

SWITCHING REGULATOR APPLICATIONS

Features

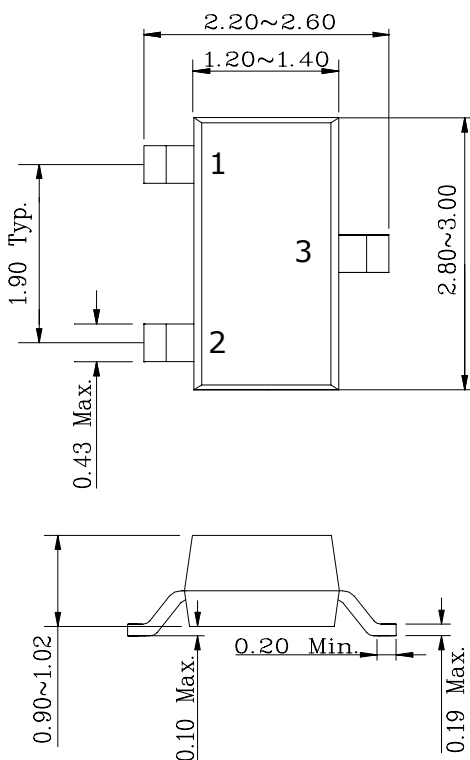
- High Voltage: $BV_{DSS}=60V(\text{Min.})$
- Low C_{rSS} : $C_{rSS}=3.1pF(\text{Typ.})$
- Low gate charge : $Q_g=2.8nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=2.8\Omega(\text{Typ.})$

Ordering Information

Type NO.	Marking	Package Code
STK7002B	72B	SOT-23

Outline Dimensions

unit : mm



PIN Connections

1. Gate
2. Source
3. Drain

Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	60	V	
Gate-source voltage	V_{GSS}	±20	V	
Drain current (DC)	I_D	(Tc=25°C)	380	mA
		(Tc=100°C)	240	mA
Drain current (Pulsed) *	I_{DP}	1.52	A	
Drain Power dissipation **	P_D	350	mW	
Avalanche current (Single) ②	I_{AS}	380	mA	
Single pulsed avalanche energy ②	E_{AS}	3.8	mJ	
Avalanche current (Repetitive) ①	I_{AR}	380	mA	
Repetitive avalanche energy ①	E_{AR}	0.1	mJ	
Junction temperature	T_J	150	°C	
Storage temperature range	T_{stg}	-55~150		

* Limited by maximum junction temperature

** Device mounted on 99.5% Alumina 10 x 8 x 0.6mm

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-ambient	$R_{th(J-a)}$	-	357	°C/W

Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	BV_{DSS}	$I_D=10\mu A, V_{GS}=0$	60	-	-	V	
Gate-threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	1.0	-	2.5	V	
Drain-source leakage current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA	
Gate-source leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA	
Drain-Source on-resistance ④	$R_{DS(on)}$	$V_{GS}=5V, I_D=50mA$	-	2.8	4.2	Ω	
	$R_{DS(on)}$	$V_{GS}=10V, I_D=180mA$	-	2.7	4.0		
Forward transfer admittance ④	g_{fs}	$V_{DS}=3V, I_D=180mA$	-	353		mS	
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1MHz$	-	20	30	pF	
Output capacitance	C_{oss}		-	7.8	11.7		
Reverse transfer capacitance	C_{rss}		-	3.1	4.7		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V$ $I_D=380mA, R_G=25\Omega$	-	7	10.5	ns	
Turn-off delay time	$t_{d(off)}$		③④	-	11		16.5
Total gate charge	Q_g	$V_{DD}=30V, V_{GS}=10V$ $I_D=380mA$	-	2.8	4.2	nC	
Gate-source charge	Q_{gs}		③④	-	0.4		0.6
Gate-drain charge	Q_{gd}		③④	-	0.2		0.3

Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Continuous source current	I_S	Integral reverse diode in the MOSFET	-	-	380	mA
Source current (Pulsed) ①	I_{SM}		-	-	1520	
Forward voltage ④	V_{SD}	$V_{GS}=0V, I_S=0.38A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_S=380mA, V_{GS}=0V$ $dI_S/dt=10A/us$	-	39	-	ns
Reverse recovery charge	Q_{rr}		-	10	-	μC

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=10mH, I_{AS}=0.38A, V_{DD}=20V, R_G=25\Omega$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

