MS10N60

600V N-Channel MOSFET

General Description

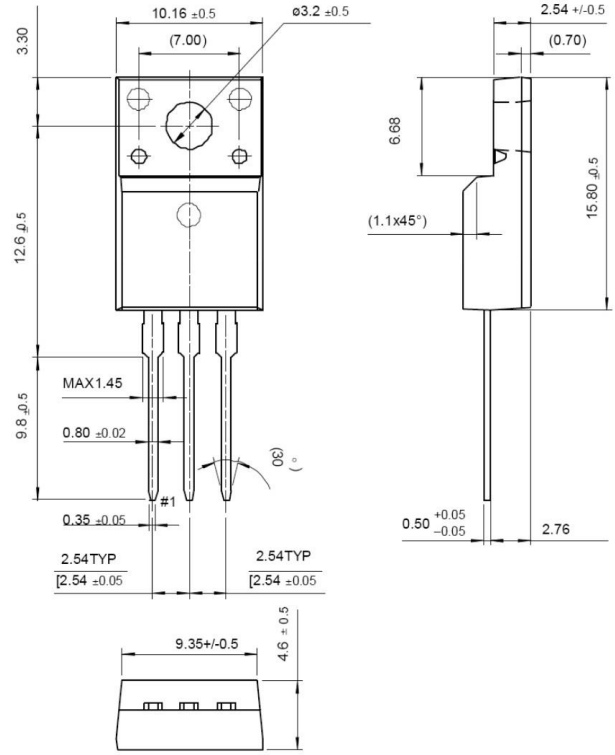
The MS13N50 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220 package is universally preferred for all commercial-industrial applications

Features

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

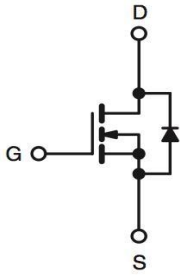
Packing Information

Shipping：50/Tube ; 1,000/Box



RoHS COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	9.5	A
	Drain Current -Continuous (TC=100°C)	5.7	A
I_{DM}	Drain Current –Pulsed	38	A
E_{AS}	Avalanche Energy	700	mJ
E_{AR}	Repetitive Avalanche Energy	15.6	mJ
dv/dt	Peak Diode Recovery dV/dt	4.5	V/ns
P_D	Power Dissipation (TC=25°C)	50	W
	Power Dissipation (TC=100°C)	0.38	W/°C
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

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NOTE:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=9.5A, V_{DD}=50V, R_G=25Ω, Starting TJ =25°C
3. I_{SD}≤9.5A, 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

Static Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
BV_{DSS}	V_{GS} = 0 V , I_D = 250μA	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C	--	0.70	--	
V_{GS}	V_{DS} = V_{GS}, I_D = 250μA	2.0		4.0	V
*$R_{DS(ON)}$	V_{GS} = 10 V , I_D = 4.75 A	--	0.6	0.73	mΩ
I_{DSS}	V_{DS} = 600 V , V_{GS} = 0 V V_{DS} = 480 V , V_{GS} = 0 V , T_j= 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

Dynamic Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	V_{DS} = 480 V,I_D = 9.5 A, V_{GS} = 10 V	--	44	57	nC
Q_{gs}		--	6.7	--	
Q_{gd}		--	18.5	--	
$t_{d(on)}$	V_{DS} = 300 V, I_D = 9.5 A, R_G = 25 Ω	--	23	55	ns
t_r		--	69	150	ns
$t_{d(off)}$		--	144	300	ns
tf		--	77	165	ns
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f=1.0MHz	--	1570	2040	pF
C_{OSS}		--	166	215	pF
C_{RSS}		--	18	24	pF

Source-Drain Diode Characteristics					
Symbol	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
I_S		--	--	9.5	A
I_{SM}		--	--	38	
V_{SD}	I_S = 9.5 A , V_{GS}=0	--	--	1.4	V
t_{rr}	I_S = 9.5 A , V_{GS}=0 , dIF/dt=100A/μs	--	420	--	nS
Q_{rr}		--	4.2	--	uC

