

SAMWIN

SW2N60

Features

- **N-Channel MOSFET**
- **V_{DSS} (Minimum) : 600 V**
- **$R_{DS(ON)}$ (Maximum) : 5.0 ohm**
- **I_D : 2.0 A**
- **Q_g (Typical) : 16 nc**
- **P_D (@TC=25 °C) : 50 W**

General Description

This power MOSFET is produced in CHMC with advanced VDMOS technology of SAMWIN. This technology enable power MOSFET to have better characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics. This power MOSFET is usually used at high efficient DC to DC converter block and SMPS. It's typical application is TV and monitor.



Absolute Maximum Ratings

Symbol	Parameter	Value		Units
		TO-220	TO-251(2)	
V_{DSS}	Drain to Source Voltage	600		V
I_D	Continuous Drain Current (@Tc=25°C)	2.0	1.8	A
	Continuous Drain Current (@Tc=100°C)	1.67	1.47	A
I_{DM}	Drain Current Pulsed (Note 1)	8.0	7.2	A
V_{GS}	Gate to Source Voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	110		mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	5.0	4.2	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.0		V/ns
P_D	Total Power Dissipation (@Tc=25°C)	50	42	W
	Derating Factor above 25°C	0.4	0.34	W/°C
T_{STG}, T_J	Operating junction temperature & Storage temperature	-55~+150		°C
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300		°C

Thermal Characteristics

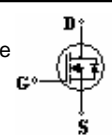
Symbol	Parameter	Value		Units
		TO-220	TO-251(2)	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case Max	2.4	2.9	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink TYP.	0.5		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Max	62.5		°C/W



Electrical Characteristics (Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
Off Characteristics						
BV _{DSS}	Drain- Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	600	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature coefficient	I _D =250uA, referenced to 25°C	-	0.17	-	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =600V, V _{GS} =0V	-	-	1	uA
		V _{DS} =480V, Tc=125°C				
I _{GSS}	Gate-Source Leakage Current	V _{GS} =30V, V _{DS} =0V	-	-	100	nA
	Gate-Source Leakage Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.0	-	4.0	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} =10V, I _D =0.9A	-	-	5	ohm
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	-	* 520	pF
C _{oss}	Output Capacitance		-	-	50	
C _{rss}	Reverse Transfer Capacitance		-	-	11	
Dynamic Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =300V, I _D =1.8A R _G =50ohm (Note4,5)	-	-	* 60	ns
t _r	Rise Time		-	-	* 94	
t _{d(off)}	Turn-off Delay Time		-	-	* 140	
t _f	Fall Time		-	-	* 74	
Q _g	Total Gate Charge	V _{DS} =480V, V _{GS} =10V, I _D =1.8A (Note4,5)	-	-	20	nC
Q _{gs}	Gate-Source Charge		-	3	-	
Q _{gd}	Gate-Drain Charge (Miller Charge)		-	5	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	TO-220		TO-251(2)	Unit.
I _S	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET 	2.0		1.8	A
I _{SM}	Pulsed Source Current		8.0		7.2	
			MIN	TYP	MAX	
V _{SD}	Diode Forward Voltage	I _S =1.8A, V _{GS} =0V	-	-	1.5	V
t _{rr}	Reverse Recovery Time	I _S =1.8A, V _{GS} =0V, dI _F /dt=100A/us	-	250	-	ns
Q _{rr}	Reverse Recovery Charge		-	1.5	-	uc

※NOTES

1. Repeatability rating: pulse width limited by junction temperature
2. L=62.2mH, I_{AS}=1.8A, V_{DD}=50V, R_G=0ohm, Starting T_J=25°C
3. I_{SD}≤1.8A, di/dt≤100A/us, V_{DD}≤BVDSS, Starting T_J=25°C
4. Pulse Test: Pulse Width≤300us, Duty Cycle≤2%
5. Essentially independent of operating temperature.
6. The Max data with “*” will be reduce soon.

