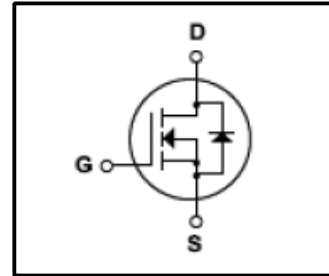## *Silicon N-Channel MOSFET*

## Features

- 10A,650V,$R_{DS(on)}$(Max 0.95Ω)@V_{GS}=10V

- Ultra-low Gate Charge(Typical 43nC)

- Fast Switching Capability

- 100%Avalanche Tested

- Isolation Voltage(V_{ISO}=4000V AC)

- Improved dv/dt capability

General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe,VDMOS technology. This latest technology has been especially designed to minimize on -state resistance,have a high rugged avalanche characteristics. This devices is specially well suited for AC-DC switching power supplies,DC-DC power converters,high voltage h-bridge motor drive PWM.
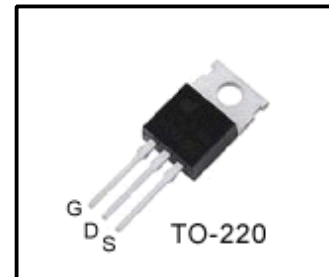
Absolute Maximum Ratings

Symbol	Parameter		Value	Units
V_{DSS}	Drain Source Voltage		650	V
I_D	Continuous Drain Current(@Tc=25℃)		10*	A
	Continuous Drain Current(@Tc=100℃)		6.0*	A
I_{DM}	Drain Current Pulsed	(Note1)	40*	A
V_{GS}	Gate to Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note2)	748	mJ
E_{AR}	Repetitive Avalanche Energy	(Note1)	15.6	mJ
dv/dt	Peak Diode Recovery dv /dt	(Note3)	4.5	V/ ns
P_D	Total Power Dissipation(@Tc=25℃)		156	W
	Derating Factor above 25℃		1.25	W/℃
T_J,T_{stg}	Junction and Storage Temperature		-55~150	℃
T_L	Channel Temperature		300	℃

*Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance , Junction -to -Case	-	-	0.80	℃/W
R_{QJA}	Thermal Resistance , Junction-to -Ambient	-	-	62.5	℃/W

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Electrical Characteristics(Tc=25℃)

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS}=\pm30V, V_{DS}=0V$	-	-	±100	nA
Gate-source breakdown voltage		$V_{(BR)GSS}$	$I_G=\pm10\ \mu A, V_{DS}=0V$	±30	-	-	V
Drain cut -off current		I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	10	μA
			$V_{DS}=480V, Tc=125℃$			100	μA
Drain -source breakdown voltage		$V_{(BR)DSS}$	$I_D=250\ \mu A, V_{GS}=0V$	650	-	-	V
Gate threshold voltage		$V_{GS(th)}$	$V_{DS}=10V, I_D=250\ \mu A$	3	-	4.5	V
Drain -source ON resistance		$R_{DS(ON)}$	$V_{GS}=10V, I_D=4.75A$	-	0.84	0.95	Ω
Forward Transconductance		gfs	$V_{DS}=50V, I_D=4.75A$	-	6.4	-	S
Input capacitance		C_{iss}	$V_{DS}=25V,$	-	1430	-	pF
Reverse transfer capacitance		C_{rss}	$V_{GS}=0V,$	-	2.5	-	
Output capacitance		C_{oss}	f=1MHz	-	117	-	
Switching time	Rise time	tr	$V_{DD}=300V,$	-	46	-	ns
	Turn-on time	ton	$I_D=10A,$	-	74	-	
	Fall time	tf	$R_G=25Ω,$	-	340	-	
	Turn-off time	toff	(Note4,5)	-	66	-	
Total gate charge(gate-source plus gate-drain)		Qg	$V_{DD}=480V, V_{GS}=10V,$	-	43	-	nC
Gate-source charge		Qgs	$I_D=10A$	-	9	-	
Gate-drain("miller") Charge		Qgd	(Note4,5)	-	15	-	

Source-Drain Ratings and Characteristics(Ta=25℃)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	10	A
Pulse drain reverse current	I_{DRP}	-	-	-	40	A
Forward voltage(diode)	V_{DSF}	$I_{DR}=10A, V_{GS}=0V$	-	-	1.4	V
Reverse recovery time	trr	$I_{DR}=10A, V_{GS}=0V,$	-	450	-	ns
Reverse recovery charge	Qrr	$dI_{DR}/dt=100\ A/\mu s$	-	2.4	-	μC

