AUK Semiconductor

STK5006P

Advanced Power MOSFET

SWITCHING REGURATOR APPLICATIONS

Features

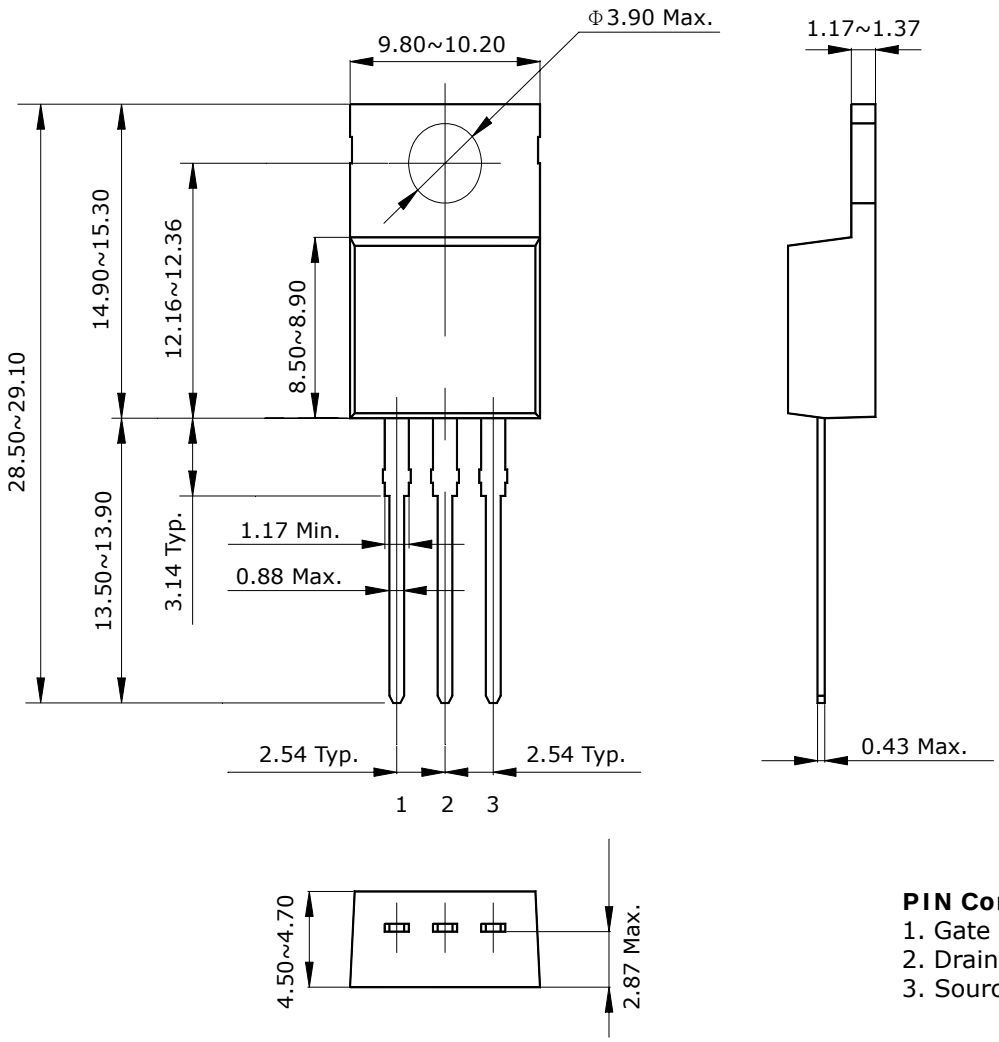
- High Voltage: BV_{DSS}=60V(Min.)
- Low C_{rss} : C_{rss}=84pF(Typ.)
- Low gate charge : Qg= 26.7nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=25mΩ(Max.)

