

MSF9N70

N-Channel 700V MOSFET

Description

The MSF9N70 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 ITO-220AB 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

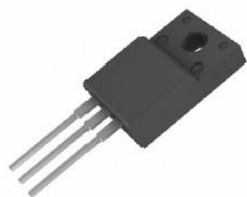
Application

- Adapter
- Switching Mode Power Supply

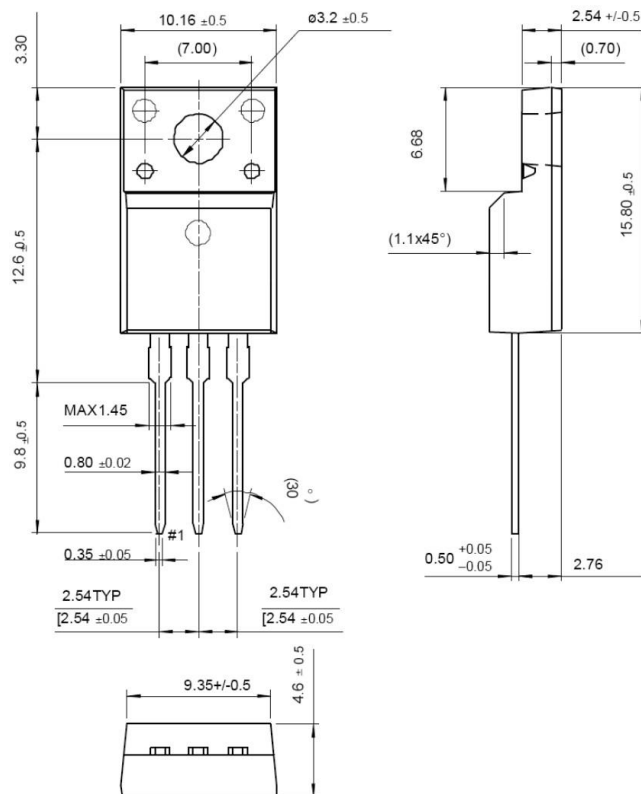
Package type : ITO220-AB

Packing & Order Information

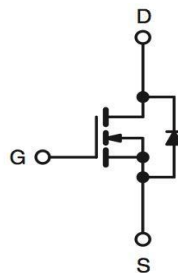
50/Tube ; 1,000/Box



**RoHS
COMPLIANT**



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	700	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	9	A
	Drain Current -Continuous (TC=100°C)	5.4	A
I _{DM}	Drain Current Pulsed	40	A
E _{AS}	Single Pulsed Avalanche Energy	658	mJ
E _{AR}	Repetitive Avalanche Energy	17.8	mJ
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns

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

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC = 25 °C)	35	W
	Power Dissipation (TC = 100 °C)	0.30	W/°C
T _J ,T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Note:

1. Pulse width limited by maximum junction temperature
2. L = 15mH, I_{AS} =9.0A, V_{DD} = 50V, R_G = 25Ω , Starting T_J = 25°C
3. I_{SD} ≤ 9.0A, di/dt ≤ 200A/us, V_{DD} ≤ BVDSS, Starting T_J = 25°C
4. Pulse Test : Pulse Width ≤ 300us, 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	2.5		4.5	V
*R _{DS(ON)}	V _{GS} = 10 V , I _D = 4.75 A	--	0.8	1.0	mΩ
BV _{DSS}	V _{GS} = 0 V , I _D = 250μA	700	--	--	V
ΔBV _{DSS} /ΔT _J	I _D = 250μA, Referenced to 25°C		0.6		
I _{DSS}	V _{DS} = 700 V , V _{GS} = 0 V V _{DS} = 560 V , V _{GS} = 0 V , T _J = 125°C	--	--	1 10	uA
G _{FS}	V _{DS} = 30 V, V _{GS} = 0 V			100	nA
I _{GSS}	V _{DS} = -30 V, V _{GS} = 0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
Q _g	V _{DS} = 520 V, I _D = 10 A, V _{GS} = 10 V	--	48	58	nC
Q _{gs}		--	7.0	--	
Q _{gd}		--	18	--	
t _{d(on)}	V _{DS} = 325 V, I _D = 10 A, R _G = 25 Ω	--	25	55	ns
t _r		--	70	150	ns
t _{d(off)}		--	140	300	ns
t _f		--	80	165	ns
C _{ISS}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0MHz	--	1650	2050	pF
C _{OSS}		--	165	217	pF
C _{RSS}		--	18	25	pF

