MSF7N60

600V N-Channel MOSFET

Description

The MSF7N60 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-220F package is universally preferred for all commercial-industrial applications

Features

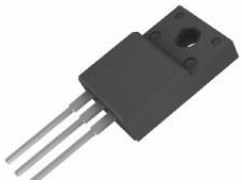
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

- Open Framed Power Supply
- Adapter
- STB

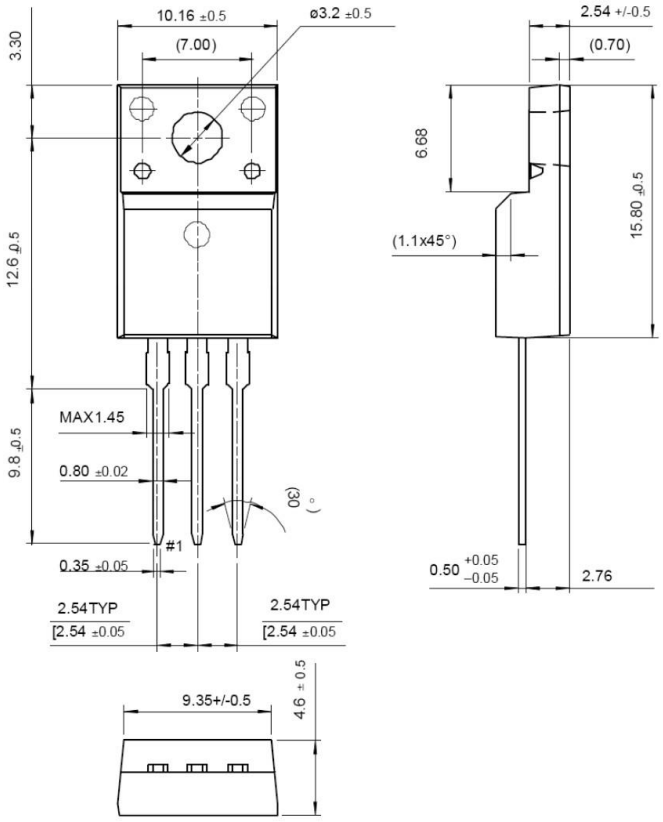
Packing & Order Information

50/Tube ; 1,000/Box

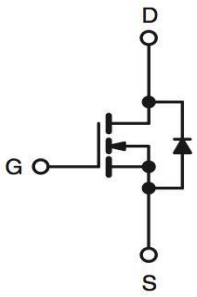


RoHS COMPLIANT

HALOGEN FREE Avaliable



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	7.0	A
	Drain Current -Continuous (TC=100°C)	4.4	A
I_{DM}	Drain Current Pulsed	21	A
E_{AS}	Single Pulsed Avalanche Energy	48	mJ
I_{AR}	Avalanche Current	7.0	A

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
E_{AR}	Repetitive Avalanche Energy	3.1	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
P_D	Total Power Dissipation (TC = 25 °C)	31	W
	Derating Factor above 25 °C	0.25	W/°C
T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 10 seconds	300	°C
TPKG	Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
T_J	Storage Temperature	150	°C

Note:

1.Repetitive rating; pulse width limited by maximum junction temperature.

2. I_{AS}≤7A, V_{DD}=50V, L=7mH, V_G=10V, starting TJ=+25°C.

3. I_{SD}≤7A, dI/dt≤200A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Junction-to-Case	2.6	°C/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
*$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 3.5 A	--	0.85	1.2	Ω
BV_{DSS}	V_{GS} = 0 V , I_D = 250μA	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	V_{DS} = 600 V , V_{GS} = 0 V V_{DS} = 480 V , V_C= 125°C	--	--	1 10	uA
I_{GSS}	V_{GS} = ±30	--	--	±100	nA

Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0MHz	--	1482	--	pF
C_{OSS}		--	121.7	--	pF
C_{RSS}		--	14	--	pF

