

SWITCHING REGULATOR APPLICATIONS

Features

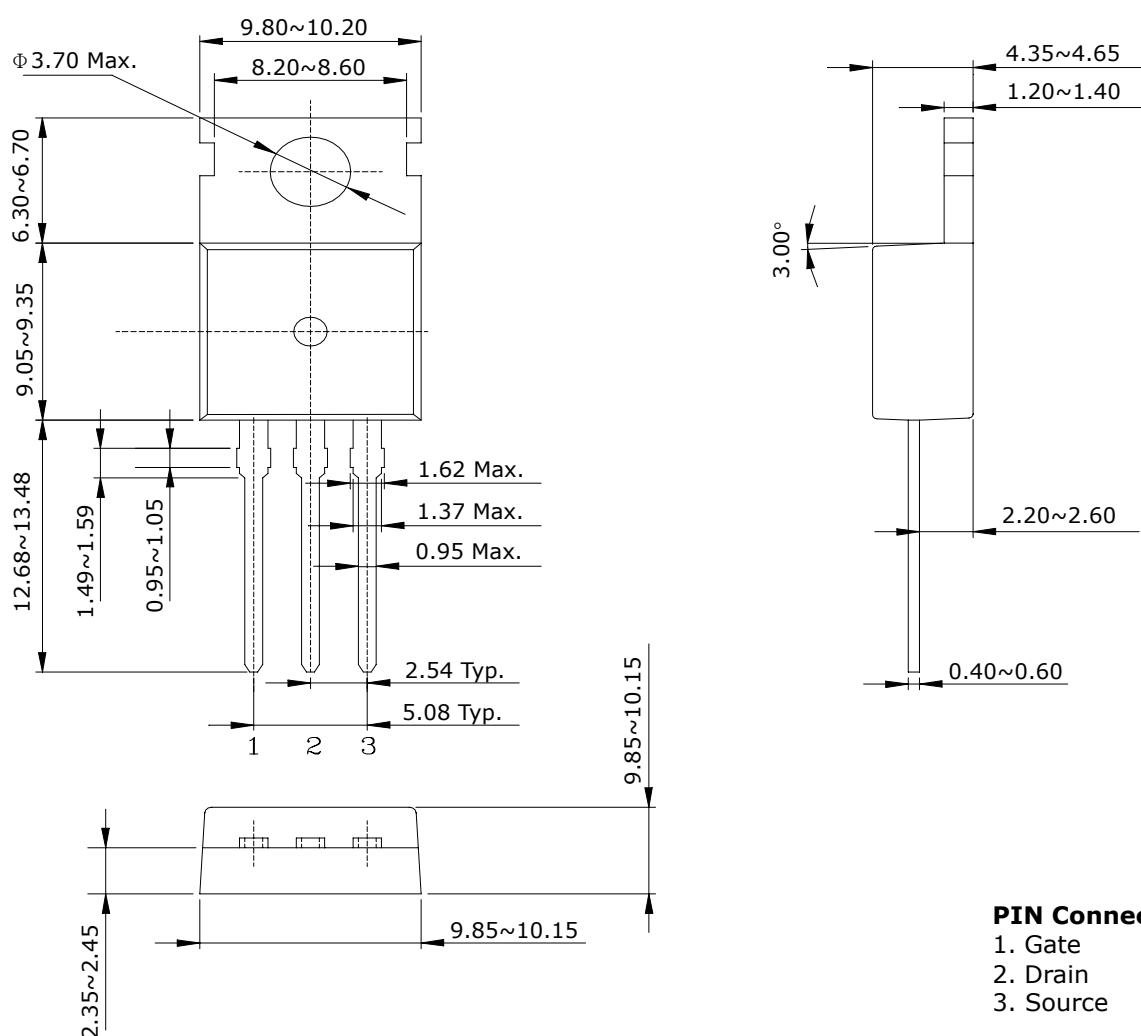
- High Voltage: $BV_{DSS}=500V(\text{Min.})$
- Low C_{RSS} : $C_{RSS}=12pF(\text{Typ.})$
- Low gate charge : $Q_g=28nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.8\Omega(\text{Max.})$

