MS18N50

500V N-channel MOSFET

Description

The MS18N50 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-220 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

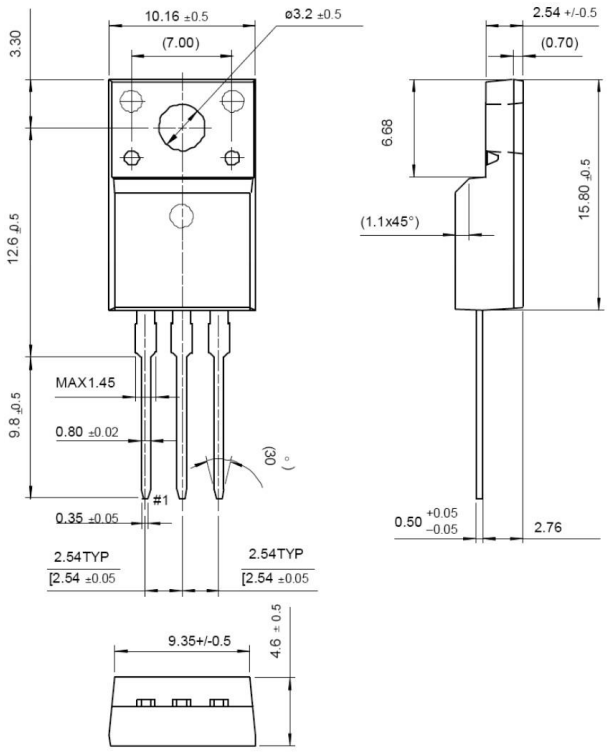
Application

- High current, High speed switching
- PFC (Power Factor Correction)
- SMPS (Switched Mode Power Supplies)

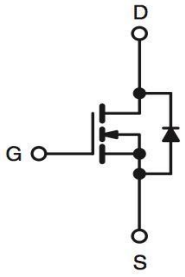
Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

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
T_J, Tstg	Operating Junction and Storage Temperature	-55~+150	°C
P_D	Power Dissipation (TC=25°C)	238	W
	Power Dissipation (TC=100°C)	1.8	W

• Drain current limited by maximum junction temperature

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Thermal Characteristics

Symbol	Parameter	Value	Units
Rthjc	Thermal Resistance resistance	0.53	°C/W
RθJA	Thermal Resistance resistance	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
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	--	V/°C
I_{DSS}	V_{DS} = 500 V , V_{GS} = 0 V V_{DS} = 400 V , V_{GS} = 0 V , T_C = 125°C	--	--	1 10	uA
I_{GSSF}	V_{GS} =-30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
*$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 9 A	--	0.25	0.32	Ω

Dynamic Characteristics

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

Source-Drain Diode Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	18	A
I_{SM}		--	--	72	
V_{SD}	I_S = 18 A , V_{GS} = 0 V	--	--	1.5	V
t_{rr}	I_F = 18 A , V_{GS} = 0 V diF/dt=100A/us	--	550	--	ns
Q_{rr}		--	5.5	--	uC

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Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L= 5.5mH,I_{AS}= 18.0A,V_{DD}=50V,R_G=25Ω,Starting TJ=25°°C
3. I_{SD} ≤ 16.0 A, di/dt ≤ 200A/μs, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

