

SWITCHING REGULATOR APPLICATIONS

Features

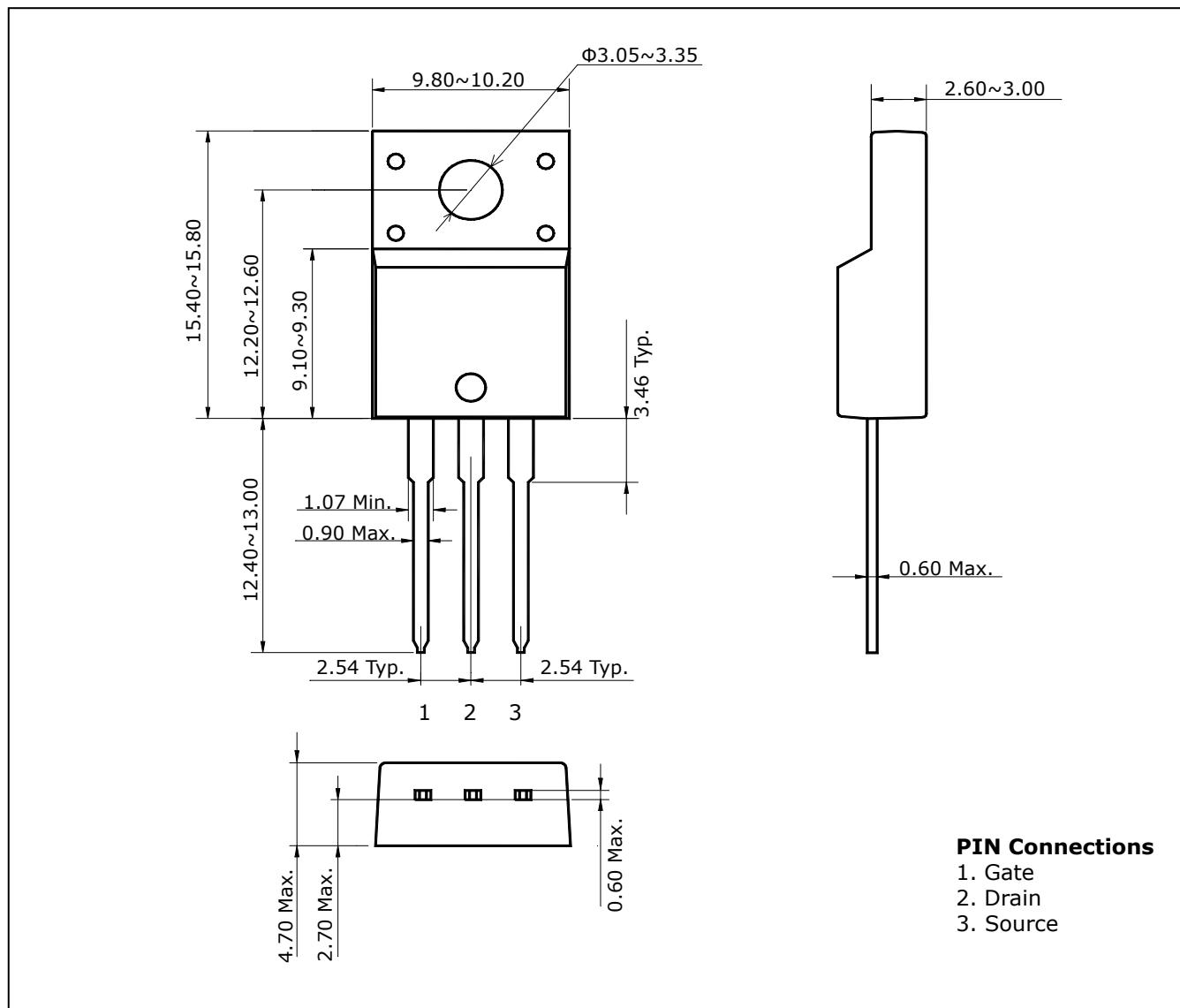
- High Voltage: $BV_{DSS}=600V$ (Min.)
- Low C_{rss} : $C_{rss}=7.5\text{pF}$ (Typ.)
- Low gate charge : $Q_g=16\text{nC}$ (Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}=2.5\Omega$ (Max.)

