AUK Semiconductor

STK1820F

Advanced Power MOSFET

DC-DC CONVERTER APPLICATION
HIGH VOLTAGE SWITCHING APPLICATIONS

Features

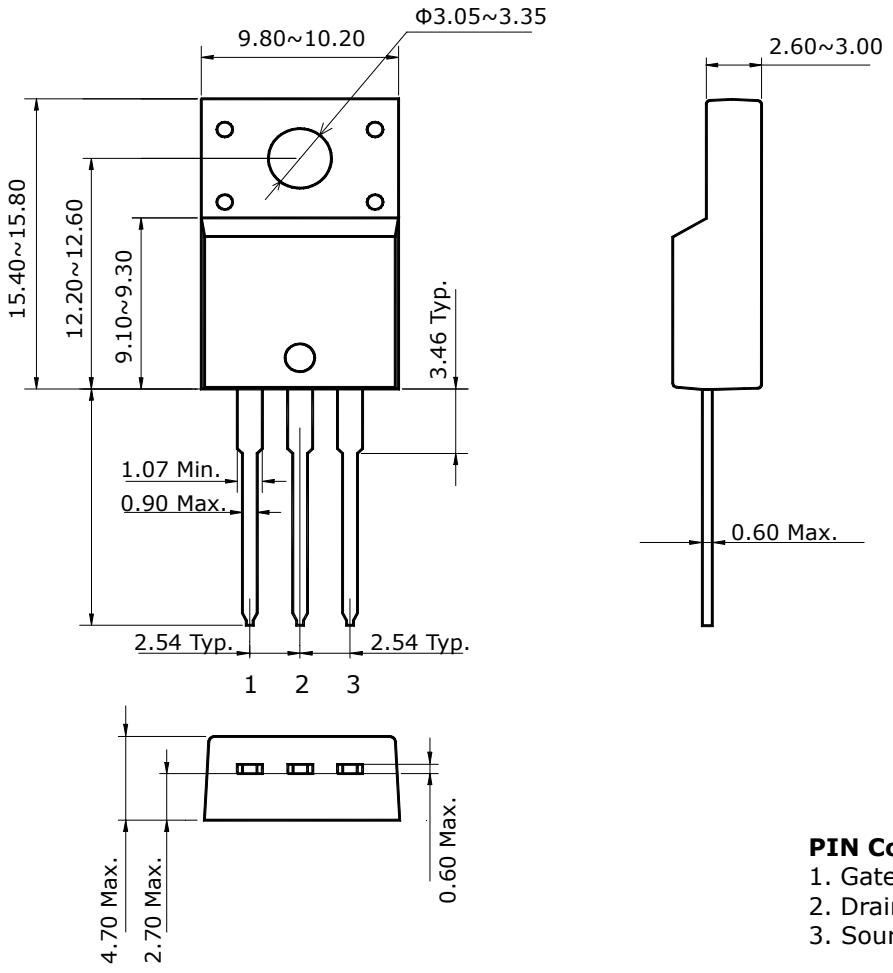
- High Voltage: BV_{DSS}=200V(Min.)
- Low C_{rss} : C_{rss}=22pF(Typ.)
- Low gate charge : Qg=30nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.17Ω(Max.)

Ordering Information

Type NO.	Marking	Package Code
STK1820F	STK1820	TO-220F-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}		200	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC)	I_D	(Tc=25℃)	18	A
		(Tc=100℃)	8.6	A
Drain current (Pulsed) *	I_{DP}		72	A
Drain Power dissipation	P_D		30	W
Avalanche current (Single) ②	I_{AS}		18	A
Single pulsed avalanche energy ②	E_{AS}		396	mJ
Avalanche current (Repetitive) ①	I_{AR}		18	A
Repetitive avalanche energy ①	E_{AR}		13.9	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	Junction-case	$R_{th(J-C)}$	-	4.16	℃/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	BV_{DSS}	I_D=250μA, V_{GS}=0	200	-	-	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}=200V, V_{GS}=0V	-	-	10	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=9A	-	0.14	0.17	Ω
Forward transfer admittance ④	g_{fs}	V_{DS}=40V, I_D=9A	-	8.5	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	840	1260	pF
Output capacitance	Coss		-	150	225	
Reverse transfer capacitance	Crss		-	22	33	
Turn-on delay time	$t_{d(on)}$	V_{DD}=100V, I_D=18A R_G=25Ω ③④	-	24	36	ns
Rise time	t_r		-	29	43	
Turn-off delay time	$t_{d(off)}$		-	68	102	
Fall time	t_f		-	29	43	
Total gate charge	Q_g	V_{DD}=100V, V_{GS}=10V I_D=18A ③④	-	30	45	nC
Gate-source charge	Q_{gs}		-	4.8	7.2	
Gate-drain charge	Q_{gd}		-	11.5	17.3	