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■Characteristic Curves

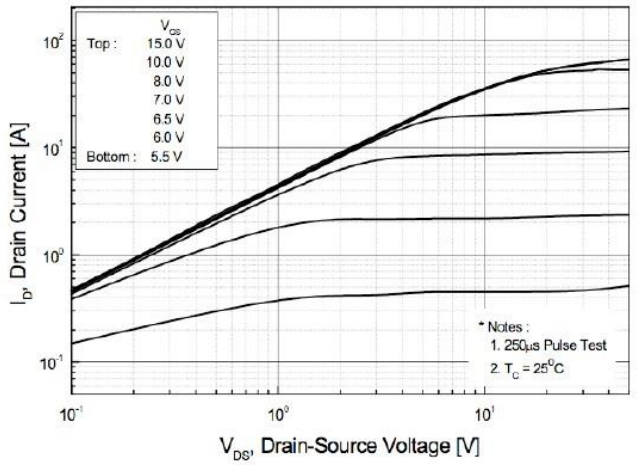

FIG.1-ON REGION CHARACTERISTICS

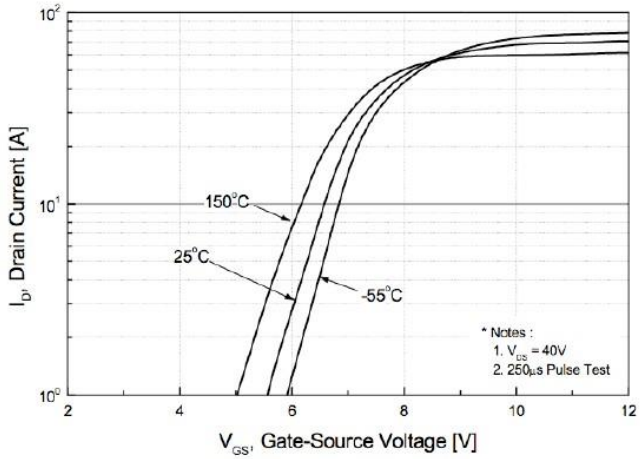

FIG.2-TRANSFER CHARACTERISTICS

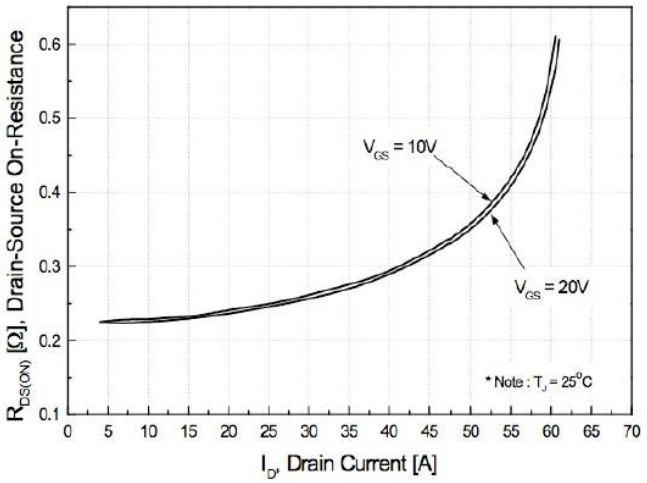

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

