

**SWITCHING REGULATOR APPLICATIONS**

**Features**

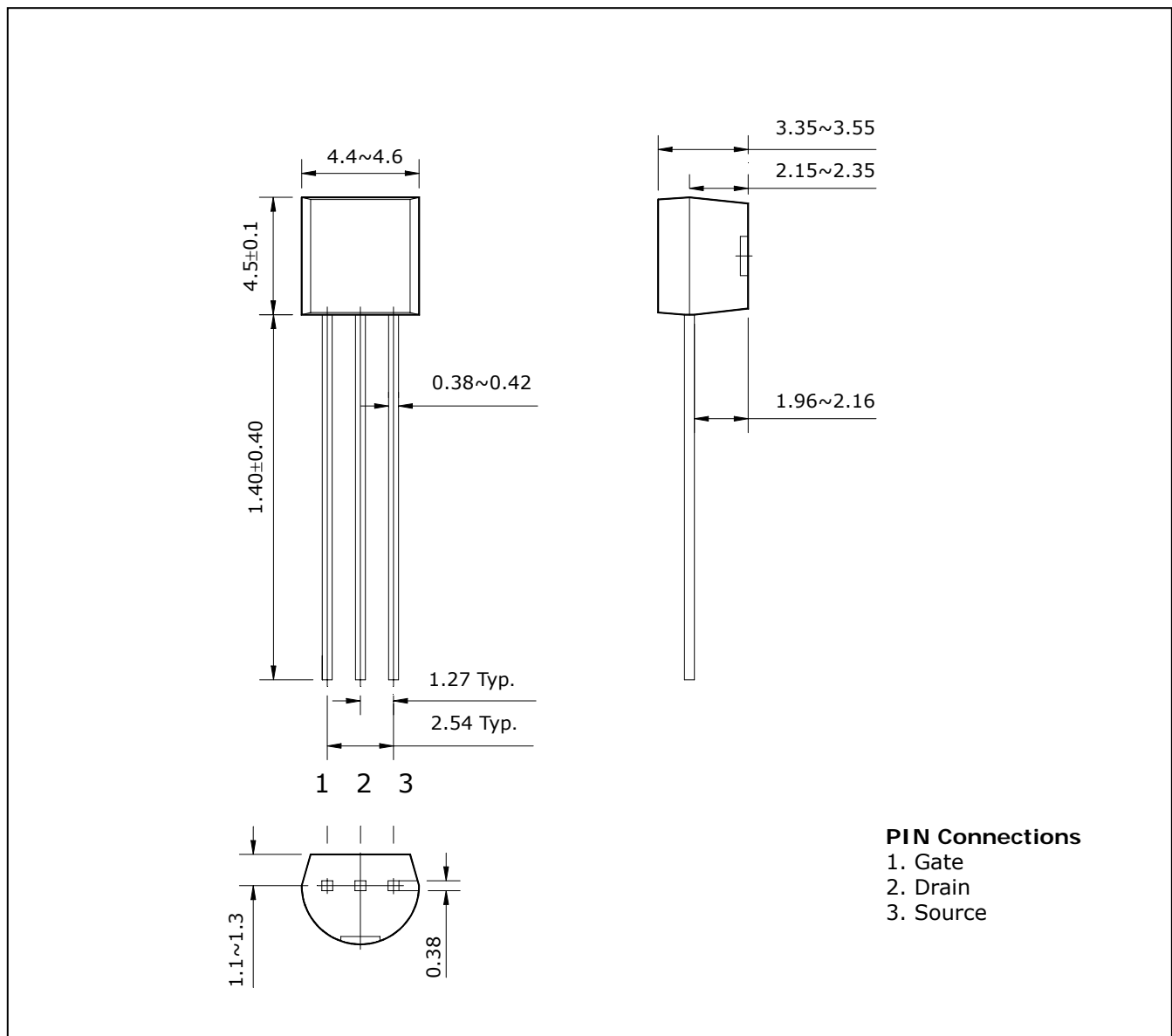
- High Voltage:  $BV_{DSS}=600V(\text{Min.})$
- Low  $C_{rss}$  :  $C_{rss}=4pF(\text{Typ.})$
- Low gate charge :  $Qg=12nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=9.0\Omega(\text{Typ.})$

