

MSF7N80

800V N-Channel MOSFET

Description

The MSF7N80 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

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

Application

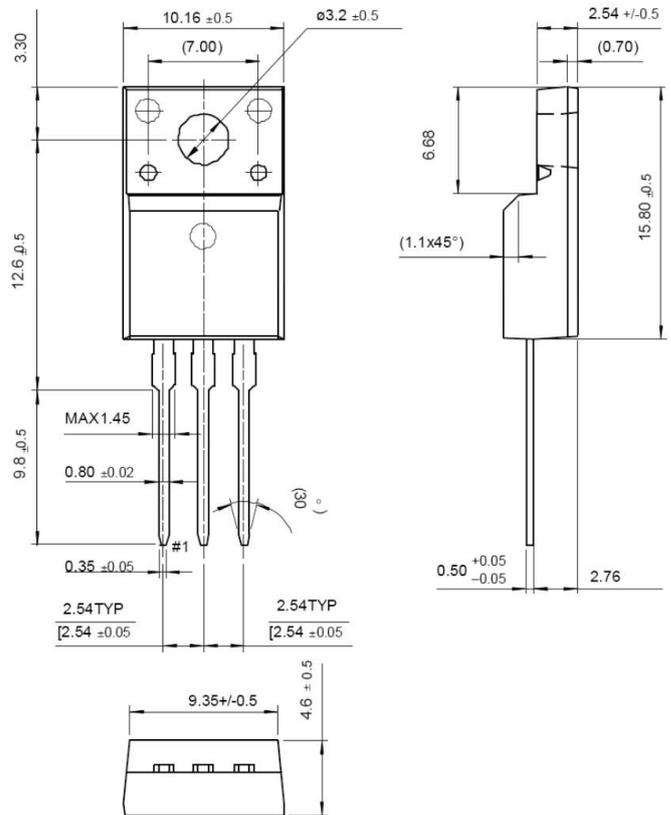
- Open Framed Power Supply
- Adapter
- STB

Packing & Order Information

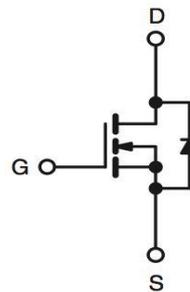
50/Tube ; 1,000/Box



RoHS
COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	800	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	7.0	A
	Drain Current -Continuous (TC=100°C)	4.2	A
I _{DM}	Drain Current Pulsed	28	A
E _{AS}	Single Pulsed Avalanche Energy	580	mJ
E _{AR}	Repetitive Avalanche Energy	16.7	mJ

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns
P _D	Total Power Dissipation (TC = 25 °C)	56	W
	Derating Factor above 25 °C	0.42	W/°C
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 characteristics

Symbol	Parameter	Max.	Units
R _{θJC}	Junction-to-Case	2.25	°C/W
R _{θJA}	Junction-to-Ambient	62.5	

On 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 = 3.5 A	--	1.4	1.9	Ω

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	V _{GS} = 0 V, I _D = 250μA	800	--	--	V
ΔBV _{DSS} /ΔT _J	I _D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
I _{DSS}	V _{DS} = 800 V, V _{GS} = 0 V V _{DS} = 640 V, V _C = 125°C	--	--	10 100	μA
I _{GSSF}	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA

Switching Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
Q _g	V _{DG} = 640 V, I _D = 10 A, V _{GS} = 7 V	--	35	--	nC
Q _{gs}		--	11	--	nC
Q _{gd}		--	15	--	nC
t _{d(on)}	V _{DS} = 400 V, I _D = 7 A, R _G = 25 Ω	--	40	--	ns
t _r		--	120	--	ns
t _{d(off)}		--	60	--	ns
t _f		--	70	--	ns

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Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{MHz}$	--	1500	2010	pF
C_{OSS}		--	145	190	pF
C_{RSS}		--	13	20	pF

Source-Drain Diode Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	7	A
I_{SM}		--	--	28	
V_{SD}	$I_S = 7\text{ A}, V_{GS} = 0\text{ V}$	--	--	1.4	V
t_{rr}	$I_F = 7\text{ A}, V_{GS} = 0\text{ V}, di/dt = 100\text{A}/\mu\text{s}$	--	650	--	ns
Q_{rr}		--	8	--	μC

Notes:

1. Repeativity rating : pulse width limited by junction temperature
2. $L = 18.0\text{mH}, I_{AS} = 7.0\text{A}, V_{DD} = 5\text{V}, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 7.0\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BVDSS$, 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.

