MSF9N20

N-Channel 200-V (D-S) MOSFET

Description

The MSF9N20 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 RDS(on) trench technology
- Low thermal impedance
- Fast switching speed
- RoHS compliant package

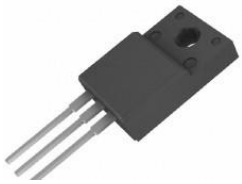
Application

- PoE Power Sourcing Equipment
- PoE Powered Devices
- Telecom DC/DC converters
- White LED boost converters

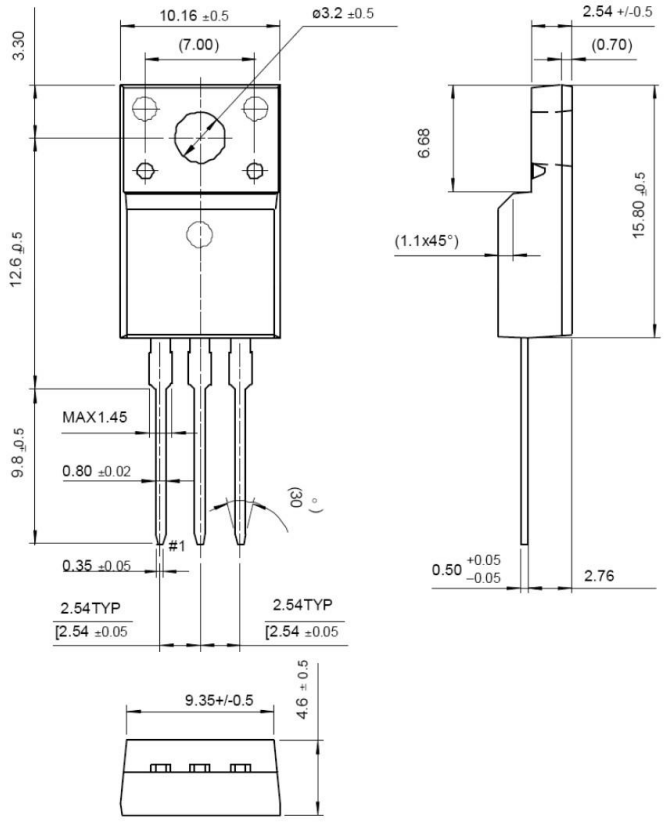
Package type：ITO220-AB

Packing & Order Information

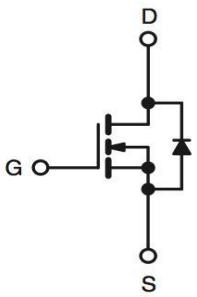
50/Tube ; 1,000/Box



RoHS COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current -Continuous (TC=25°C)	9	A
I_{DM}	Drain Current Pulsed	50	A
I_S	Single Pulsed Avalanche Energy	50	A
P_D	Total Power Dissipation (TC = 25 °C)	60	W
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to +175	°C

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Thermal characteristics (Tc=25°C unless otherwise noted)			
Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Maximum Junction-to-Case	2.5	°C/W
$R_{\theta JA}$	Maximum Junction-to-Ambient	62.5	

