

**Features**

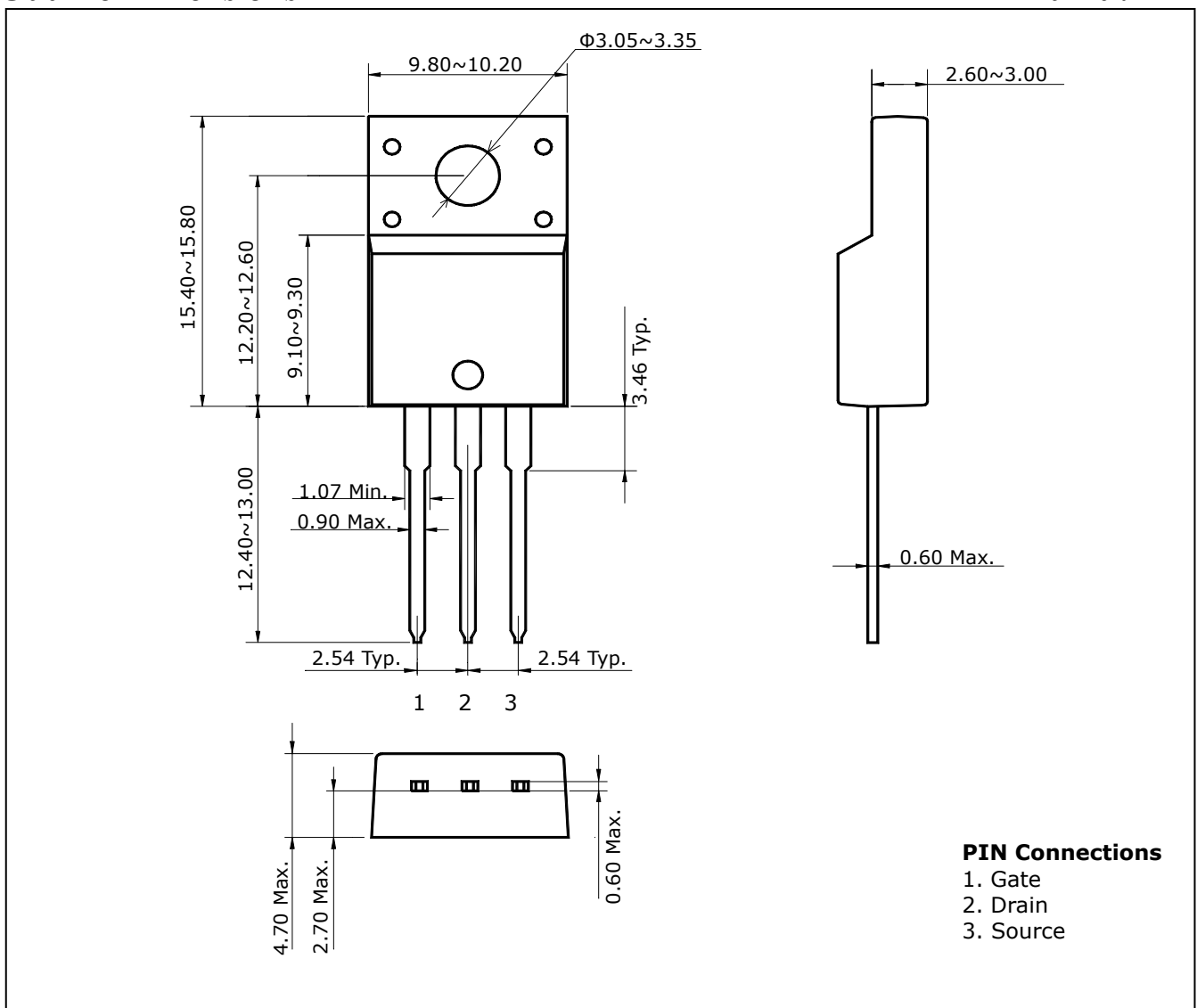
- Avalanche rugged technology.
- Low input capacitance.
- Low leakage current : 10  $\mu\text{A}$  (Max.) @  $V_{\text{DS}}=200\text{V}$ .
- Low  $R_{\text{DS(on)}}$  : 0.30  $\Omega$  (Typ.)