Ordering Information

Type NO.	Marking	Package Code
STK5006P STK5006		TO-220AB-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}	60	V
Gate-Source voltage	V_{GSS}	±20	V
Continuous Drain current (Tc=25℃)	I_D 50		A
Continuous Drain current (Tc=100℃)	I_D 35.4		A
Drain Current-Pulsed ①	I_{DM} 200		A
Power Dissipation (Tc=25℃)	P_D 120		W
Single Pulsed Avalanche Energy ②	E_{AS} 490		mJ
Avalanche current ①	I_{AR} 50		A
Repetitive Avalanche Energy ①	E_{AR} 12		mJ
Junction temperature	T_J	150	°C
Storage temperature range	T_{stg}	-55~175	

Thermal Resistance

Characteristic Symbol		Typ.	Max	Units
Junction to Case	$R_{th(J-C)}$	-	1.24	℃/W
Junction to 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	60 -		-	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}=60V, V_{GS}=0V -		-	1	μA
Gate-source leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	- -		±100	nA
Drain-Source on-resistance ④	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A -		18	22	mΩ
Forward transfer admittance ④	g_{fs}	V_{DS}=25V, I_D=25A -		22	-	S
Input capacitance	Ciss -	V_{GS}=0V, V_{DS}=25V, f=1MHz		1289	1675	pF
Output capacitance	Coss		-	445	580	
Reverse transfer capacitance	Crss		- 84		110	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=25A R_G=25Ω ④⑤	-	15	40	ns
Rise time	t_r		-	105	220	
Turn-off delay time	$t_{d(off)}$		-	80	180	
Fall time	t_f		- 85		180	
Total gate charge	Q_g -	V_{DS}=48V, V_{GS}=10V, I_D=50A ④⑤		26.7	34	nC
Gate-source charge	Q_{gs} -			5.0	-	
Gate-drain("Miller")charge Q	gd		- 10.	2	-	

Source-Drain Diode Ratings and Characteristics (Tc=25°C)

Characteristic Symbol		Test Condition	Min	Typ	Max	Units
Continuous source current	I_S	Integral reverse diode in the MOSFET	-	-	50	A
Pulsed-source current ①	I_{SM}		- -		200	
Diode forward voltage ④	V_{SD}	V_{GS}=0V, I_S=50A -		-	1.5	V
Reverse recovery time	t_{rr}	I_s=50A di_F/dt=100A/us ④	-	45	-	ns
Reverse recovery charge	Q_{rr}		- 70		-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=230μH I_{AS}=50A, V_{DD}=25V, R_G=25Ω , starting T_J=25℃