Note 1.Repeativity rating :pulse width limited by junction temperature

2.L=14.5mH $I_{AS}=10A, V_{DD}=90V, R_G=25Ω$,Starting $T_J=25℃$

3.$I_{SD}≤10A, di/dt≤200A/us, V_{DD}<BV_{DSS}$,STARTING $T_J=25℃$

4.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

Steady, keep you advance
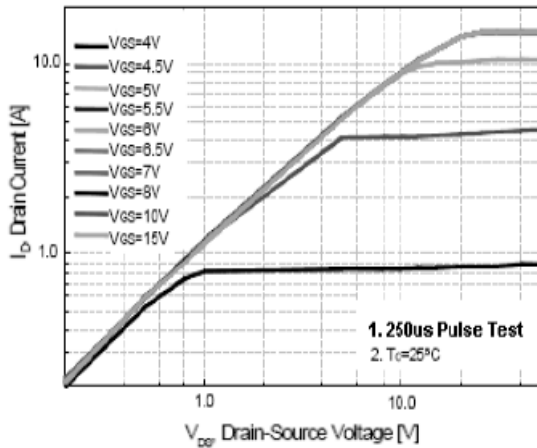
WINSEMI®
MICROELECTRONICS
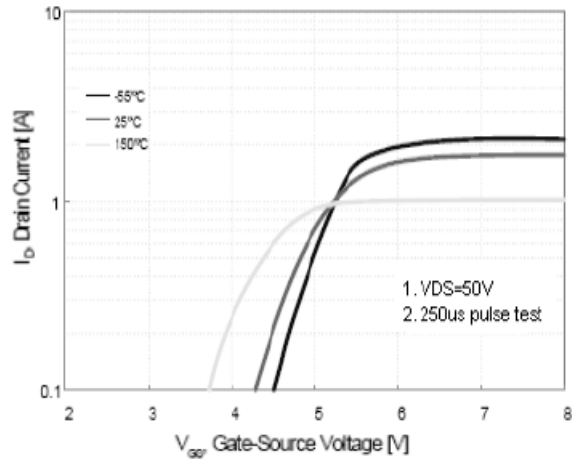

Fig.1 On-State Characteristics

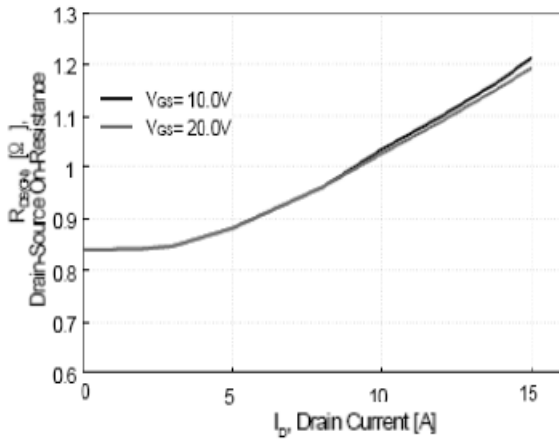Fig.2 Transfer Current Characteristics

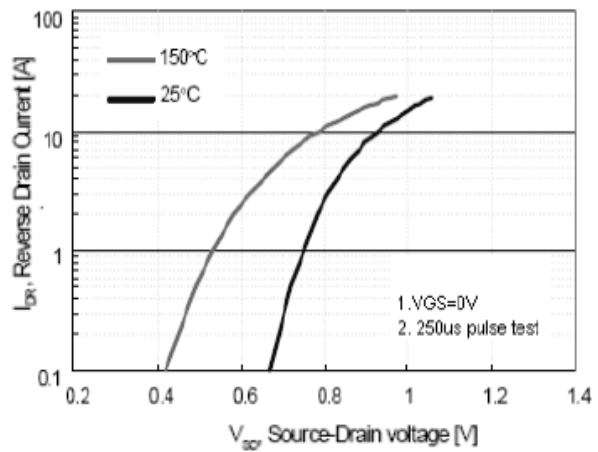Fig.3 On-Resistance variation
vs Drain Current