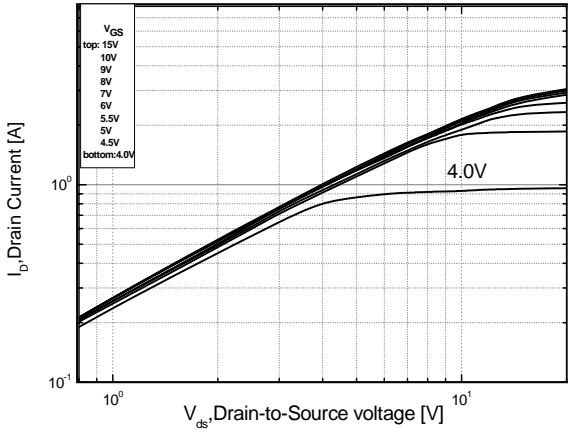


Fig 1. On-State Characteristics

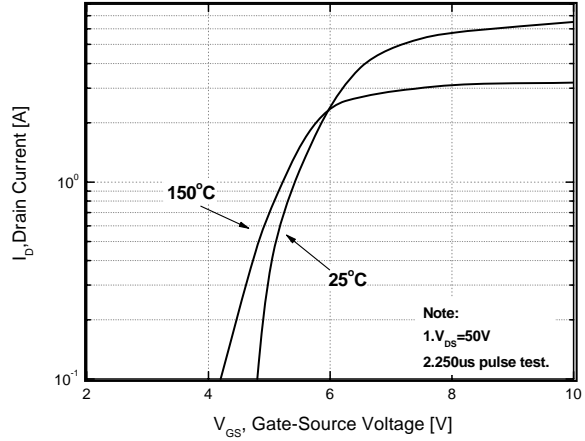


Fig 2. Transfer Characteristics

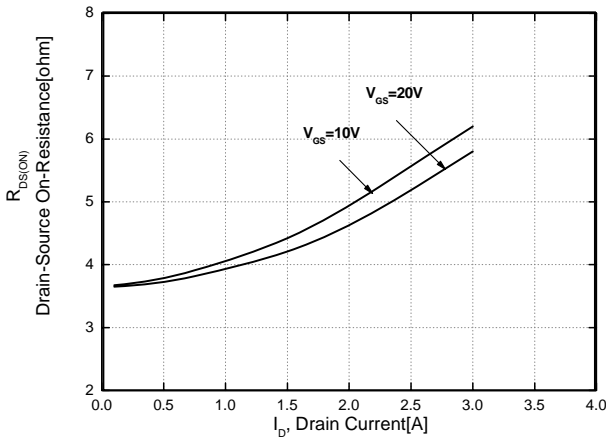


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

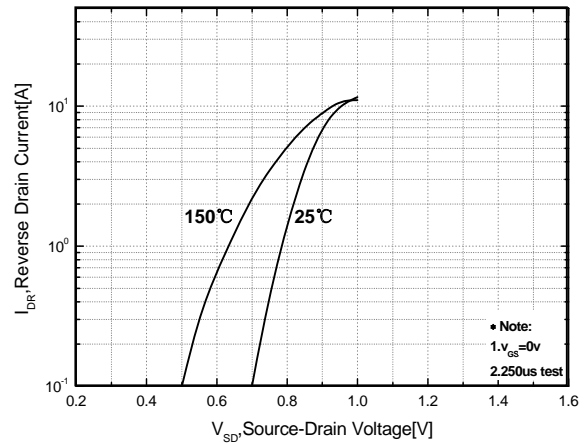


Fig 4. On State Current vs. Allowable Case Temperature

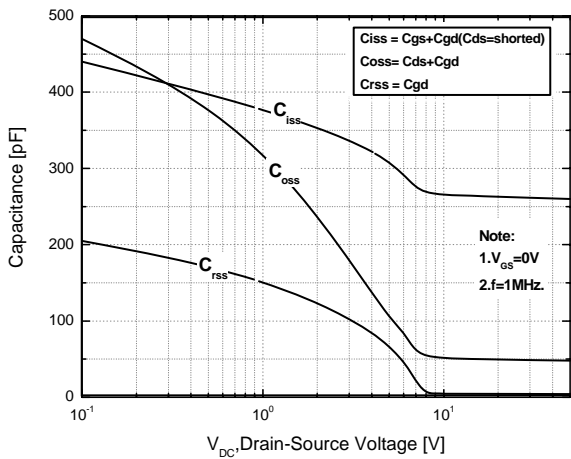


Fig 5. Capacitance Characteristics (Non-Repetitive)

