MSD2N60

N-Channel MOSFET

Description

The MSD2N60 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-252 package is universally preferred for all commercial-industrial applications

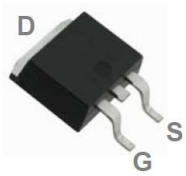
Features

- Originative New Design
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Unrivalled Gate Charge : 9.5nC (Typ.)
- Extended Safe Operating Area
- Lower RDS(ON) : 4.0 Ω (Typ.) @VGS=10V
- 100% Avalanche Tested
- RoHS compliant package

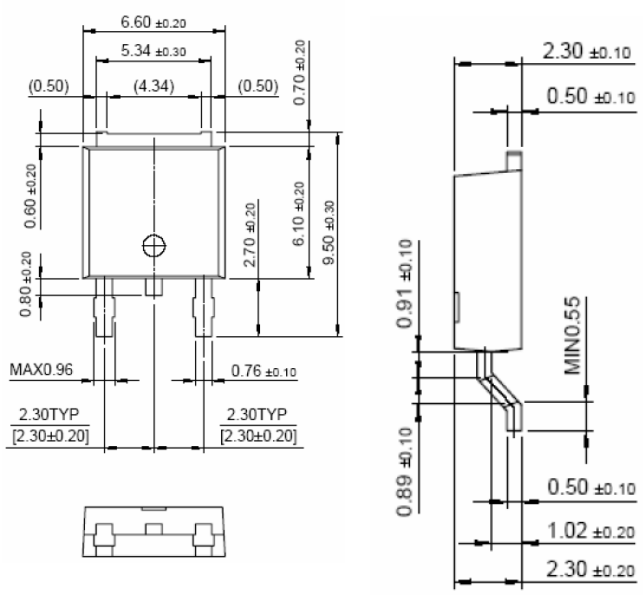
Packing & Order Information

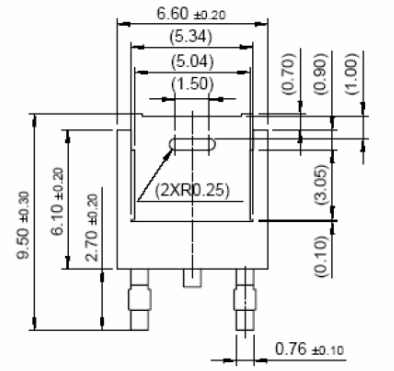
Part No./ R：2,500/Reel

Part No./ T：80/Tube , 4,000/Box

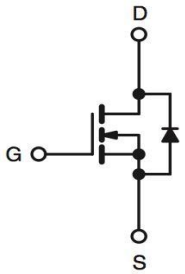


RoHS COMPLIANT





Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current @ TC=25°C	2	A
	Continuous Drain Current @ TC=100°C	1.3	A

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Absolute Maximum Ratings (Tc=25°C unless otherwise noted)			
Symbol	Parameter	Value	Unit
I_{DM}	Pulsed Drain Current	8.0	A
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
E_{AS}	Single Pulsed Avalanche Energy	120	mJ
E_{AR}	Repetitive Avalanche Energy	5.4	mJ
P_D	Power Dissipation (TC=25°C)	23	W
	- Derate above 25°C	0.18	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	

• Drain current limited by maximum junction temperature

Thermal Resistance Characteristics			
Symbol	Parameter	Maximum	Units
$R_{\theta JC}$	Junction-to-Case	2.87	°C/W
$R_{\theta JA}$	Junction-to-Ambient	50	

On Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 3.5 A	--	4.0	4.7	Ω

Off Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	V_{GS} = 0 V , I_D = 250 μA	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 , T_C = 125°C	--	--	10 100	μA
I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA

Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	V_{DS} = 15 V, V_{GS} = 0 V, F = 1.0MHz	--	320	420	pF
C_{OSS}		--	35	46	pF
C_{RSS}		--	4.5	6.0	pF

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Switching Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	V_{DS} = 300 V, I_D = 2 A, R_G = 25 Ω	--	8	30	ns
t_r		--	23	60	ns
$t_{d(off)}$		--	25	60	ns
tf		--	28	70	ns
Q_g	V_{DS} = -480 V , I_D = 2 A, V_{GS} = 10 V	--	9.5	13	nC
Q_{gs}		--	1.6	--	nC
Q_{gd}		--	4.0	--	nC

