

MSF7N60

N-Channel 600V MOSFET

Description

The MSF7N60 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

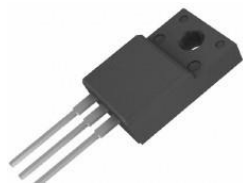
Application

- Open Framed Power Supply
- Adapter
- STB

Package type : ITO220-AB

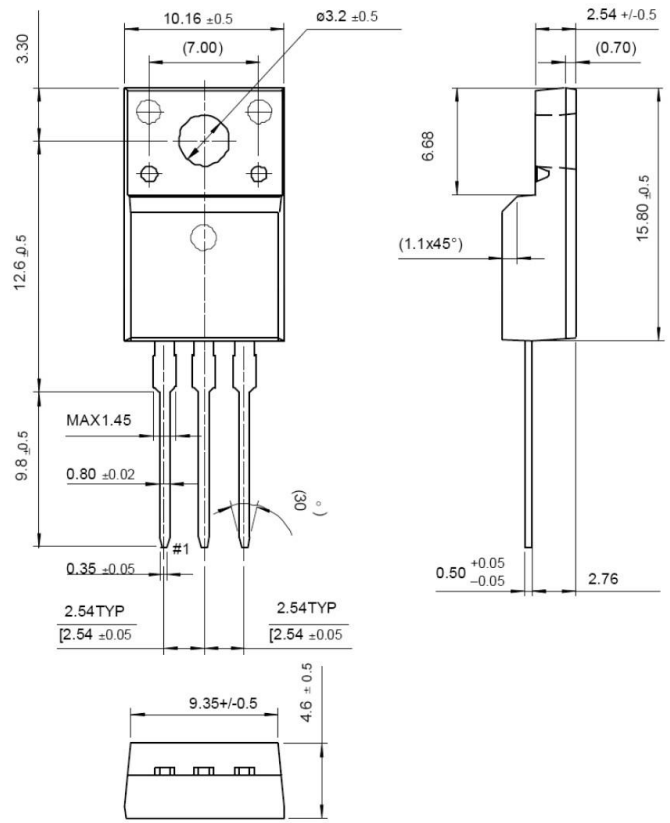
Packing & Order Information

50/Tube ; 1,000/Box

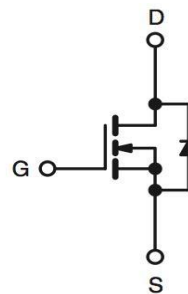


RoHS
COMPLIANT

HALOGEN
FREE
Available



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	600	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)	4.4	A
I _{DM}	Drain Current Pulsed	21	A
E _{AS}	Single Pulsed Avalanche Energy	48	mJ
I _{AR}	Avalanche Current	7.0	A

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Absolute Maximum Ratings			
Symbol	Parameter	Value	Unit
E_{AR}	Repetitive Avalanche Energy	3.1	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns
P_D	Total Power Dissipation (TC = 25 °C)	31	W
	Derating Factor above 25 °C	0.25	W/°C
T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 10 seconds	300	°C
TPKG	Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
T_J	Storage Temperature	150	°C

Note:

1. Repetitive rating; pulse width limited by maximum junction temperature.
2. $I_{AS} \leq 7A$, $V_{DD} = 50V$, $L = 7mH$, $V_G = 10V$, starting $T_J = +25^\circ C$.
3. $I_{SD} \leq 7A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BVDSS$, starting $T_J = +25^\circ C$.