Notes

a. Pulse width limited by maximum junction temperature

Static						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D=250μA	1	--	3.5	V
$I_{D(on)}$	On-State Drain Current	V_{GS} = 10 V , V_{DS} = 5 V	34	--	--	A
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS} = 10 V , I_D = 9 A V_{GS} = 5.5 V , I_D = 8.5 A	--	--	400 500	mΩ
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 160 V , V_{GS} = 0 V V_{DS} = 160 V , V_{GS} = 0 V , T_j = 55°C	--	--	1 25	uA
I_{GSS}	Gate-Body Leakage Current, Forward	V_{GS} = 20 V , V_{DS} = 0 V	--	--	±10	uA
gfs	Forward Transcondctance	V_{DS} =15 V , I_D = 10 A	--	20	--	S
VSD	Diode Forward Voltage	V_{GS} = 0 V , I_S = 25 A	--	0.95	--	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DS} = 100 V,I_D = 6 A, V_{GS} = 10 V	--	15.8	--	nC
Q_{gs}	Gate-Source Charge		--	4.2	--	nC
Q_{gd}	Gate-Drain Charge		--	4.4	--	nC
$t_{d(on)}$	Turn-On Time	V_{DD} = 100 V, I_D = 15 A, V_{GS} = 10 V , R_G = 9.1 Ω RL = 10 Ω	--	10.8	--	ns
t_r	Turn-On Time		--	17.6	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	32.2	--	ns
tf	Turn-Off Fall Time		--	30.2	--	ns
C_{ISS}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0MHz	--	807	--	pF
C_{OSS}	Output Capacitance		--	81	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	38	--	pF

