

MSF5N50

500V N-Channel MOSFET

Description

The MSF5N50 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-220F package is universally preferred for all commercial-industrial applications

Features

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

Application (500V-600V)

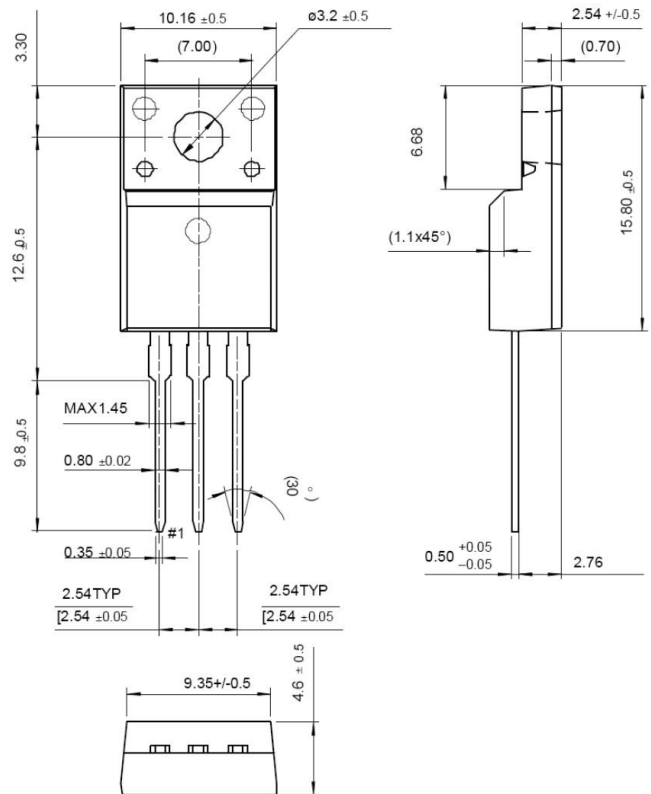
- Open Framed Power Supply
- Adapter
- STB

Packing & Order Information

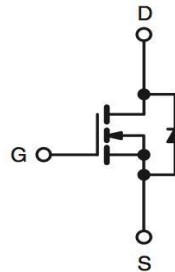
50/Tube ; 1,000/Box



RoHS
COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	500	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Continuous Drain Current (@ TC=25°C)	4.5	A
	Continuous Drain Current (@ TC=100°C)	2.9	A
I _{DM}	Pulsed Drain Current	18	A
I _{AR}	Avalanche Current	4.5	A
E _{AS}	Single Pulsed Avalanche Energy	270	mJ
E _{AR}	Repetitive Avalanche Energy	7.3	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC=25°C)	38	W
	Power Dissipation (TC=100°C)	0.3	W/°C
T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=4.5A, V_{DD}=50V, R_G=25Ω, Starting T_J =25°C
3. I_{SD}≤4.5A, di/dt≤300A/μs, V_{DD}≤BV_{DSS} , Starting T_J =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
V _{GS}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V
*R _{DS(ON)}	V _{GS} = 10 V , I _D = 2.25 A	--	1.2	1.5	mΩ
BV _{DSS}	V _{GS} = 0 V , I _D = 250μA	500	--	--	V
ΔBV _{DSS} /ΔT _J	I _D = 250μA, Referenced to 25°C		0.4		V/°C
I _{DSS}	V _{DS} = 500 V , V _{GS} = 0 V	--	--	10	uA
	V _{DS} = 400 V , V _{GS} = 0 V , T _J = 125°C			100	
I _{GSSF}	V _{DS} = 30 V, V _{GS} = 0 V			100	nA
I _{GSSR}	V _{DS} = -30 V, V _{GS} = 0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
Q _g	V _{DS} = 400 V, I _D = 4.5 A, V _{GS} = 10 V	--	14	18	nC
Q _{gs}		--	2.5	--	nC
Q _{gd}		--	6	--	nC
t _{d(on)}	V _{DS} = 250 V, I _D = 2.5 A, R _G = 25 Ω	--	20	40	ns
t _r		--	25	50	ns
t _{d(off)}		--	45	90	ns
t _f		--	25	50	ns
C _{ISS}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0MHz	--	550	720	pF
C _{OSS}		--	80	105	pF
C _{RSS}		--	10	13	pF

