LT7N60

N-channel MOSFET

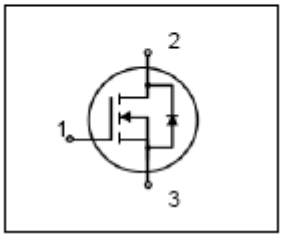
Xi'an Longtium Microelectronics Technology Developing Co., Ltd.

Features

N-channel MOSFET

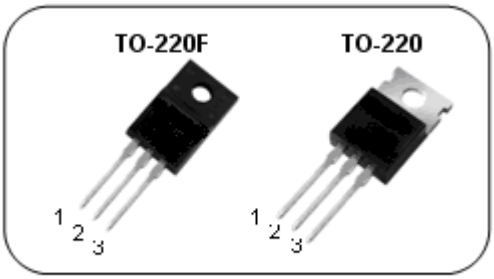
- High ruggedness
- RDS(ON) (Max 1.3 Ω)@VGS=10V
- Gate Charge (Typ 38nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

BV_{DSS} : 600V
I_D : 7.0A
$R_{DS(ON)}$: 1.3ohm



General Description

- This power MOSFET is produced with advanced VDMOS technology of LONGTIUMIC.
- 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 switch mode power supply.



1. Gate 2. Drain 3. Source

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	LT P 7N60A	LT7N60A	TO-220	TUBE
2	LT F 7N60A	LT7N60A	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220	TO-220F	
V_{DSS}	Drain to Source Voltage	600		V
I_D	Continuous Drain Current (@T_C=25ºC)	7.0	7.0*	A
	Continuous Drain Current (@T_C=100ºC)	5.1	4.1*	A
I_{DM}	Drain current pulsed (note 1)	28		A
V_{GS}	Gate to Source Voltage	±30		V
E_{AS}	Single pulsed Avalanche Energy (note 2)	490		mJ
E_{AR}	Repetitive Avalanche Energy (note 1)	14.2		mJ
dv/dt	Peak diode Recovery dv/dt (note 3)	4.5		V/ns
P_D	Total power dissipation (@T_C=25ºC)	147	53*	W
	Derating Factor above 25ºC	1.18	0.43	W/ºC
T_{STG}, T_J	Operating Junction Temperature & Storage Temperature	-55 ~ + 150		ºC
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300		ºC

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220	TO-220F	
R_{thjc}	Thermal resistance, Junction to case	0.85	2.35	ºC/W
R_{thcs}	Thermal resistance, Case to Sink	0.5		ºC/W
R_{thja}	Thermal resistance, Junction to ambient	62.5		ºC/W

Electrical characteristic (T_C = 25 °C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600	-	-	V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C	-	0.68	-	V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V	-	-	1	uA
		V_{DS}=480V, T_C=125°C	-	-	20	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V	-	-	100	nA
	Gate to source leakage current, 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
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		0.85	1.3	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		960	1260	pF
C_{oss}	Output capacitance			110	135	
C_{rss}	Reverse transfer capacitance			15	18	
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=7.0A, R_G=25Ω		35	80	ns
tr	Rising time			79	165	
$t_{d(off)}$	Turn off delay time			80	160	
t_f	Fall time			52	120	
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=7.0A		38	47	nC
Q_{gs}	Gate-source charge			6.0	-	
Q_{gd}	Gate-drain charge			20	-	

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET	-	-	7	A
I_{SM}	Pulsed source current		-	-	28	A
V_{SD}	Diode forward voltage drop.	I_S=7.0A, V_{GS}=0V	-	-	1.5	V
T_{rr}	Reverse recovery time	I_S=7.0A, V_{GS}=0V, dI_F/dt=100A/us	-	360	-	ns
Q_{rr}	Breakdown voltage temperature		-	2.4	-	uC

※. Notes

1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 20mH, I_{AS} = 7.0A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7.0A, di/dt = 200A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