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Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	V_{DG} = 300 V,I_D = 7 A, V_{GS} = 10 V	--	28	37	nC
Q_{gs}		--	4.7	--	nC
Q_{gd}		--	11	--	nC
$t_{d(on)}$	V_{DS} = 400 V, I_D = 7 A, R_G = 25 Ω , V_{GS} = 10 V	--	10	30	ns
t_r		--	35	80	ns
$t_{d(off)}$		--	45	100	ns
tf		--	40	90	ns

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0MHz	--	1500	2010	pF
C_{OSS}		--	145	190	pF
C_{RSS}		--	13	20	pF

Source-Drain Diode Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
I_S	V_G = V_D = 0 V, V_S = 13 V	--	--	7	A
I_{SM}		--	--	28	
V_{SD}	I_S = 7 A , V_{GS} = 0 V	--	--	1.4	V
t_{rr}	I_F = 7 A ,V_{GS} = 0 V , dIF/dt=100A/μs	--	350	--	ns
Q_{rr}		--	3.3	--	uC

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

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■Characteristics Curve

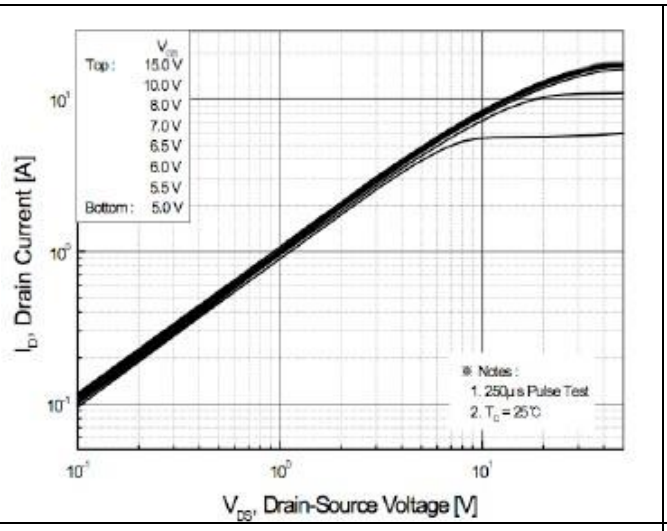

FIG.1-ON REGION CHARACTERISTICS

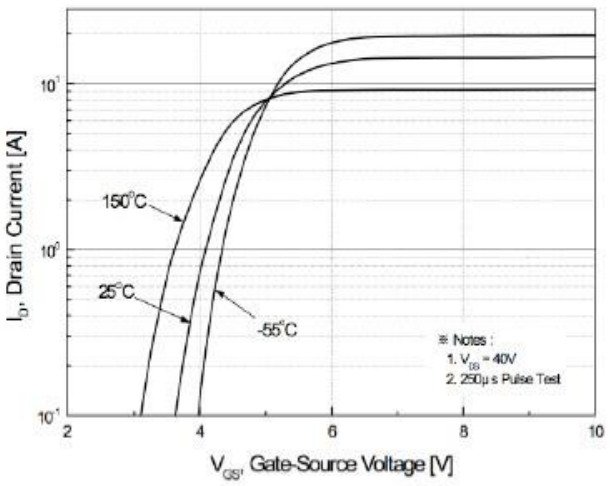

FIG.2-TRANSFER CHARACTERISTICS

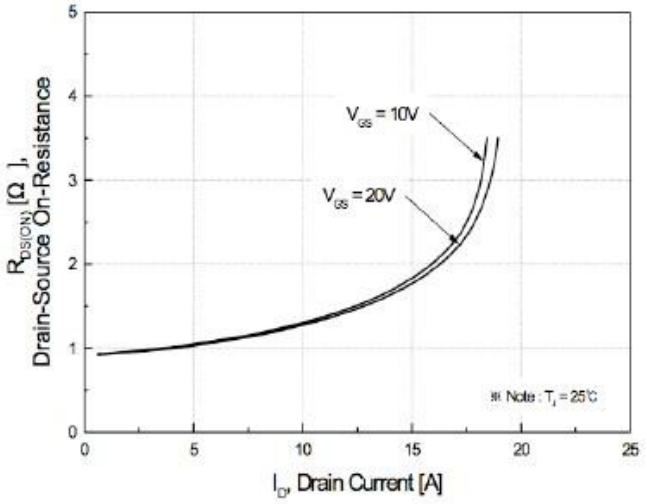

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

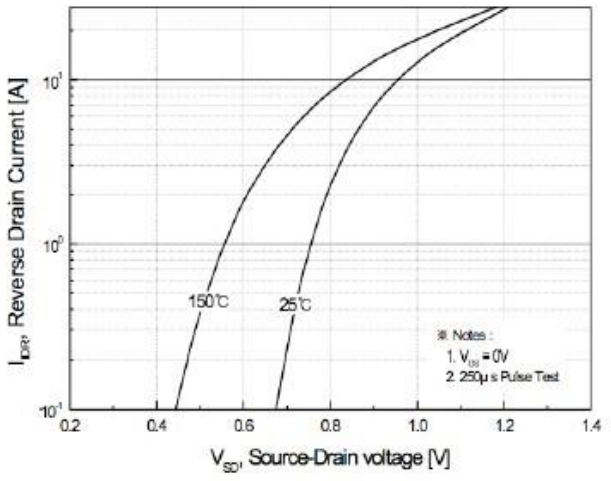