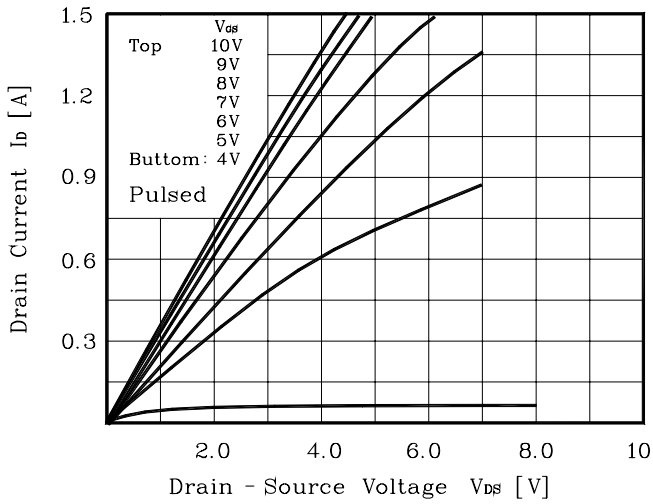


Fig. 2 $I_D - V_{GS}$

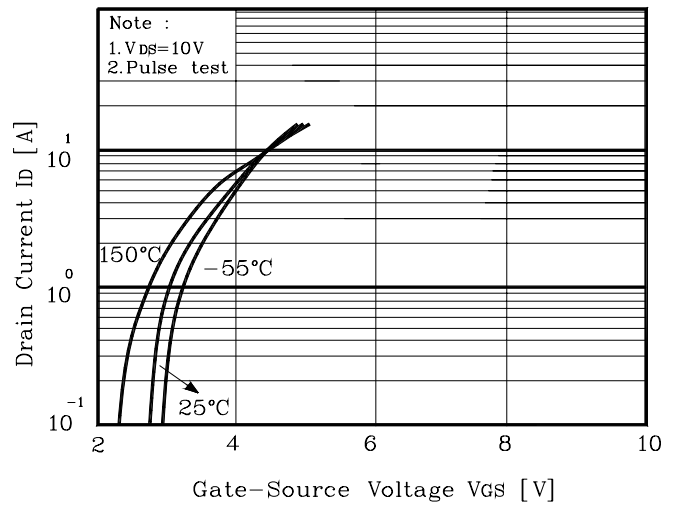


Fig. 3 $R_{DS(on)} - I_D$

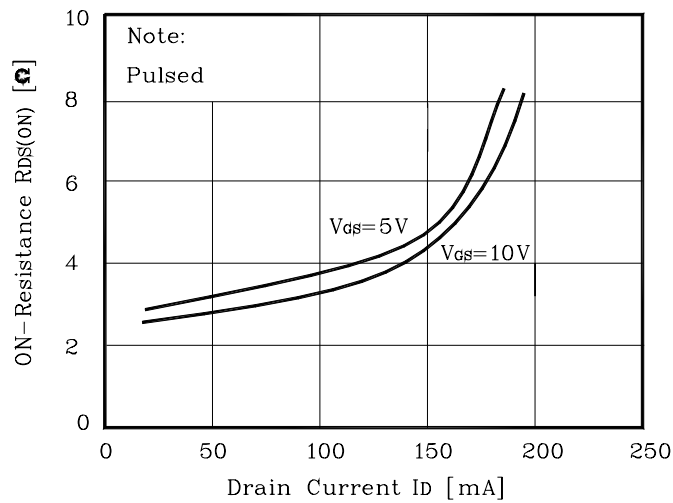


Fig. 4 $I_S - V_{SD}$