Thermal characteristics			
Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Junction-to-Case	2.6	°C/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	

Off Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2.0	--	4.0	V
* $R_{DS(ON)}$	$V_{GS} = 10 V$, $I_D = 3.5 A$	--	0.85	1.2	Ω
BV_{DSS}	$V_{GS} = 0 V$, $I_D = 250\mu A$	600	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	$I_D = 250\mu A$, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	$V_{DS} = 600 V$, $V_{GS} = 0 V$	--	--	1	μA
	$V_{DS} = 480 V$, $V_C = 125^\circ C$	--	--	10	
I_{GSS}	$V_{GS} = \pm 30$	--	--	± 100	nA

Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	$V_{DS} = 25 V$, $V_{GS} = 0 V$, $f = 1.0MHz$	--	1482	--	pF
C_{OSS}		--	121.7	--	pF
C_{RSS}		--	14	--	pF

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Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
Q_g	$V_{DG} = 300\text{ V}, I_D = 7\text{ A},$ $V_{GS} = 10\text{ V}$	--	28	37	nC
Q_{gs}		--	4.7	--	nC
Q_{gd}		--	11	--	nC
$t_{d(on)}$	$V_{DS} = 400\text{ V}, I_D = 7\text{ A},$ $R_G = 25\ \Omega, V_{GS} = 10\text{ V}$	--	10	30	ns
t_r		--	35	80	ns
$t_{d(off)}$		--	45	100	ns
t_f		--	40	90	ns

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	$V_G = V_D = 0$	--	--	7	A
I_{SM}	$V_S = 13\text{ V}$	--	--	28	
V_{SD}	$I_S = 7\text{ A}, V_{GS} = 0\text{ V}$	--	--	1.4	V
t_{rr}	$I_F = 7\text{ A}, V_{GS} = 0\text{ V}, dI_F/dt = 100\text{ A}/\mu\text{s}$	--	350	--	ns
Q_{rr}		--	3.3	--	uC

*Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

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■ Characteristics Curve

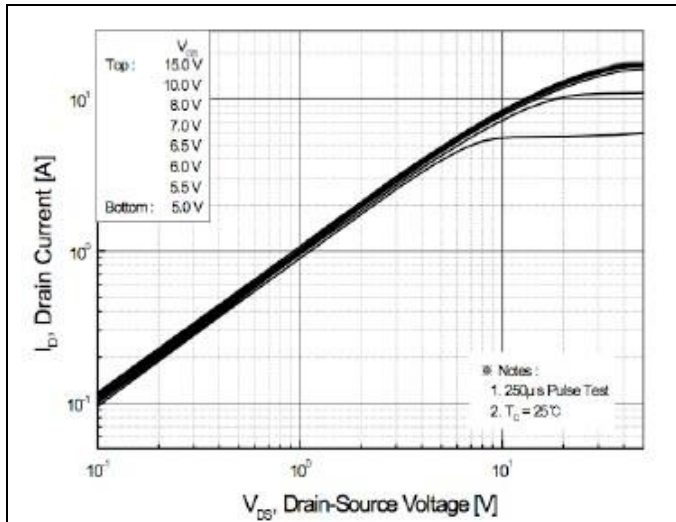


FIG.1-ON REGION CHARACTERISTICS

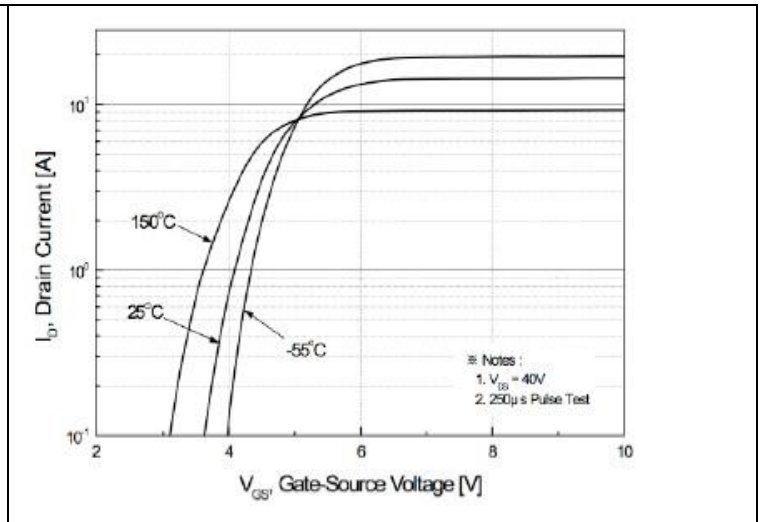


FIG.2-TRANSFER CHARACTERISTICS