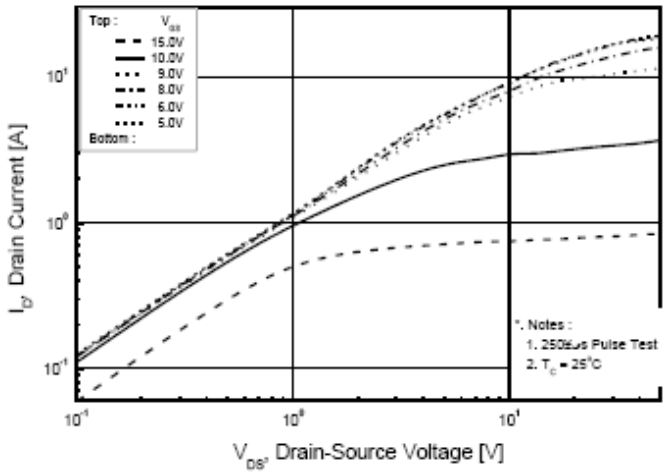


Fig. 1. On-state characteristics

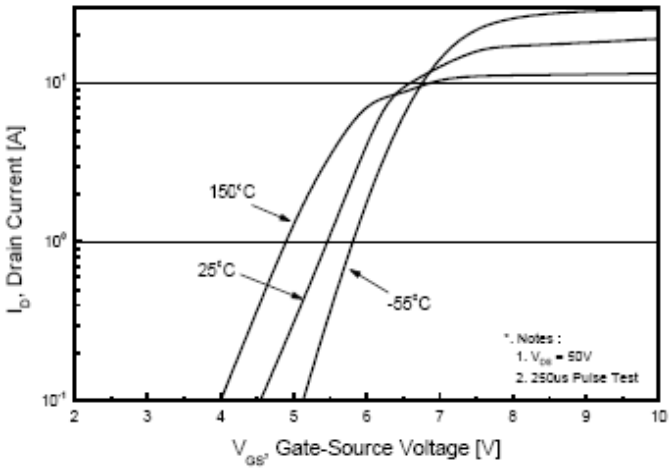


Fig. 2. Transfer characteristics

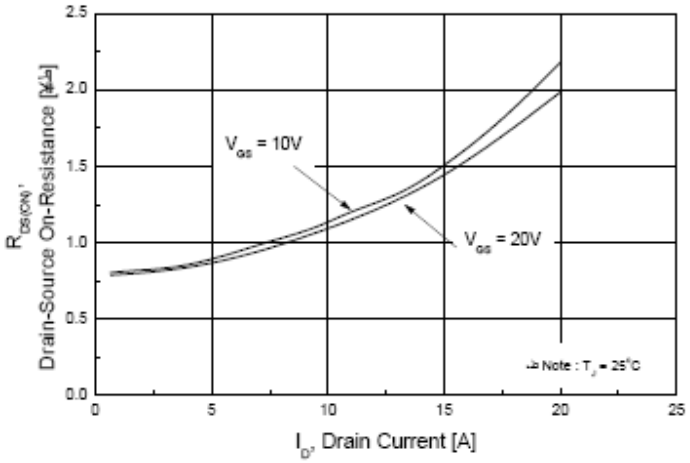


Fig. 3. On-resistance variation vs. drain current and gate voltage

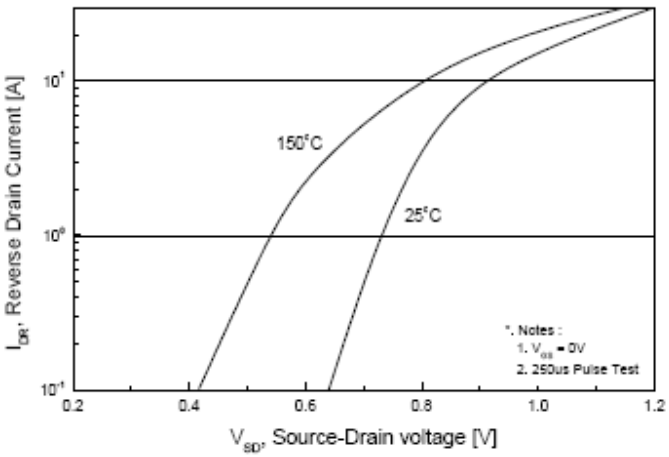


Fig. 4. On state current vs. diode forward voltage

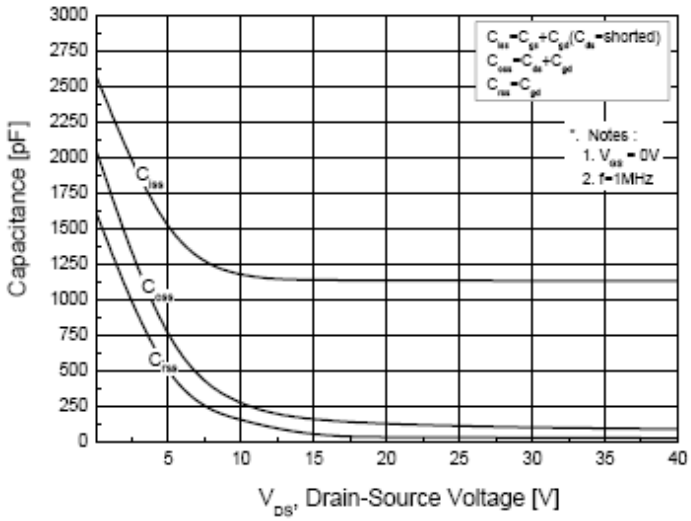