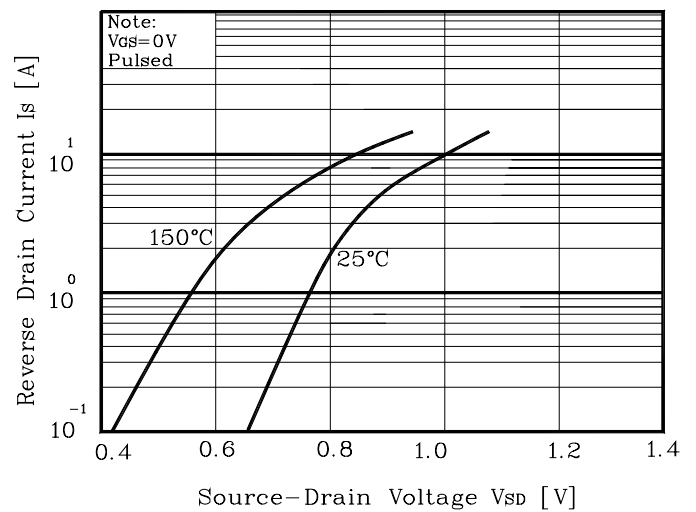


Fig. 5 Capacitance - V_{DS}

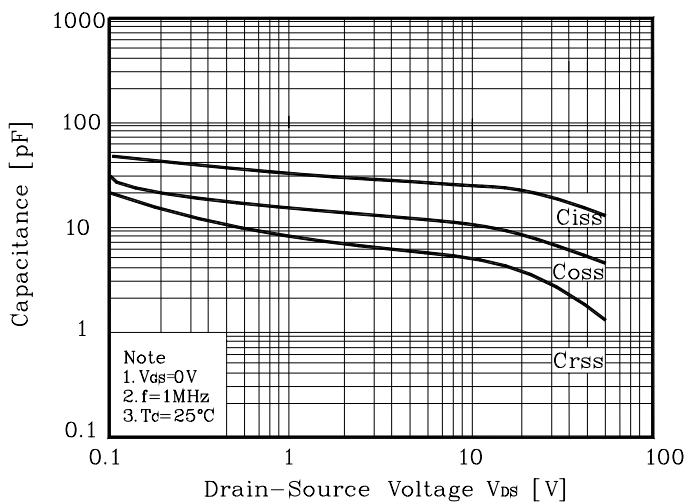


Fig. 6 $V_{GS} - Q_G$

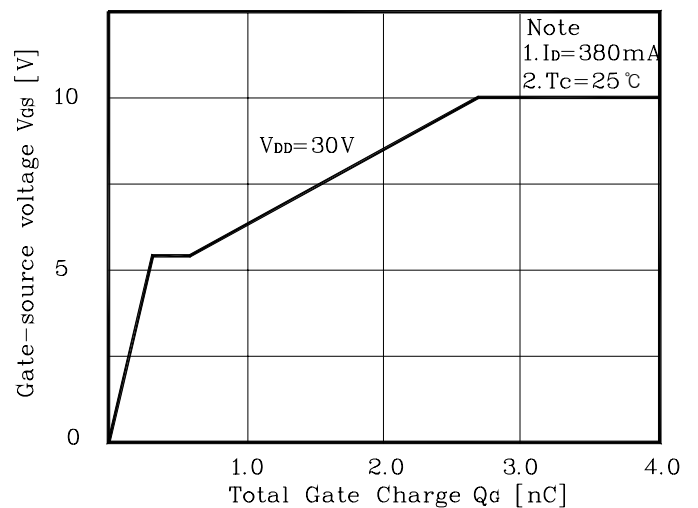


Fig. 7 $V_{DSS} - T_J$

