MSU4N60

600V N-Channel MOSFET

Description

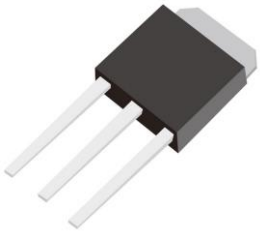
The MSU4N60 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-251 package is universally preferred for all commercial-industrial applications

Features

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

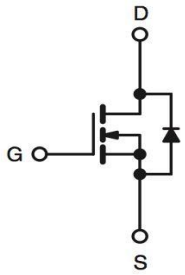
Packing & Order Information

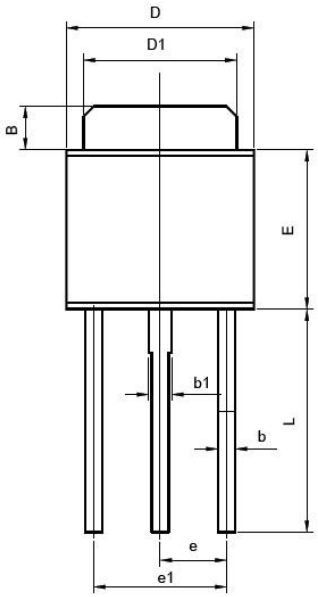
80/Tube ; 4,000/Box

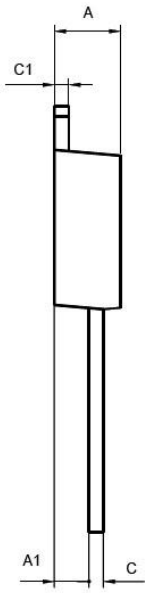


RoHS COMPLIANT

Graphic symbol







	Dimensions in Millimeters		Dimensions in Inches	
Symbol	**min**	**max**	**min**	**max**
A	2.15	2.45	0.85	0.96
A1	1.00	1.40	0.39	0.55
B	1.25	1.75	0.49	0.69
b	0.45	0.75	0.18	0.3
b1	0.65	0.95	0.26	0.37
C	0.38	0.64	0.15	0.25
C1	0.38	0.64	0.15	0.25
D	6.30	6.70	2.48	2.64
D1	5.10	5.50	2.01	2.17
E	5.30	5.70	2.09	2.24
e	2.3 (typ.)		0.91 (typ.)	
e1	4.4	4.8	1.73	1.89
L	7.4	8.0	2.91	3.15

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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	Drain Current -Continuous (TC=25°C)	4.5	A
	Drain Current -Continuous (TC=100°C)	2.6	A
I_{DM}	Drain Current Pulsed	18	A
E_{AS}	Single Pulsed Avalanche Energy	33	mJ
E_{AR}	Repetitive Avalanche Energy	10	mJ
I_{AR}	Avalanche Current	4.0	A
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns
P_D	Power Dissipation (TC = 25 °C)	31	W
	- Derate above 25°C	0.25	W/°C
T_{STG}	Operating and Storage Temperature	-55 to +150	°C
T_J	Storage Temperature	150	°C

Note:

1. Repetitive rating; pulse width limited by maximum junction temperature.
2. I_{AS}=4A, V_{DD}=50V, L=8mH, V_G=10V, starting TJ=+25°C.
3. I_{SD}≤4A, dI/dt≤100A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal Resistance Characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	

Static 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 = 2.25 A	--	2.0	25	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	--	0.60	--	V/°C
I_{DSS}	V_{DS} = 600 V , V_{GS} = 0 V V_{DS} = 480 V , T_C = 125°C	--	--	1 10	μA
I_{GSS}	V_{GS} = ±30	--	--	±100	nA

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Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	V_{DD} = 300 V, I_D = 4.5 A, V_{GS} = 10 V, R_G = 25 Ω	--	10	30	ns
t_r		--	40	80	ns
$t_{d(off)}$		--	40	100	ns
tf		--	50	90	ns
Q_g	V_{DS} = 480 V,I_D = 4.5 A, V_{GS} = 10 V	--	16	--	nC
Q_{gs}		--	2.5	--	nC
Q_{gd}		--	6.5	--	nC
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, F = 1.0MHz	--	560	--	pF
C_{OSS}		--	55	--	pF
C_{RSS}		--	7	--	pF