Ordering Information

Type NO.	Marking	Package Code
STK0850P	STK0850	TO-220AB-3L

Outline Dimensions

unit : mm



PIN Connections

1. Gate
2. Drain
3. Source

Absolute maximum ratings
(Tc=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	500	V
Gate-source voltage	V_{GSS}	±30	V
Drain current (DC)	I_D	(Tc=25°C)	8
		(Tc=100°C)	3.9
Drain current (Pulsed) *	I_{DM}	32	A
Drain power dissipation	P_D	65	W
Avalanche current (Single) ②	I_{AS}	8	A
Single pulsed avalanche energy ②	E_{AS}	360	mJ
Avalanche current (Repetitive) ①	I_{AR}	8	A
Repetitive avalanche energy ①	E_{AR}	7.5	mJ
Junction temperature	T_J	150	°C
Storage temperature range	T_{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	1.92	°C/W
	Junction-ambient	$R_{th(J-a)}$	-	83.3	

Electrical Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0$	500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.0A$	-	0.65	0.8	Ω
Forward transfer conductance ④	g_{fs}	$V_{DS}=10V, I_D=4.0A$	-	6.5	-	S
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1MHz$	-	950	1430	pF
Output capacitance	C_{oss}		-	100	150	
Reverse transfer capacitance	C_{rss}		-	12	18	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=200V, I_D=8A$ $R_G=25\Omega$ ③④	-	18	-	ns
Rise time	t_r		-	65	-	
Turn-off delay time	$t_{d(off)}$		-	93	-	
Fall time	t_f		-	64	-	
Total gate charge	Q_g	$V_{DS}=200V, V_{GS}=10V$ $I_D=8A$ ③④	-	28	42	nC
Gate-source charge	Q_{gs}		-	5	8	
Gate-drain charge	Q_{gd}		-	10	15	

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Units
Continuous source current	I_S	Integral reverse diode in the MOSFET	-	-	8	A
Pulsed-source current ①	I_{SM}		-	-	32	
Forward voltage ④	V_{SD}	$V_{GS}=0V, I_S=8A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_S=8A, V_{GS}=0$ $di_S/dt=100A/us$	-	335	-	ns
Reverse recovery charge	Q_{rr}		-	4.55	-	μC

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=10mH, I_{AS}=8A, V_{DD}=50V, R_G=27\Omega$, starting $T_J=25^\circ C$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