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Source-Drain Diode Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	4.5	A
I_{SM}		--	--	18	
V_{SD}	$I_S = 4.5 \text{ A}, V_{GS} = 0 \text{ V}$	--	--	1.5	V
t_{rr}	$I_S = 4.5 \text{ A}, V_{GS} = 0 \text{ V}, dI/dt = 100 \text{ A}/\mu\text{s}$	--	250	--	ns
Q_{rr}		--	2.2	--	uC

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■ Characteristics Curve

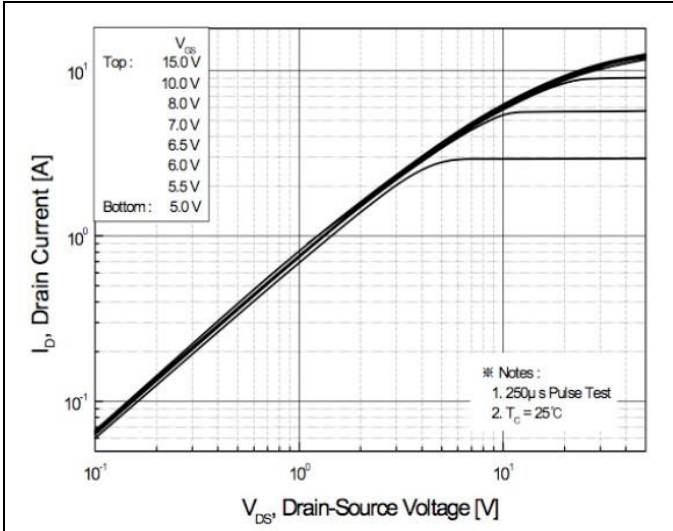


FIG.1-ON REGION CHARACTERISTICS

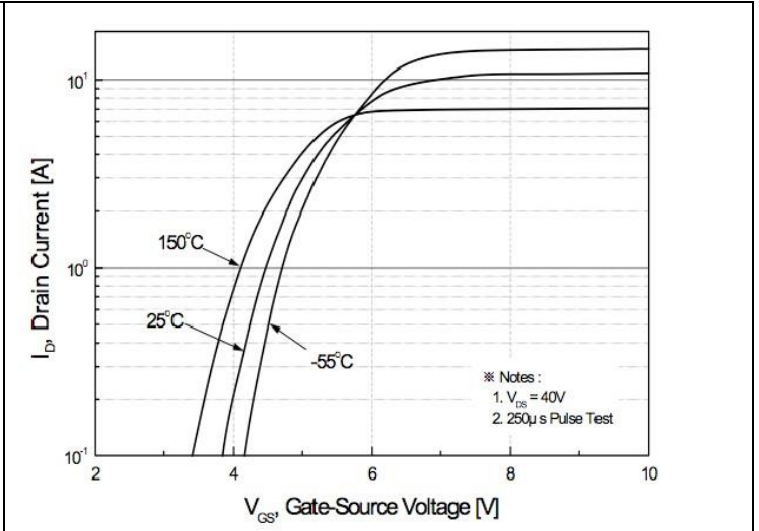


FIG.2-TRANSFER CHARACTERISTICS

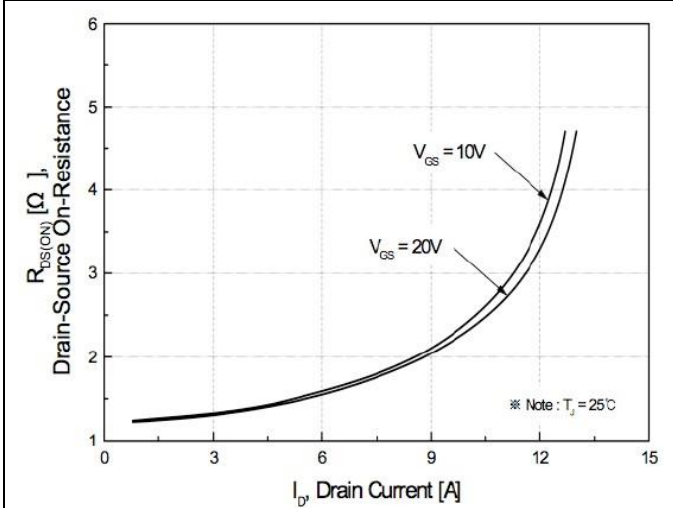


