

Features

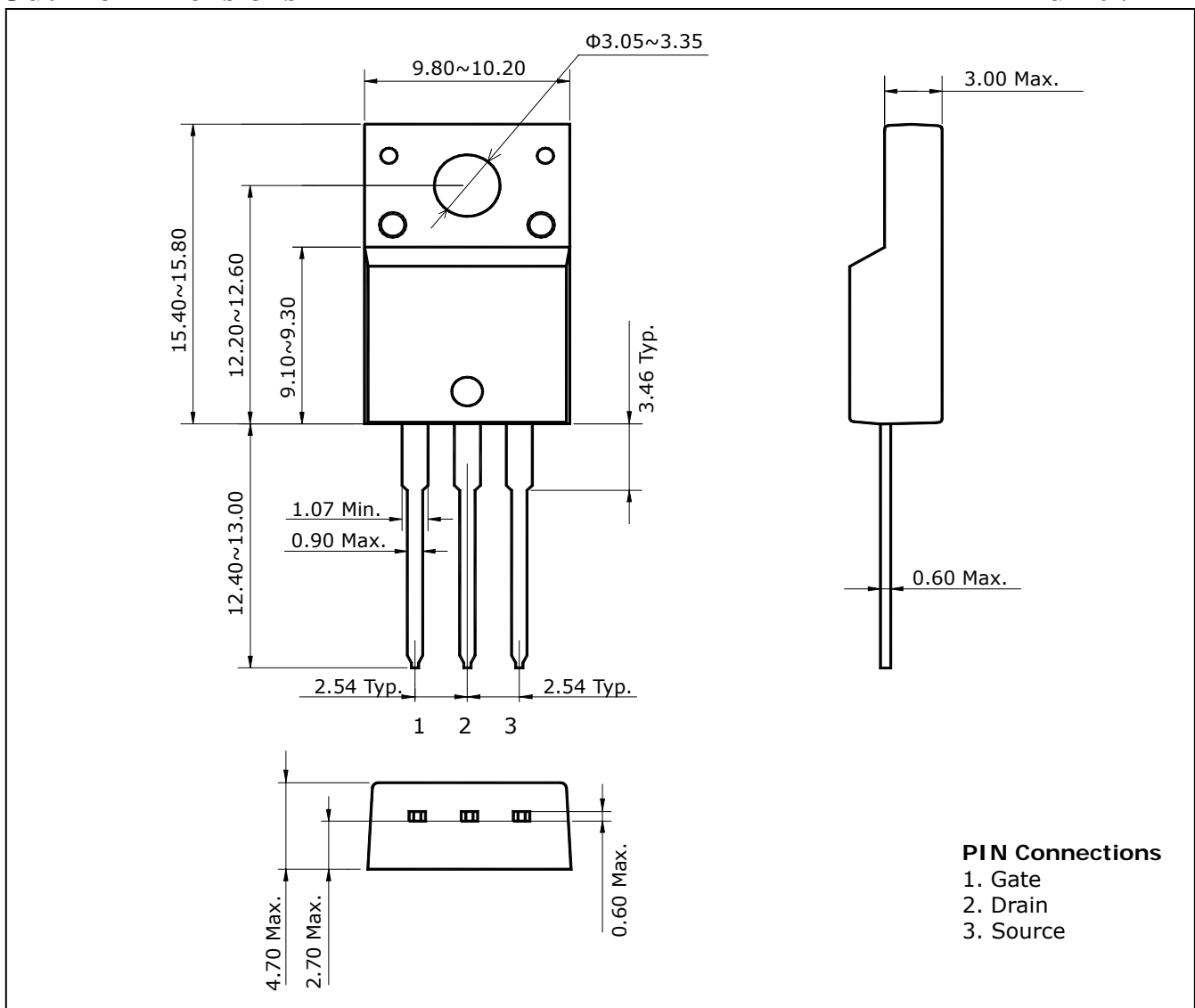
- Avalanche rugged technology.
- Low input capacitance.
- Low leakage current : 10 μA (Max.) @ $V_{\text{DS}}=200\text{V}$.
- Low $R_{\text{DS(on)}}$: 0.40 Ω (Max.)

