

MSW20N50

500V N-Channel MOSFET

Description

This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supplies.

Features

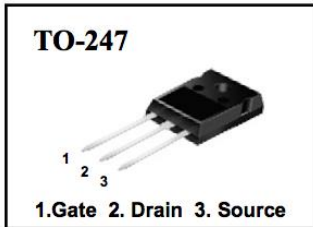
- RDS(on) (Typical 0.26Ω) @VGS=10V
- Gate Charge (Typical 90nC)
- Improved dv/dt Capability, High Ruggedness
- 100% EAS Test
- Extended Safe Operating Area
- RoHS compliant package

Application

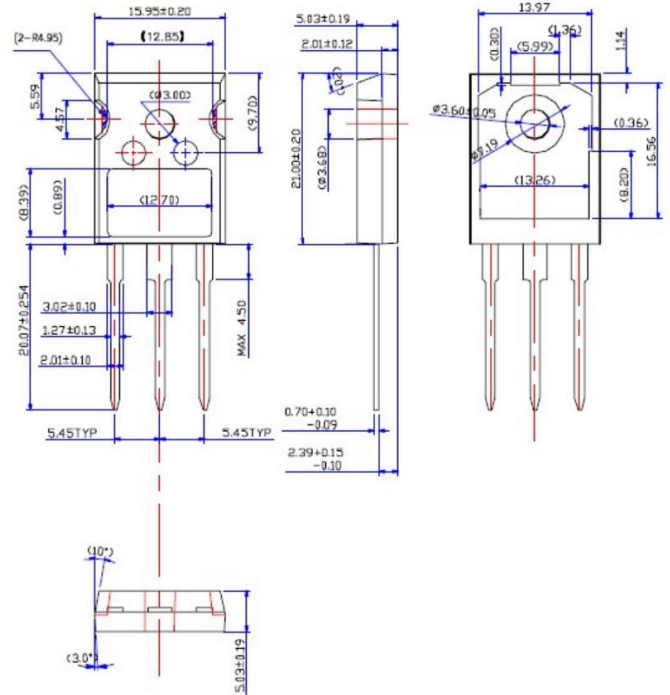
- High current, High speed switching
- PFC (Power Factor Correction)
- SMPS (Switched Mode Power Supplies)

Packing & Order Information

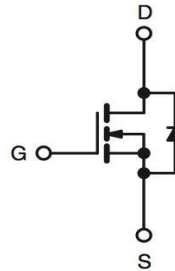
50/Tube ; 1,000/Box



**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	500	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	20	A
	Drain Current -Continuous (TC=100°C)	13	A
I _{DM}	Drain Current Pulsed	80	A
E _{AS}	Single Pulsed Avalanche Energy	1400	mJ
E _{AR}	Repetitive Avalanche Energy	21	mJ

MSW20N50

500V N-Channel MOSFET

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC = 25 °C)	215	W
	- Derate above 25°C	2.1	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +175	°C

Note:

1. Pulse width limited by maximum junction temperature
2. Duty cycle ≤ 1%

Thermal Resistance Characteristics

Symbol	Parameter	Max.	Units
R _{thjc}	Typical thermal resistance	0.64	°C/W
R _{θJA}		40	

Static Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V _{GS}	V _{DS} = V _{GS} , I _D = 250μA	3.0	--	5.0	V
*R _{DS(ON)}	V _{GS} = 10 V, I _D = 10 A	--	0.21	0.26	Ω
BV _{DSS}	V _{GS} = 0 V, I _D = 250μA	500	--	--	V
ΔBV _{DSS} /ΔT _J	I _D = 250μA, Referenced to 25°C	--	0.5	--	V/°C
I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V V _{DS} = 400 V, V _{GS} = 0 V, T _j = 125°C	--	--	1 10	uA
I _{GSS}	V _{GS} = ±30	--	--	±100	nA