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

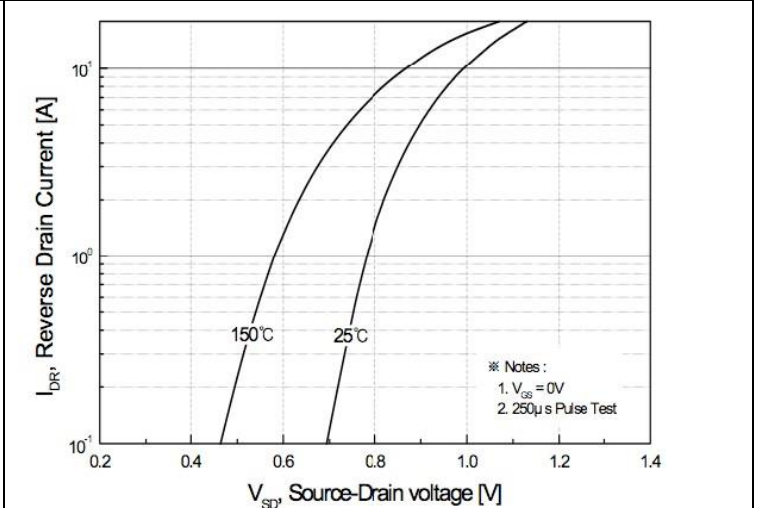


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

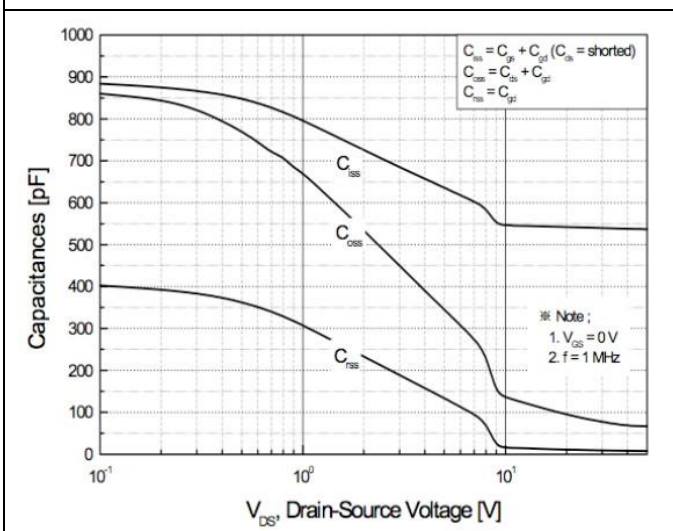


FIG.5-CAPACITANCE CHARACTERISTICS

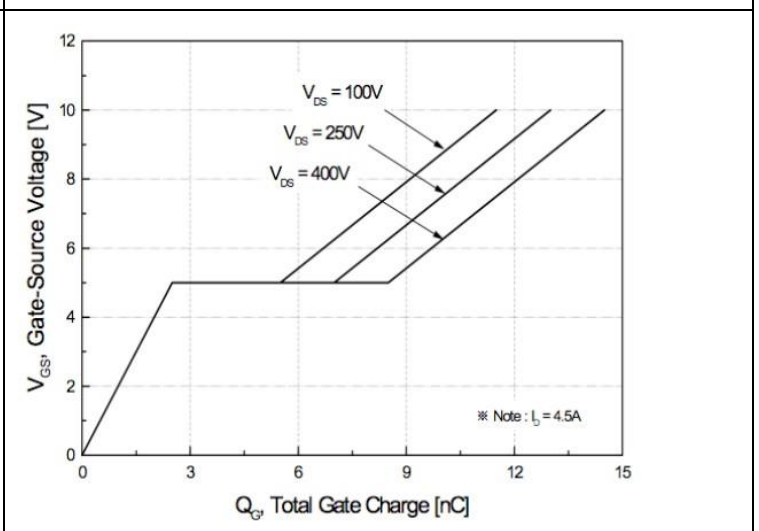
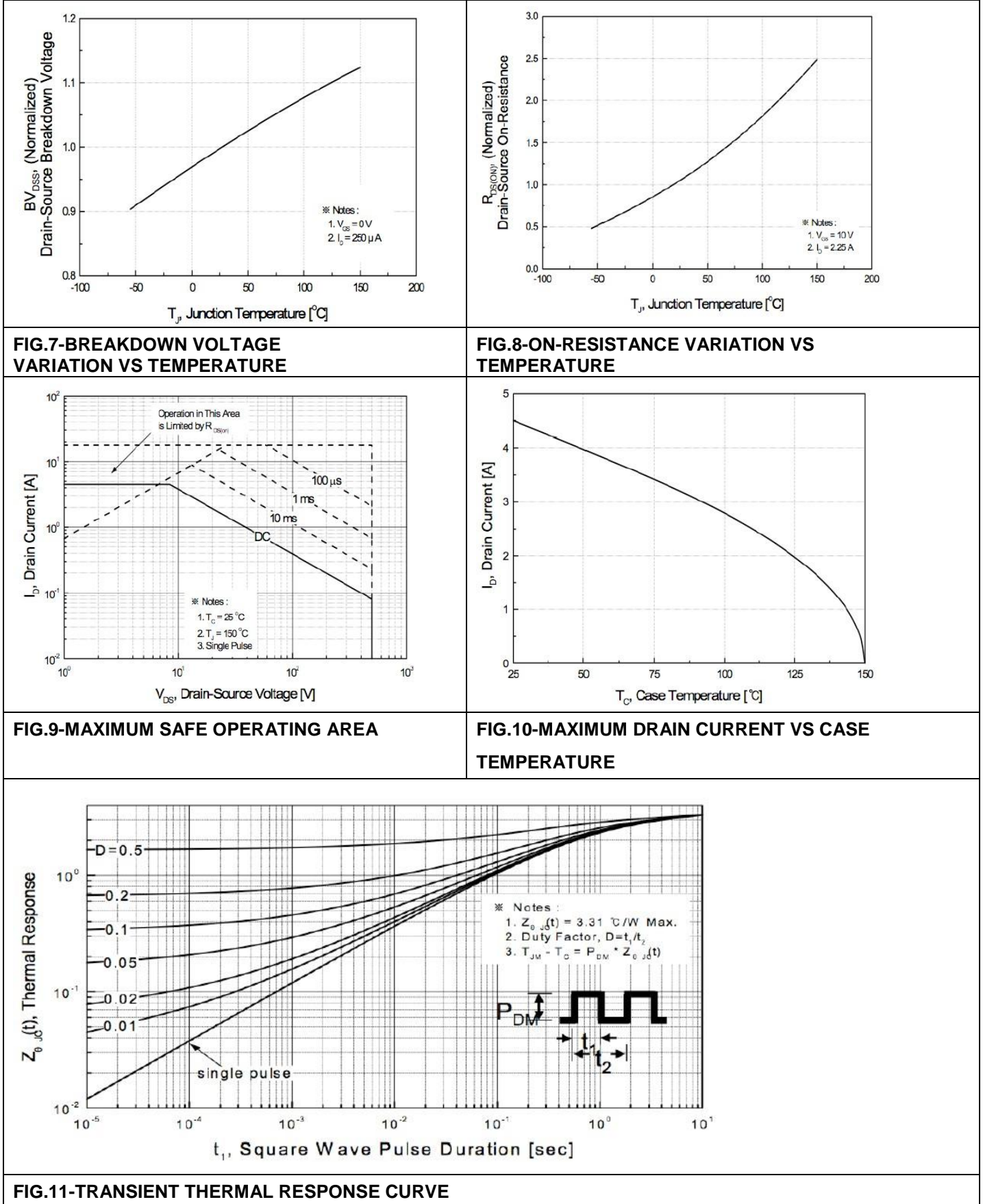