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}	± 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}	54		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	μA
Gate leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.5A$ ③	-	-	0.4	Ω
Forward transfer conductance	g_{fs}	$V_{DS}=40V, I_D=4.5A$ ③	-	3.87	-	S
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f=1 \text{ MHz}$	-	423	-	pF
Output capacitance	C_{oss}		-	80	-	
Reverse transfer capacitance	C_{rss}		-	15	-	
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	-	18	-	nC
Gate-source charge	Q_{gs}		-	3.5	-	
Gate-drain charge	Q_{gd}		-	6.5	-	

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}	$I_S=9A, V_{GS}=0V$ $dI_S/dt=100A/\mu s$ ④	-	140	-	ns
Reverse recovery charge	Q_{rr}		-	0.87	-	μC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② $L=1mH, I_{AS}=9A, V_{DD}=50V, R_G=27\Omega$, 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 $I_D - V_{DS}$

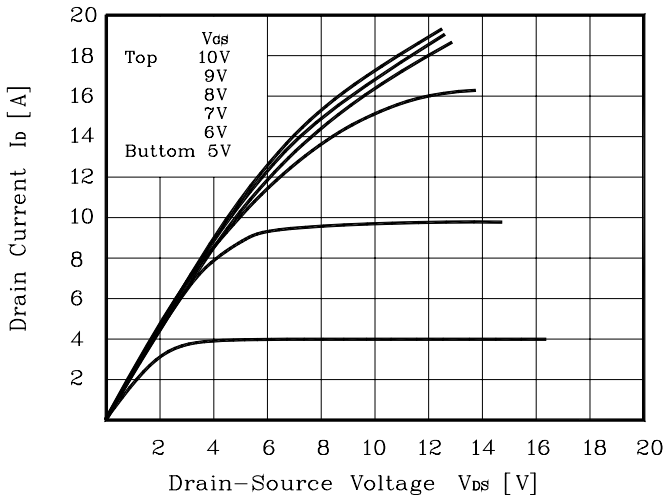


Fig. 2 $I_D - V_{GS}$

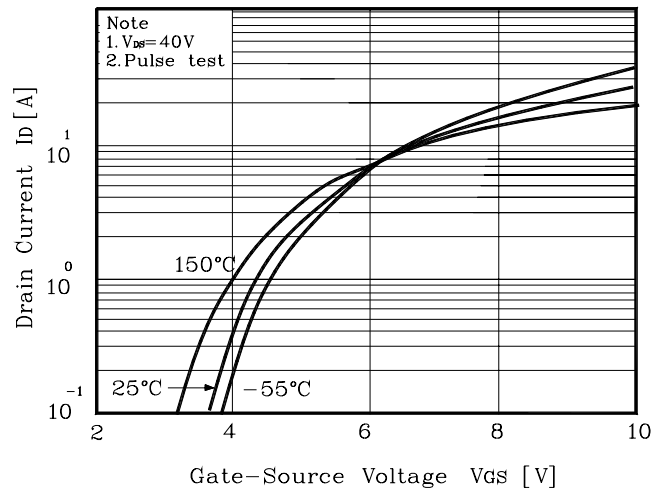


