MSF18N50

500V N-Channel MOSFET

Description

The MSF18N50 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. he TO-220F package is universally preferred for all commercial-industrial applications

Features

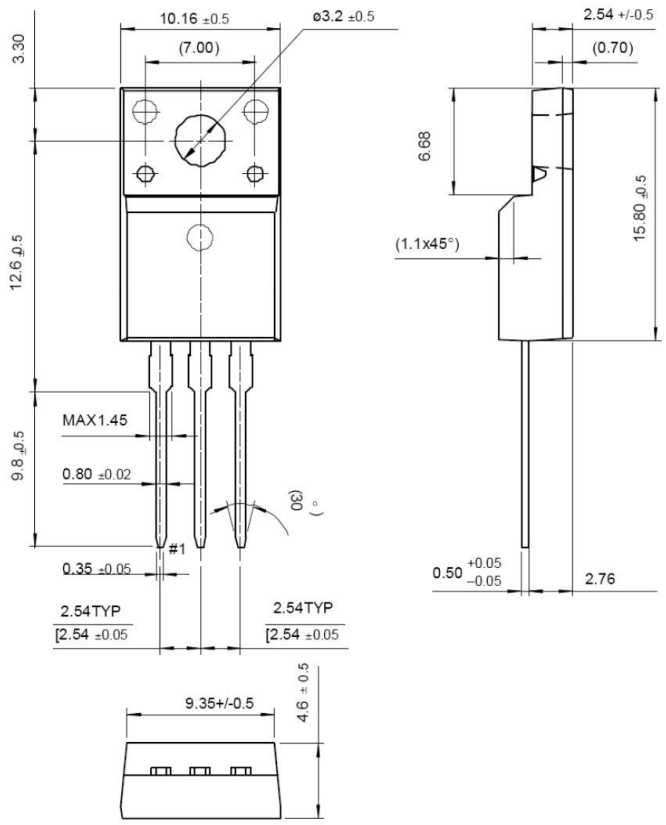
- Originative New Design
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- 100% EAS Test
- Extended Safe Operating Area
- RoHS compliant package

Application

- High current, High speed switching
- PFC (Power Factor Correction)

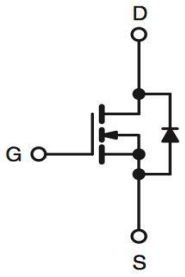
Packing & Order Information

50/Tube ; 1,000/Box



RoHS COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	18	A
	Drain Current -Continuous (TC=100°C)	10.8	A
I_{DM}	Drain Current Pulsed	72	A
E_{AS}	Single Pulsed Avalanche Energy	990	mJ
E_{AR}	Repetitive Avalanche Energy	23.5	mJ
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns
P_D	Power Dissipation (TC = 25 °C)	235	W
	Power Dissipation (TC=100°C)	1.8	W/°C

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Absolute Maximum Ratings (Tc=25°C unless otherwise noted)			
Symbol	**Parameter**	**Value**	**Unit**
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C

NOTE:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Thermal characteristics (Tc=25°C unless otherwise noted)			
Symbol	**Parameter**	**Max.**	**Units**
Rthjc	Typical thermal resistance	0.53	°C/W
$R_{\theta JA}$		62.5	

Static Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
V_{GS}	V_{DS} = V_{GS}, I_D=250μA	3.0		5.0	V
*$R_{DS(ON)}$	V_{GS}=10V , I_D=9.0A	--	0.25	0.32	mΩ
BV_{DSS}	V_{GS}=0 V , I_D=250μA	500	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C		0.6		
I_{DSS}	V_{DS}=500V , V_{GS}= 0 V V_{DS}=400V , V_{GS}= 0 V , T_j= 125°C	--	--	1 10	uA
I_{GSSF}	V_{DS} =30V, V_{Ds}=0 V			100	nA
I_{GSSR}	V_{DS} =-30V, V_{Ds}=0 V	--	--	-100	nA