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

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■Characteristics Curve

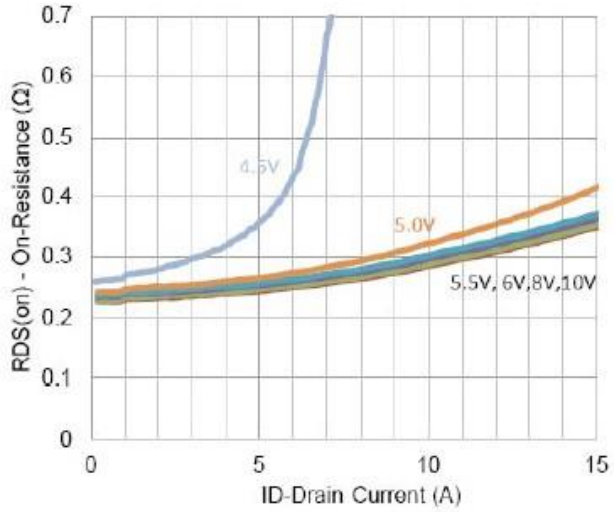

FIG.1-ON REGION CHARACTERISTICS

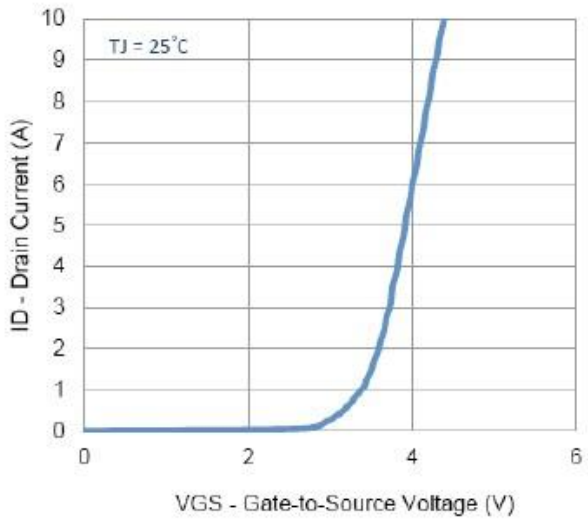

FIG.2-TRANSFER CHARACTERISTICS

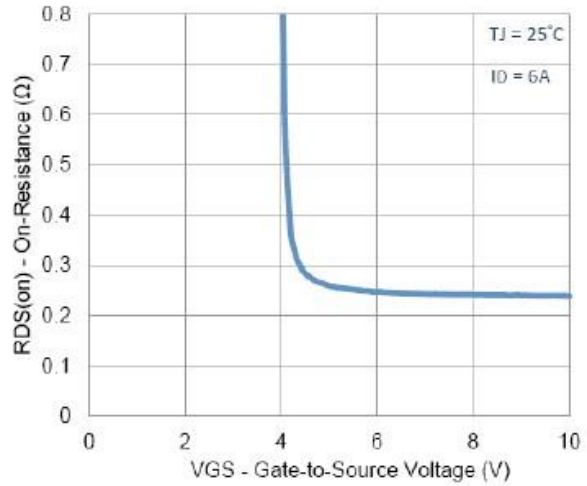

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

