

MSF12N60

N-Channel 600V MOSFET

Description

The MSF12N60 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

- Power Factor Correction
- LCD TV Power
- Full and Half Bridge Power

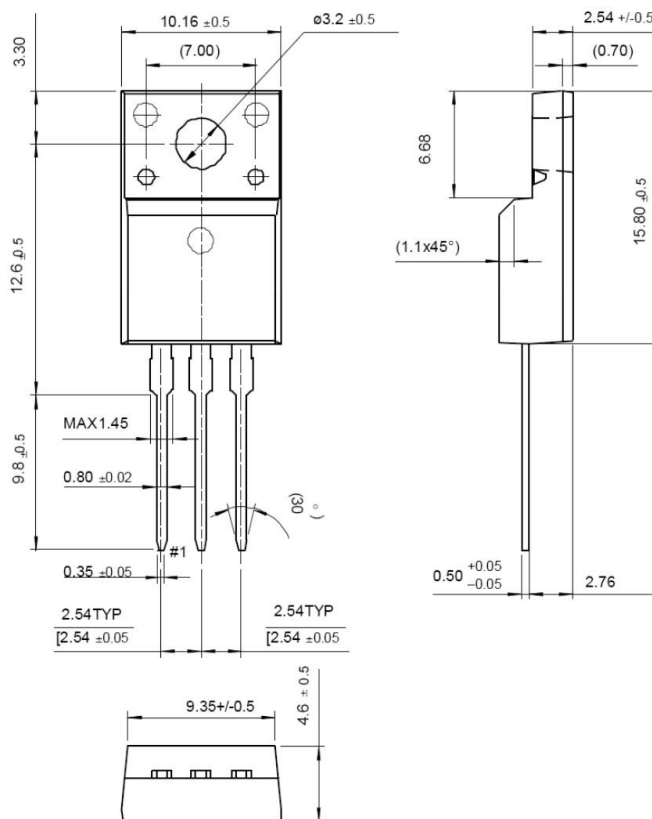
Package type : ITO220-AB

Packing & Order Information

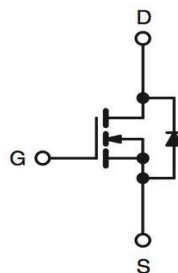
50/Tube ; 1,000/Box



**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	600	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	12	A
	Drain Current -Continuous (TC=100°C)	7.5	A
I _{DM}	Drain Current Pulsed	48	A
E _{AS}	Single Pulsed Avalanche Energy	870	mJ
I _{AR}	Avalanche Current	12	A
E _{AR}	Repetitive Avalanche Energy	22.5	mJ
dV/dt	Peak Diode Recovery dV/dt	3.5	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)	54	W
	Power Dissipation (TC=100°C)	0.43	W/°C
T _J ,T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

NOTE:

1. T_J=+25°C to +150°C.
2. Repetitive rating; pulse width limited by maximum junction temperature. 3. I_{SD}=12A, di/dt<100A/μs, V_{DD}<BV_{DSS}, T_J=+150°C.
4. I_{AS}=12A, V_{DD}=50V, L=11mH, R_G=25Ω, starting T_J=+25°C.

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V _{GS}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	--	4.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6A	--	0.58	0.65	Ω
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250μA	600	--	--	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Referenced to 25°C	--	0.5	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} = 0 V V _{DS} =480V, T _C = 125°C	--	--	1 10	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} =30V, V _{DS} =0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C _{ISS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	1760	2290	pF
C _{OSS}	Output Capacitance		--	182	235	pF
C _{RSS}	Reverse Transfer Capacitance		--	21	28	pF

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
t _{d(on)}	Turn-On Time	V _{DS} =250 V, I _D =12A, R _G =10Ω	--	30	70	ns
t _r	Turn-On Time		--	85	180	ns
t _{d(off)}	Turn-Off Delay Time		--	140	280	ns
t _f	Turn-Off Fall Time		--	90	190	ns
Q _g	Total Gate Charge	V _{DS} =480V, I _D =12A, V _{GS} =10 V	--	48	63	nC
Q _{gs}	Gate-Source Charge		--	8.5	--	nC
Q _{gd}	Gate-Drain Charge		--	21	--	nC

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Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	12	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	48	
V_{SD}	Source-Drain Diode Forward Voltage	$I_S=12A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=12A, V_{GS}=0V$ $diF/dt=100A/\mu s$	--	460	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.9	--	μC