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Source-Drain Diode Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	10	A
I_{SM}		--	--	40	
V_{SD}	$I_F = 10\text{ A}, V_{GS} = 0$	--	--	1.4	V
t_{rr}	$I_F = 10\text{ A}, V_{GS} = 0, dI_F/dt = 100\text{ A}/\mu\text{s}$	--	430	--	ns
Q_{rr}		--	4.3	--	nC

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■ Characteristics Curve

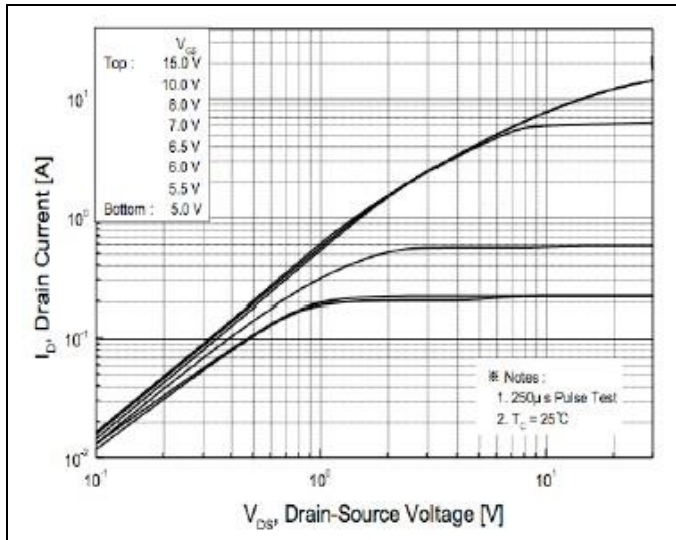


FIG.1-ON REGION CHARACTERISTICS

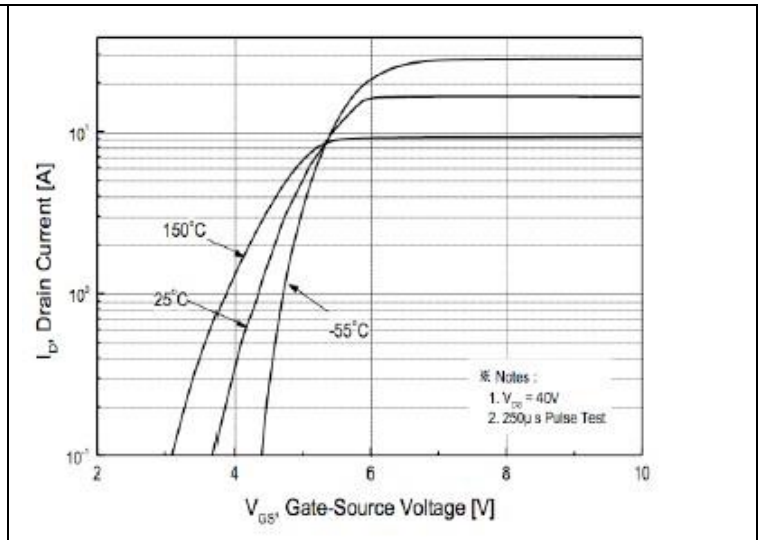


FIG.2-TRANSFER CHARACTERISTICS