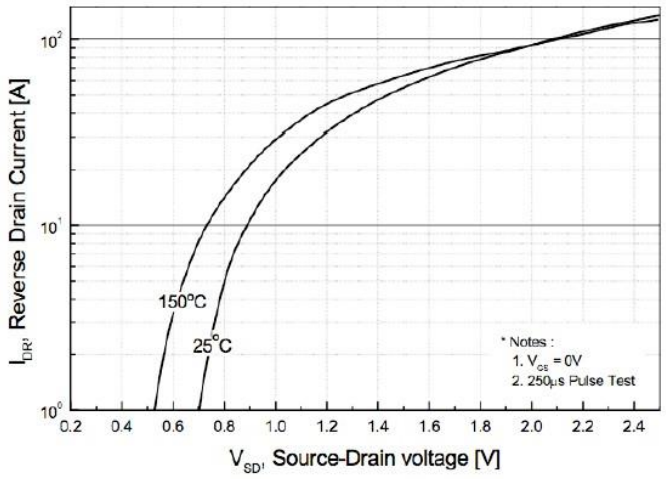

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

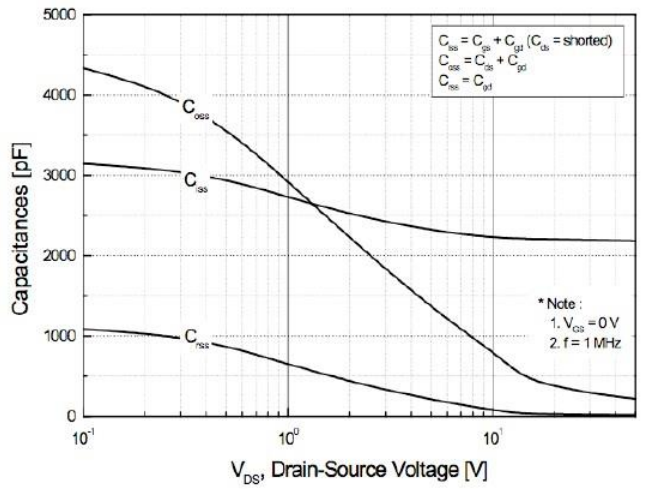

FIG.5-CAPACITANCE CHARACTERISTICS

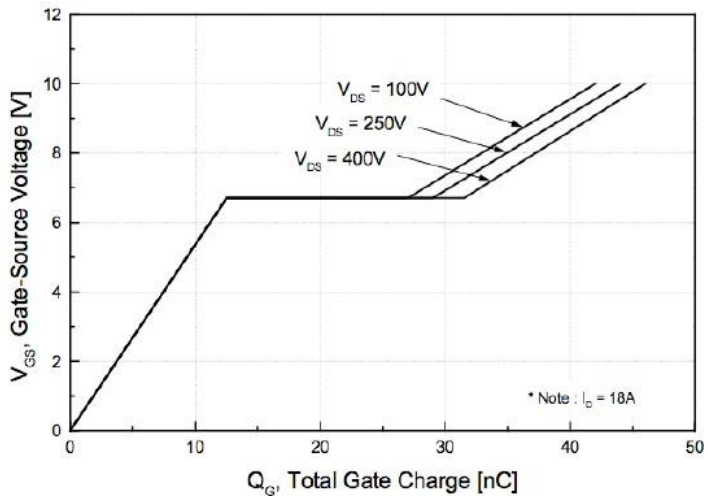

FIG.6-GATE CHARGE CHARACTERISTICS

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■Typical Electrical Characteristics