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■ Characteristics Curve

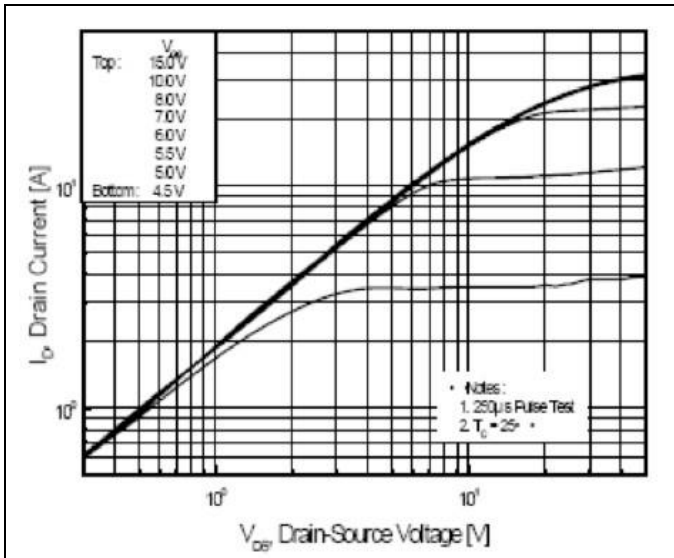


FIG.1-ON REGION CHARACTERISTICS

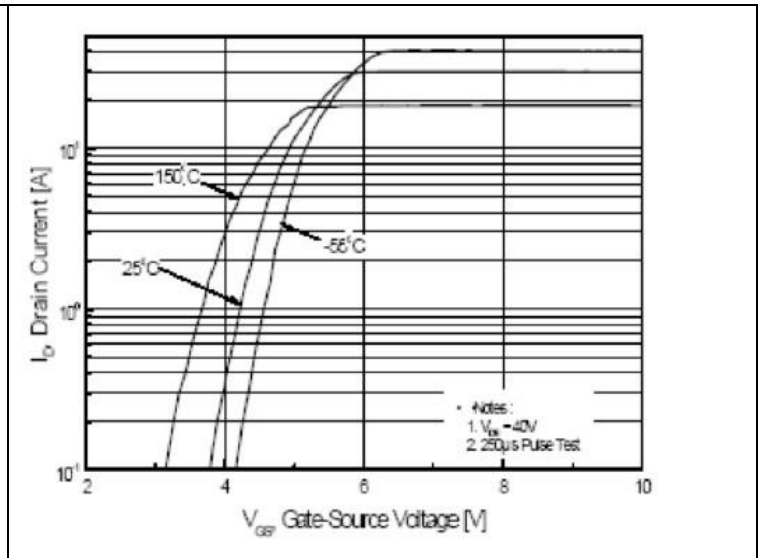


FIG.2-TRANSFER CHARACTERISTICS

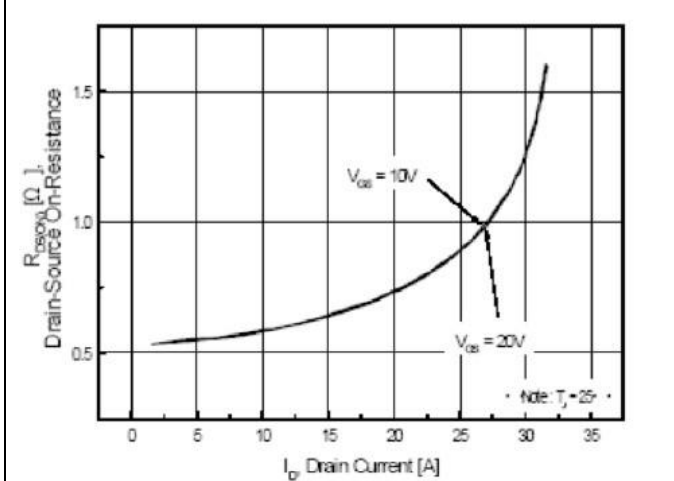


