

SWITCHING REGURATOR APPLICATIONS

**Features**

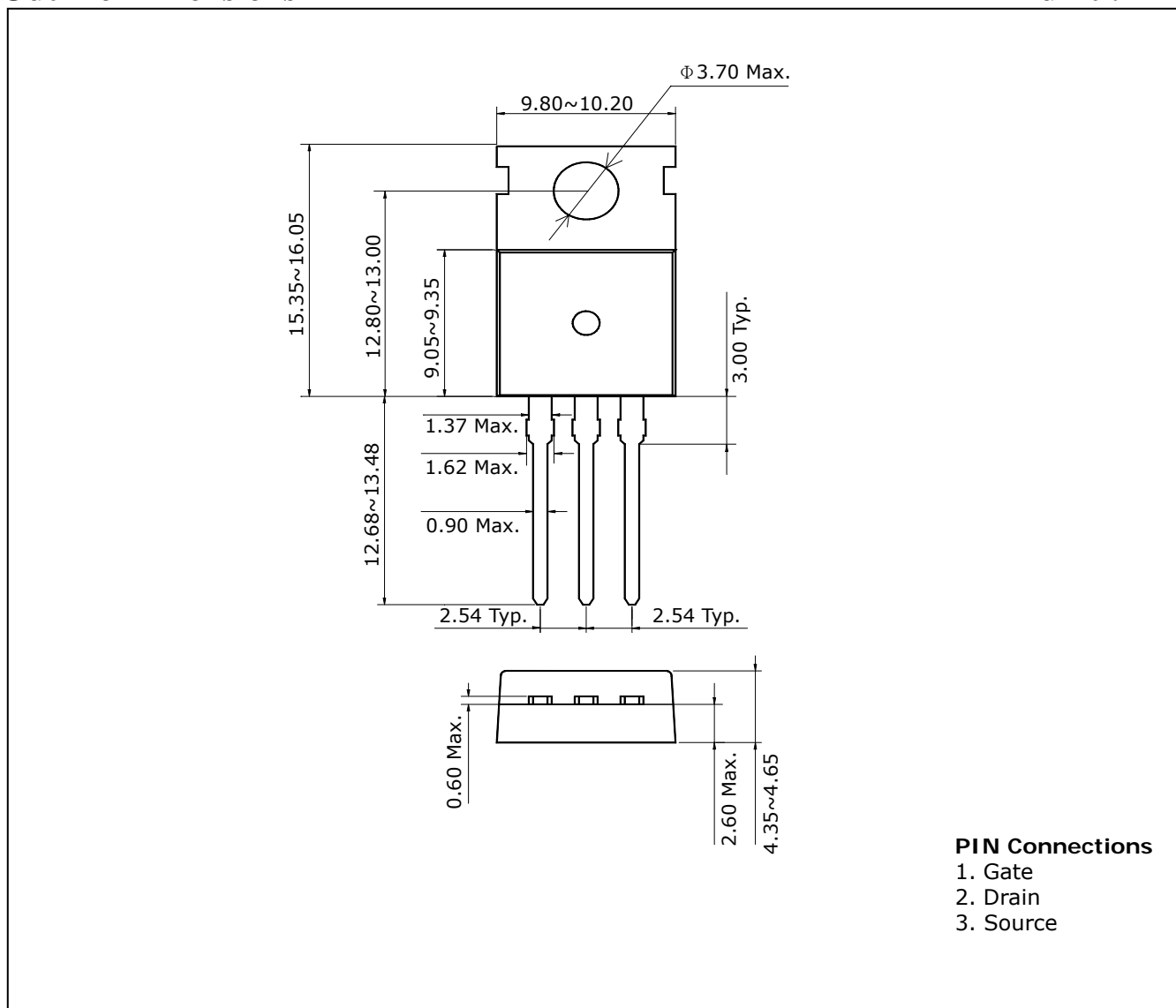
- High Voltage:  $BV_{DSS}=80V(\text{Min.})$
- Low  $C_{rSS}$  :  $C_{rSS}=220pF(\text{Typ.})$
- Low gate charge :  $Qg=80nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=17m\Omega(\text{Max.})$