Dynamic Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
t _{d(on)}	V _{DS} = 250 V, I _D = 20 A, R _G = 25 Ω	--	60	138	ns
t _r		--	210	462	ns
t _{d(off)}		--	170	357	ns
t _f		--	130	286	ns
Q _g	V _{DS} = 400 V, I _D = 20 A, V _{GS} = 10 V	--	90	117	nC
Q _{gs}		--	20	26	nC
Q _{gd}		--	43	56	nC
C _{ISS}	V _{DS} = 25 V, V _{GS} = 0 V, F = 1.0MHz	--	3350	4355	pF
C _{OSS}		--	490	637	pF
C _{RSS}		--	50	65	pF

MSW20N50

500V N-Channel MOSFET

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S			--	--	20	A
I_{SM}			--	--	80	
V_{SD}	$I_S = I_F, V_{GS} = 0\text{ V}$		--	--	1.4	V
t_{rr}	$I_S = I_F, diF/dt = 100\text{A}/\mu\text{s}$		--	370	--	ns
Q_{rr}			--	3.8	--	μC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS}=20\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. $I_{SD}\leq 20\text{A}$, $di/dt\leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature

MSW20N50

500V N-Channel MOSFET

Typical Characteristics

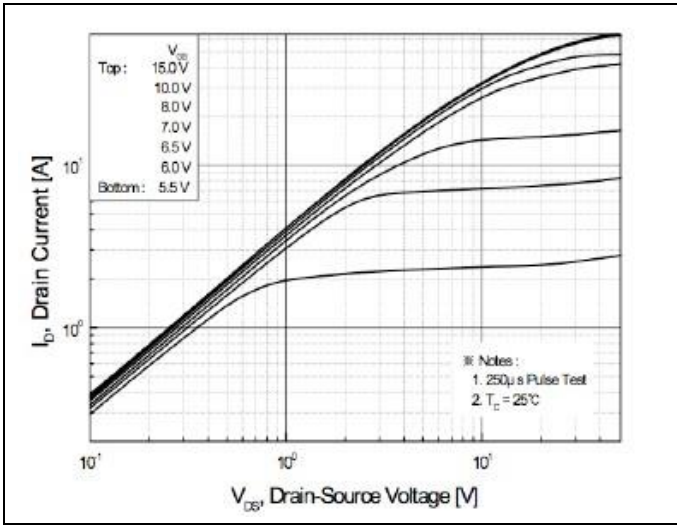


