

MS6N80

800V N-Channel MOSFET

Description

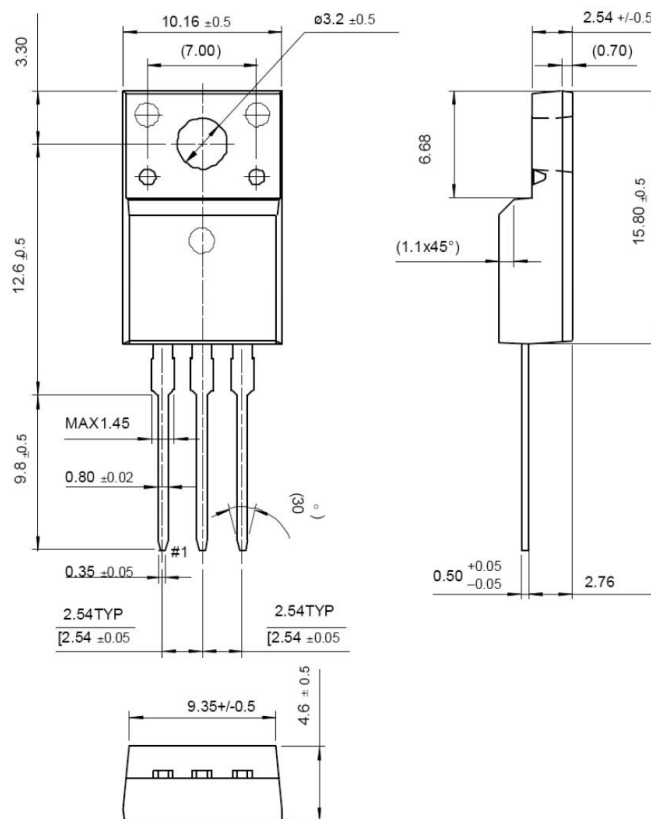
The MS6N80 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220 package is universally preferred for all commercial-industrial applications

Features

- Originative New Design
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Unrivalled Gate Charge : 37nC (Typ.)
- Extended Safe Operating Area
- RoHS compliant package

Application

- Adapter
- Switching Mode Power Supply



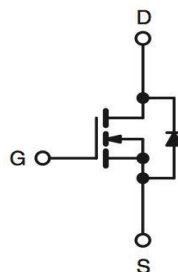
Packing & Order Information

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 _{DSS}	Drain-Source Voltage	800	V
I _D	Drain Current -Continuous (TC=25°C)	36	A
	Drain Current -Continuous (TC=100°C)	4.2	A
I _{DM}	Drain Current –Pulsed	28	A
V _{GS}	Gate-Source Voltage	±30	V
E _{AS}	Single Pulsed Avalanche Energy	580	mJ
E _{AR}	Repetitive Avalanche Energy	16.7	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns
P _D	Power Dissipation (TC=25°C) - Derate above 25°C	156	W
		1.25	W/°C

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Symbol	Parameter	Value	Unit
T_J/T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

- Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	0.75	°C/W
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.5	--	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 V, I_D = 3 A$	--	1.6	2.3	Ω

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250\mu A$	800	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800 V, V_{GS} = 0 V$ $V_{DS} = 640 V, V_C = 125^\circ C$	--	--	10 100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30 V, V_{DS} = 0 V$	--	--	100	μA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30 V, V_{DS} = 0 V$	--	--	100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	Input Capacitance	$V_{DS} = 25 V, V_{GS} = 0 V$, $f = 1.0 MHz$	--	1500	2010	pF
C_{OSS}	Coss Output Capacitance		--	145	190	pF
C_{RSS}	Crss Reverse Transfer Capacitance		--	13	20	pF

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Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DS} = 400\text{ V}, I_D = 6\text{ A},$ $R_G = 25\ \Omega$	--	40	--	ns
t_r	Turn-On Rise Time		--	120	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	60	--	ns
t_f	Turn-Off Fall Time		--	70	--	ns
Q_g	Total Gate Charge	$V_{DS} = 640\text{ V}, I_D = 6\text{ A},$ $V_{GS} = 7\text{ V}$	--	35	--	nC
Q_{gs}	Gate-Source Charge		--	11	--	nC
Q_{gd}	Gate-Drain Charge		--	15	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	7	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	28	
V_{SD}	Source-Drain Diode Forward Voltage	$I_S = 6\text{ A}, V_{GS} = 0\text{ V}$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$I_S = 6\text{ A}, V_{GS} = 0\text{ V}$ $diF/dt = 100\text{ A}/\mu\text{s}$	--	650	--	ns
Q_{rr}	Reverse Recovery Charge		--	8	--	μC

Notes:

1. Repeativity rating : pulse width limited by junction temperature
2. $L = 34.0\text{mH}$, $I_{AS} = 6.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 6.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq \text{BVDSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially independent of operating temperature.