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■ Characteristics Curve

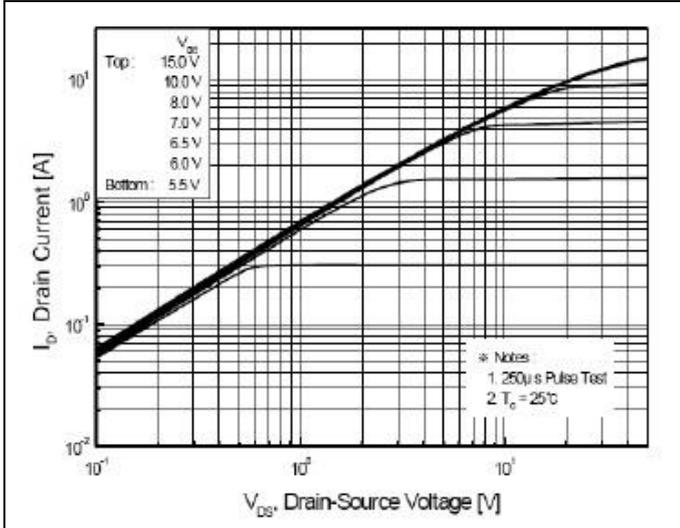


FIG.1-ON REGION CHARACTERISTICS

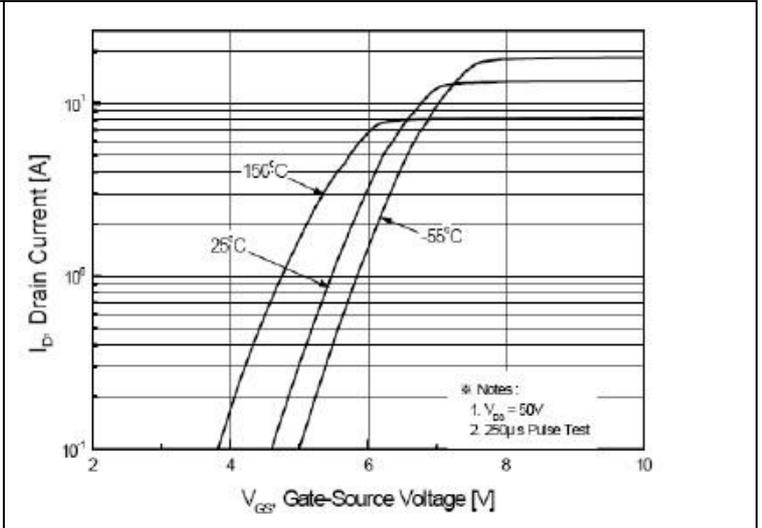


FIG.2-TRANSFER CHARACTERISTICS