FIG.1-ON REGION CHARACTERISTICS

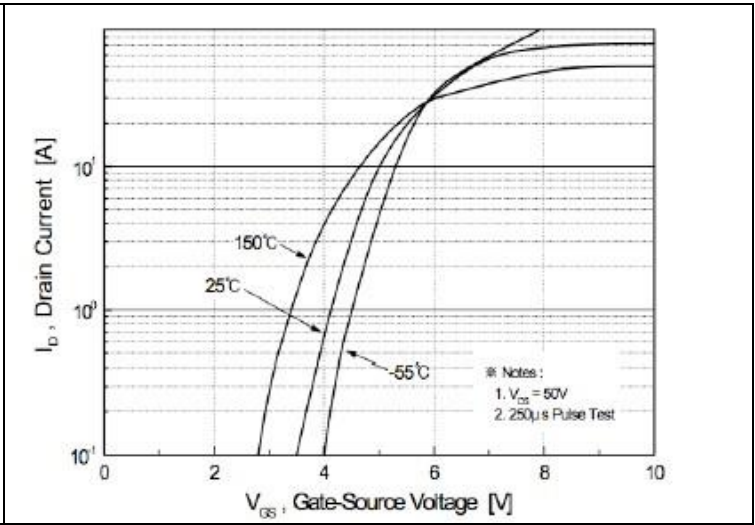


FIG.2-TRANSFER CHARACTERISTICS

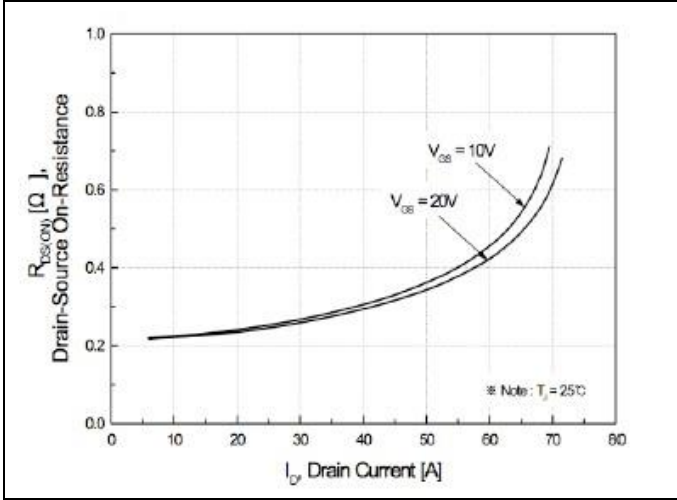


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

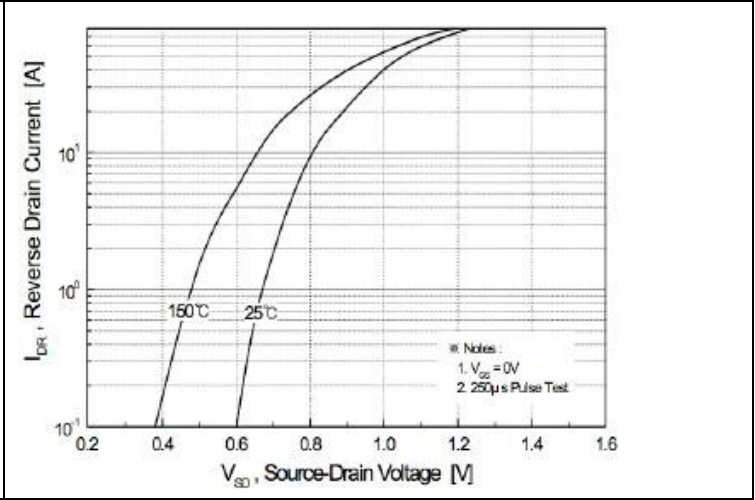


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

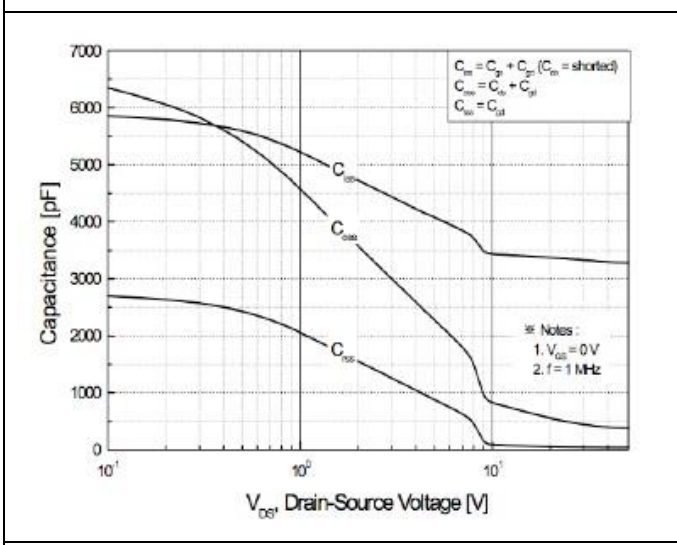


FIG.5-CAPACITANCE CHARACTERISTICS

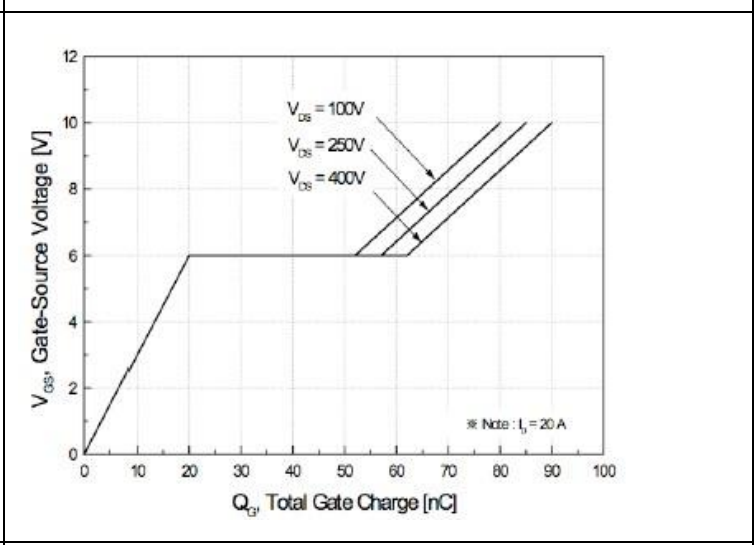


FIG.6-GATE CHARGE CHARACTERISTICS