■ Characteristics Curve

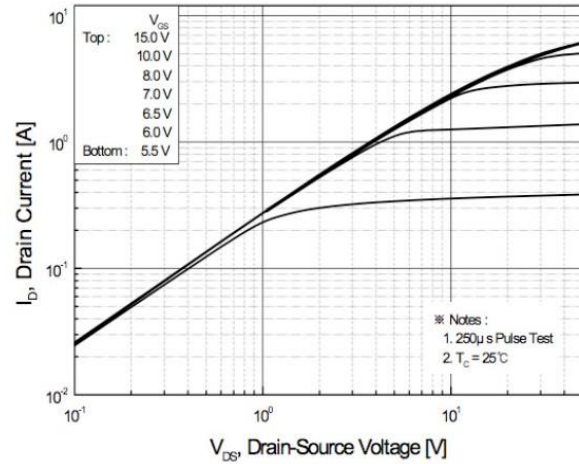


FIG.1-ON REGION CHARACTERISTICS

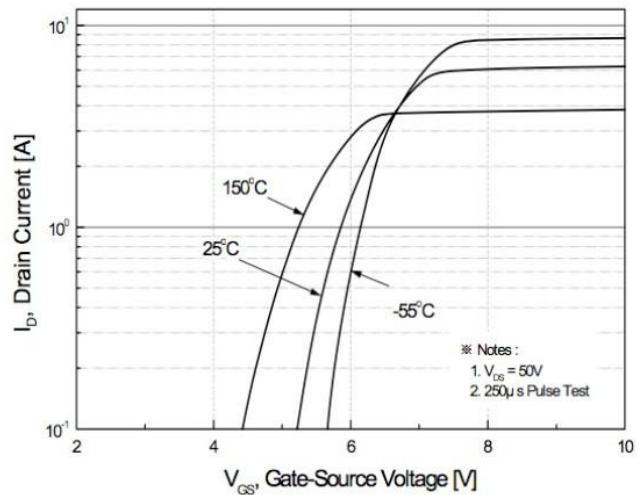


FIG.2-TRANSFER CHARACTERISTICS

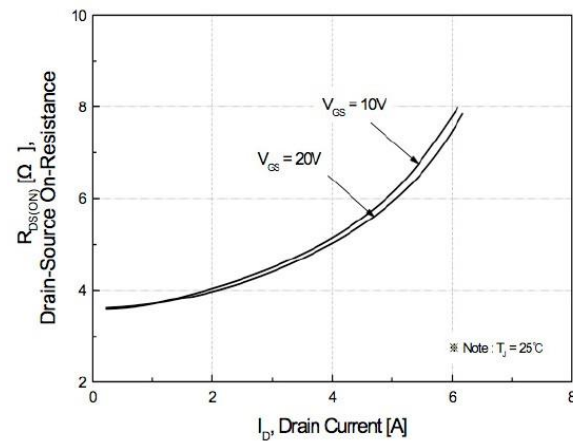


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

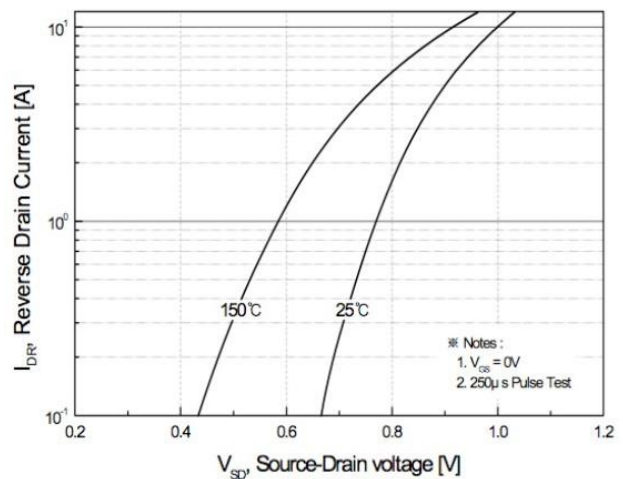


