

# MSF11N70

## N-Channel 700V MOSFET

### Description

The MSF11N70 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

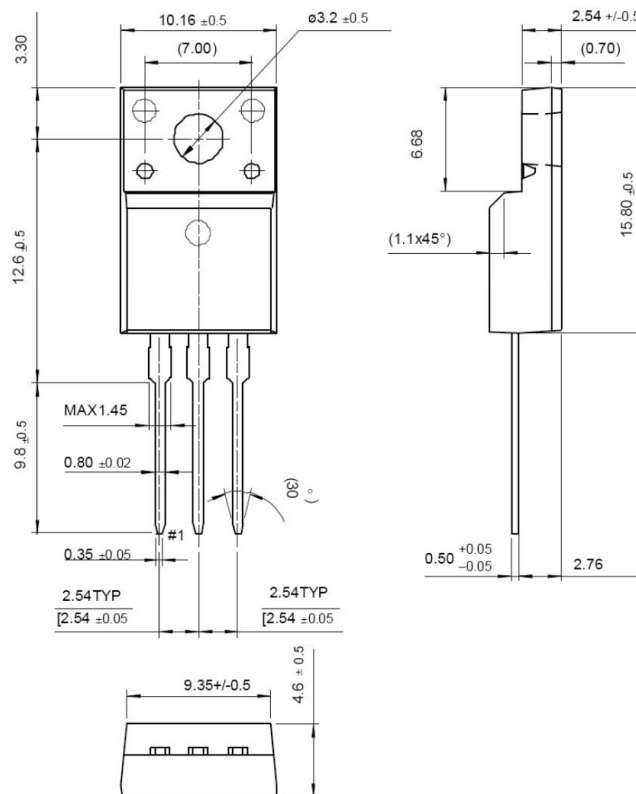
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package available

### Packing & Order Information

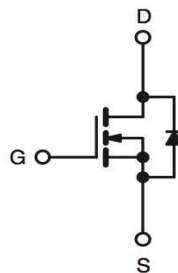
50/Tube ; 1,000/Box



**RoHS  
COMPLIANT**



Graphic symbol



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-Source Voltage	700	V
V <sub>GS</sub>	Gate-Source Voltage	±30	V
I <sub>D</sub>	Continuous Drain Current @ TC=25°C	1.1	A
	Continuous Drain Current @ TC=100°C	6.5	A
I <sub>DM</sub>	Pulsed Drain Current	40	A
I <sub>AR</sub>	Avalanche Current	10	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy	658	mJ
E <sub>AR</sub>	Repetitive Avalanche Energy	17.8	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns

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#### Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
P <sub>D</sub>	Power Dissipation (TC=25°C)	35	W
	Power Dissipation (TC=100°C)	0.30	W/°C
T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to +150	°C

#### NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 15mH, I<sub>AS</sub> =9.0A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25Ω , Starting T<sub>J</sub> = 25°C
3. I<sub>SD</sub> ≤ 11.0A, di/dt ≤ 200A/us, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

#### Static Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V <sub>GS</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0		4.5	V
*R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V , I <sub>D</sub> = 5.0 A	--	0.9	1.2	mΩ
BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V , I <sub>D</sub> = 250μA	700	--	--	V
ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	I <sub>D</sub> = 250μA, Referenced to 25°C		0.6		
I <sub>DSS</sub>	V <sub>DS</sub> = 700 V , V <sub>GS</sub> = 0 V	--	--	1	uA
	V <sub>DS</sub> = 560 V , V <sub>GS</sub> = 0 V , T <sub>J</sub> = 125°C			10	
I <sub>GSSF</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			100	nA
I <sub>GSSR</sub>	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V	--	--	-100	nA

#### Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
Q <sub>g</sub>	V <sub>DS</sub> = 520 V, I <sub>D</sub> = 11 A, V <sub>GS</sub> = 10 V	--	48	58	nC
Q <sub>gs</sub>		--	7.0	--	
Q <sub>gd</sub>		--	18.0	--	
t <sub>d(on)</sub>	V <sub>DS</sub> = 325 V, I <sub>D</sub> = 11 A, R <sub>G</sub> = 25 Ω	--	25	55	ns
t <sub>r</sub>		--	70	150	ns
t <sub>d(off)</sub>		--	140	300	ns
t <sub>f</sub>		--	80	165	ns
C <sub>ISS</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0MHz	--	1650	2050	pF
C <sub>OSS</sub>		--	165	217	pF
C <sub>RSS</sub>		--	18	25	pF

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Source-Drain Diode Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$I_S$		--	--	10	A
$I_{SM}$		--	--	40	
$V_{SD}$	$I_S = 11 \text{ A}, V_{GS} = 0 \text{ V}$	--	--	1.4	V
$t_{rr}$	$I_S = 11 \text{ A}, V_{GS} = 0 \text{ V}, dI/dt=100\text{A}/\mu\text{s}$	--	430	--	ns
$Q_{rr}$		--	4.3	--	nC

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#### ■ Characteristics Curve

