

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 TO-220F 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

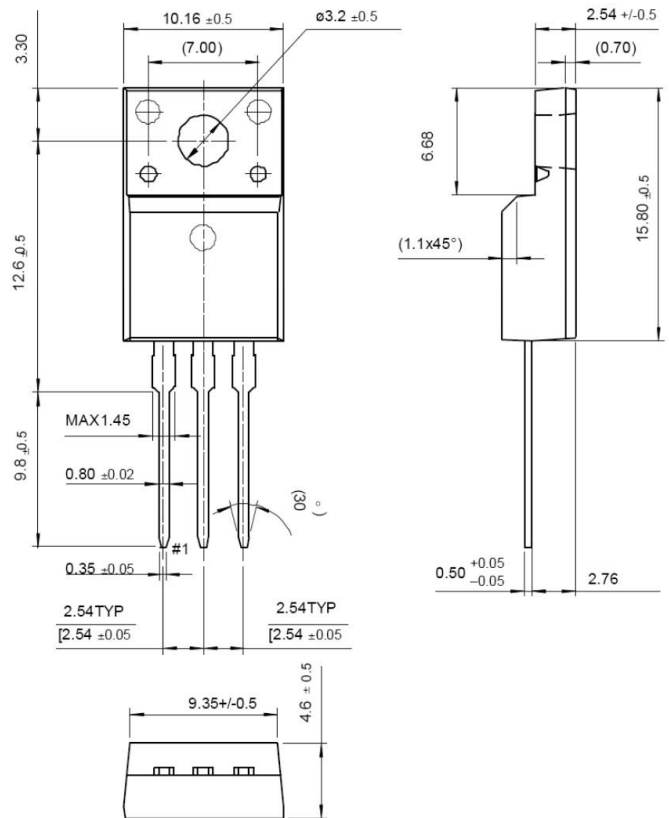
- PoE Power Sourcing Equipment
- PoE Powered Devices
- Telecom DC/DC converters
- White LED boost converters

Packing & Order Information

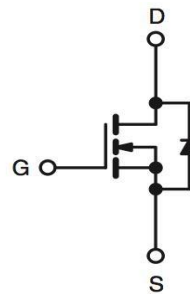
50/Tube ; 1,000/Box



**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 _{θJC}	Maximum Junction-to-Case	2.5	°C/W
R _{θJA}	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	V/°C
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	μA
I _{GSS}	Gate-Body Leakage Current, Forward	V _{GS} = 20 V, V _{DS} = 0 V	--	--	±10	μA
g _{fs}	Forward Transconductance	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
t _f	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