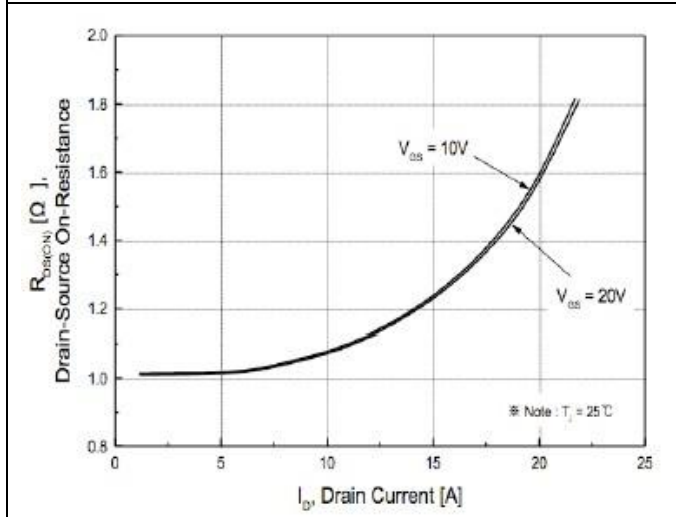


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

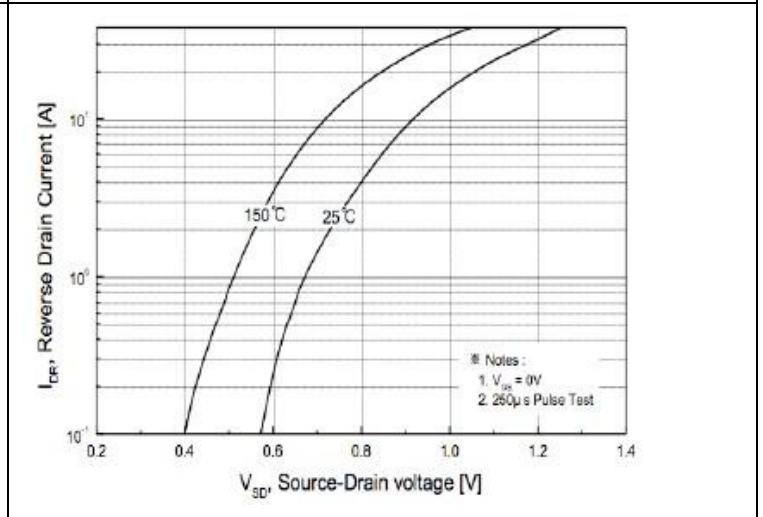


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

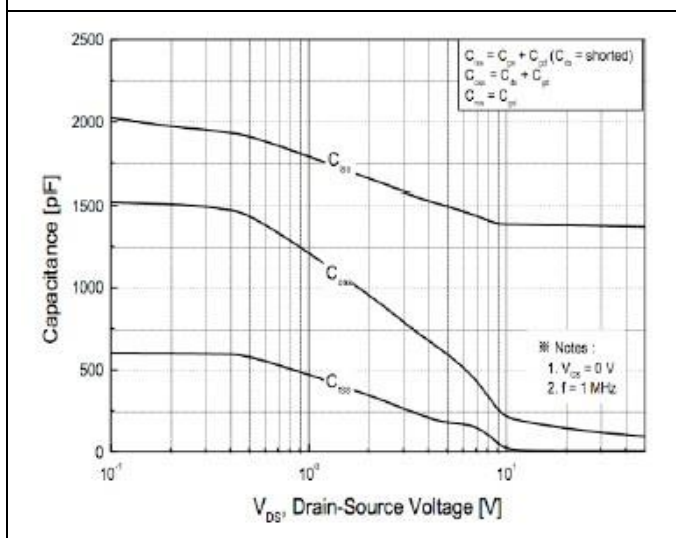


FIG.5-CAPACITANCE CHARACTERISTICS