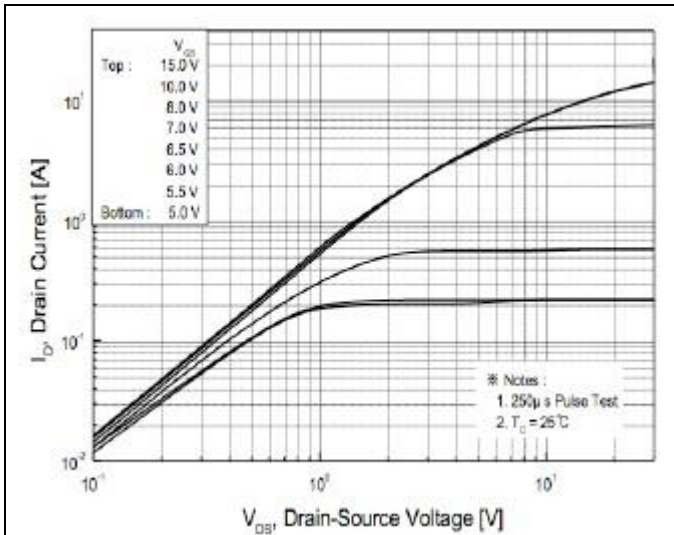


FIG.1-ON REGION CHARACTERISTICS

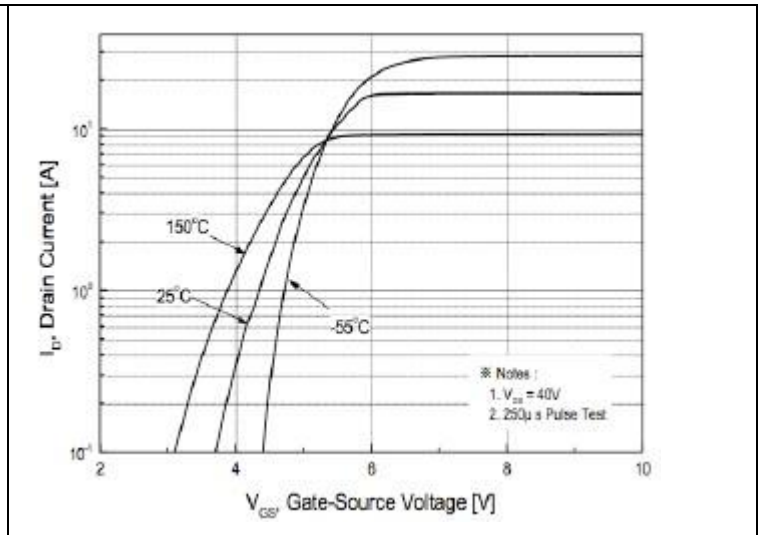


FIG.2-TRANSFER CHARACTERISTICS