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S			--	--	4.0	A
I_{SM}			--	--	16	
V_{SD}	I_S = 4 A , V_{GS} = 0 V		--	--	1.4	V
t_{rr}	I_S = 4 A , V_{GS} = 0 V diF/dt = 100A/μs		--	270	--	ns
Q_{rr}			--	18	--	uC

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

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■Characteristics Curve

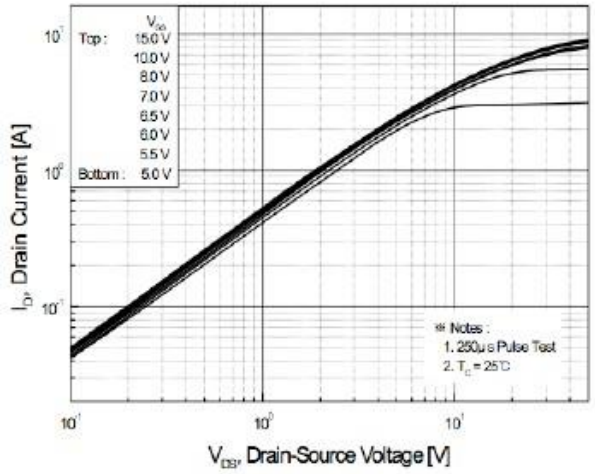

FIG.1-ON REGION CHARACTERISTICS

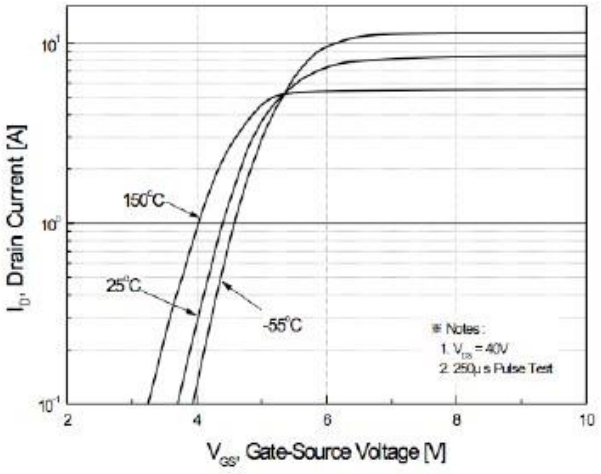

FIG.2-TRANSFER CHARACTERISTICS

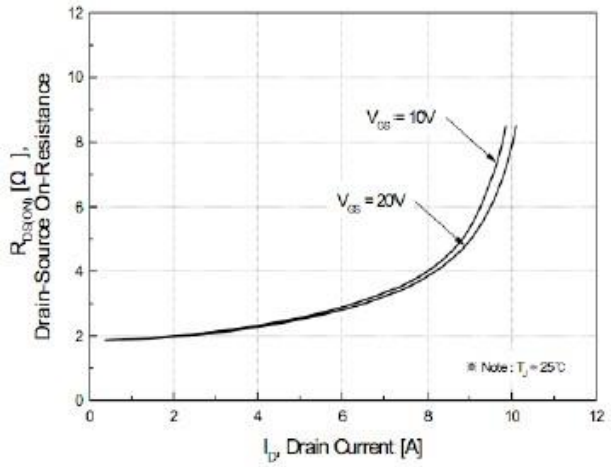

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

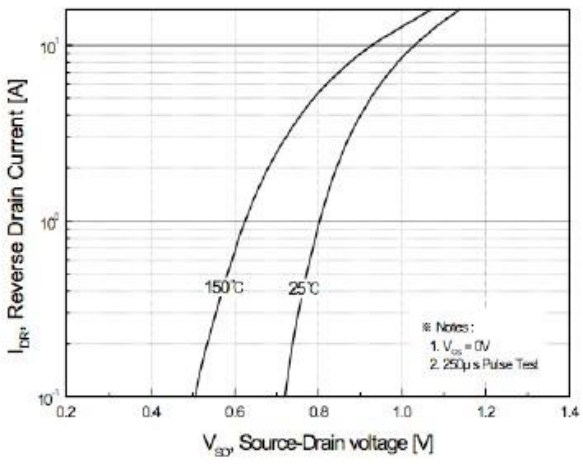

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

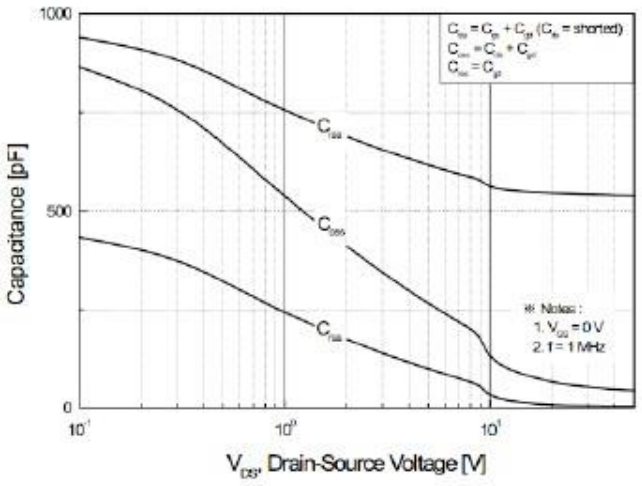