**Ordering Information**

Type NO.	Marking	Package Code
STK630F	STK630	TO-220F-3L

**Outline Dimensions**

unit : mm



## Absolute maximum ratings

Characteristic	Symbol	Rating		Unit
Drain-source voltage	$V_{DSS}$	200		V
Gate-source voltage	$V_{GSS}$	$\pm 30$		V
Drain current (DC) *	$I_D$	$T_C=25^\circ\text{C}$	9	A
		$T_C=100^\circ\text{C}$	5.7	A
Drain current (Pulsed) *	$I_{DP}$	36		A
Drain power dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	30		W
Single pulsed avalanche energy ②	$E_{AS}$	162		mJ
Avalanche current (Repetitive) ①	$I_{AR}$	9		A
Repetitive avalanche energy ①	$E_{AR}$	7.2		mJ
Junction temperature	$T_J$	150		$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~150		$^\circ\text{C}$

\* Limited by maximum junction temperature

## Thermal Resistance

Characteristic	Symbol	Typ.	Max.	Units
Thermal resistance junction-case	$R_{th(J-C)}$	-	4.16	$^\circ\text{C}/\text{W}$
Thermal resistance junction-ambient	$R_{th(J-A)}$	-	62.5	

## Electrical Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250 \mu A, V_{GS}=0V$	200	-	-	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	$I_{DSS}$	$V_{DS}=200V, V_{GS}=0V$	-	-	10	$\mu A$
Gate leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	$\pm 100$	nA
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.5A$ ③	-	-	0.4	$\Omega$
Forward transfer conductance	$g_{fs}$	$V_{DS}=40V, I_D=4.5A$ ③	-	3.87	-	S
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V$ $f=1 \text{ MHz}$	-	550	-	pF
Output capacitance	$C_{oss}$		-	110	-	
Reverse transfer capacitance	$C_{rss}$		-	40	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=100V, I_D=9A$ $R_G=12\Omega$ Fig 13. ③④	-	13	-	ns
Rise time	$t_r$		-	13	-	
Turn-off delay time	$t_{d(off)}$		-	30	-	
Fall time	$t_f$		-	18	-	
Total gate charge	$Q_g$	$V_{DS}=160V, V_{GS}=10V,$ $I_D=9A$ Fig 12. ③④	-	22	-	nC
Gate-source charge	$Q_{gs}$		-	4.3	-	
Gate-drain charge	$Q_{gd}$		-	10.9	-	

## Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

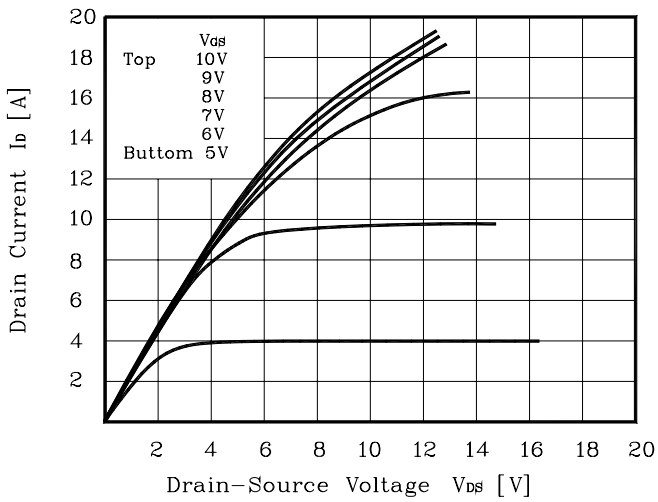
Characteristic	Symbol	Test Condition	Min	Typ	Max	Units
Source current (DC)	$I_S$	Integral reverse diode in the MOSFET	-	-	9	A
Source current (Pulsed) ①	$I_{SP}$		-	-	36	
Diode forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=9A$	-	-	1.5	V
Reverse recovery time	$t_{rr}$	$I_S=9A, V_{GS}=0V$ $dI_S/dt=50A/\mu s$ ④	-	300	-	ns
Reverse recovery charge	$Q_{rr}$		-	0.87	-	$\mu C$

