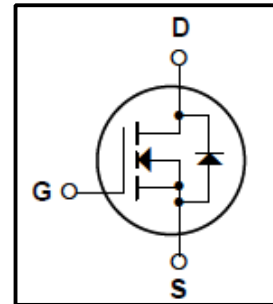


Silicon N-Channel MOSFET

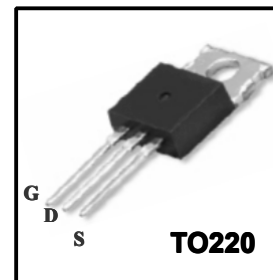
Features

- 9A, 200V, $R_{DS(on)}$ (Max 0.4 Ω)@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 22nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150°C)



General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe, DMOS 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 low voltage applications such as automotive, high efficiency switching for DC/DC converters, and DC motor control.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain Source Voltage	200	V
I_D	Continuous Drain Current(@ $T_c=25^\circ\text{C}$)	9	A
	Continuous Drain Current(@ $T_c=100^\circ\text{C}$)	5.7	A
I_{DM}	Drain Current Pulsed (Note1)	36	A
V_{GS}	Gate to Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	160	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	7.2	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5	V/ns
P_D	Total Power Dissipation(@ $T_c=25^\circ\text{C}$)	72	W
	Derating Factor above 25°C	0.57	W/°C
T_J, T_{stg}	Junction and Storage Temperature	-55~150	°C
T_L	Maximum lead Temperature for soldering purposes	300	°C

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance, Junction-to-Case	-	-	1.74	°C/W
R_{QCS}	Thermal Resistance, Case to Sink	-	0.5	-	°C/W
R_{QJA}	Thermal Resistance, Junction-to-Ambient	-	-	62.5	°C/W

Electrical Characteristics (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10\ \mu\text{A}, V_{DS} = 0\text{ V}$	± 30	-	-	V	
Drain cut-off current	I_{DSS}	$V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}$	-	-	10	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 250\ \mu\text{A}, V_{GS} = 0\text{ V}$	200	-	-	V	
Break Voltage Temperature Coefficient	$\frac{\Delta V_{DSS}}{\Delta T_J}$	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	-	0.2	-	V/°C	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10\text{ V}, I_D = 250\ \mu\text{A}$	2	-	4	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 4.5\text{ A}$	-	-	0.4	Ω	
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{ V}, I_D = 4.5\text{ A}$	-	7.05	-	S	
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V},$	-	500	720	pF	
Reverse transfer capacitance	C_{rss}	$V_{GS} = 0\text{ V},$	-	22	29		
Output capacitance	C_{oss}	$f = 1\text{ MHz}$	-	85	110		
Switching time	Rise time	t_r	$V_{DD} = 100\text{ V},$ $I_D = 9\text{ A}$ $R_G = 12\ \Omega$ (Note4,5)	-	11	30	ns
	Turn-on time	t_{on}		-	70	150	
	Fall time	t_f		-	60	130	
	Turn-off time	t_{off}		-	65	140	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} = 160\text{ V},$ $V_{GS} = 10\text{ V},$ $I_D = 9\text{ A}$	-	22	29	nC	
Gate-source charge	Q_{gs}	(Note4,5)	-	3.6	-		
Gate-drain ("miller") Charge	Q_{gd}	(Note4,5)	-	10	-		

Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_{DR}	-	-	-	9	A
Pulse drain reverse current	I_{DRP}	-	-	-	36	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 9\text{ A}, V_{GS} = 0\text{ V}$	-	1.4	1.5	V
Reverse recovery time	t_{rr}	$I_{DR} = 9\text{ A}, V_{GS} = 0\text{ V},$	-	140	-	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 100\text{ A} / \mu\text{s}$	-	1.1	2.2	μC

- Note 1.Repeativity rating :pulse width limited by junction temperature
 2.L=500uH,I_{AS}=9A,V_{DD}=50V,R_G=0Ω,Starting T_J=25°C
 3.I_{SD}≤9A,di/dt≤300A/us, V_{DD}<BV_{DSS},STARTING T_J=25°C
 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