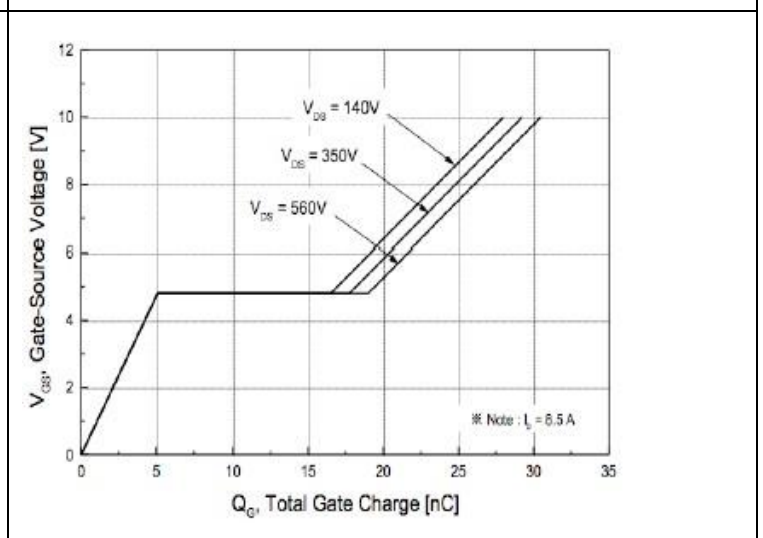


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve

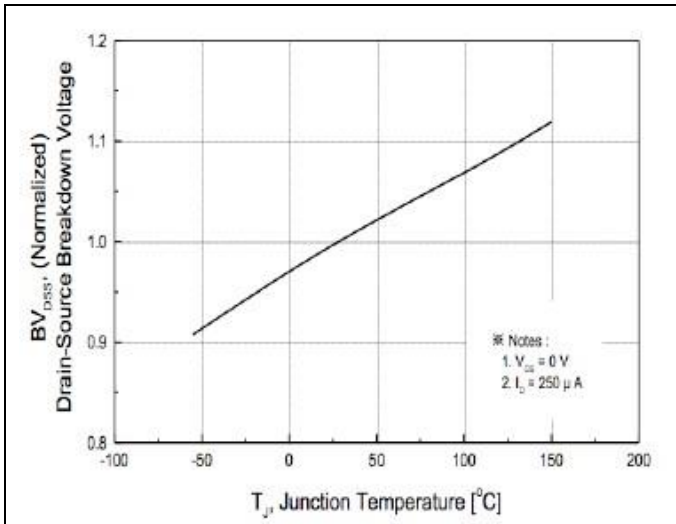


FIG. 7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

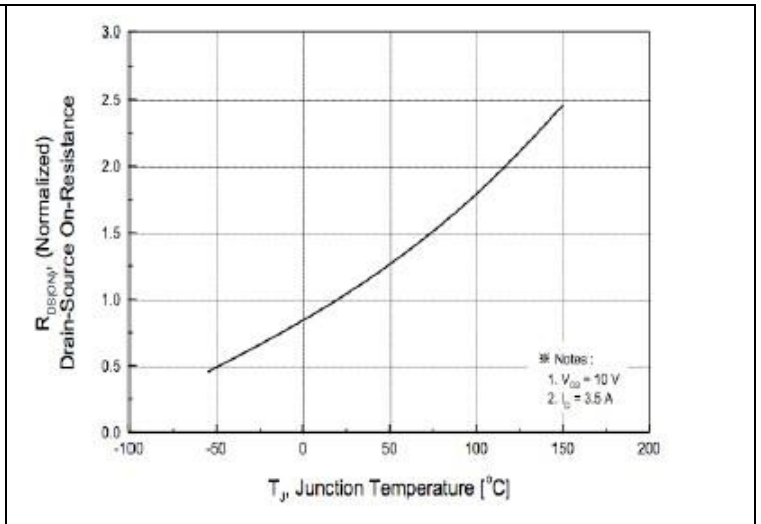


