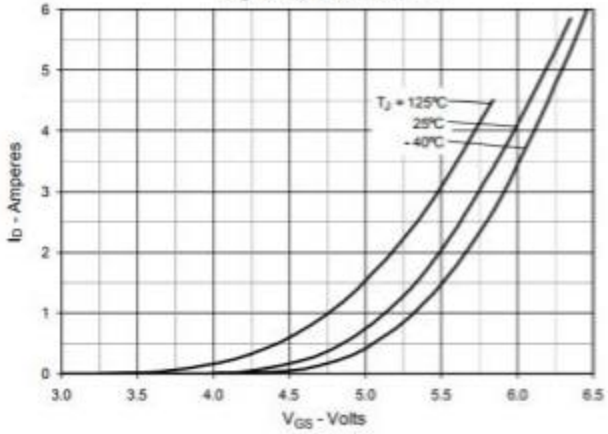


Fig. 8. Transconductance

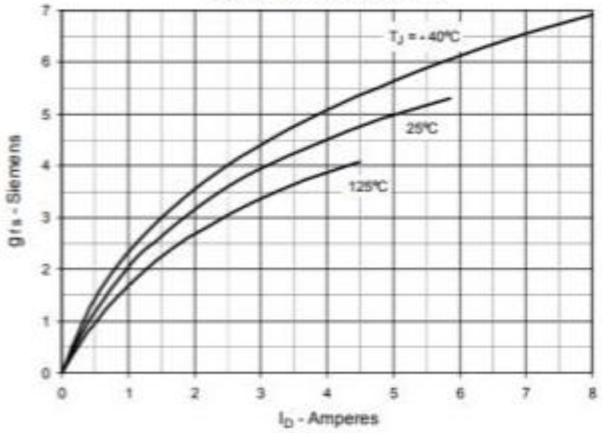


Fig. 9. Forward Voltage Drop of Intrinsic Diode

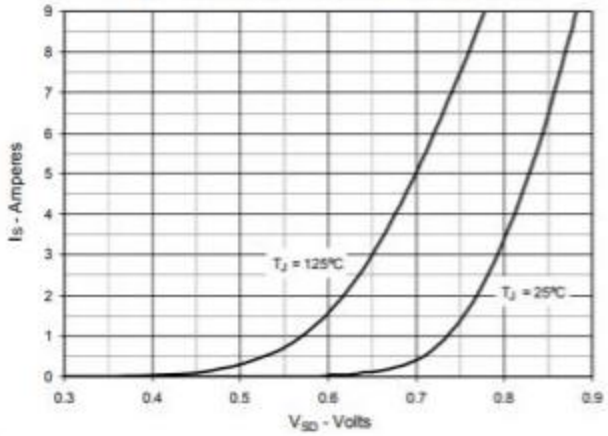


Fig. 10. Gate Charge

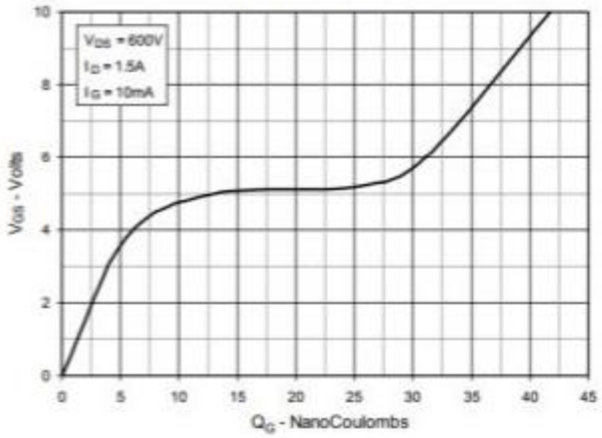


Fig. 11. Capacitance

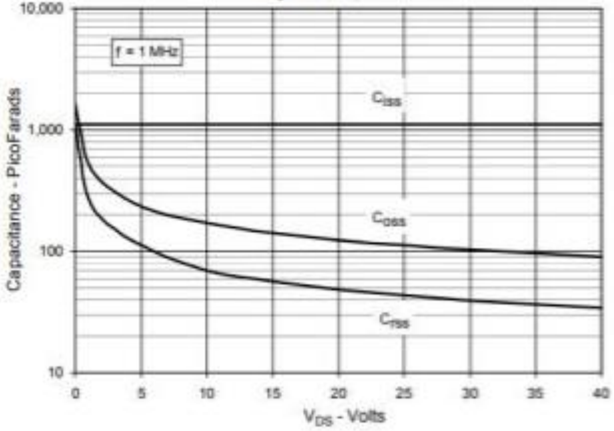
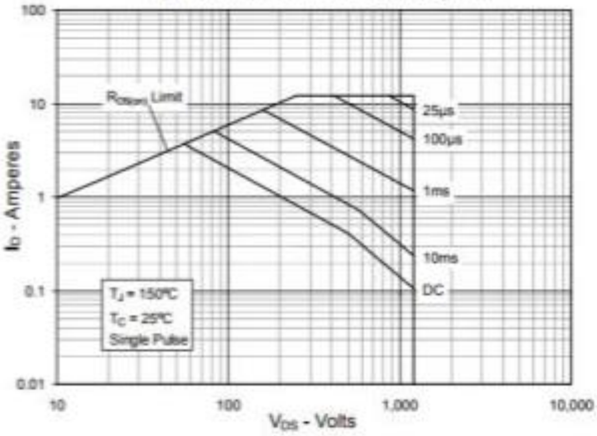