**Ordering Information**

Type NO.	Marking	Package Code
STK0160	STK0160	TO-92

**Outline Dimensions**

unit : mm



## Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	600	V
Gate-source voltage	$V_{GSS}$	±30	V
Drain current (DC) **	$I_D$	0.3	A
Drain current (Pulsed) *	$I_{DP}$	1.2	A
Total Power dissipation **	$P_D$	625	mW
Avalanche current (Single) ②	$I_{AS}$	0.3	A
Single pulsed avalanche energy ②	$E_{AS}$	53	mJ
Avalanche current (Repetitive) ①	$I_{AR}$	0.3	A
Repetitive avalanche energy ①	$E_{AR}$	1.1	mJ
Junction temperature	$T_J$	150	°C
Storage temperature range	$T_{stg}$	-55~150	

\* Limited by maximum junction temperature

\*\* Device mounted on a glass-epoxy board

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-ambient	$R_{th(J-a)}$ **	-	200	°C/W

## N-CH Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0$	600	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	3.0	-	5.0	V	
Drain-source cut-off current	$I_{DSS}$	$V_{DS}=600V, V_{GS}=0V$	-	-	1	$\mu A$	
Gate leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	$\pm 100$	nA	
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=150mA$	-	9.0	13.5	$\Omega$	
Forward transfer conductance ④	$g_{fs}$	$V_{DS}=3V, I_D=150mA$	-	0.32	-	S	
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V,$ $f=1MHz$	-	130	-	pF	
Output capacitance	$C_{oss}$		-	20	-		
Reverse transfer capacitance	$C_{rss}$		-	4	-		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=0.3A$ $R_G=25\Omega$	-	5.5	-	ns	
Rise time	$t_r$		-	5	-		
Turn-off delay time	$t_{d(off)}$		③④	-	13		-
Fall time	$t_f$		-	-	28		-
Total gate charge	$Q_g$	$V_{DD}=300V, V_{GS}=10V$ $I_D=0.3A$	-	12	18	nC	
Gate-source charge	$Q_{gs}$		③④	-	2.5		3.8
Gate-drain charge	$Q_{gd}$		-	-	3.0		4.5

## Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current	$I_S$	Integral reverse diode in the MOSFET	-	-	0.3	A
Source current(Plused) ①	$I_{SM}$		-	-	1.2	
Forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=0.3A$	-	0.7	1.2	V
Reverse recovery time	$t_{rr}$	$I_S=0.3A, V_{GS}=0V$ $dI_S/dt=80A/us$	-	260	-	ns
Reverse recovery charge	$Q_{rr}$		-	-	3.5	-

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=80.3mH, I_{AS}=1.1A, V_{DD}=50V, R_G=25\Omega$
- 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  $I_D - V_{GS}$