Fig. 3 $R_{DS(on)} - I_D$

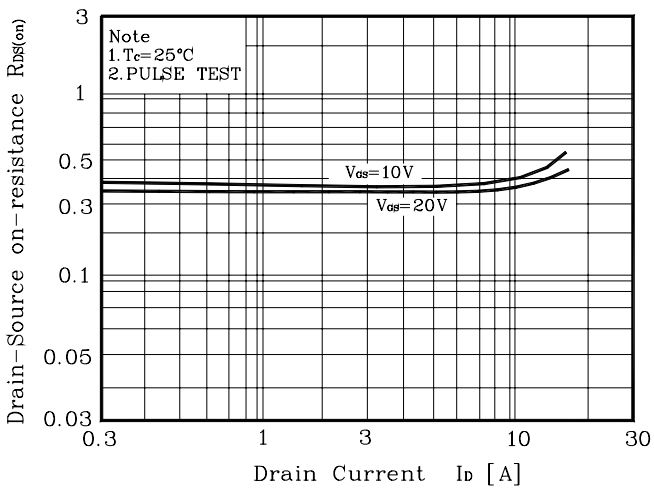


Fig. 4 $I_S - V_{SD}$

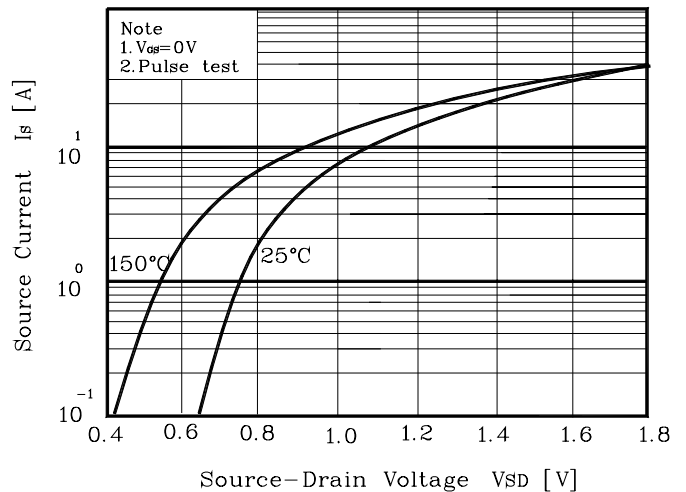


Fig. 5 $V_{GS} - Q_G$

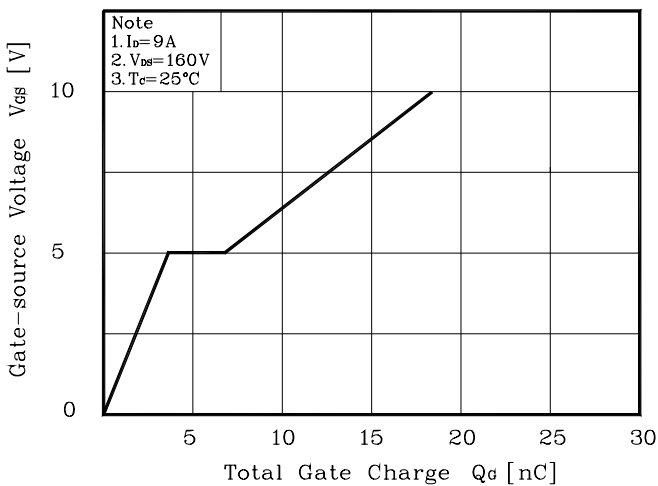


Fig. 6 Capacitance - V_{DS}

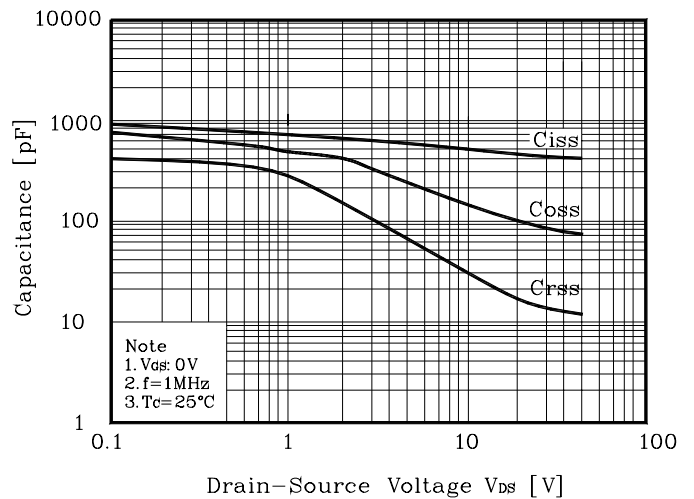


Fig. 7 $V_{(BR)DSS} - T_J$

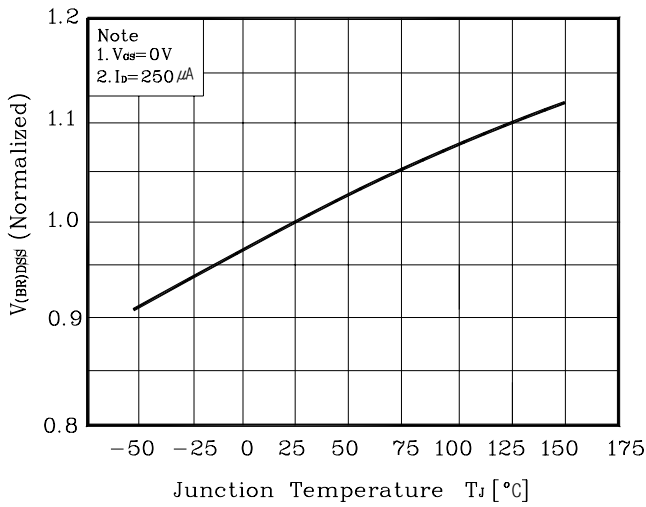