Fig. 5. Capacitance characteristics

(Non-Repetitive)

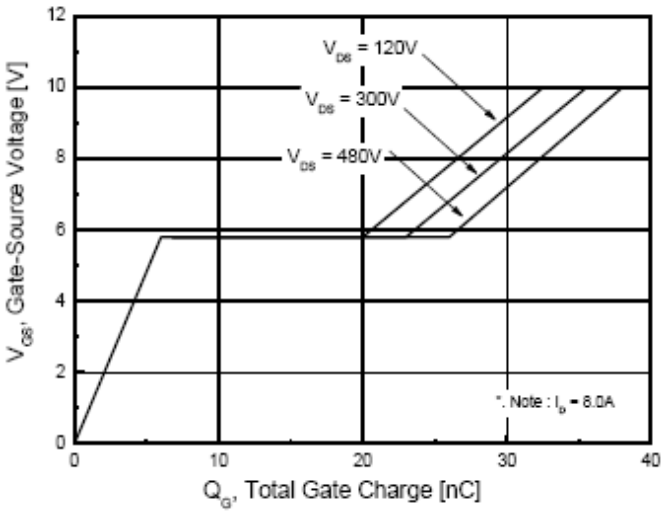


Fig. 6. Gate charge characteristics

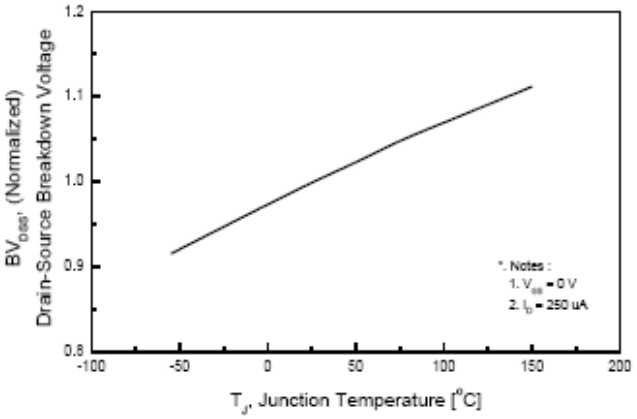


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

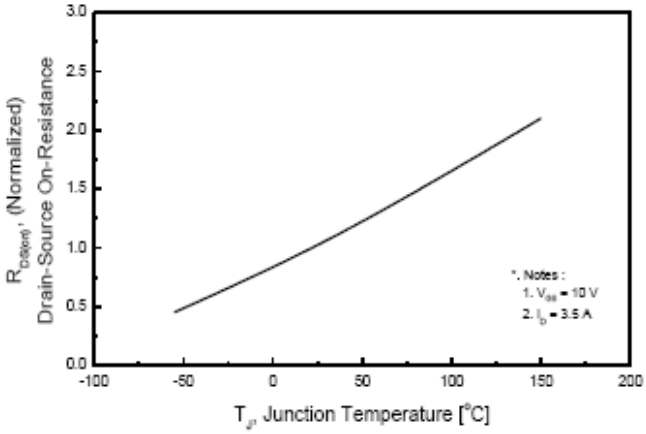


Fig. 8. On resistance variation vs. junction temperature

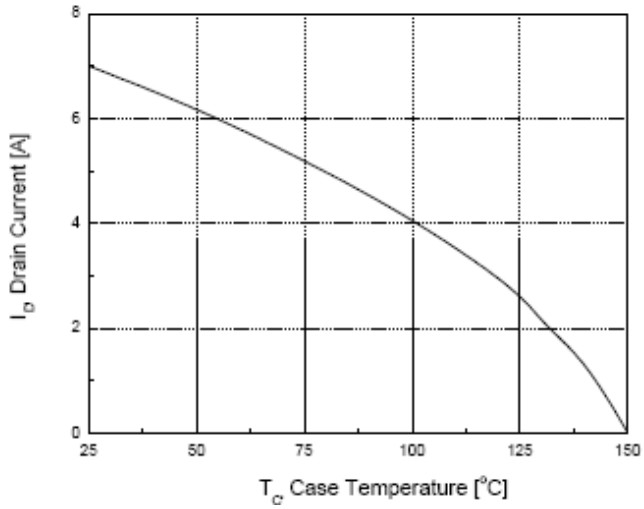


Fig. 9. Maximum drain current vs. case temperature.

