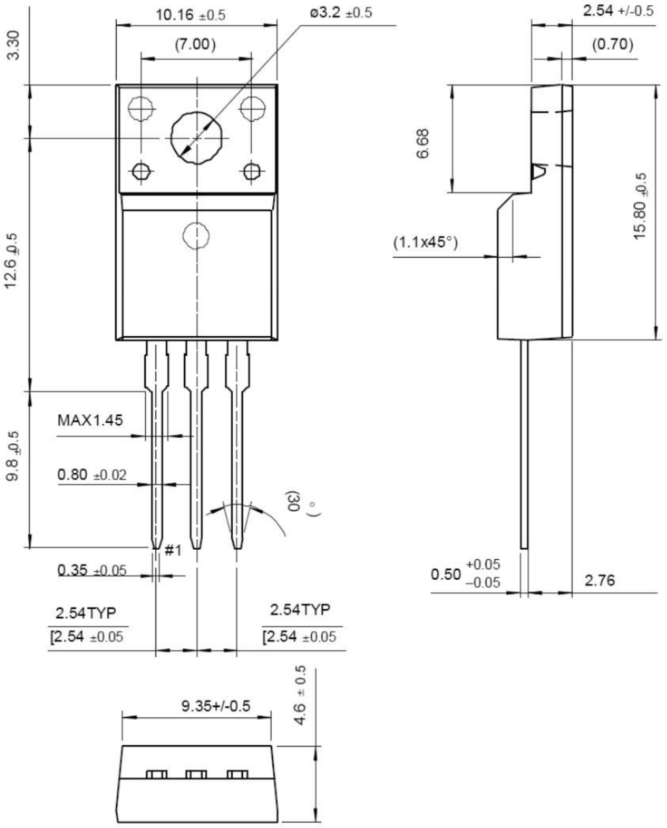
MS6N90

N-Channel 900V MOSFET

Description

The MS6N90 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220AB package is universally preferred for all commercial-industrial applications



Features

- RDS(on) (Max 2.4 Ω)@VGS=10V
- Gate Charge (Typical 33nC)
- Excellent Switching Characteristics
- Improved dv/dt Capability, High
- Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature
- Range (150°°C)
- RoHS compliant package

Application

- Open Framed Power Supply
- Adapter

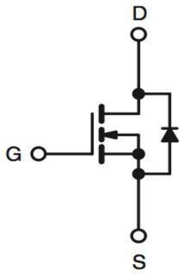
Package type： TO-220AB

Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	900	V
I_D	Drain Current -Continuous (TC=25°C)	6	A
	Drain Current -Continuous (TC=100°C)	4.2	A
I_{DM}	Drain Current –Pulsed	28	A
V_{GS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy	580	mJ
E_{AR}	Repetitive Avalanche Energy	16.7	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns

- Drain current limited by maximum junction temperature

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
P_D	Power Dissipation (TC=25°C)	165	W
	- Derate above 25°C	1.4	W/°C
T_J/T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

●Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	0.75	°C/W
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS},I_D = 250μA	3.0	--	5.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10 V,I_D = 3 A	--	1.95	2.4	Ω

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D = 250μA	900	--	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 900 V , V_{GS} = 0 V V_{DS} = 720 V , V_C = 125°C	--	--	10 100	μA
I_{GSSF}	Gate-Body Leakage Current,Forward	V_{GS} = 30 V , V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current,Reverse	V_{GS} = -30 V , V_{DS} = 0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0MHz	--	1500	--	pF
C_{OSS}	Coss Output Capacitance		--	120	--	pF
C_{RSS}	Crss Reverse Transfer Capacitance		--	12	--	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	V_{DS} = 450 V, I_D = 6 A, R_G = 25 Ω	--	50	--	ns
t_r	Turn-On Rise Time		--	100	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	50	--	ns
tf	Turn-Off Fall Time		--	60	--	ns
Q_g	Total Gate Charge	V_{DS} = 720 V , I_D = 6 A, V_{GS} = 10 V	--	33	--	nC
Q_{gs}	Gate-Source Charge		--	10	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC
trr	Reverse Recovery Time	I_S = 6 A , V_{GS} = 0 V diF/dt =100A/μs	--	0.65	--	ns
Qrr	Reverse Recovery Charge		--	7.0	--	μC

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	6	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	24	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 6 A , V_{GS} = 0 V	--	--	1.4	V

Notes:

1. Repeativity rating : pulse width limited by junction temperature
2. L = 34.0mH, I_{AS} =6.0A, V_{DD} = 50V, R_G = 25Ω , Starting TJ = 25°C
3. I_{SD} ≤ 6.0A, di/dt ≤ 200A/us, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature.

