

SWITCHING REGULATOR APPLICATIONS

Features

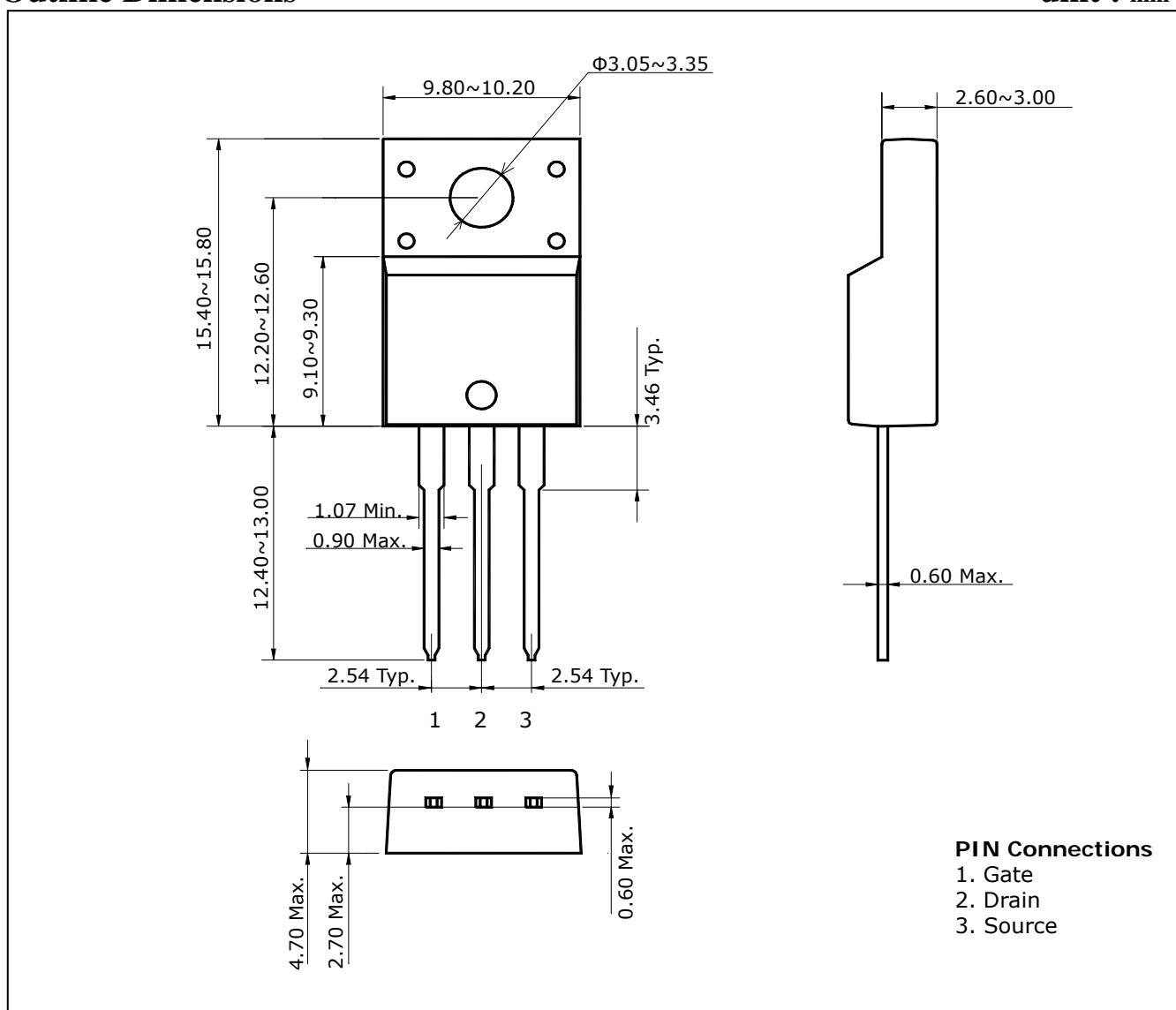
- High Voltage: $BV_{DSS}=400V(\text{Min.})$
- Low C_{rSS} : $C_{rSS}=8.4pF(\text{Typ.})$
- Low gate charge : $Qg=16nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=1.0\Omega(\text{Max.})$