FIG.5-CAPACITANCE CHARACTERISTICS

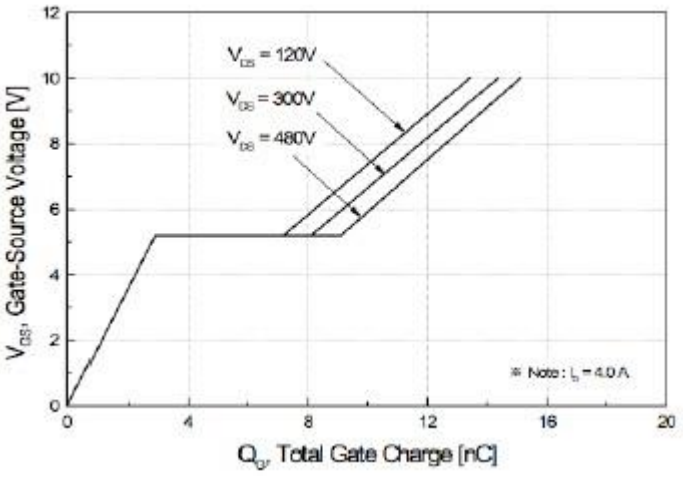

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

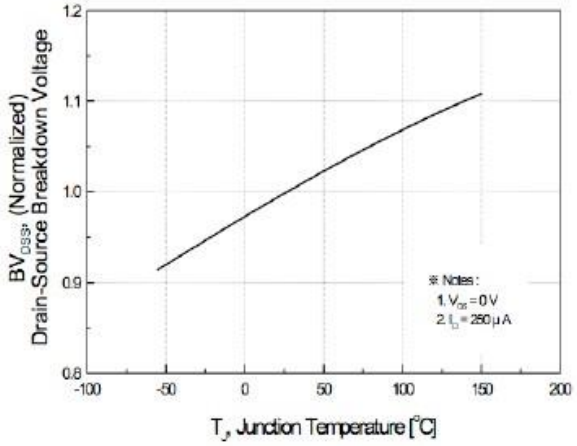

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

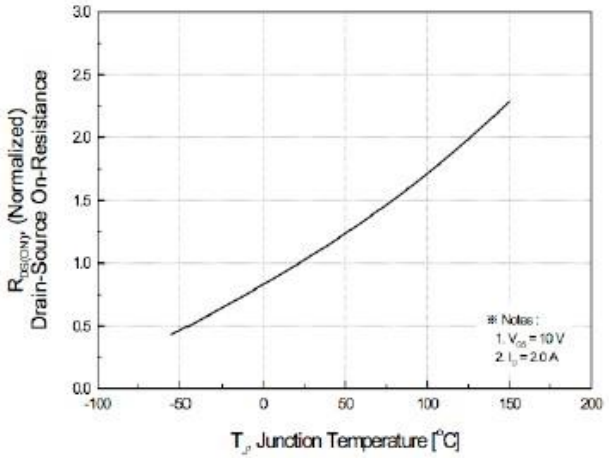

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

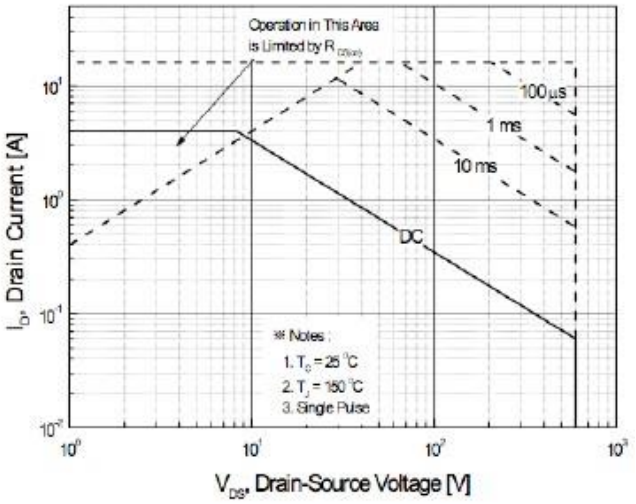