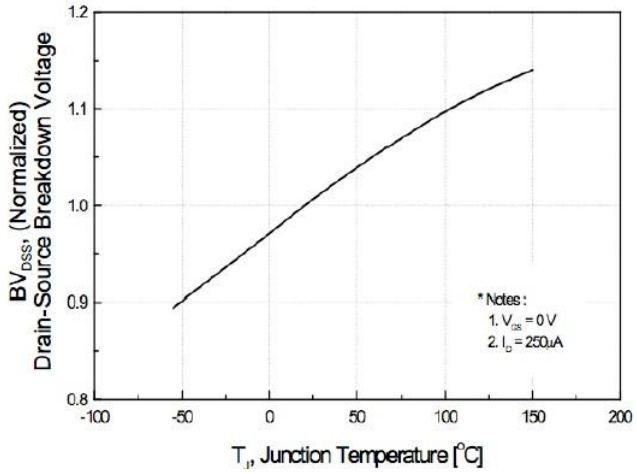

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

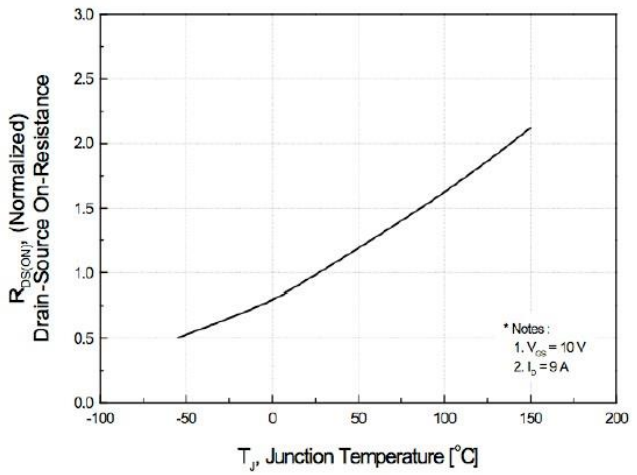

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

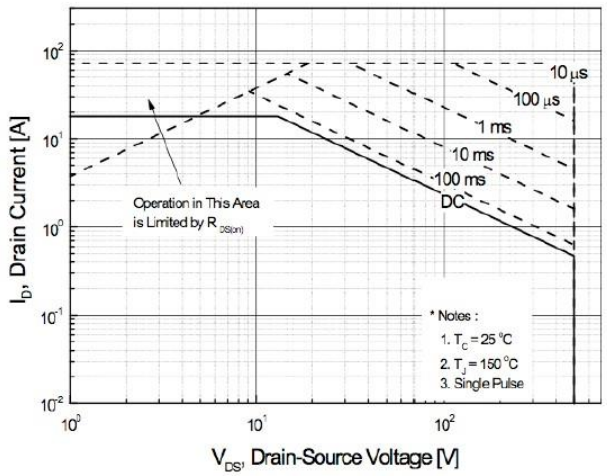

FIG.9-MAXIMUM SAFE OPERATING AREA

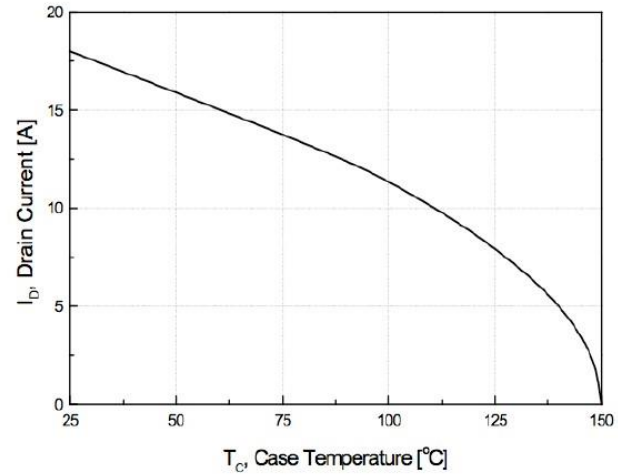

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

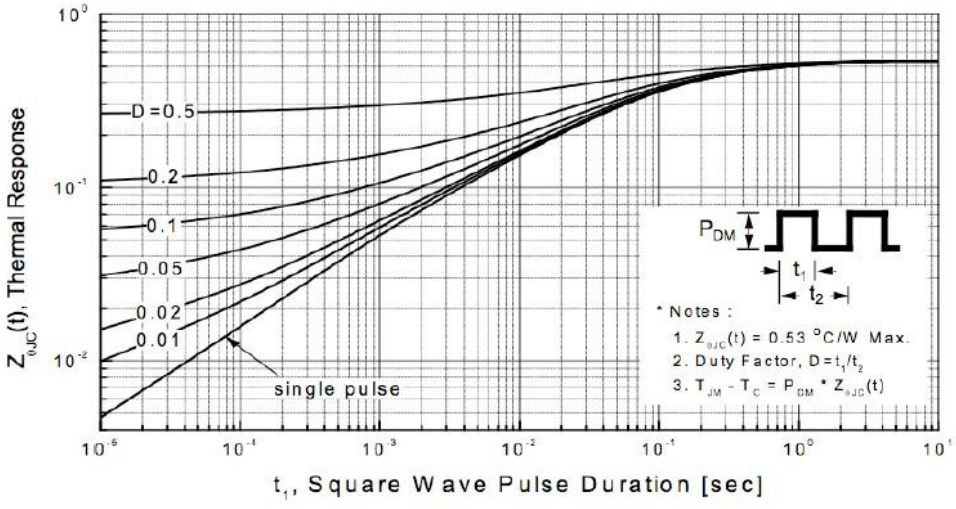

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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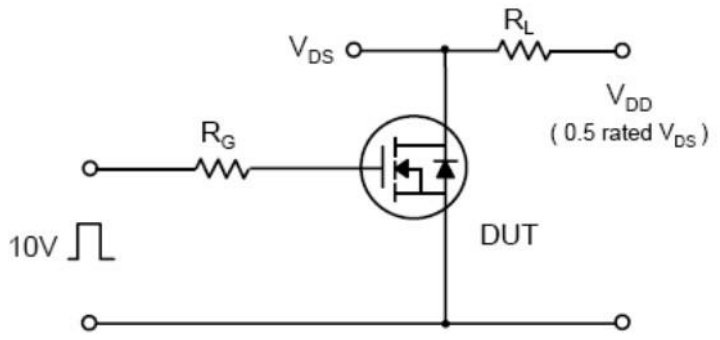
■Characteristics Test Circuit & Waveform