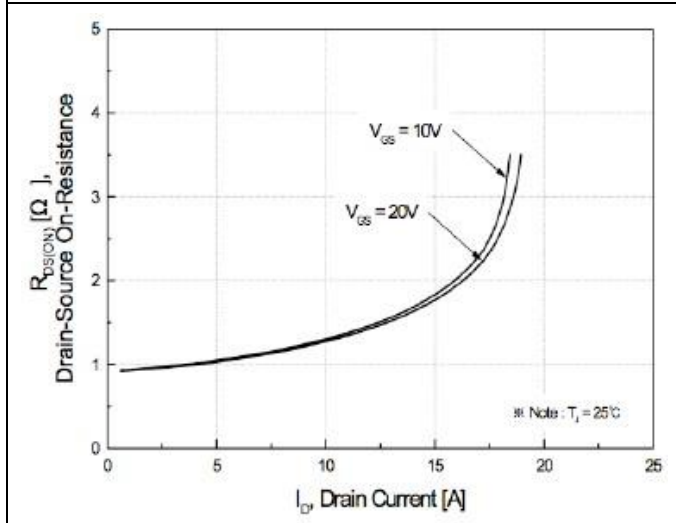


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

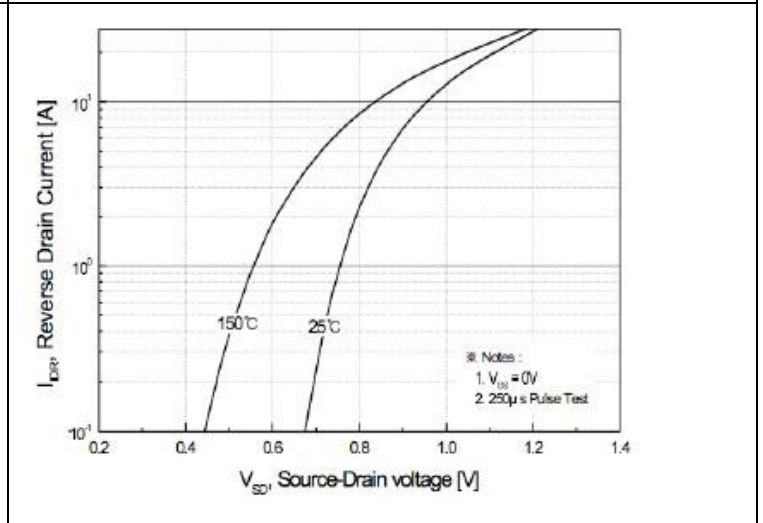


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

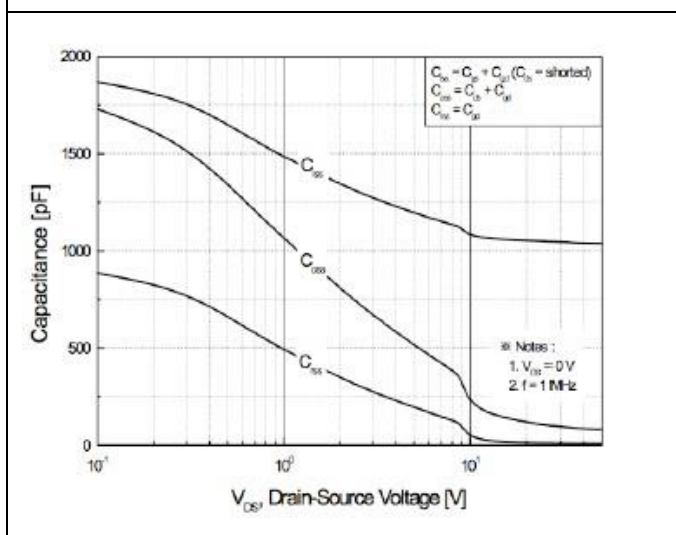


FIG.5-CAPACITANCE CHARACTERISTICS

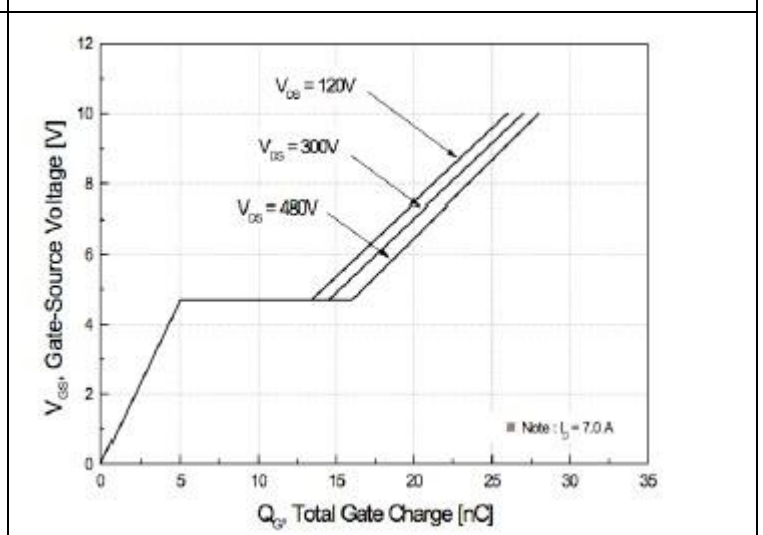