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve



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■ Characteristics Test Circuit & Waveform

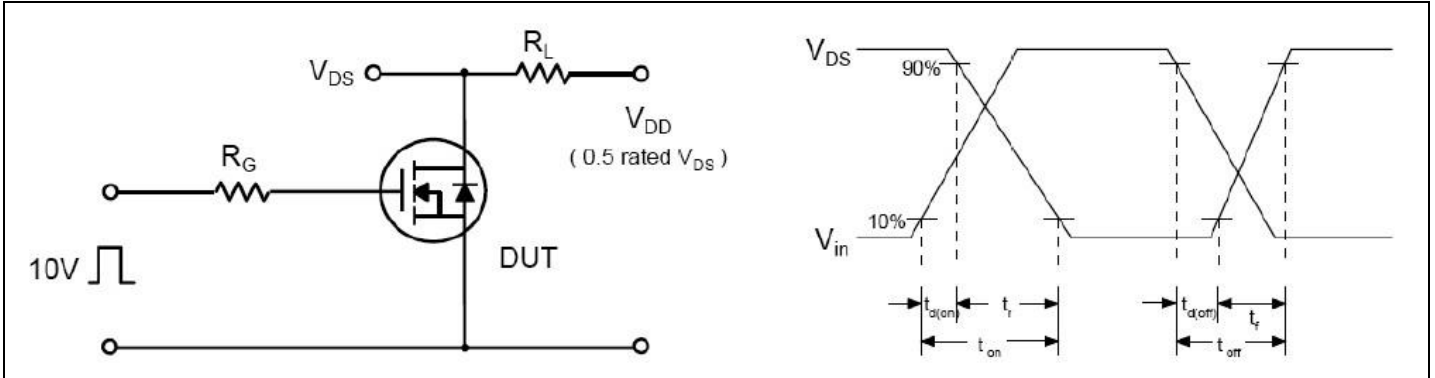