Fig.12. Forward-Bias Safe Operating Area



Test Circuits and Waveforms

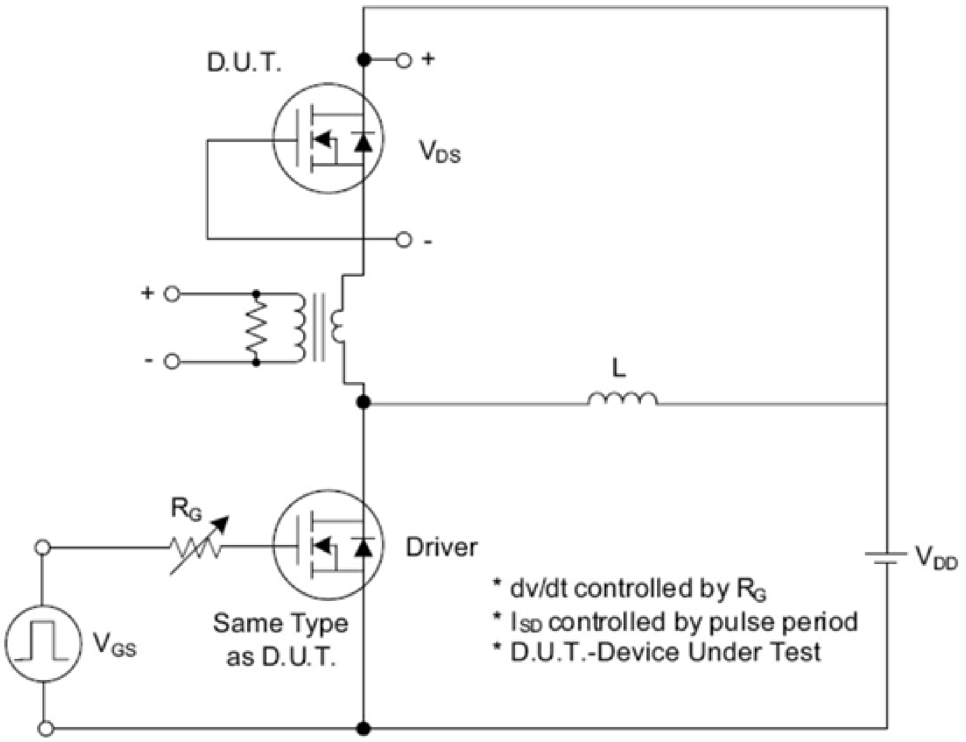


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

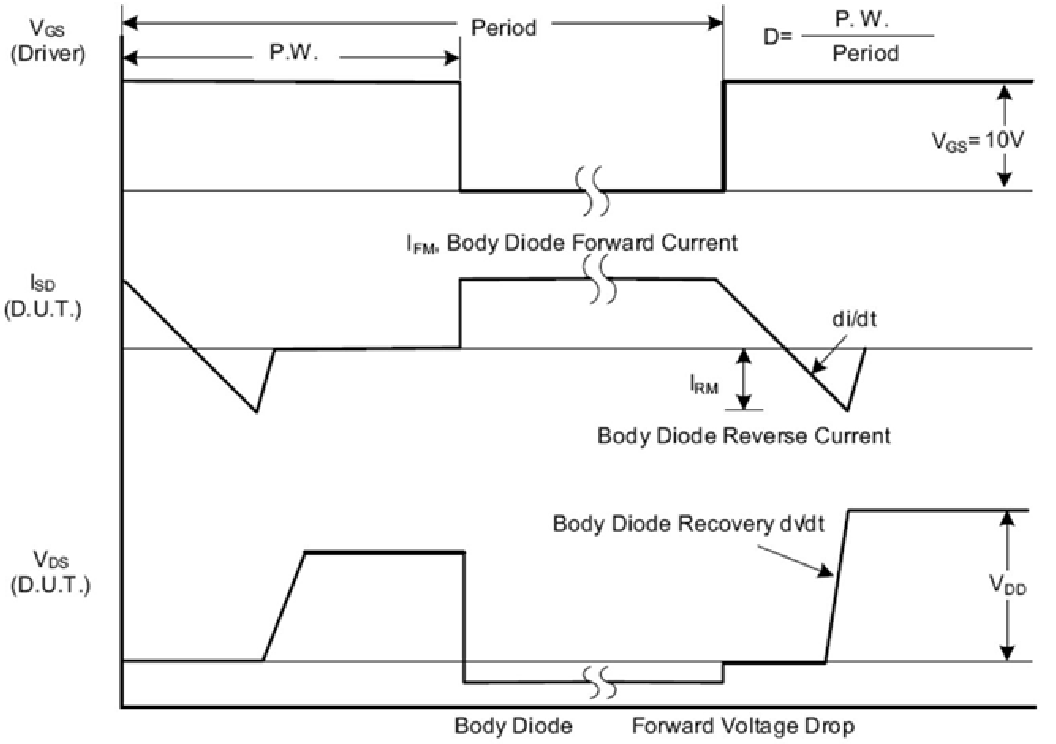


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms **(Cont.)**

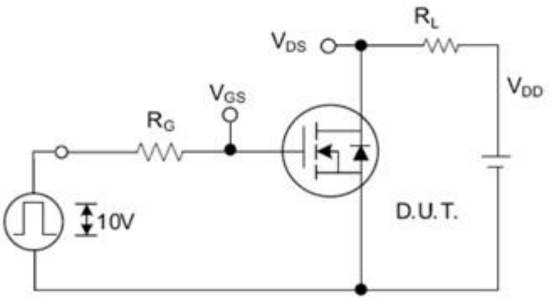


Fig. 2.1 Switching Test Circuit

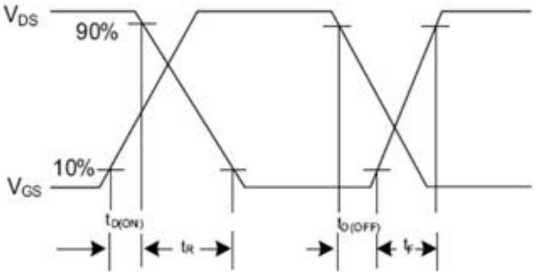