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

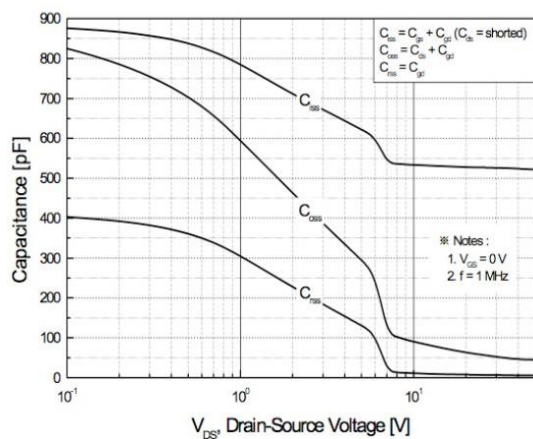


FIG.5-CAPACITANCE CHARACTERISTICS

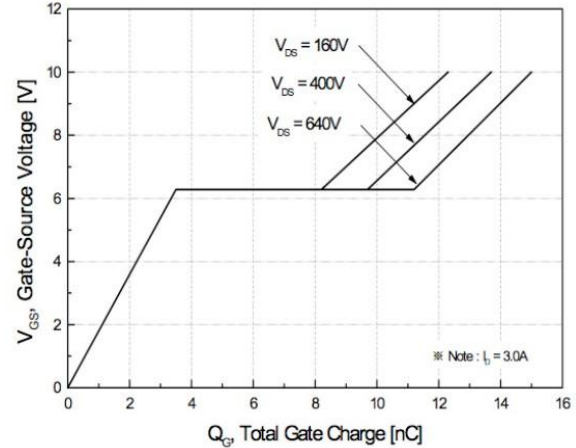


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve

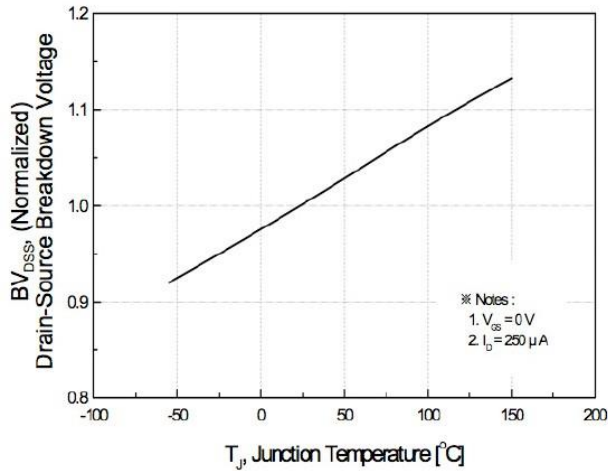


