

MSF10N60

N-Channel 600V MOSFET

Description

The MSF10N60 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

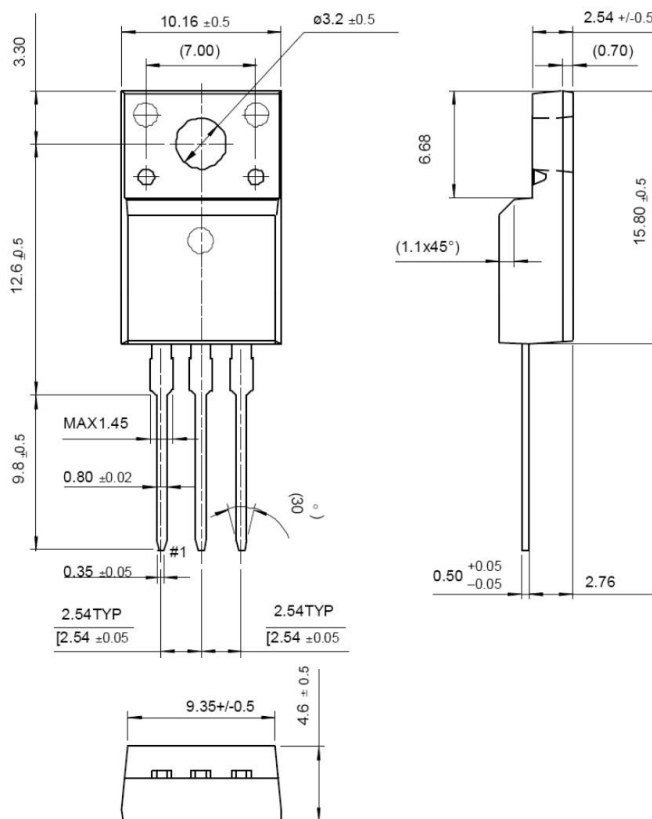
Package type : ITO220-AB

Packing & Order Information

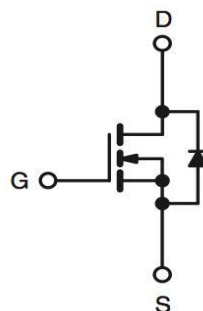
50/Tube ; 1,000/Box



**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)	9.5	A
	Drain Current -Continuous (TC=100°C)	5.7	A
I _{DM}	Drain Current Pulsed	38	A
E _{AS}	Single Pulsed Avalanche Energy	700	mJ
I _{AR}	Avalanche Current	9.5	A
E _{AR}	Repetitive Avalanche Energy	15.6	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)	50	W
	Power Dissipation (TC=100°C)	0.38	W/°C
T _J ,T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

NOTE:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=9.5A, V_{DD}=50V, R_G=25Ω, Starting T_J =25°C
3. I_{SD}≤9.5A, di/dt≤300A/μs, V_{DD}≤B_VD_{SS}, Starting T_J =25 °C
4. Pulse test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating temperature

On 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 =4.75A	--	0.6	0.73	mΩ

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
B _V D _{SS}	Drain-Source Breakdown Voltage	V _{GS} =0 V , I _D =250μA	600	--	--	V
ΔB _V D _{SS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Referenced to 25°C	--	0.70	--	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V , V _{GS} = 0 V V _{DS} =480V , T _J = 125°C, V _{GS} = 0 V	--	--	1 10	uA
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	--	1570	2040	pF
C _{OSS}	Output Capacitance		--	166	215	pF
C _{RSS}	Reverse Transfer Capacitance		--	18	24	pF
t _{d(on)}	Turn-On Time	V _{DS} =300 V, I _D =9.5A, R _G =25Ω	--	23	55	ns
t _r	Turn-On Time		--	69	150	ns
t _{d(off)}	Turn-Off Delay Time		--	144	300	ns
t _f	Turn-Off Fall Time		--	77	165	ns