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	V_{DS}=400V,I_D=18A, V_{GS}=10 V	--	48.5	--	nC
Q_{gs}		--	14	--	
Q_{gd}		--	22	--	
$t_{d(on)}$	V_{DS}=250 V, I_D=18A, R_G=25Ω	--	70	--	ns
t_r		--	190	--	ns
$t_{d(off)}$		--	100	--	ns
tf		--	100	--	ns
C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	--	2500	--	pF
C_{OSS}		--	400	--	pF
C_{RSS}		--	40	--	pF

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Source-Drain Diode Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
I_S		--	--	18	A
I_{SM}		--	--	72	
V_{SD}	IF=18A , V_{GS}=0	--	--	1.5	V
t_{rr}	IF=18A , V_{GS}=0 , dIF/dt=100A/μs	--	550	--	ns
Q_{rr}		--	5.5	--	uC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=5.5mH, I_{AS}=18A, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃
3. I_{SD}≦16A, di/dt≦200A/μs,V_{DD}≦BV_{DSS}, Starting T_J=25℃
4. Pulse Test: Pulse Width ≦ 300μs, Duty Cycle≦ 2%
5. Essentially Independent of Operating Temperature

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■Characteristics Curve

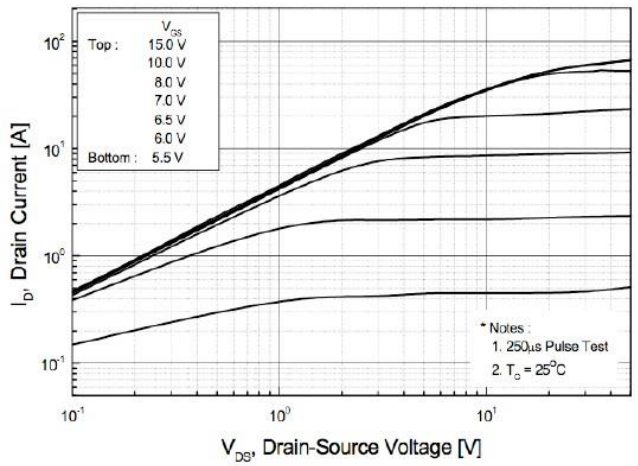

FIG.1-ON REGION CHARACTERISTICS

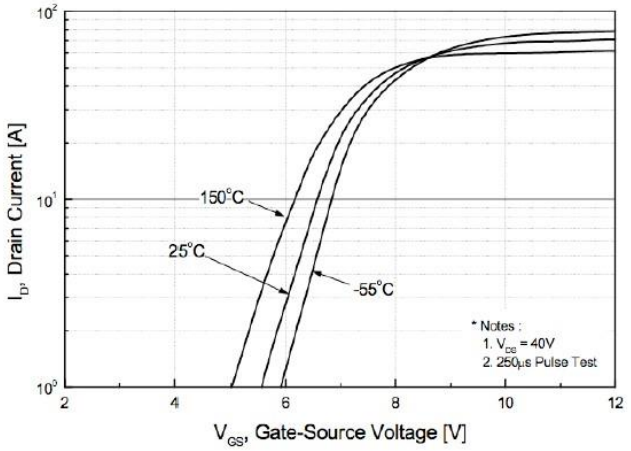

FIG.2-TRANSFER CHARACTERISTICS

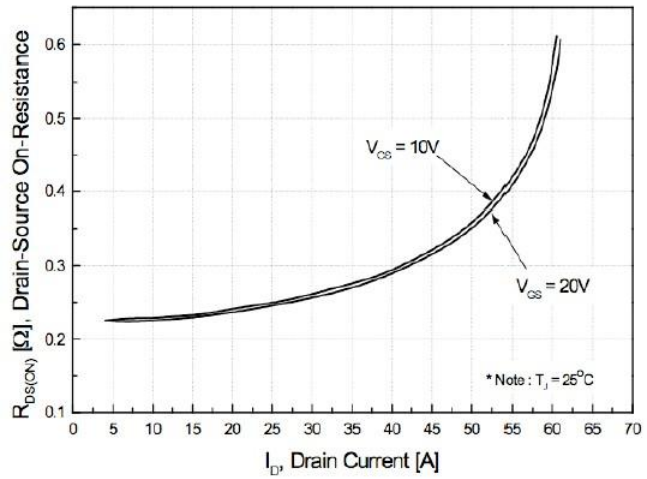

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