Ordering Information

Type NO.	Marking	Package Code
STK730F	STK730	TO-220F-3L

Outline Dimensions

unit : mm



Absolute maximum ratings

(Tc=25°C)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	400	V	
Gate-source voltage	V_{GSS}	±30	V	
Drain current (DC)	I_D	Tc=25°C	5.5	A
		Tc=100°C	3.5	A
Drain current (Pulsed) *	I_{DP}	22	A	
Drain power dissipation	P_D	25	W	
Avalanche current (Single) ②	I_{AS}	5.5	A	
Single pulsed avalanche energy ②	E_{AS}	270	mJ	
Avalanche current (Repetitive) ①	I_{AR}	5.5	A	
Repetitive avalanche energy ①	E_{AR}	7.3	mJ	
Junction temperature	T_J	150	°C	
Storage temperature range	T_{stg}	-55~150	°C	

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	5.0	°C/W
	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	$V_{(BR)DSS}$	$I_D=250\ \mu A, V_{GS}=0$	400	-	-	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}	$V_{DS}=400V, V_{GS}=0$	-	-	10	μA	
Gate leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA	
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10V, I_D=2.75A$	-	0.8	1	Ω	
Forward transfer conductance ④	g_{fs}	$V_{DS}=10V, I_D=2.75A$	-	3.6	-	S	
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f=1\ MHz$	-	550	825	pF	
Output capacitance	C_{oss}		-	46	70		
Reverse transfer capacitance	C_{rss}		-	8.4	13		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=200V, I_D=5.5A$ $R_G=12\ \Omega$	-	13	-	ns	
Rise time	t_r		-	65	-		
Turn-off delay time	$t_{d(off)}$		③④	-	21		-
Fall time	t_f		-	38	-		
Total gate charge	Q_g	$V_{DS}=200V, V_{GS}=10V$ $I_D=5.5A$	-	16	24	nC	
Gate-source charge	Q_{gs}		③④	-	2.5		3.8
Gate-drain charge	Q_{gd}		-	6.6	10		

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	5.5	A
Source current (Pulsed) ①	I_{SP}		-	-	22	
Forward voltage ④	V_{SD}	$V_{GS}=0V, I_S=5.5A$	-	-	1.5	V
Reverse recovery time	t_{rr}	$I_S=5.5A, V_{GS}=0V$ $dI_S/dt=100A/\mu S$	-	270	-	ns
Reverse recovery charge	Q_{rr}		-	2.16	-	μC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② $L=13.7mH, I_{AS}=5.5A, V_{DD}=50V, R_G=27\ \Omega$
- ③ Pulse Test : Pulse Width $\leq 400\ \mu S$, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