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■Characteristics Curve

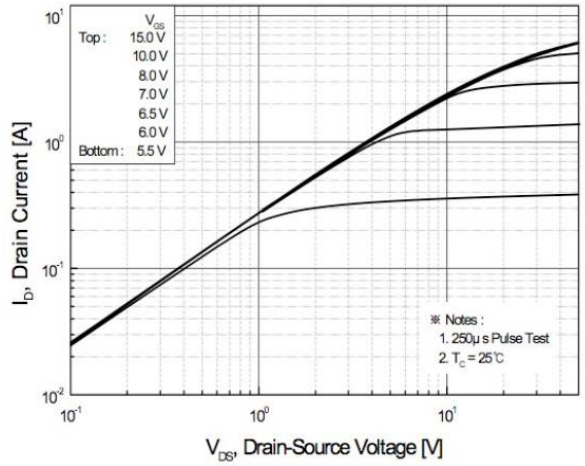

FIG.1-ON REGION CHARACTERISTICS

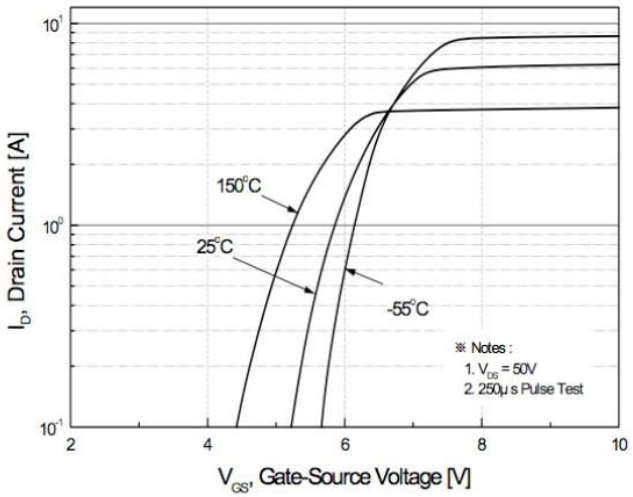

FIG.2-TRANSFER CHARACTERISTICS

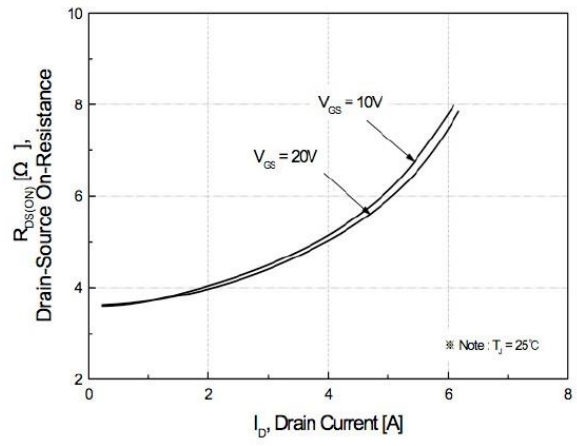

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

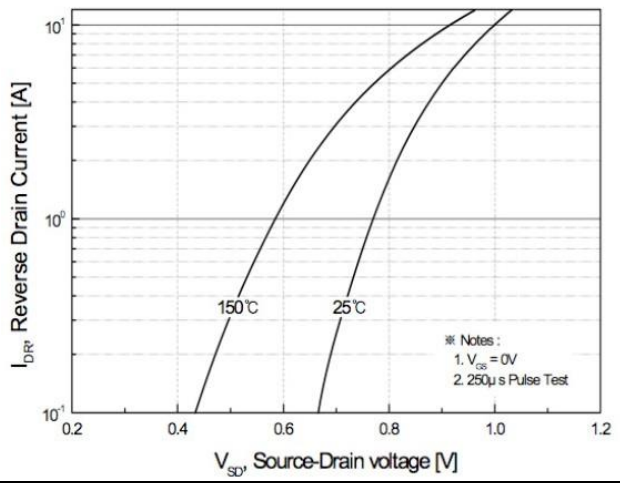

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