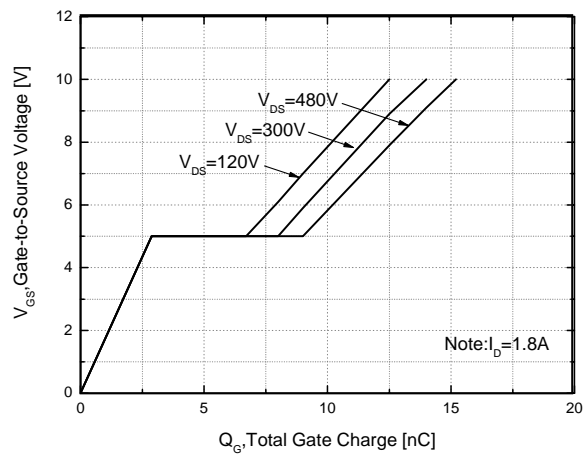


Fig 6. Gate Charge Characteristics

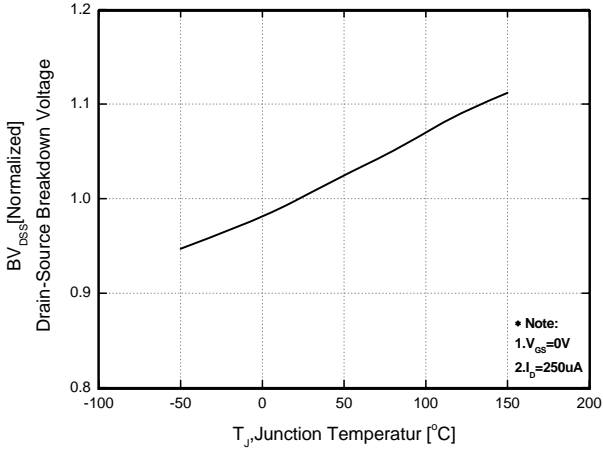


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

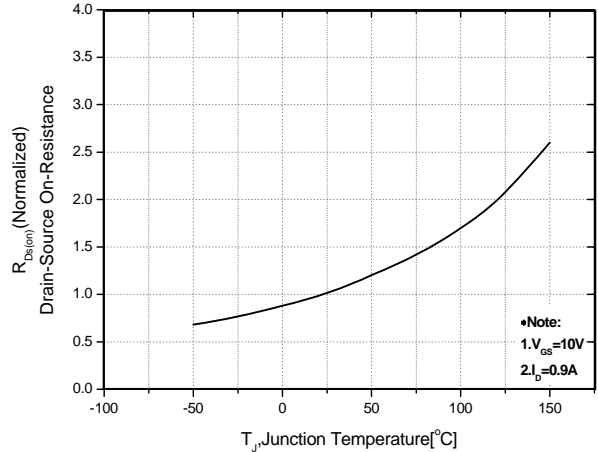