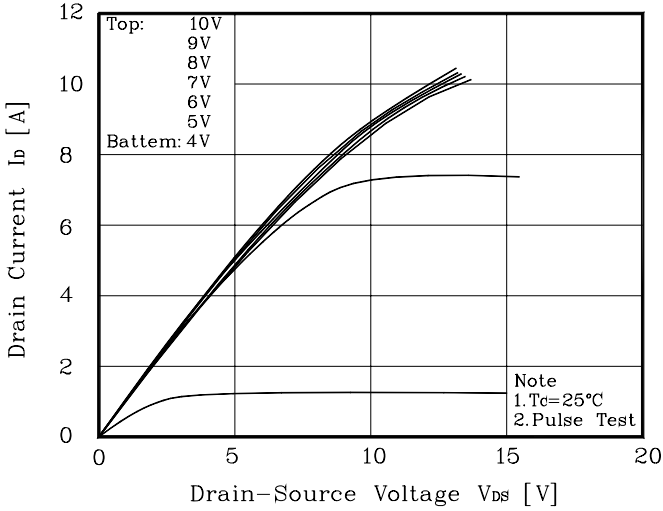


Fig. 2 $I_D - V_{GS}$

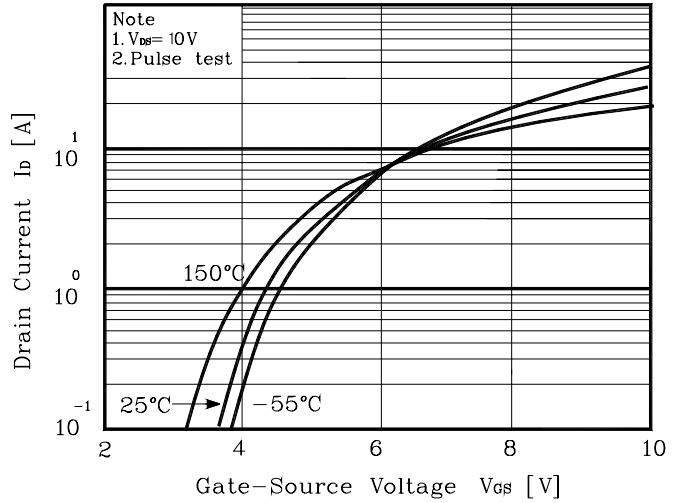


Fig. 3 $R_{DS(on)} - I_D$

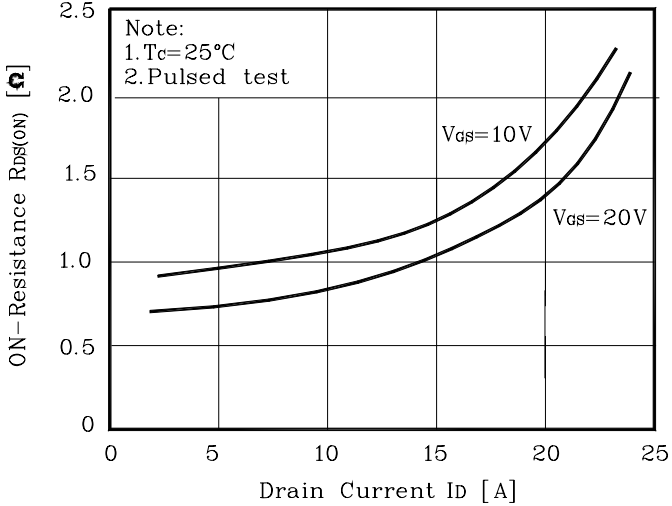


Fig. 4 $I_S - V_{SD}$

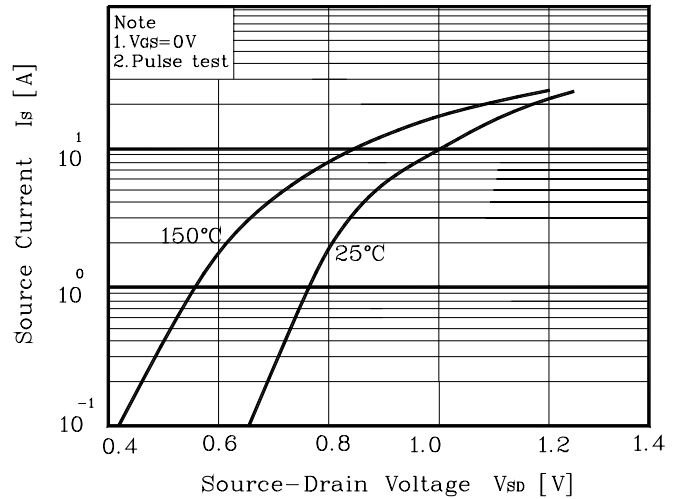