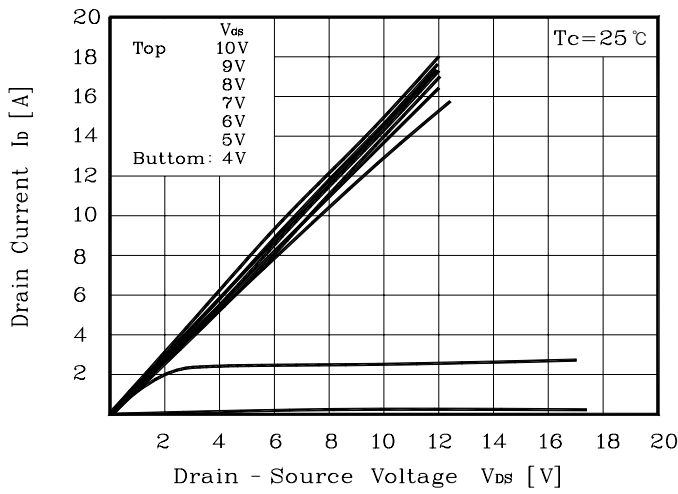


Fig. 2 $I_D - V_{GS}$

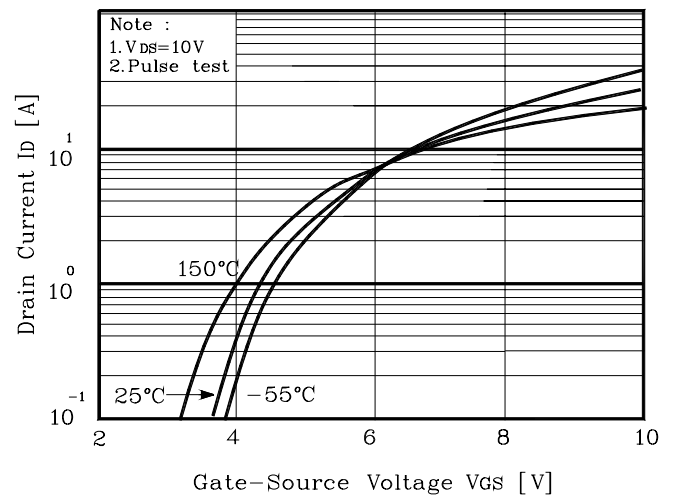


Fig. 3 $R_{DS(on)} - I_D$

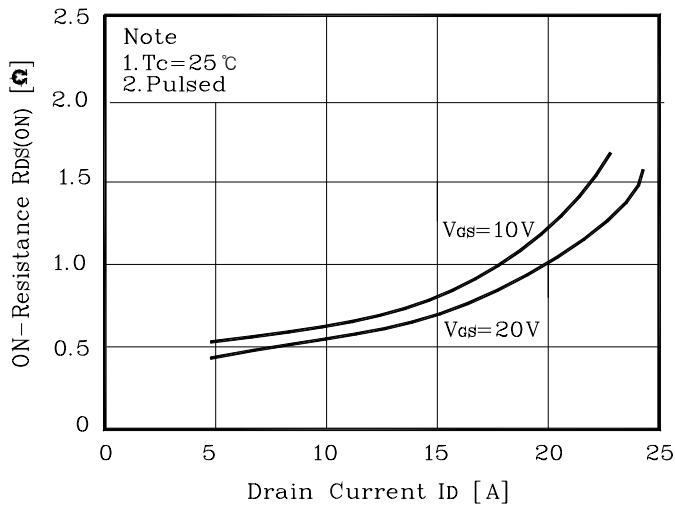


Fig. 4 $I_S - V_{SD}$