Fig.4 Body Diode Forward Voltage
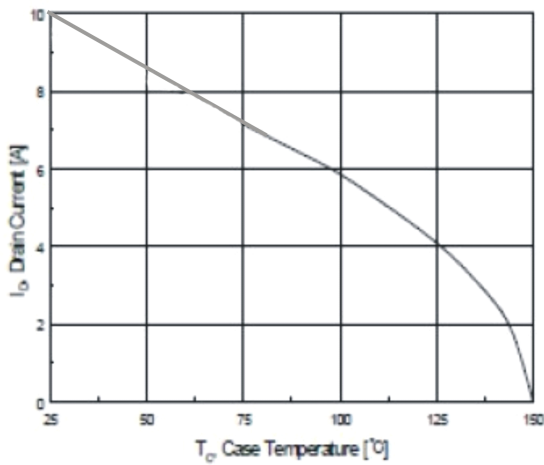Variation with Source Current
and Temperature
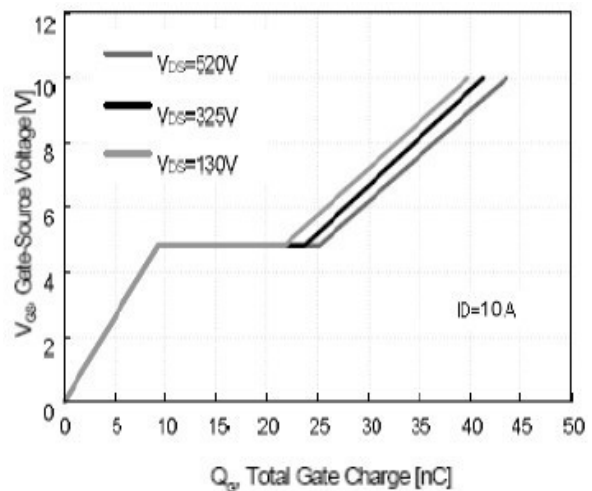

Fig.5 Maximum Drain Current vs
Case Temperature

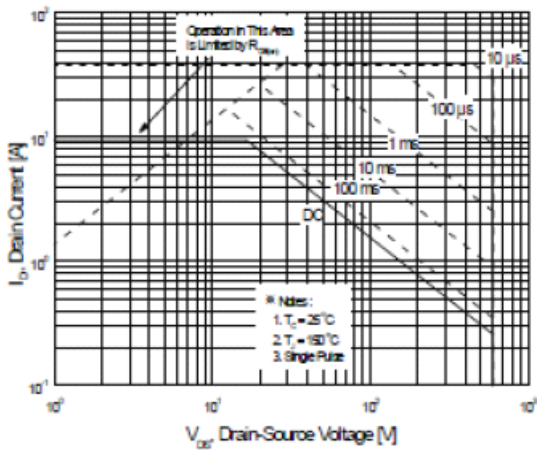

Fig.6 Gate Charge Characteristics

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Fig.7 Maximum Safe Operation Area
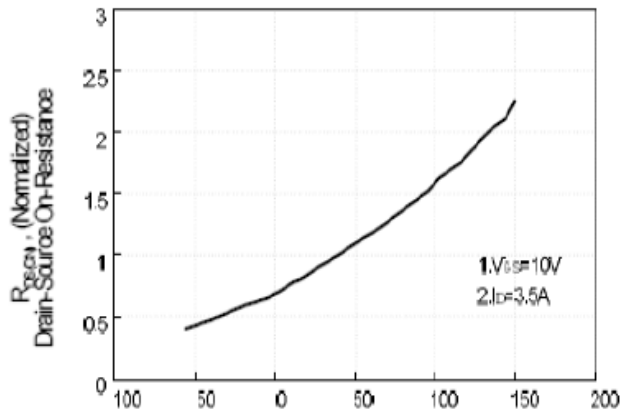
Fig.8 On-Resistance Variation vs Junction Temperature
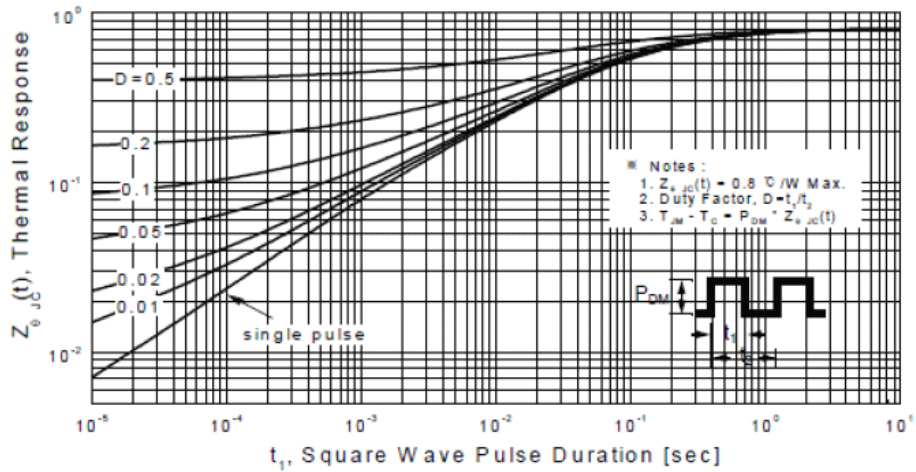
Fig.9 Transient Thermal Response curve