Fig. 5 Capacitance - V_{DS}

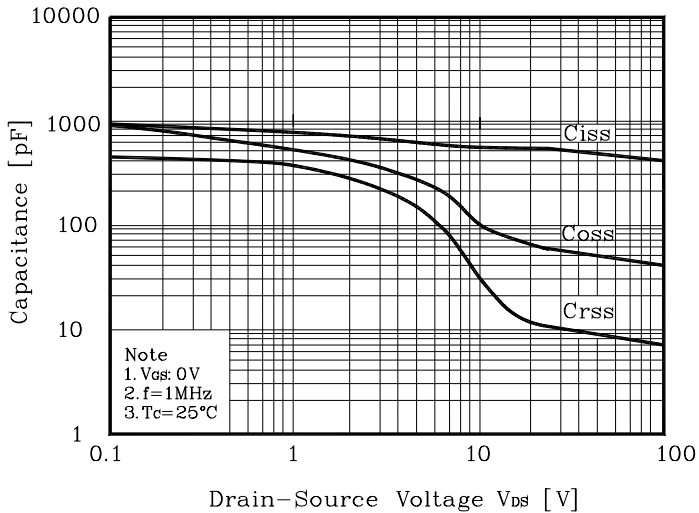


Fig. 6 $V_{GS} - Q_G$

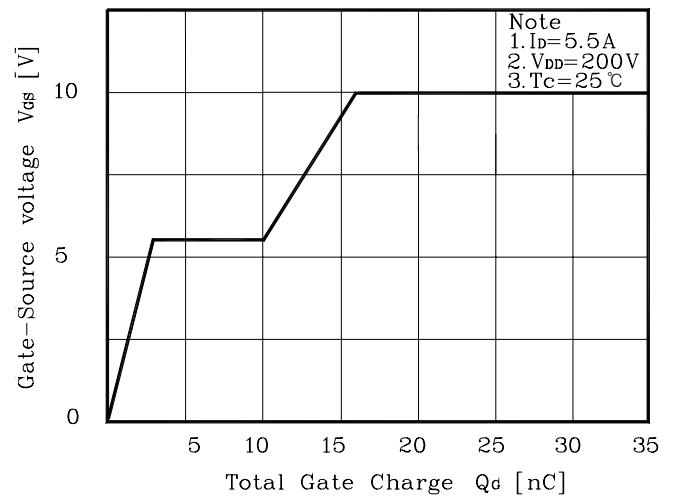


Fig. 7 $V_{DSS} - T_J$

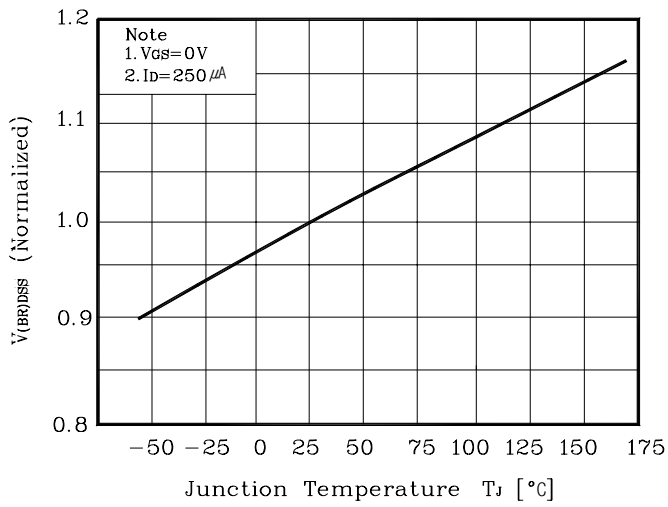