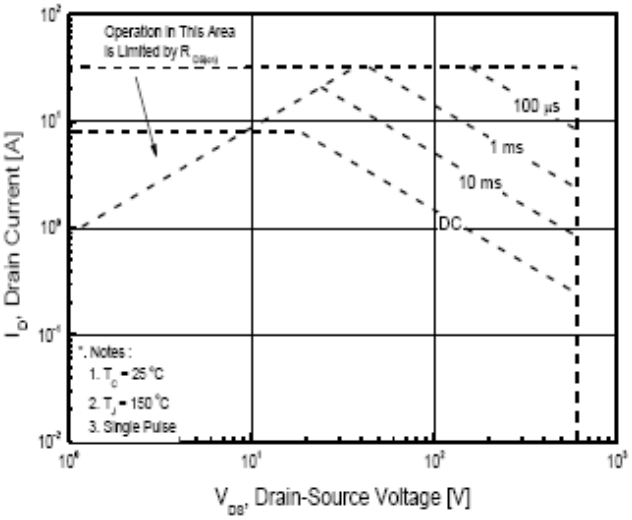


Fig. 10. Maximum safe operating area (TO-220)

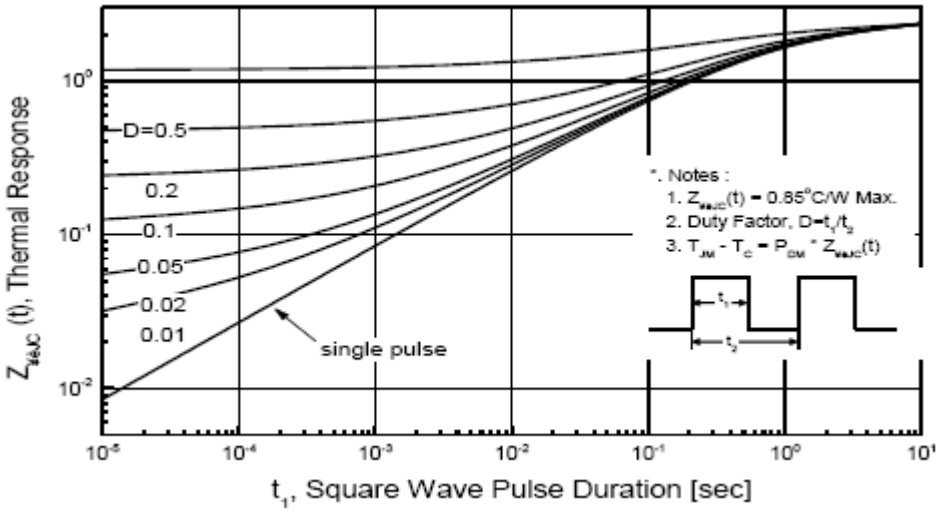


Fig. 11. Transient thermal response curve