Ordering Information

Type NO.	Marking	Package Code
STK0460F	STK0460	TO-220F-3L

Outline Dimensions

unit : mm



Absolute maximum ratings

(Tc=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	(Tc=25°C)	4
		(Tc=100°C)	2.2
Drain current (Pulsed) *	I _{DM}	16	A
Drain Power dissipation	P _D	25	W
Avalanche current (Single) ②	I _{AS}	4	A
Single pulsed avalanche energy ②	E _{AS}	150	mJ
Avalanche current (Repetitive) ①	I _{AR}	4	A
Repetitive avalanche energy ①	E _{AR}	7	mJ
Junction temperature	T _J	150	°C
Storage temperature range	T _{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic	Symbol	Typ.	Max	Unit
Thermal resistance	R _{th(J-C)}	-	5.0	°C/W
	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 =250μA, V _{GS} =0	600	-	-	V
Gate-threshold voltage	V _{GS(th)}	I _D =250μA, V _{DS} = V _{GS}	2.0	-	4.0	V
Drain-source leakage current	I _{DSS}	V _{DS} =600V, V _{GS} =0V	-	-	1	μA
Gate-source leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA
Drain-Source on-resistance ④	R _{DS(ON)}	V _{GS} =10V, I _D =2.0A	-	1.9	2.5	Ω
Forward transfer admittance ④	g _{fs}	V _{DS} =10V, I _D =2.0A	-	3.0	-	S
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	520	780	pF
Output capacitance	C _{oss}		-	35	53	
Reverse transfer capacitance	C _{rss}		-	7.5	12	
Turn-on delay time	t _{d(on)}	V _{DD} =300V, I _D =4A R _G =25Ω	-	10	-	ns
Rise time	t _r		-	42	-	
Turn-off delay time	t _{d(off)}		-	38	-	
Fall time	t _f		-	46	-	
Total gate charge	Q _g	V _{DS} =300V, V _{GS} =10V I _D =4A	-	16	24	nC
Gate-source charge	Q _{gs}		-	2.8	4.2	
Gate-drain charge	Q _{gd}		-	5.5	8.3	

Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Continuous source current	I _S	Integral reverse diode in the MOSFET	-	-	4	A
Source current (Pulsed) ①	I _{SM}		-	-	16	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =4A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _s =4A di _s /dt=100A/us	-	310	-	ns
Reverse recovery charge	Q _{rr}		-	2.26	-	uC

Note :

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② L=17mH, I_{AS}=4A, V_{DD}=50V, R_G=27Ω
- ③ Pulse Test : Pulse Width < 300us, Duty cycle≤ 2%
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