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

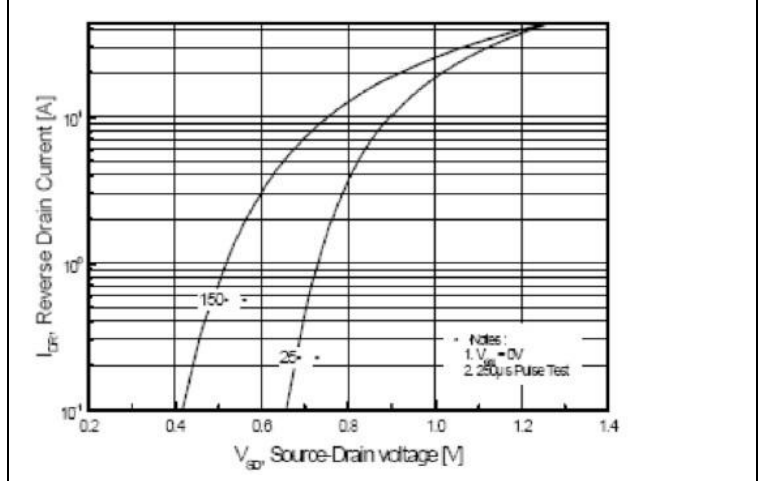


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

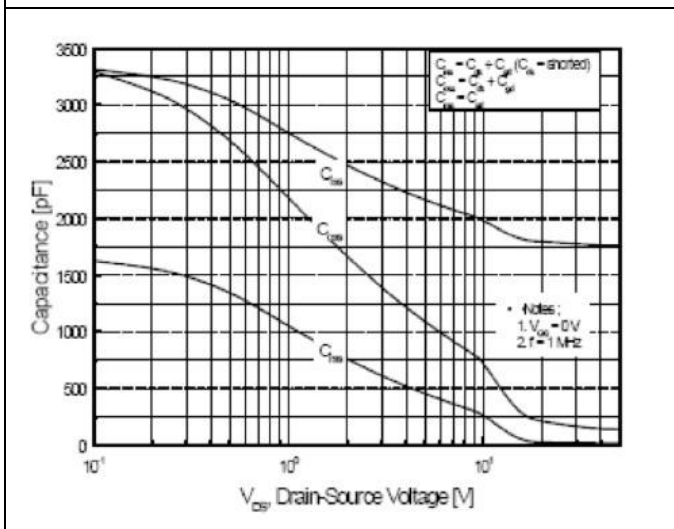


FIG.5-CAPACITANCE CHARACTERISTICS

