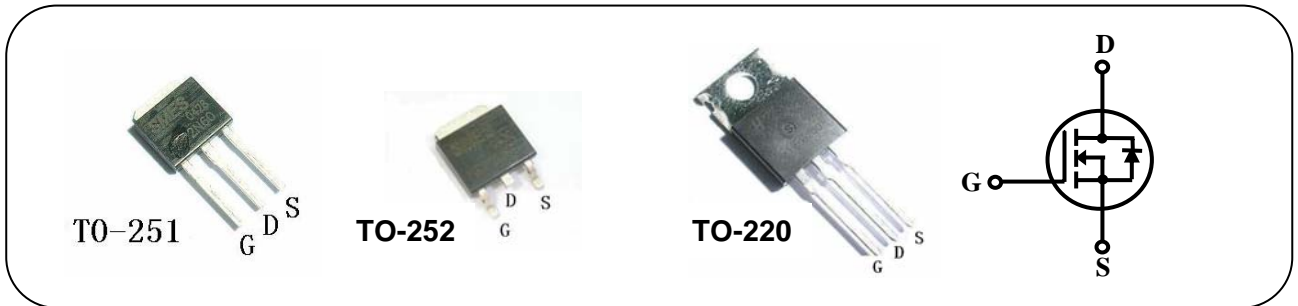


## Features

- **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	
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain- Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	600	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature coefficient	I <sub>D</sub> =250uA, referenced to 25°C	-	0.17	-	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	1	uA
		V <sub>DS</sub> =480V, Tc=125°C				
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V	-	-	100	nA
	Gate-Source Leakage Reverse	V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V	-	-	-100	nA

### On Characteristics

V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2.0	-	4.0	V
R <sub>DS(ON)</sub>	Static Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =0.9A	-	-	5	ohm

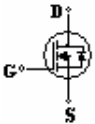
### Dynamic Characteristics

C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz	-	-	* 520	pF
C <sub>oss</sub>	Output Capacitance		-	-	50	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	-	11	

### Dynamic Characteristics

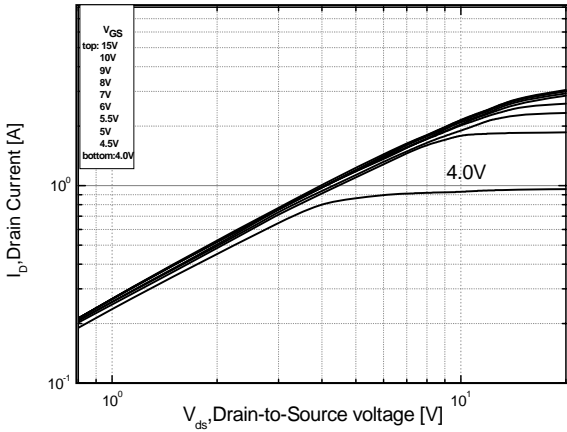
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =300V, I <sub>D</sub> =1.8A R <sub>G</sub> =50ohm  (Note4,5)	-	-	* 60	ns
t <sub>r</sub>	Rise Time		-	-	* 94	
t <sub>d(off)</sub>	Turn-off Delay Time		-	-	* 140	
t <sub>f</sub>	Fall Time		-	-	* 74	
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =480V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.8A  (Note4,5)	-	-	20	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3	-	
Q <sub>gd</sub>	Gate-Drain Charge (Miller Charge)		-	5	-	

### Source-Drain Diode Ratings and Characteristics

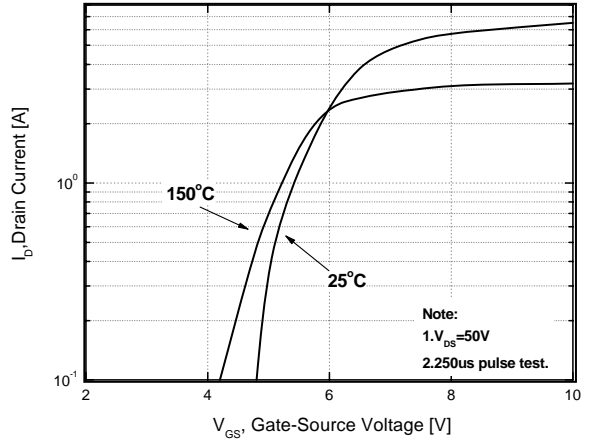
Symbol	Parameter	Test Conditions	TO-220		TO-251(2)	Unit.
I <sub>S</sub>	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET 	2.0		1.8	A
I <sub>SM</sub>	Pulsed Source Current		8.0		7.2	
			MIN	TYP	MAX	
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1.8A, V <sub>GS</sub>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