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■Characteristics Curve

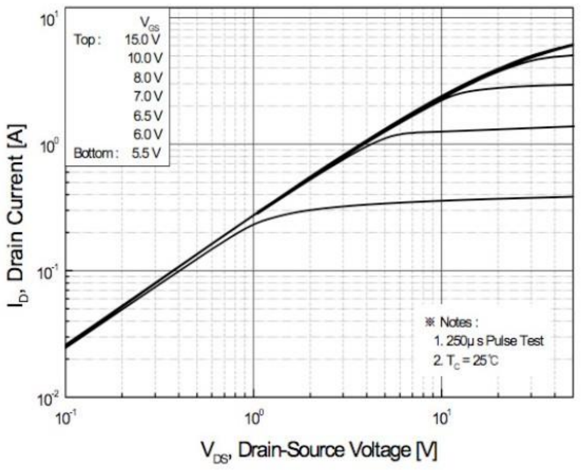

FIG.1-ON REGION CHARACTERISTICS

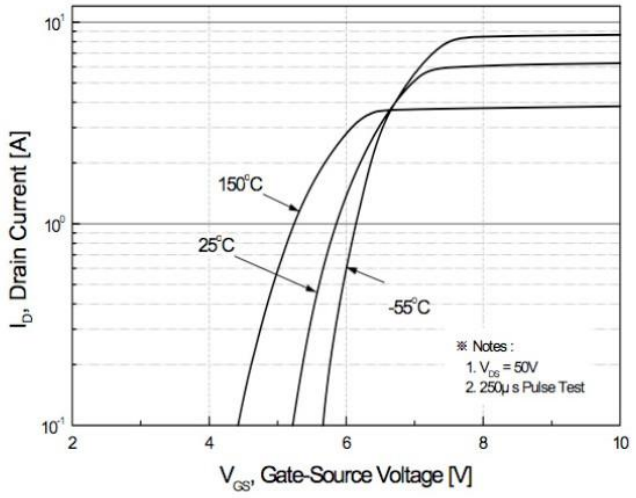

FIG.2-TRANSFER CHARACTERISTICS

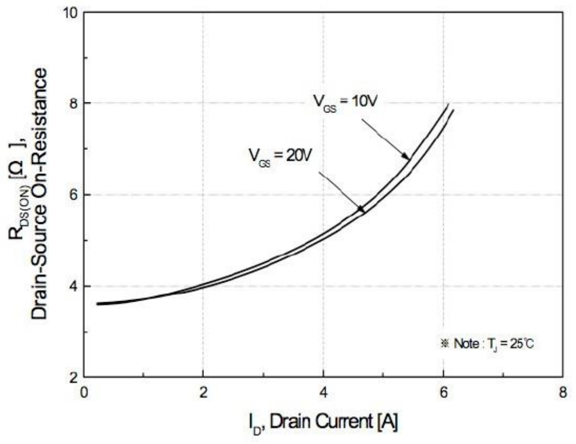

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