MSF10N60

N-Channel 600V MOSFET

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS}=480V, I_D=9.5A,$ $V_{GS}=10V$	--	44	57	nC
Q_{gs}	Gate-Source Charge		--	6.7	--	
Q_{gd}	Gate-Drain Charge		--	18.5	--	

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	9.5	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	38	
V_{SD}	Source-Drain Diode Forward Voltage	$I_S=9.5A, V_{GS}=0V$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$I_S=9.5A, V_{GS}=0V$	--	420	--	ns
Q_{rr}	Reverse Recovery Charge	$diF/dt=100A/\mu s$	--	4.2	--	nC

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■ Characteristics Curve

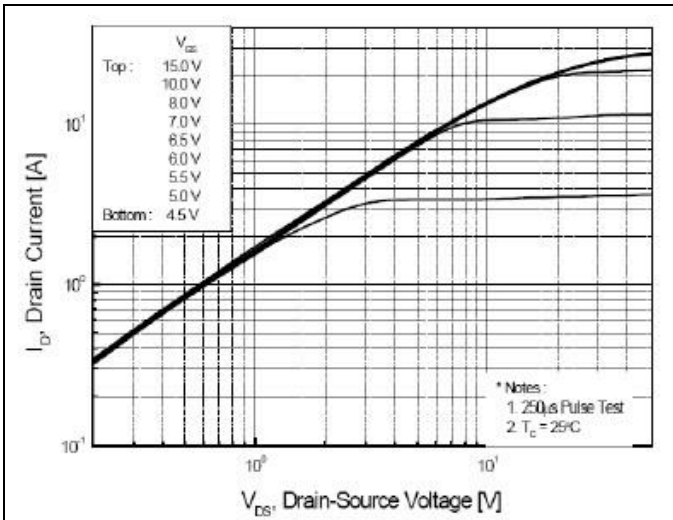


FIG.1-ON REGION CHARACTERISTICS