#### ※NOTES

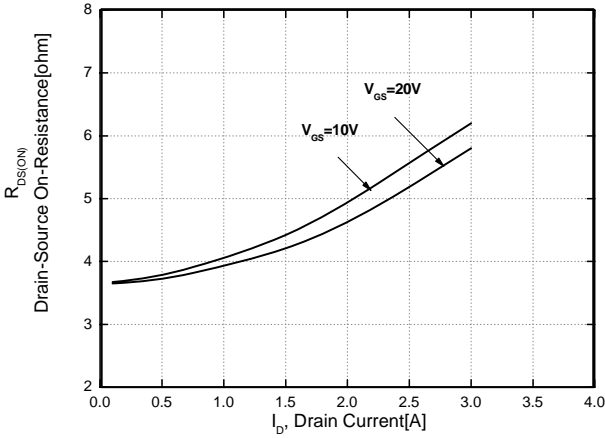
1. Repeativity rating: pulse width limited by junction temperature
2. L=62.2mH, I<sub>AS</sub>=1.8A, V<sub>DD</sub>=50V, R<sub>G</sub>=0ohm, Starting T<sub>J</sub>=25°C
3. I<sub>SD</sub> ≤ 1.8A, di/dt ≤ 100A/us, V<sub>DD</sub> ≤ BVDSS, Starting T<sub>J</sub>=25°C
4. Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature.
6. The Max data with "\*" will be reduce soon.



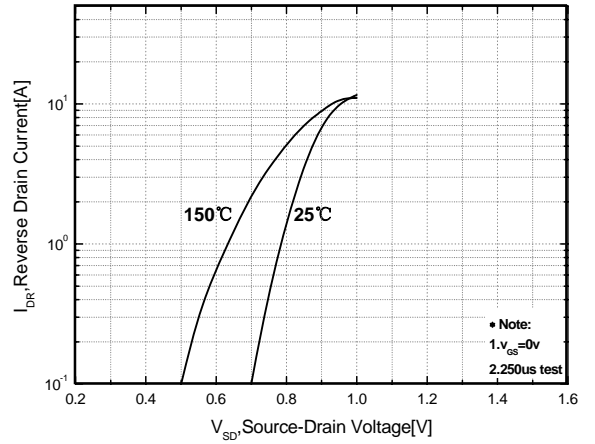
**Fig 1. On-State Characteristics**



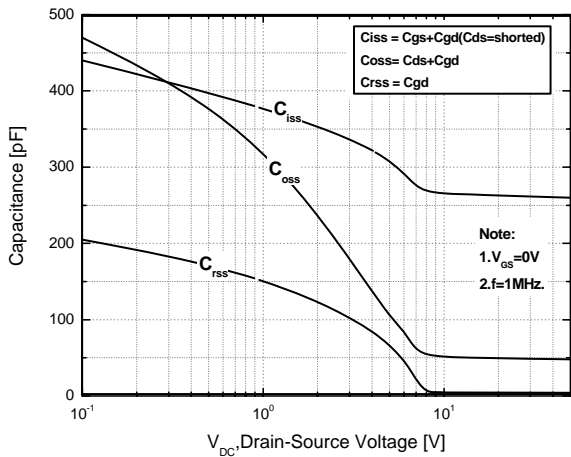
**Fig 2. Transfer Characteristics**



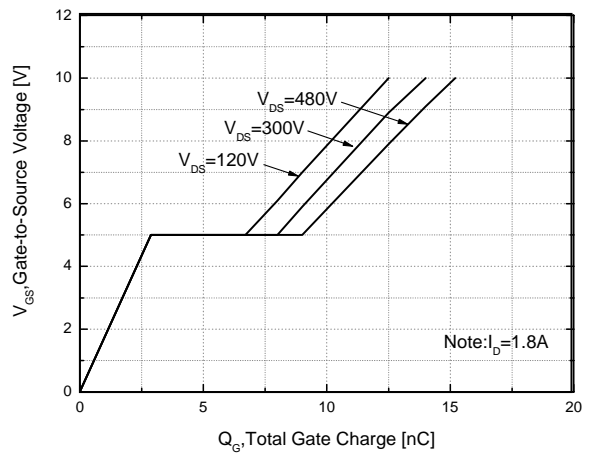
**Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage**