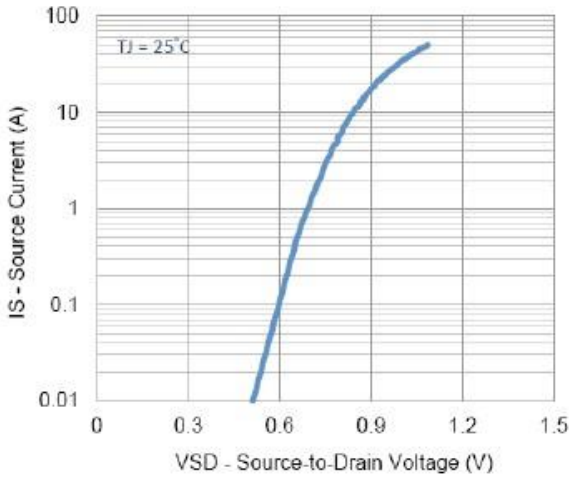

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

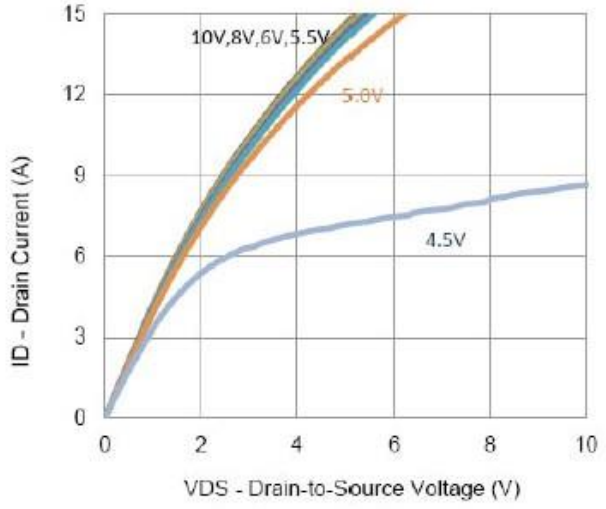

FIG.5-CAPACITANCE CHARACTERISTICS

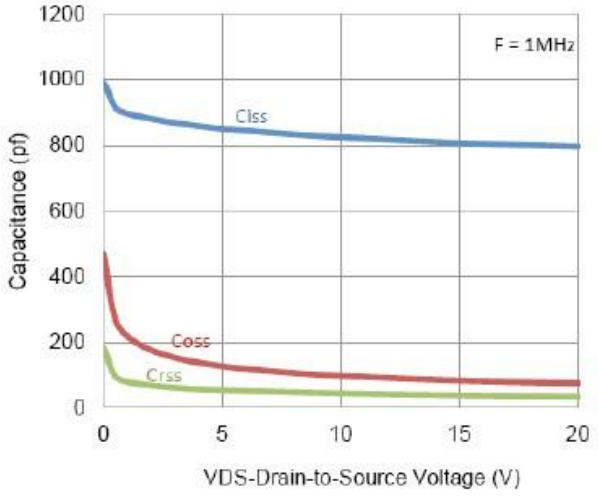

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

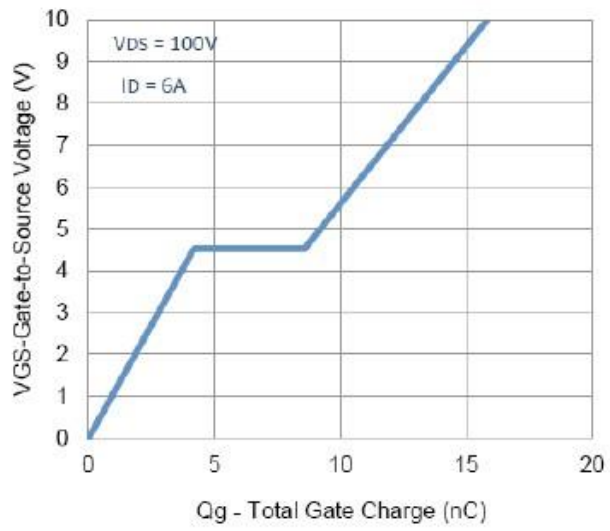

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

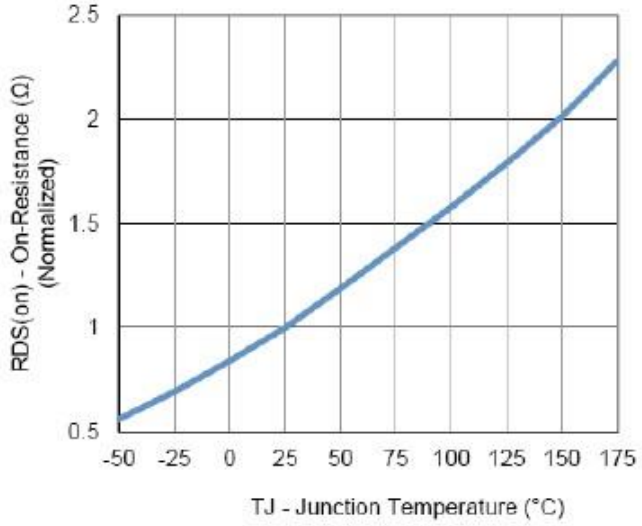