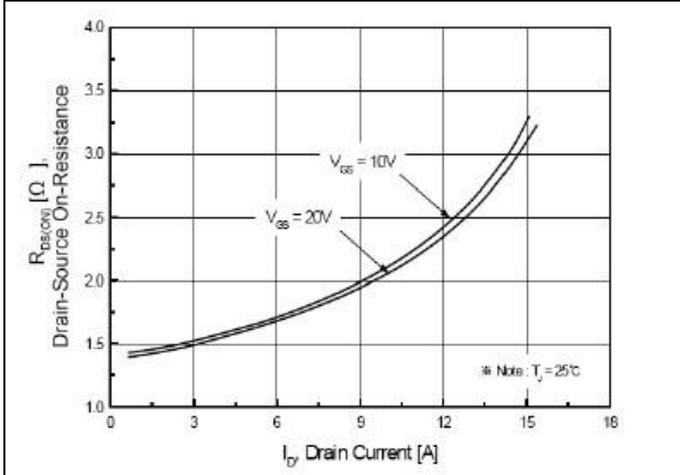


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

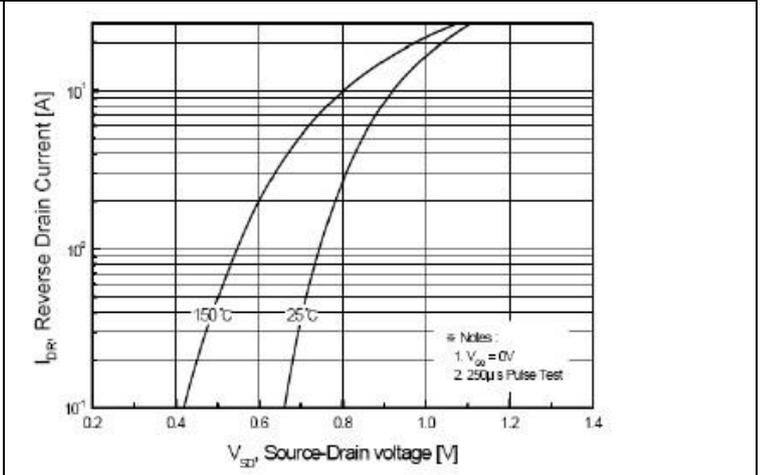


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

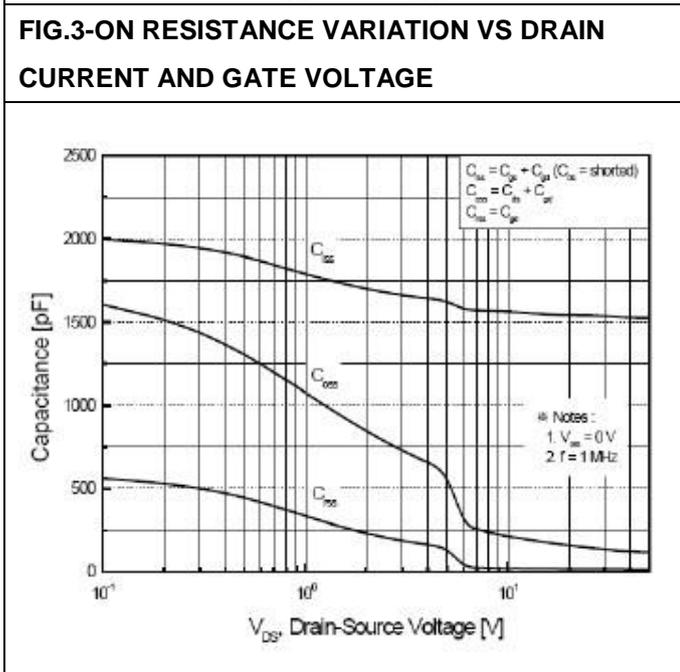