FIG.9-MAXIMUM SAFE OPERATING AREA

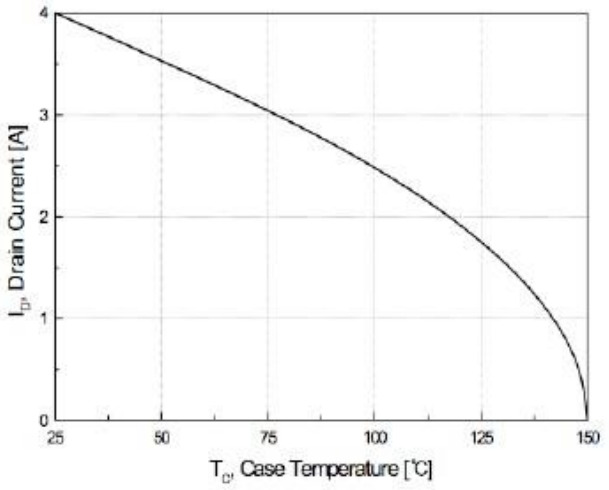

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

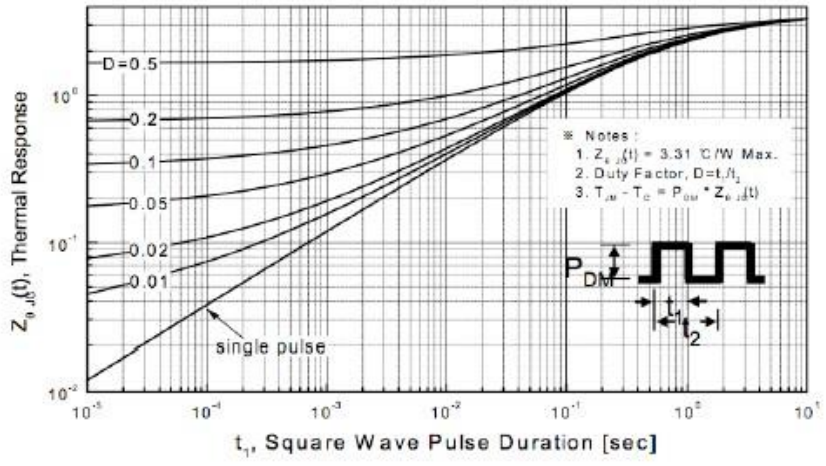

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

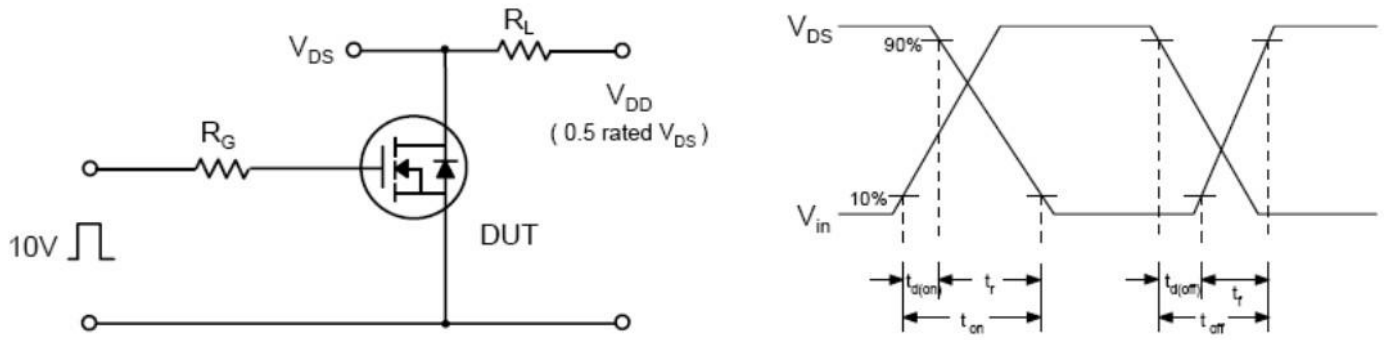

FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

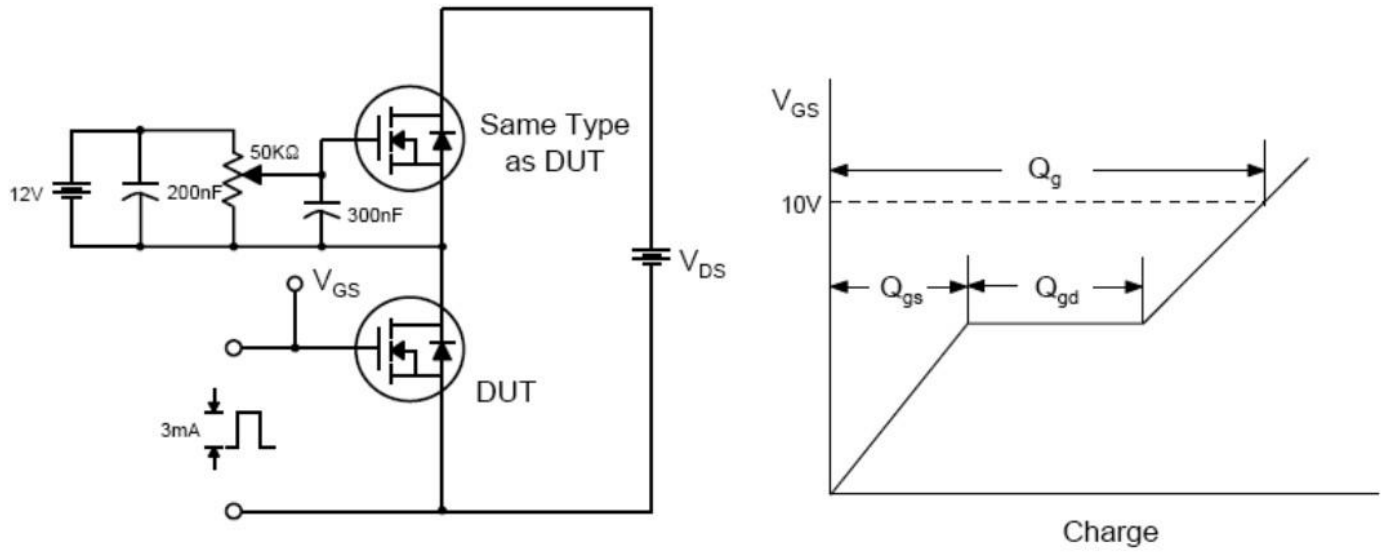

FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM

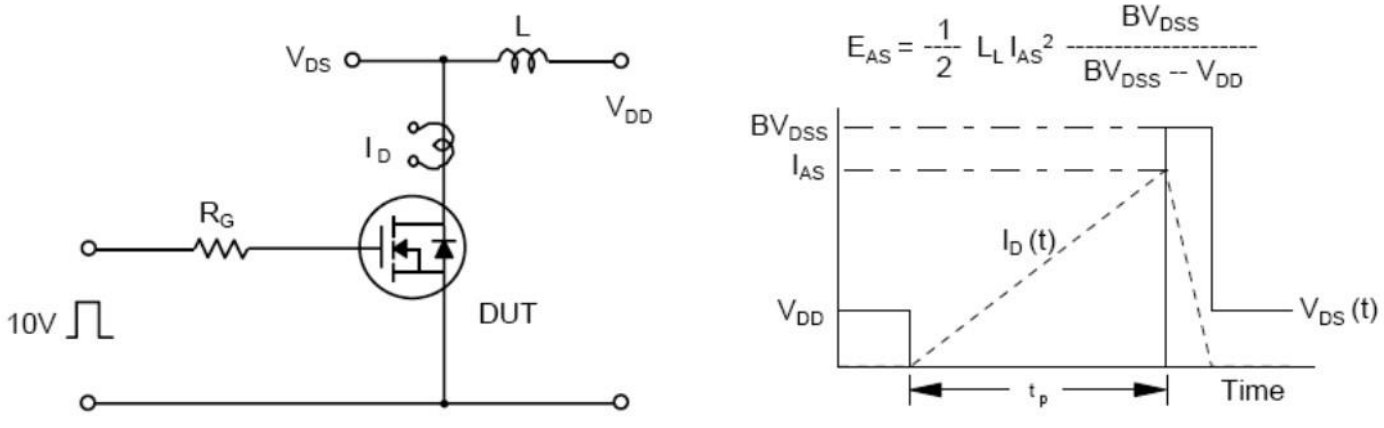

FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

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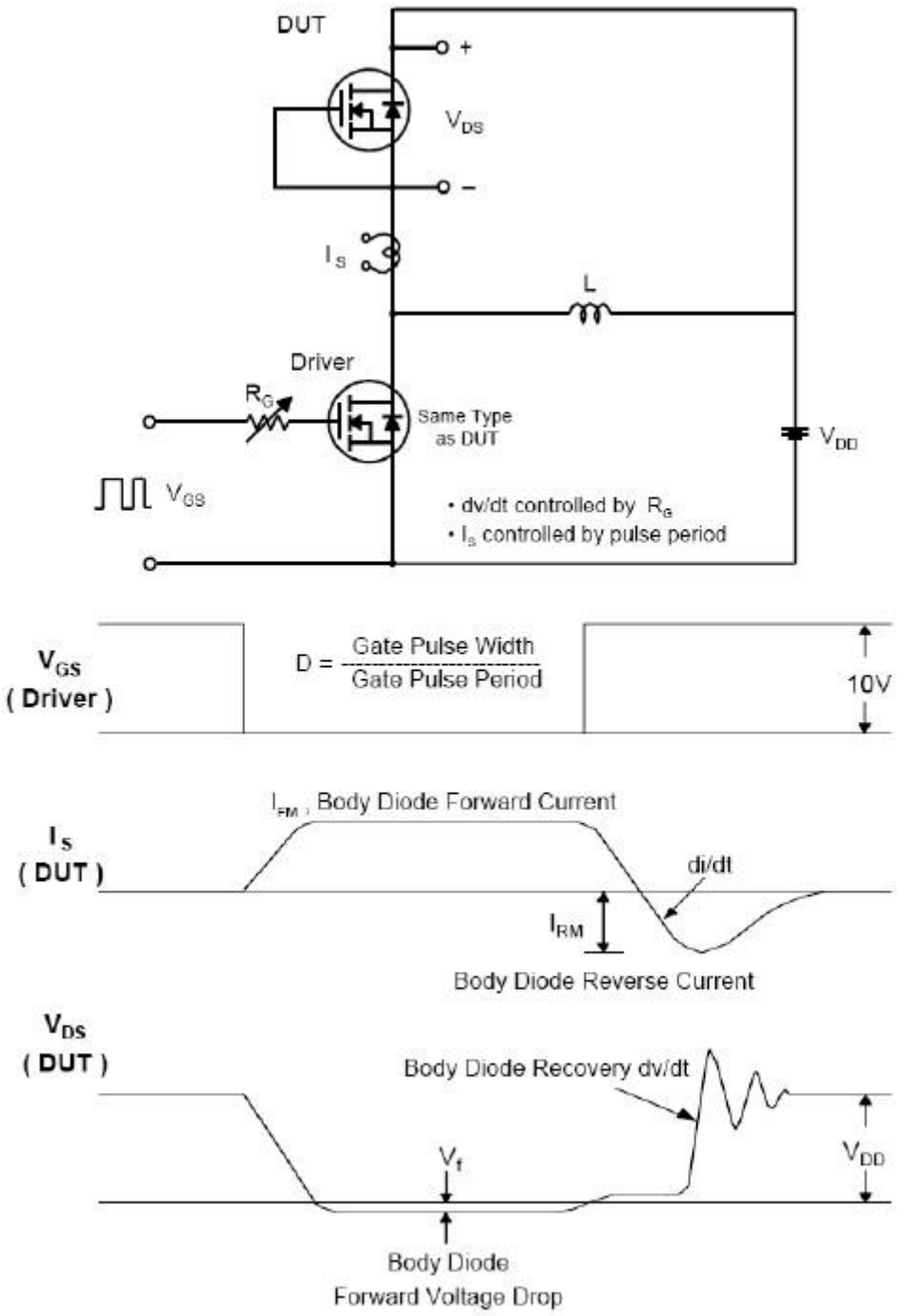

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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