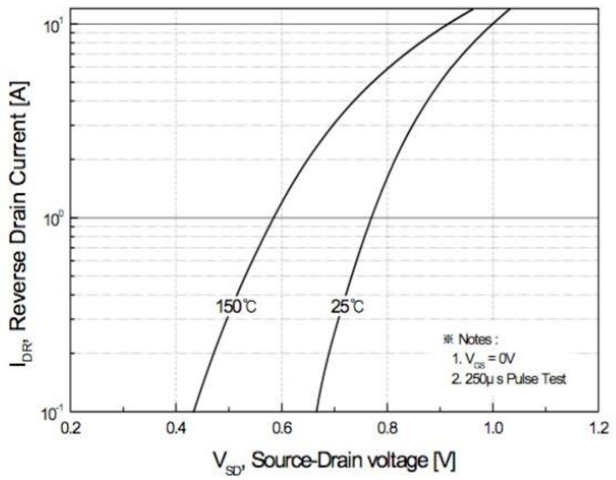

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

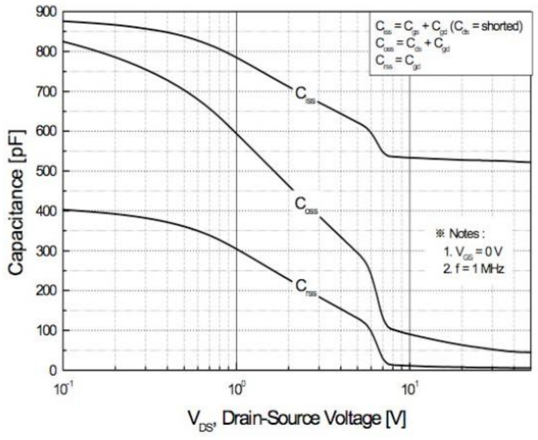

FIG.5-CAPACITANCE CHARACTERISTICS

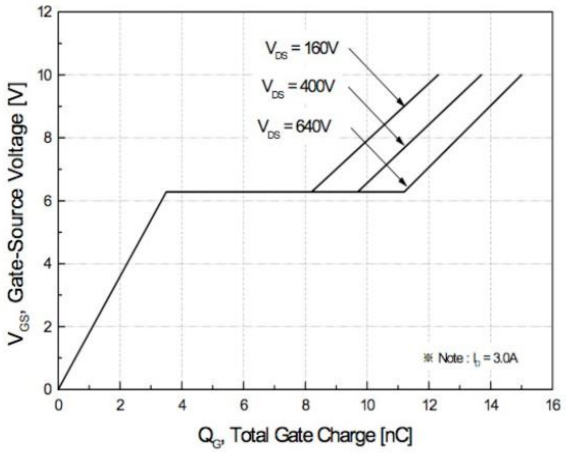

FIG.6-GATE CHARGE CHARACTERISTICS

■Characteristics Curve

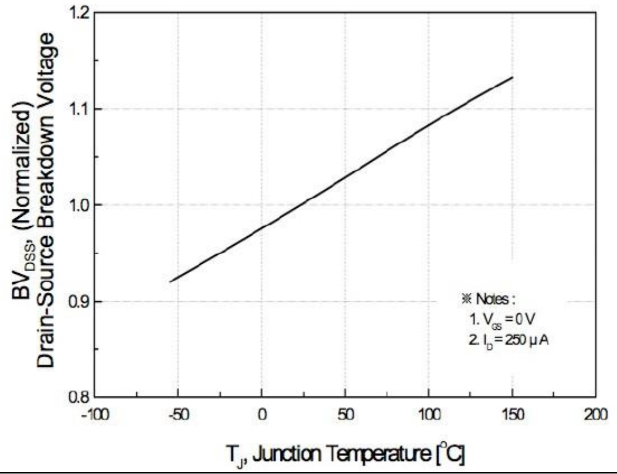