Fig. 8 $R_{DS(on)} - T_J$

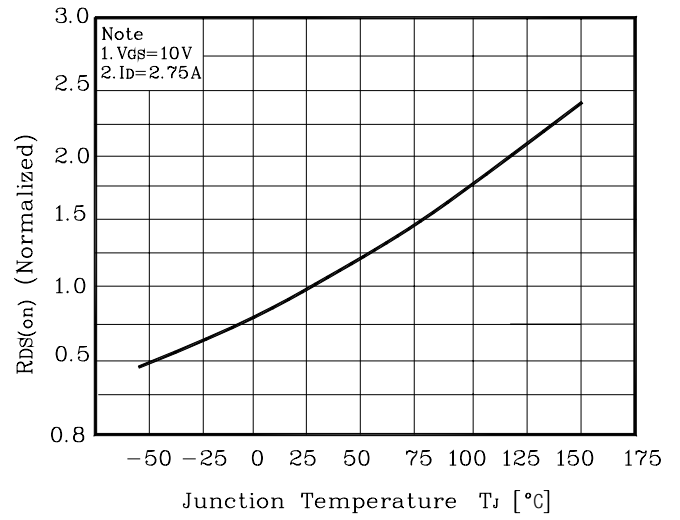


Fig. 9 $I_D - T_C$

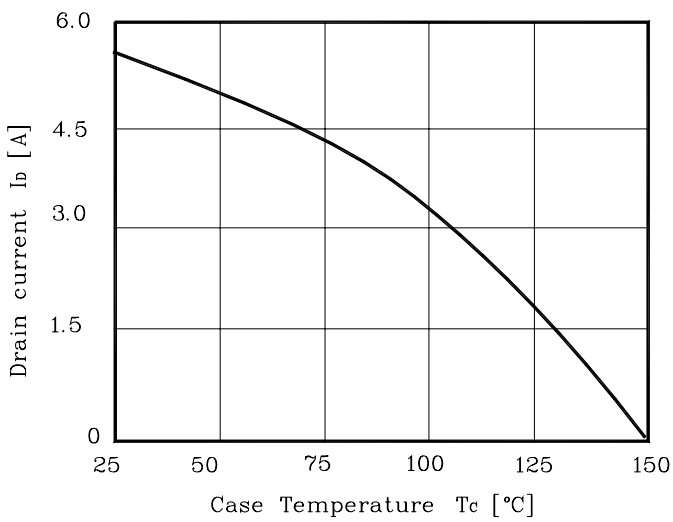


Fig. 10 Safe Operating Area

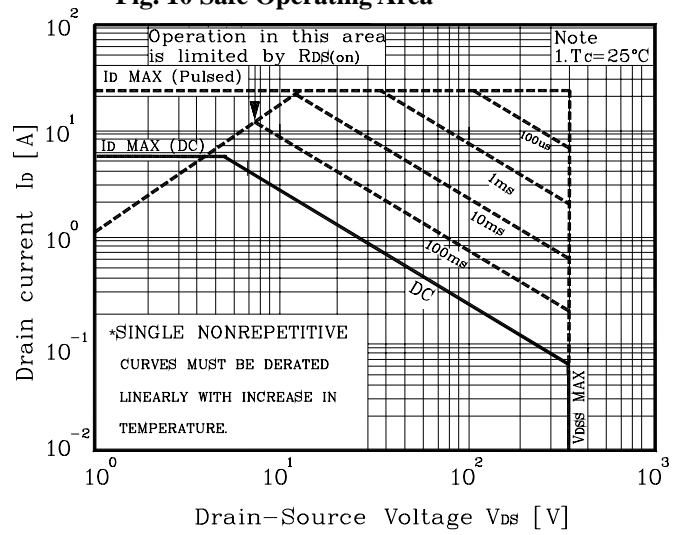


Fig. 11 Gate Charge Test Circuit & Waveform