**Ordering Information**

Type NO.	Marking	Package Code
STK7508P	STK7508	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	$V_{DSS}$	80	V
Gate-Source voltage	$V_{GSS}$	±20	V
Continuous Drain current (Tc=25°C)	$I_D$	75	A
Continuous Drain current (Tc=100°C)	$I_D$	54.3	A
Drain Current-Pulsed ①	$I_{DM}$	300	A
Power Dissipation (Tc=25°C)	$P_D$	220	W
Single Pulsed Avalanche Energy ②	$E_{AS}$	1310	mJ
Avalanche current ①	$I_{AR}$	75	A
Repetitive Avalanche Energy ①	$E_{AR}$	17.3	mJ
Junction temperature	$T_J$	175	°C
Storage temperature range	$T_{stg}$	-55~175	

## Thermal Resistance

Characteristic	Symbol	Typ.	Max	Units
Junction to Case	$R_{th(J-C)}$	-	0.68	°C/W
Junction to Ambient	$R_{th(J-a)}$	-	62.5	

## Electrical Characteristics (Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-Source breakdown voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0$	80	-	-	V	
Gate-Threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	2.0	-	4.0	V	
Drain-source leakage current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$	-	-	10	$\mu A$	
Gate-source leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA	
Drain-Source on-resistance ③	$R_{DS(on)}$	$V_{GS}=10V, I_D=37.5A$	-	14	17	m $\Omega$	
Forward transfer admittance ③	$g_{fs}$	$V_{DS}=20V, I_D=37.5A$	-	15	-	S	
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V, f=1MHz$	-	2540	3210	pF	
Output capacitance	$C_{oss}$		-	950	1200		
Reverse transfer capacitance	$C_{rss}$		-	220	275		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40V, I_D=75A$ $R_G=25\Omega$	-	40	80	ns	
Rise time	$t_r$		-	230	460		
Turn-off delay time	$t_{d(off)}$		③④	-	170		340
Fall time	$t_f$		-	190	330		
Total gate charge	$Q_g$	$V_{DS}=60V, V_{GS}=10V,$ $I_D=75A$	-	80	105	nC	
Gate-source charge	$Q_{gs}$		③④	-	16		-
Gate-drain("Miller")charge	$Q_{gd}$		-	30	-		

## Source-Drain Diode Ratings and Characteristics (Tc=25°C)

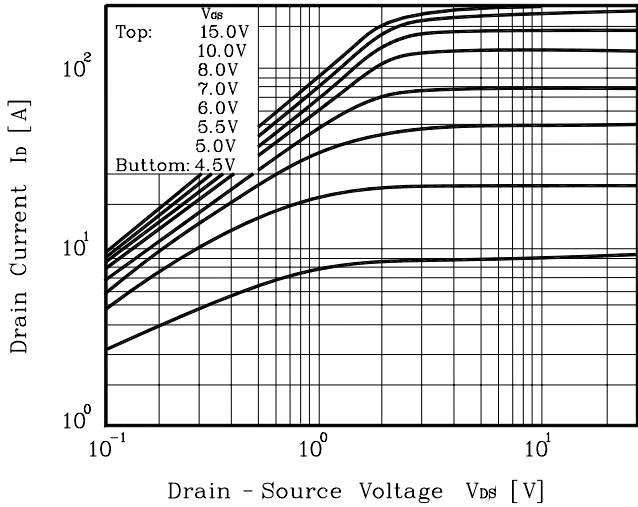
Characteristic	Symbol	Test Condition	Min	Typ	Max	Units
Continuous source current	$I_S$	Integral reverse diode in the MOSFET	-	-	75	A
Pulsed-source current ①	$I_{SM}$		-	-	300	
Diode forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=75A$	-	-	1.5	V
Reverse recovery time	$t_{rr}$	$I_S=75A$ $di_F/dt=100A/us$	-	90	-	ns
Reverse recovery charge	$Q_{rr}$		③	-	250	-

Note ;