③ I_S ≤ 50A, di/dt≤ 300A/us, V_{DD}≤ BV_{DSS}, starting T_J=25℃

④ Pulse Test : Pulse Width < 30 0us, Duty cycle≤ 2%

⑤ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

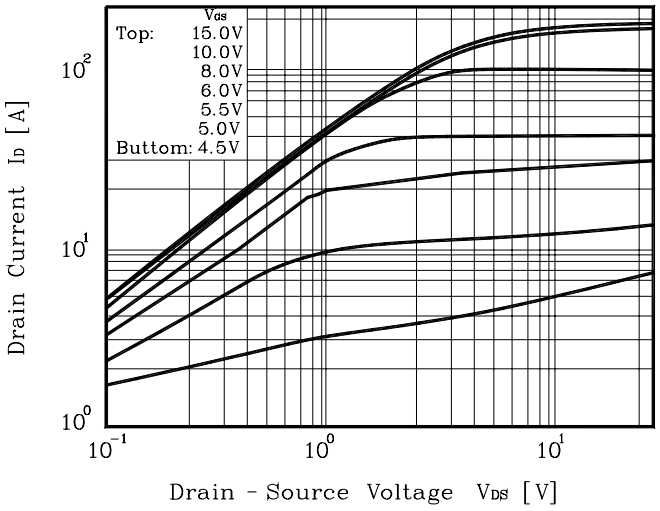


Fig. 2 I_D - V_{GS}

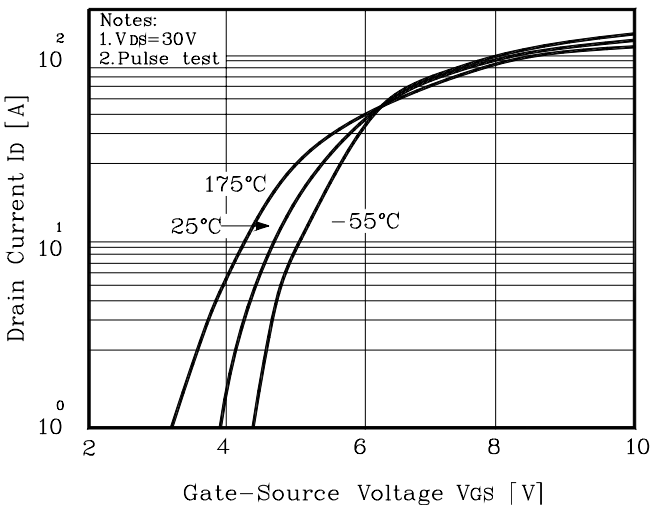


Fig. 3 $R_{DS(on)}$ - I_D