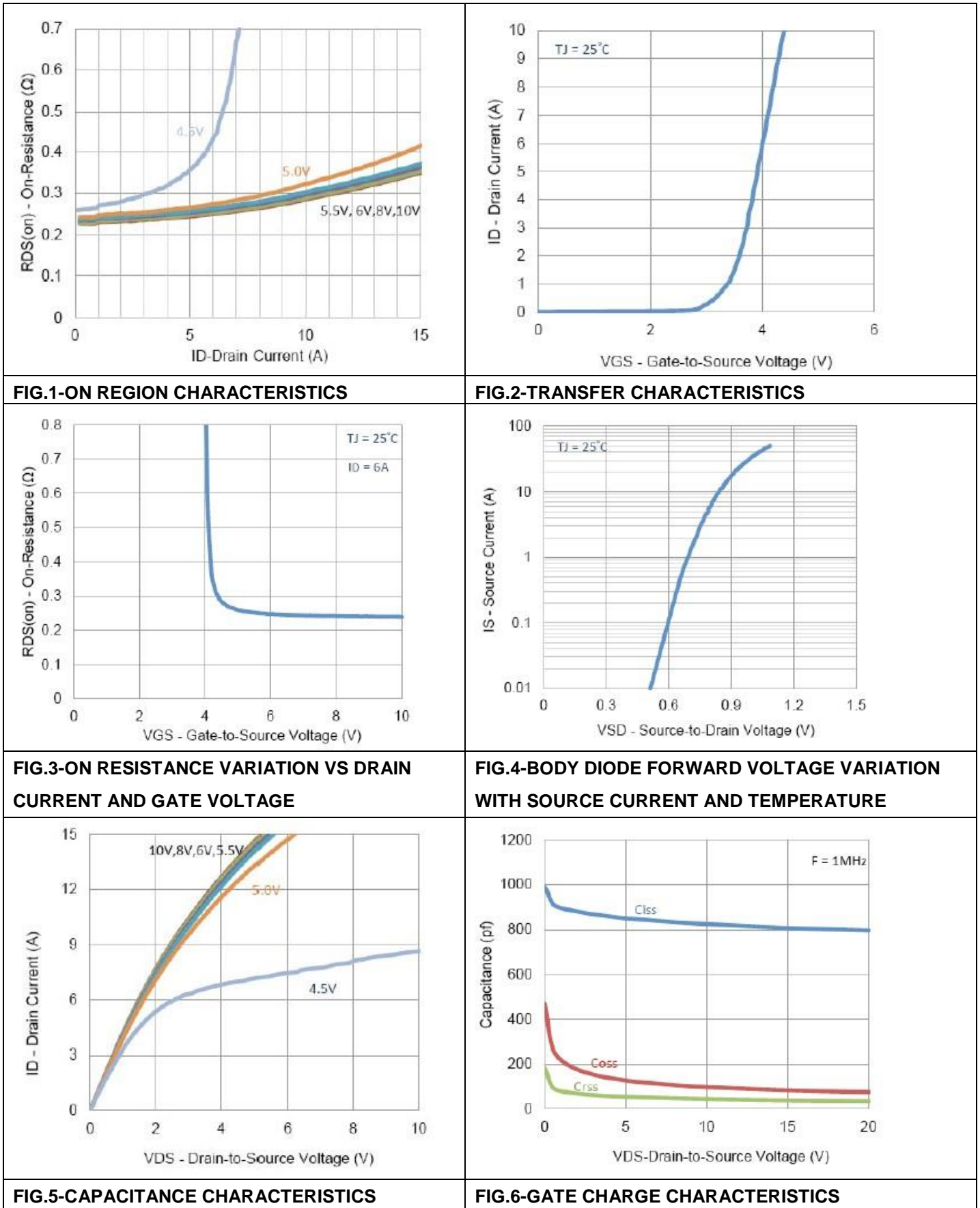
Notes

- a. Pulse test: PW ≤ 300μs duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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■ Characteristics Curve



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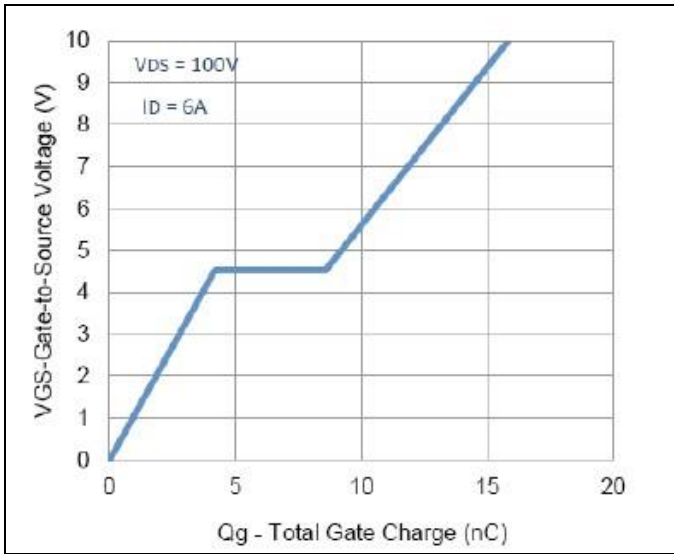