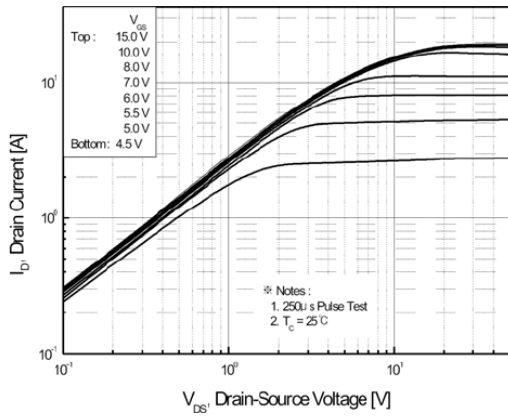


Fig. 1 On-State Characteristics

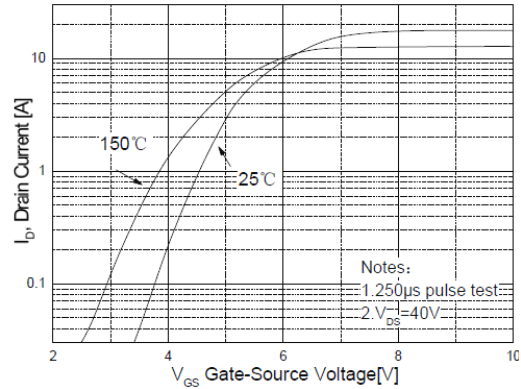


Fig. 2 Transfer Characteristics

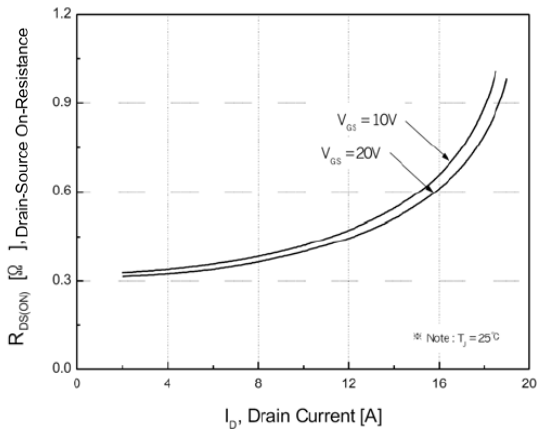


Fig. 3 On-Resistance Variation vs Drain Current

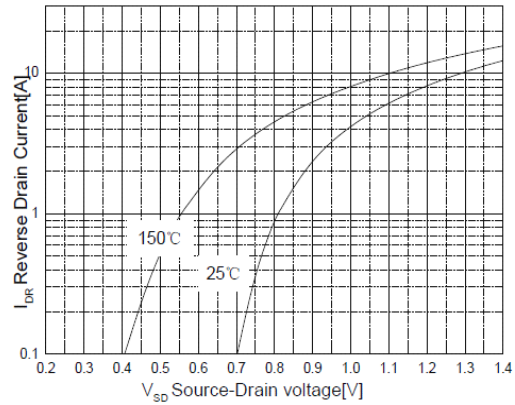


Fig. 4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