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

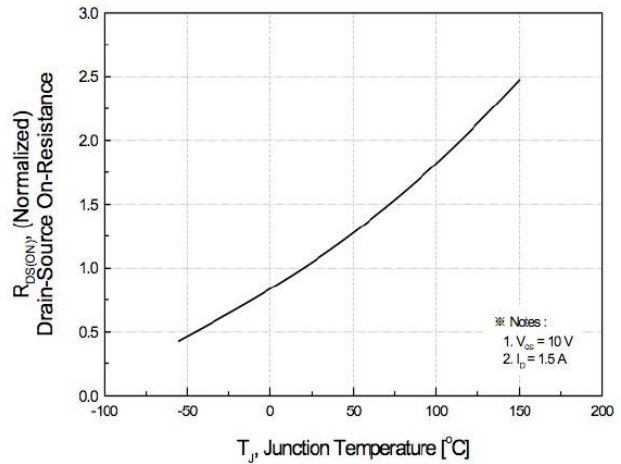


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

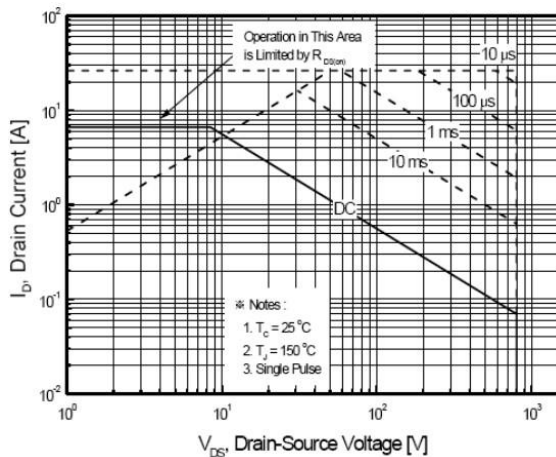


FIG.9-MAXIMUM SAFE OPERATING AREA

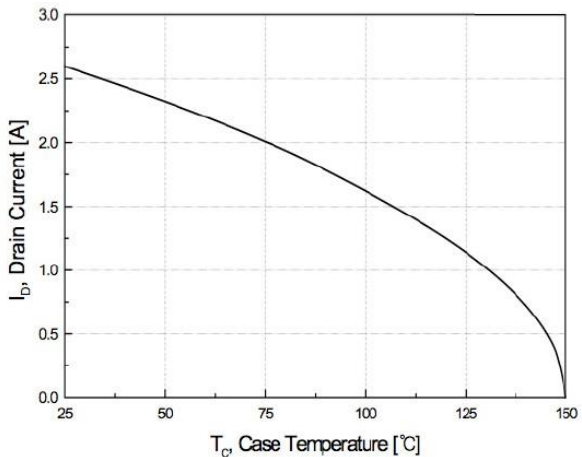


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