Source-Drain Diode Maximum Ratings and Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	2.0	A
I_{SM}		--	--	6.0	
V_{SD}	I_S = 2 A , V_{GS} = 0 V	--	--	1.4	V
t_{rr}	I_S = 2 A , V_{GS} = 0 V , dIF/dt=100A/μs	--	230	--	ns
Q_{rr}		--	1.0	--	nC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=2.0A, V_{DD}=50V, R_G=25Ω, Starting TJ =25°C
3. I_{SD}≤2.0A, di/dt≤300A/μs, VDD≤BVDSS , Starting TJ =25 °C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

■Characteristics Curve

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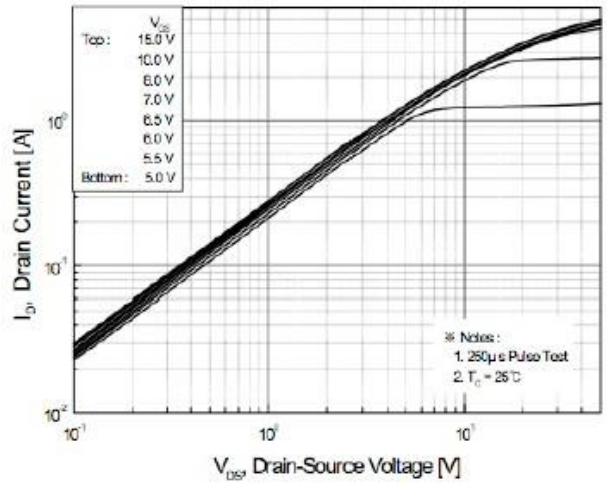