Note ;

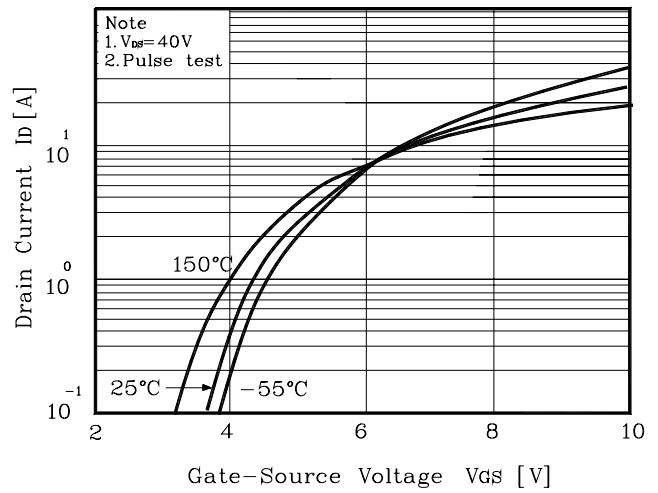
- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ②  $L=3mH, I_{AS}=9A, V_{DD}=50V, R_G=27\Omega$  , starting  $T_J=25^\circ C$
- ③ Pulse Test : Pulse Width  $\leq 400 \mu s$ , Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## Electrical Characteristic Curves