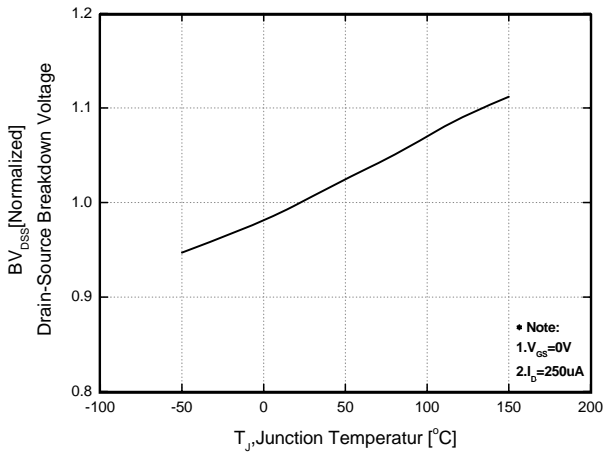
**Fig 4. On State Current vs. Allowable Case Temperature**



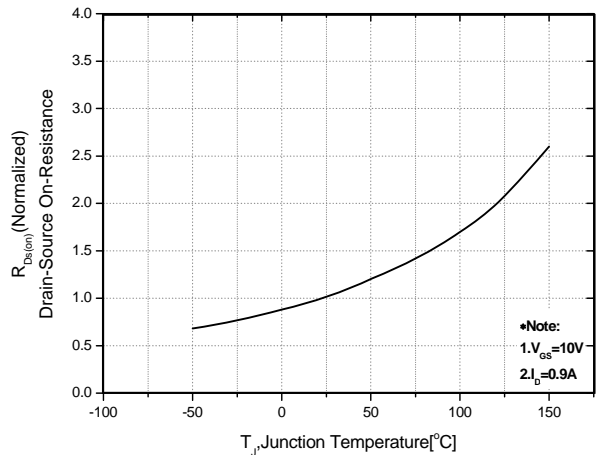
**Fig 5. Capacitance Characteristics (Non-Repetitive)**



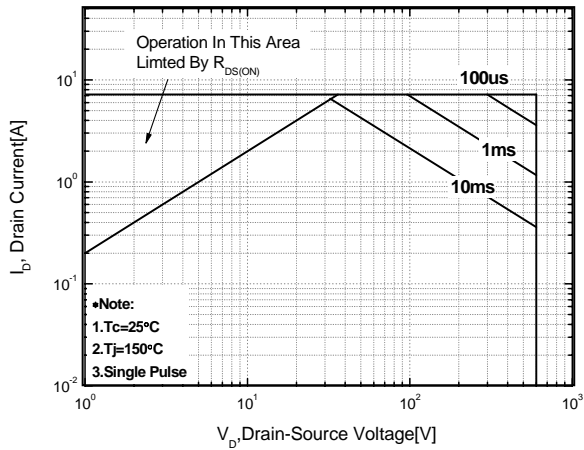
**Fig 6. Gate Charge Characteristics**



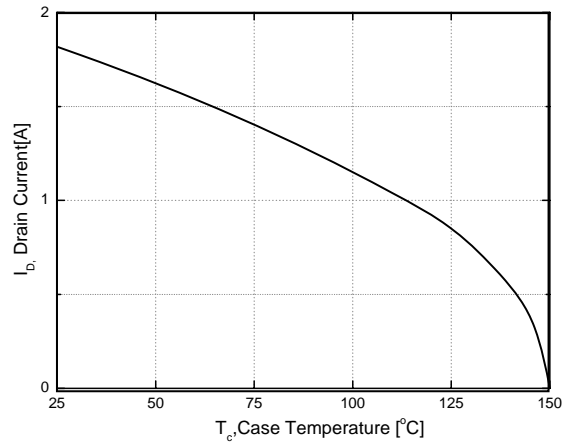
**Fig 7. Breakdown Voltage Variation vs. Junction Temperature**