FIG.1-ON REGION CHARACTERISTICS

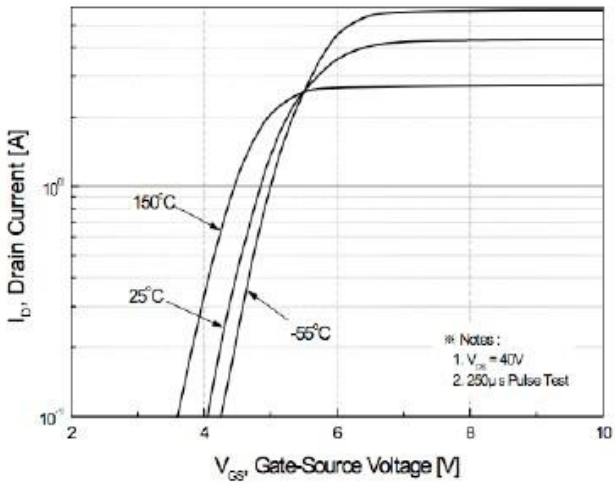

FIG.2-TRANSFER CHARACTERISTICS

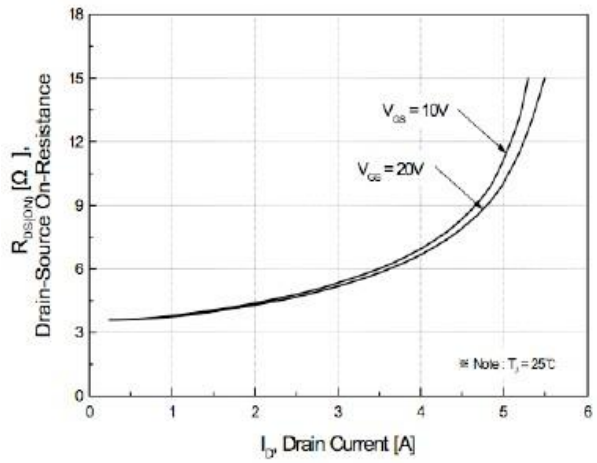

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

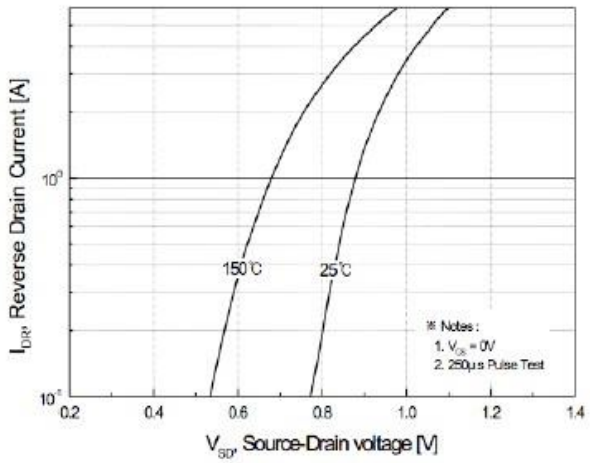

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

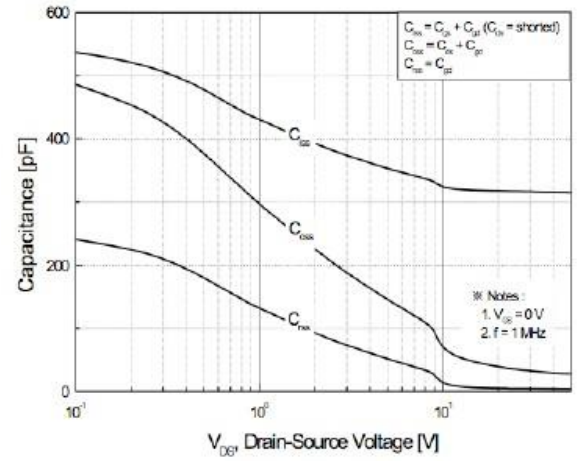