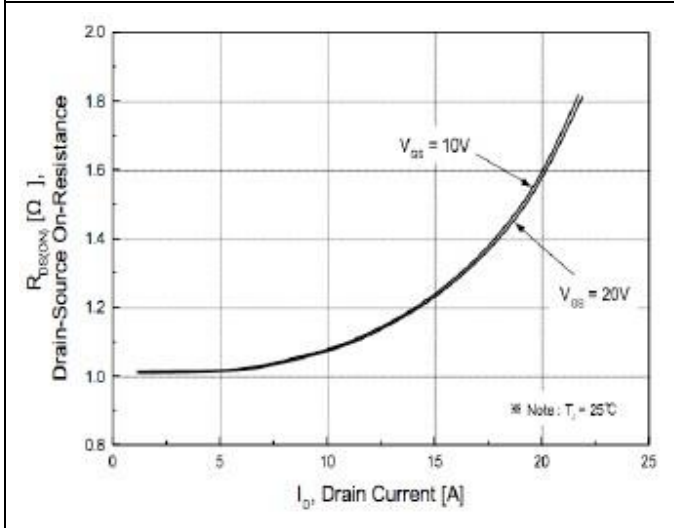


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

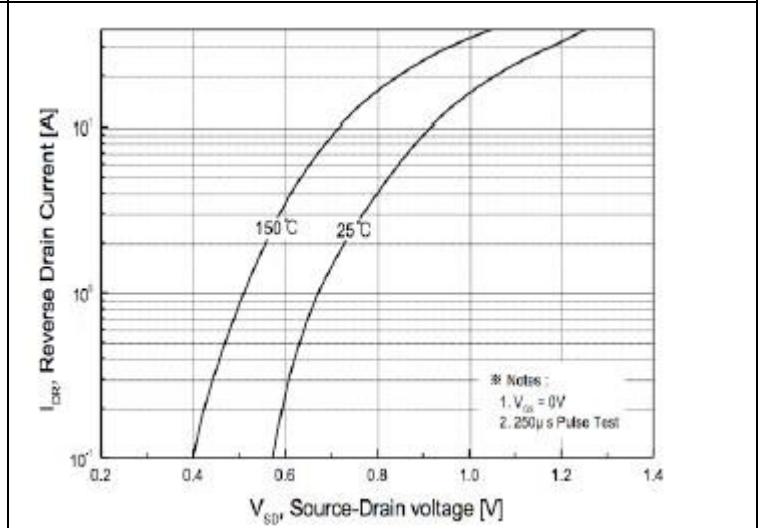


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