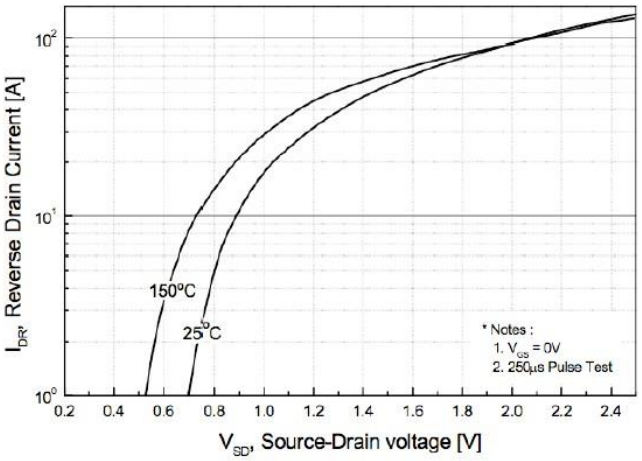

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

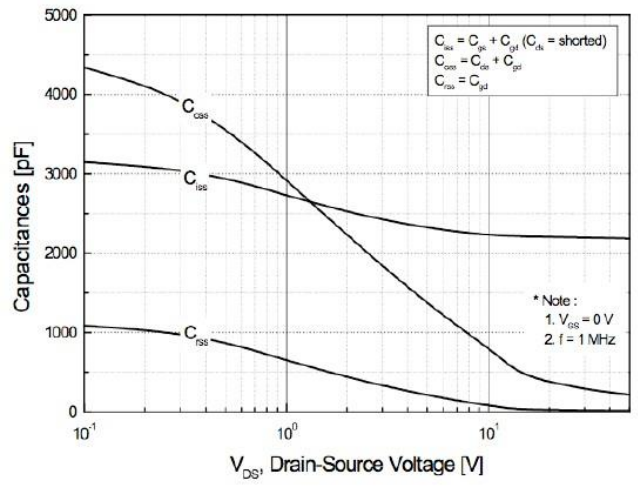

FIG.5-CAPACITANCE CHARACTERISTICS

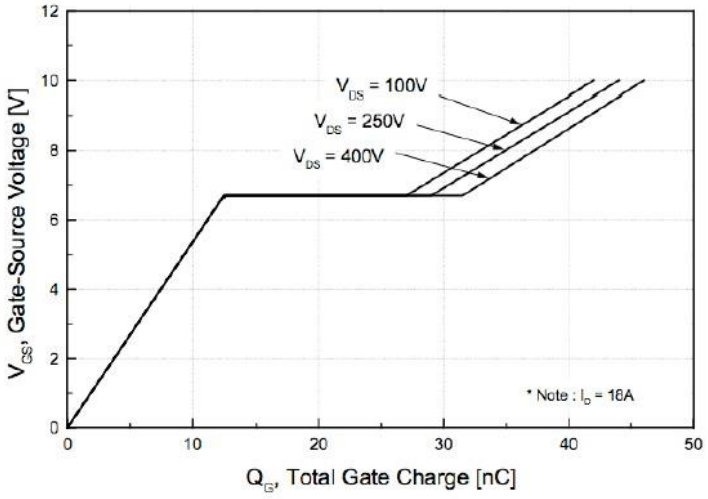

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

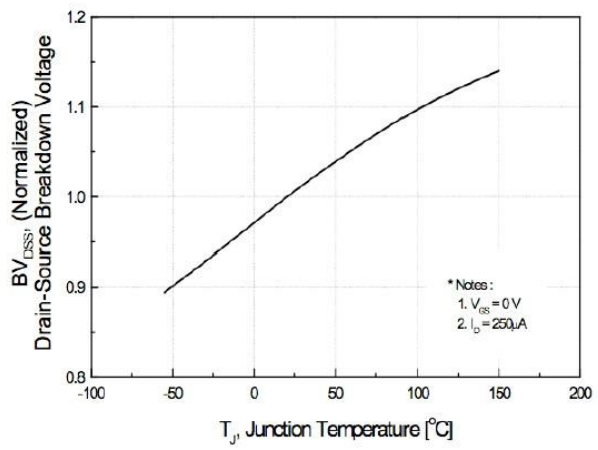

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

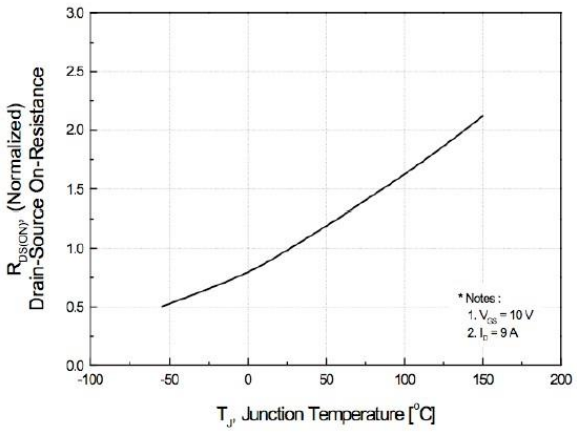