MSW20N50

500V N-Channel MOSFET

Typical Characteristics

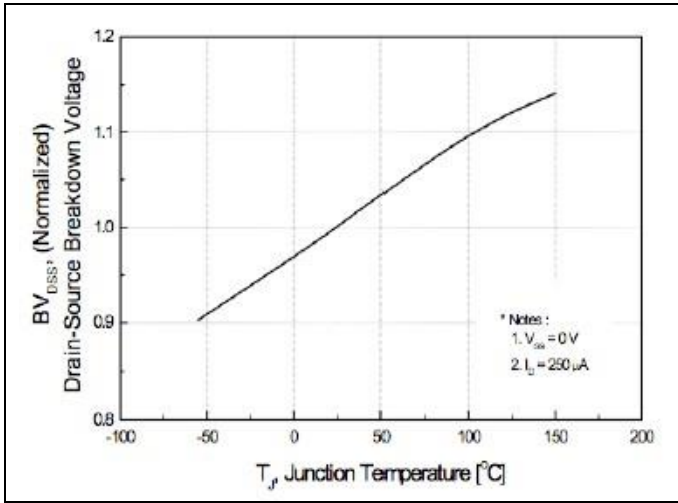


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

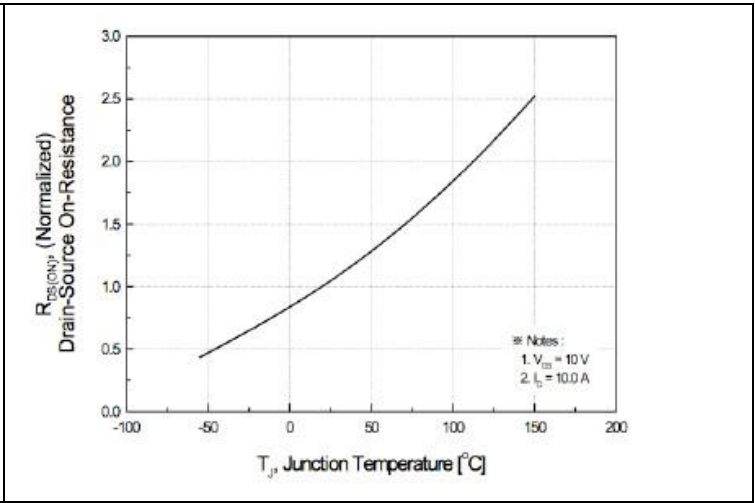


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

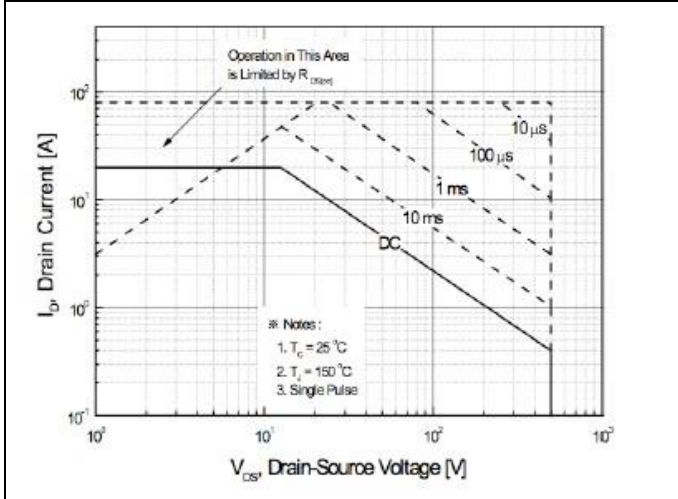


FIG.9-MAXIMUM SAFE OPERATING AREA

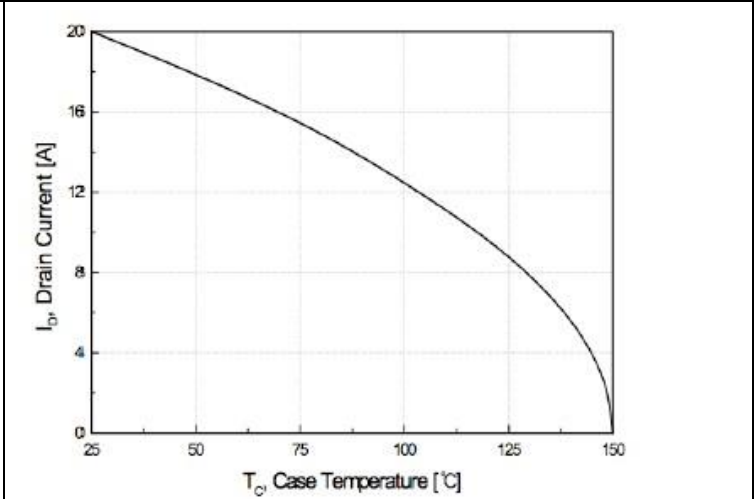


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

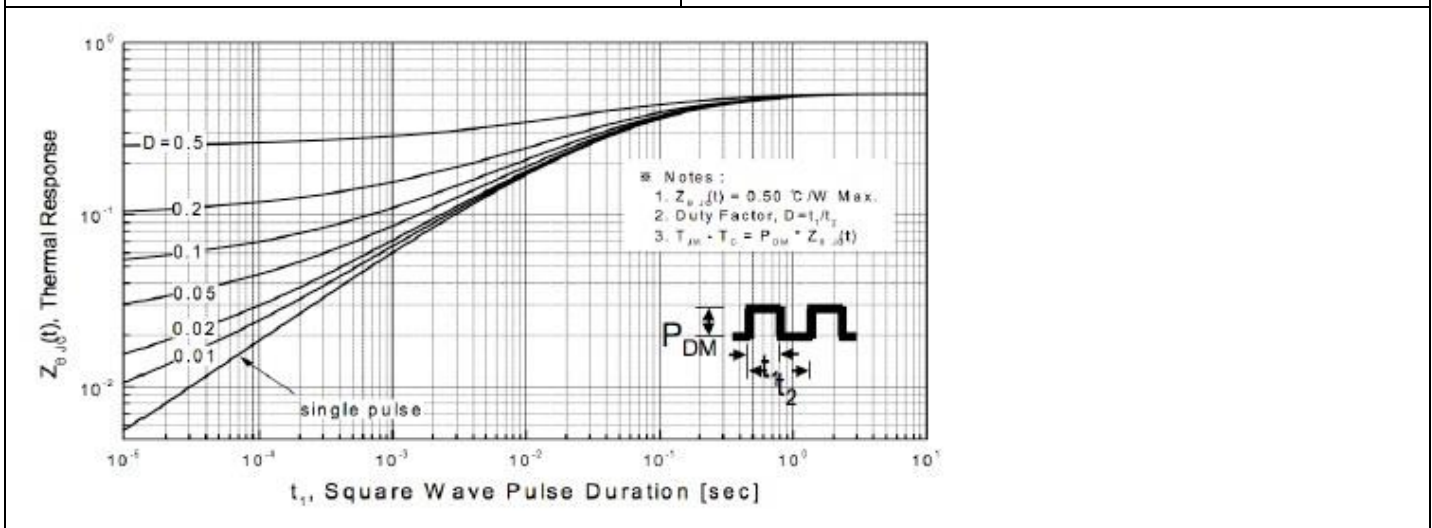