FIG.5-CAPACITANCE CHARACTERISTICS

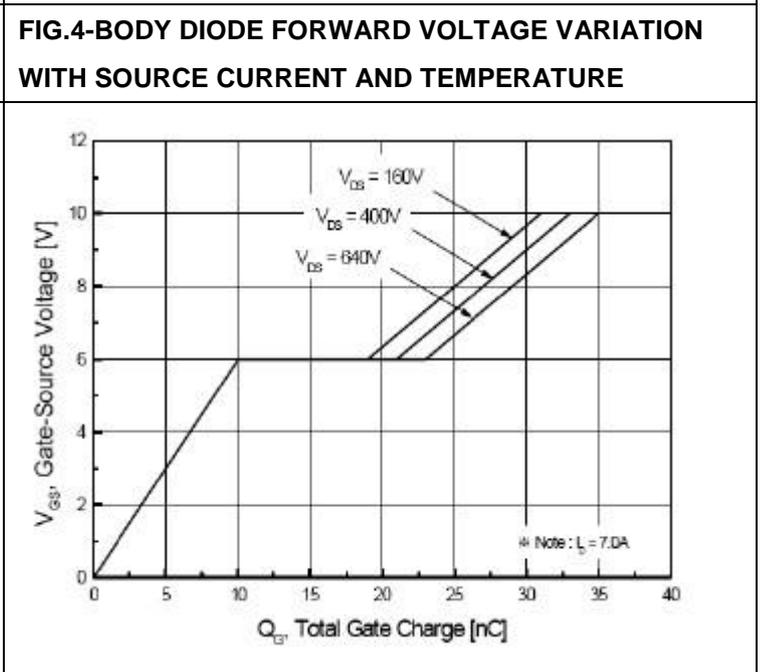


FIG.6-GATE CHARGE CHARACTERISTICS

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Characteristics Curve

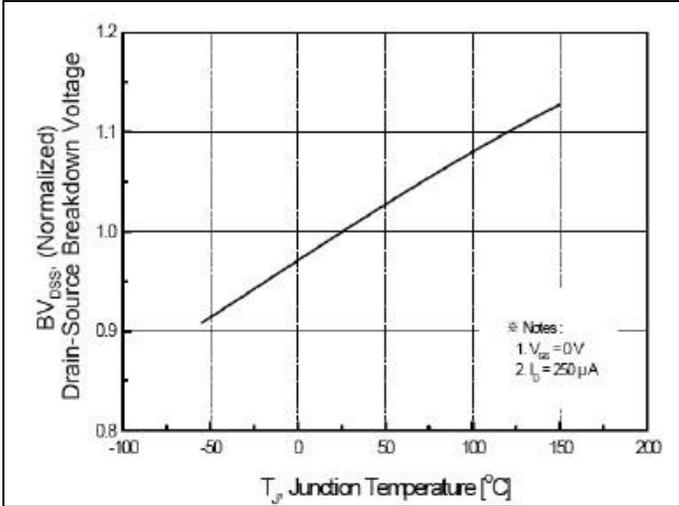