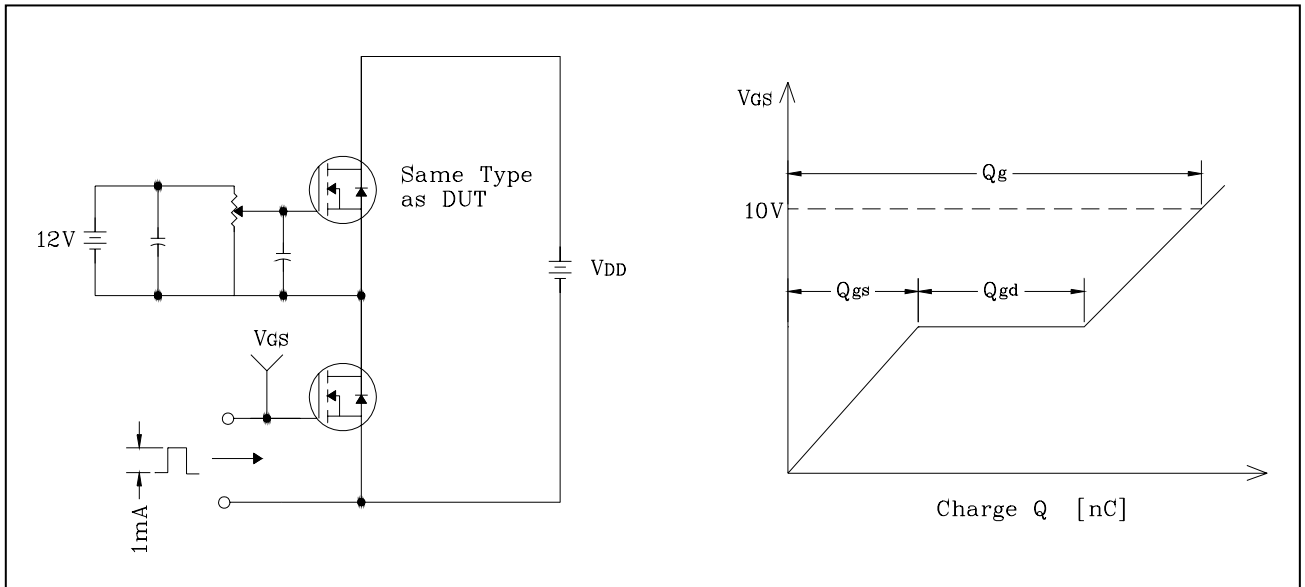


Fig. 12 Resistive Switching Test Circuit & Waveform

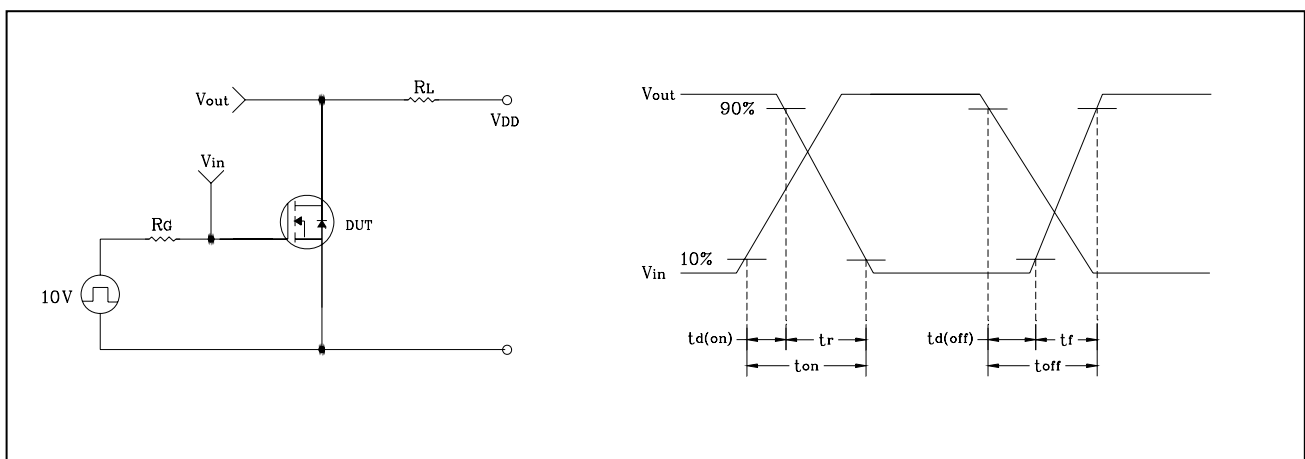


Fig. 13 E_{AS} Test Circuit & Waveform

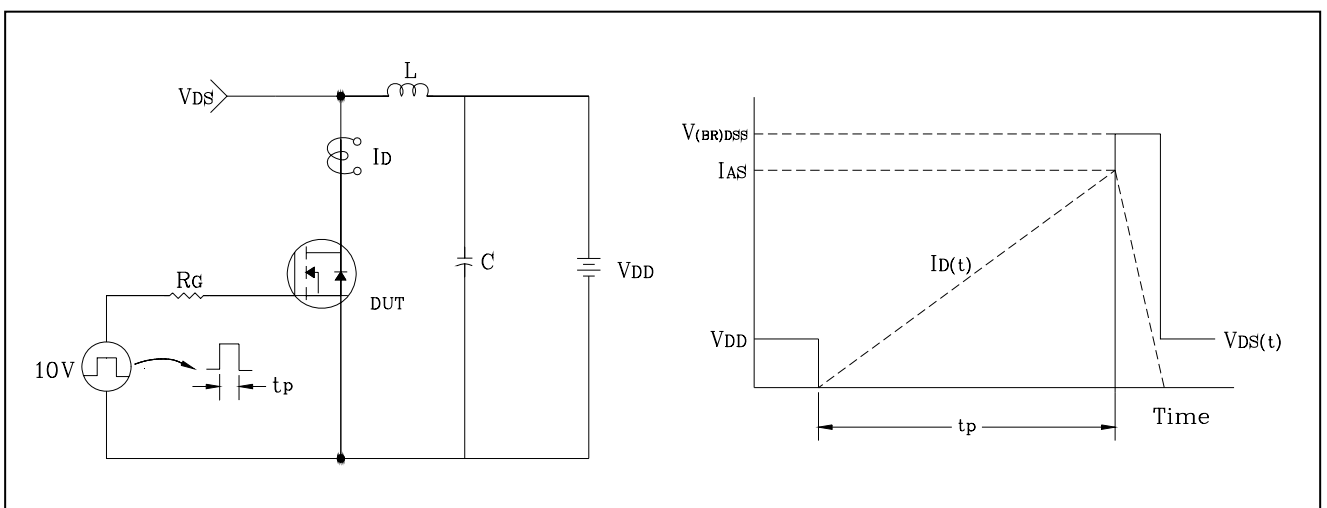