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

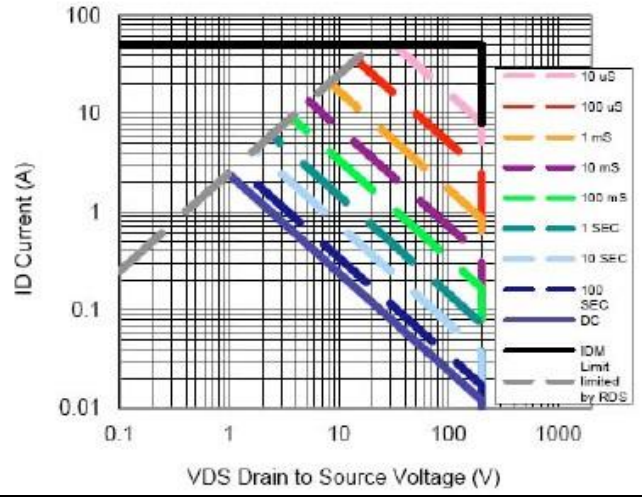

FIG.9-MAXIMUM SAFE OPERATING AREA

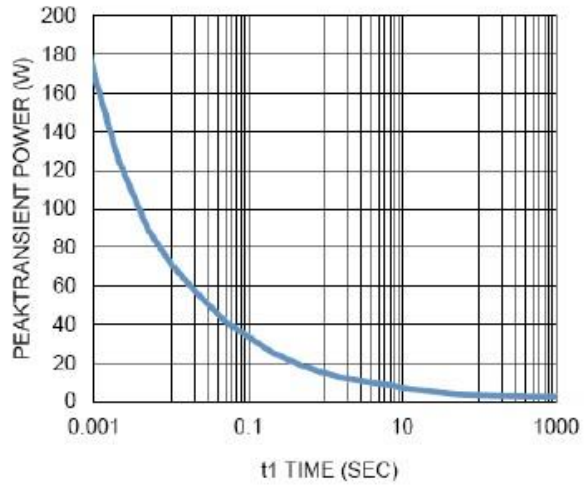

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

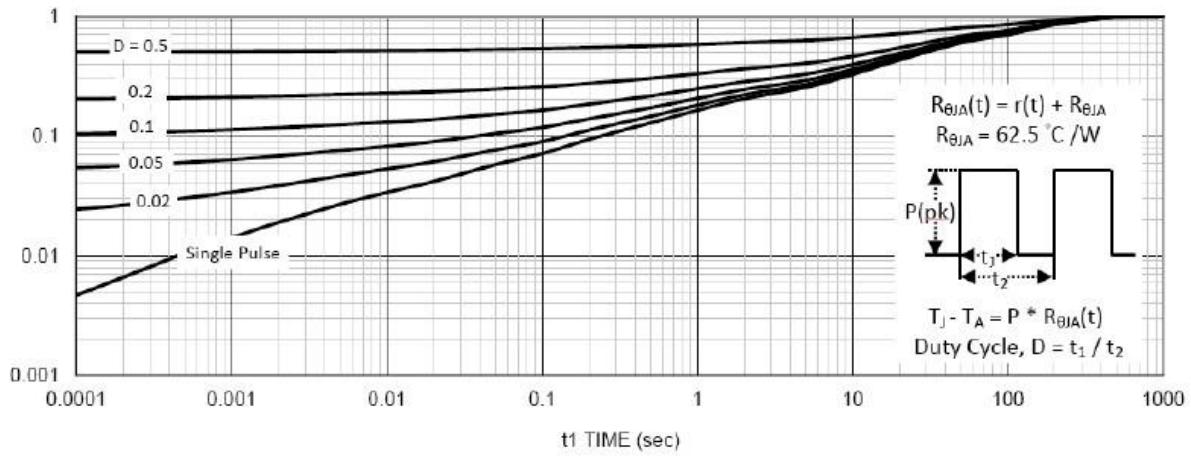

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■Characteristics Test Circuit & Waveform