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	-	-	18	A
Source current (Pulsed) ①	I_{SP}		-	-	72	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=18A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_s=18A, V_{GS}=0V di_s/dt=100A/us	-	253	-	ns
Reverse recovery charge	Q_{rr}		-	2.63	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=2.0mH, I_{AS}=18A, V_{DD}=50V, R_G=25Ω

③ Pulse Test : Pulse Width < 300us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

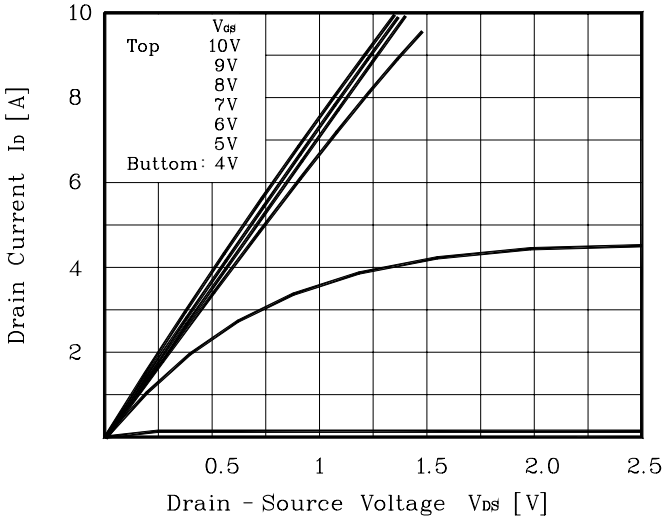


Fig. 2 I_D - V_{GS}

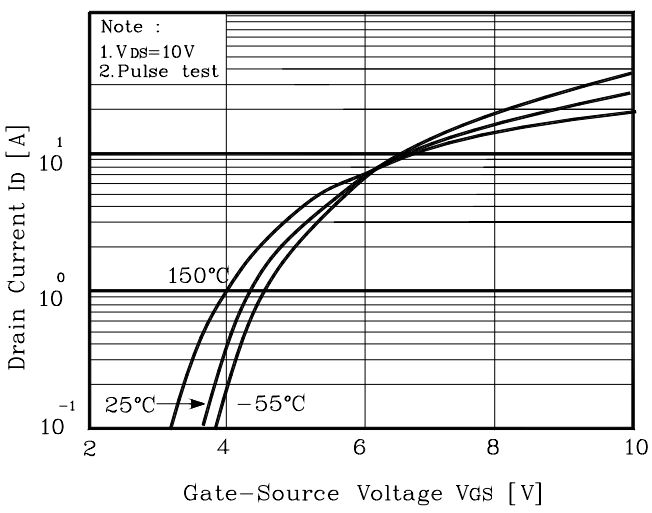


Fig. 3 $R_{DS(on)}$ - I_D

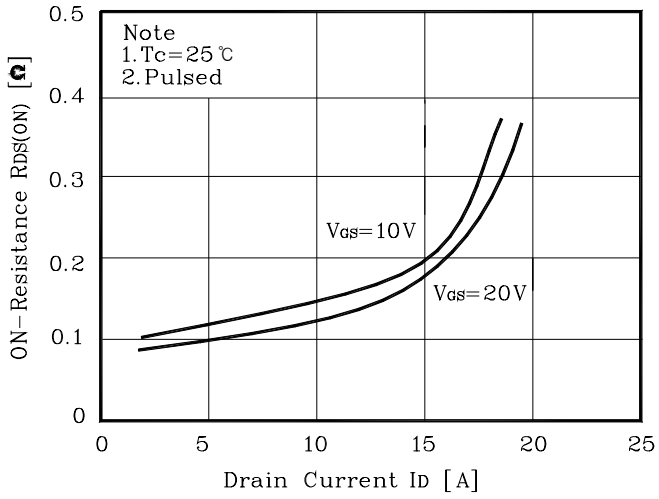


Fig. 4 I_S - V_{SD}