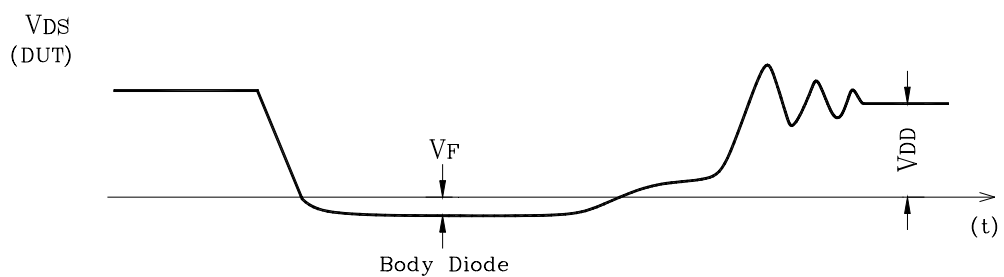
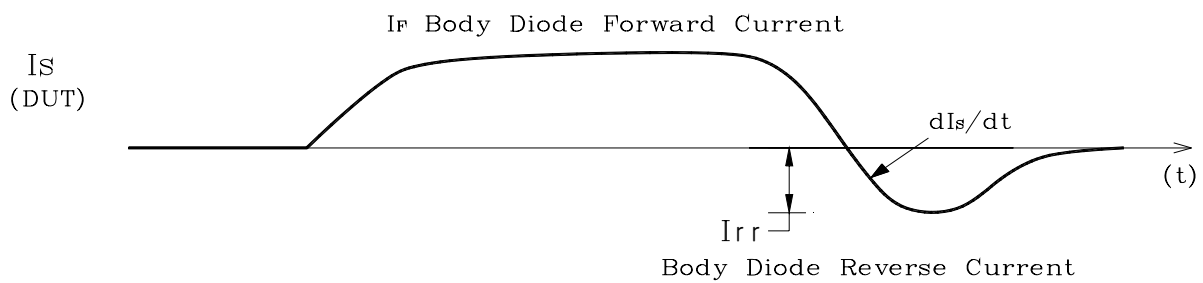
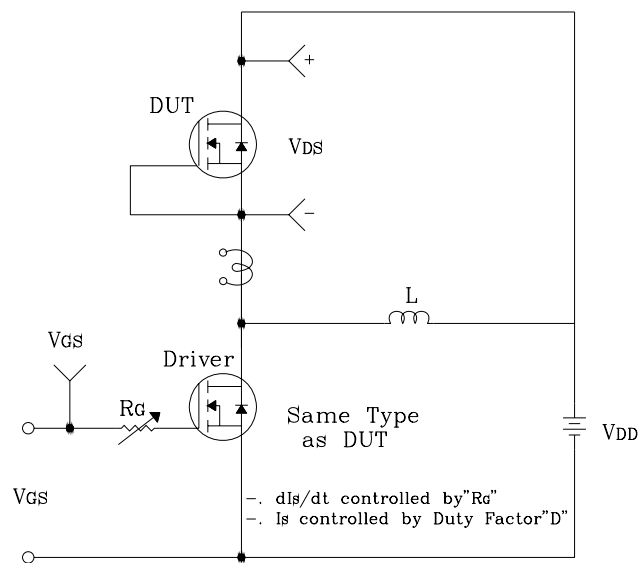


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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