FIG. 8-ON-RESISTANCE VARIATION VS TEMPERATURE

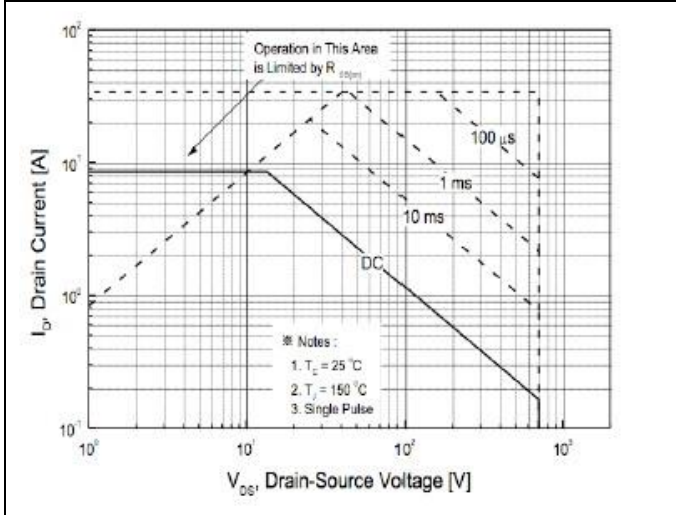


FIG. 9-MAXIMUM SAFE OPERATING AREA

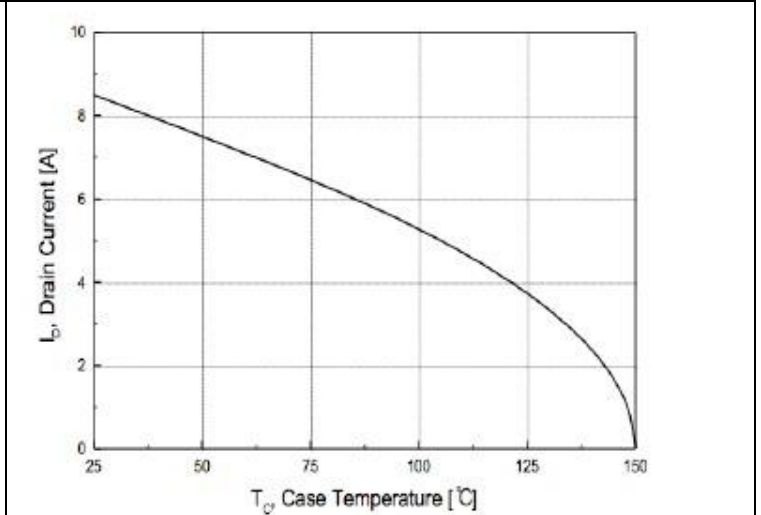


FIG. 10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

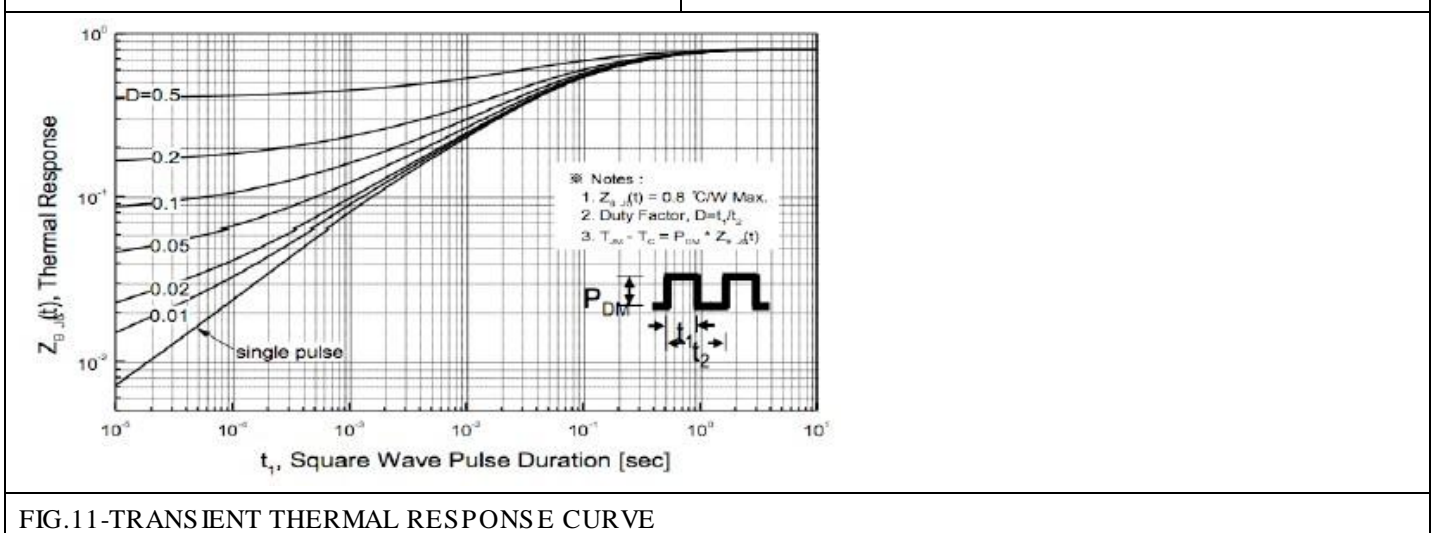