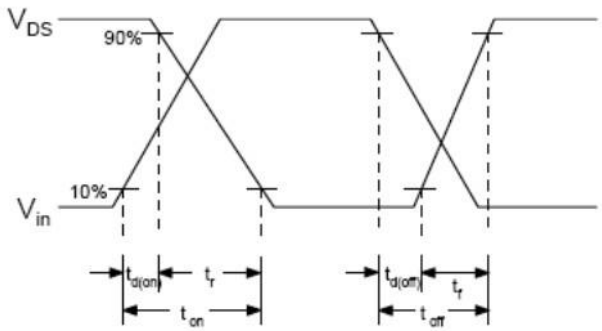
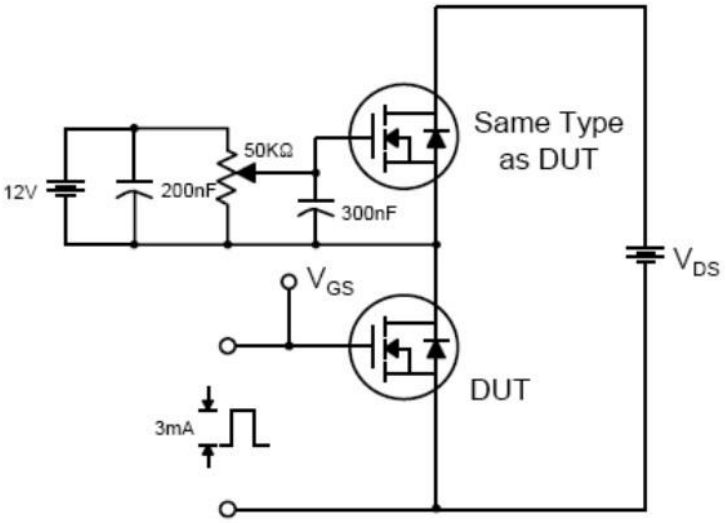


FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS



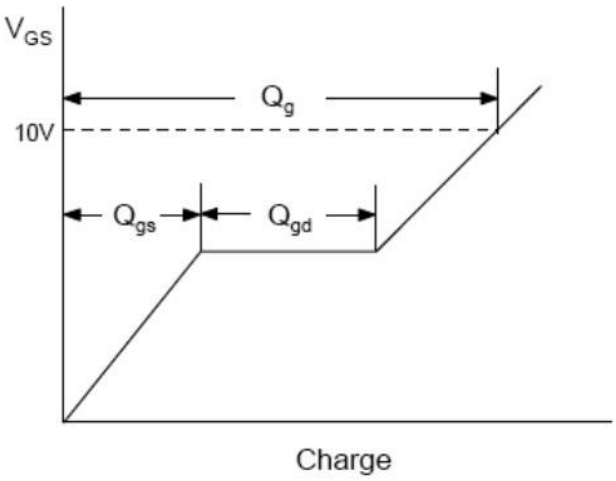
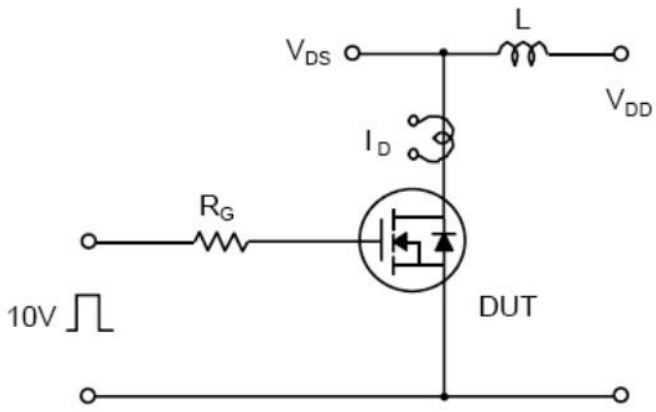


FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM



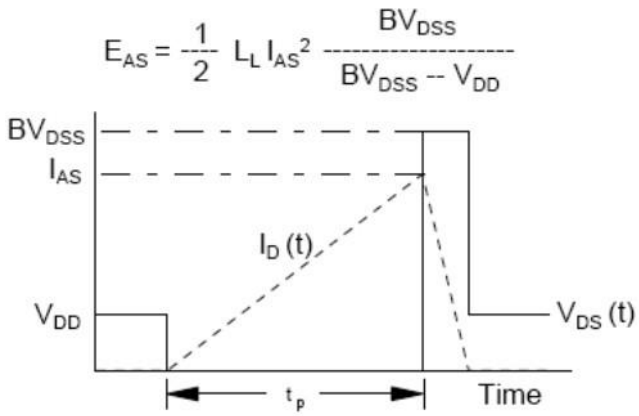


FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

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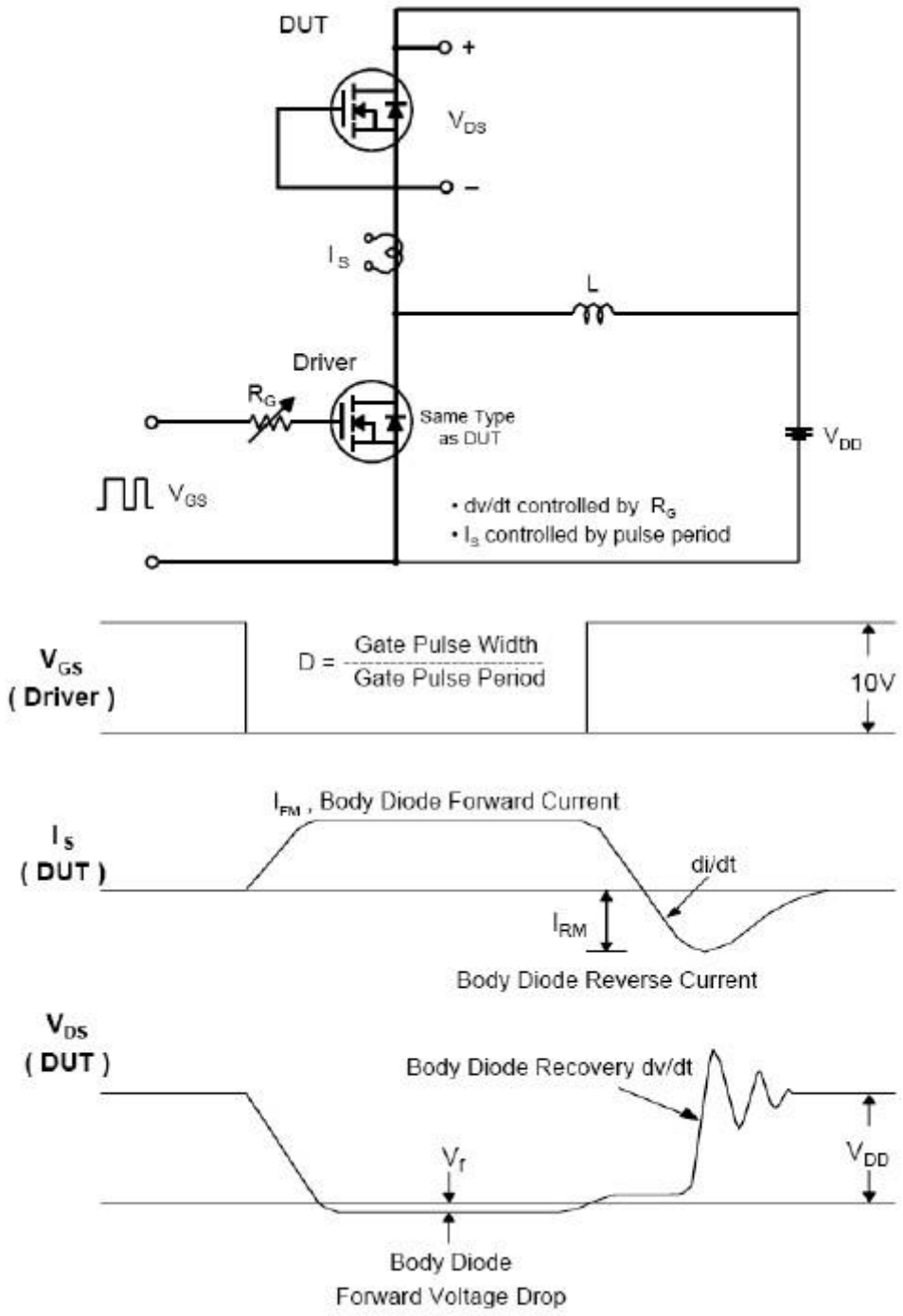

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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