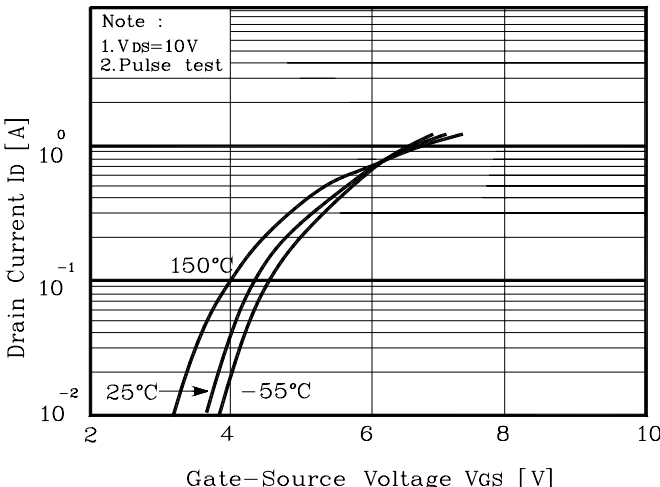


Fig. 3  $R_{DS(on)} - I_D$

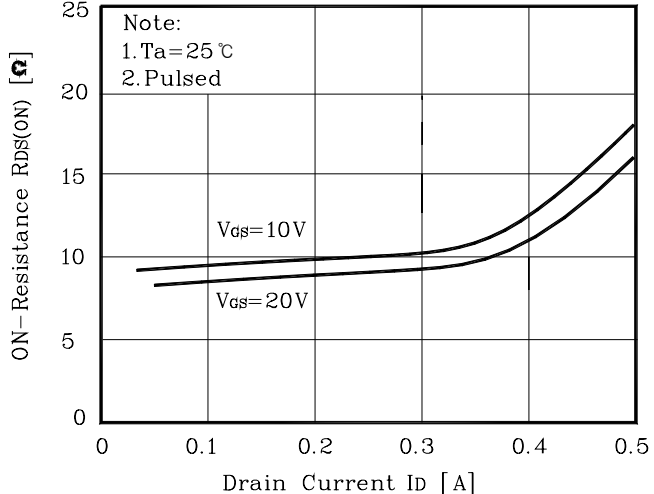


Fig. 4  $I_S - V_{SD}$

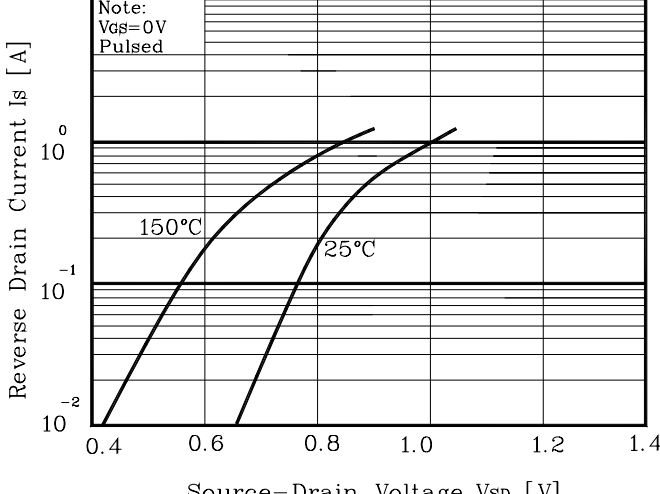