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve

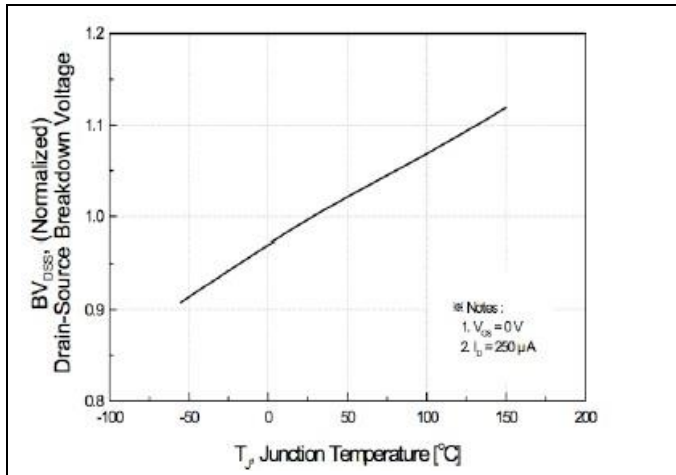


FIG. 7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

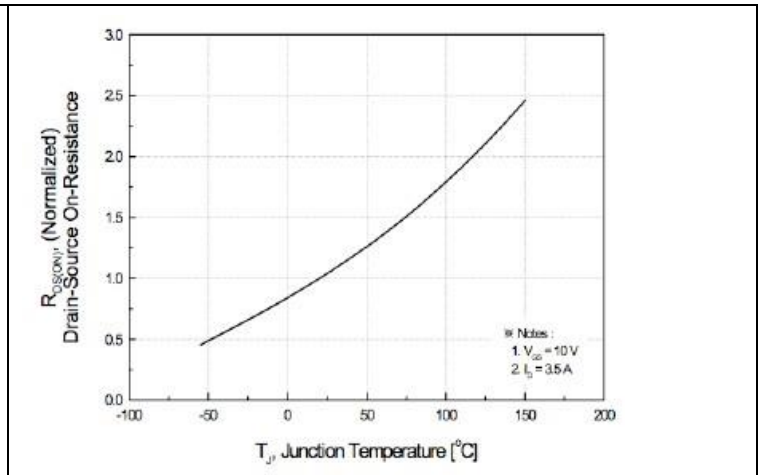


FIG. 8-ON-RESISTANCE VARIATION VS TEMPERATURE

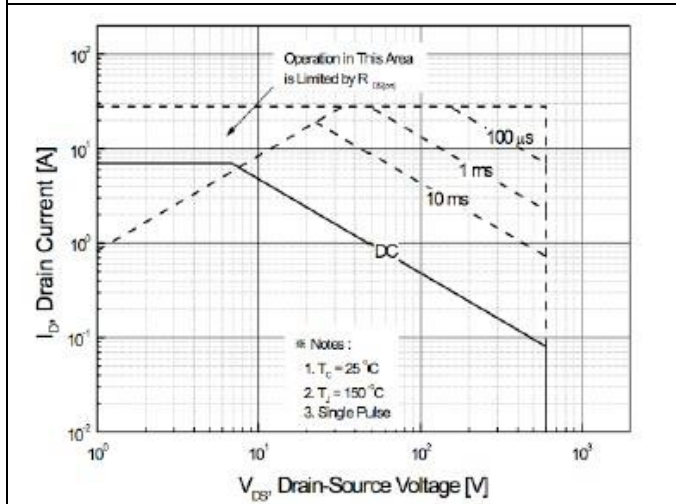