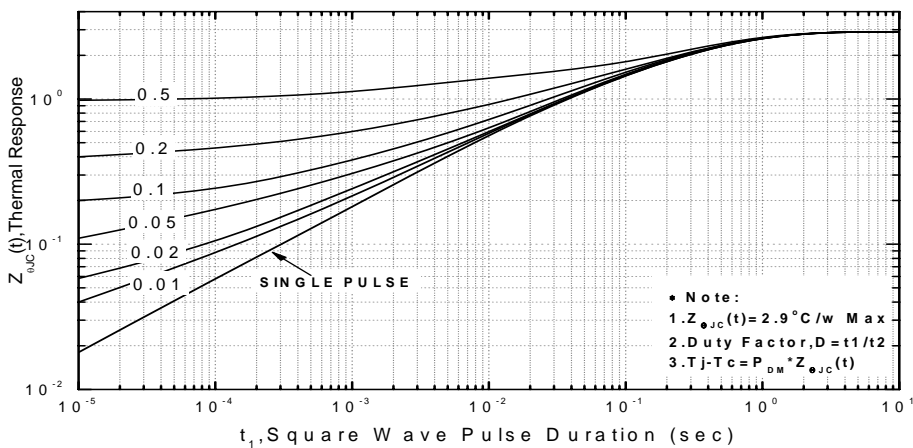
**Fig 8. On-Resistance Variation vs. Junction Temperature**



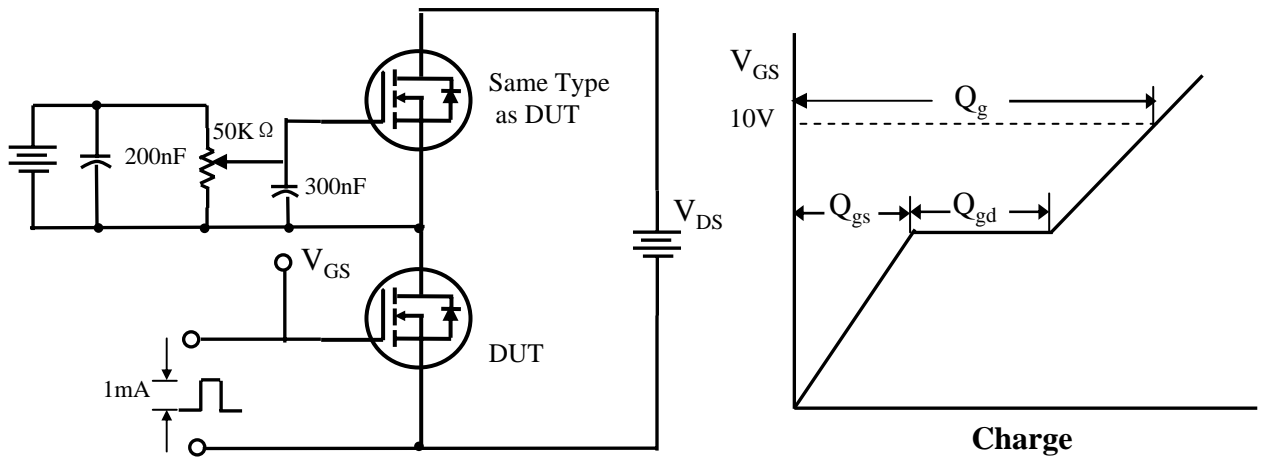
**Fig 9. Maximum Safe Operating**



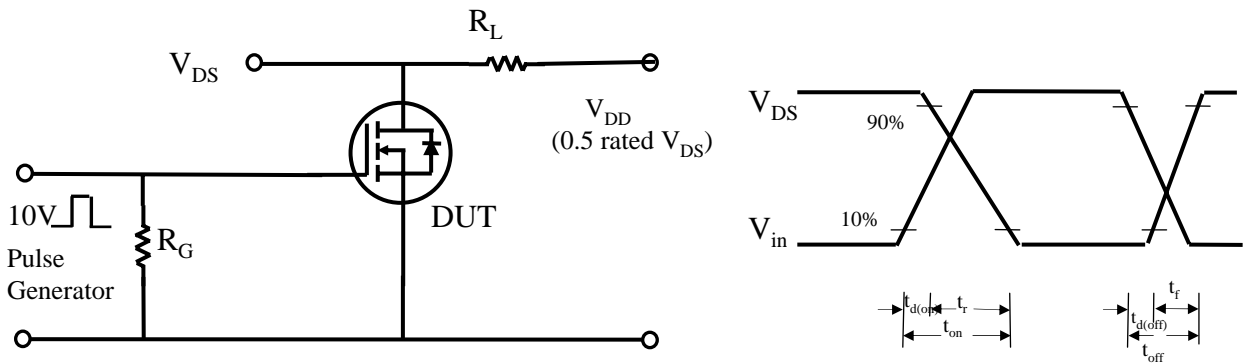
**Fig 10. Maximum Drain Current Vs. Case Temperature**