Fig. 5 Capacitance -  $V_{DS}$

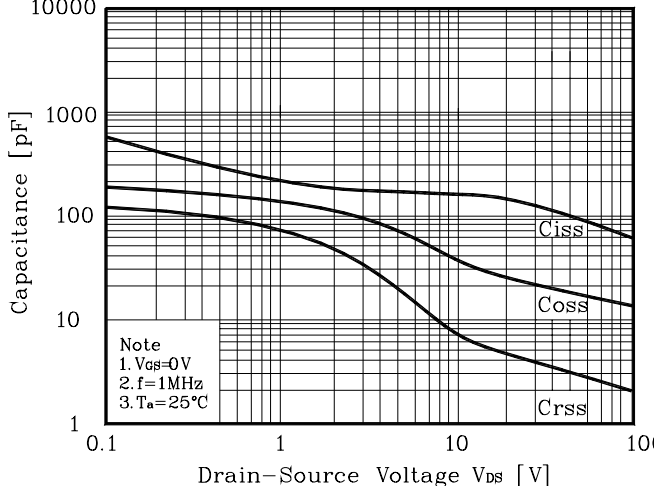
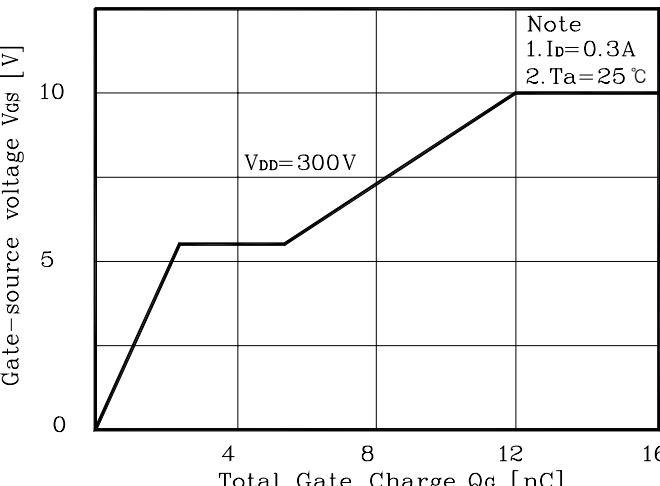
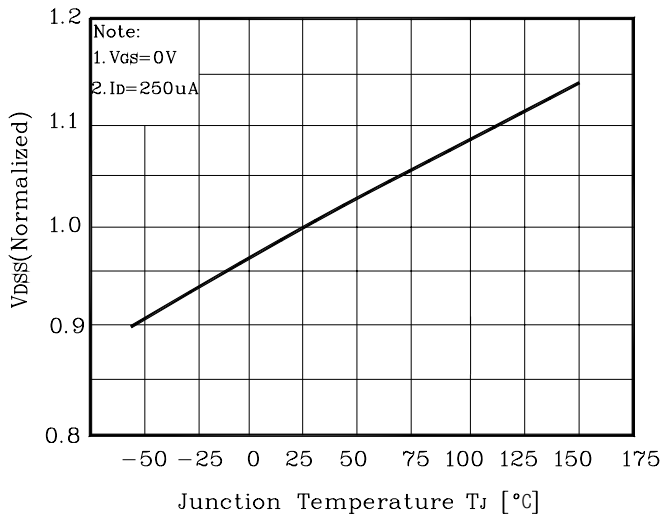