Fig 8. On-Resistance Variation vs. Junction Temperature

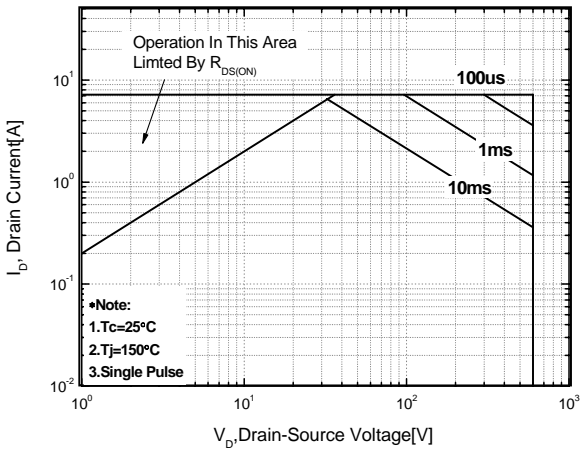


Fig9. Maximum Safe Operating

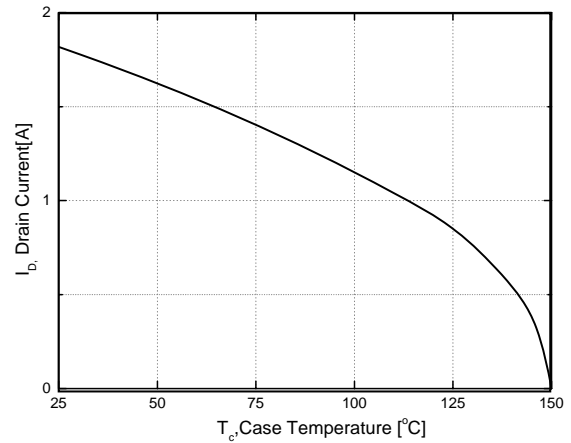


Fig 10. Maximum Drain Current Vs. Case Temperature

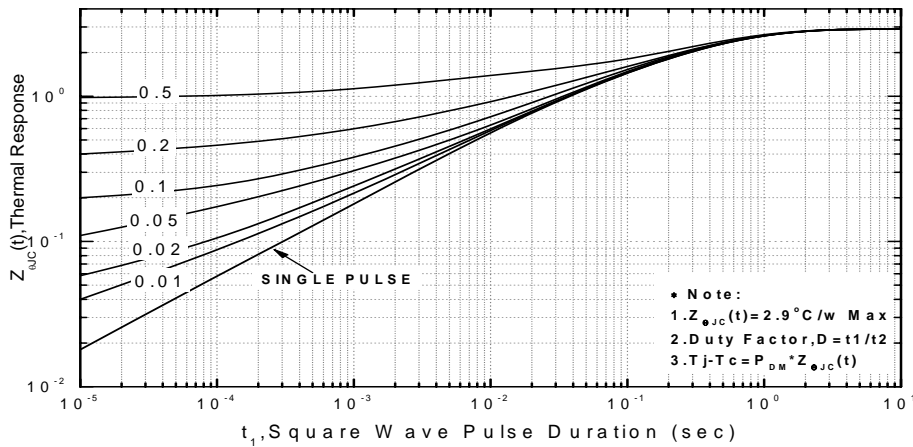