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

MSW20N50

500V N-Channel MOSFET

■ Characteristics Test Circuit & Waveform

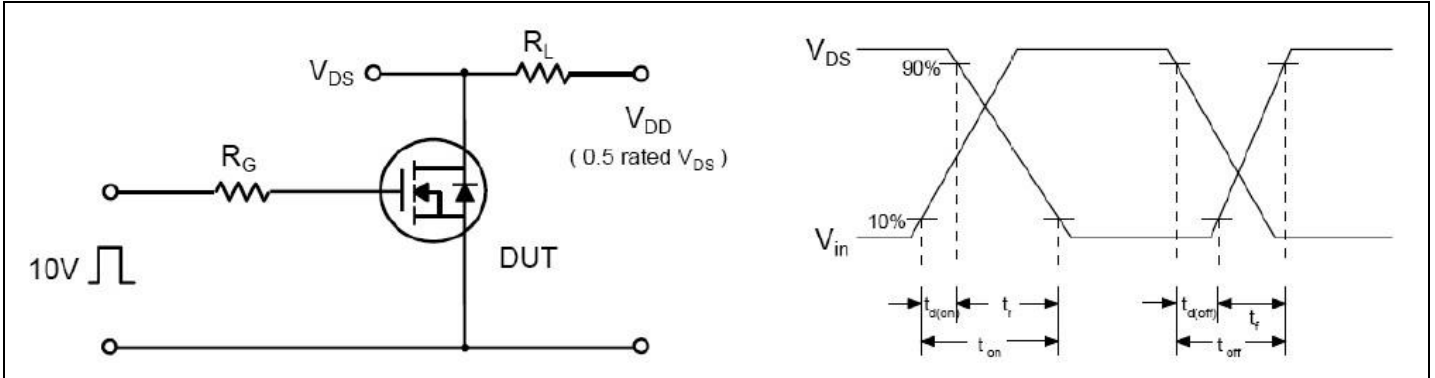


Fig 12. Resistive Switching Test Circuit & Waveforms

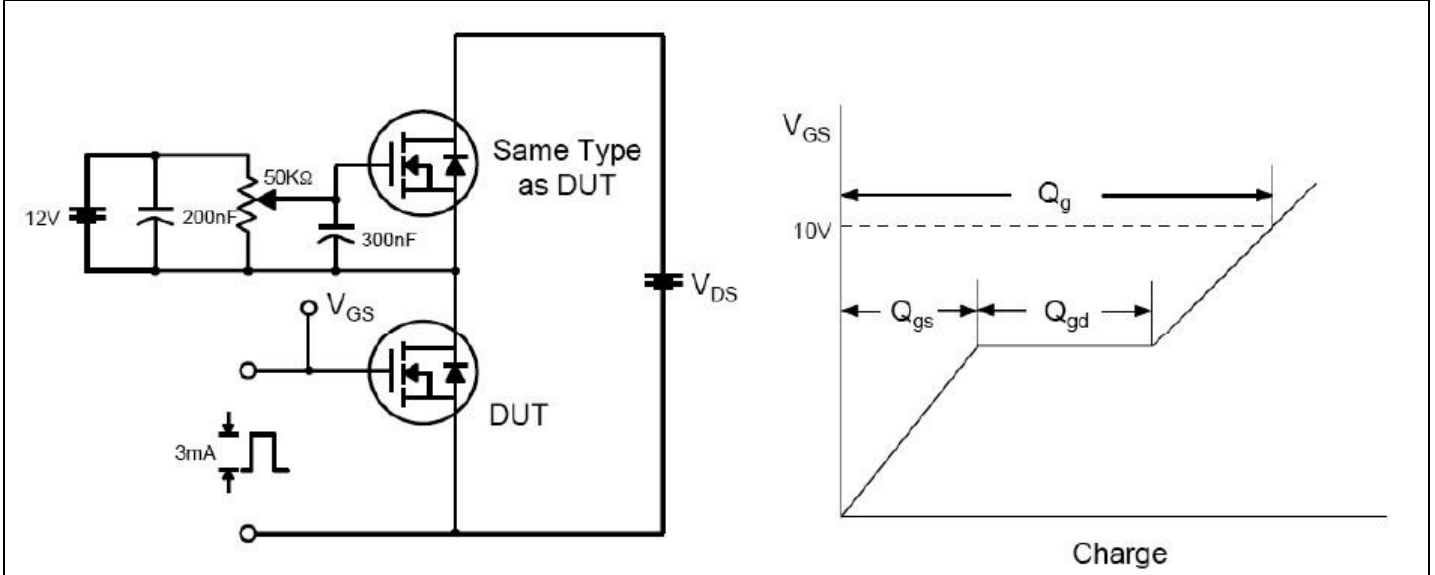


Fig 13. Gate Charge Test Circuit & Waveform

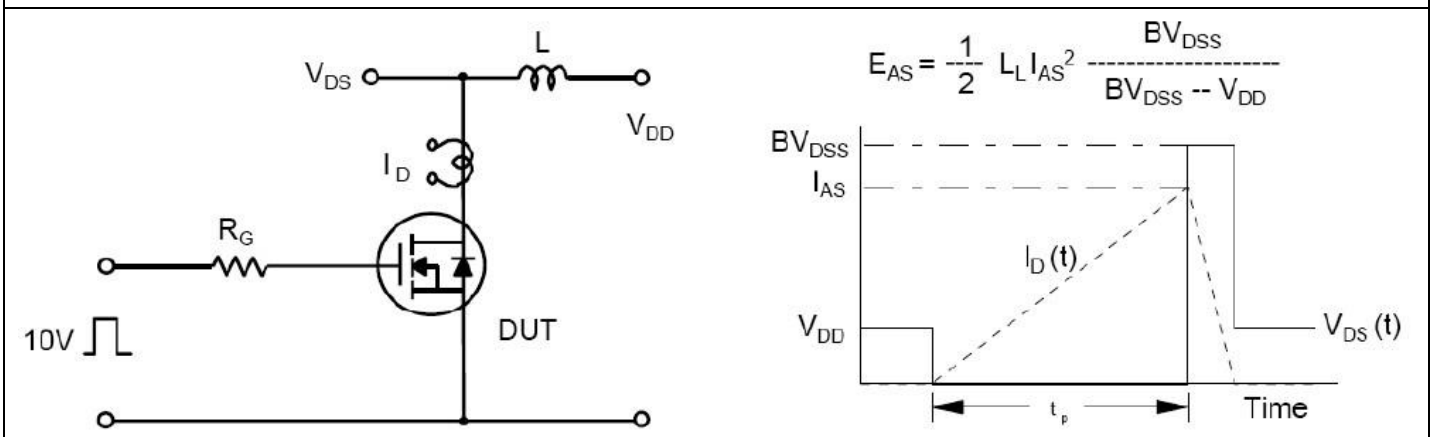


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

MSW20N50

500V N-Channel MOSFET

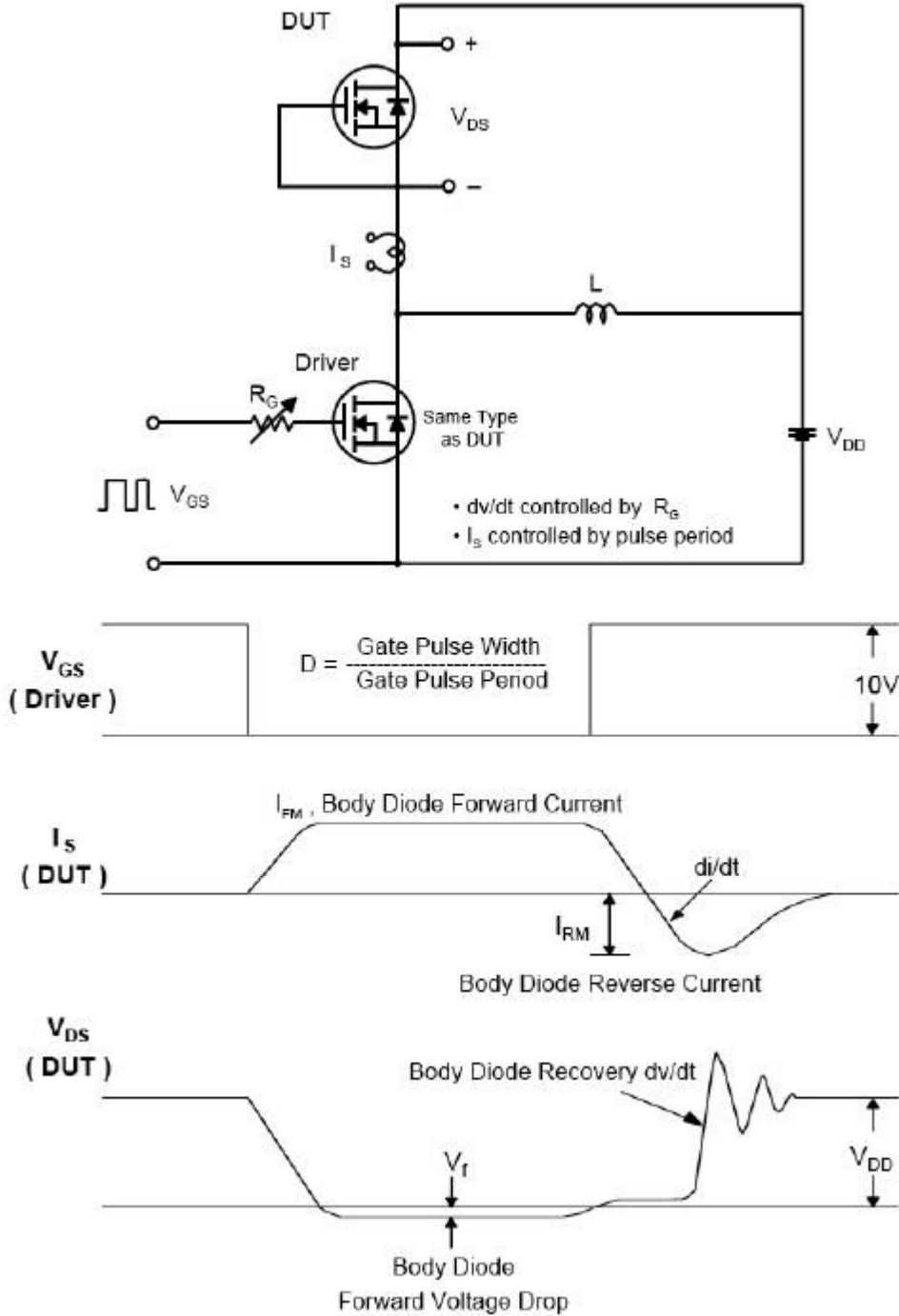


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

MSW20N50

500V N-Channel MOSFET

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Bruckewell Technology Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Bruckewell"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product. Bruckewell makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Bruckewell disclaims

- (i) Any and all liability arising out of the application or use of any product.
- (ii) Any and all liability, including without limitation special, consequential or incidental damages.
- (iii) Any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Bruckewell's knowledge of typical requirements that are often placed on Bruckewell products in generic applications.

Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time.

Product specifications do not expand or otherwise modify Bruckewell's terms and conditions of purchase, including but not limited to the warranty expressed therein.