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

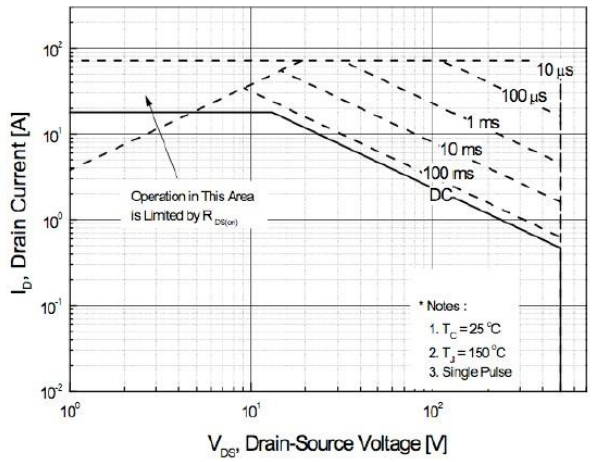

FIG.9-MAXIMUM SAFE OPERATING AREA

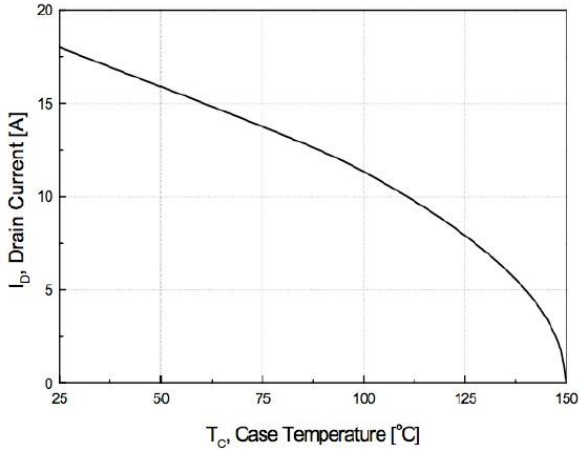

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

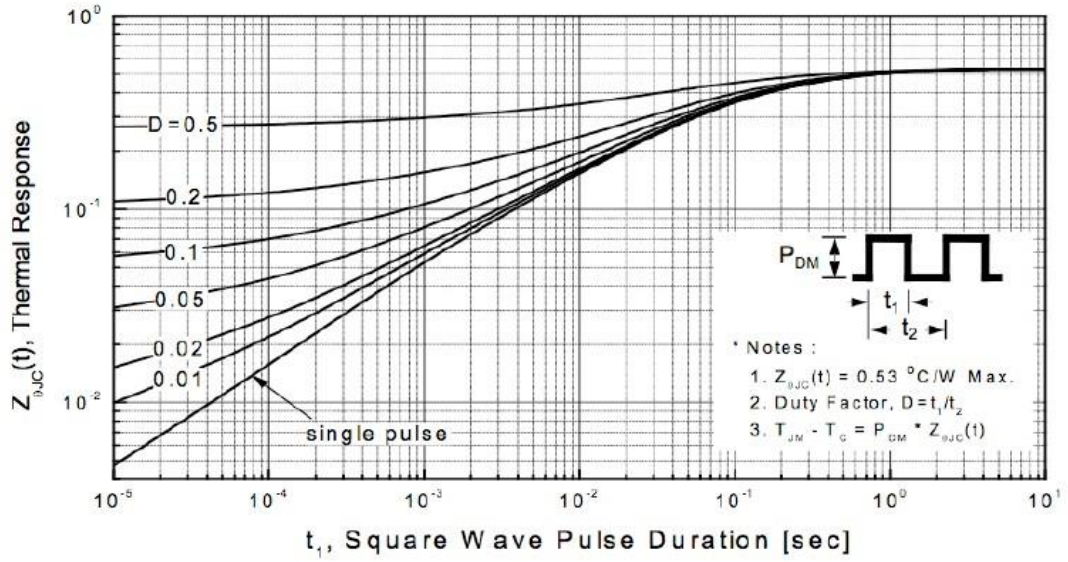

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

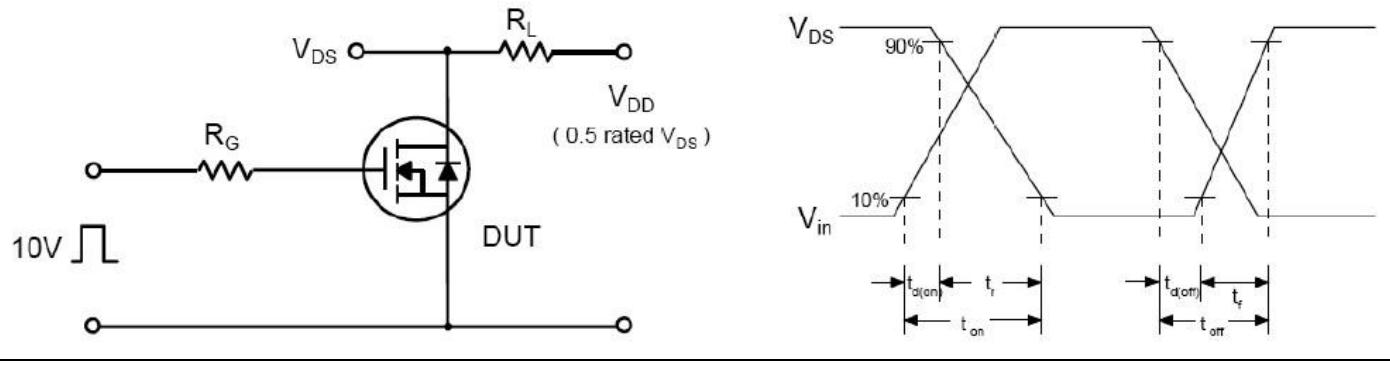