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

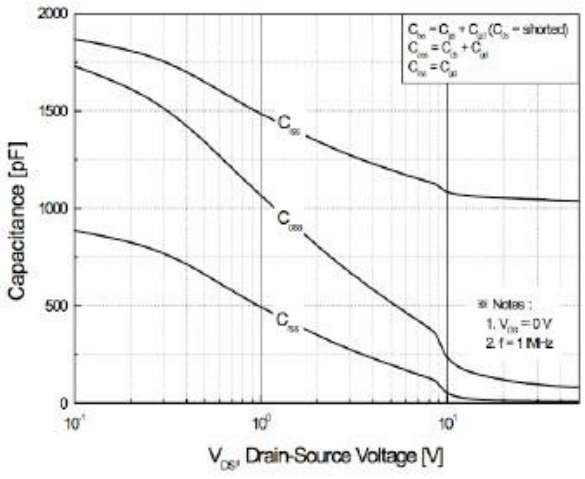

FIG.5-CAPACITANCE CHARACTERISTICS

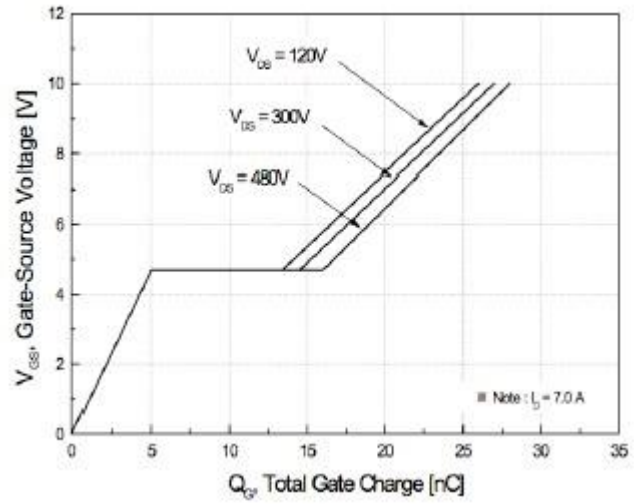

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

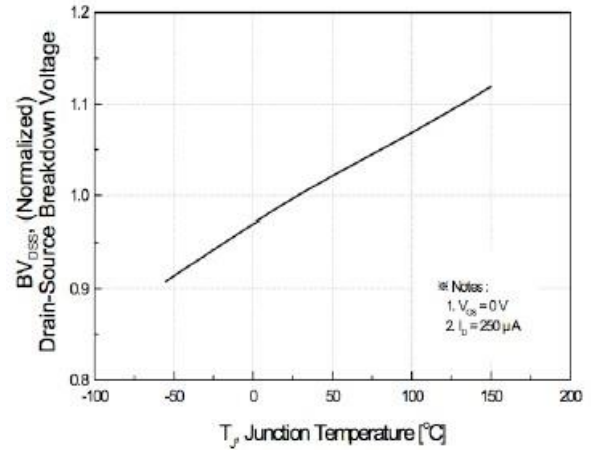

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

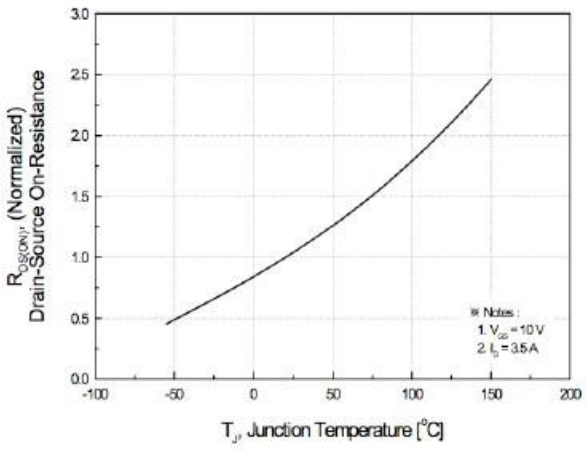

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