FIG. 11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

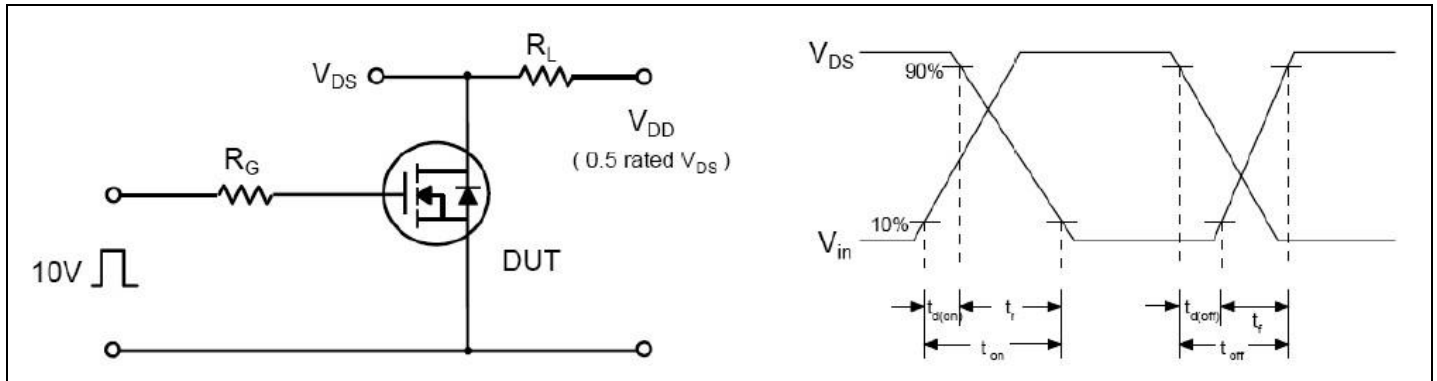


Fig 12. Resistive Switching Test Circuit & Waveforms

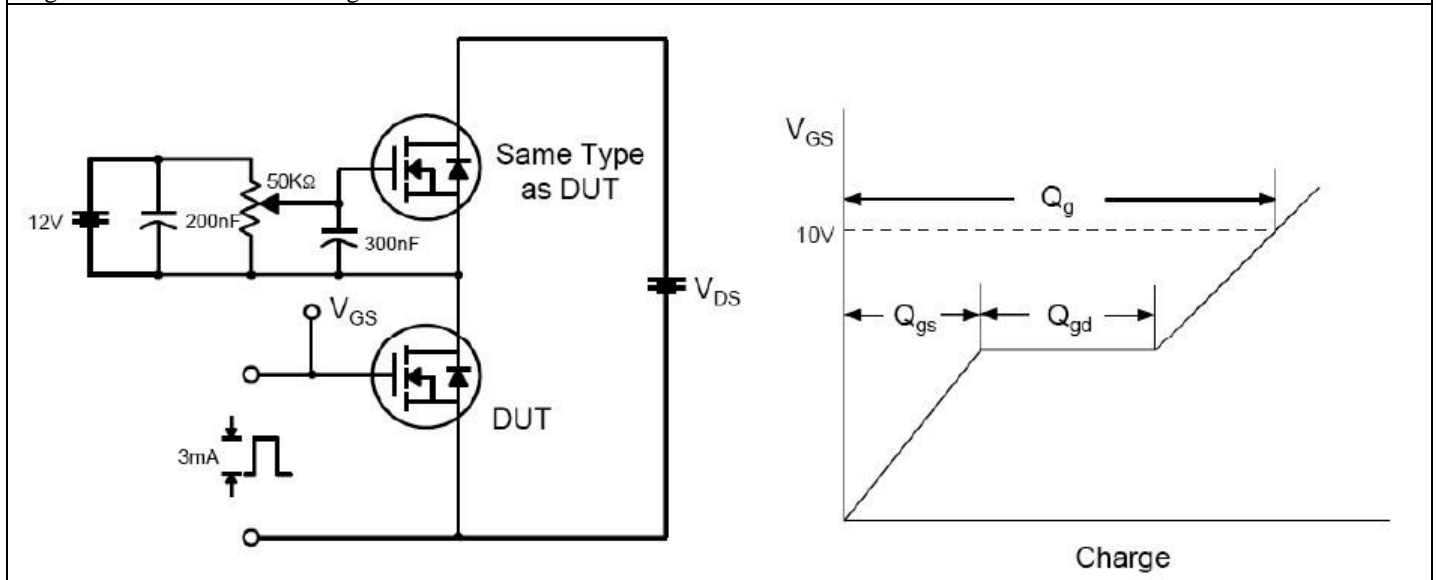


Fig 13. Gate Charge Test Circuit & Waveform

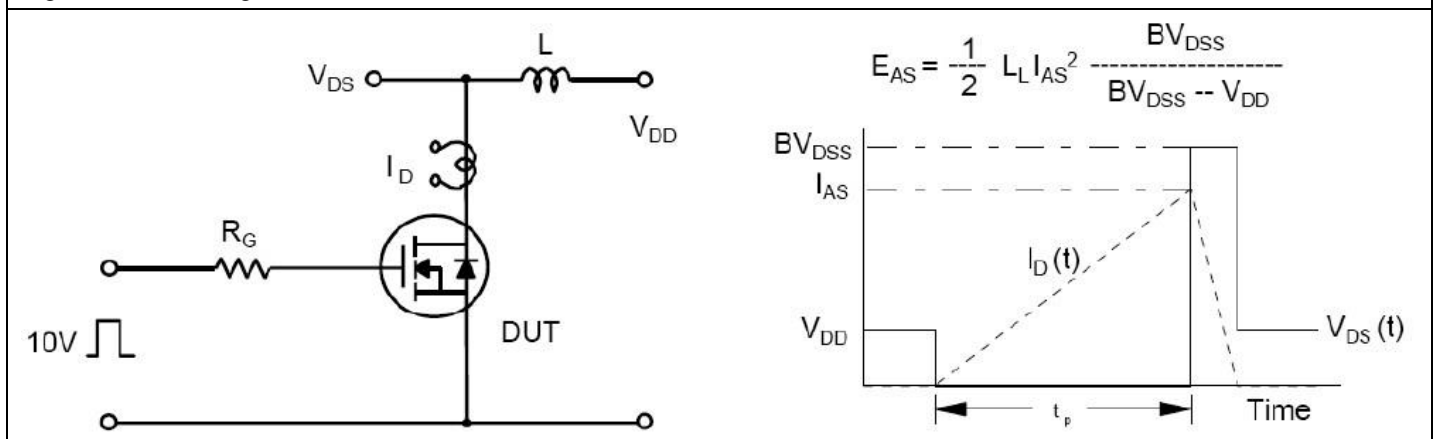