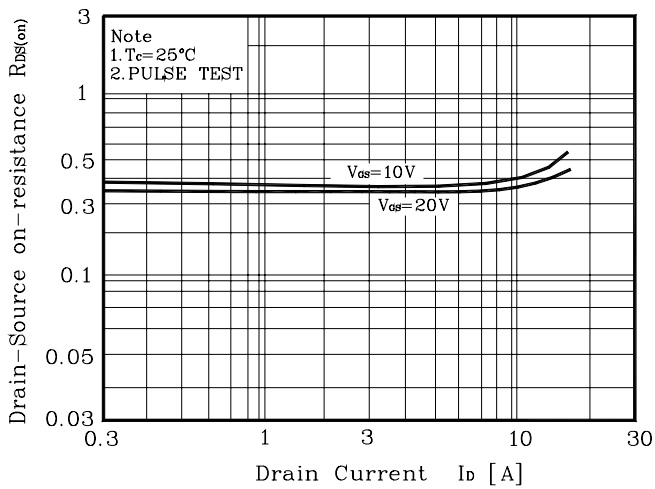
**Fig. 1  $I_D - V_{DS}$**



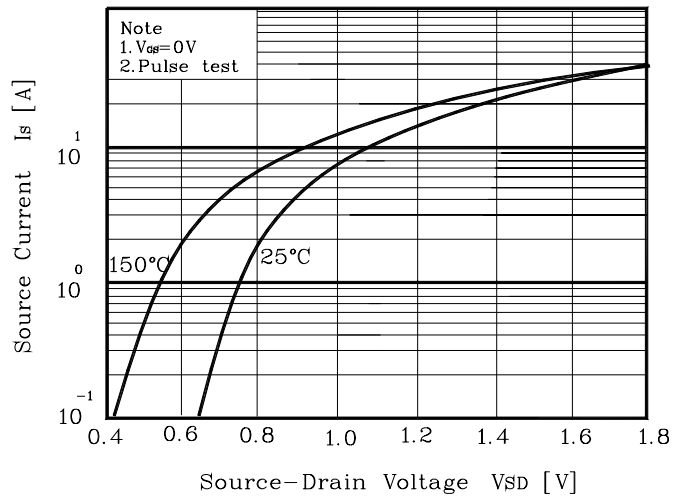
**Fig. 2  $I_D - V_{GS}$**



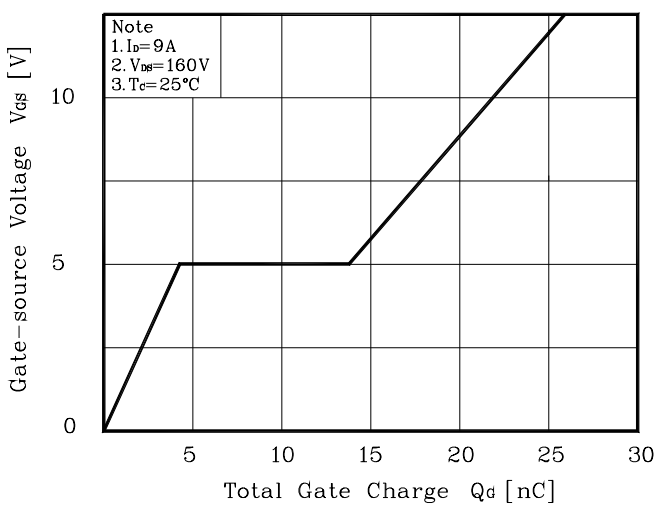
**Fig. 3  $R_{DS(on)} - I_D$**



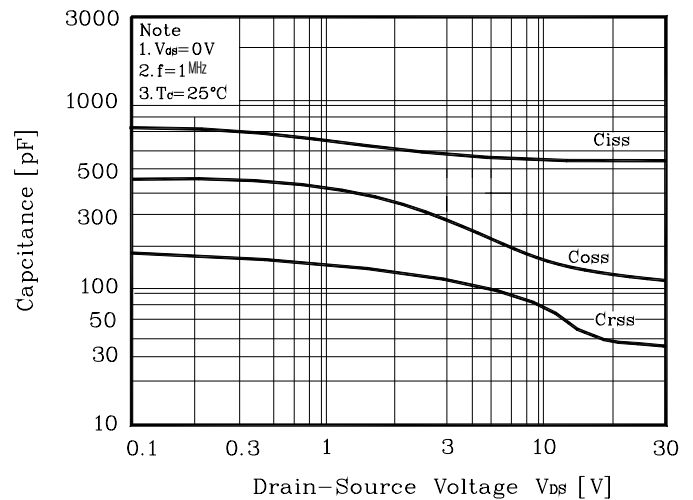