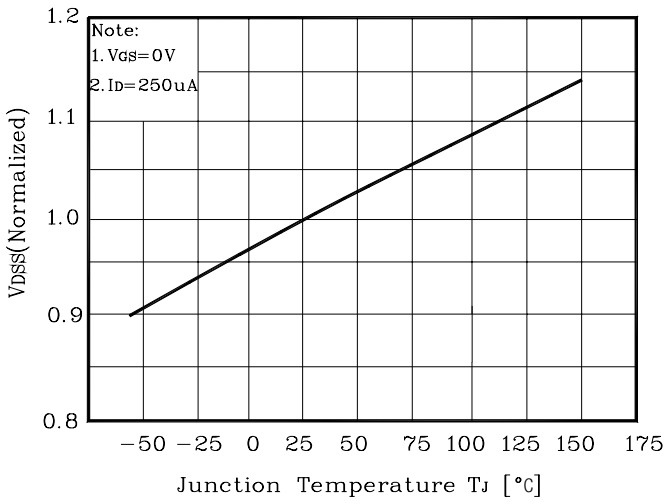


Fig. 8 $R_{DS(on)} - T_J$

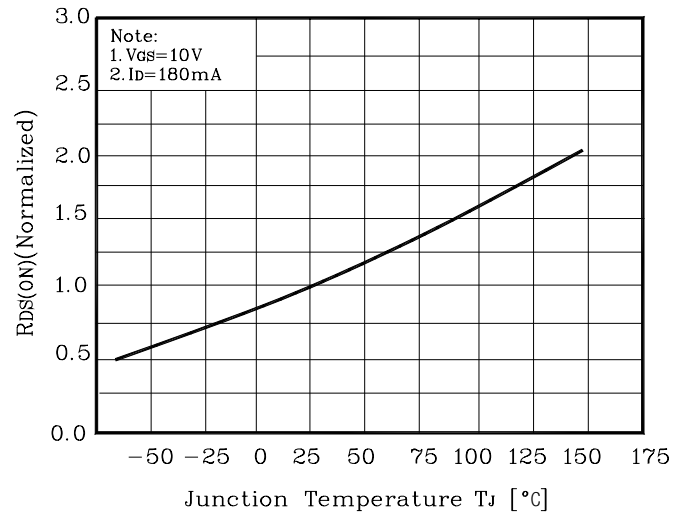


Fig. 9 $I_D - T_C$

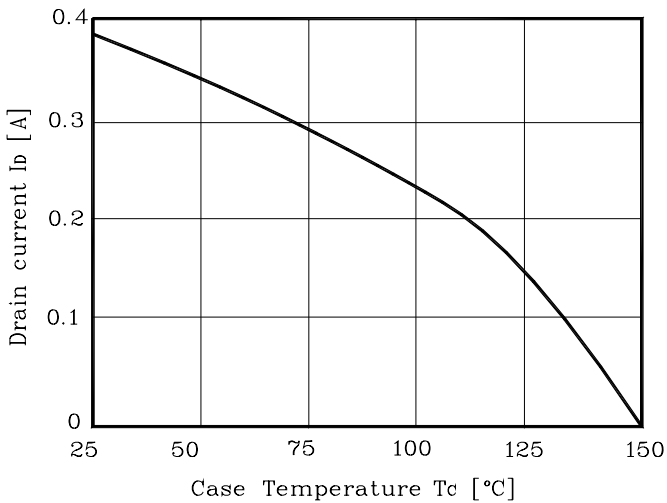


Fig. 10 Safe Operating Area

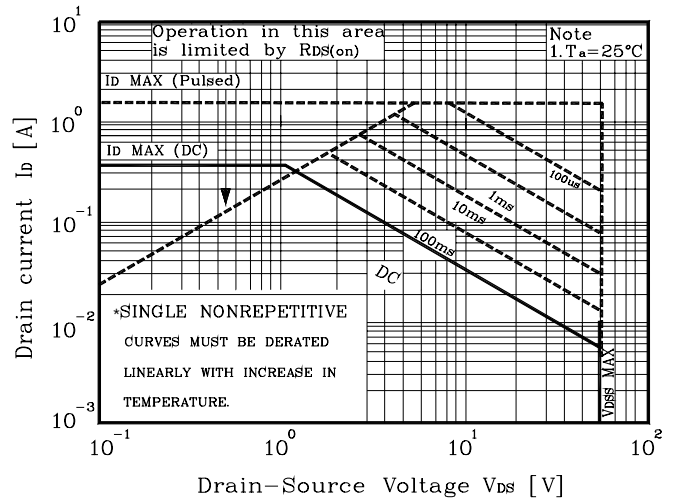