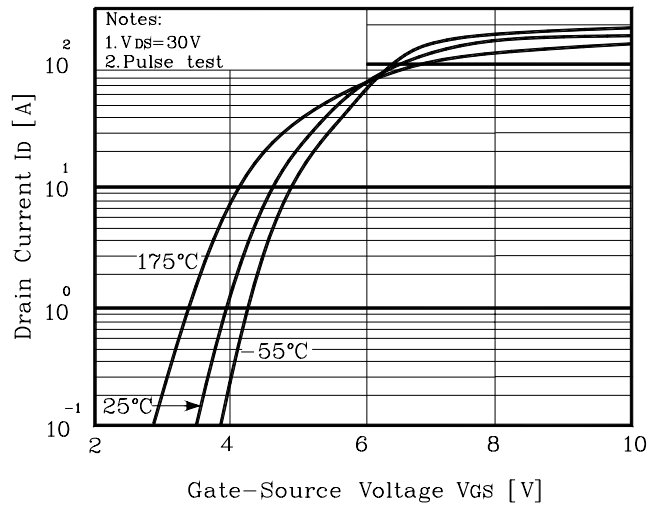
- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=0.32mH, I_{AS}=75A, V_{DD}=25V, R_G=25\Omega$ , starting  $T_J=25^\circ C$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## Electrical Characteristic Curves