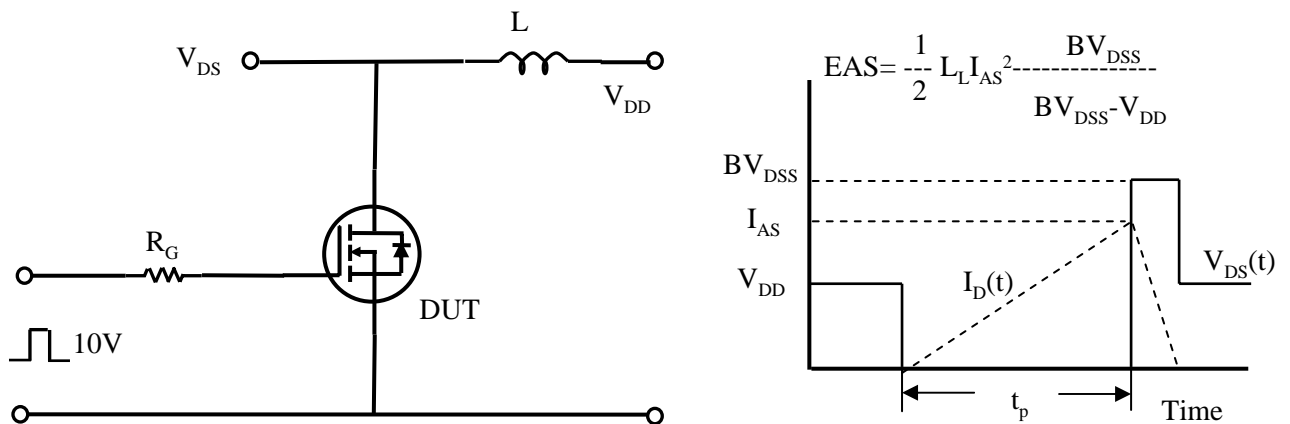
**Fig 11. Transient Thermal Response Curve**