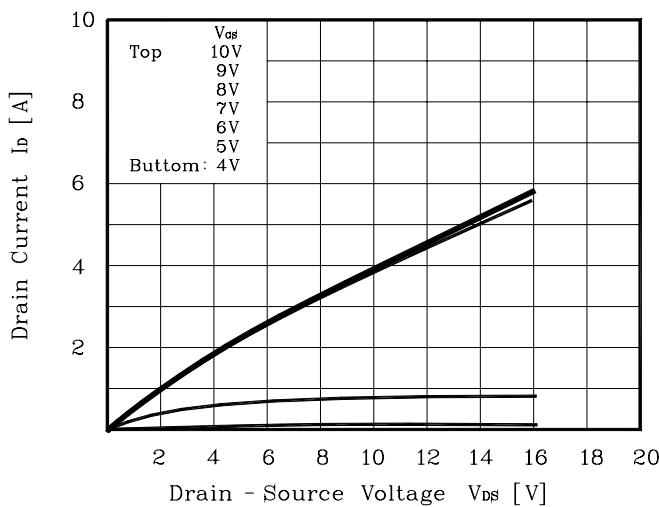


Fig. 2 I_D - V_{GS}

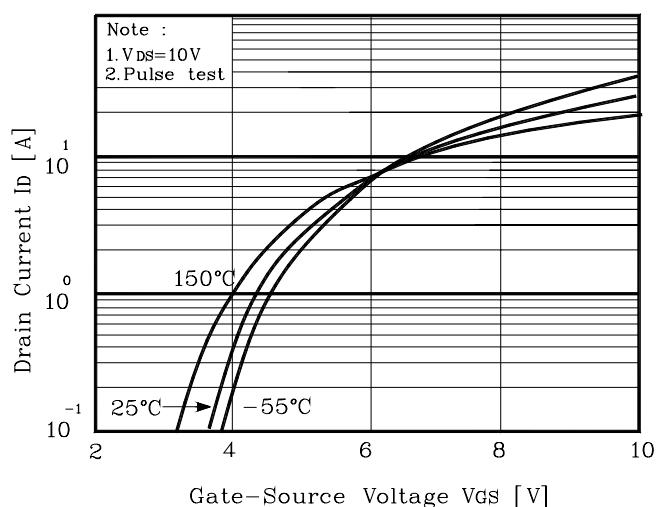


Fig. 3 $R_{DS(on)}$ - I_D

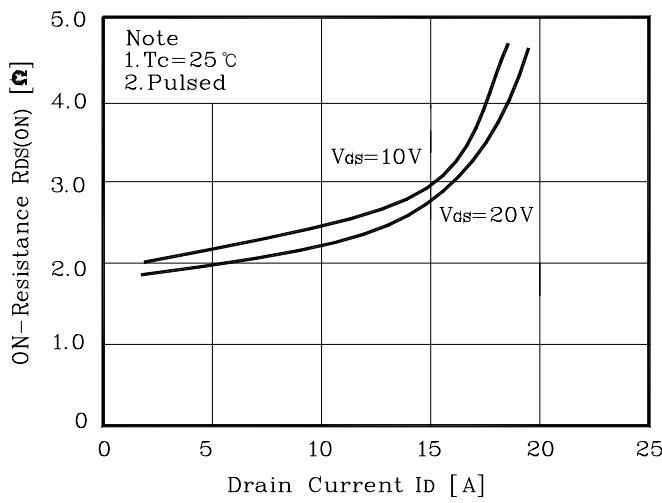


Fig. 4 I_S - V_{SD}

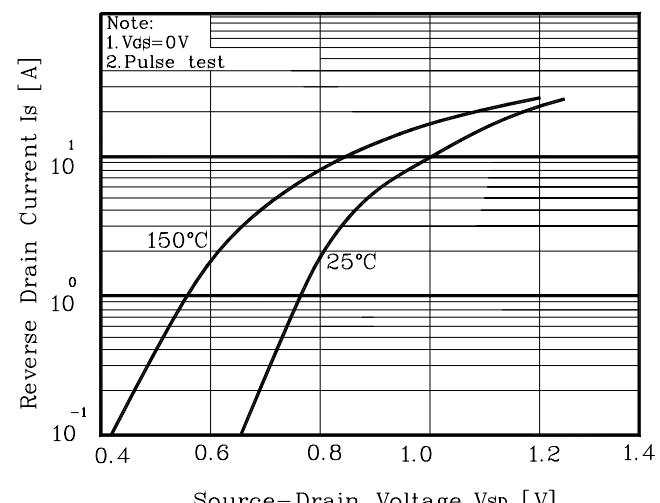