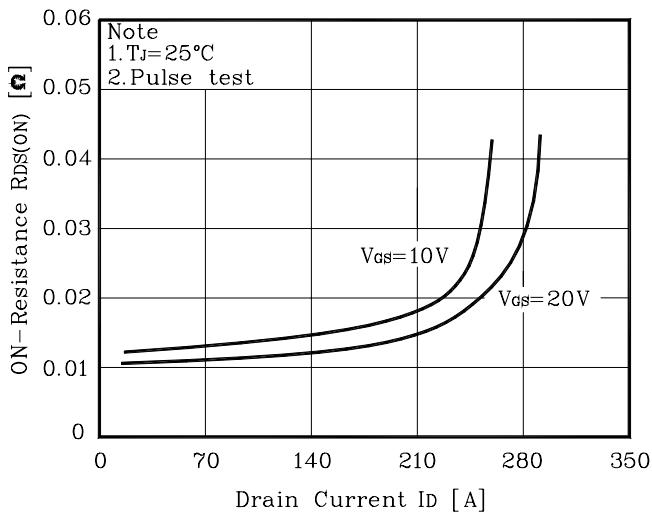
**Fig. 1  $I_D - V_{DS}$**



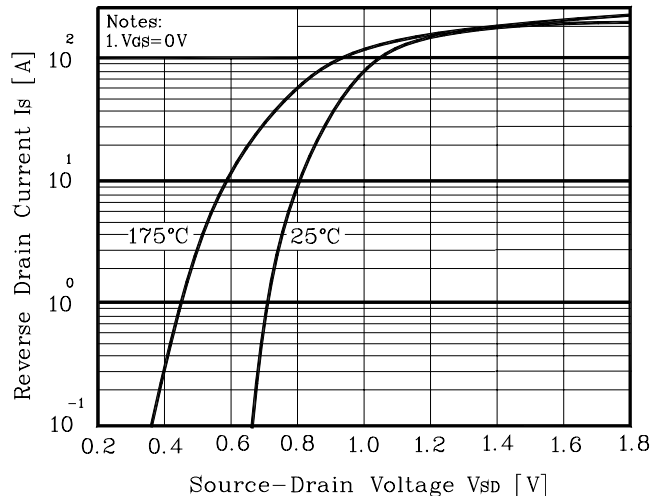
**Fig. 2  $I_D - V_{GS}$**



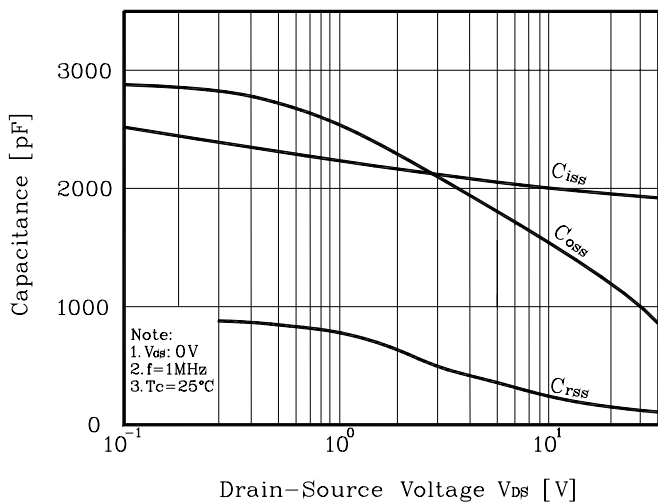
**Fig. 3  $R_{DS(on)} - I_D$**



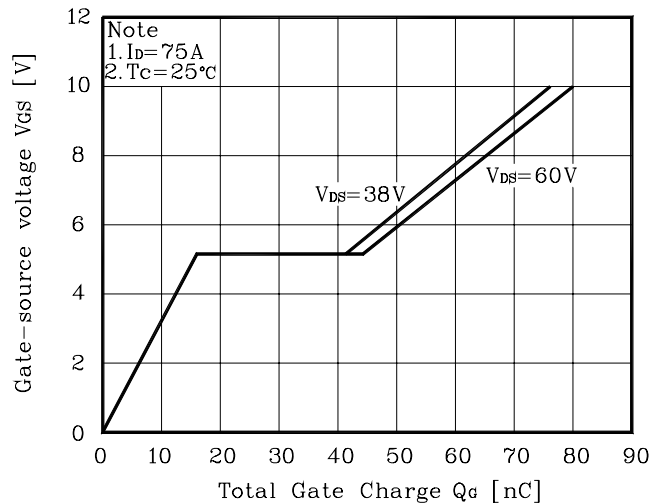