FIG.5-CAPACITANCE CHARACTERISTICS

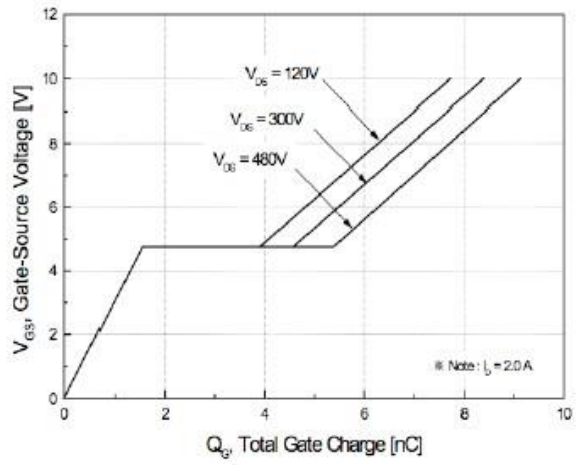

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

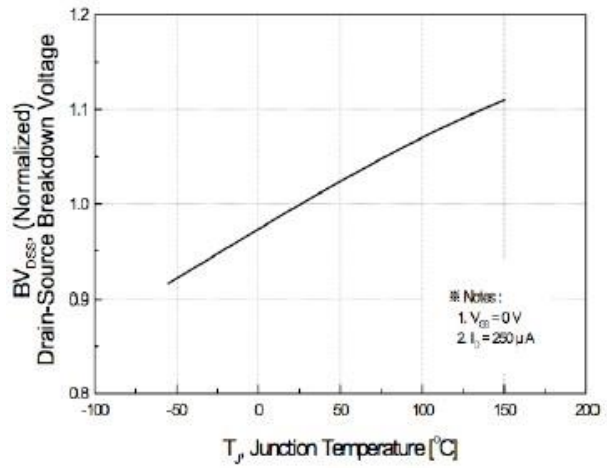

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

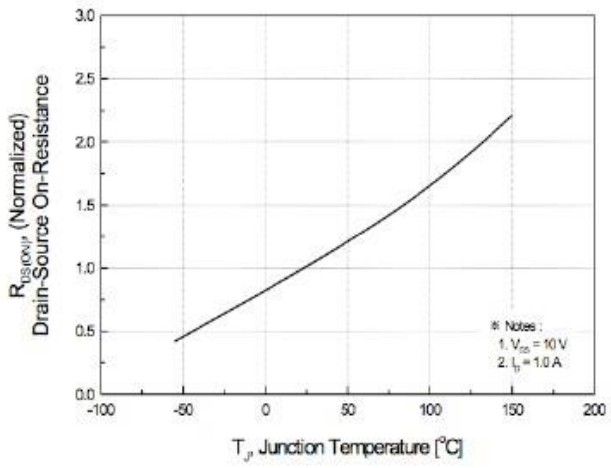

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

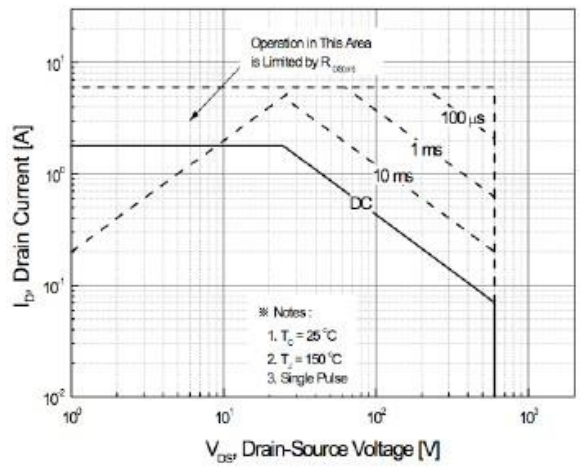