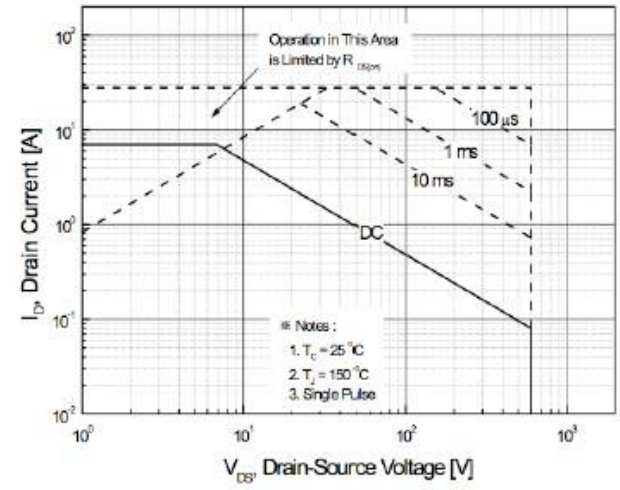

FIG.9-MAXIMUM SAFE OPERATING AREA

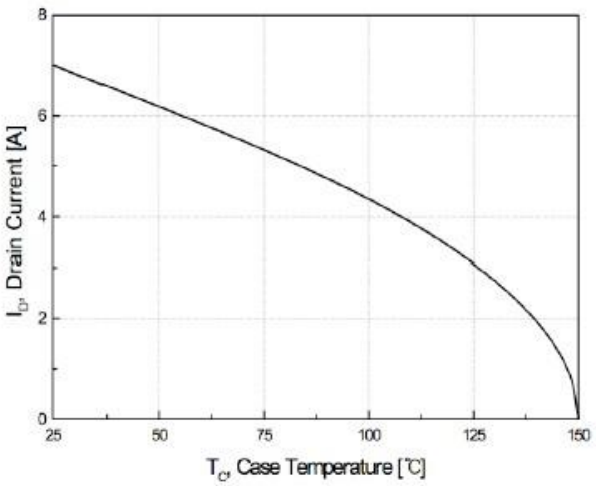

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

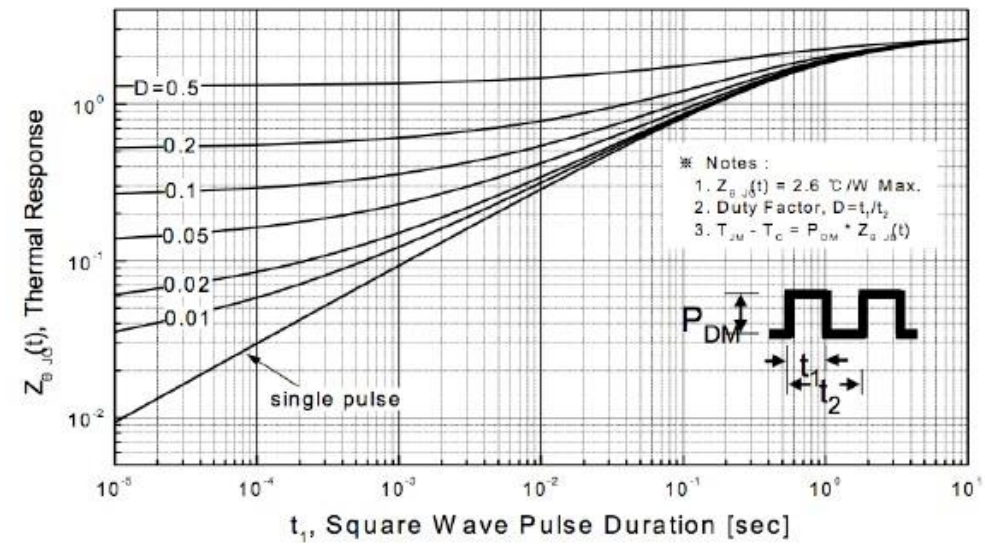

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

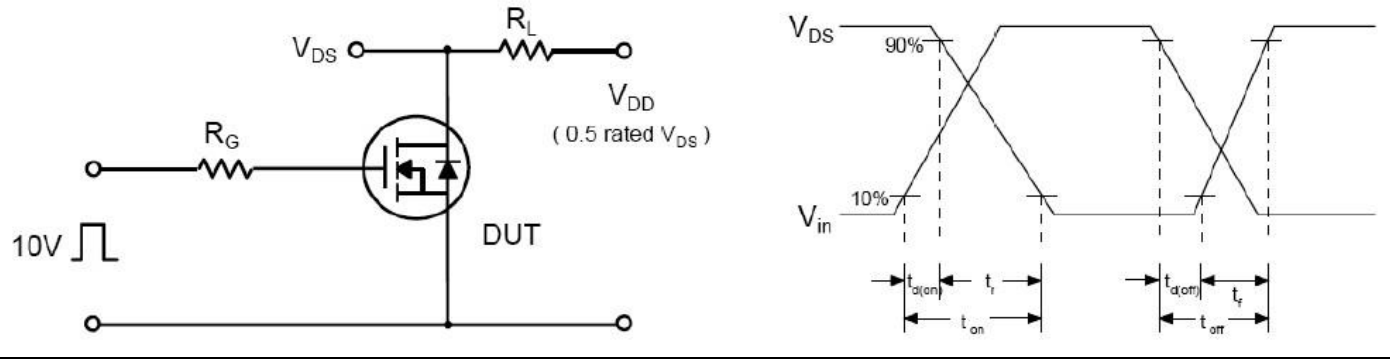

Fig 12. Resistive Switching Test Circuit & Waveforms