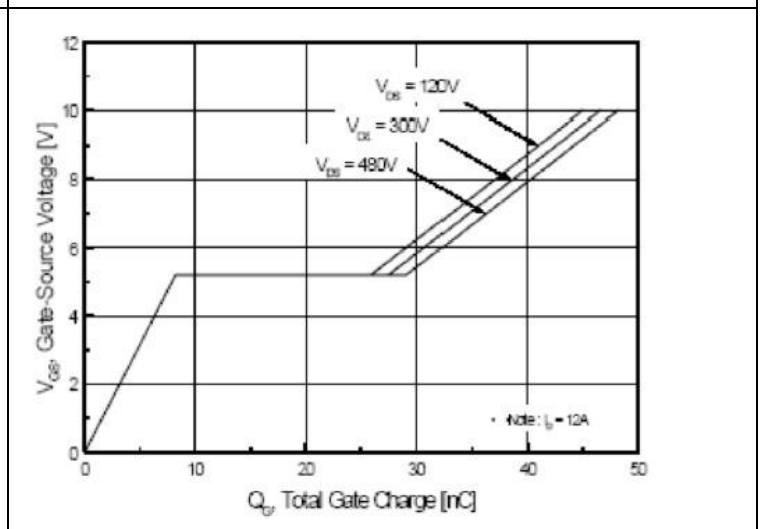


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve

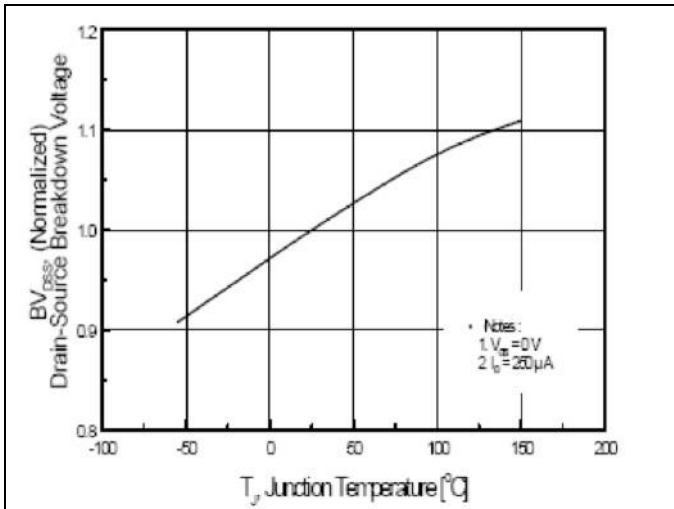


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

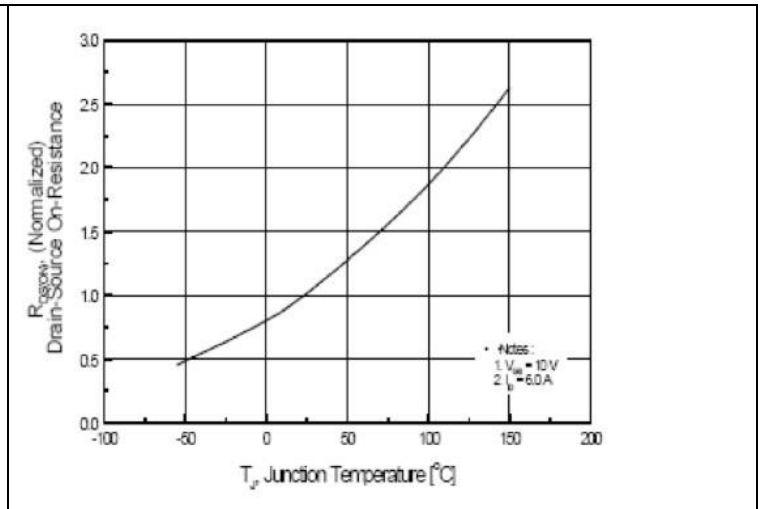


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