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

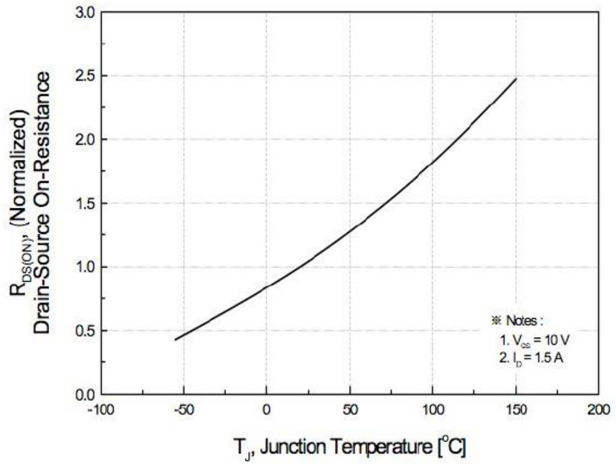

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

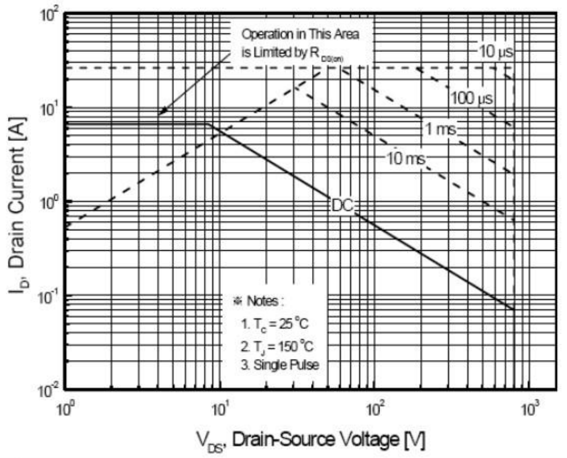

FIG.9-MAXIMUM SAFE OPERATING AREA

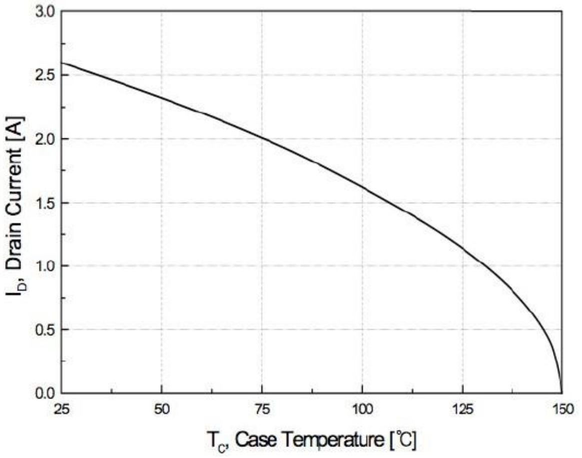