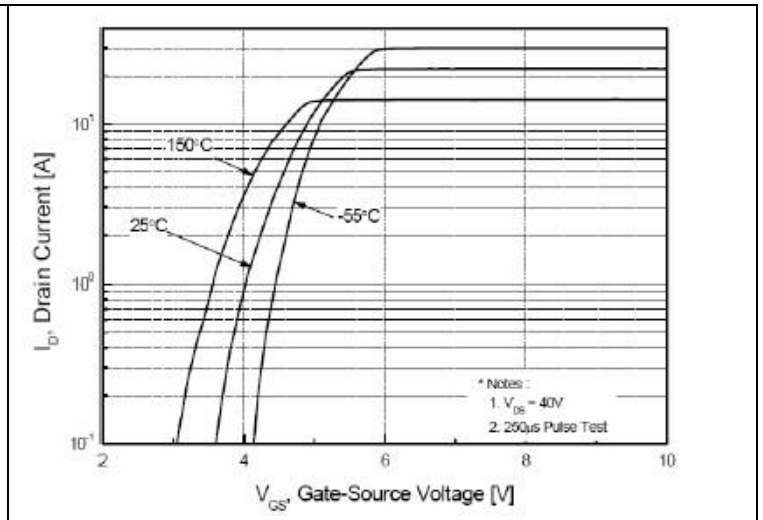


FIG.2-TRANSFER CHARACTERISTICS

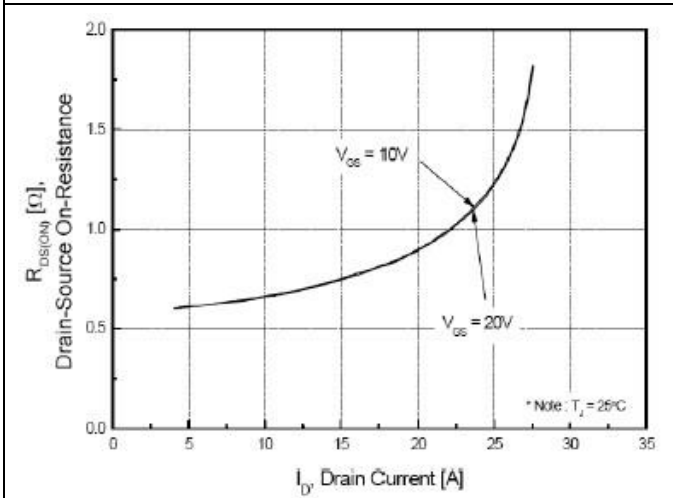


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

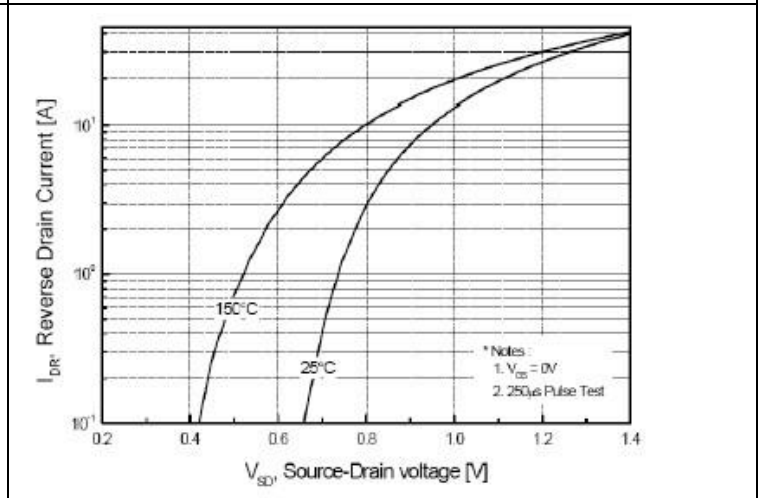


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

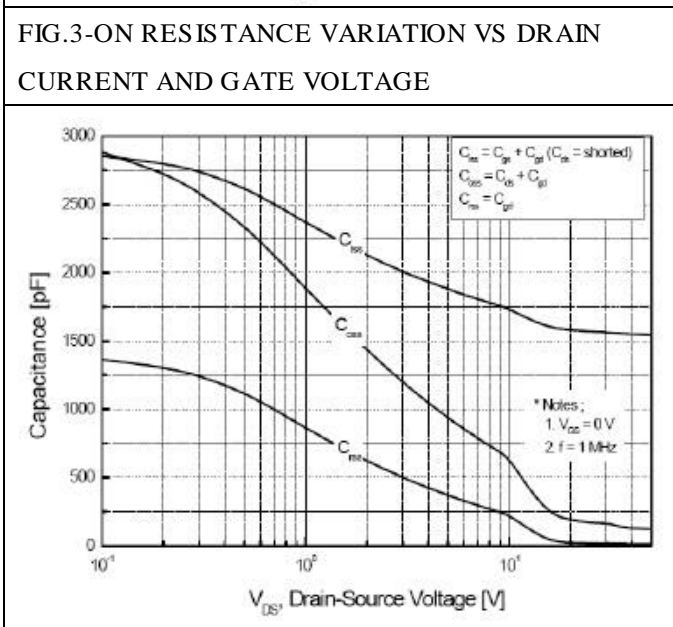


FIG.5-CAPACITANCE CHARACTERISTICS