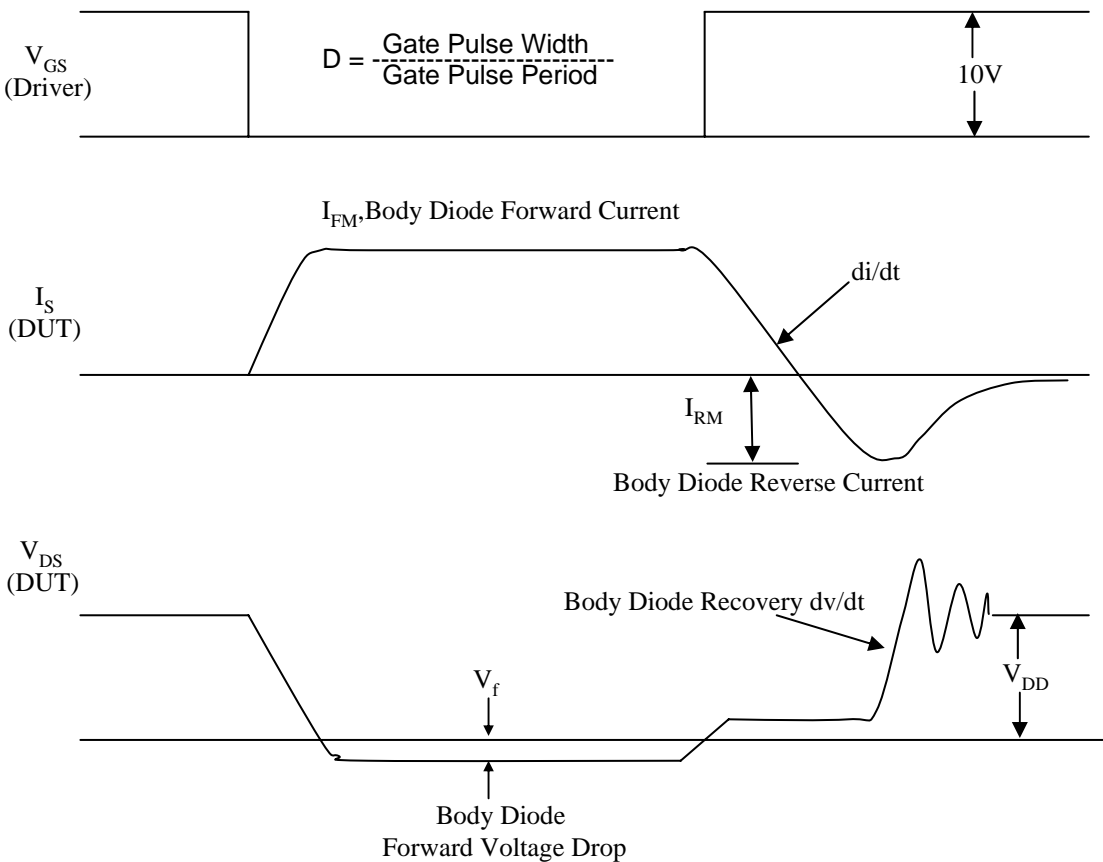
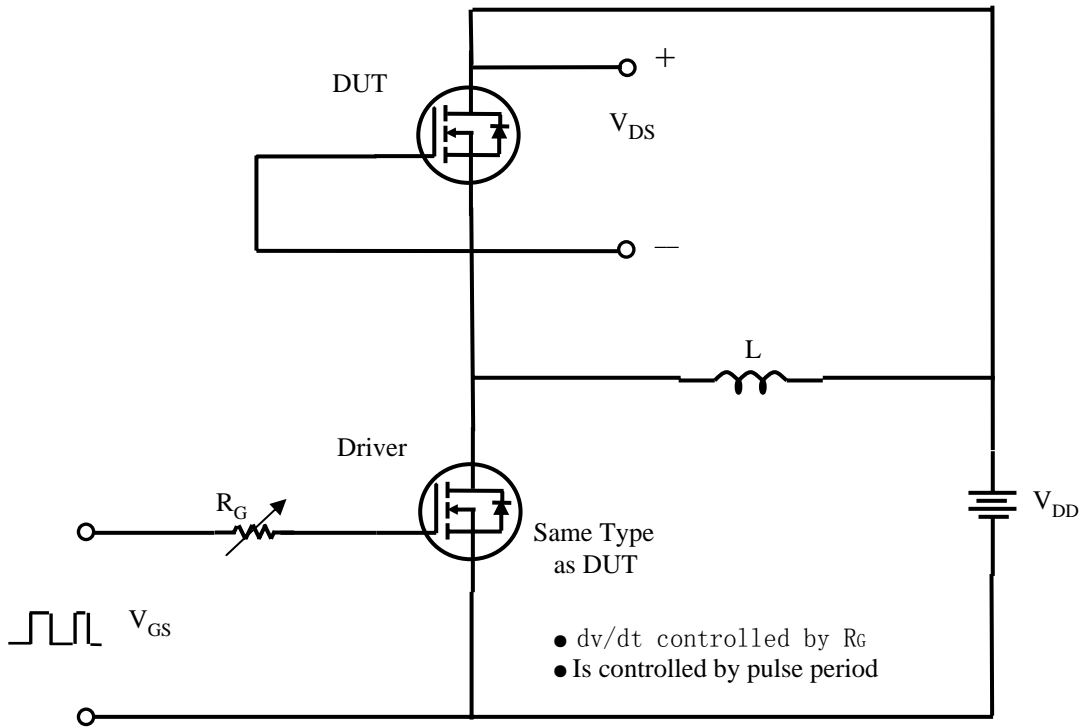
**Fig 12. Gate Charge test Circuit & Waveforms**



**Fig 13. Switching test Circuit & Waveforms**



**Fig 14. Unclamped Inductive Switching test Circuit & Waveforms**



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