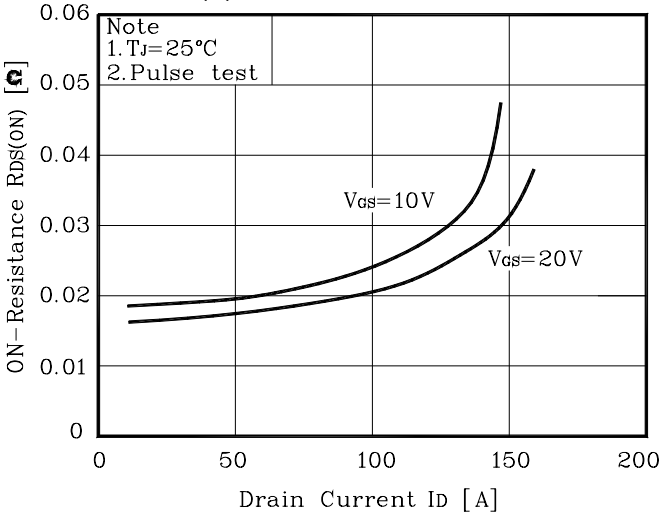


Fig. 4 I_S - V_{SD}

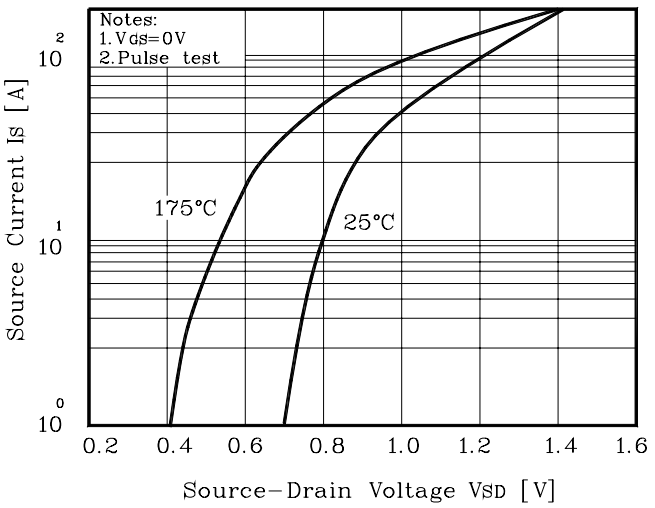


Fig. 5 Capacitance - V_{DS}

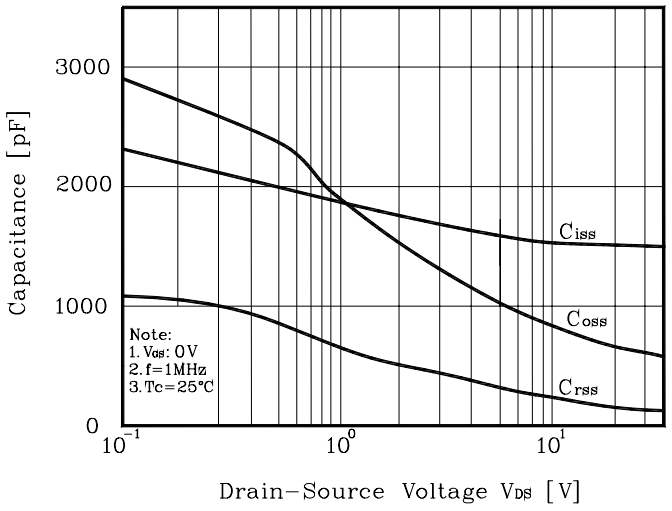


Fig.6 V_{GS} - Q_G

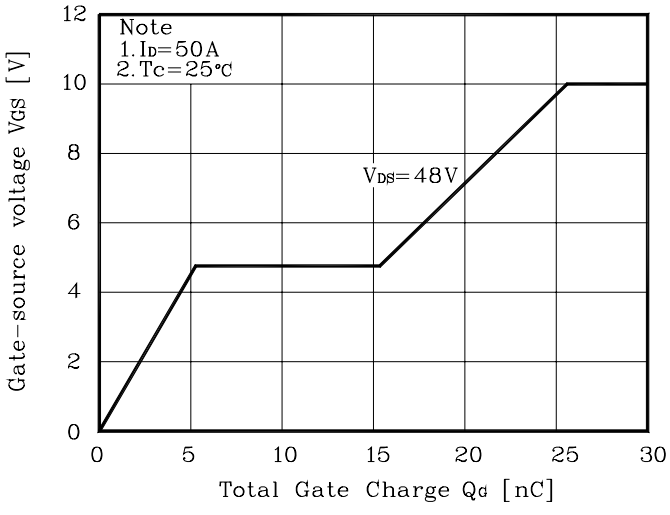


Fig. 7 V_{DSS} - T_J

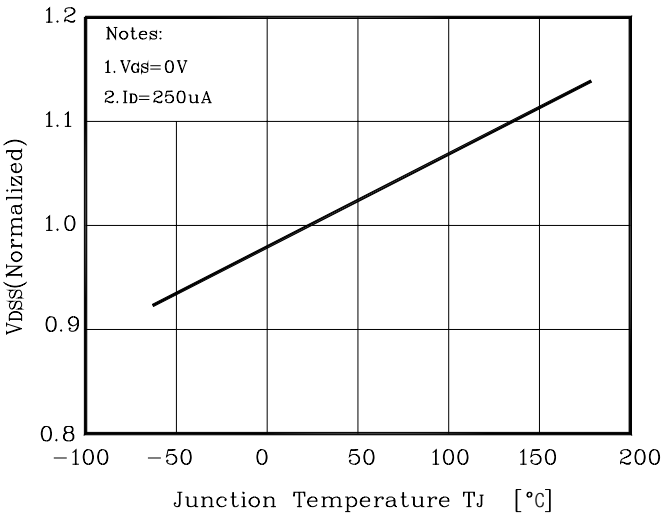


Fig.8 $R_{DS(on)}$ - T_J