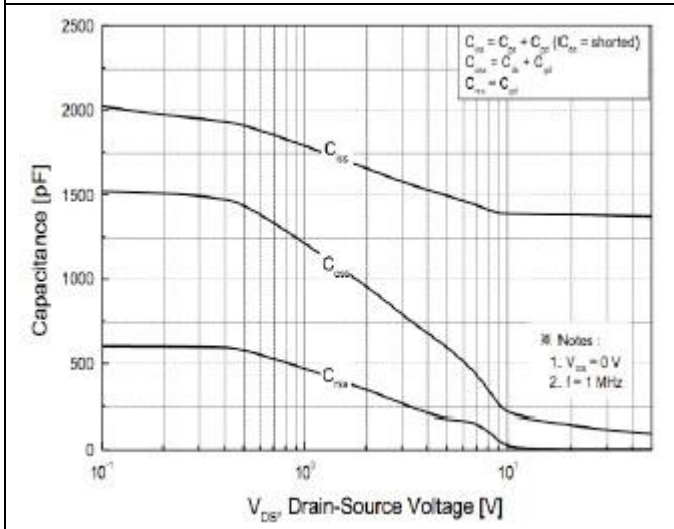


FIG.5-CAPACITANCE CHARACTERISTICS

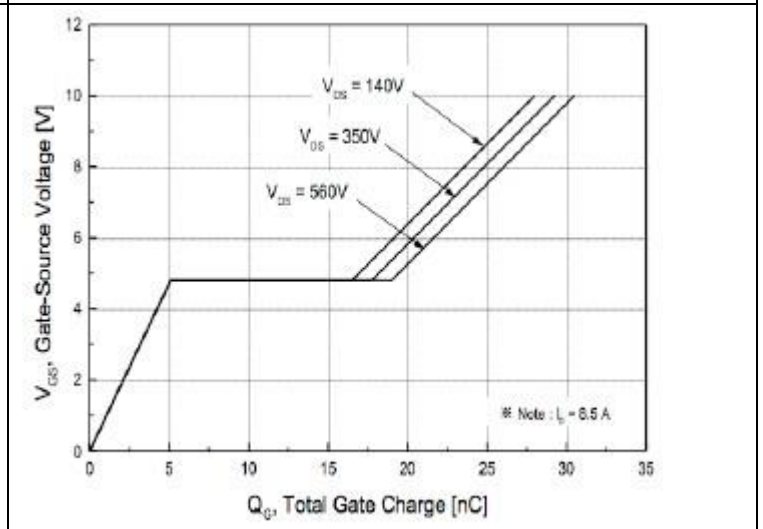
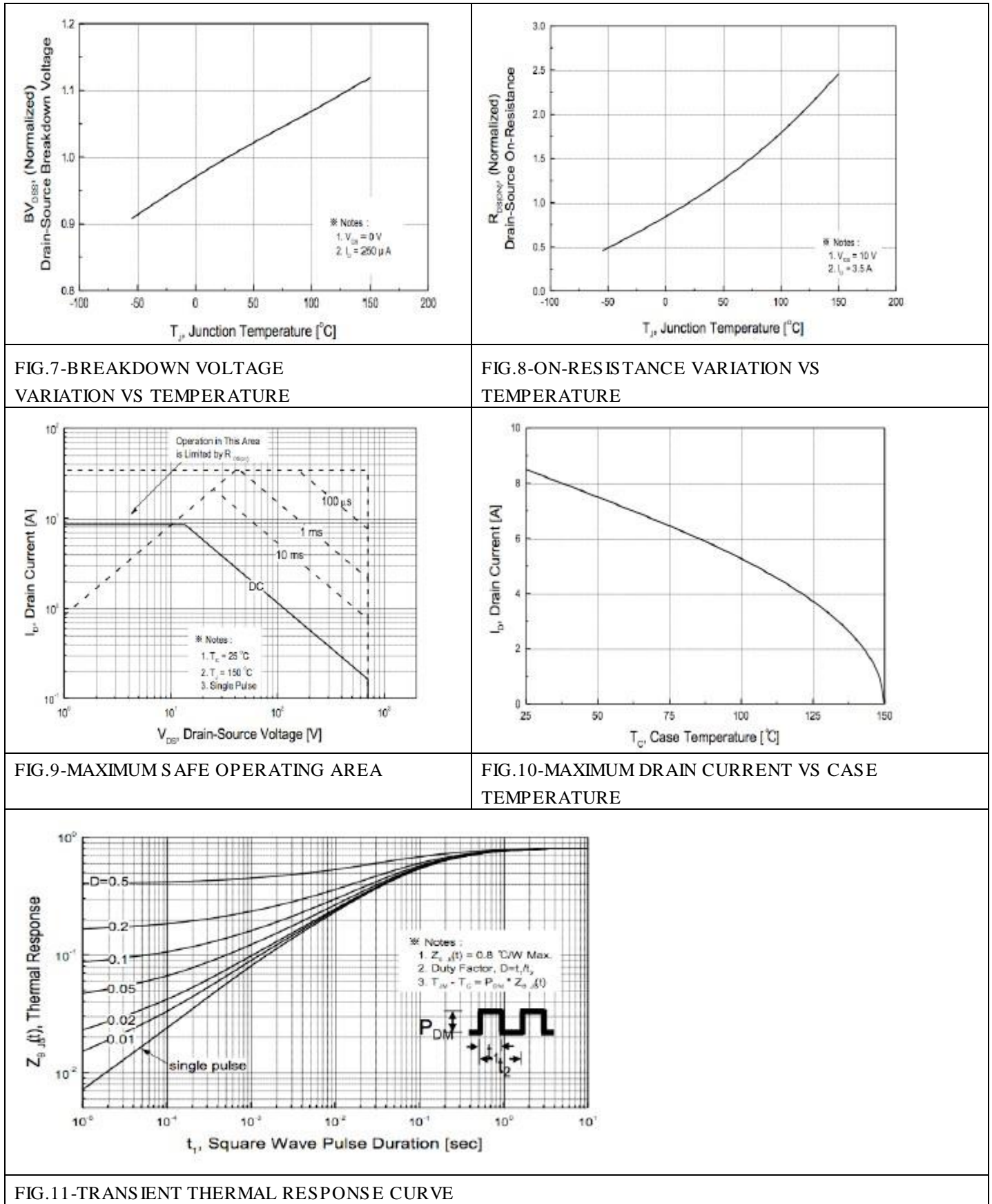