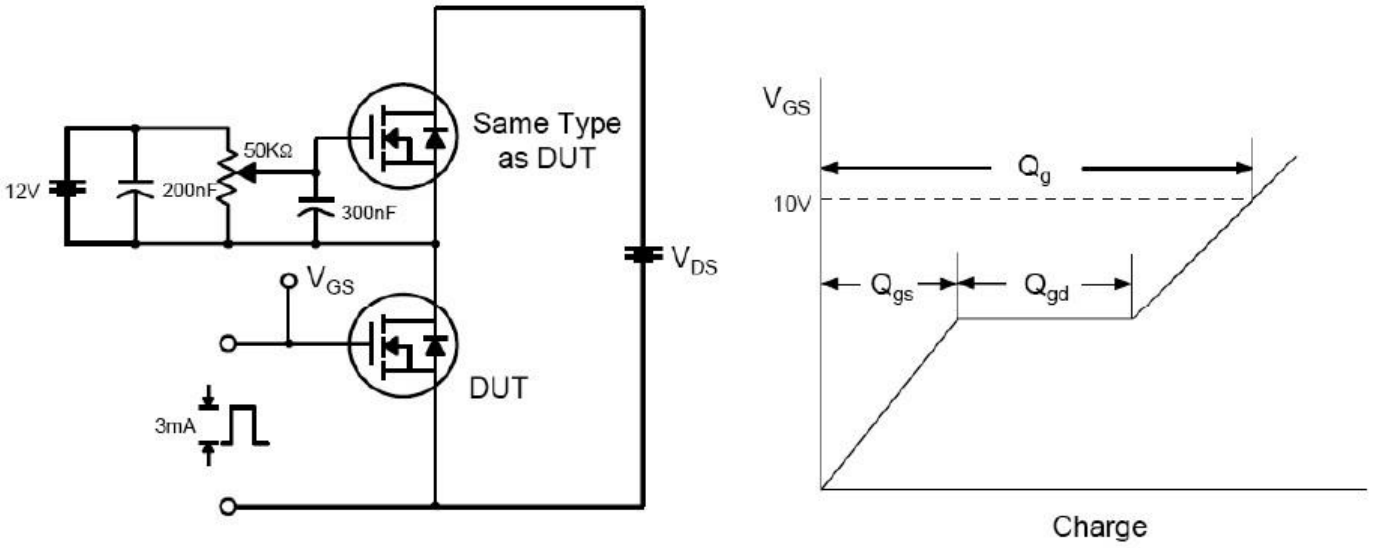

Fig 13. Gate Charge Test Circuit & Waveform

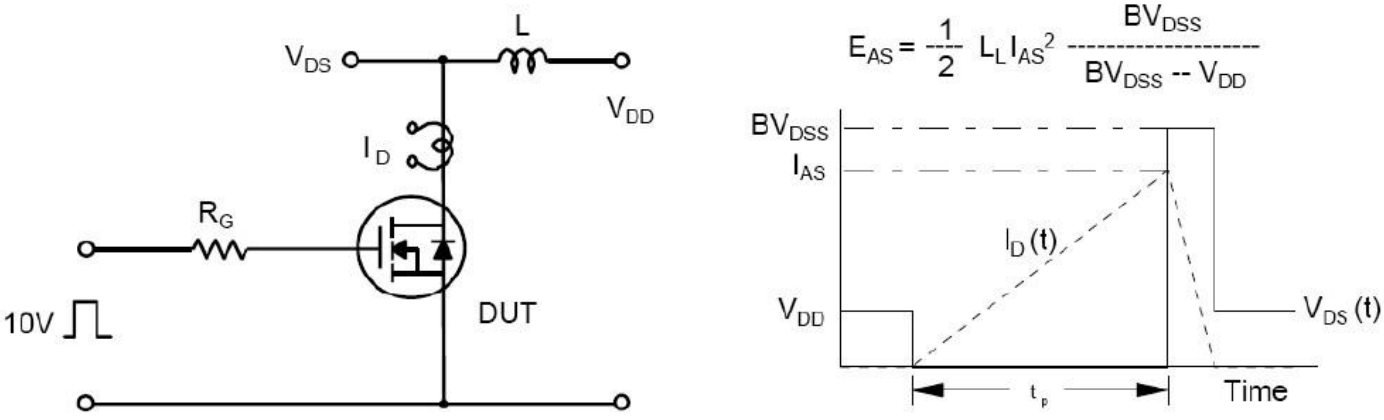

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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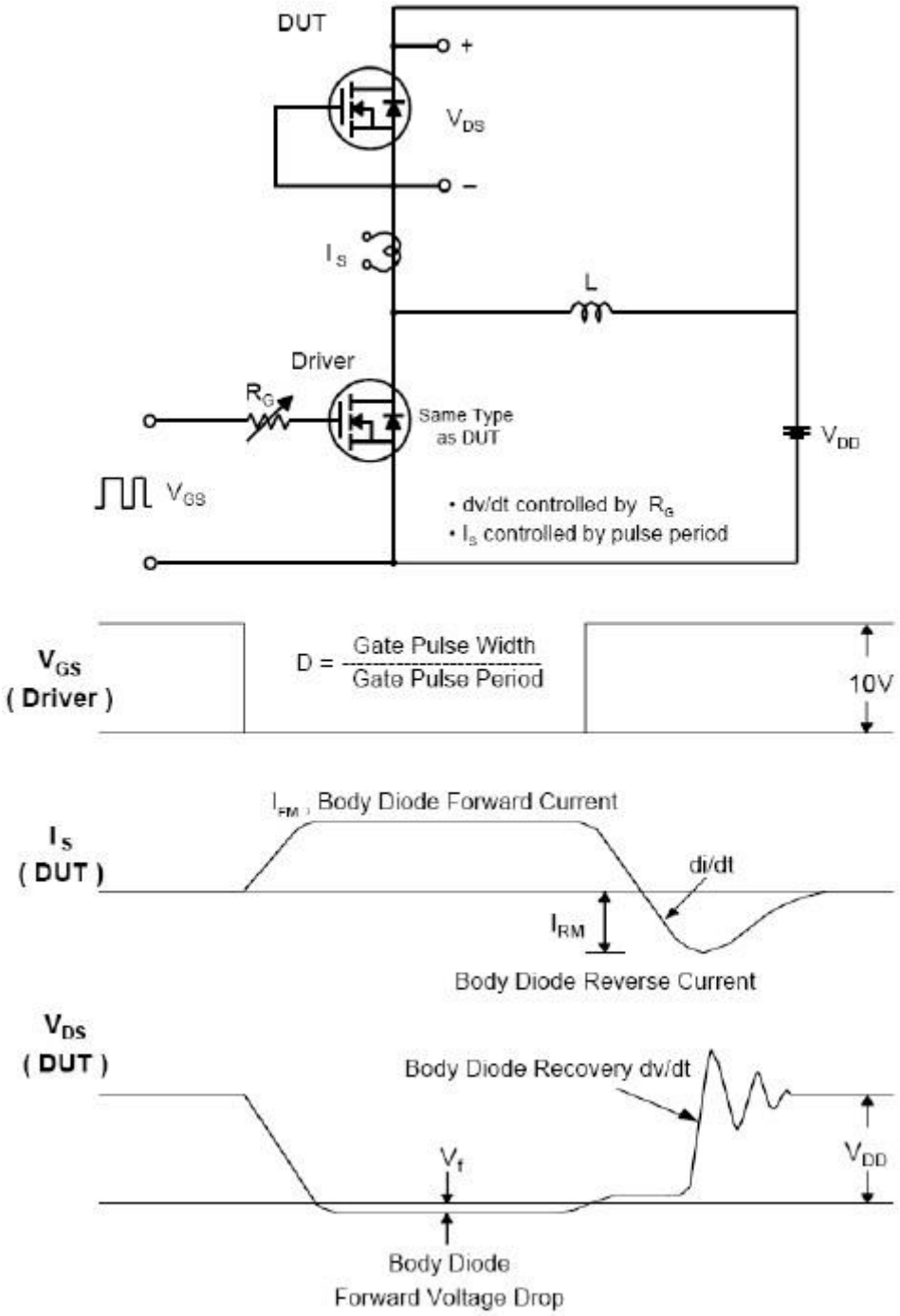

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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