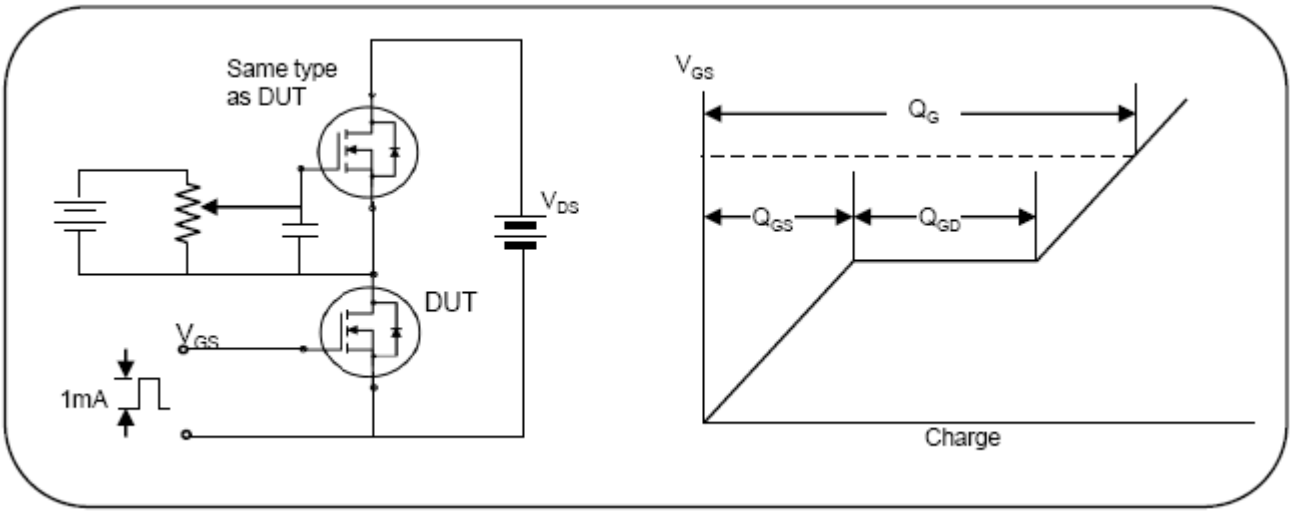


Fig. 12. Gate charge test circuit & waveform

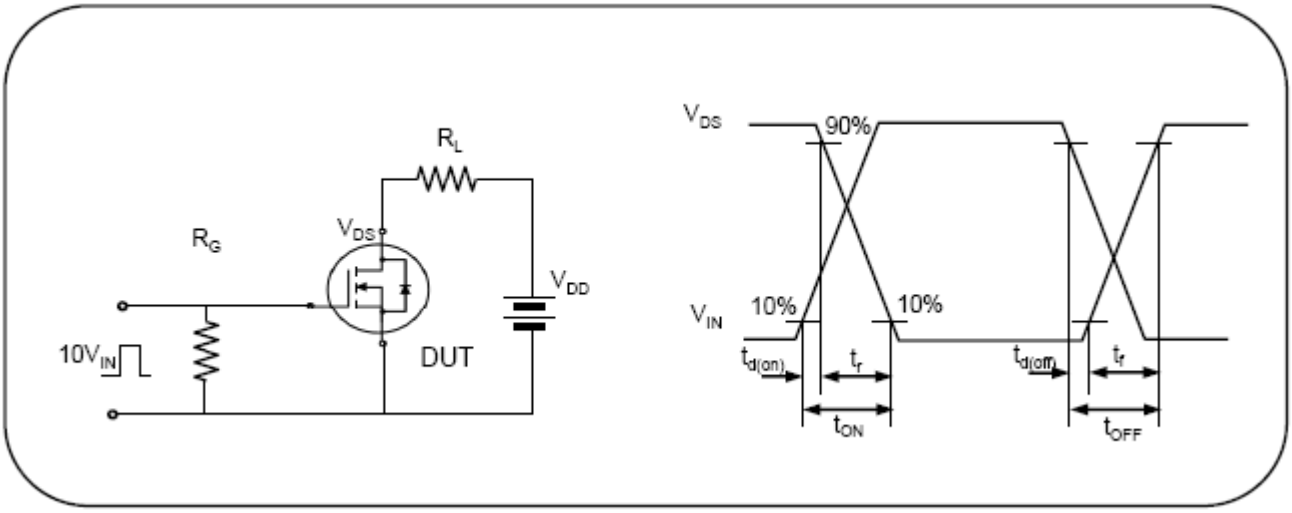


Fig. 13. Switching time test circuit & waveform