Fig. 5 Capacitance - V_{DS}

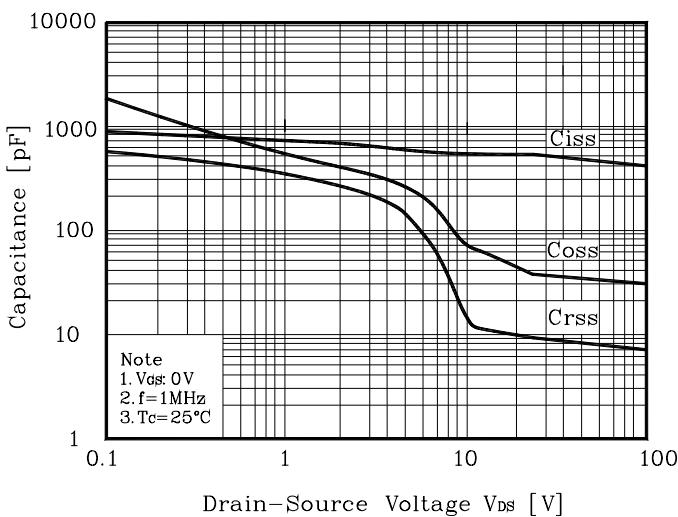


Fig. 6 V_{GS} - Q_G

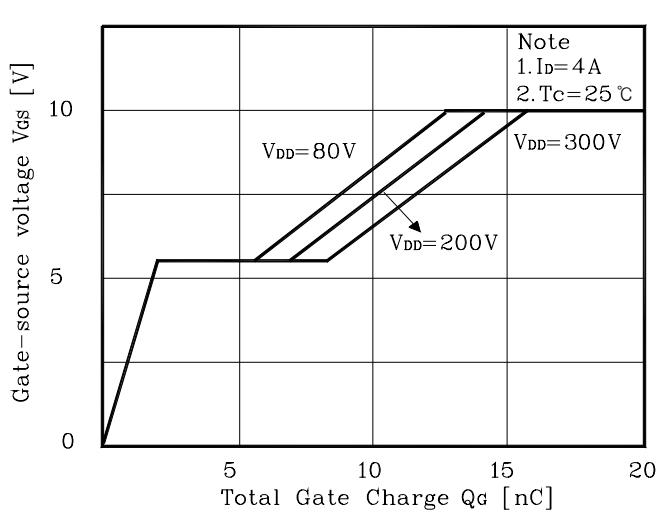


Fig. 7 V_{DSS} - T_J

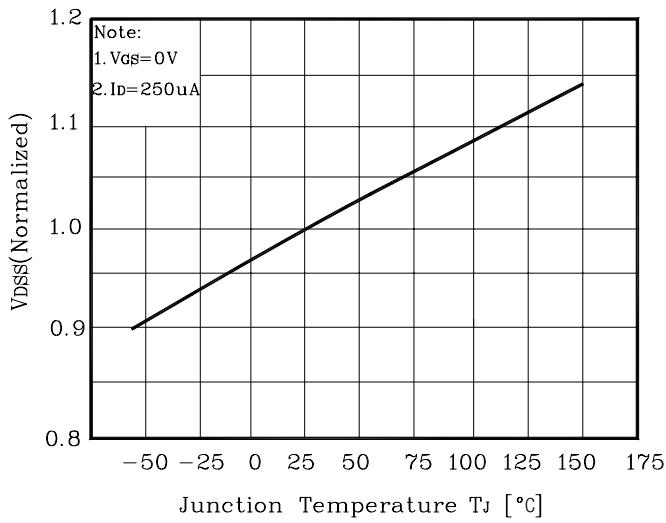


Fig. 8 $R_{DS(on)}$ - T_J