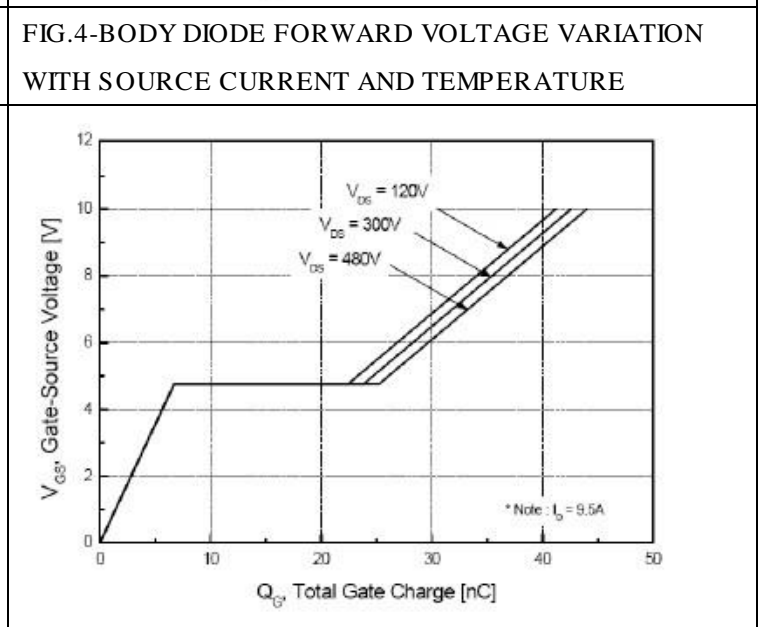


FIG.6-GATE CHARGE CHARACTERISTICS

MSF10N60

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■ Characteristics Curve

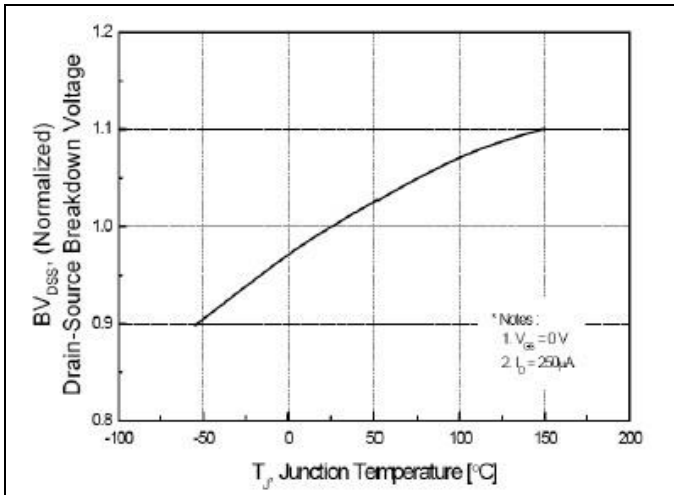


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

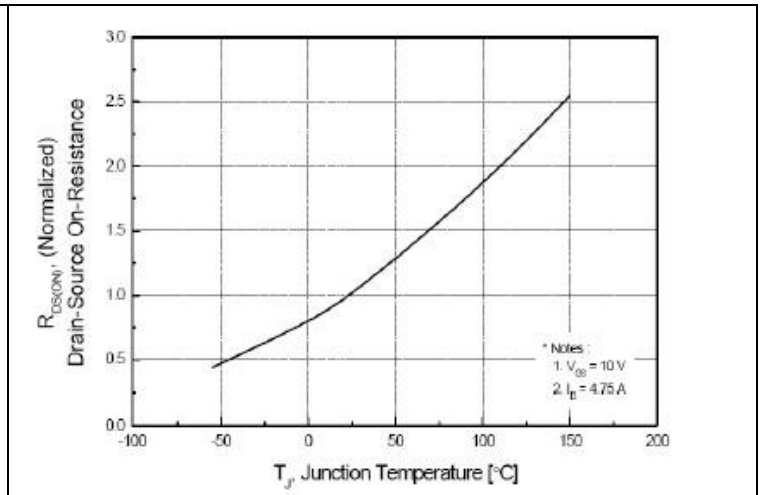


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