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

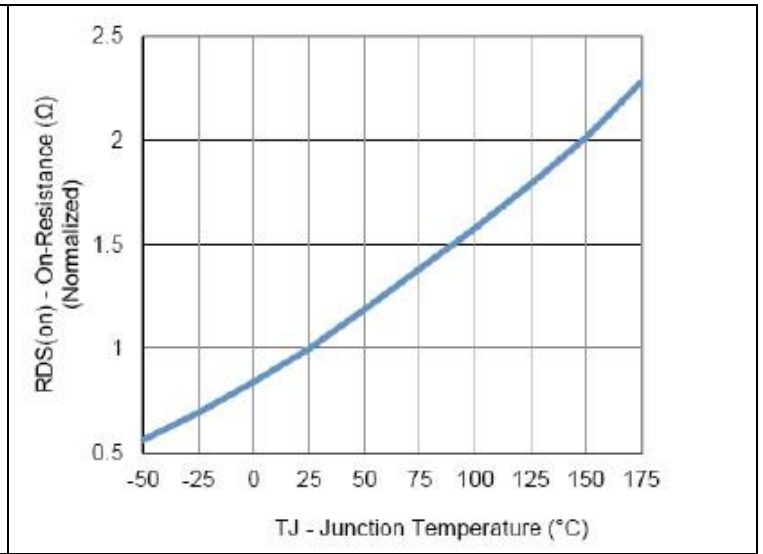


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

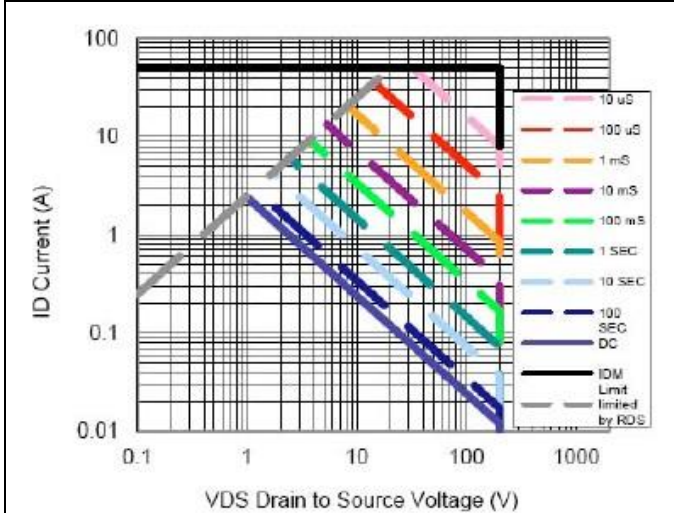


FIG.9-MAXIMUM SAFE OPERATING AREA

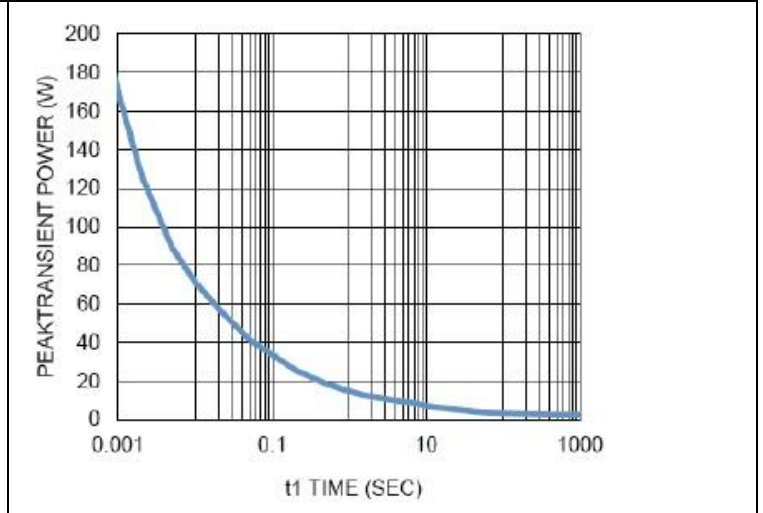