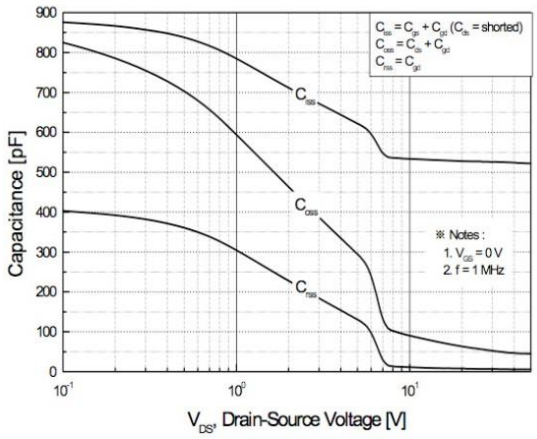

FIG.5-CAPACITANCE CHARACTERISTICS

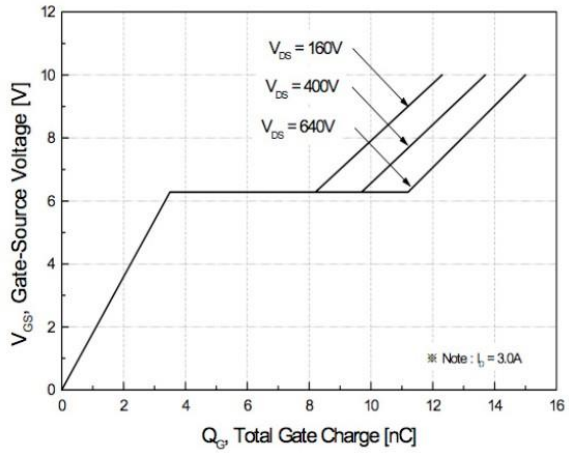

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

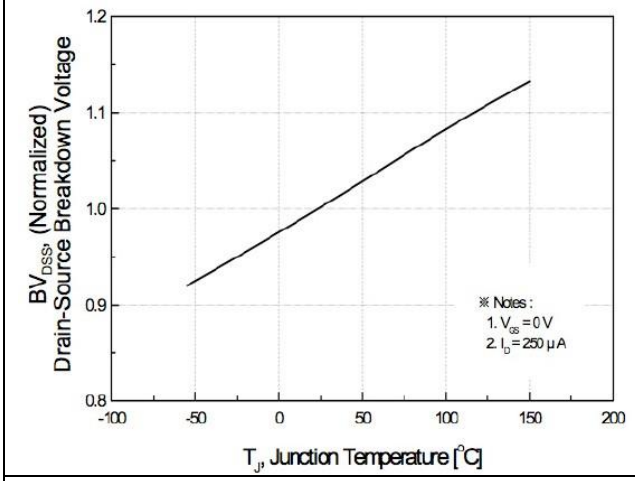

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

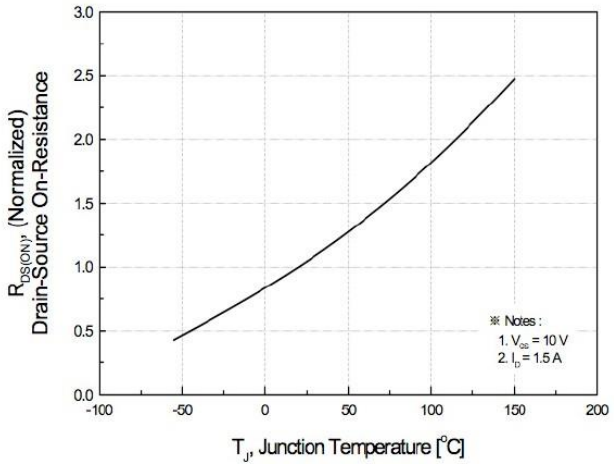

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