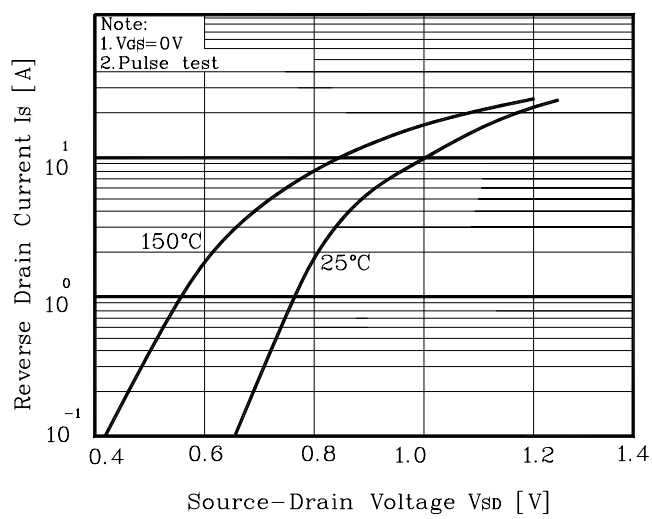


Fig. 5 Capacitance - V_{DS}

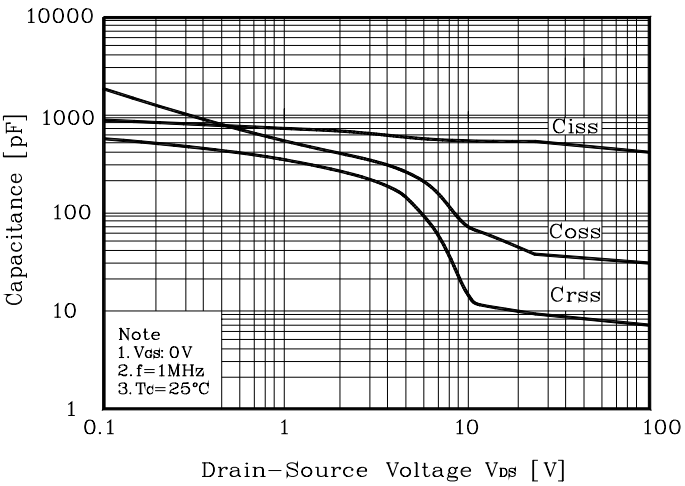


Fig. 6 V_{GS} - Q_G

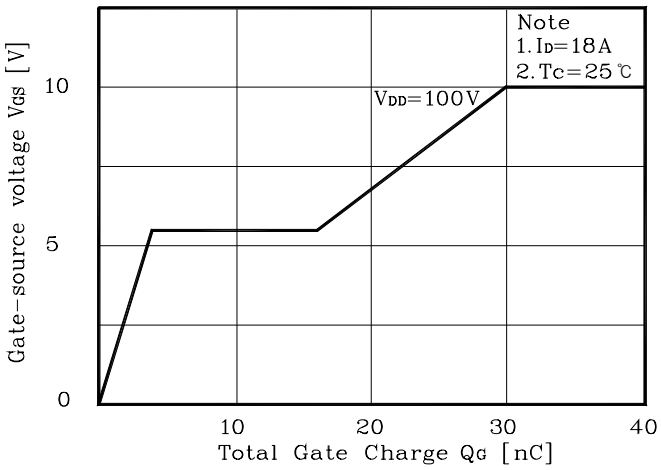


Fig. 7 V_{DSS} - T_J

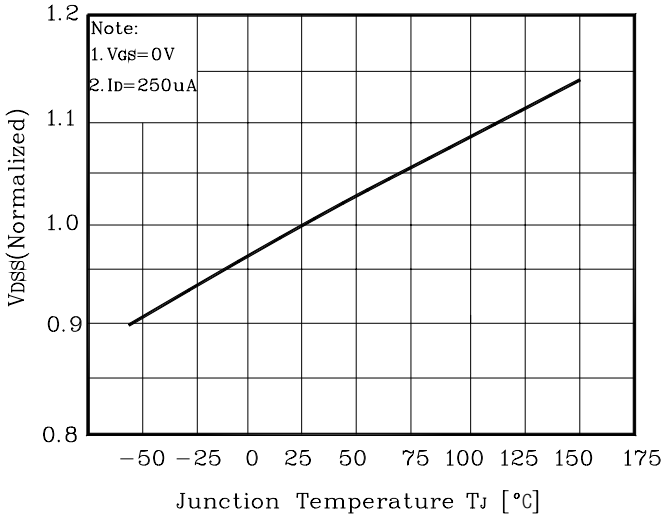


Fig. 8 $R_{DS(on)}$ - T_J

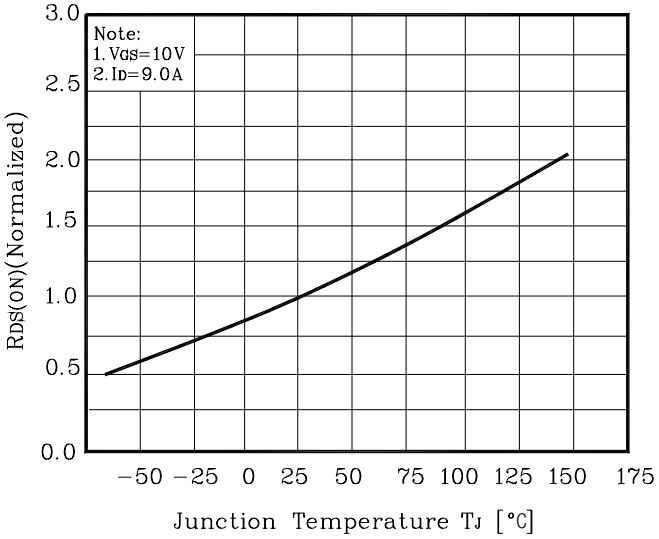


Fig. 9 I_D - T_C