Fig 11. Transient Thermal Response Curve

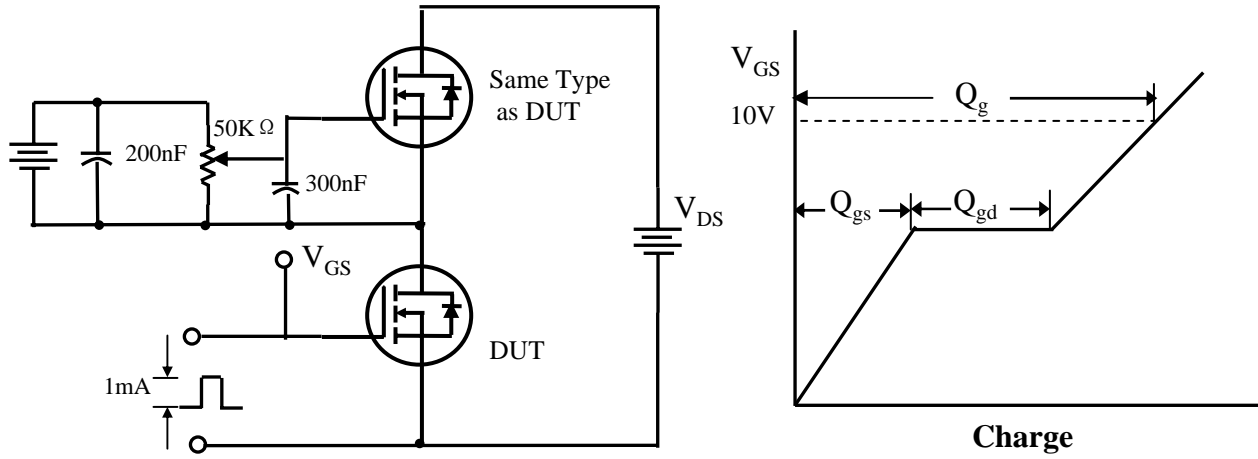


Fig 12. Gate Charge test Circuit & Waveforms

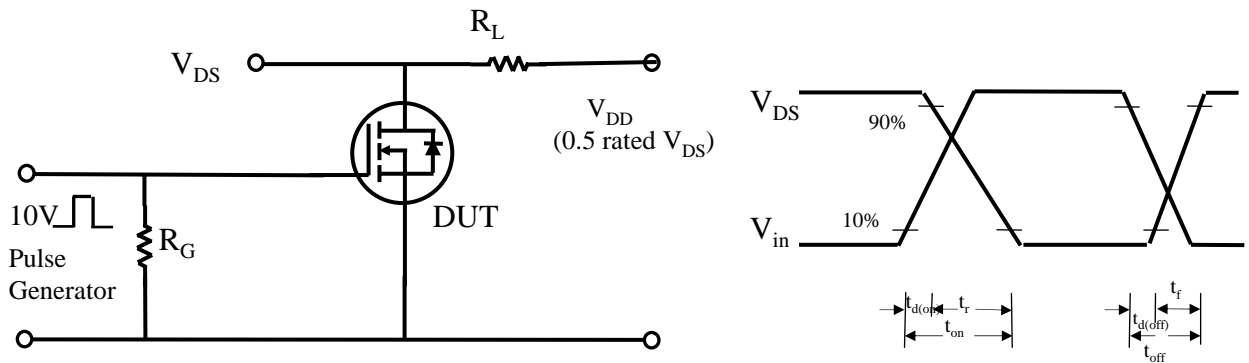


Fig 13. Switching test Circuit & Waveforms