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

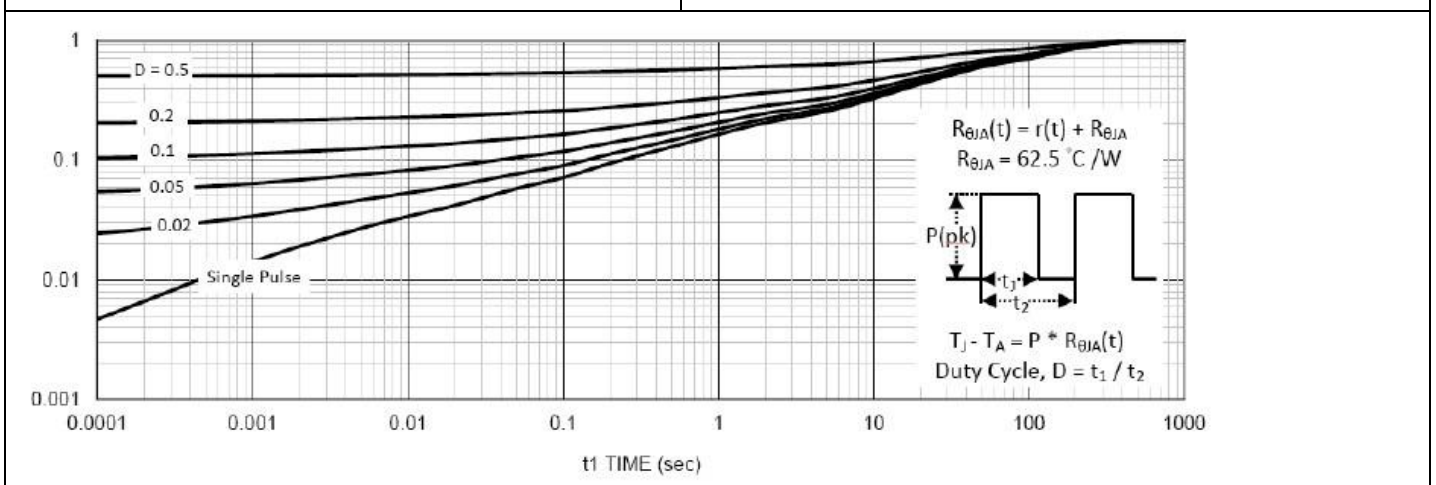


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

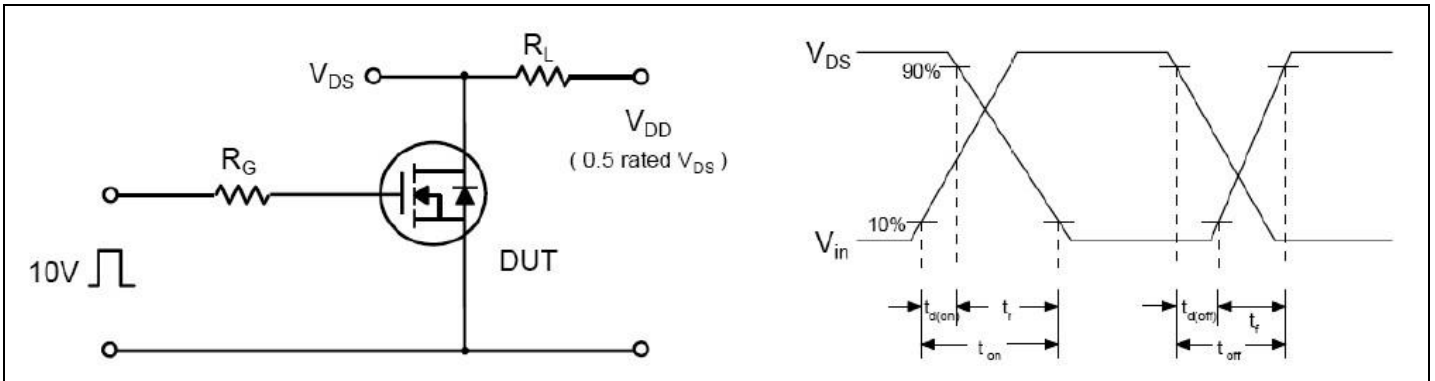


Fig 12. Resistive Switching Test Circuit & Waveforms