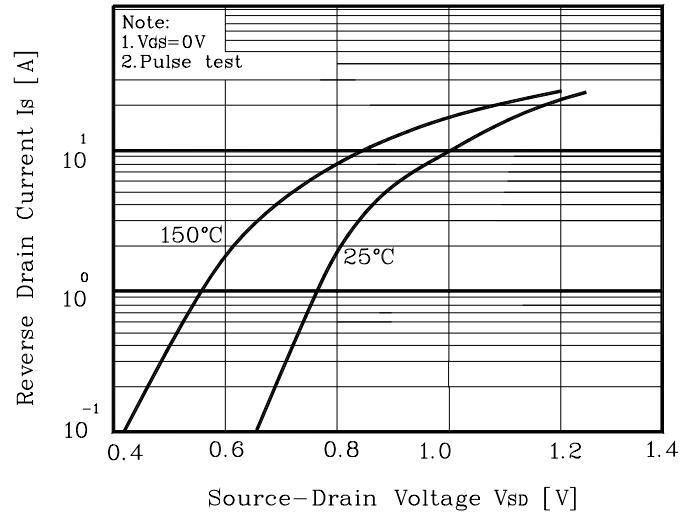


Fig. 5 Capacitance - V_{DS}

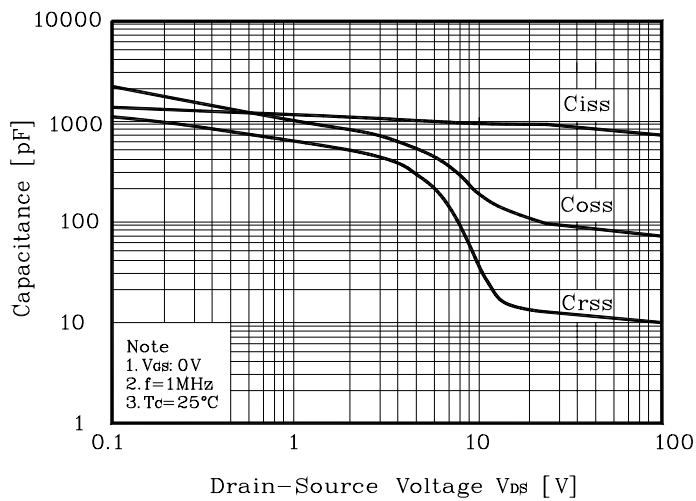


Fig. 6 $V_{GS} - Q_G$

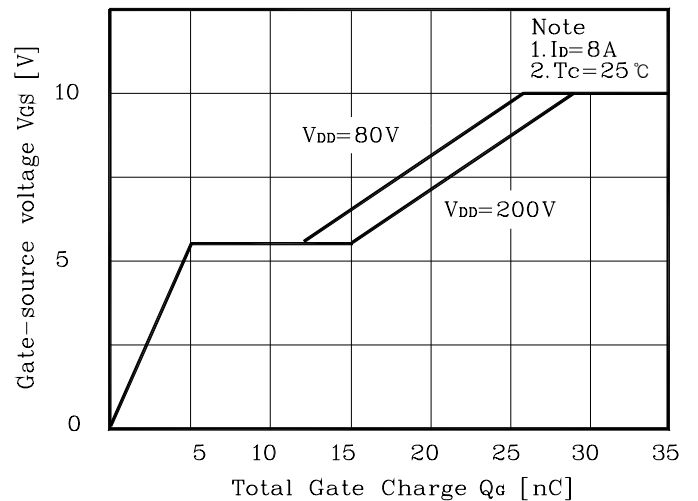


Fig. 7 $V_{DSS} - T_J$

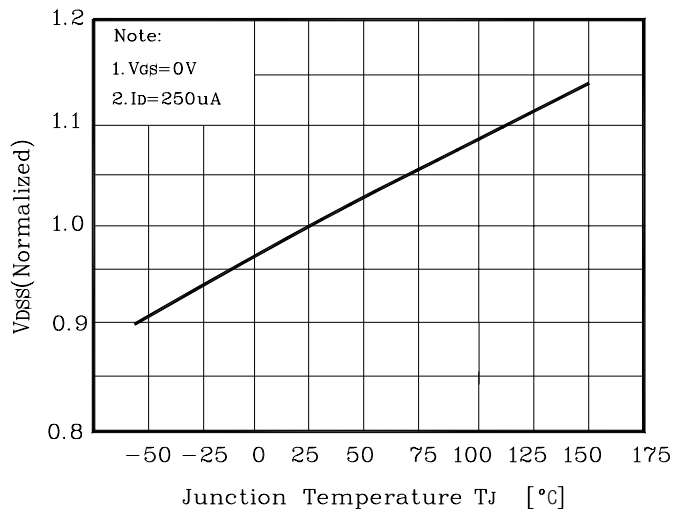