FIG. 9-MAXIMUM SAFE OPERATING AREA

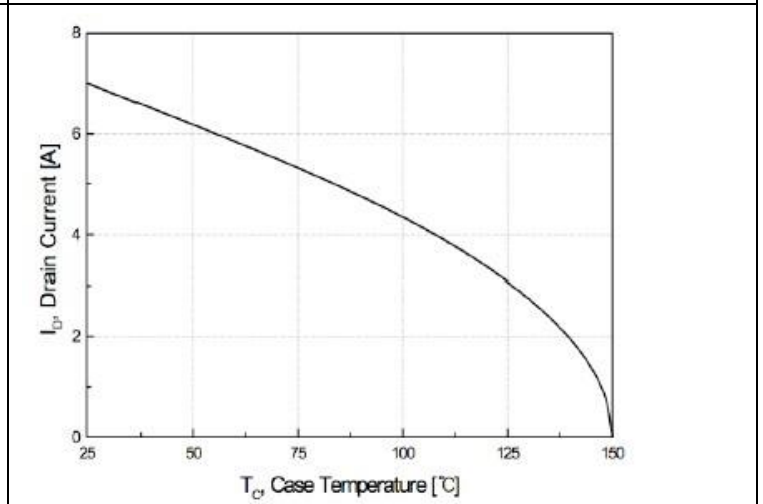


FIG. 10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

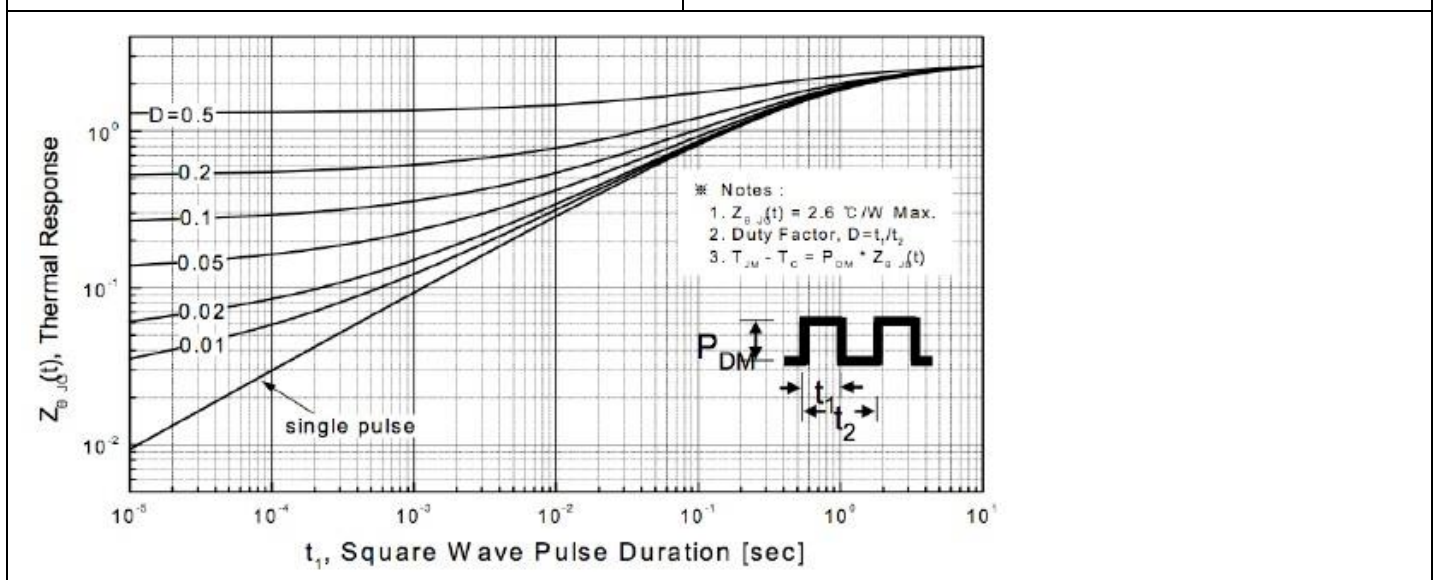


FIG. 11-TRANSIENT THERMAL RESPONSE CURVE

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■ Characteristics Test Circuit & Waveform