**Fig. 4  $I_S - V_{SD}$**



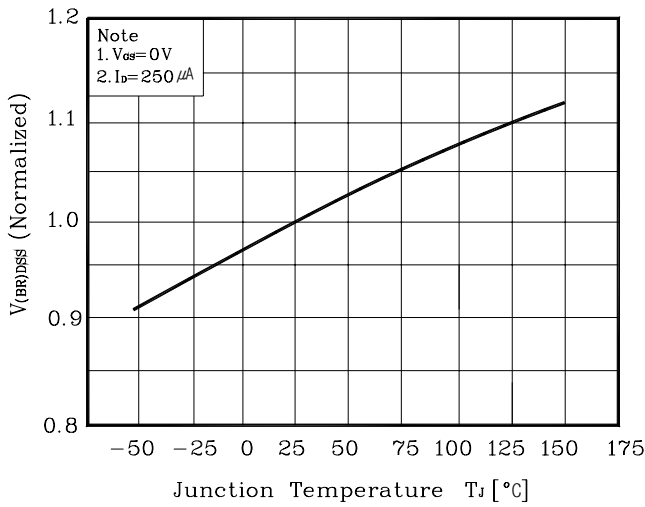
**Fig. 5  $V_{GS} - Q_G$**



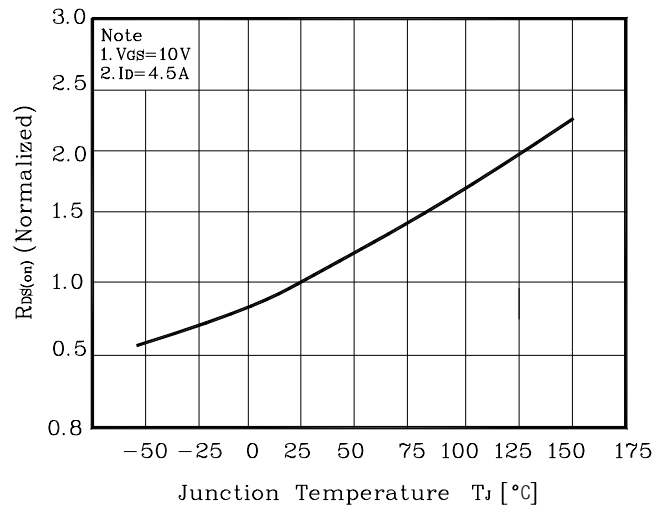
**Fig. 6 Capacitance -  $V_{DS}$**



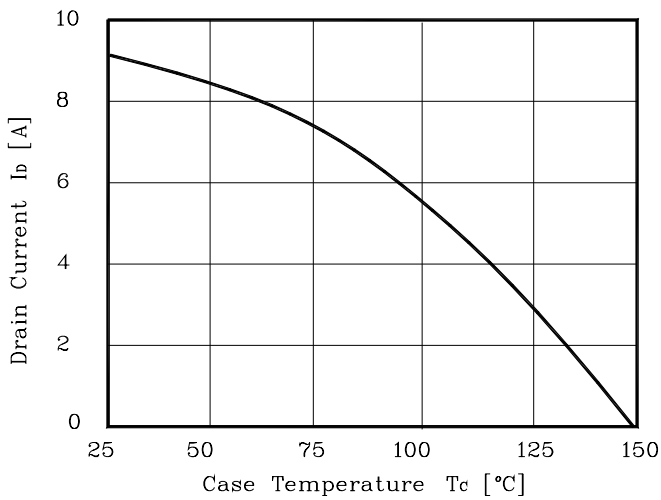