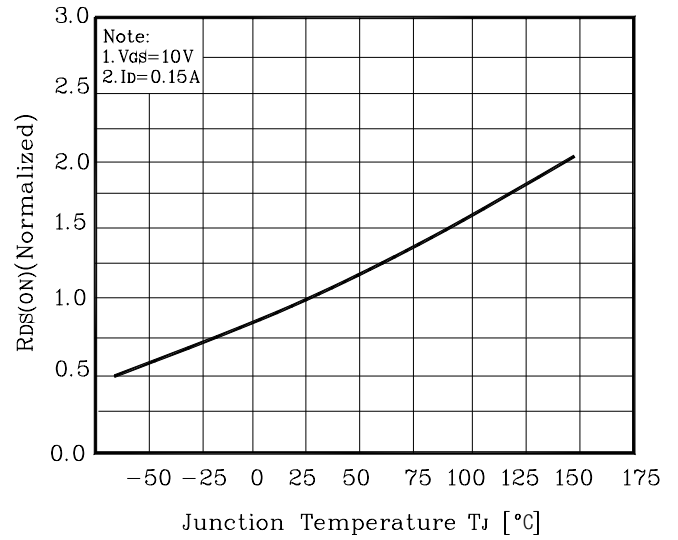
Fig. 6  $V_{GS} - Q_G$



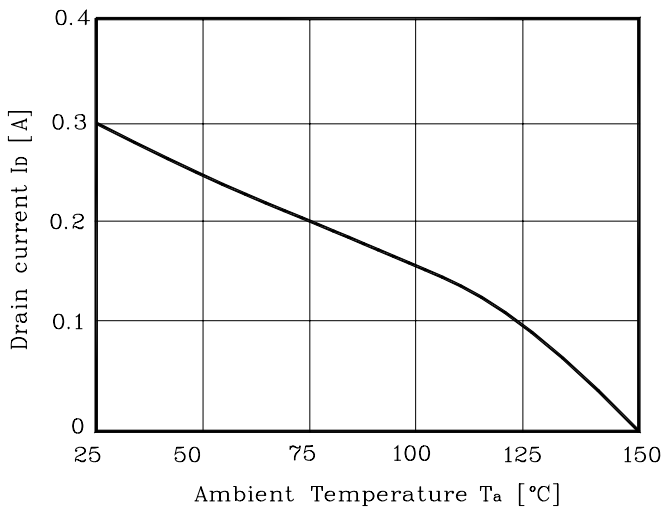
**Fig. 7  $V_{DSS} - T_J$**



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



**Fig. 9  $I_D - T_a$**



**Fig. 10 Safe