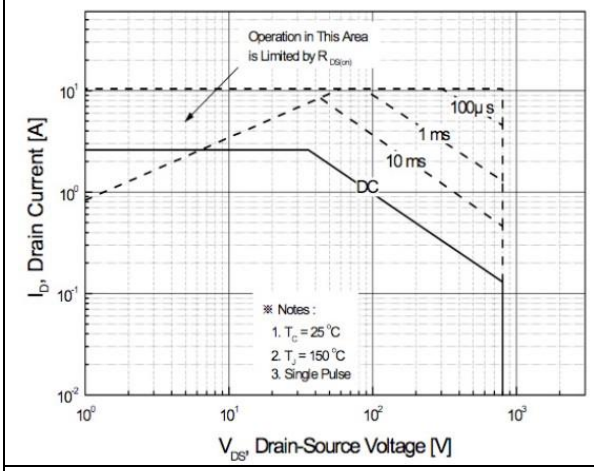

FIG.9-MAXIMUM SAFE OPERATING AREA

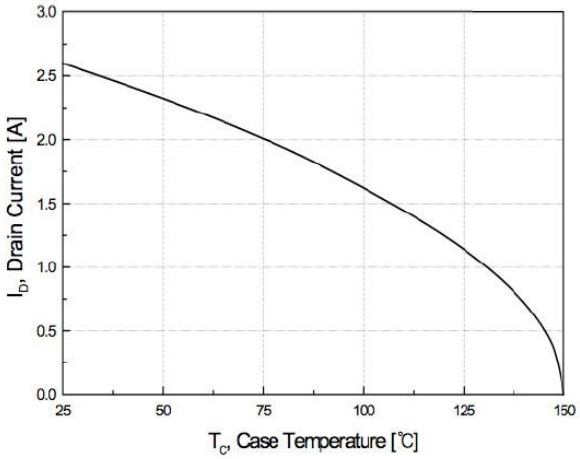

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

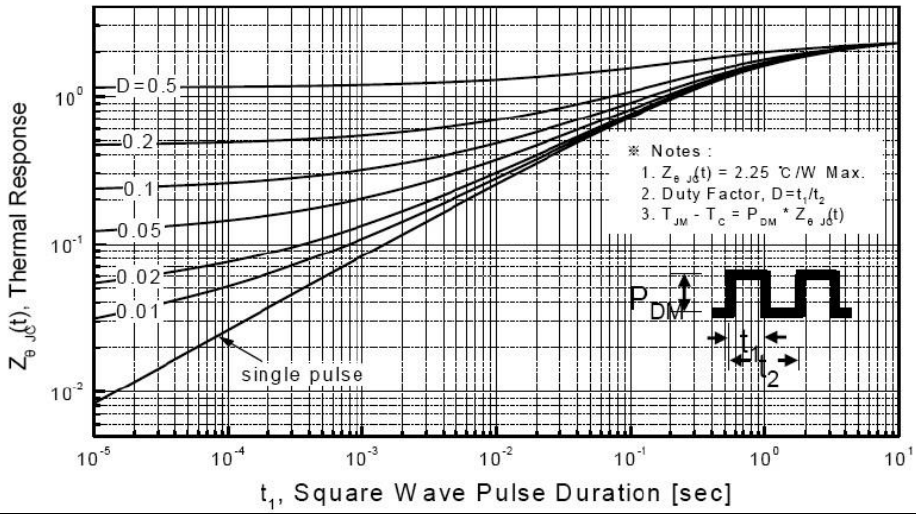

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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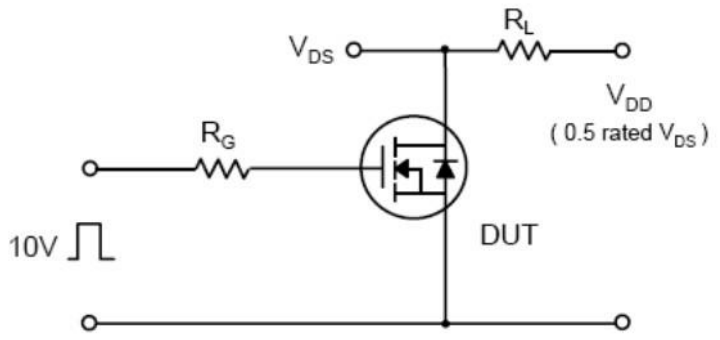
■Characteristics Test Circuit & Waveform