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

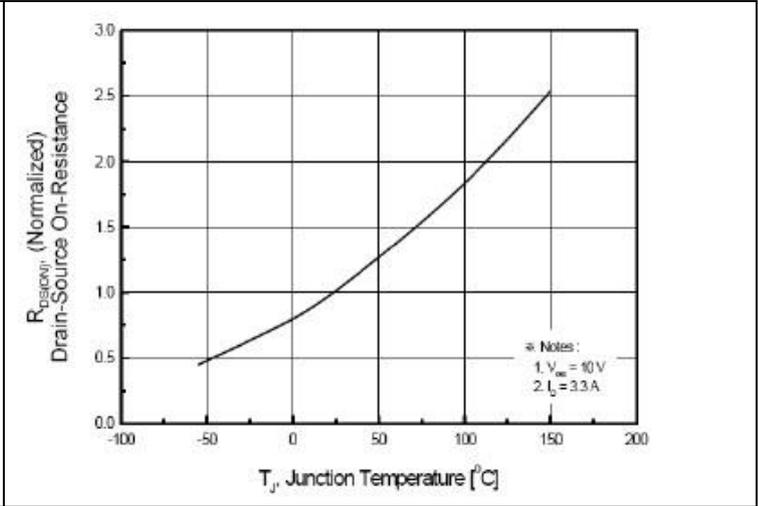


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

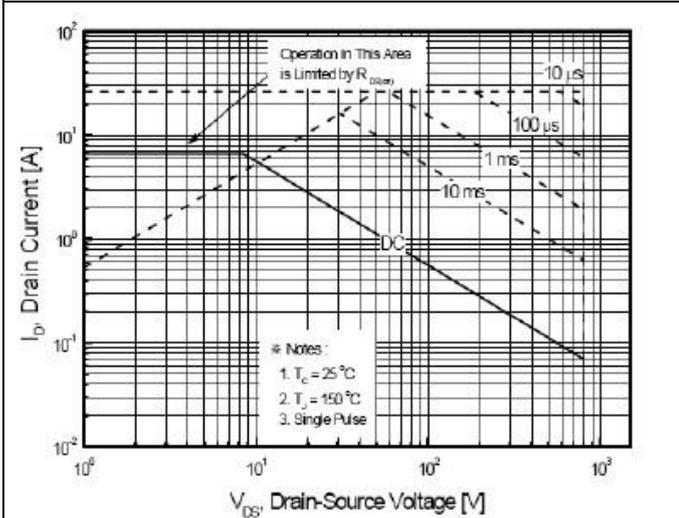


FIG.9-MAXIMUM SAFE OPERATING AREA