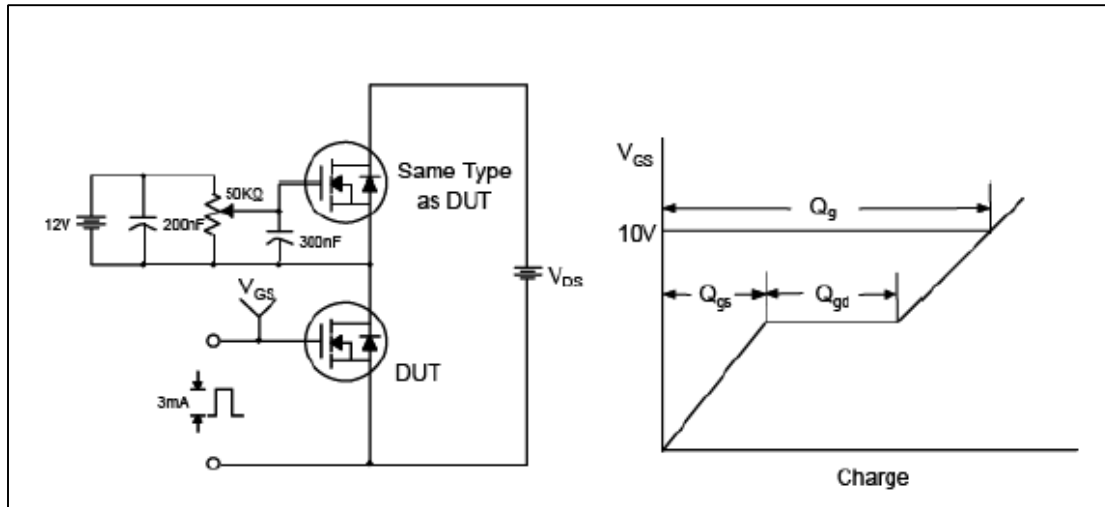*Steady, keep you advance*

Fig.10 Gate Test circuit & Waveform
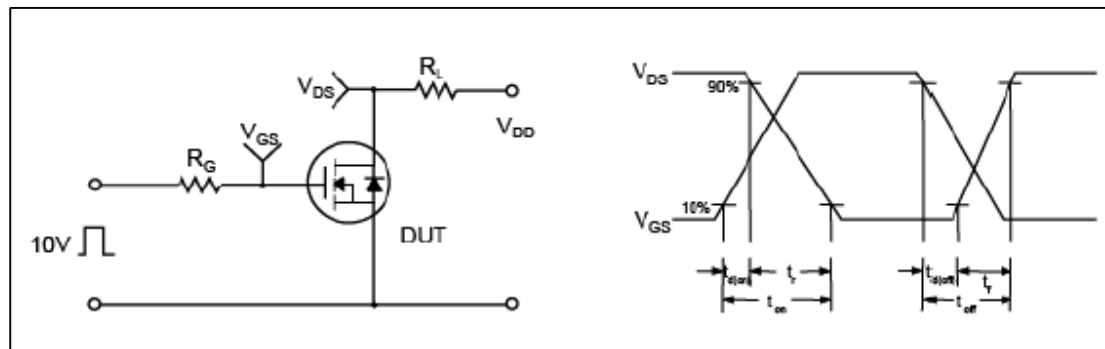
Fig.11 Resistive Switching Test Circuit & Waveform

$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
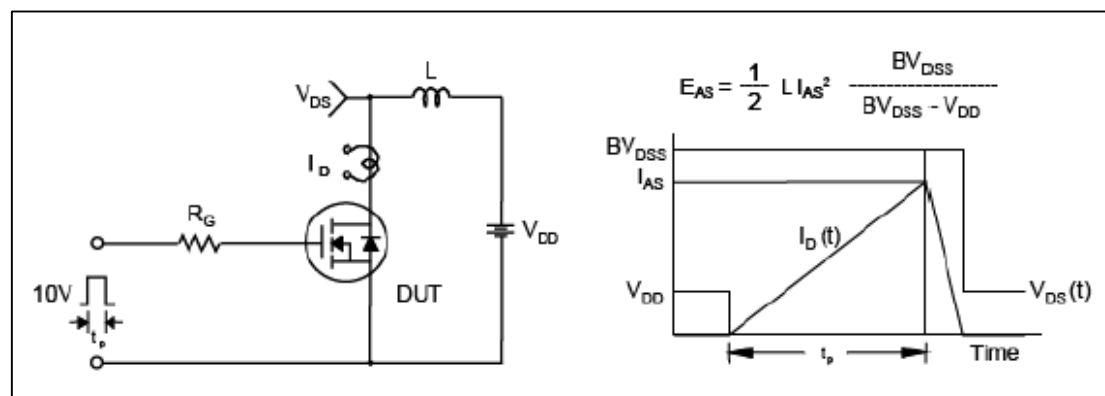
Fig.12 Uncamped Inductive Switching Test Circuit & Waveform