Fig. 8 $R_{DS(on)} - T_J$

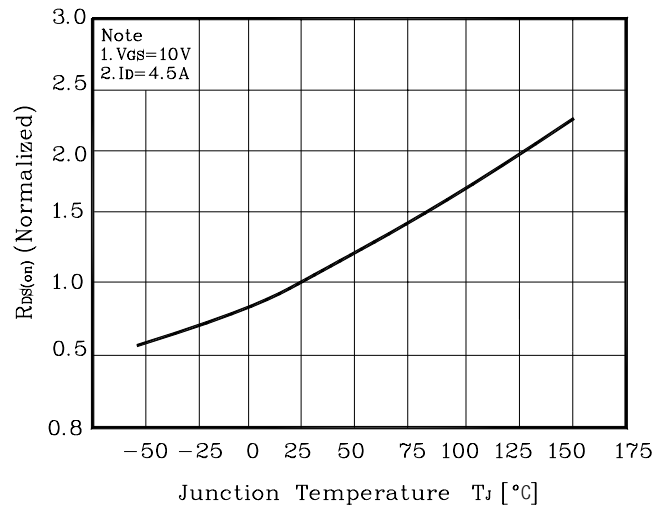


Fig. 9 $I_D - T_C$

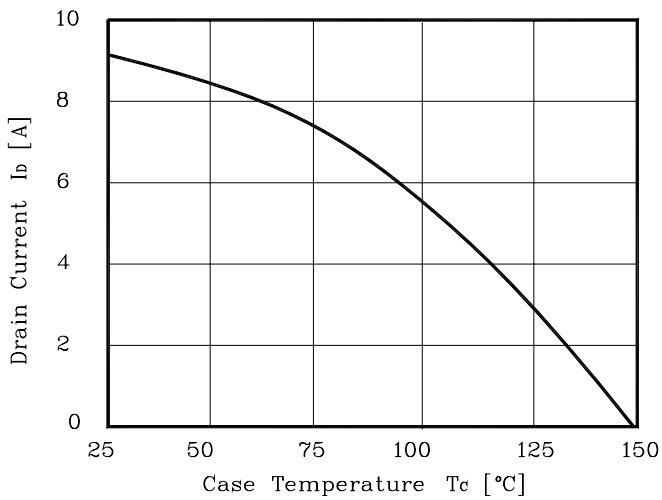


Fig. 10 Safe operating Area

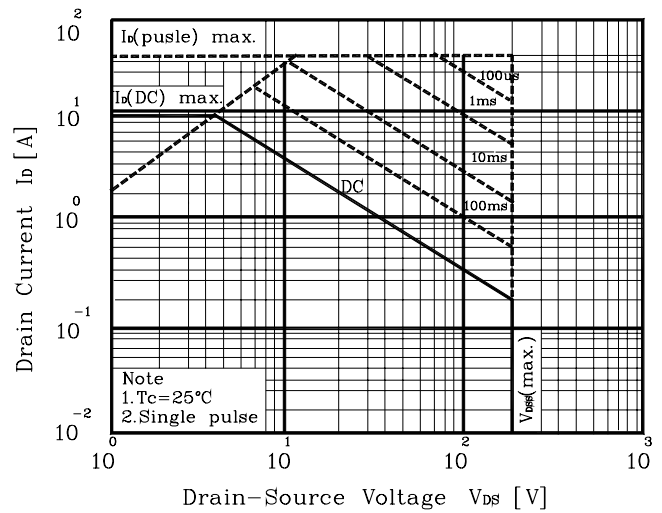


Fig. 11 Thermal Response

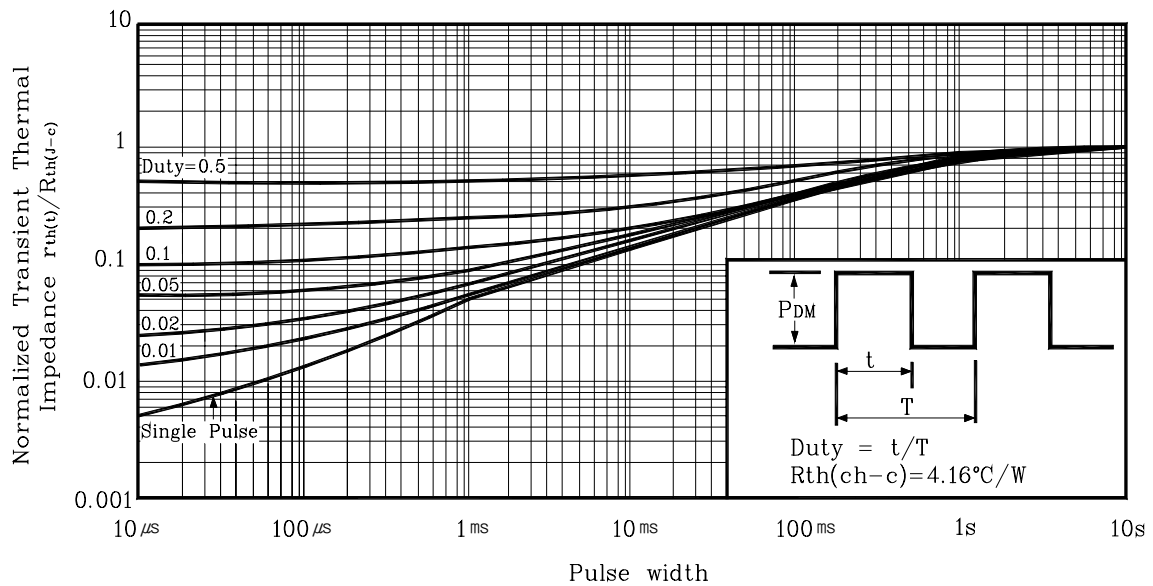


Fig. 12 Gate Charge Test Circuit & Waveform

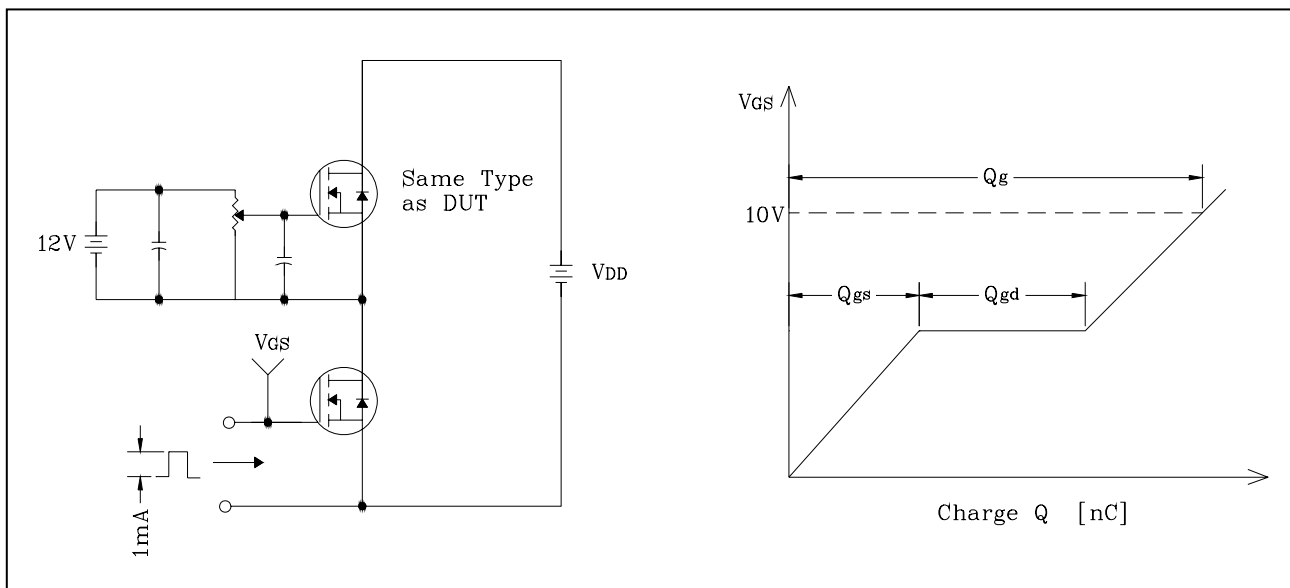