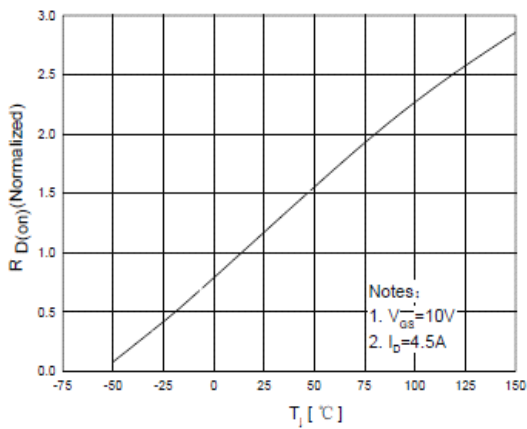


Fig. 5 On-Resistance Variation vs Junction Temperature

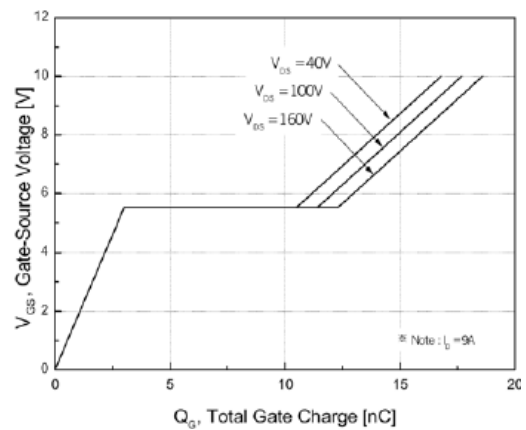


Fig. 6 Gate Charge Characteristics

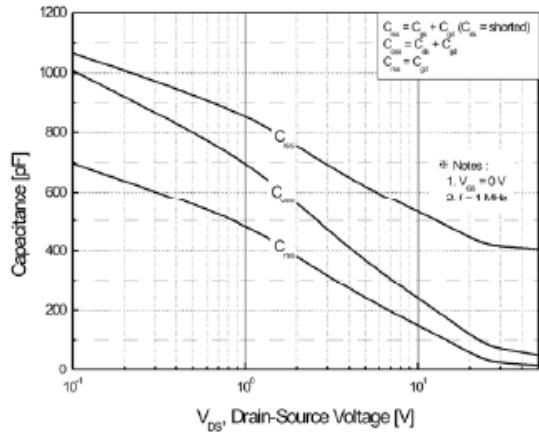


Fig.8 Capacitance Characteristics

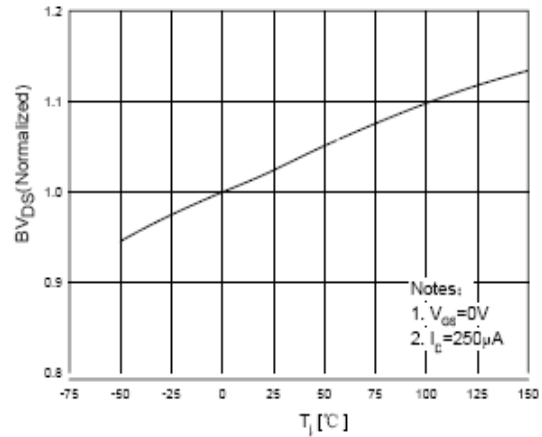