**Fig. 4  $I_S - V_{SD}$**



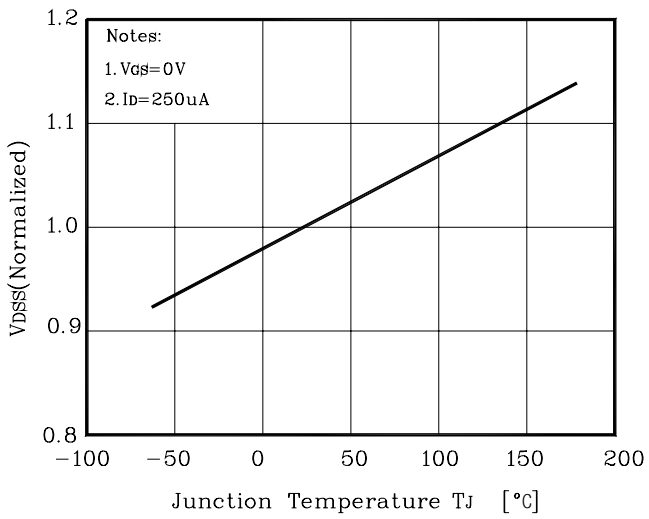
**Fig. 5 Capacitance -  $V_{DS}$**



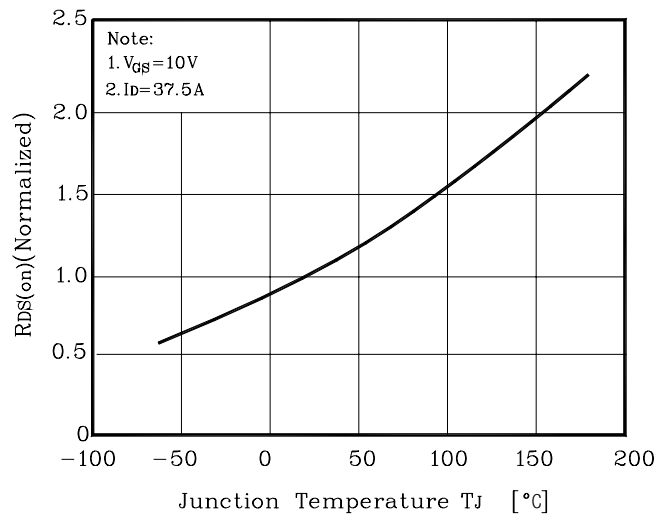
**Fig. 6  $V_{GS} - Q_G$**



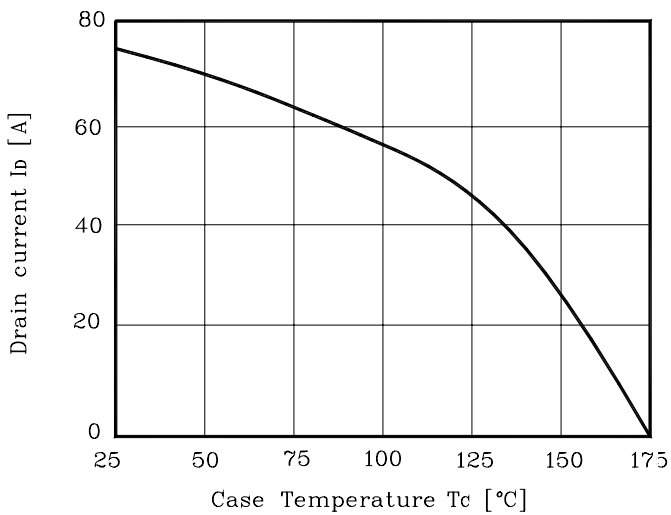
**Fig. 7  $V_{DSS} - T_J$**



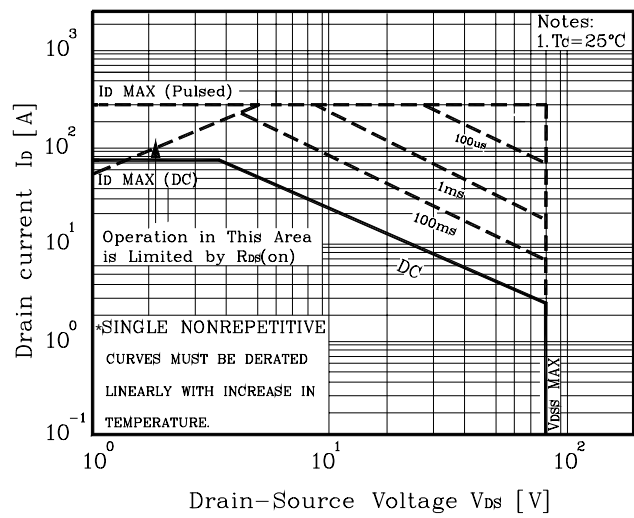