Fig. 13 Switching Time Test Circuit & Waveform

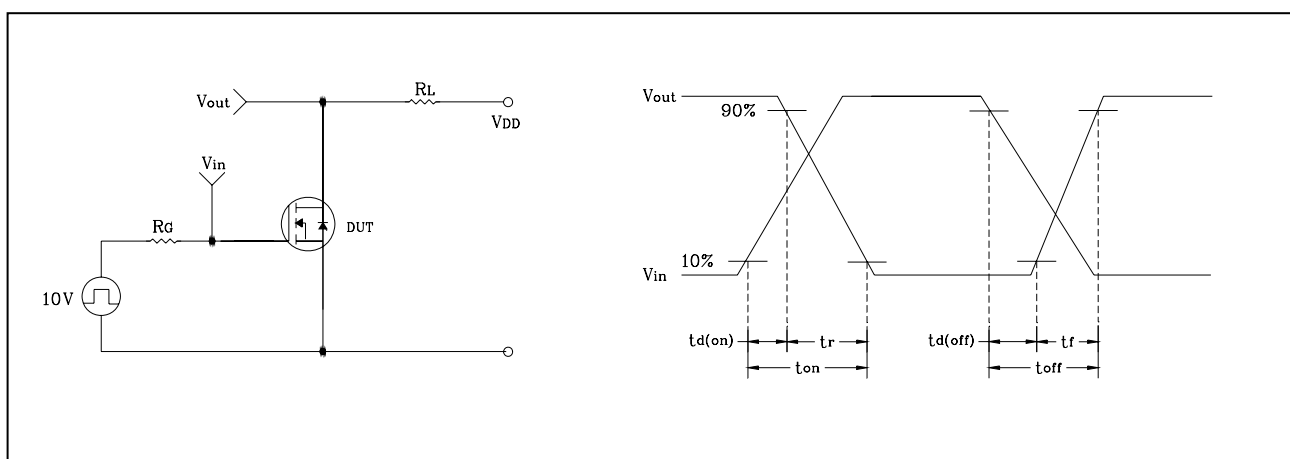


Fig. 14 E_{AS} Test Circuit & Waveform

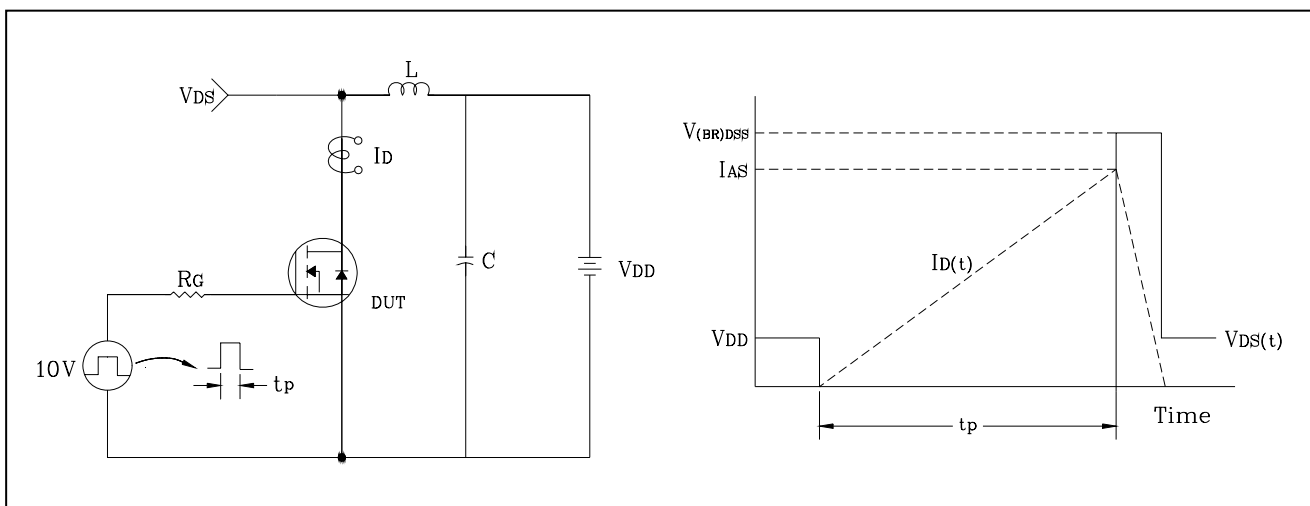
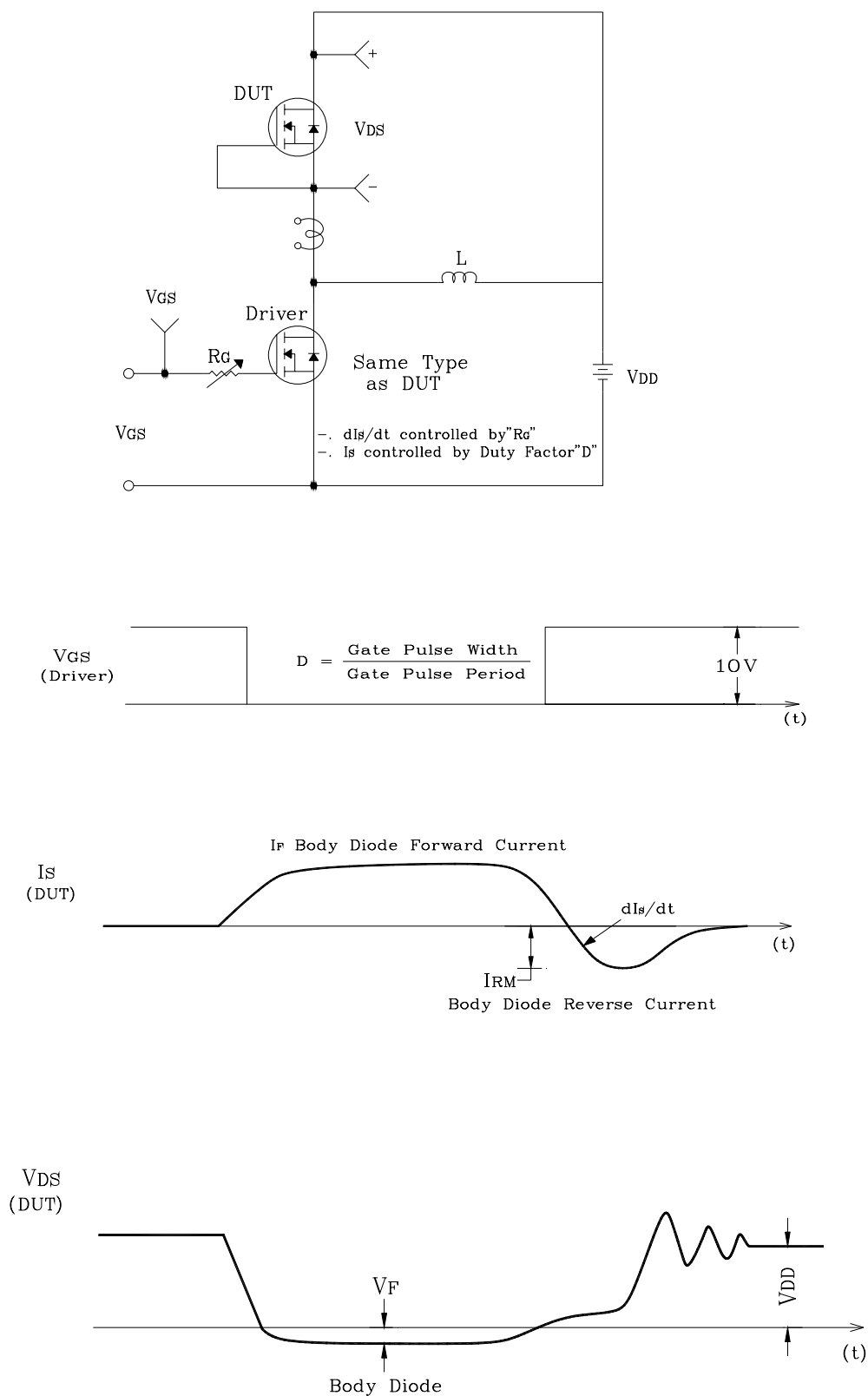


Fig. 15 Peak Diode Recovery dv/dt Test Circuit & Waveform



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