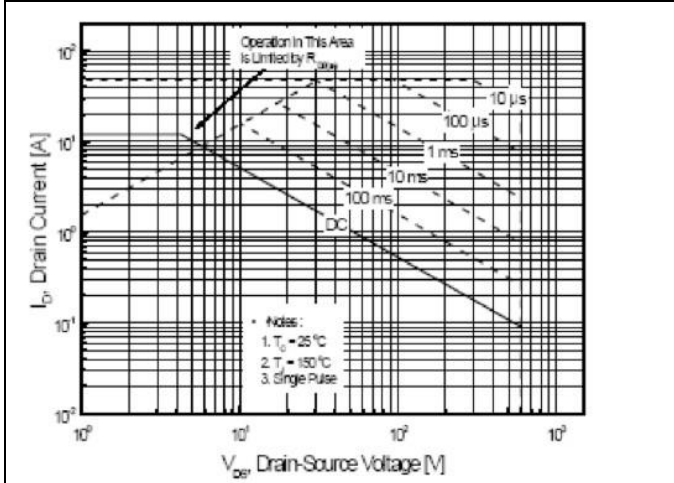


FIG.9-MAXIMUM SAFE OPERATING AREA

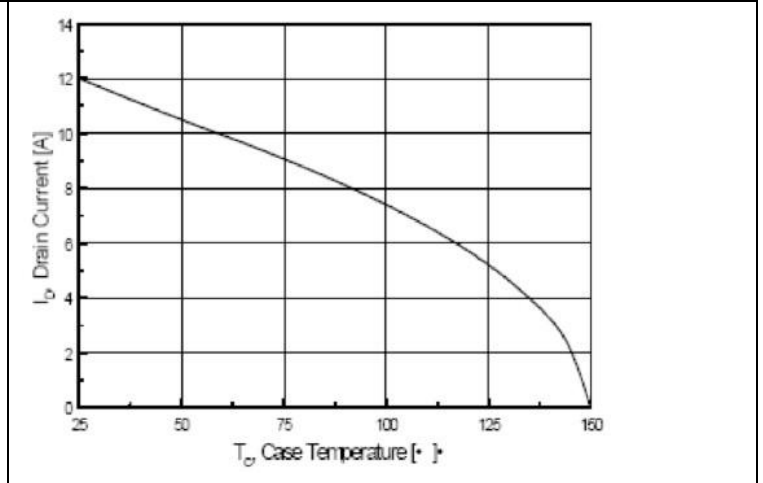


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

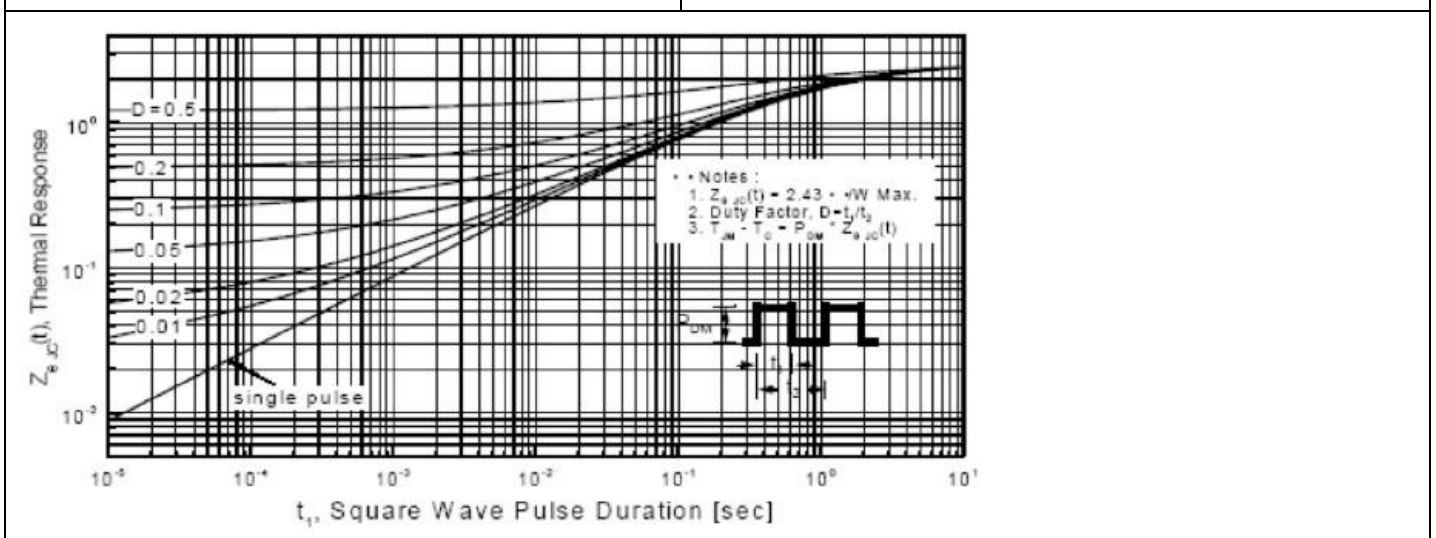