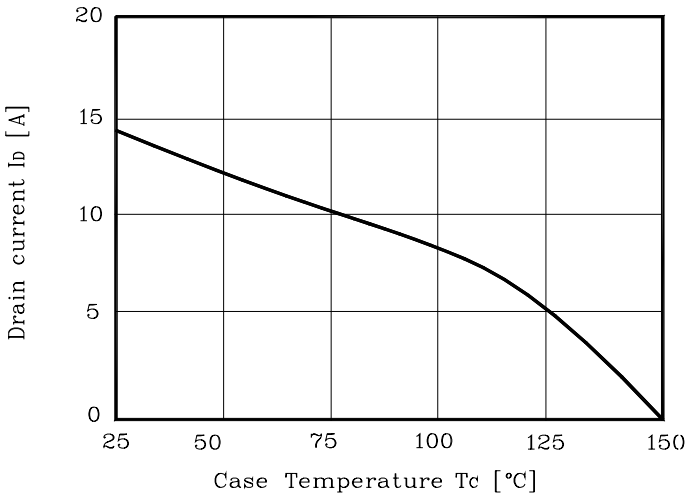


Fig. 10 Safe Operating Area

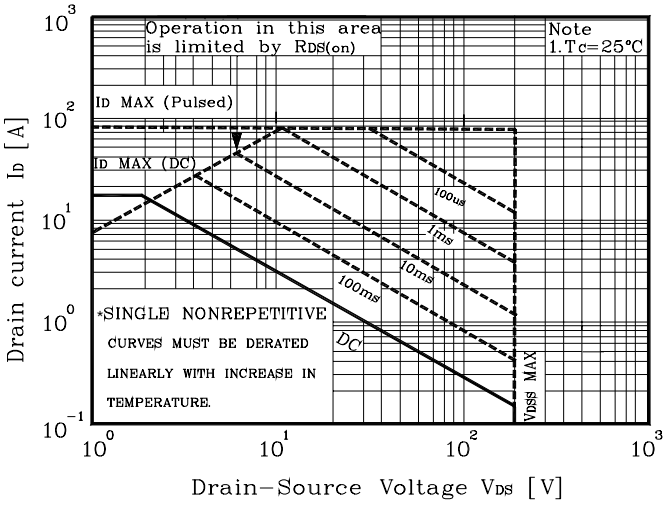


Fig. 11 Gate Charge Test Circuit & Waveform

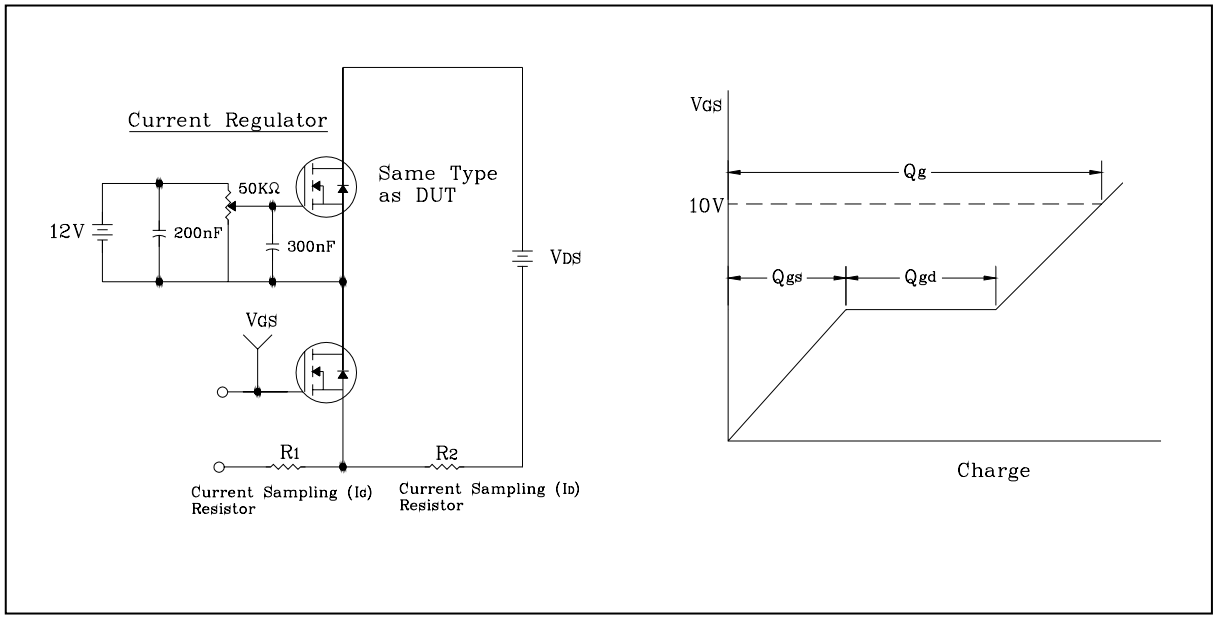


Fig. 12 Resistive Switching Test Circuit & Waveform

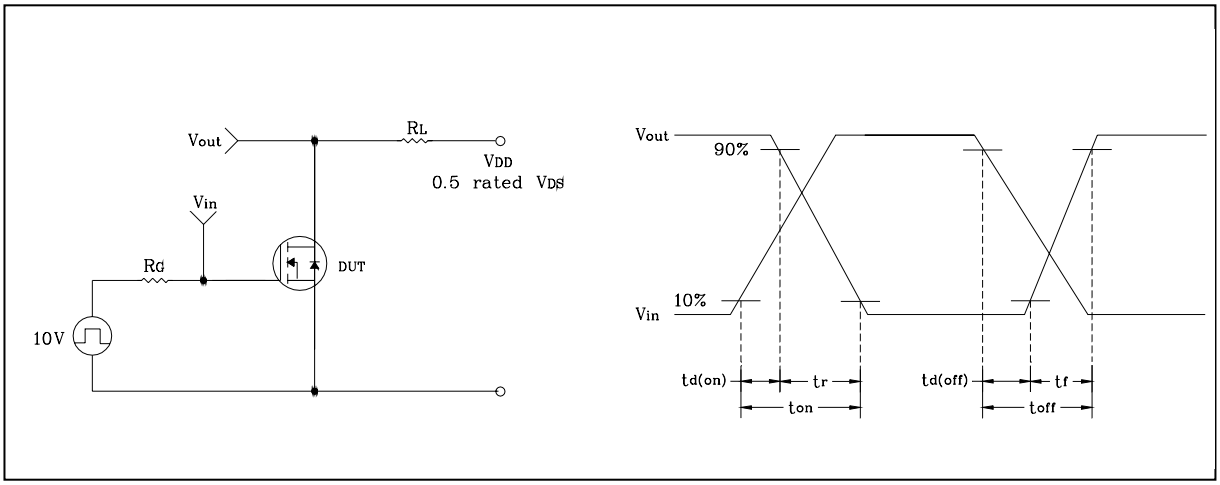


Fig. 13 E_{AS} Test Circuit & Waveform