Fig.8 $R_{DS(on)} - T_J$

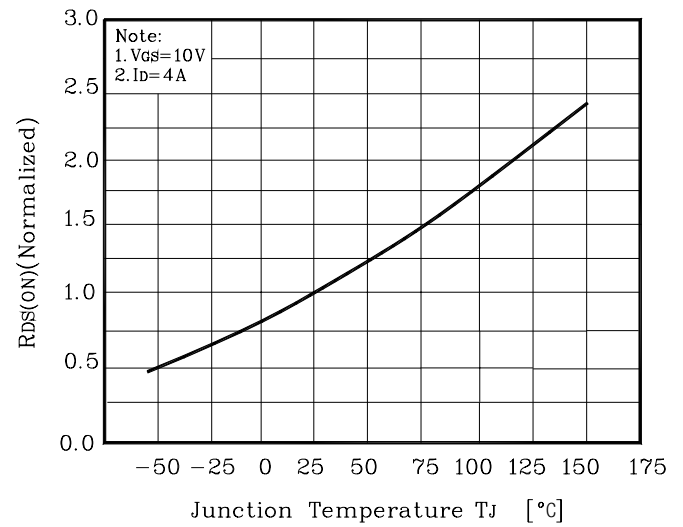


Fig. 9 $I_D - T_C$

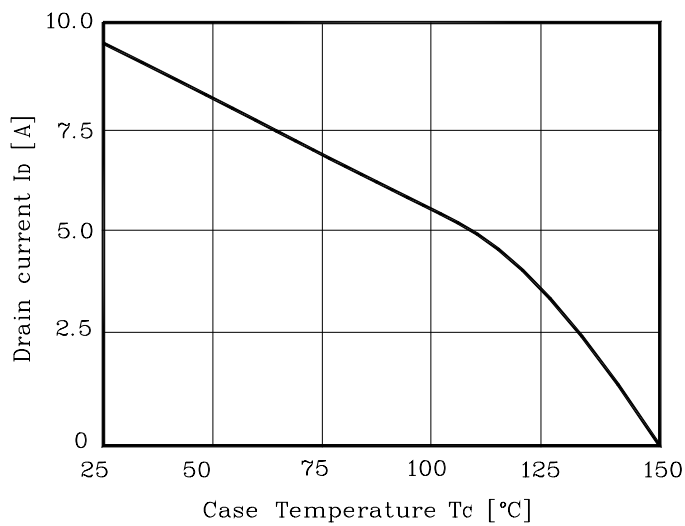


Fig. 10 Safe Operating Area

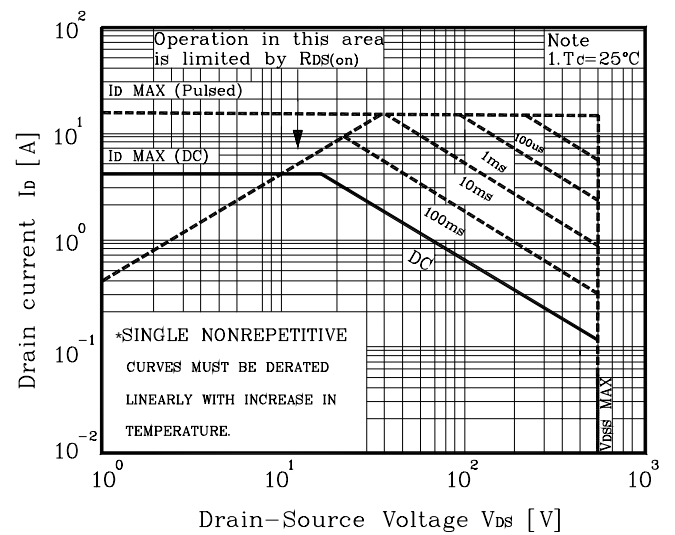