Fig. 11 Gate Charge Test Circuit & Waveform

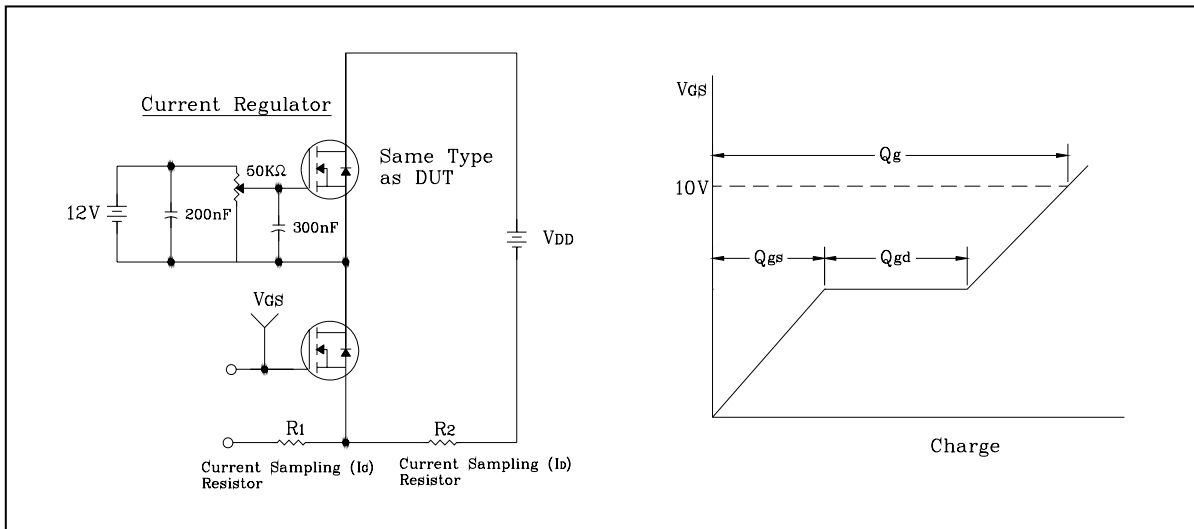


Fig. 12 Resistive Switching Test Circuit & Waveform

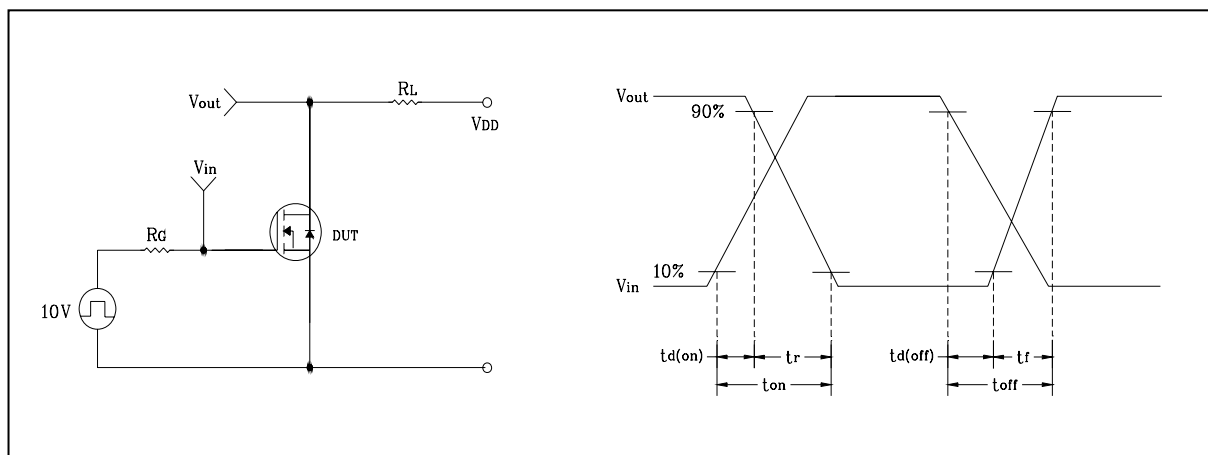