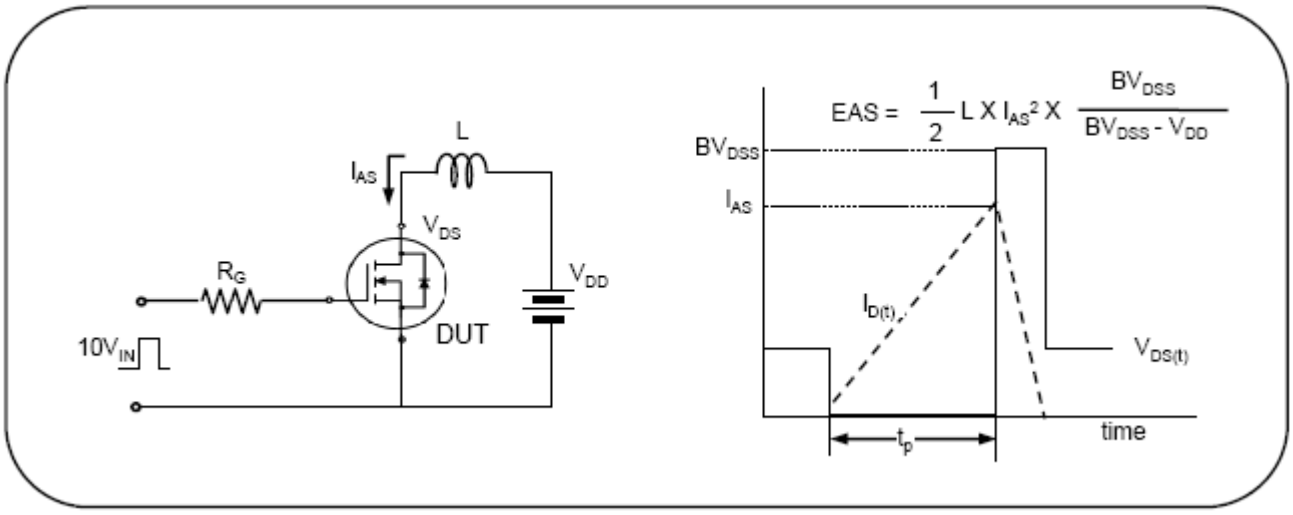


Fig. 14. Unclamped Inductive switching test circuit & waveform

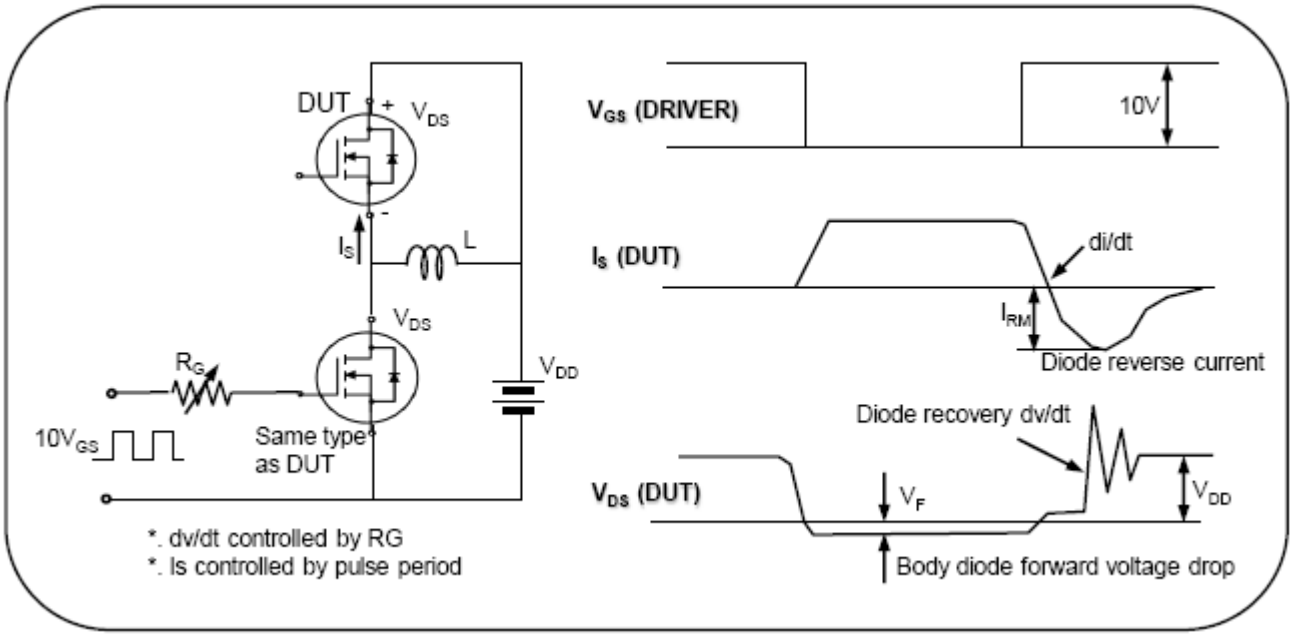


Fig. 15. Peak diode recovery dv/dt test circuit & waveform