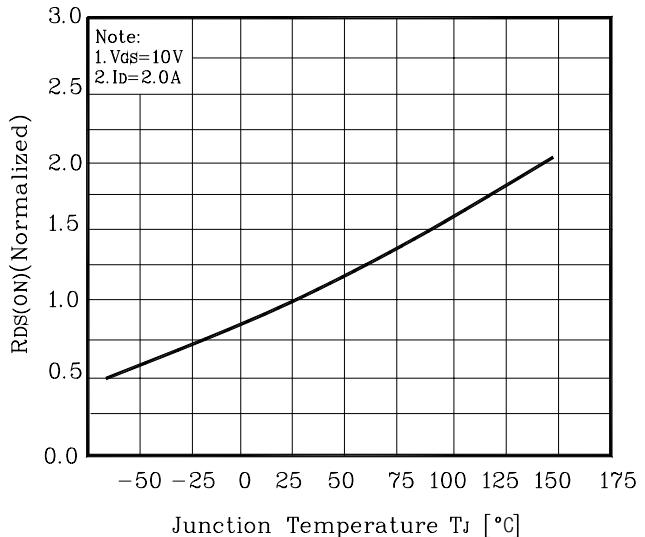


Fig. 9 I_D - T_C

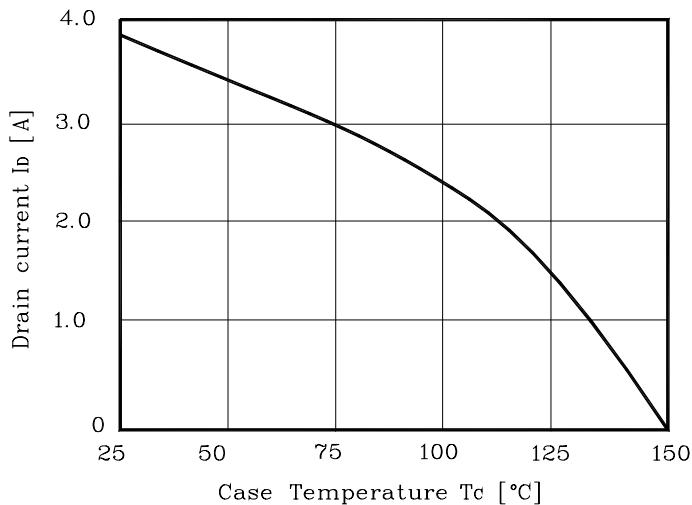


Fig. 10 Safe Operating Area

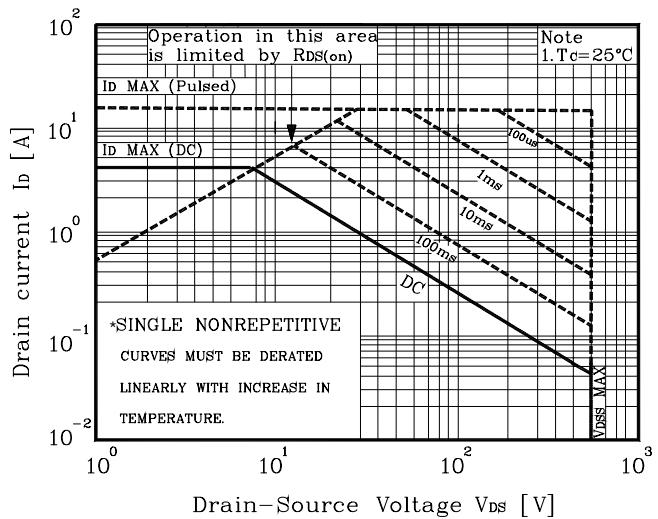


Fig. 11 Gate Charge Test Circuit & Waveform