Operating Area**

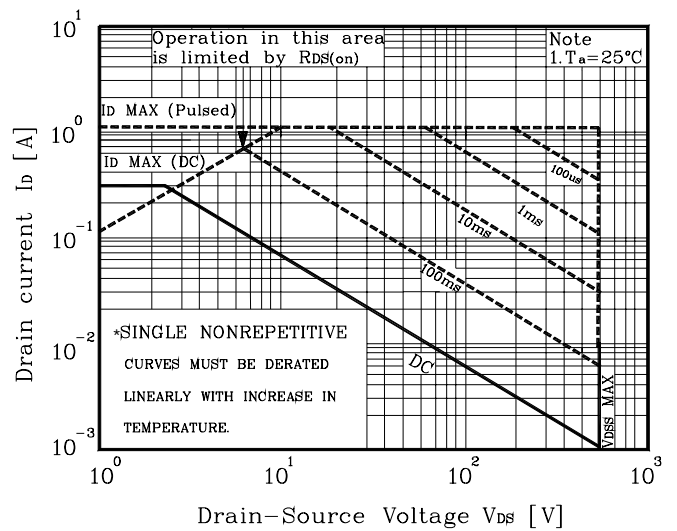


Fig. 11 Gate Charge Test Circuit & Waveform

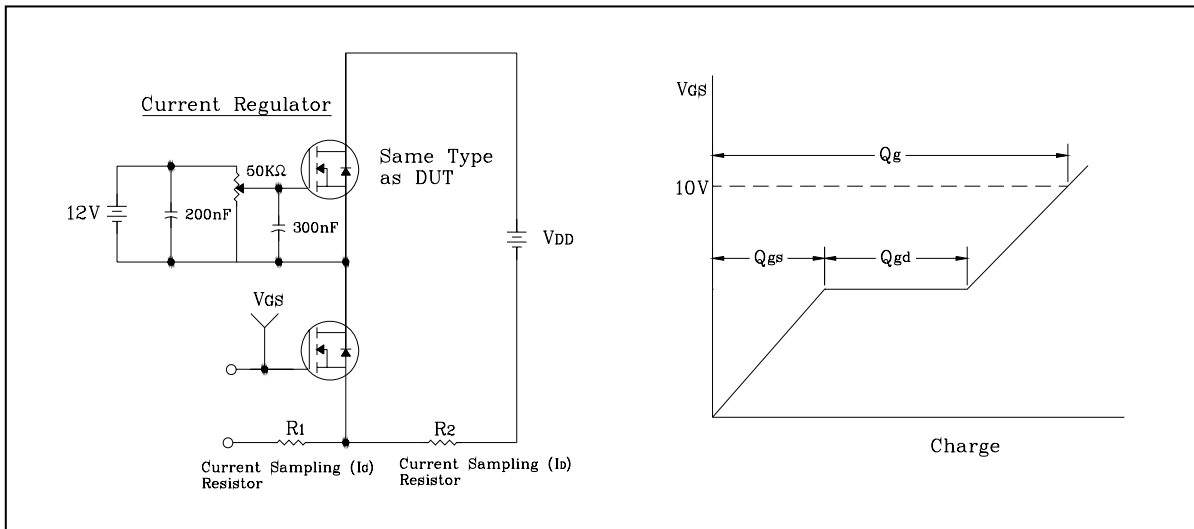


Fig. 12 Resistive Switching Test Circuit & Waveform

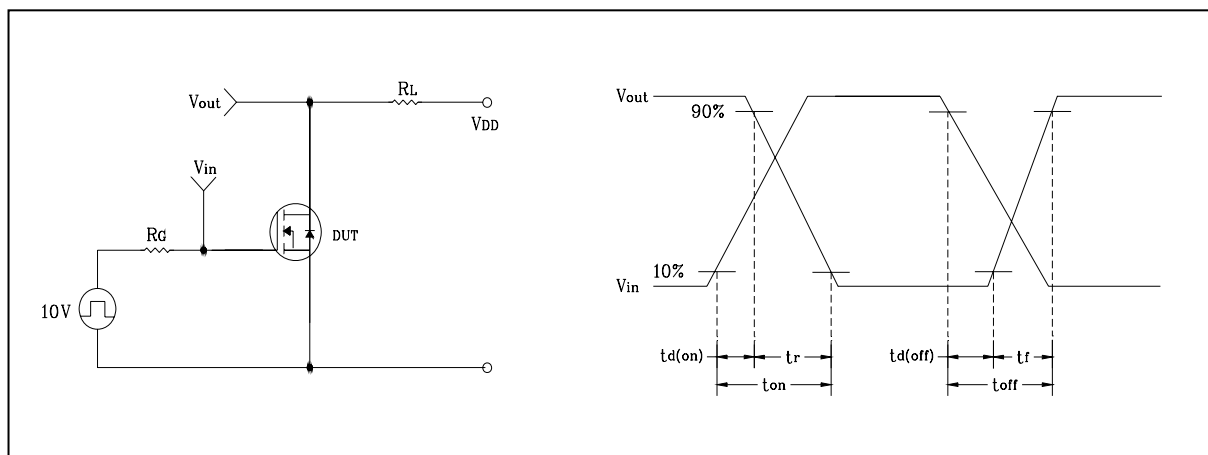