Fig.9 Breakdown Voltage Variation vs. Temperature

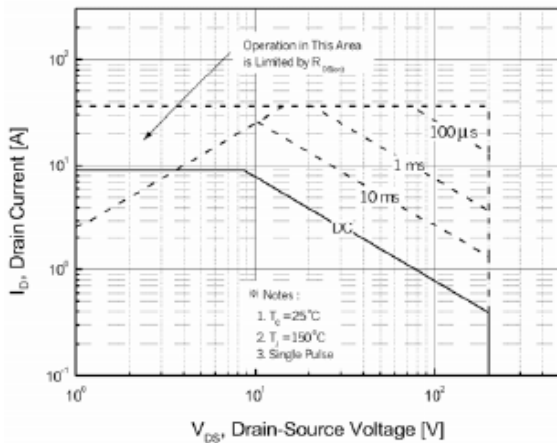


Fig.9 Maximum Safe Operation Area

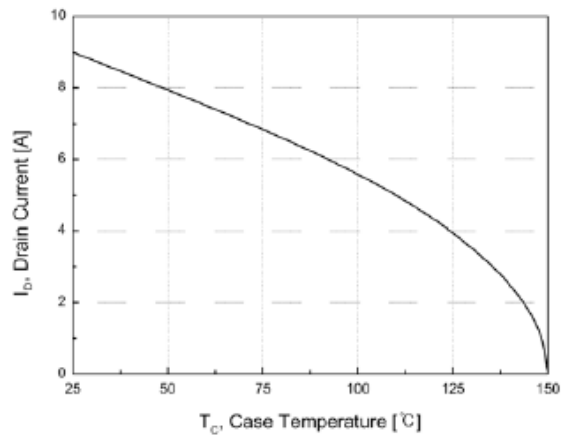


Fig.10 Maximum Drain Current vs Case Temperature

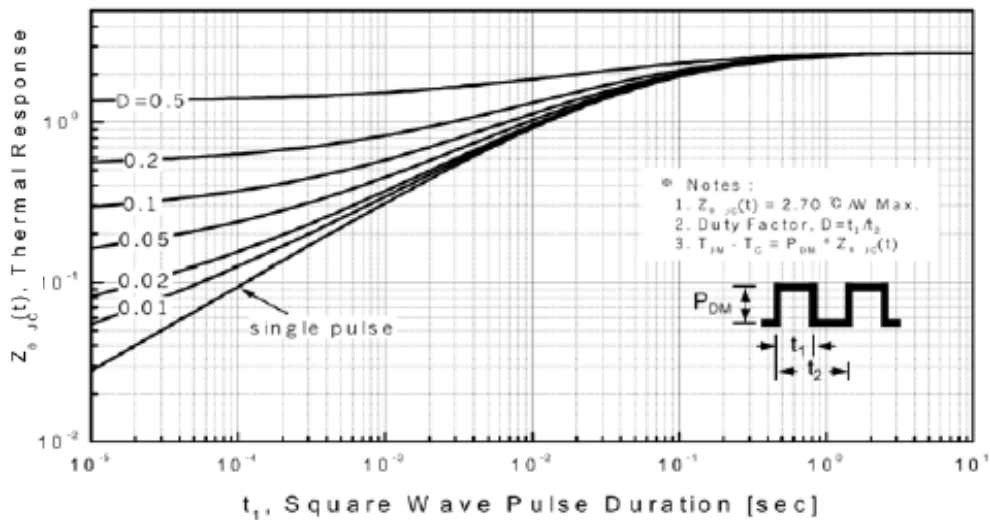


Fig.11 Transient Thermal Response Curve

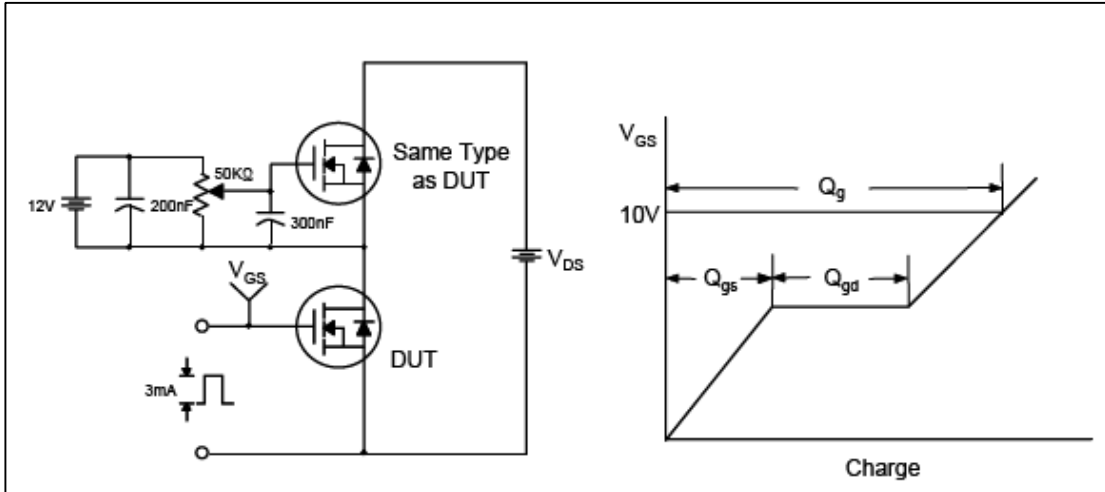