FIG.6-GATE CHARGE CHARACTERISTICS

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#### ■ Characteristics Curve



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#### ■ Characteristics Test Circuit & Waveform

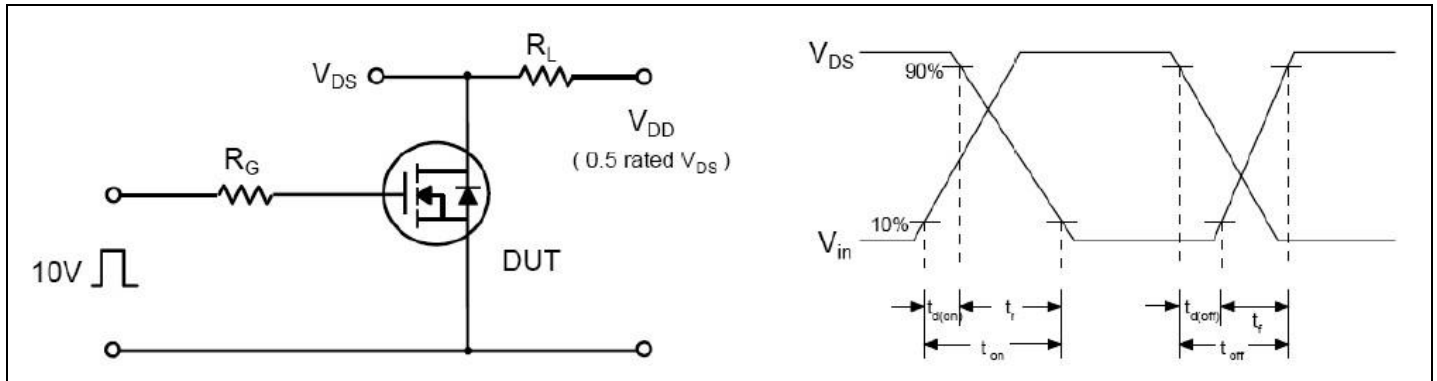


Fig 12. Resistive Switching Test Circuit & Waveforms

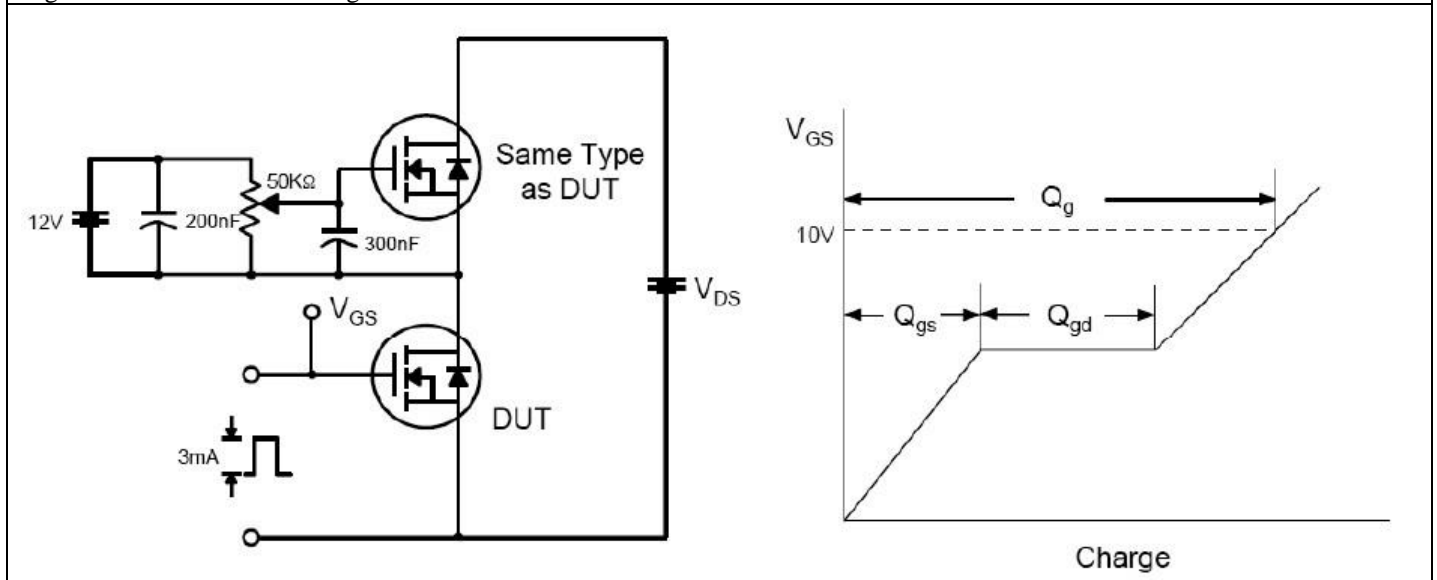


Fig 13. Gate Charge Test Circuit & Waveform