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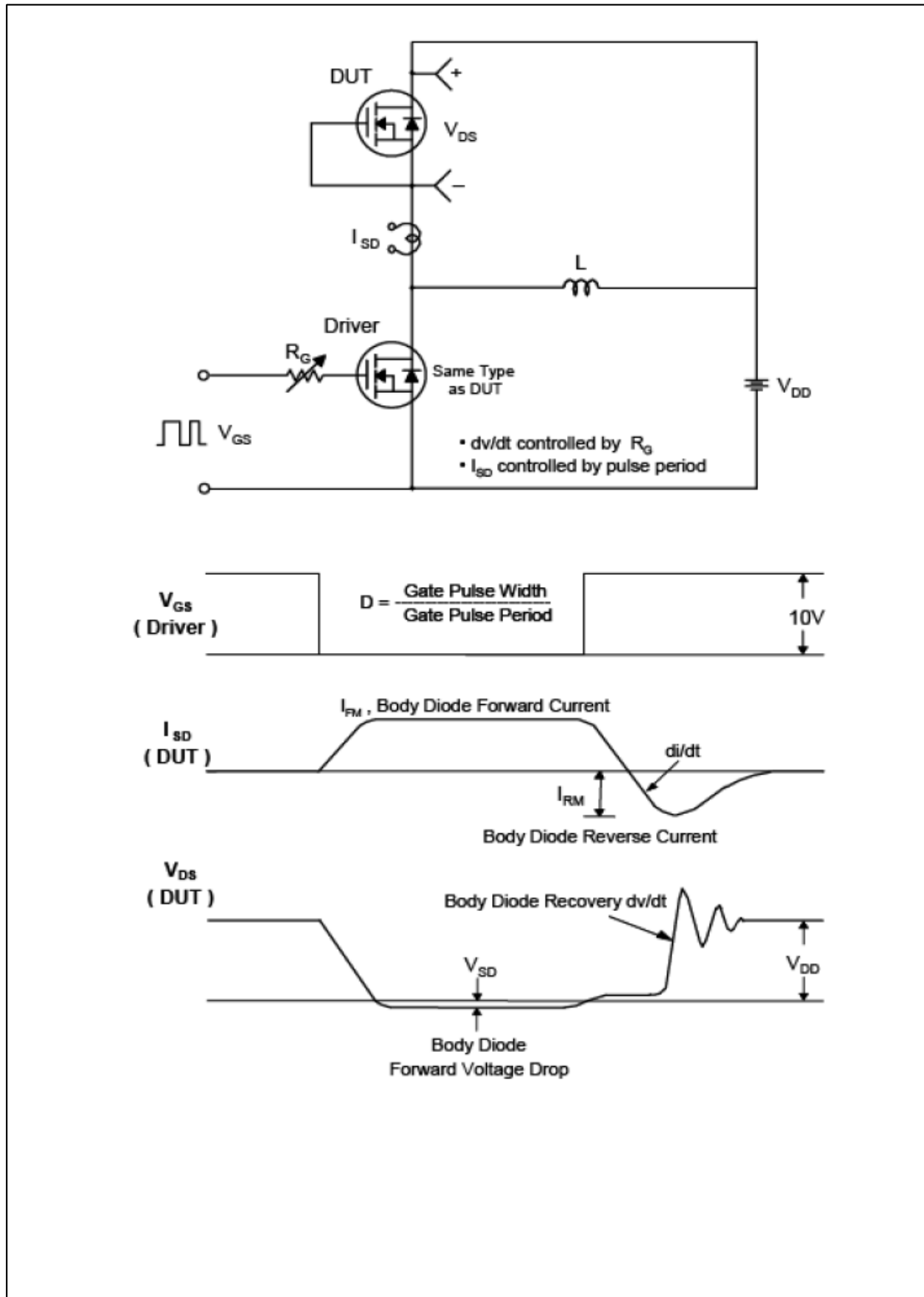
Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

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TO-220 Package Dimension

Unit:mm

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