Fig. 13  $E_{AS}$  Test Circuit & Waveform

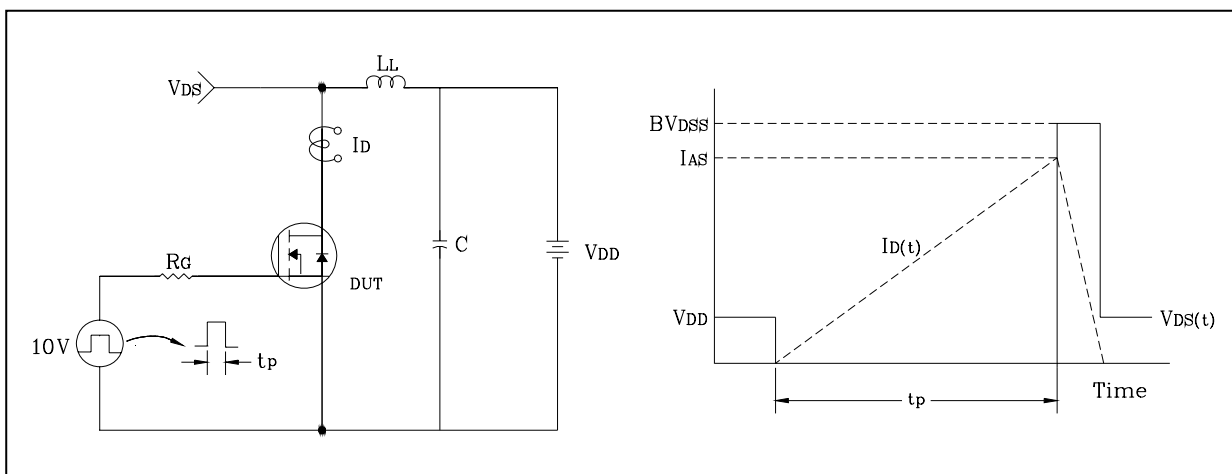
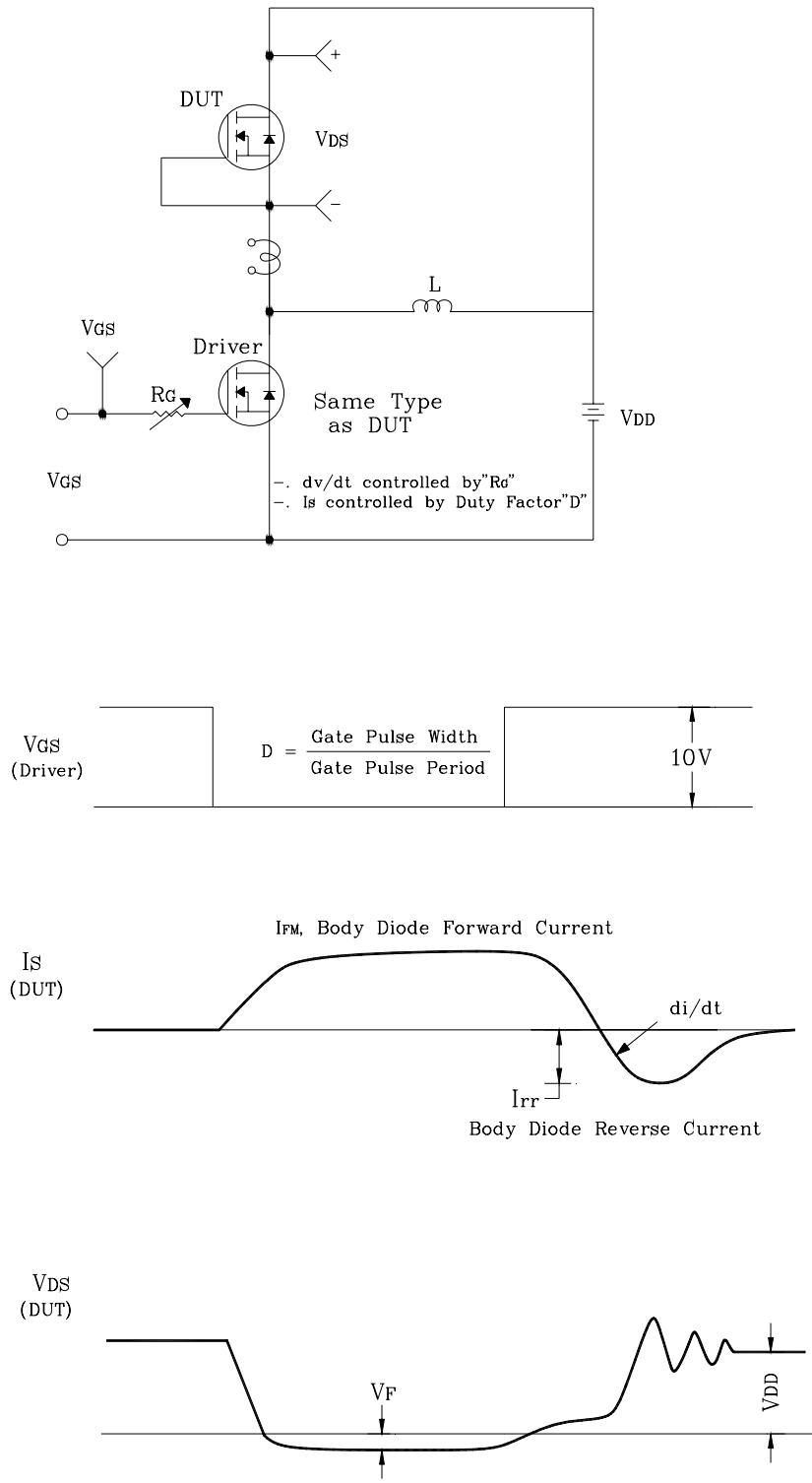


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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