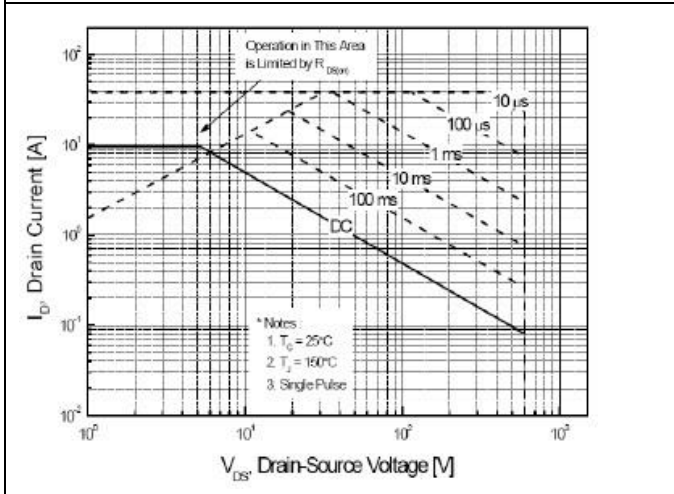


FIG.9-MAXIMUM SAFE OPERATING AREA

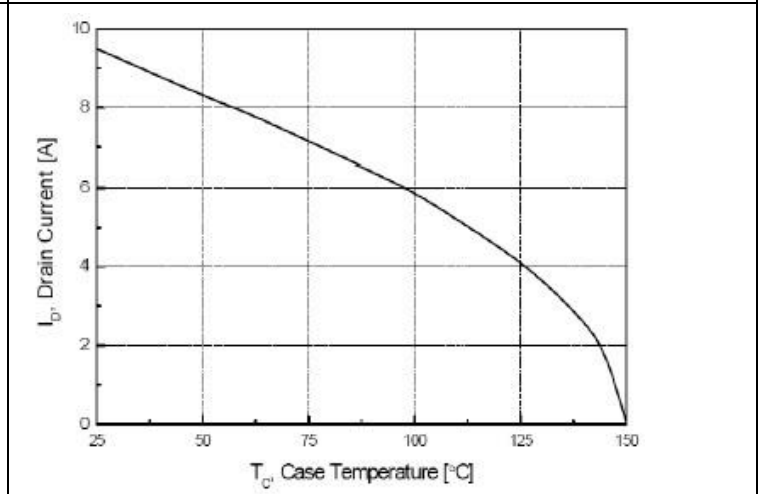


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

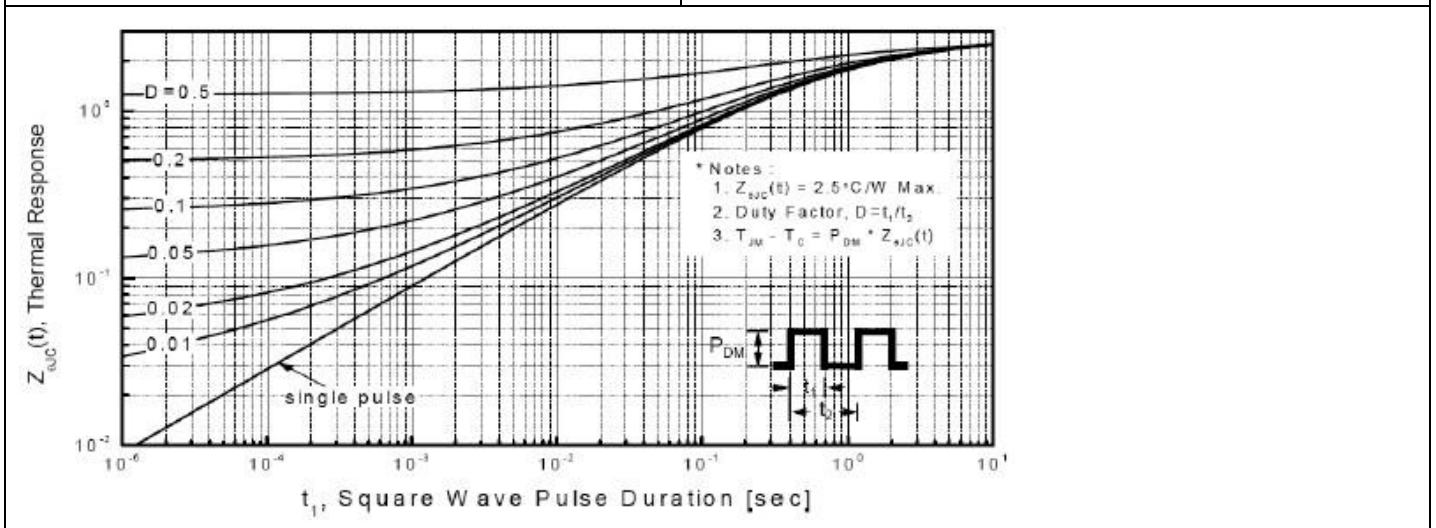


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

MSF10N60

N-Channel 600V MOSFET

■ Characteristics Test Circuit & Waveform