**Fig. 7  $V_{(BR)DSS} - T_J$**



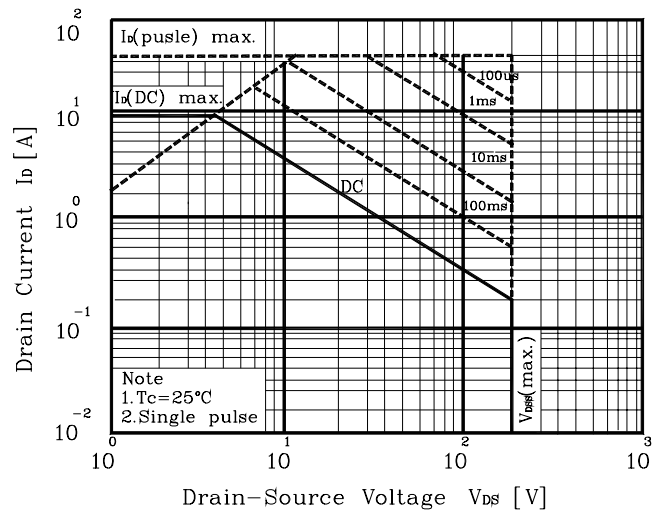
**Fig. 8  $R_{DS(on)} - T_J$**



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



**Fig. 10 Safe operating Area**



**Fig. 11 Thermal