Fig 12. Resistive Switching Test Circuit & Waveforms

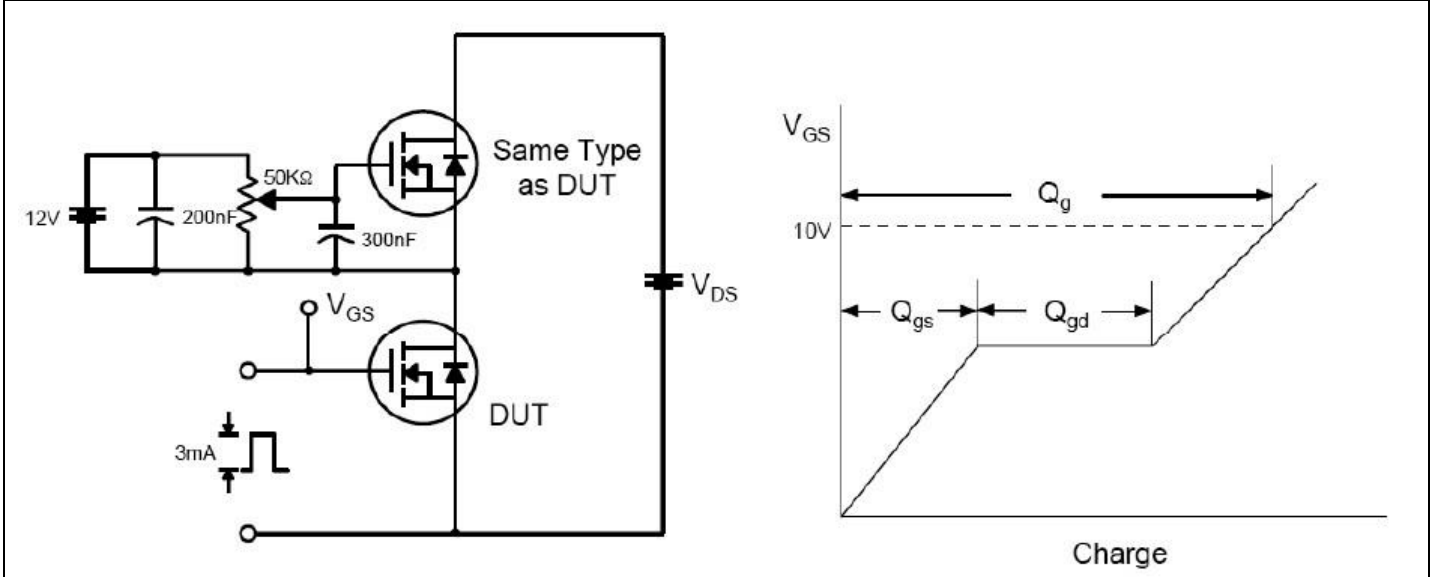


Fig 13. Gate Charge Test Circuit & Waveform

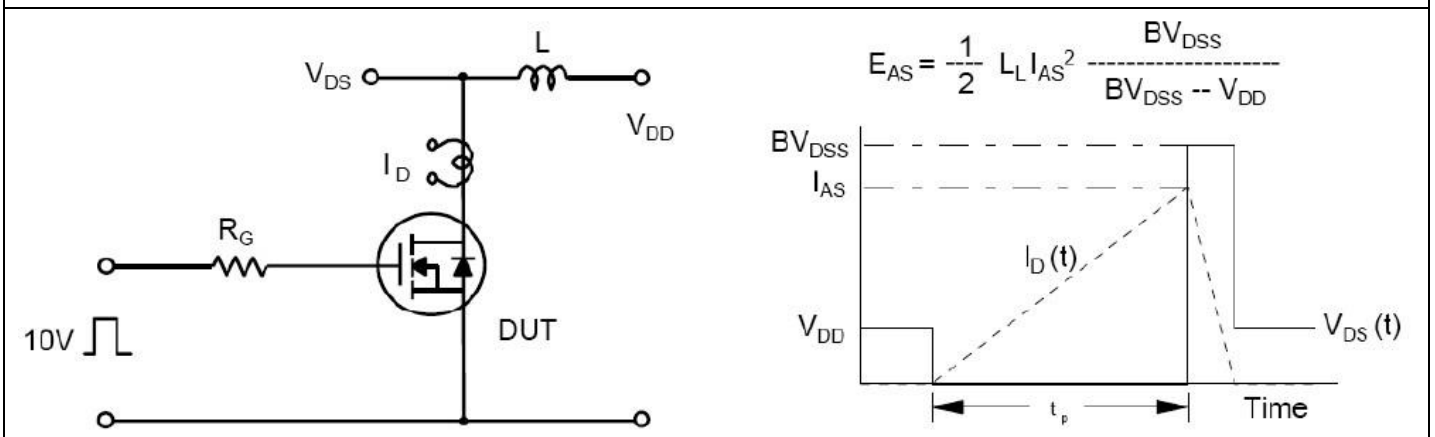


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