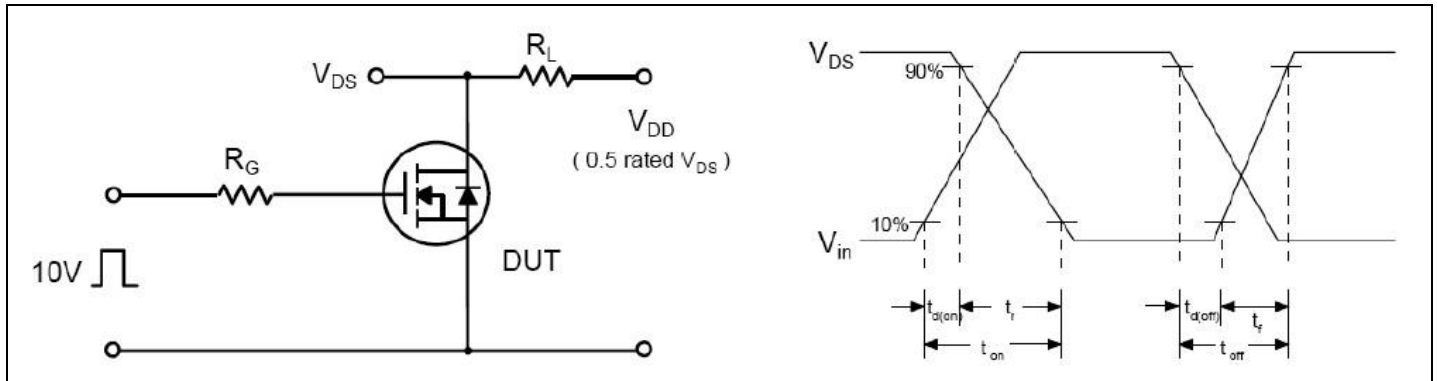


Fig 12. Resistive Switching Test Circuit & Waveforms

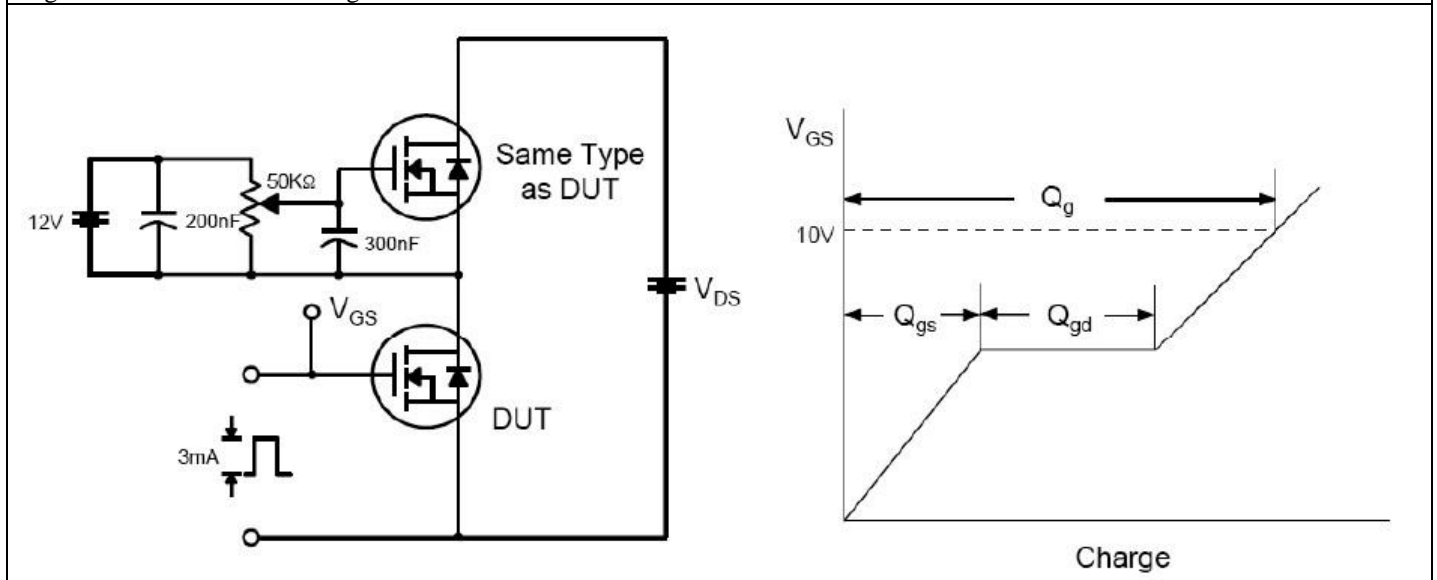


Fig 13. Gate Charge Test Circuit & Waveform

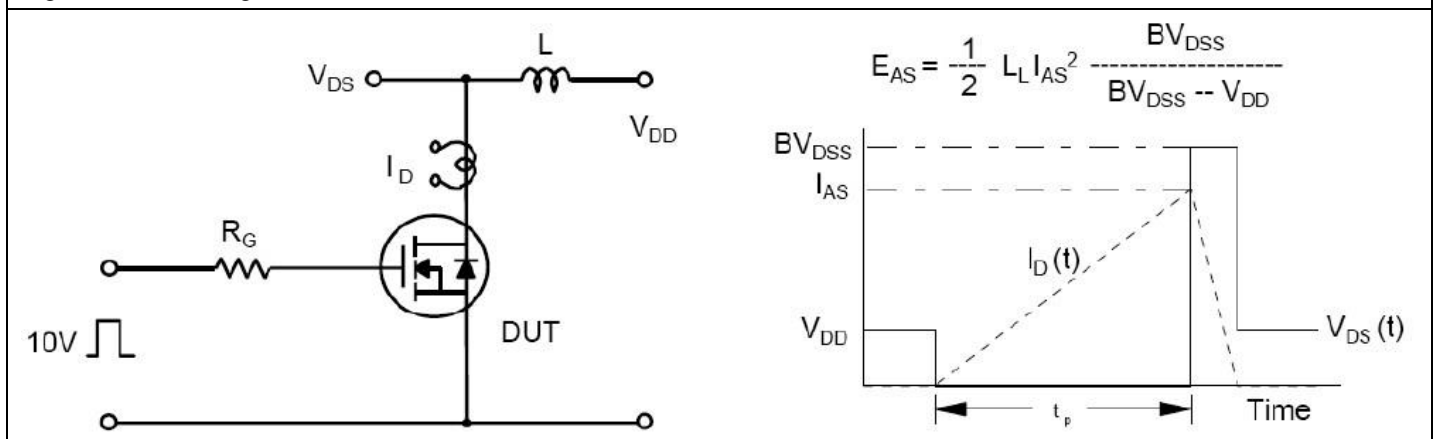


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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