Response**

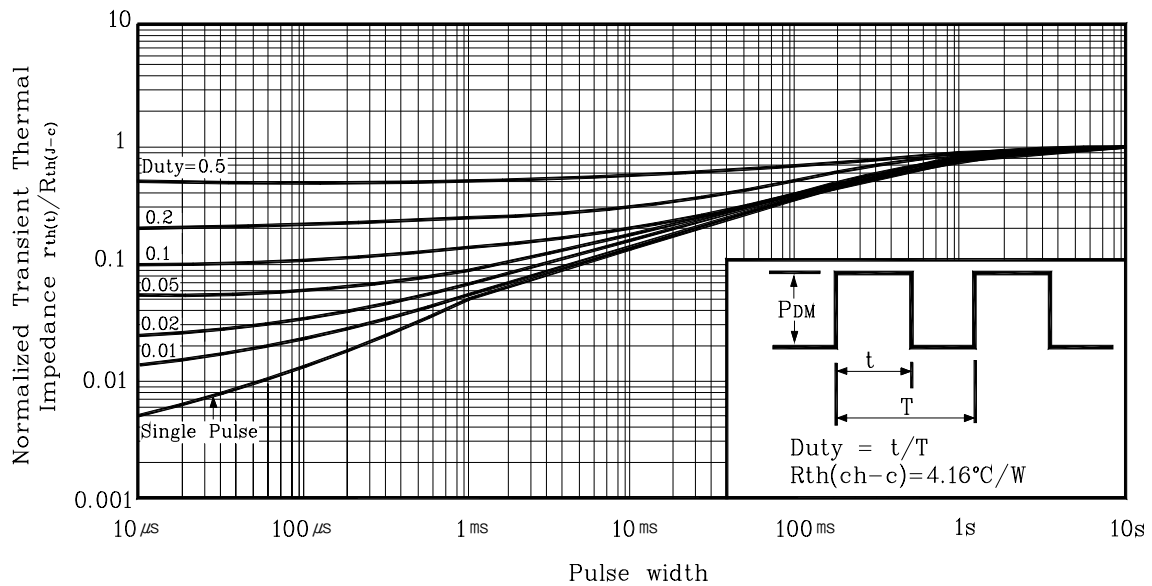


Fig. 12 Gate Charge Test Circuit & Waveform

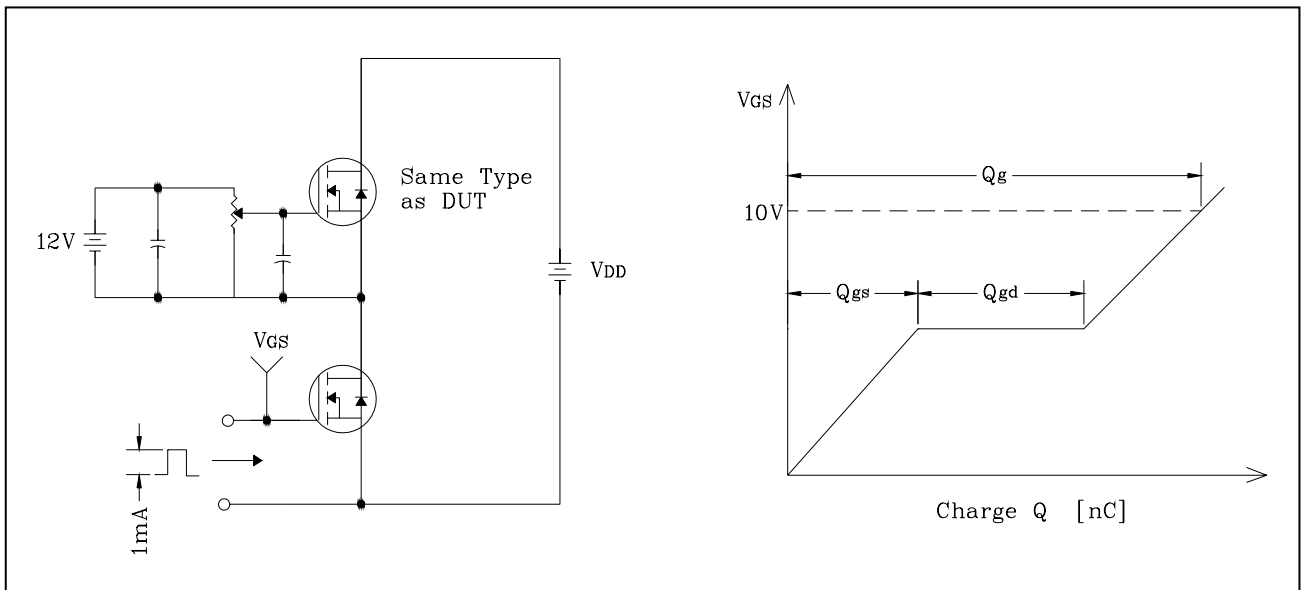


Fig. 13 Switching Time Test Circuit & Waveform

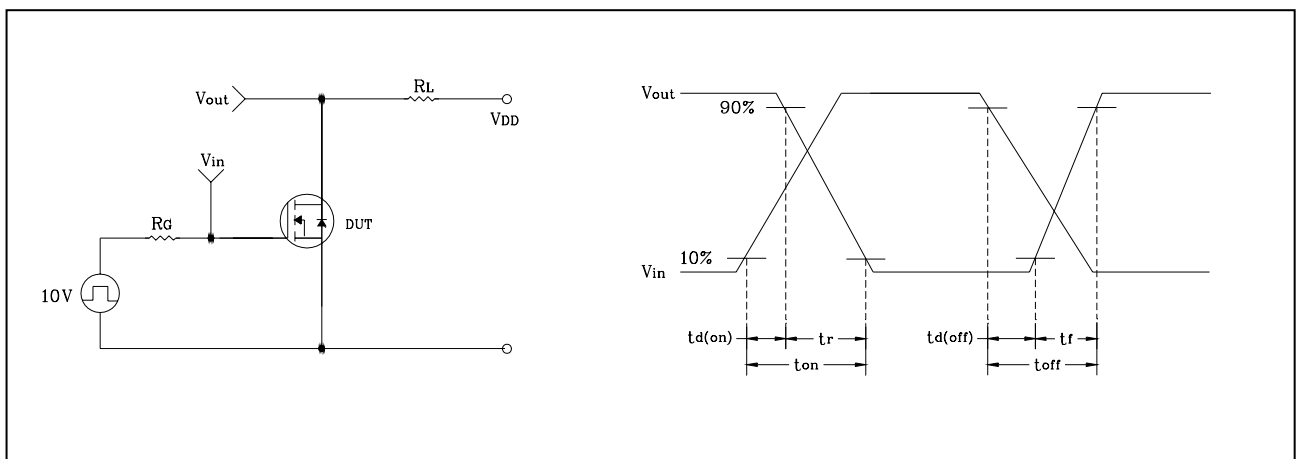