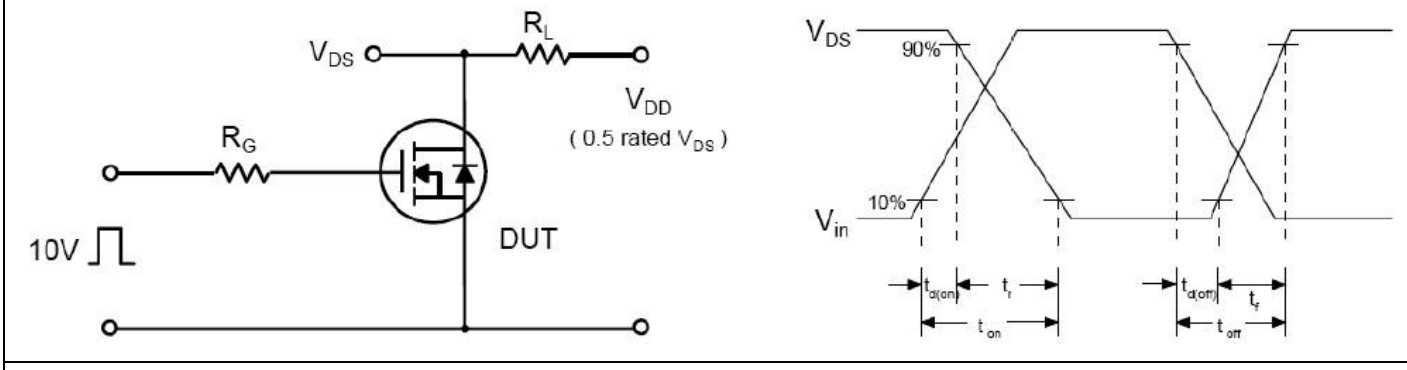

Fig 12. Resistive Switching Test Circuit & Waveforms

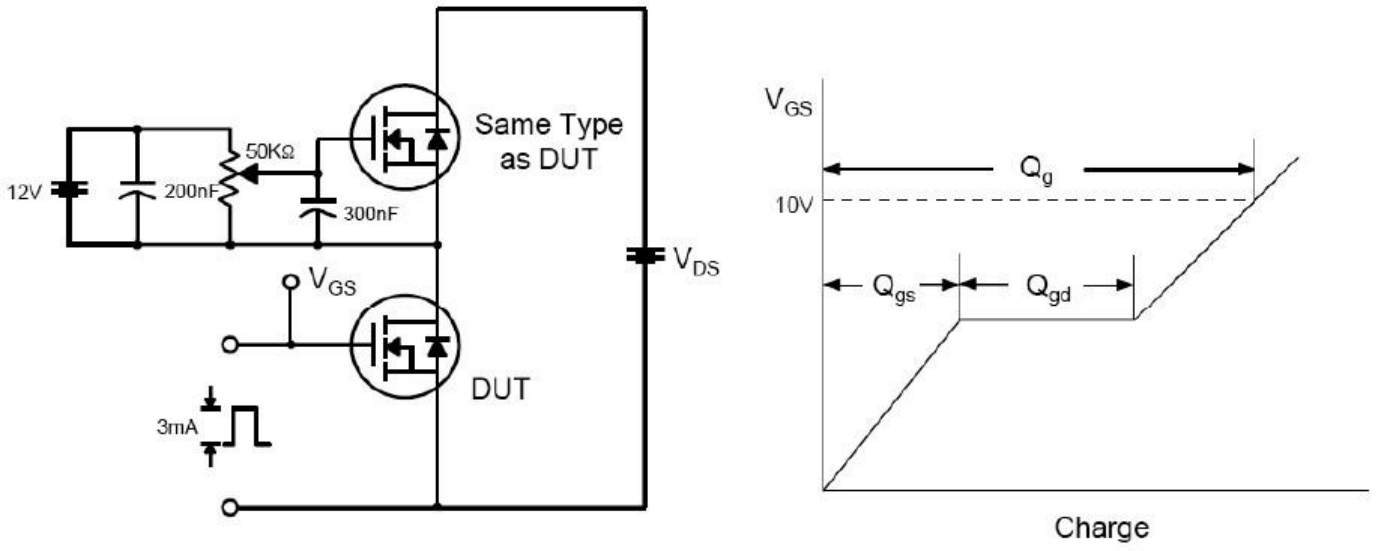

Fig 13. Gate Charge Test Circuit & Waveform

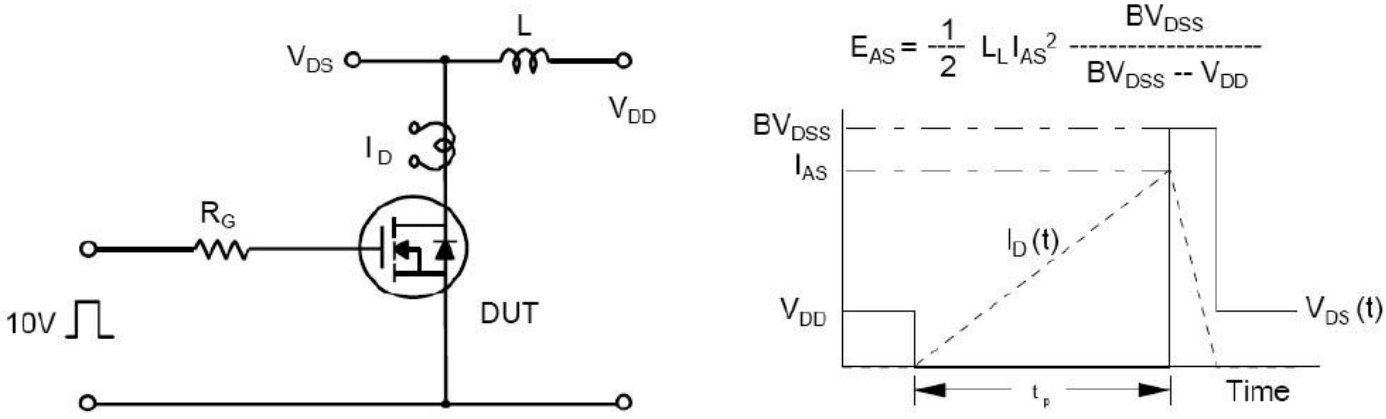

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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