FIG.9-MAXIMUM SAFE OPERATING AREA

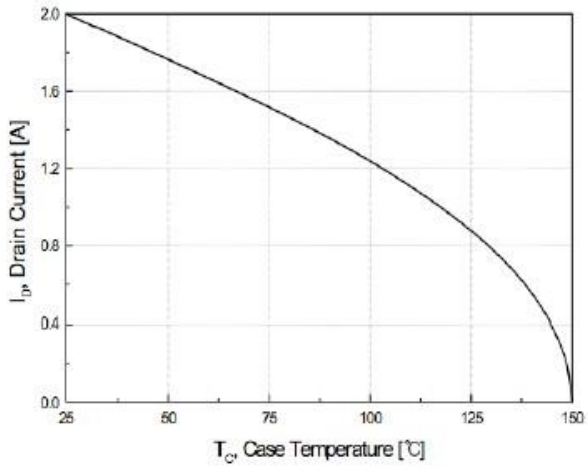

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

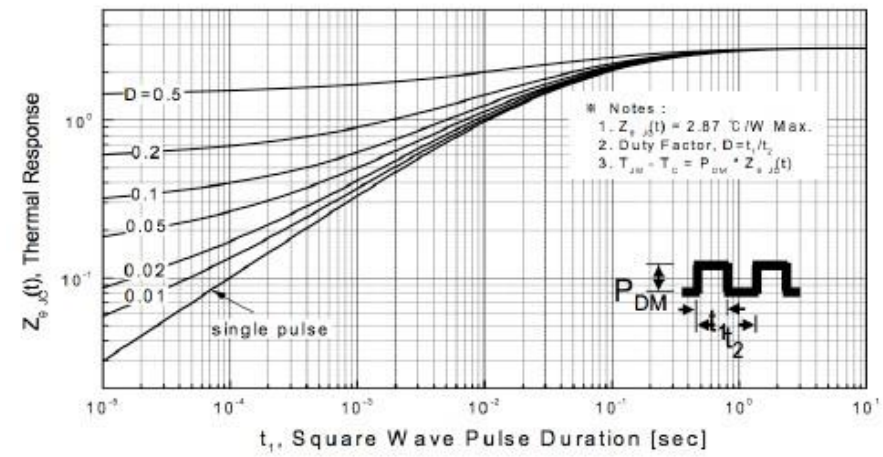

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

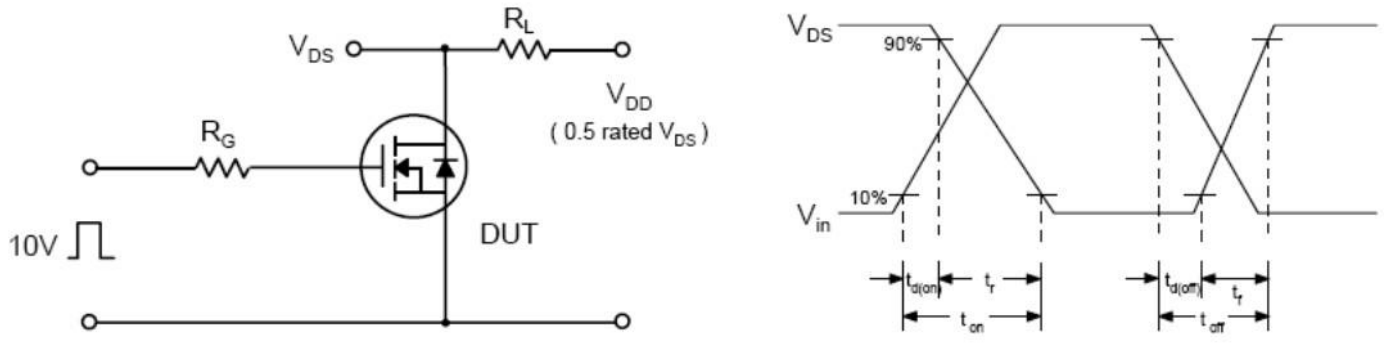

FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

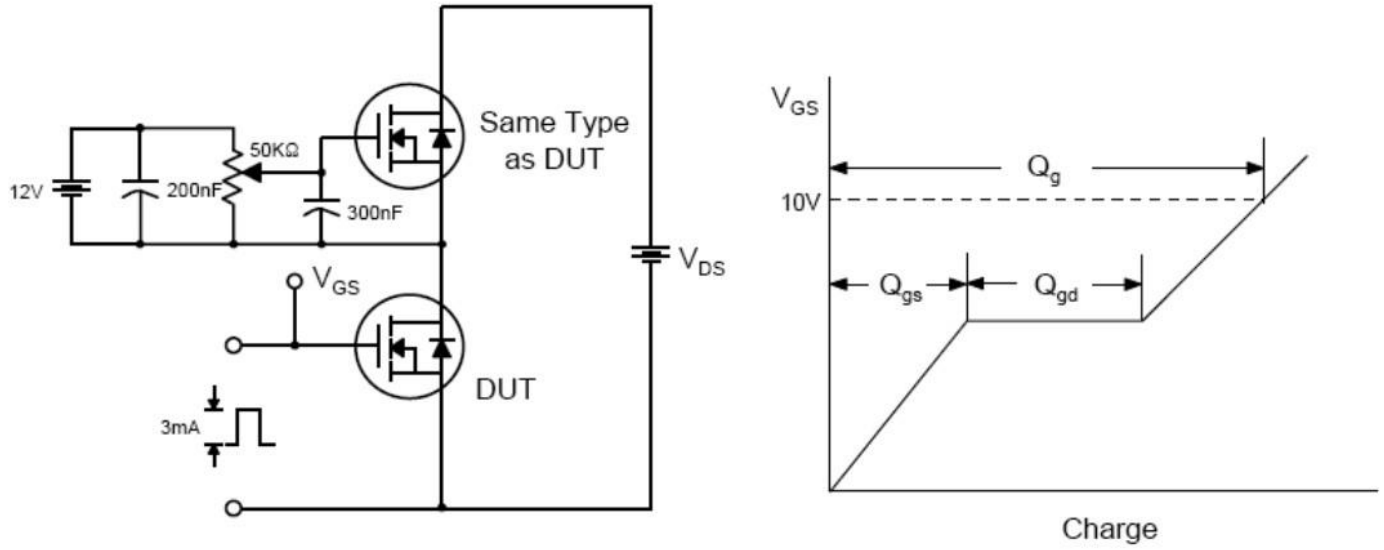

FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM

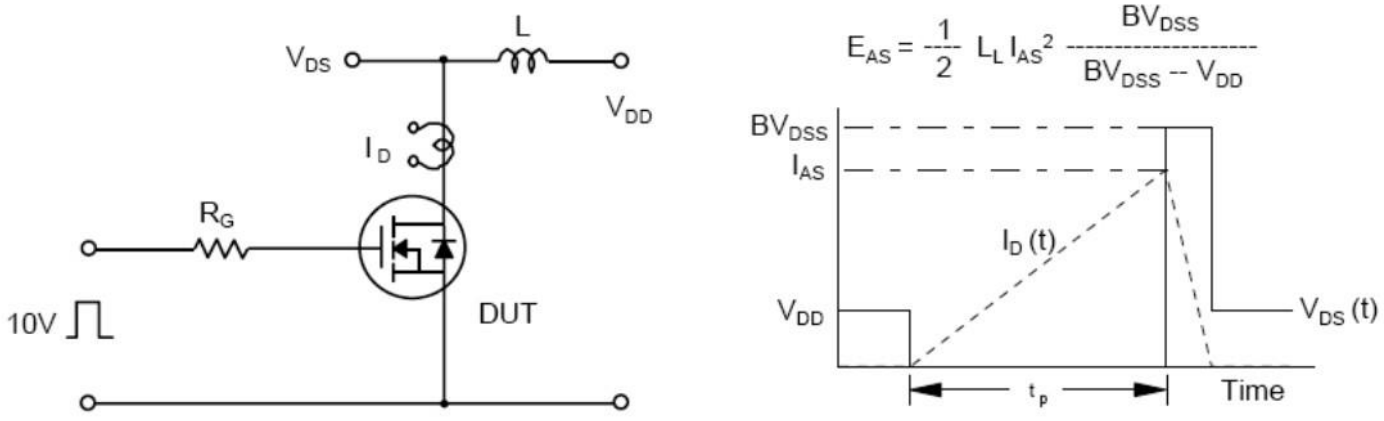

FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

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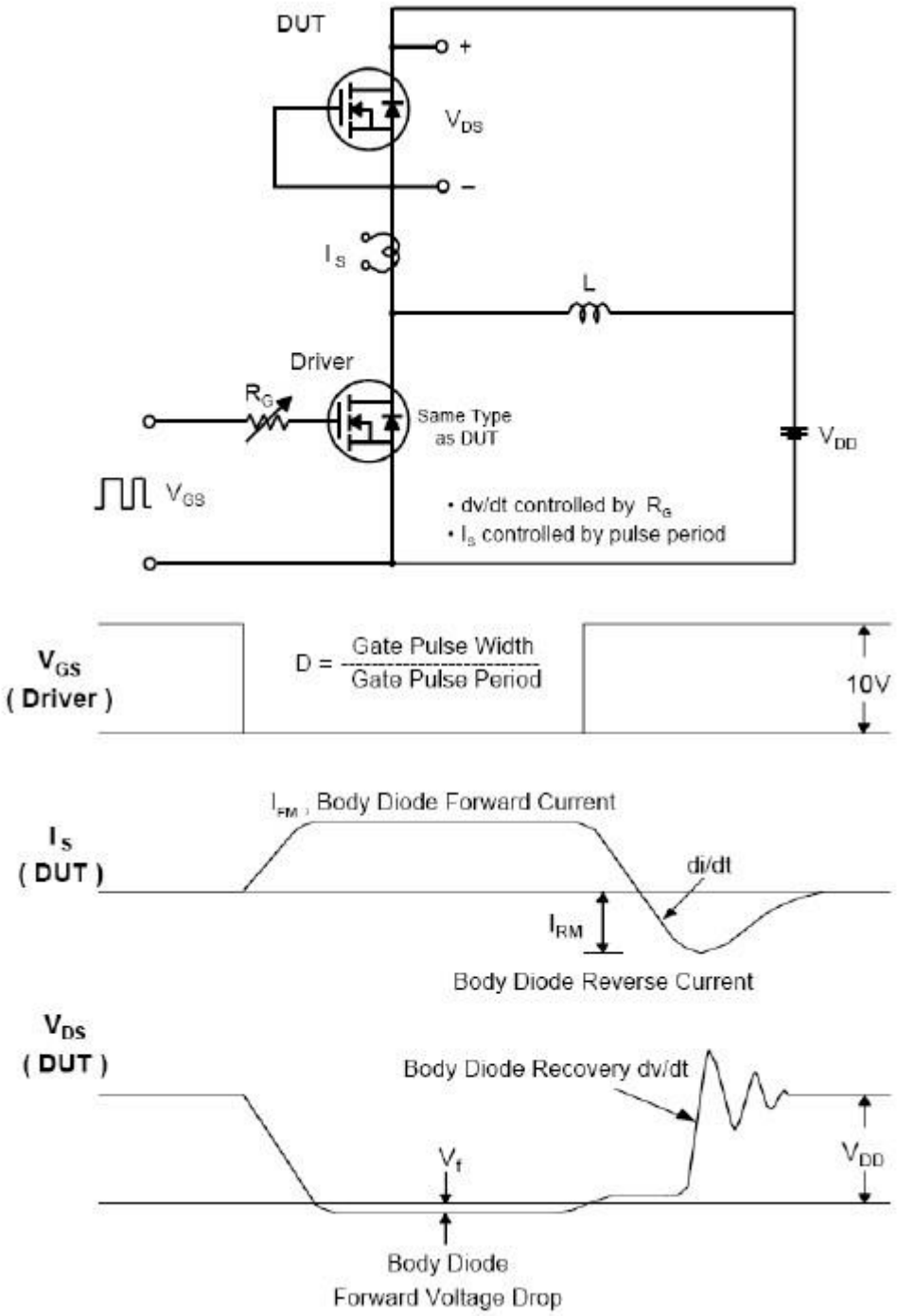

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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