Fig. 14  $E_{AS}$  Test Circuit & Waveform

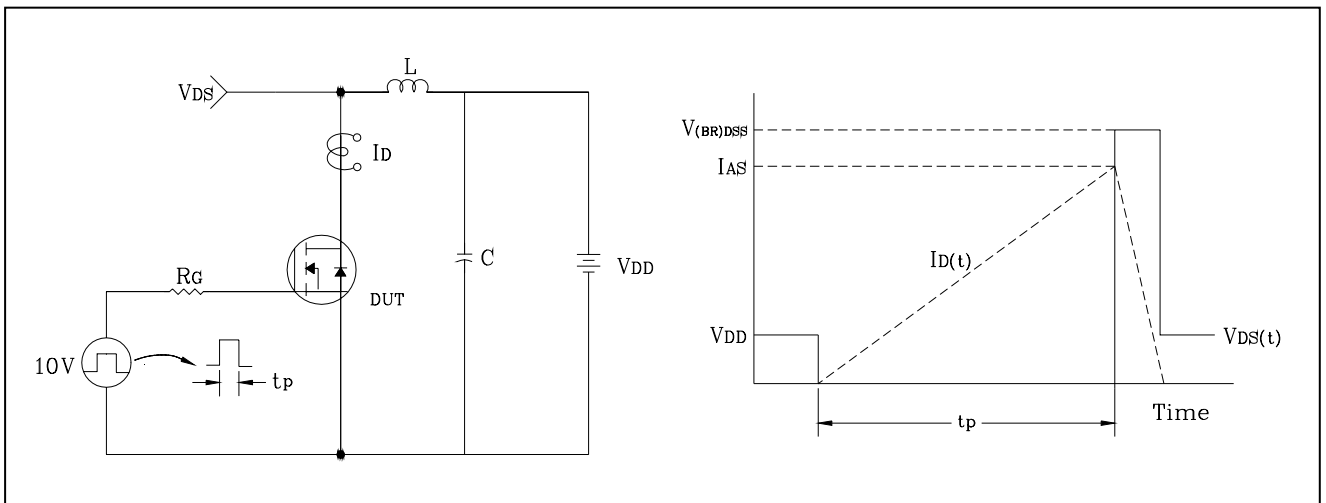
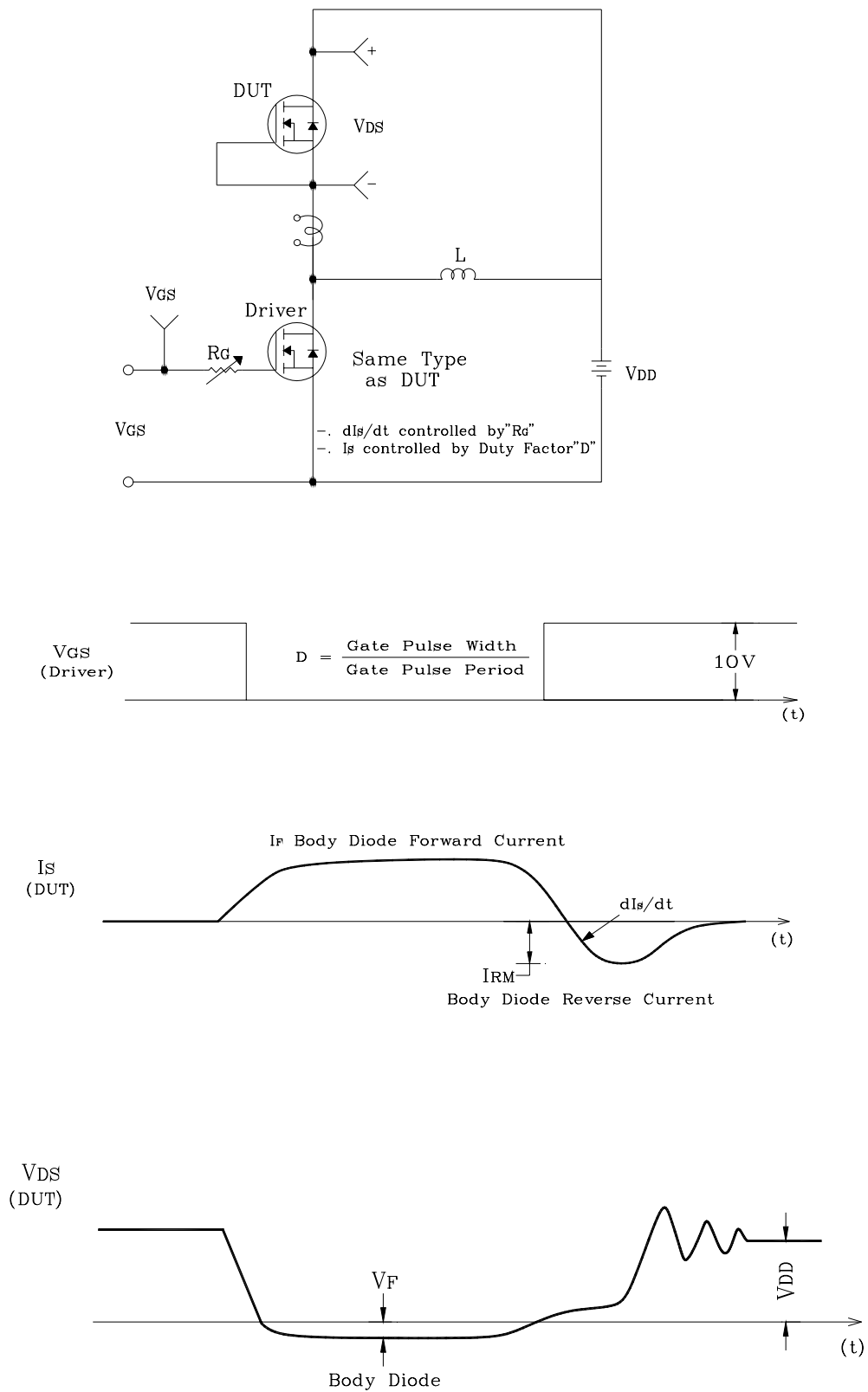


Fig. 15 Peak Diode Recovery dv/dt Test Circuit & Waveform



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