Fig. 13 EAS Test Circuit & Waveform

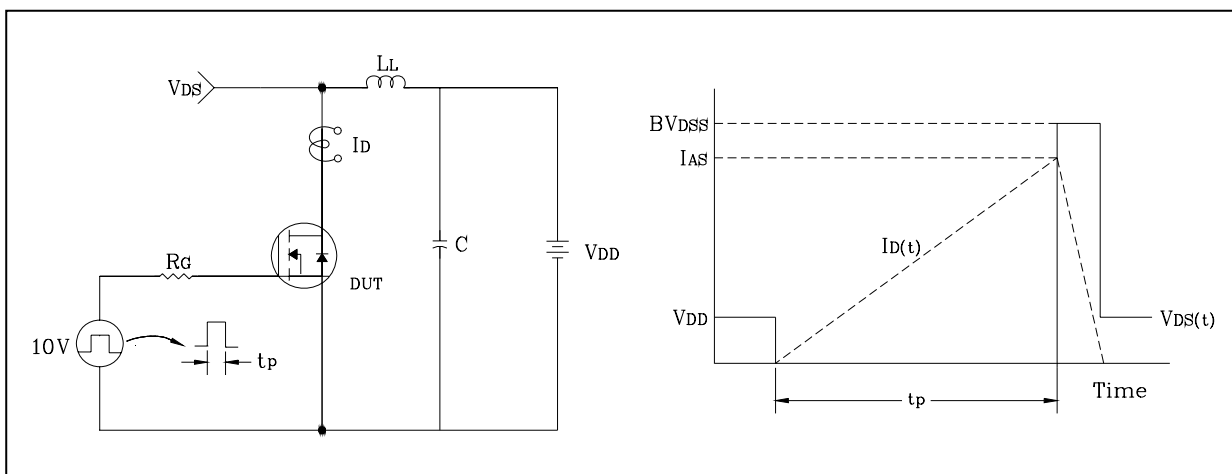
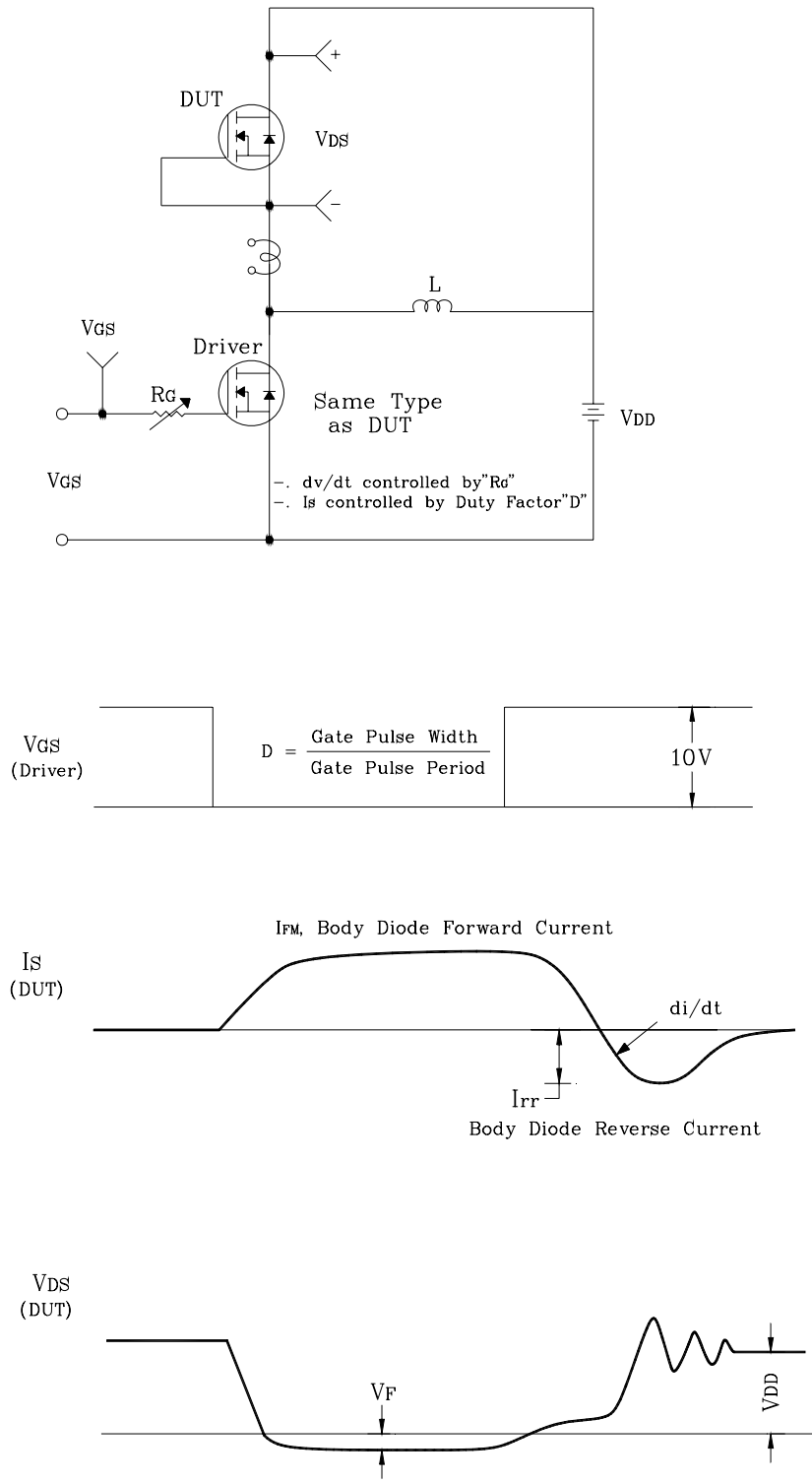


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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