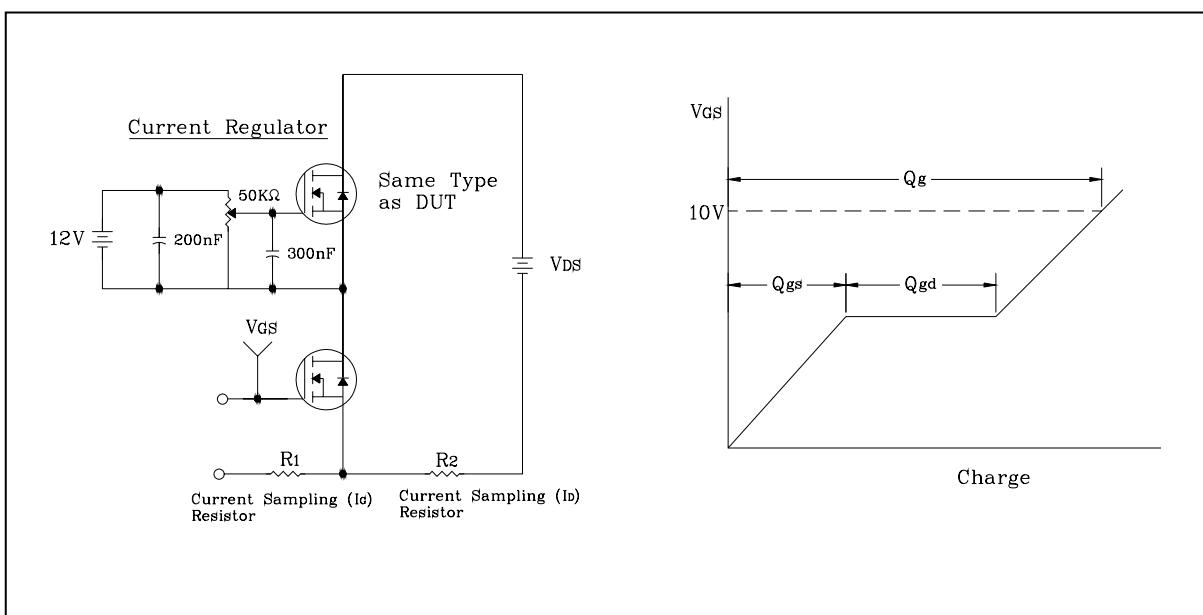


Fig. 12 Resistive Switching Test Circuit & Waveform

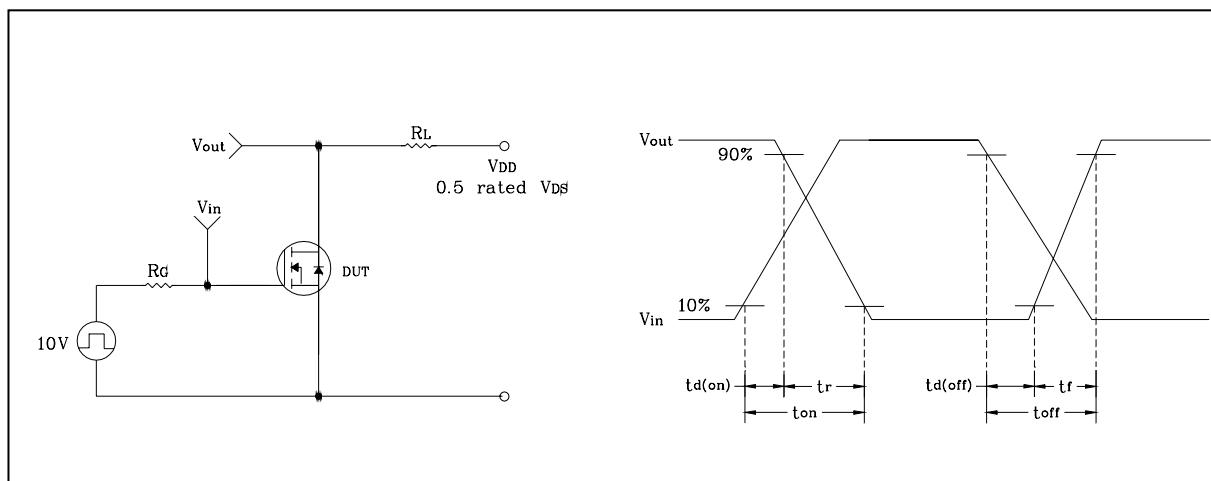


Fig. 13 E_{AS} Test Circuit & Waveform

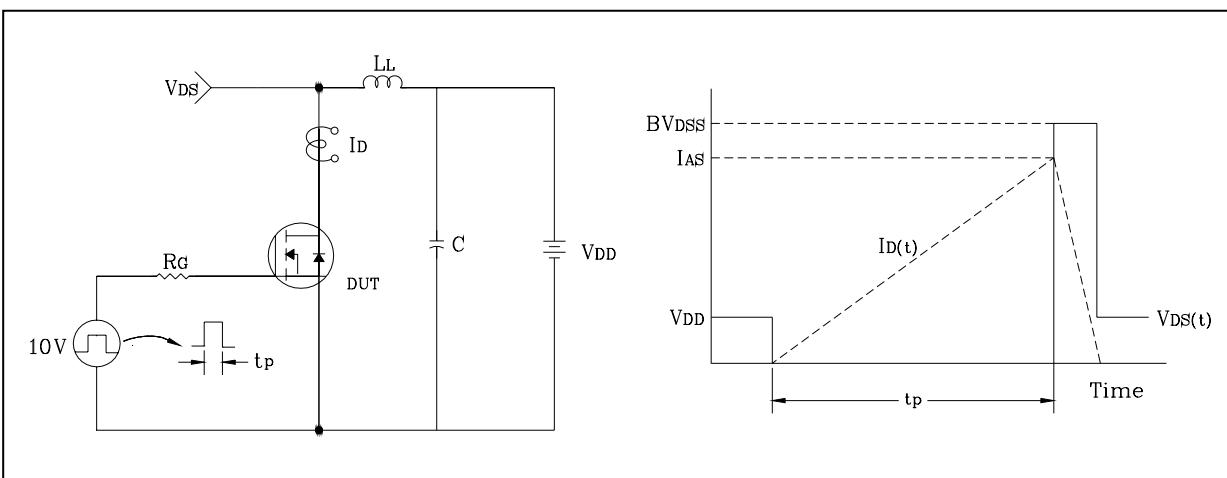
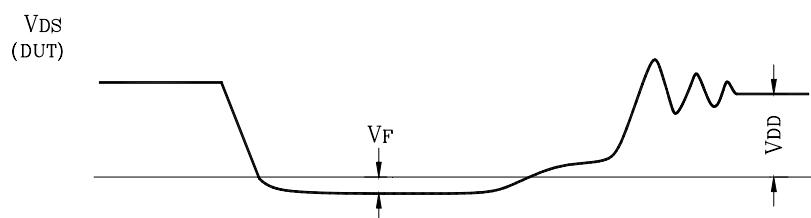