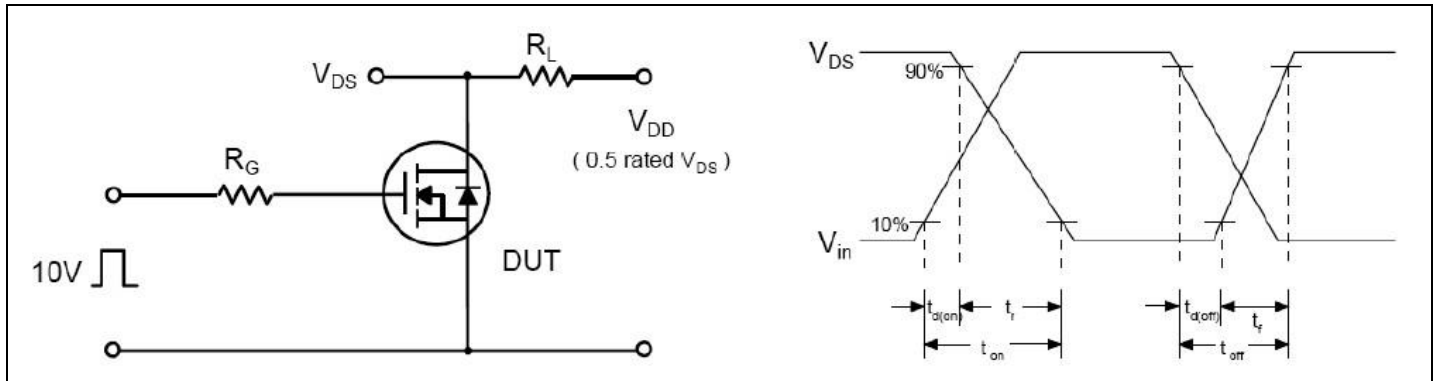


Fig 12. Resistive Switching Test Circuit & Waveforms

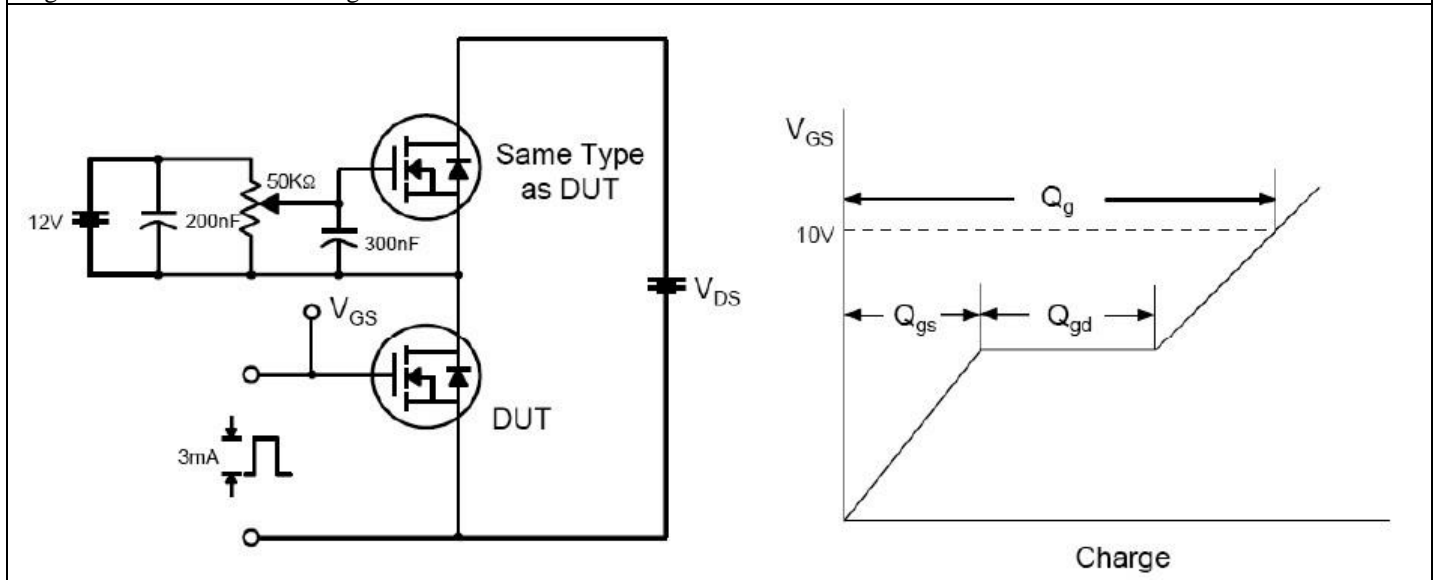


Fig 13. Gate Charge Test Circuit & Waveform

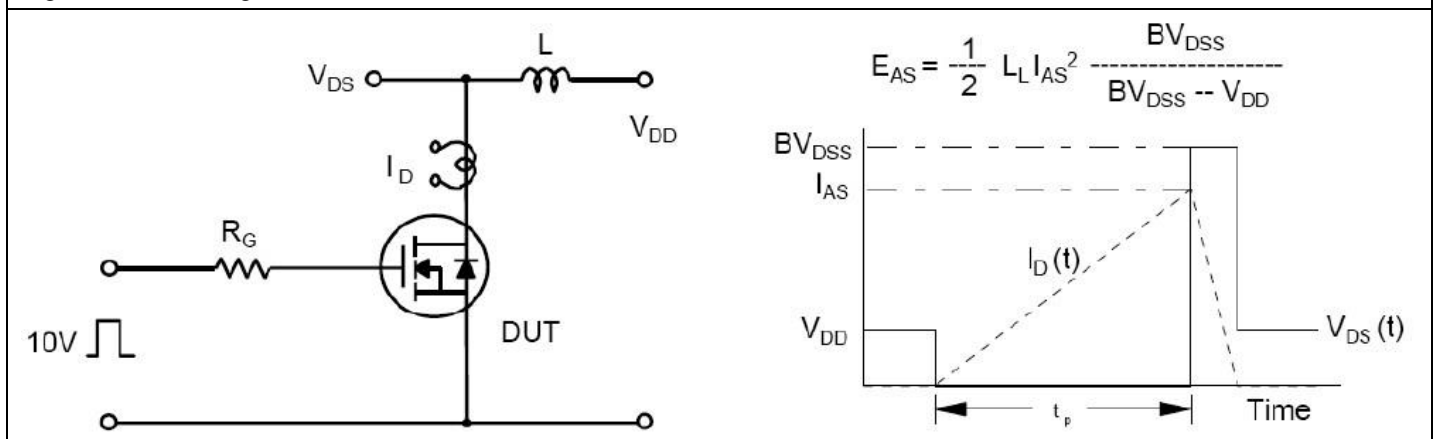