Fig. 10 Gate Charge Test Circuit & Waveform

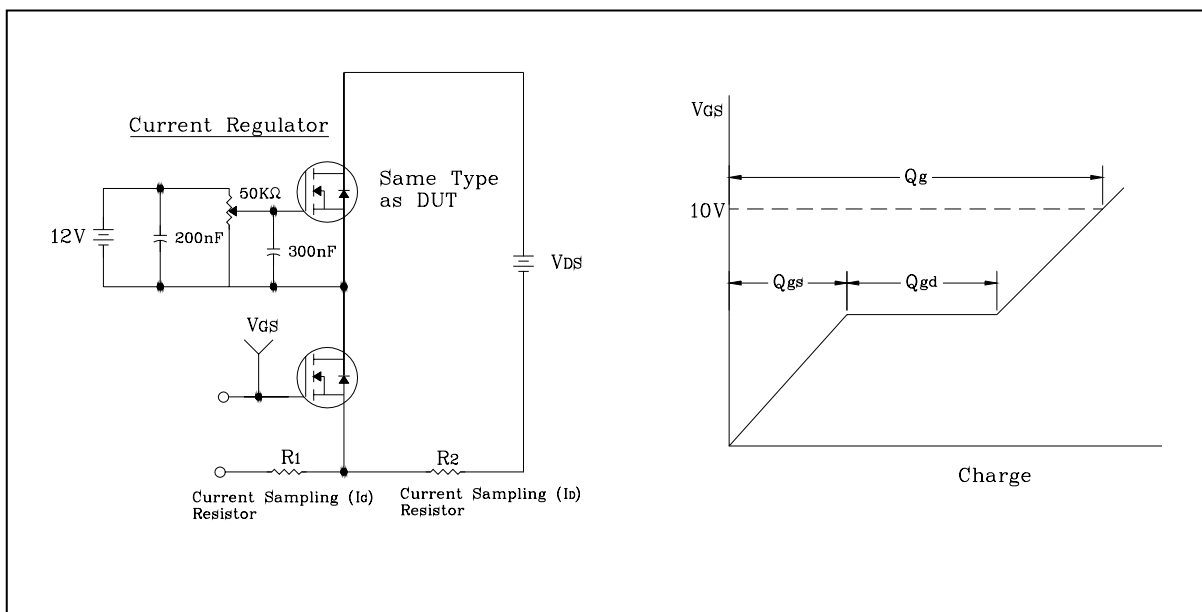


Fig. 11 Resistive Switching Test Circuit & Waveform

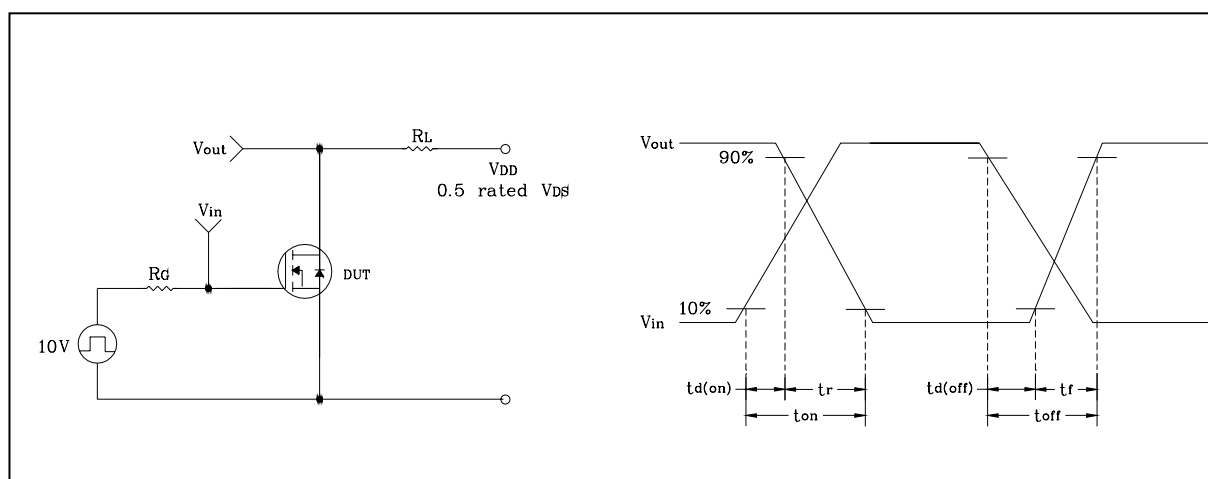


Fig. 12 E_{AS} Test Circuit & Waveform