Fig 12. Resistive Switching Test Circuit & Waveforms

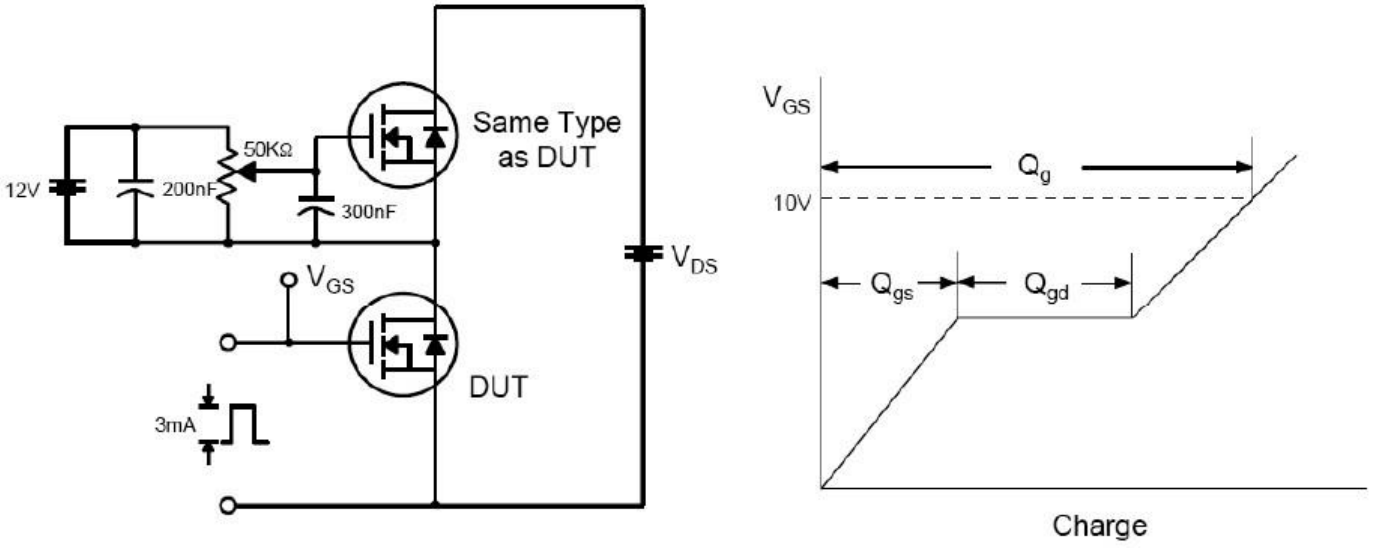

Fig 13. Gate Charge Test Circuit & Waveform

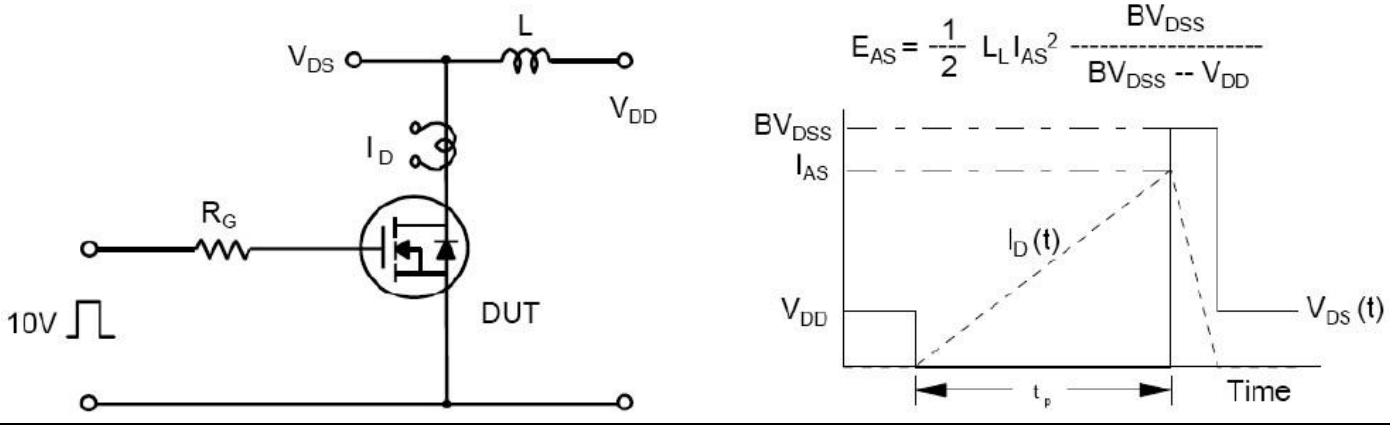

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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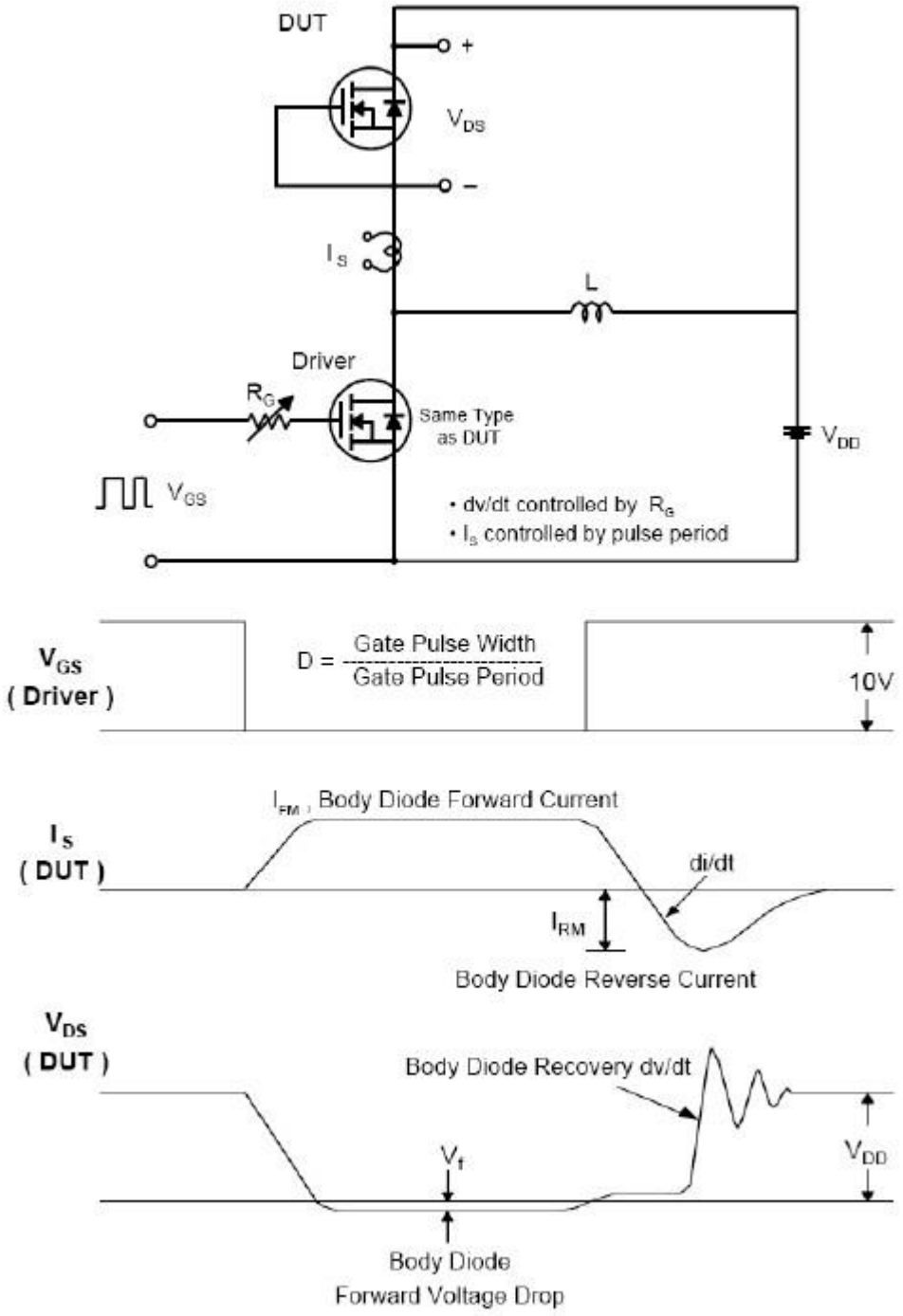

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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