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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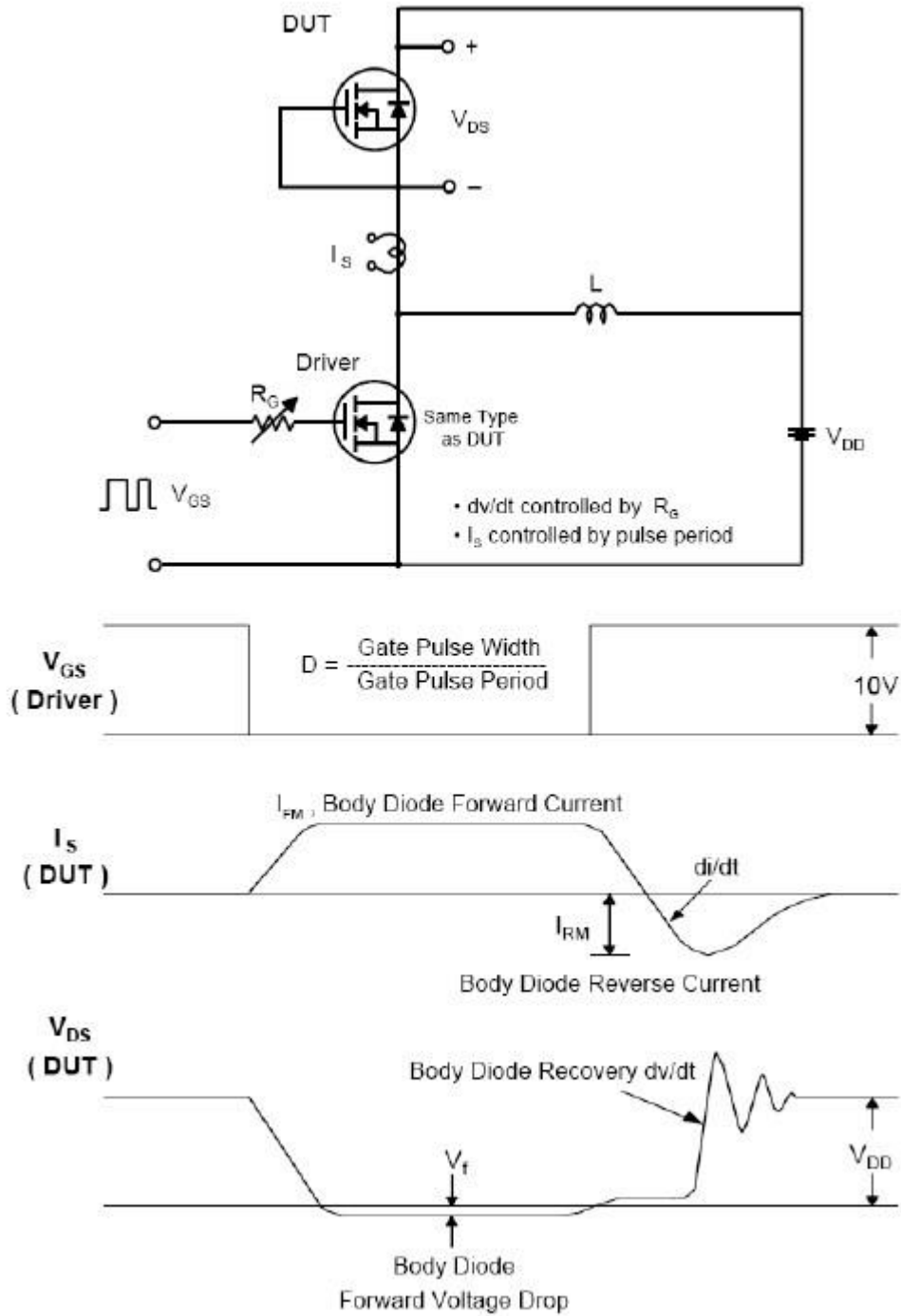


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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