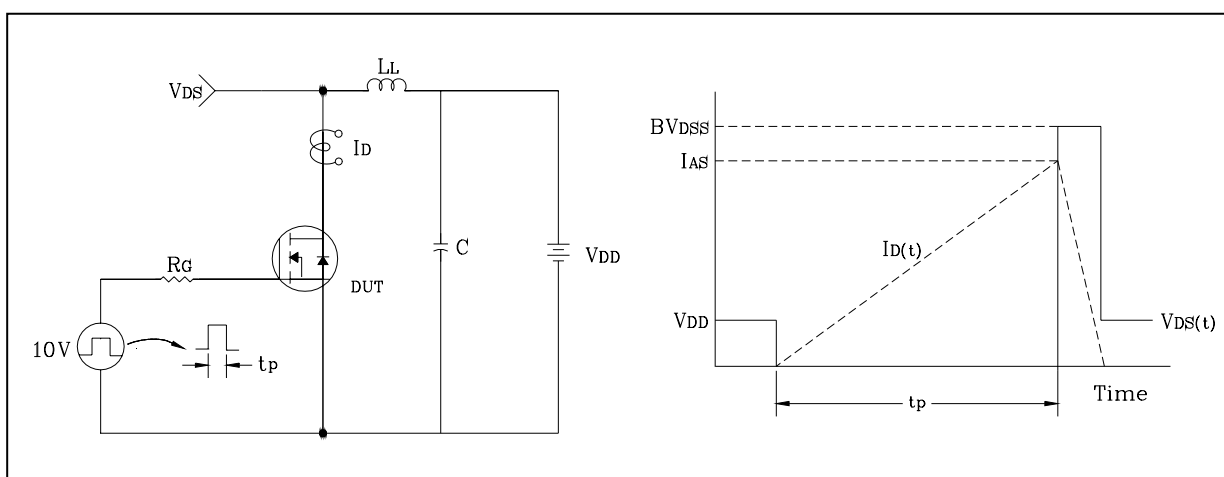
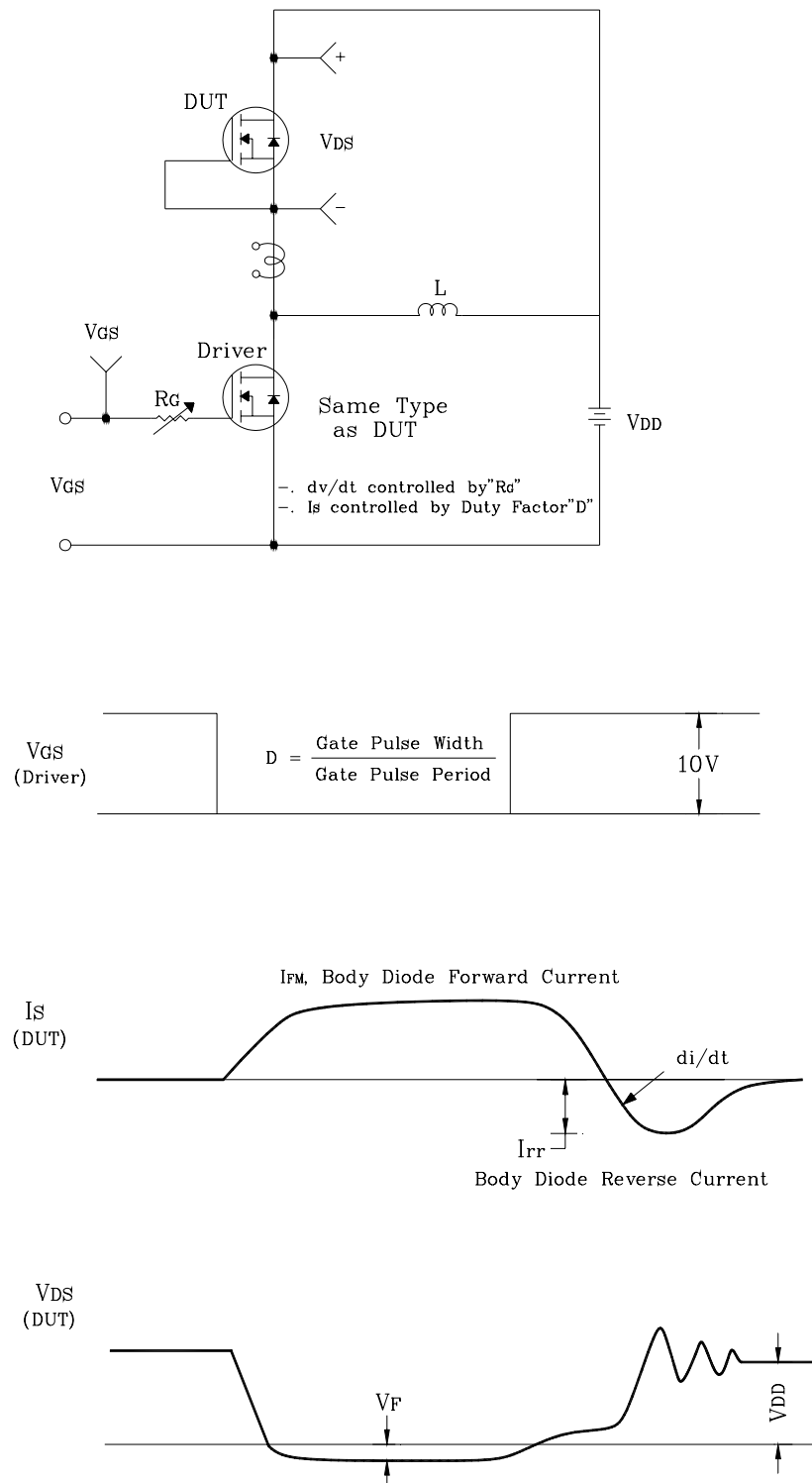


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform



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