**Fig.8  $R_{DS(on)} - T_J$**



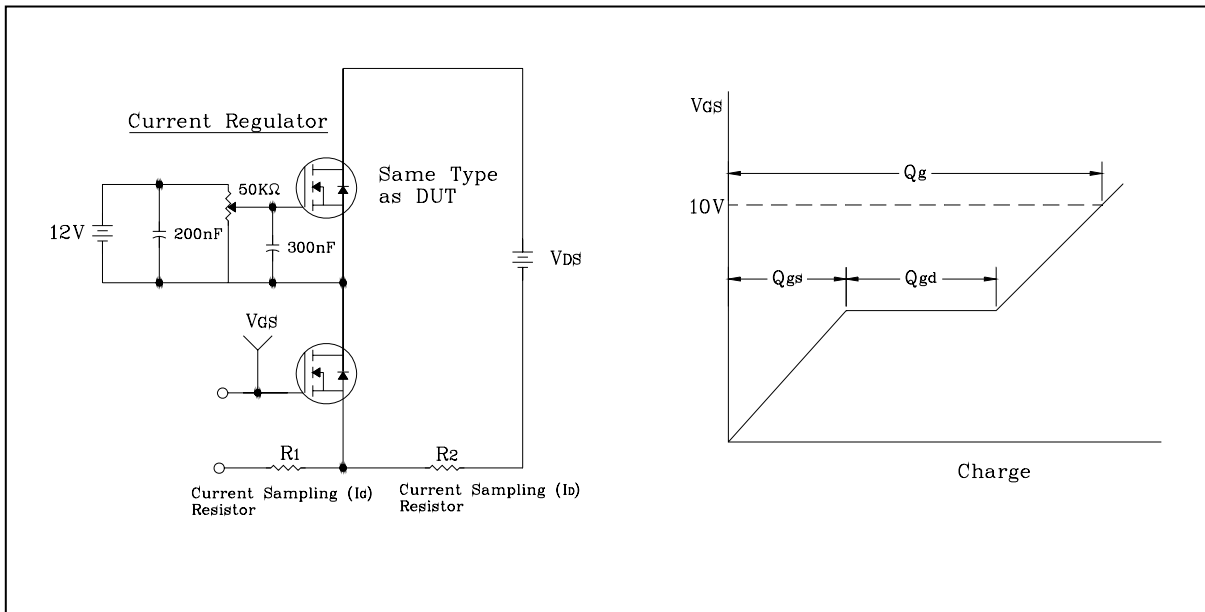
**Fig. 9  $I_D - T_C$**



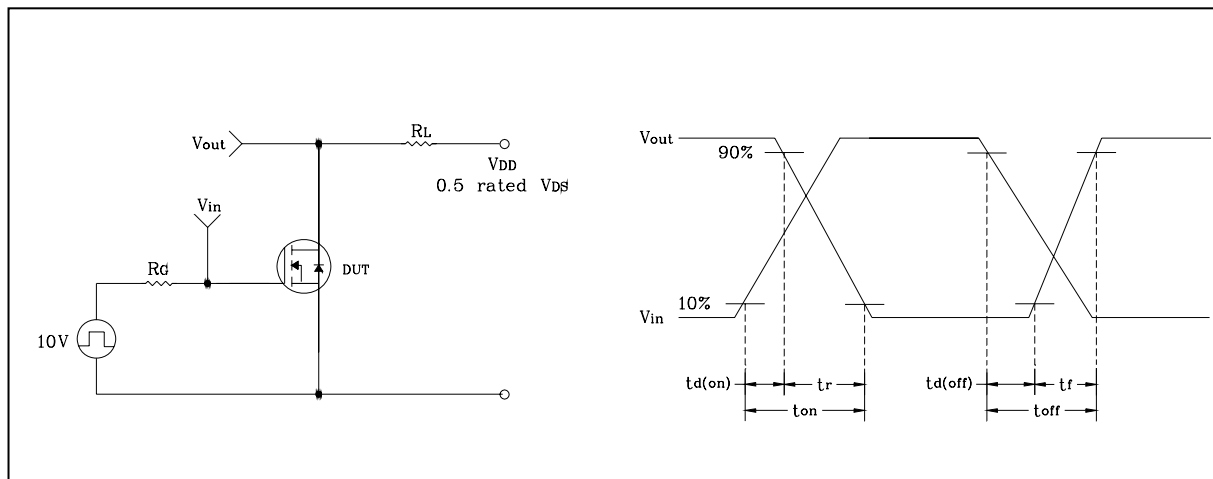
**Fig. 10 Safe Operating Area**



**Fig. 10 Gate Charge Test Circuit & Waveform**



**Fig. 11 Resistive Switching