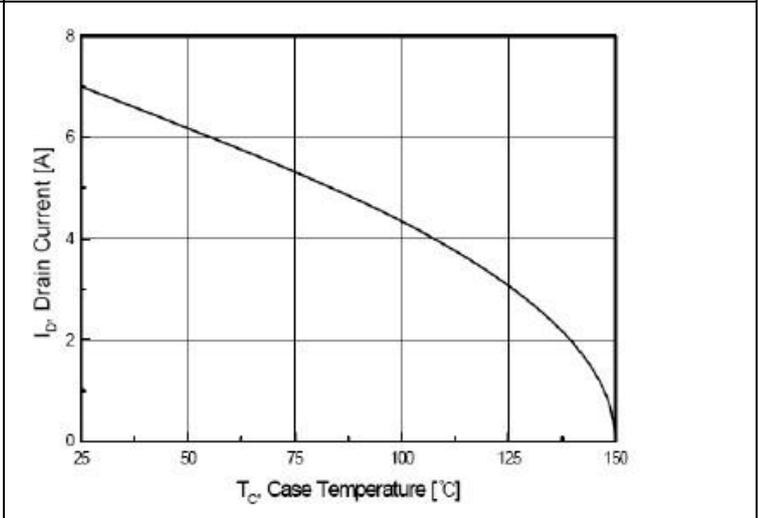


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

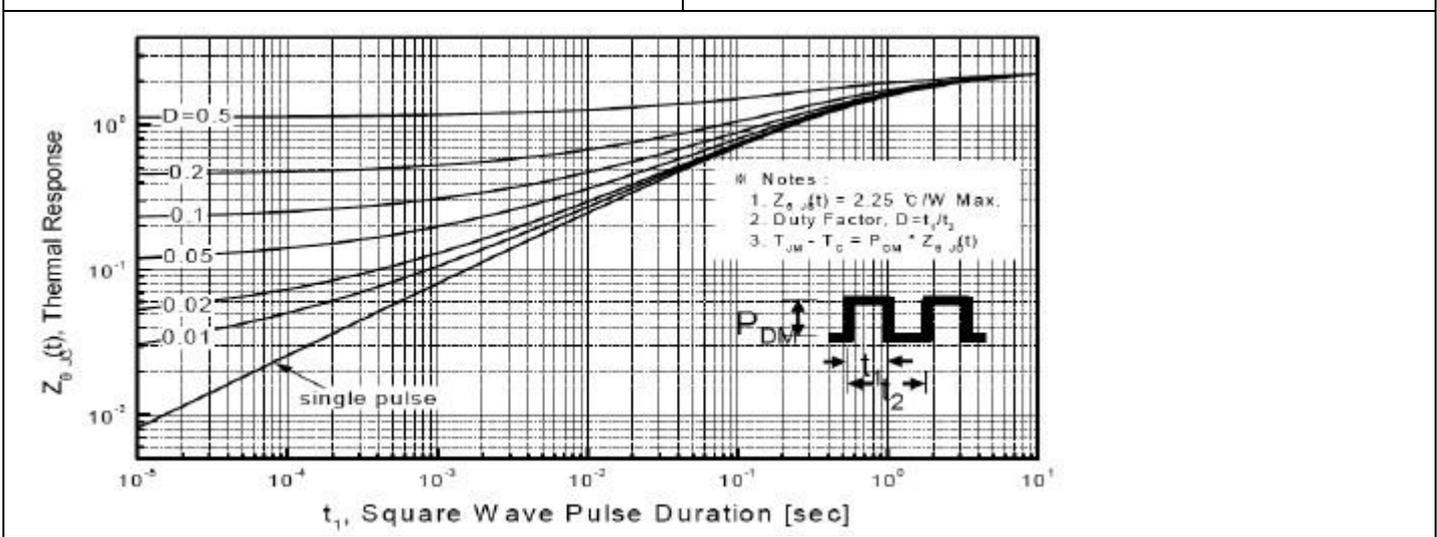


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

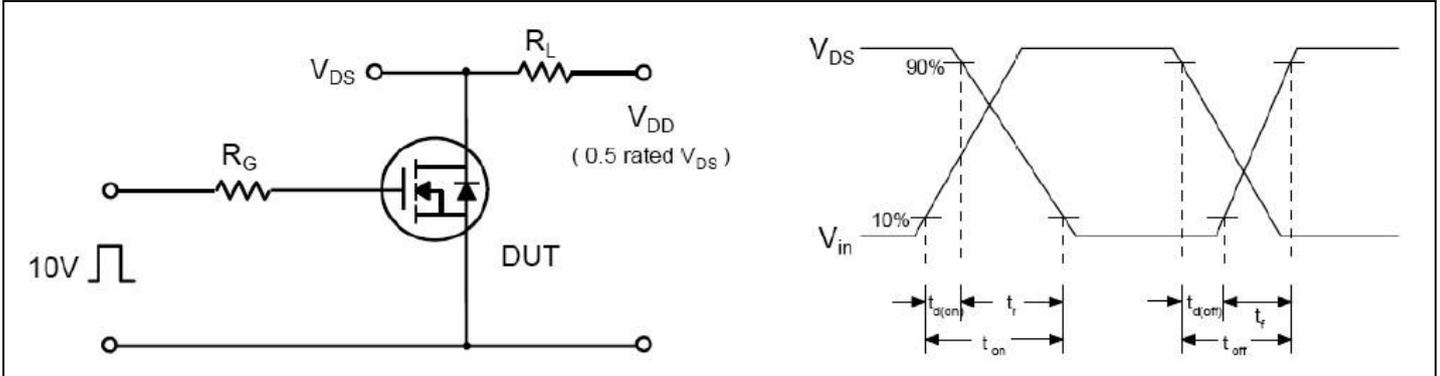