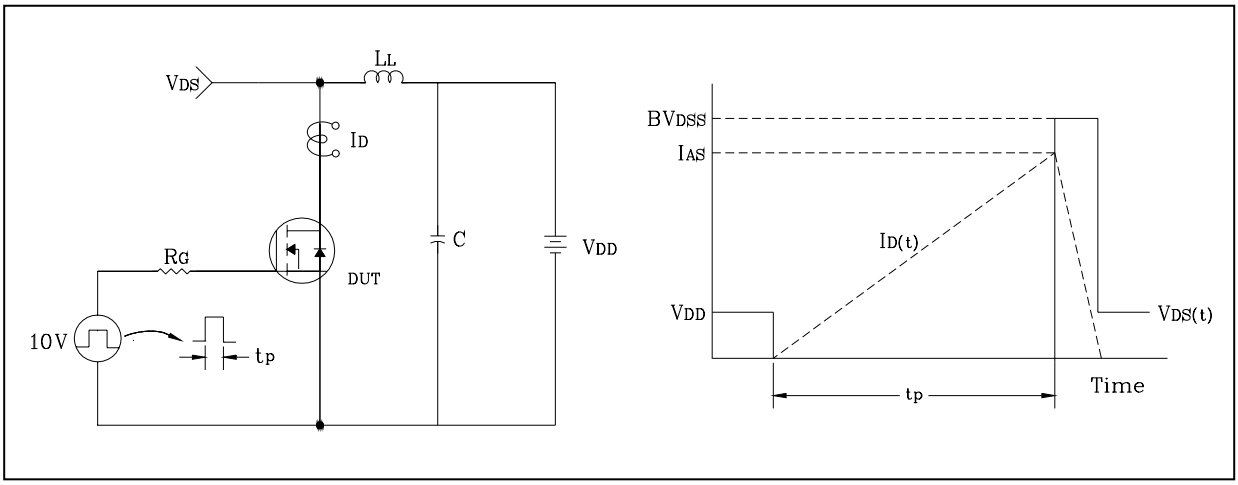
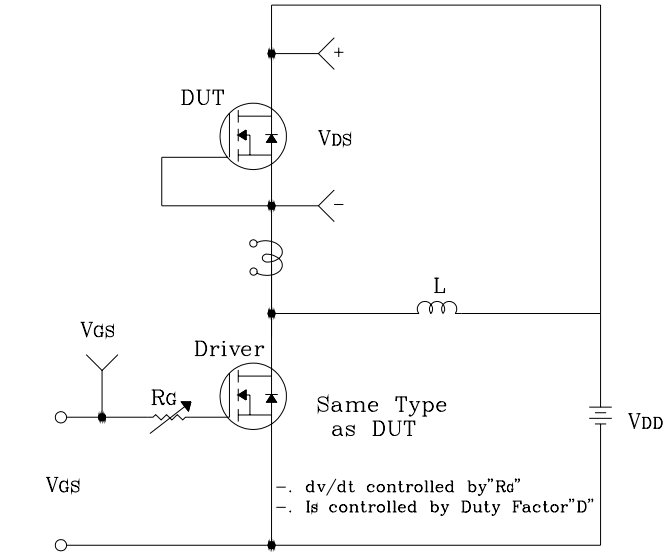
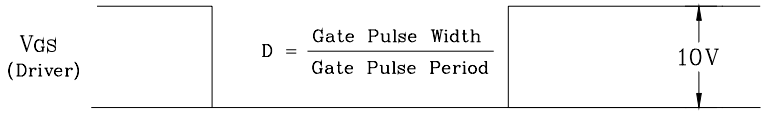
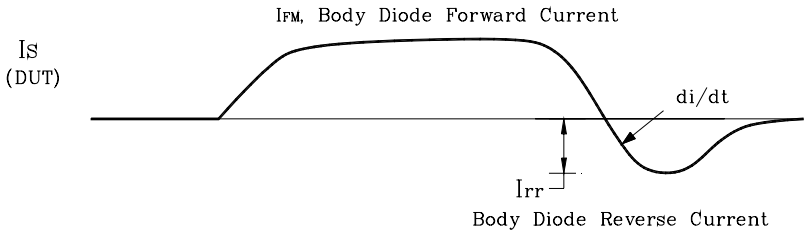
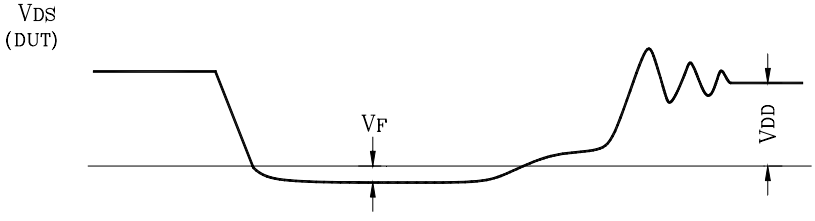


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform









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