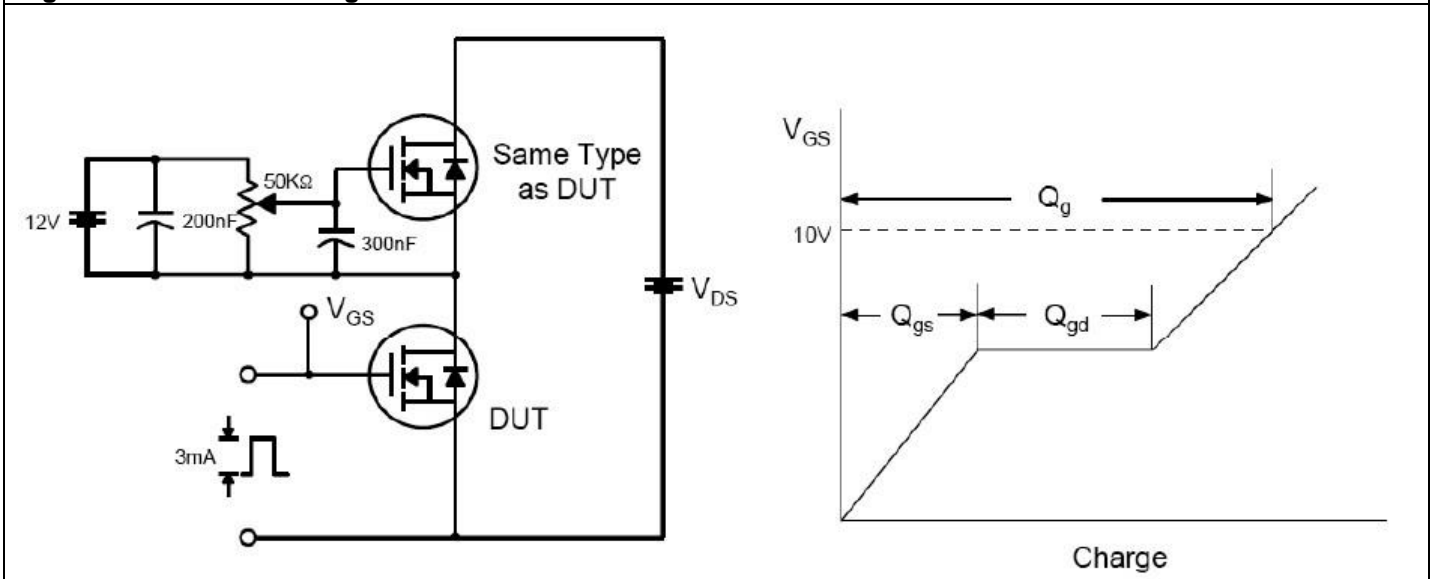


Fig 13. Gate Charge Test Circuit & Waveform

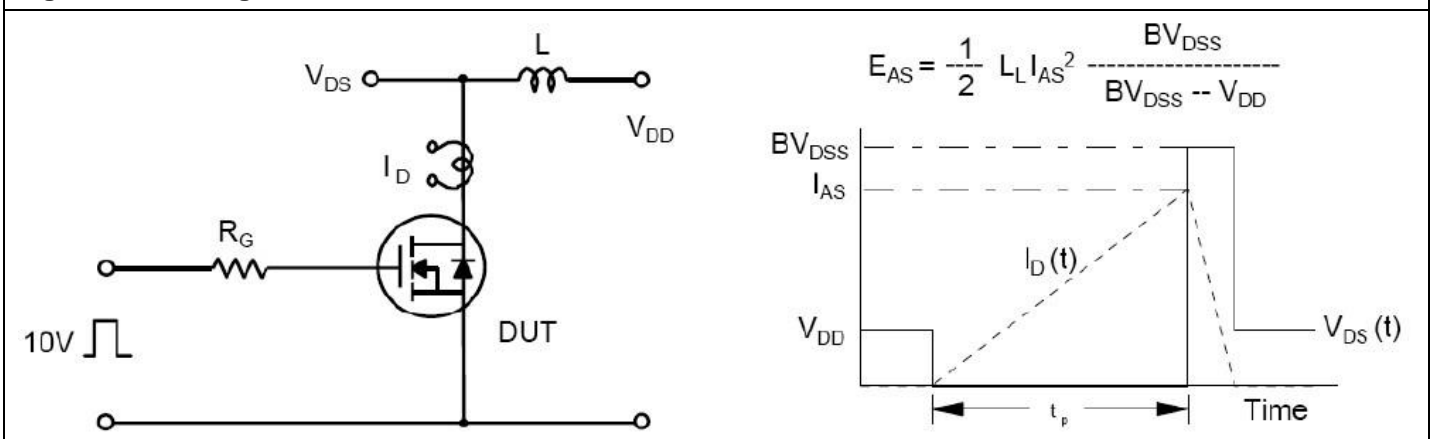


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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