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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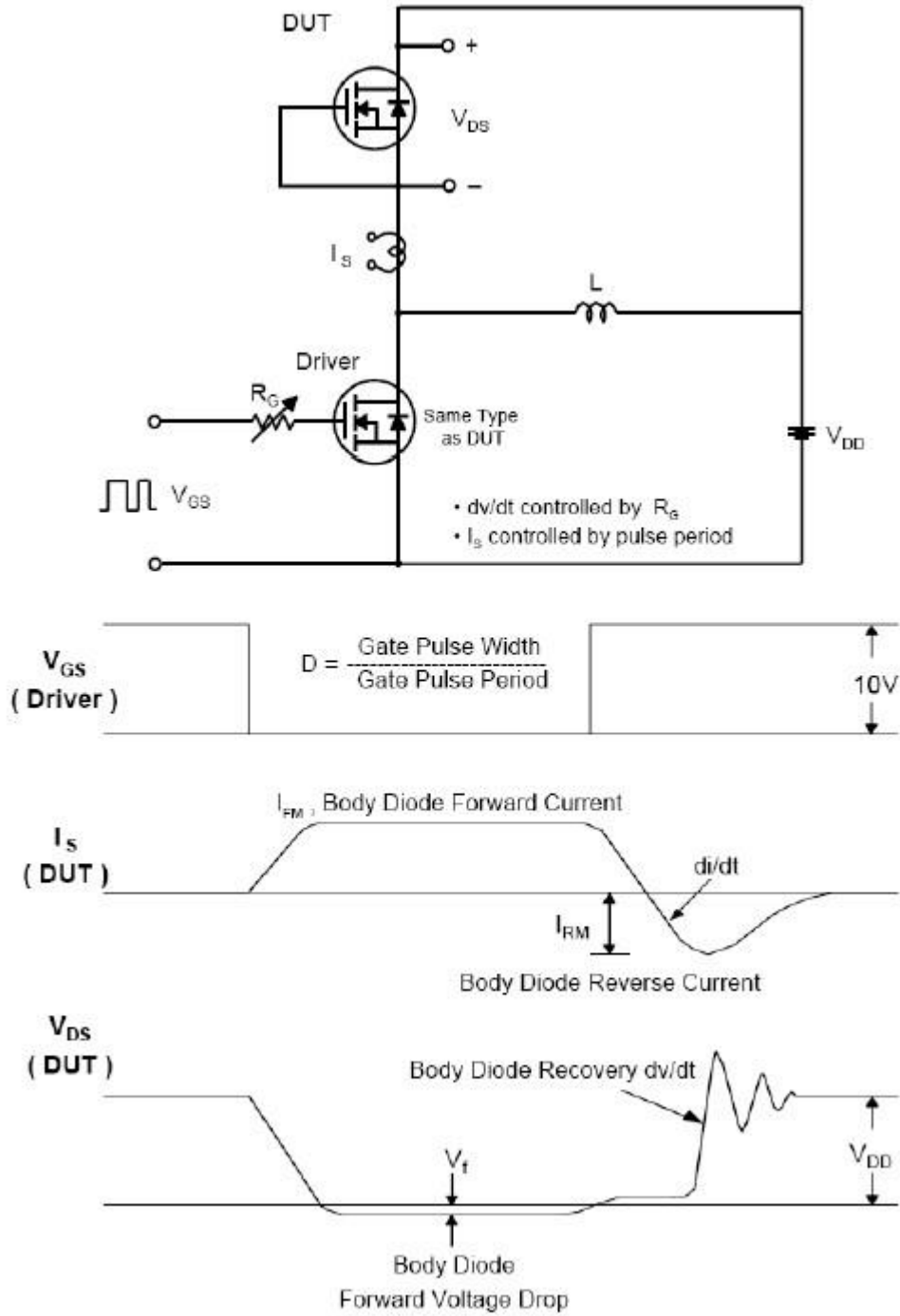


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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