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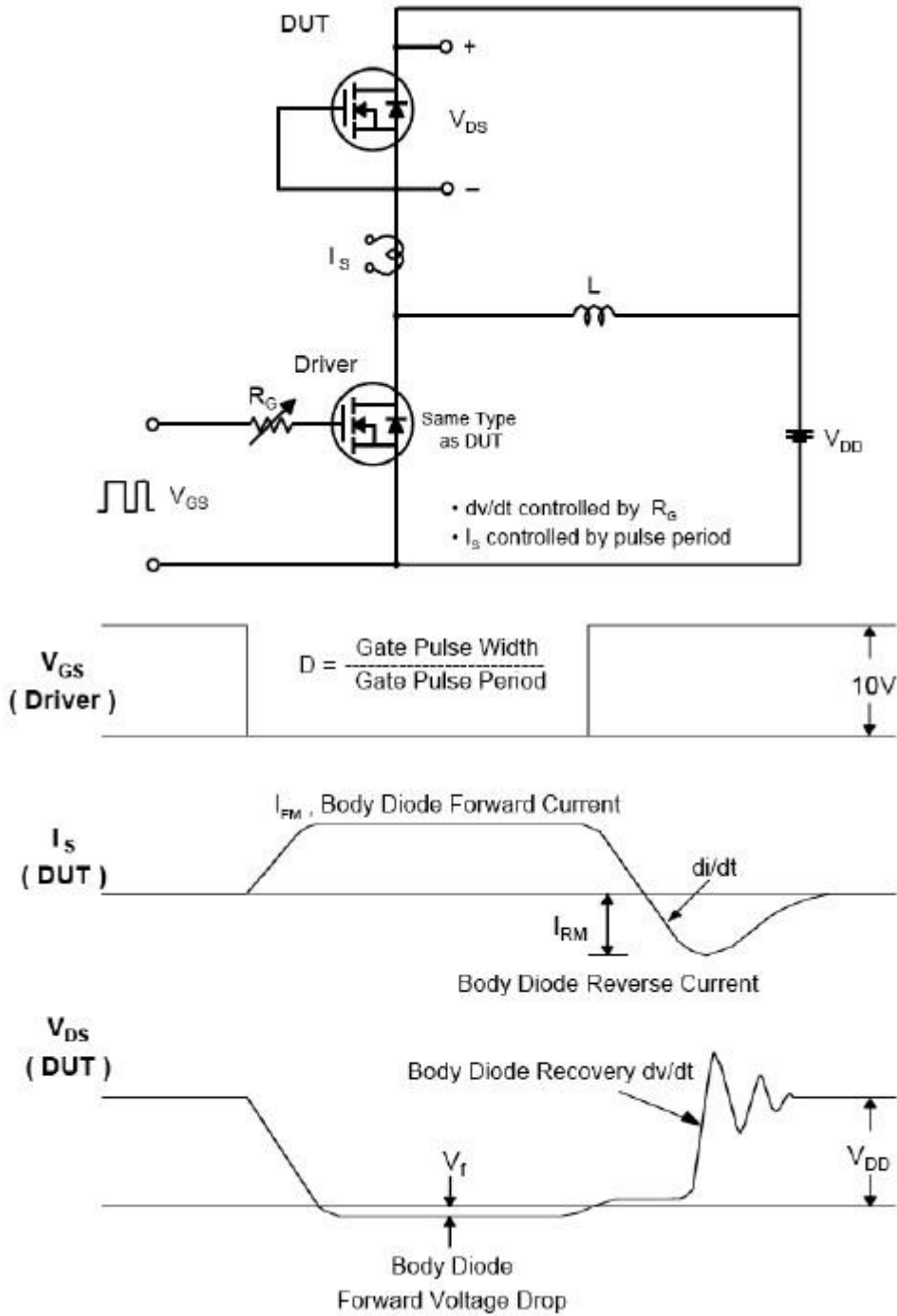


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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