Fig.10 Gate Test Circuit & Waveform

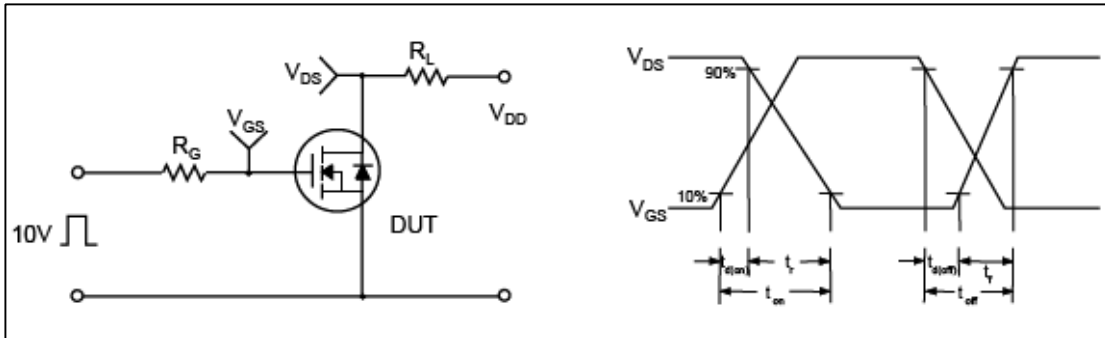


Fig.11 Resistive Switching Test Circuit & Waveform

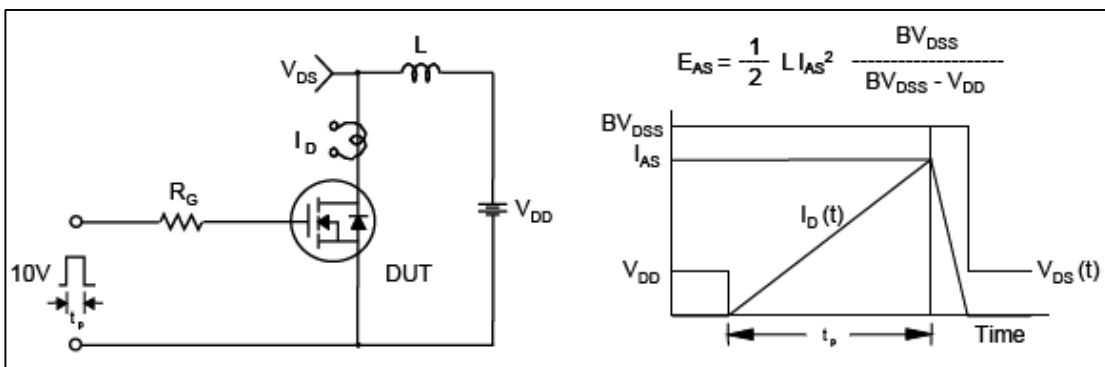


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

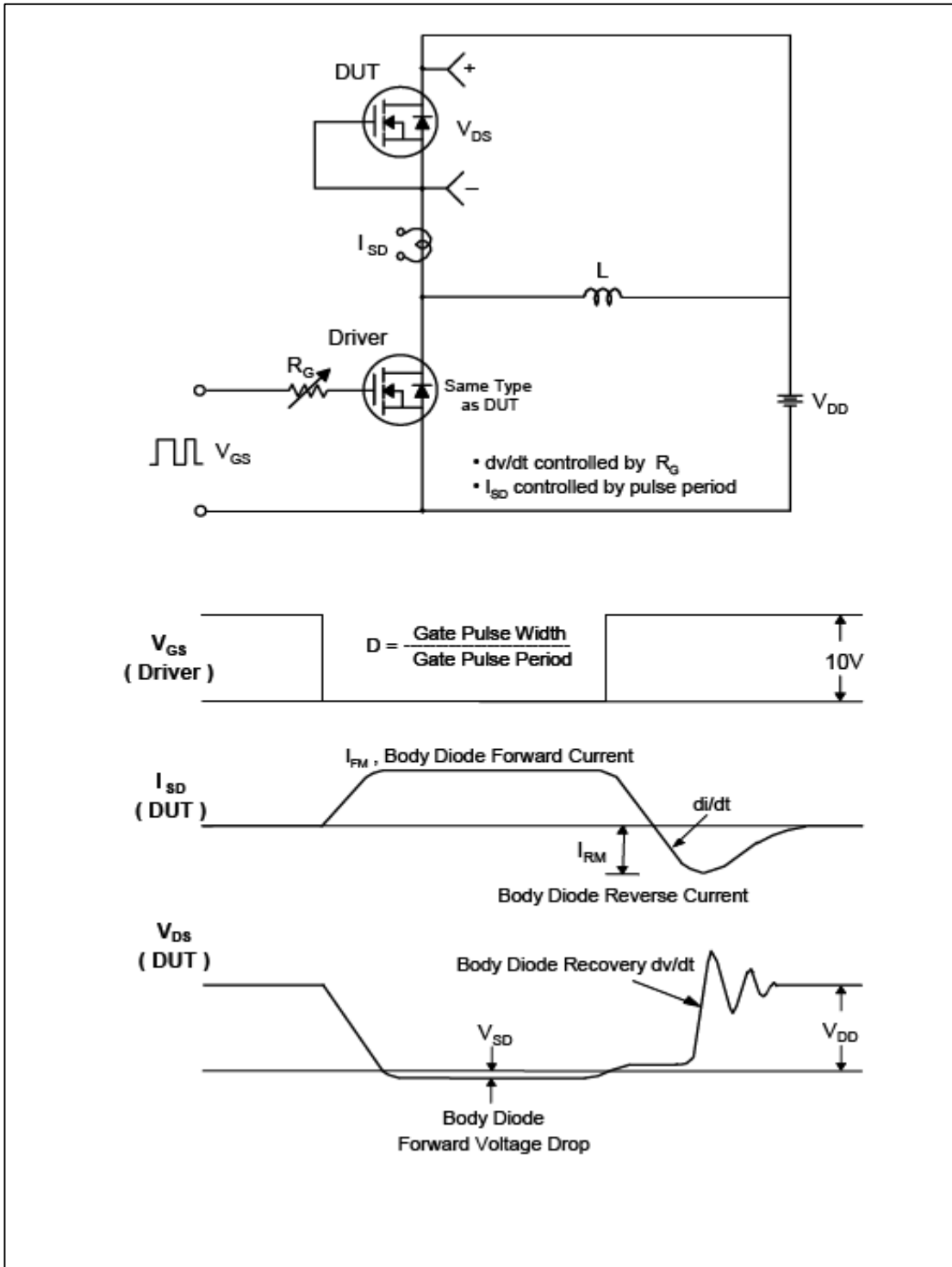


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220 Package Dimension