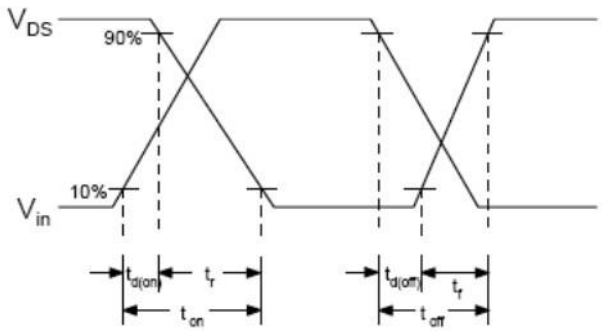
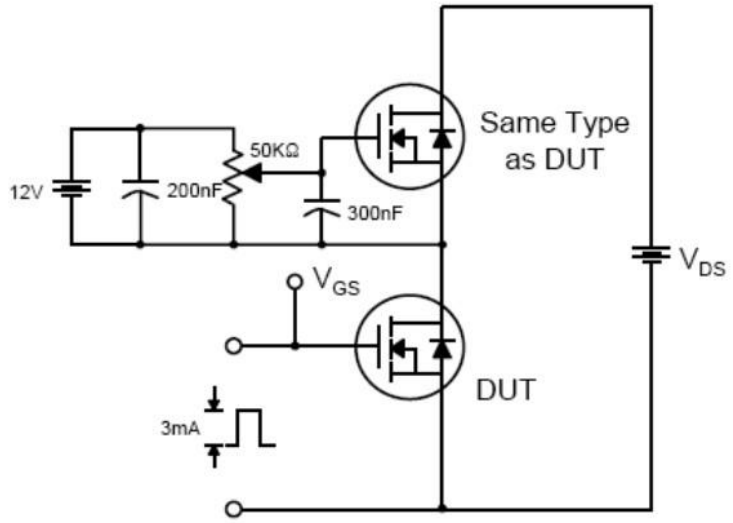


FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS



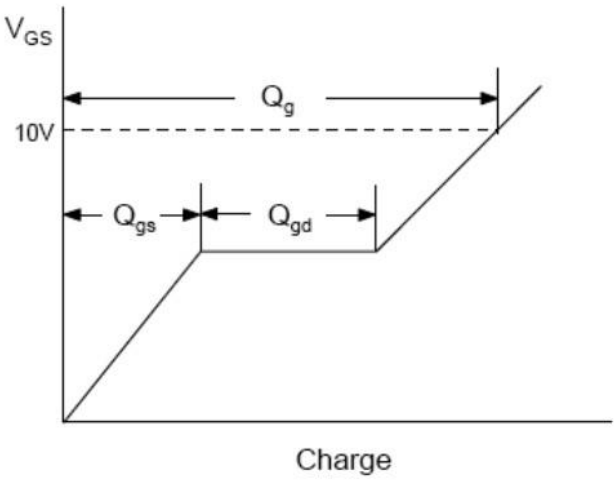
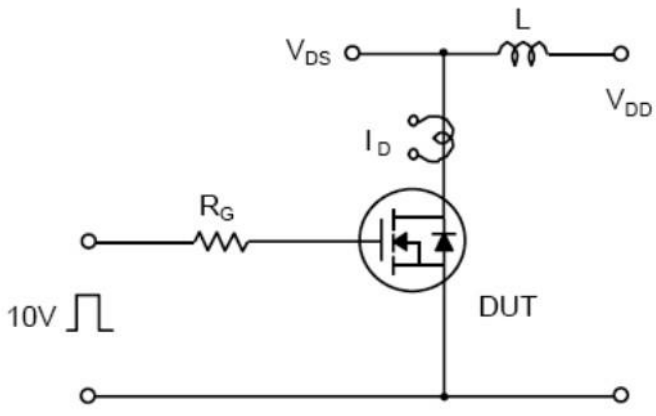


FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM



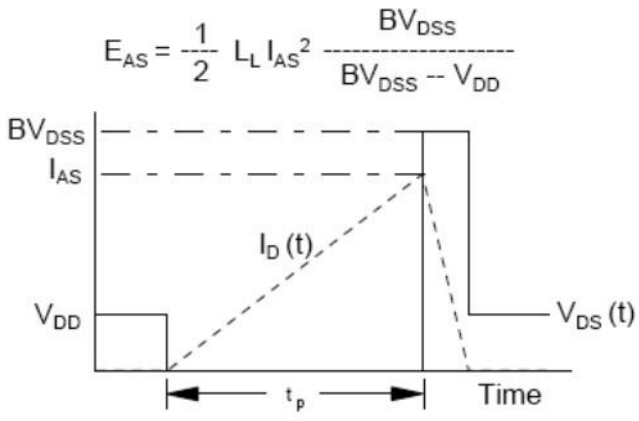


FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

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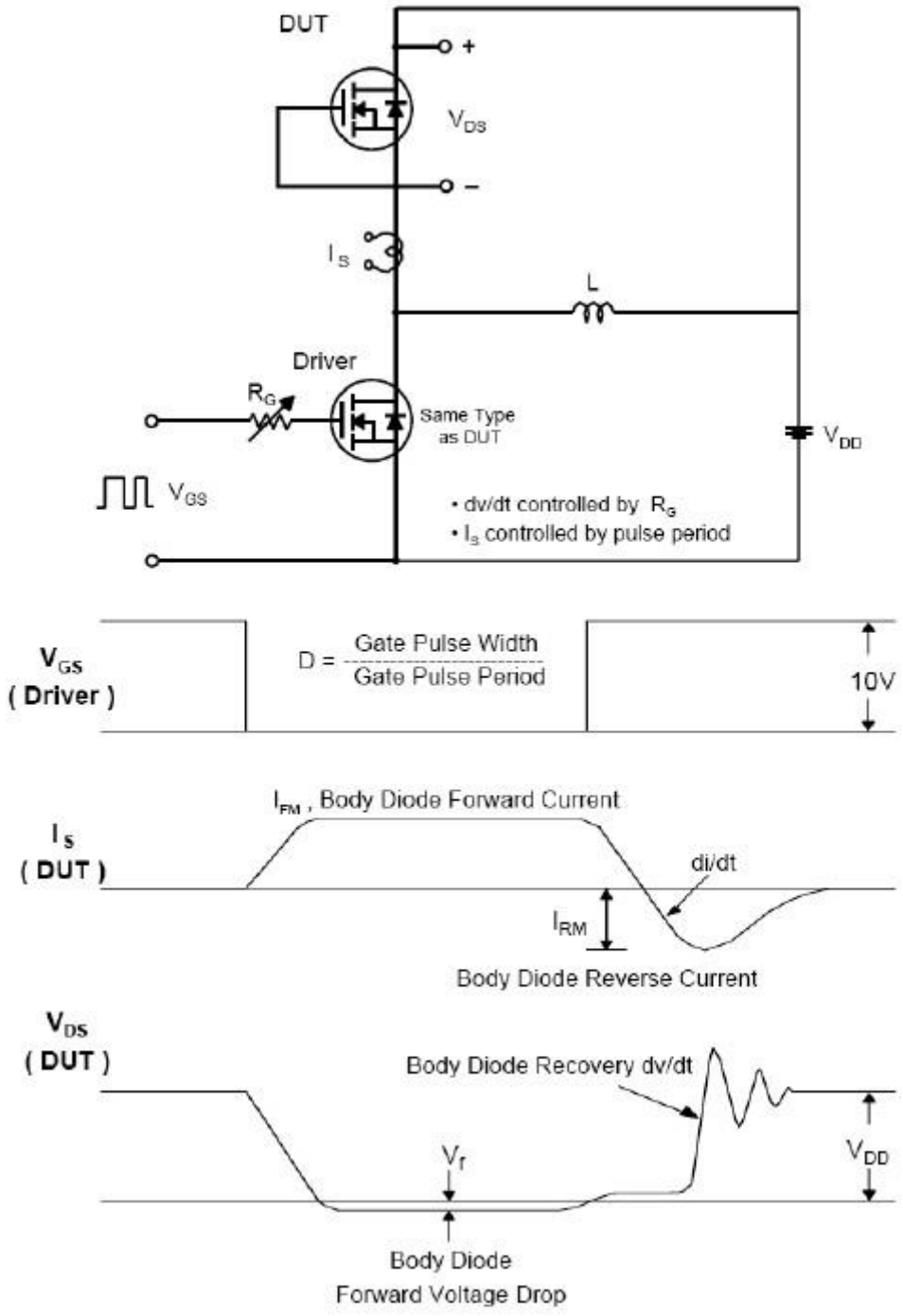

Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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