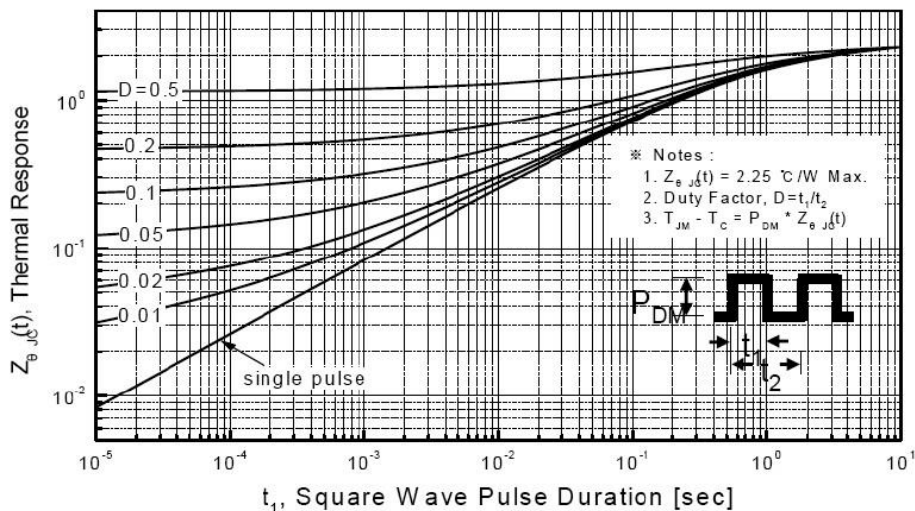


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

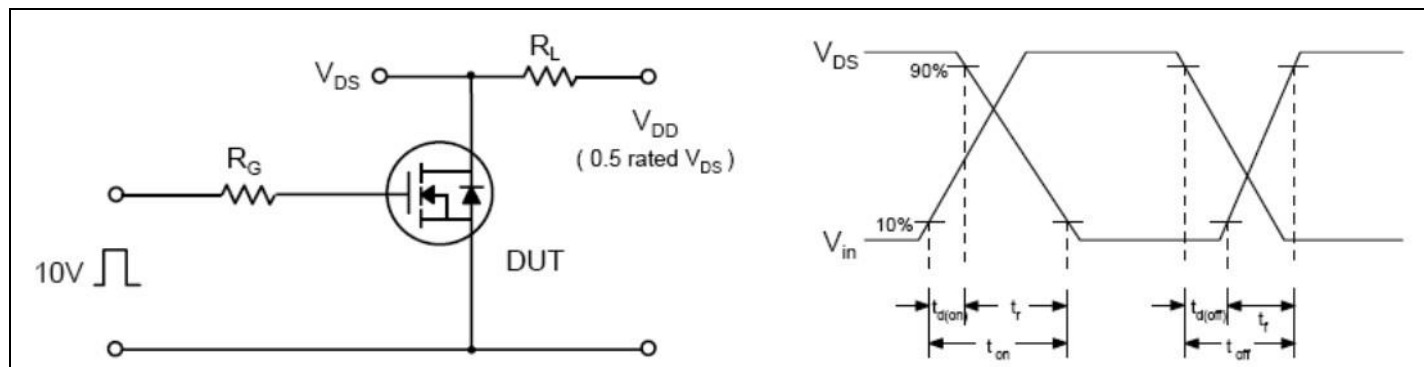


FIG.12-RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

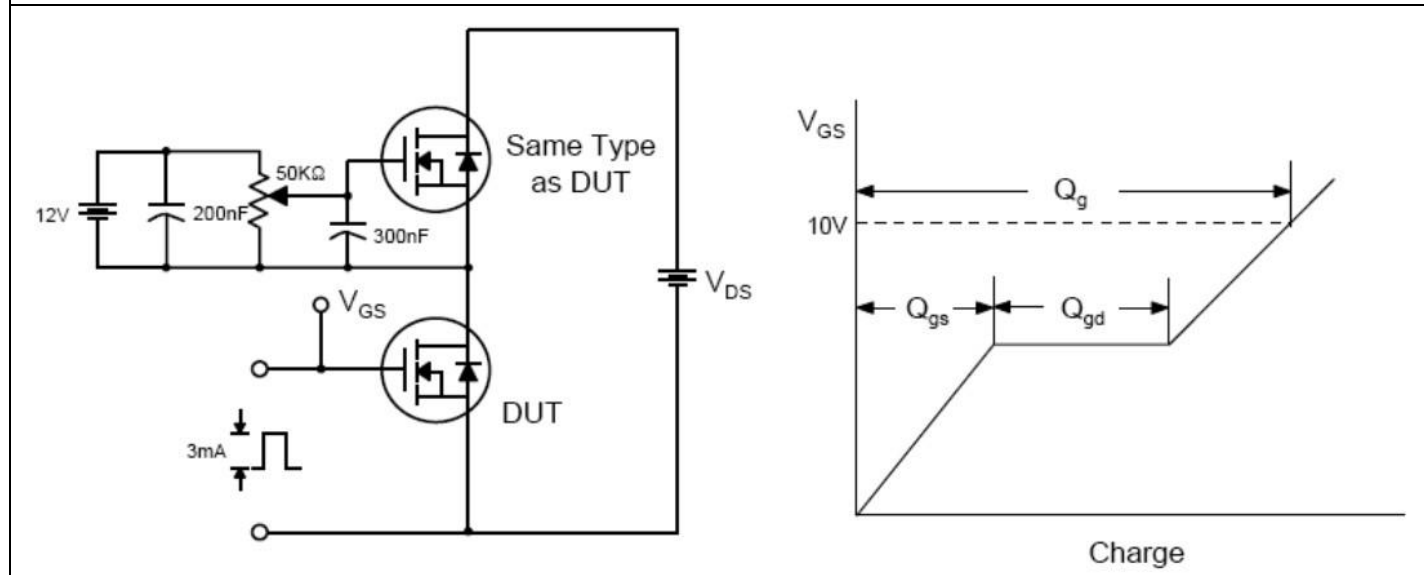


FIG.13-GATE CHARGE TEST CIRCUIT & WAVEFORM