Test Circuit & Waveform**



**Fig. 12 EAS Test Circuit & Waveform**

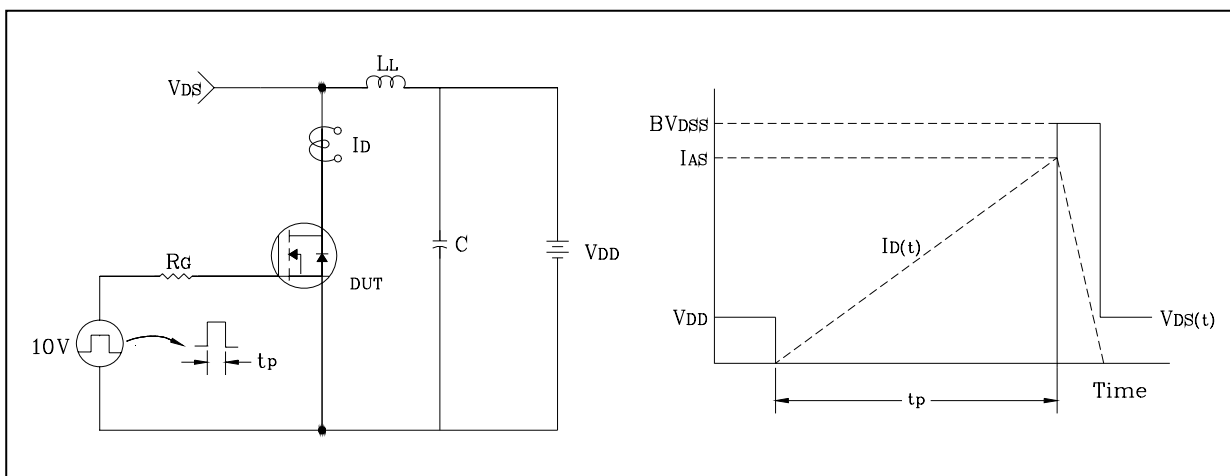
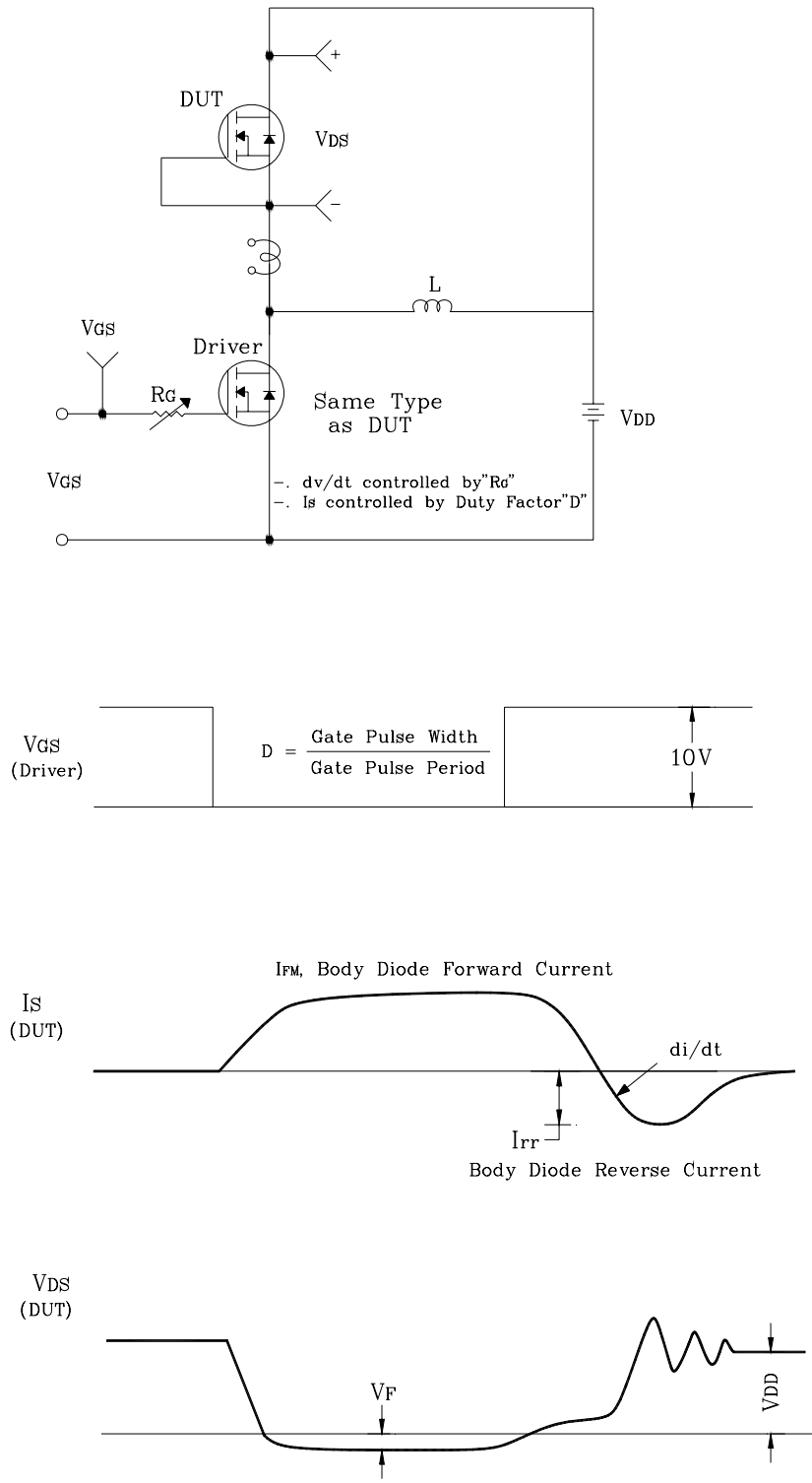


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform



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