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

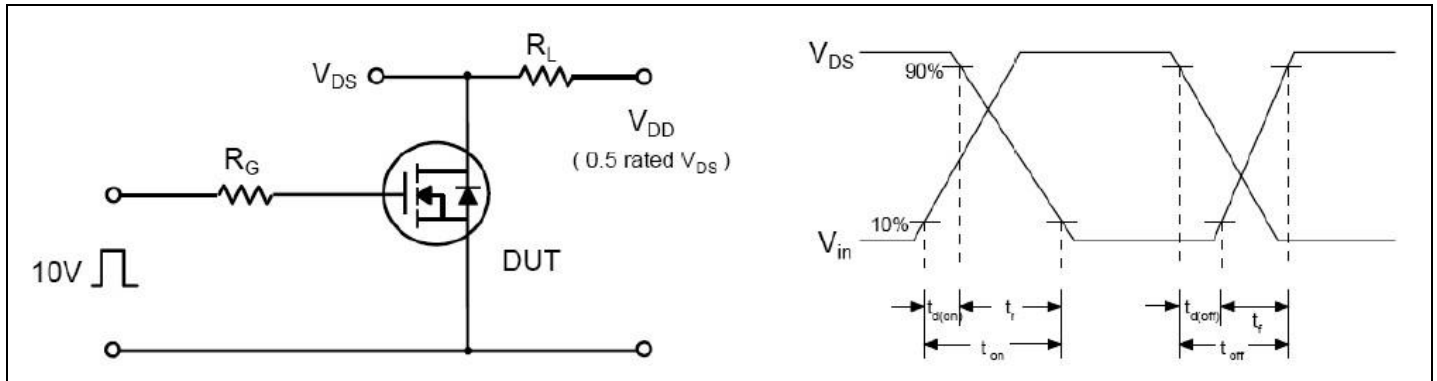


Fig 12. Resistive Switching Test Circuit & Waveforms

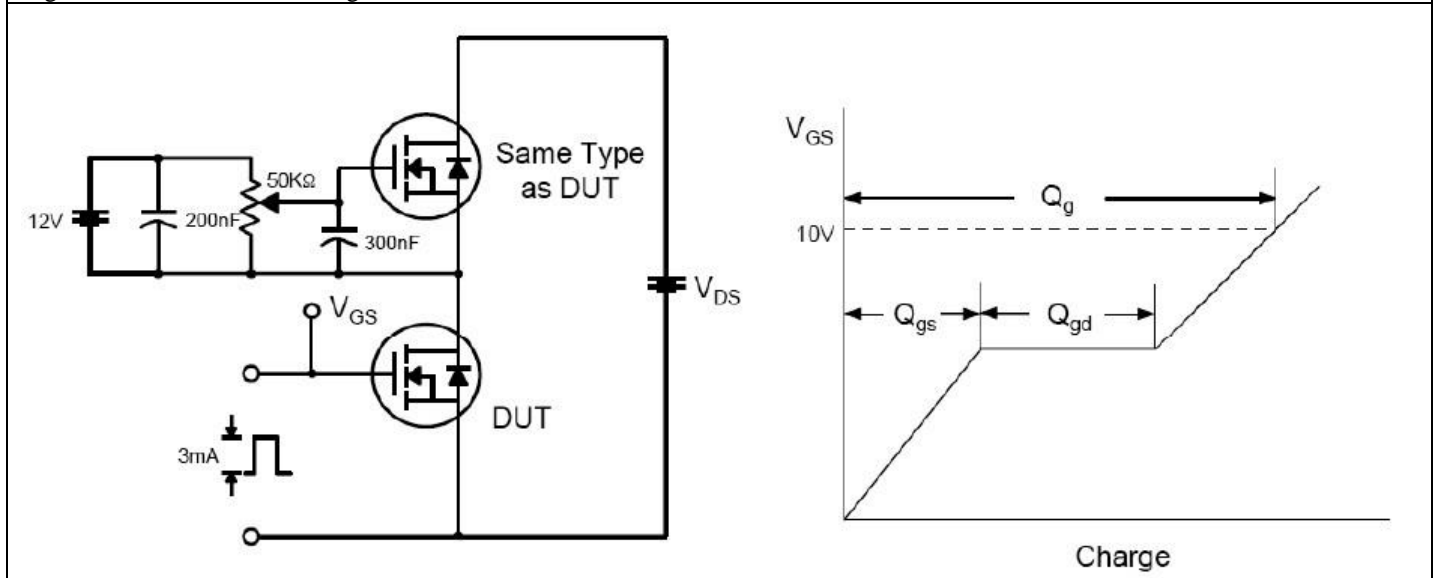


Fig 13. Gate Charge Test Circuit & Waveform

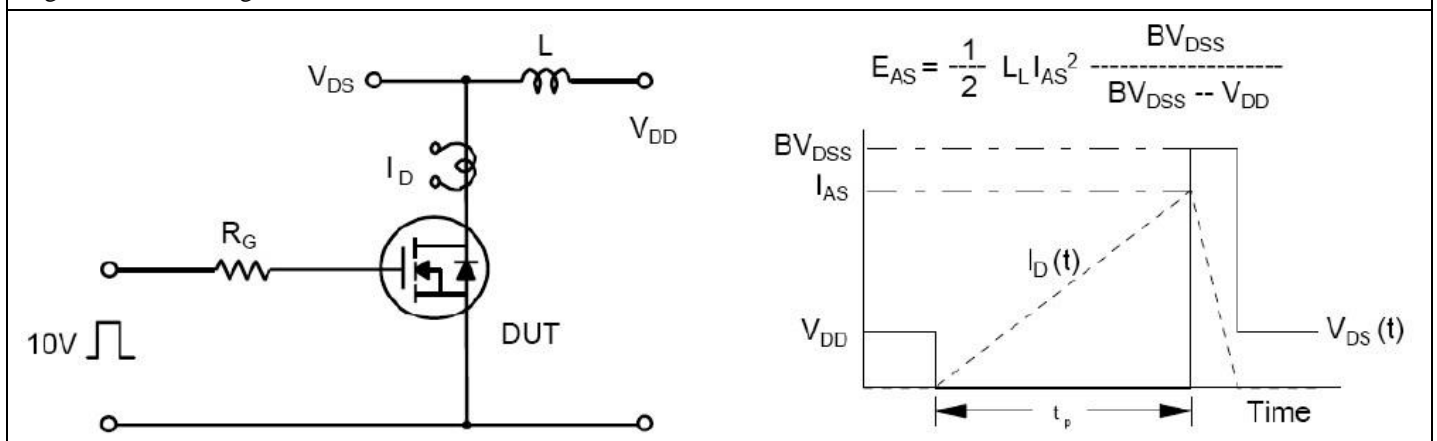