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

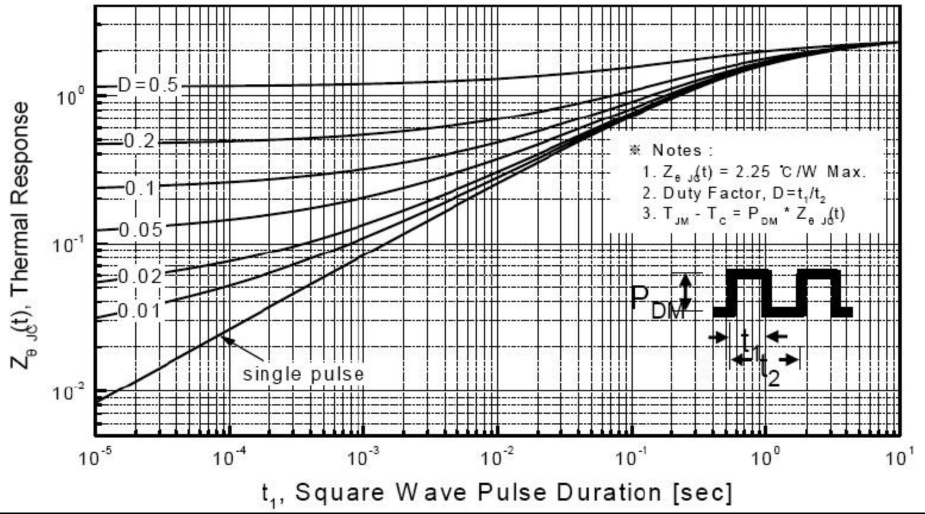

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

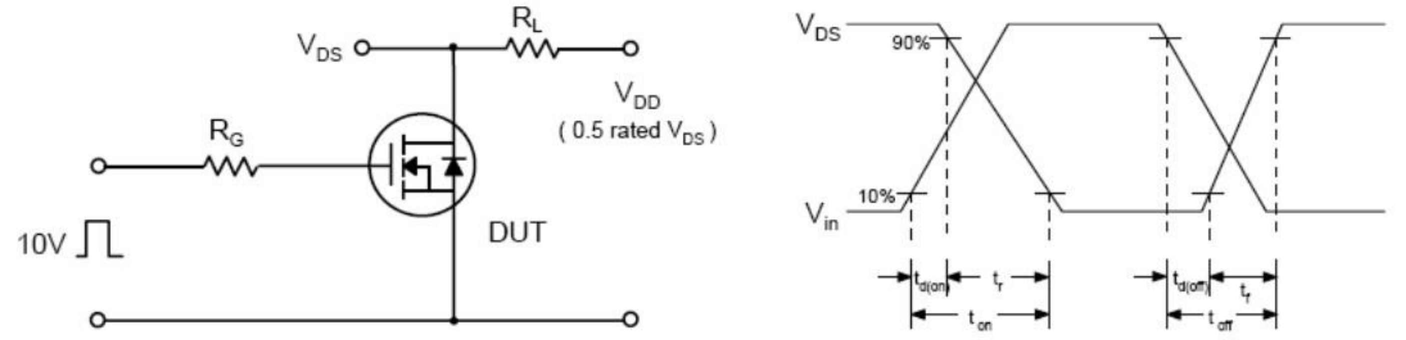


FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

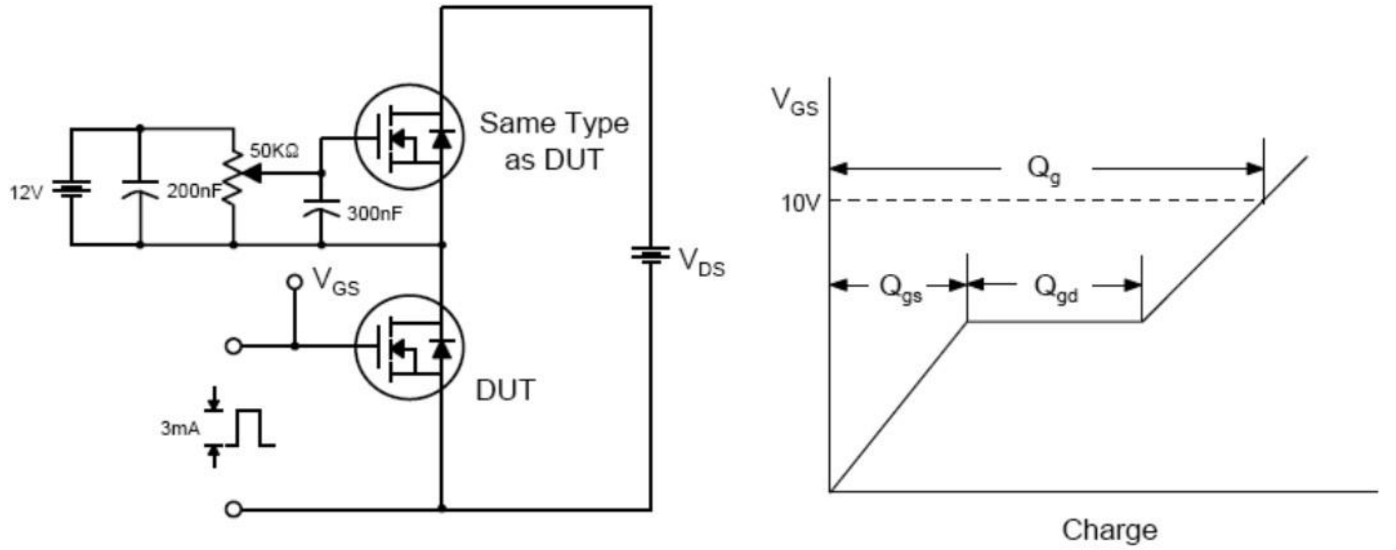
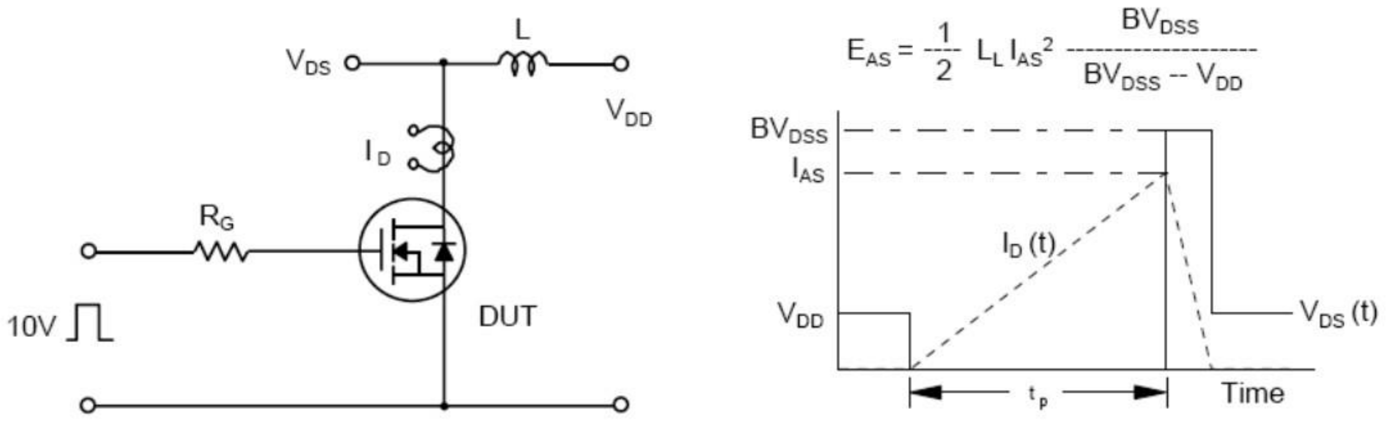


FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM



$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

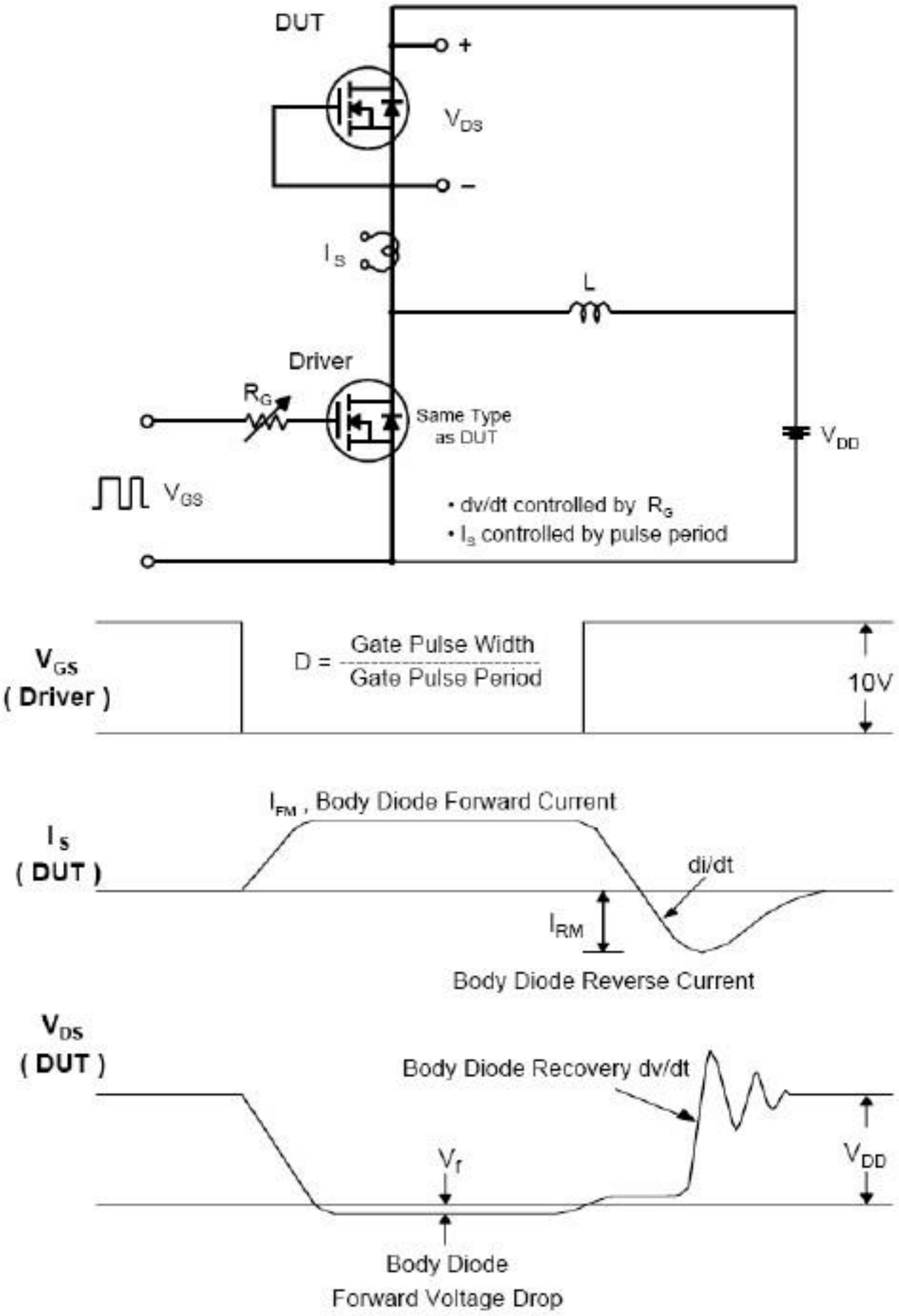


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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