Fig. 2.2 Switching Waveforms

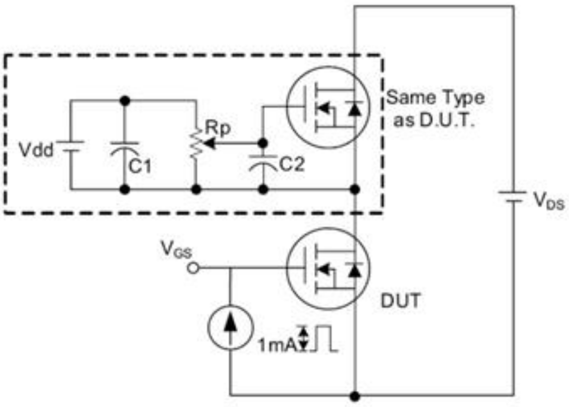


Fig. 3 . 1 Gate Charge Test Circuit

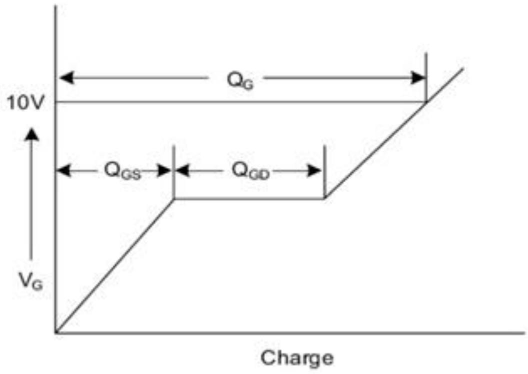


Fig. 3 . 2 Gate Charge Waveform

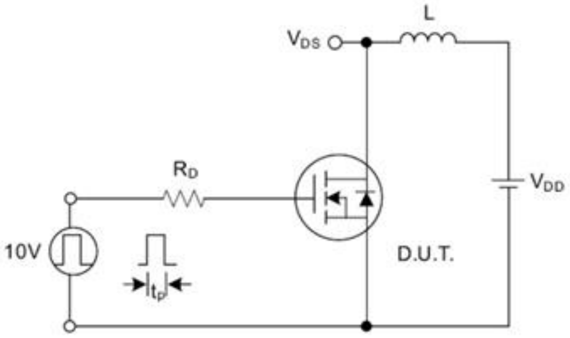


Fig. 4.1 Unclamped Inductive Switching Test Circuit

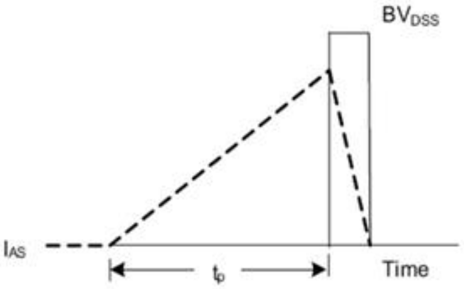


Fig. 4.2 Unclamped Inductive Switching Waveforms