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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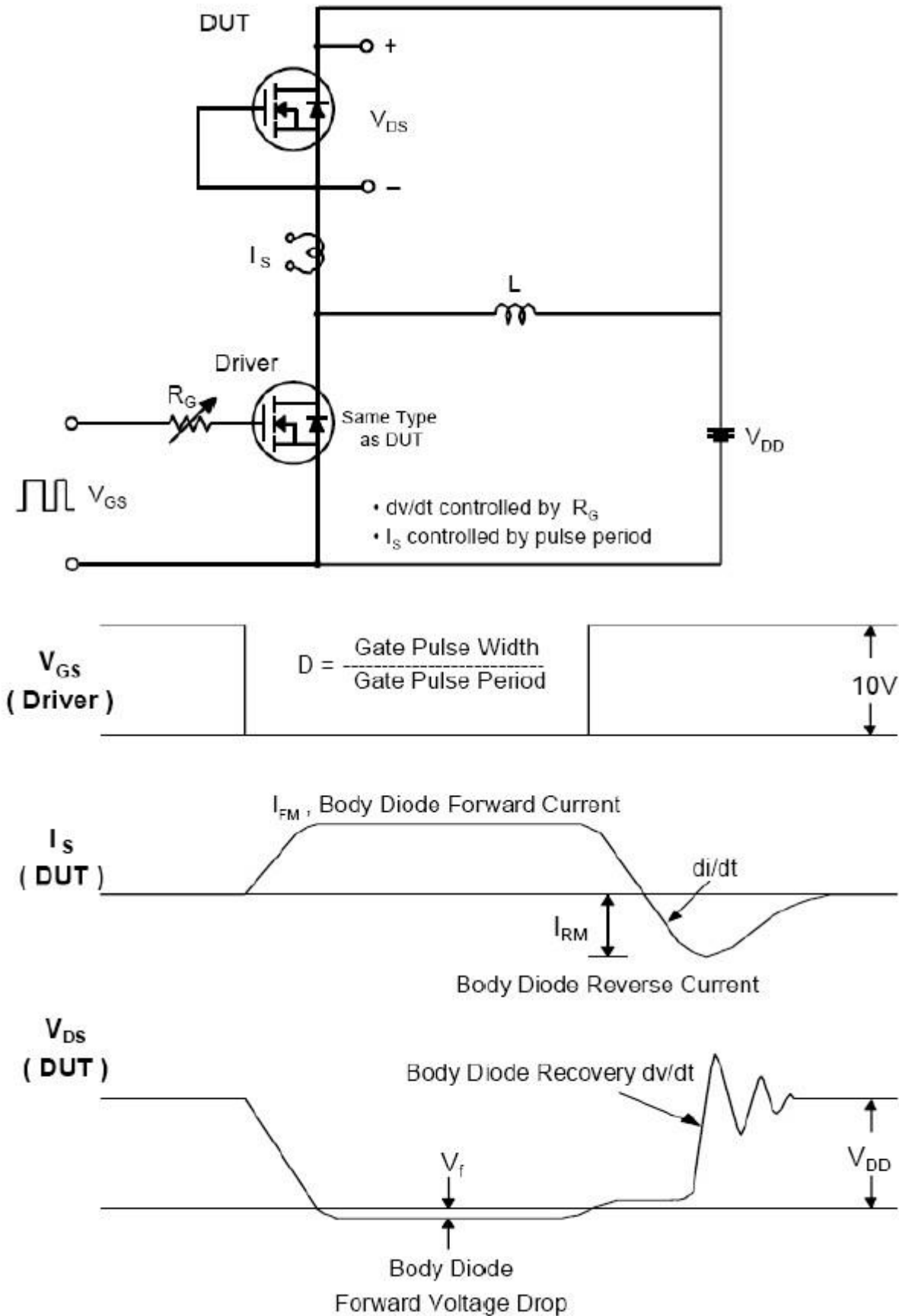


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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