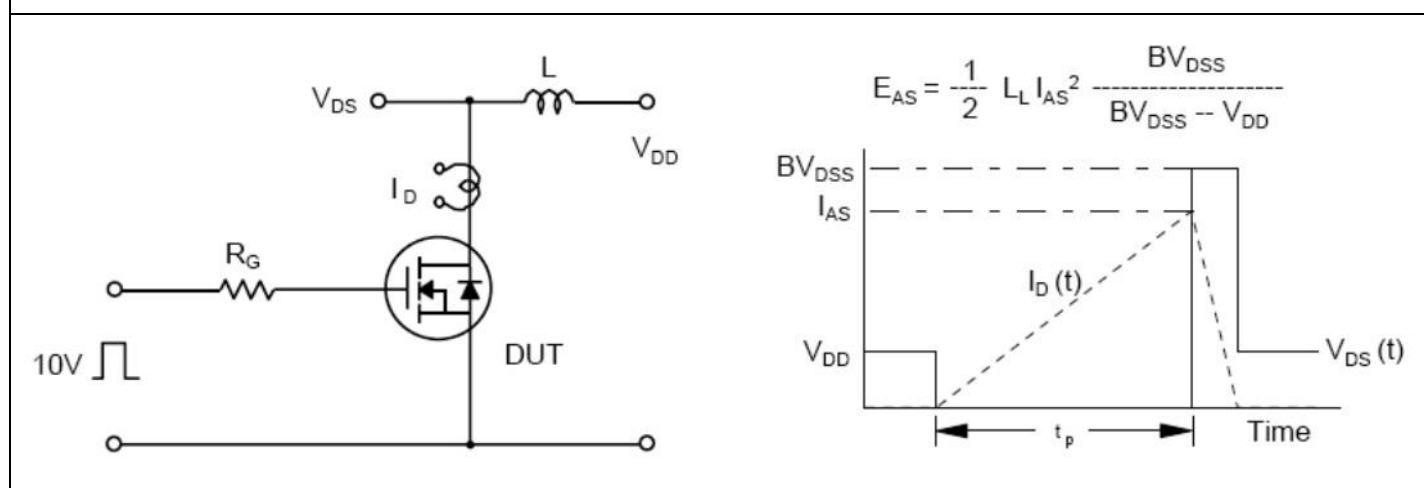


FIG.14-UNCLAMPED LINDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS

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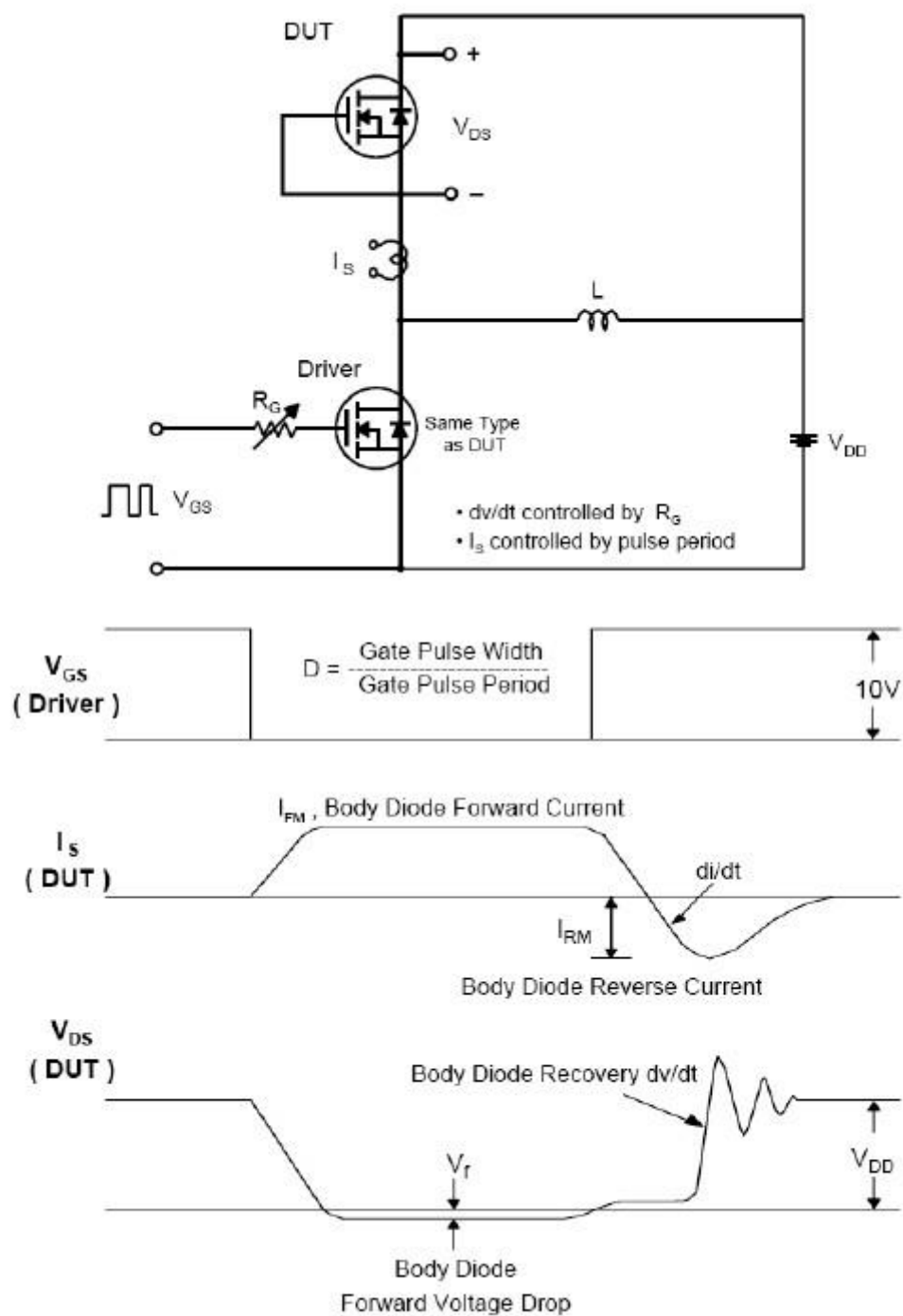


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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