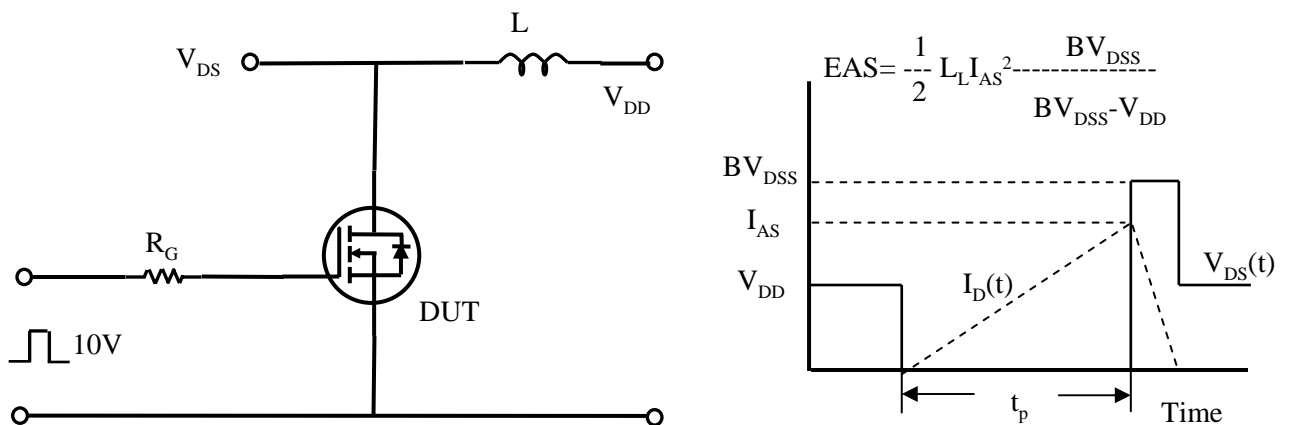


Fig 14. Unclamped Inductive Switching test Circuit & Waveforms

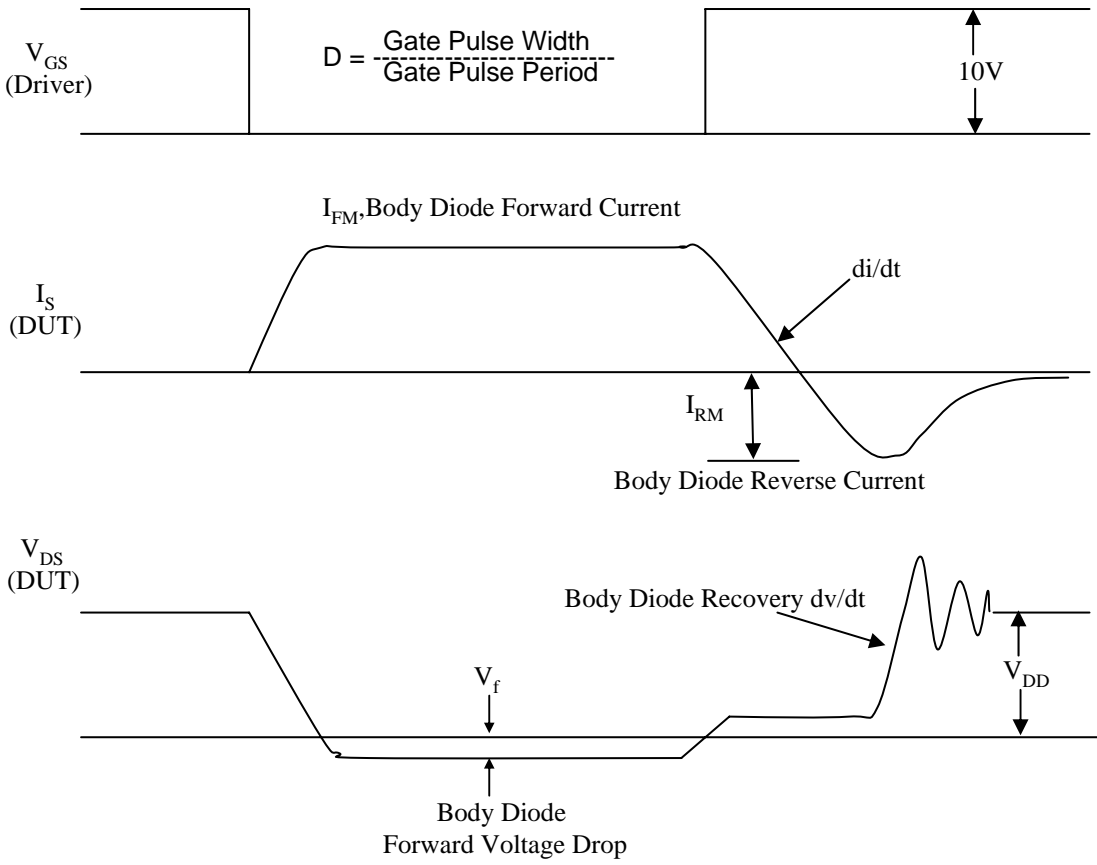
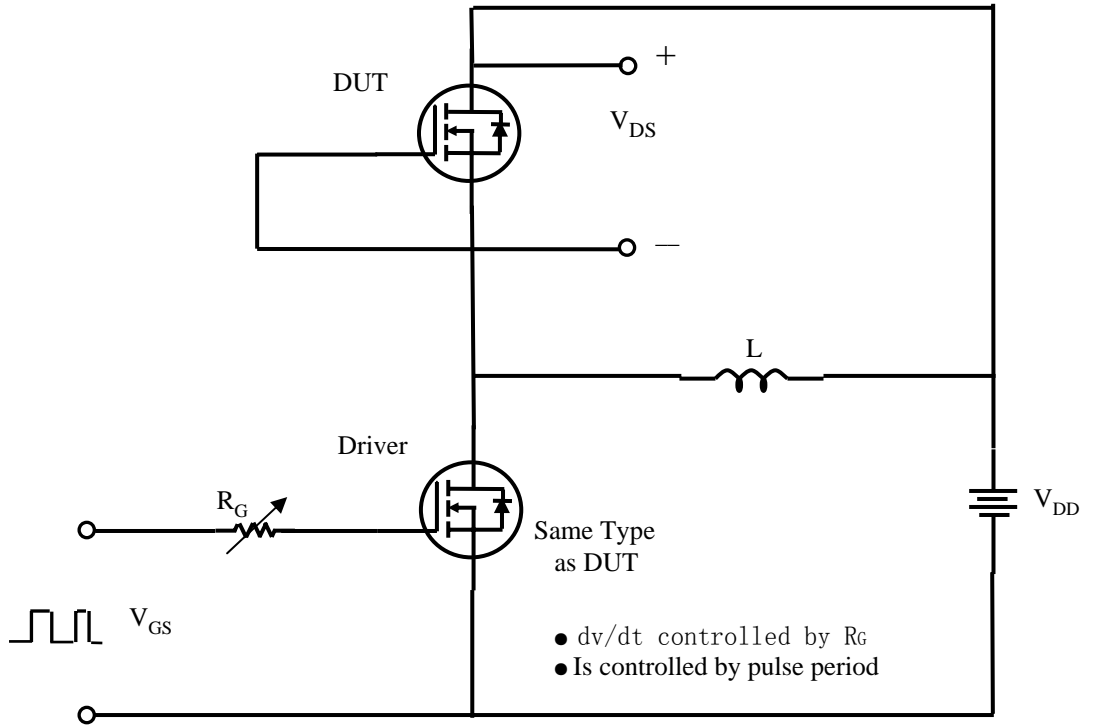


Fig 15. Peak Diode Recovery dv/dt test Circuit & Waveforms