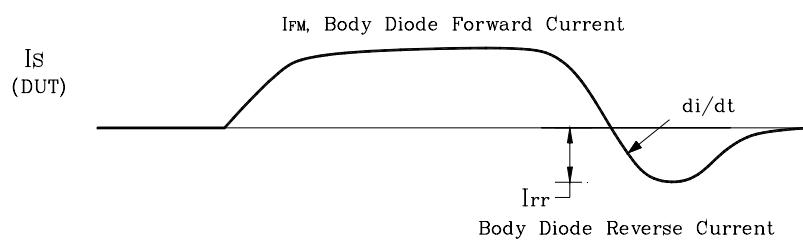
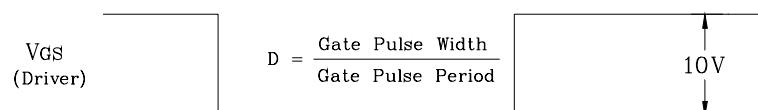
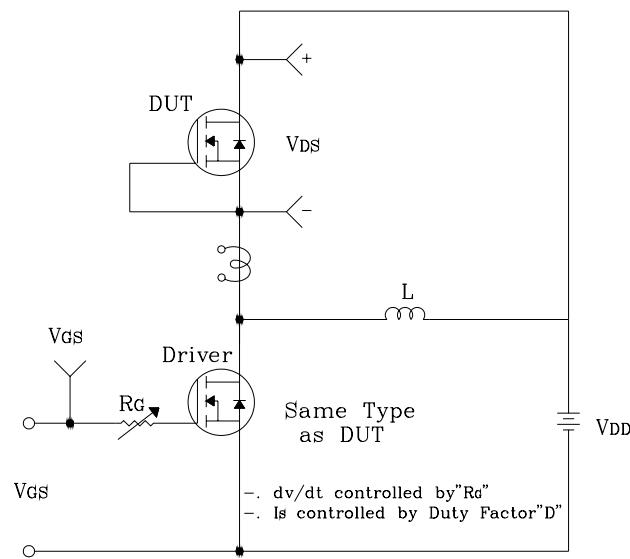


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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