Fig 12. Resistive Switching Test Circuit & Waveforms

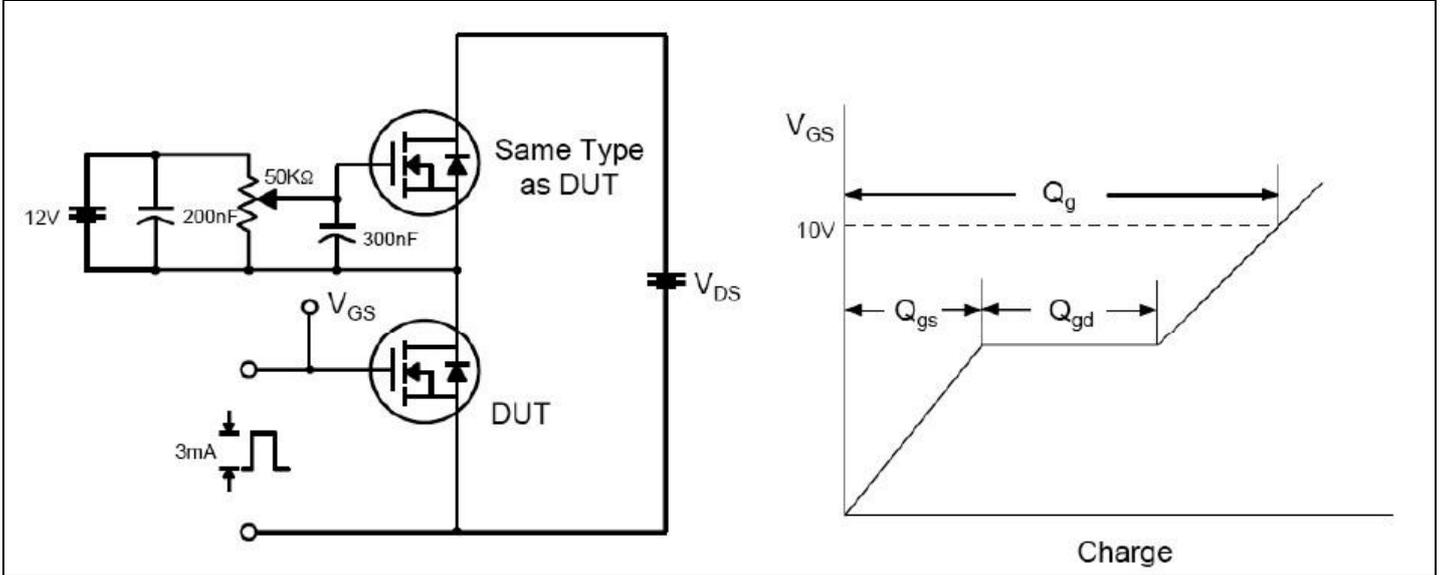


Fig 13. Gate Charge Test Circuit & Waveform

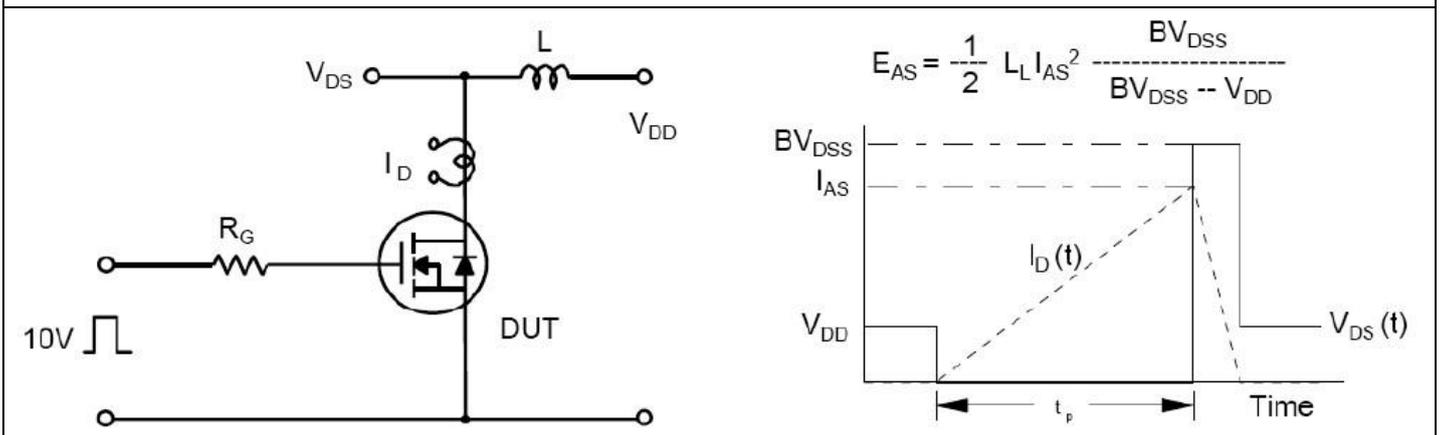