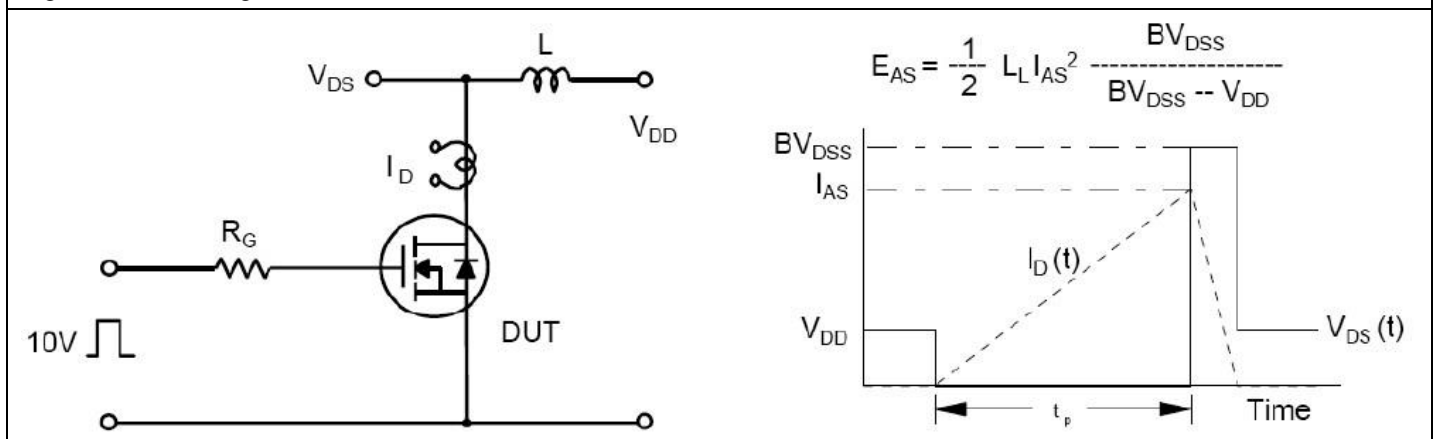


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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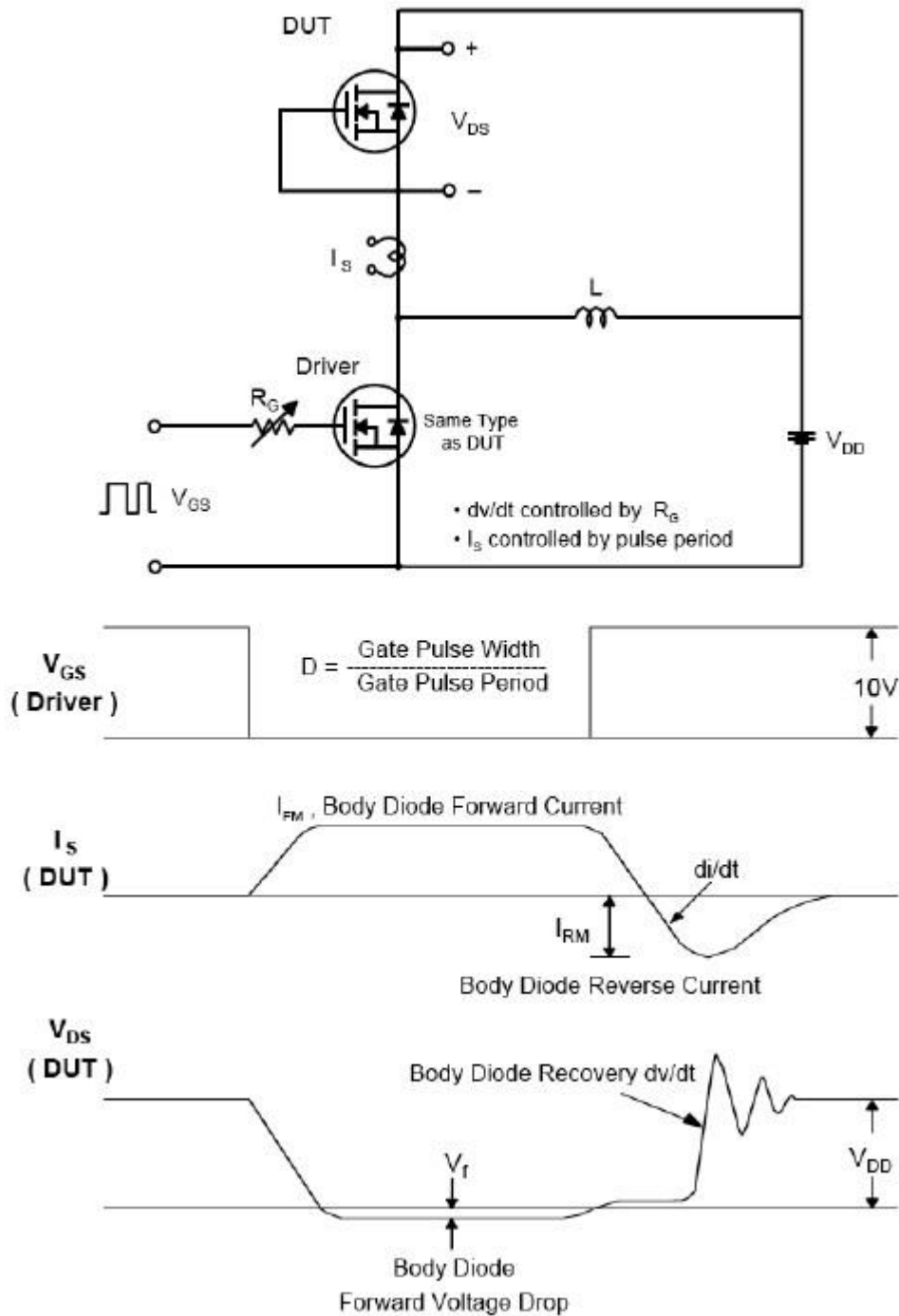


Fig 15. Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms

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#### Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE

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