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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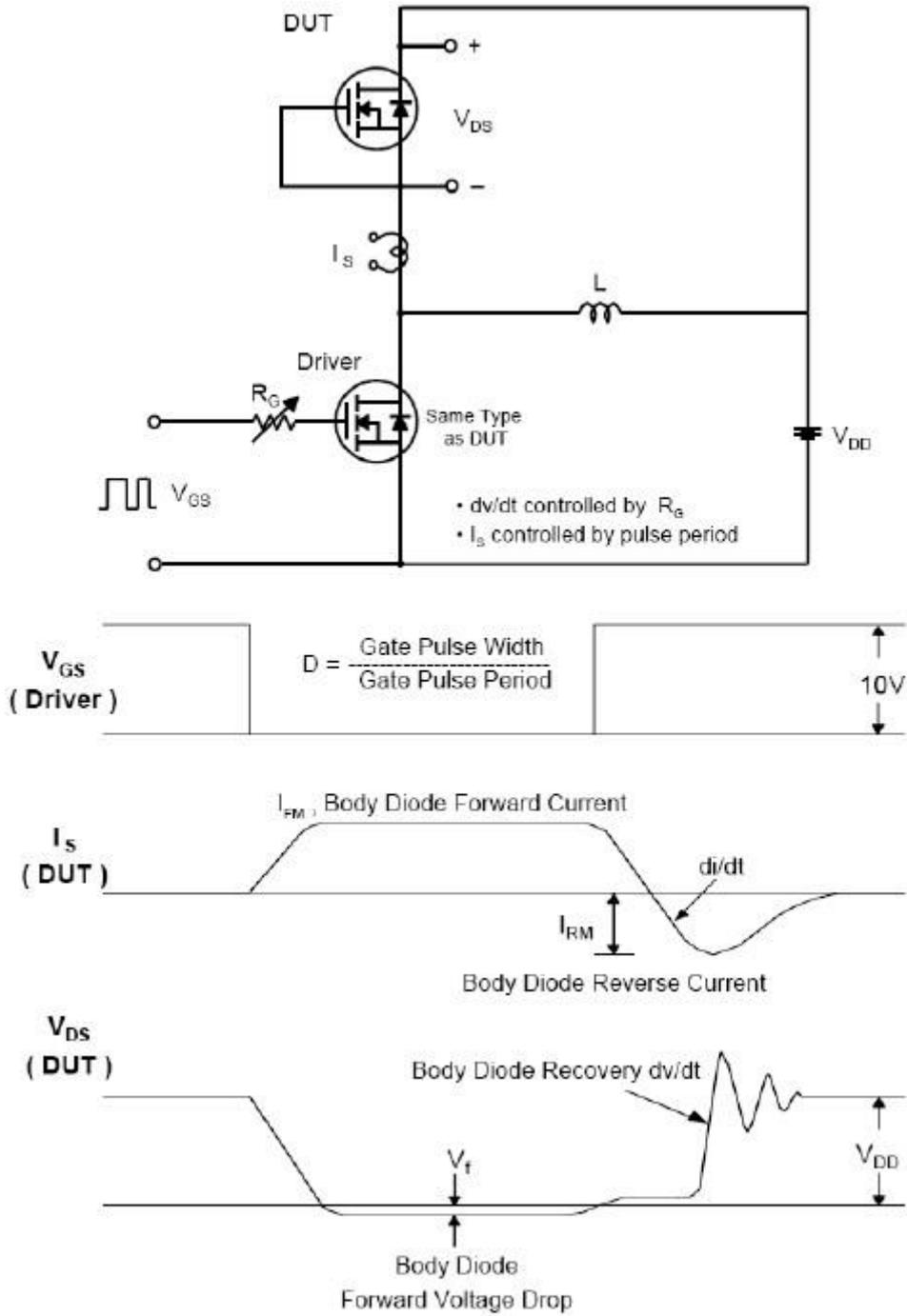


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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