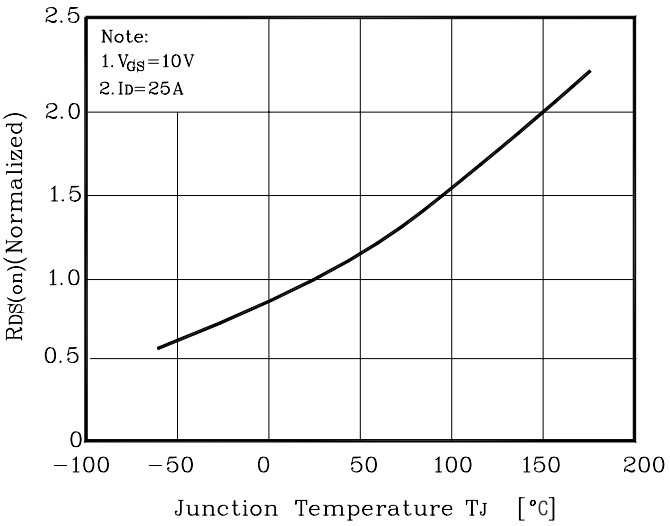


Fig. 9 I_D - T_C

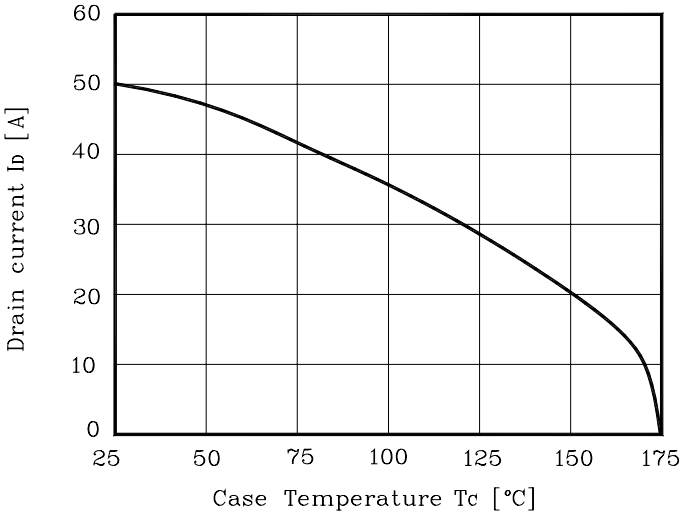


Fig. 10 Safe Operating Area

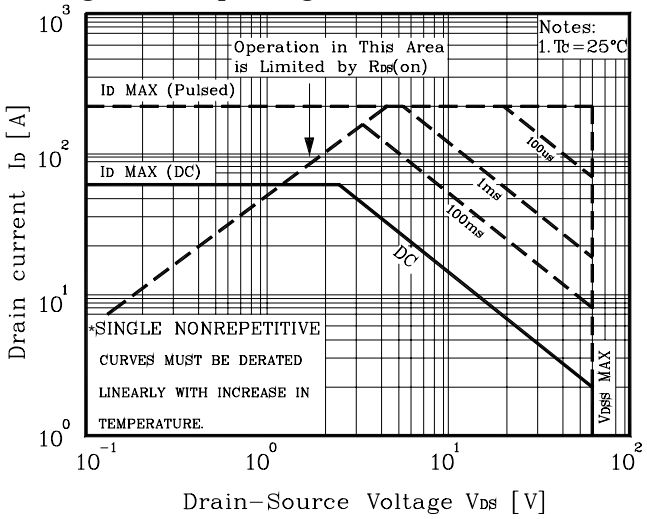


Fig. 10 Gate Charge Test Circuit & Waveform

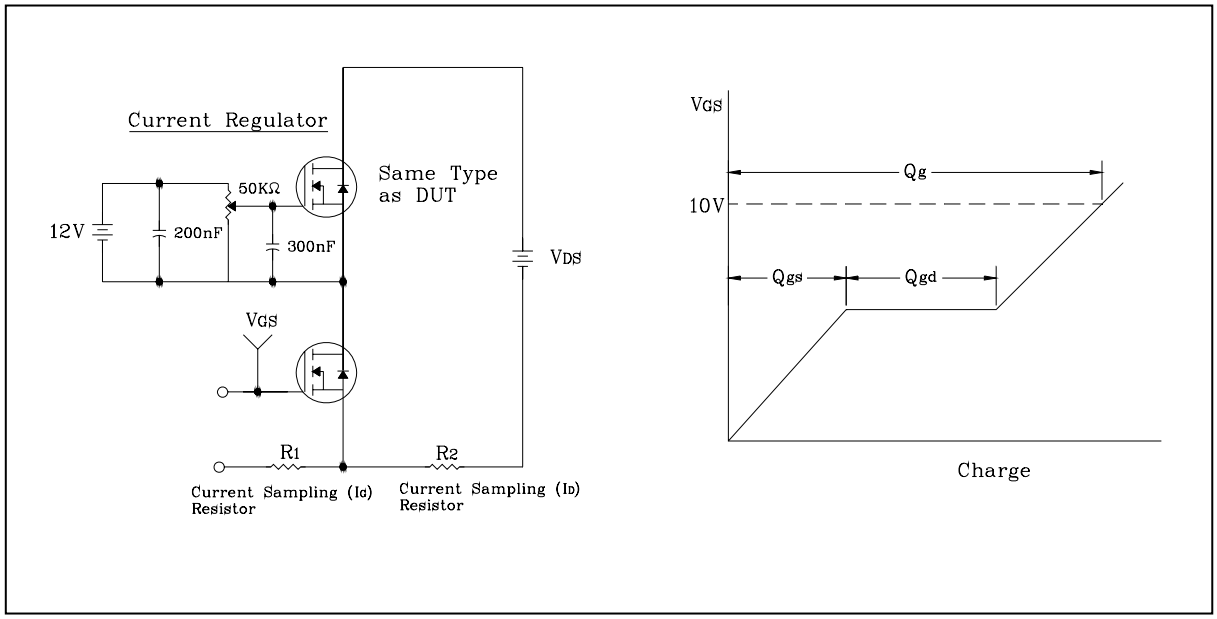


Fig. 11 Resistive Switching Test Circuit & Waveform

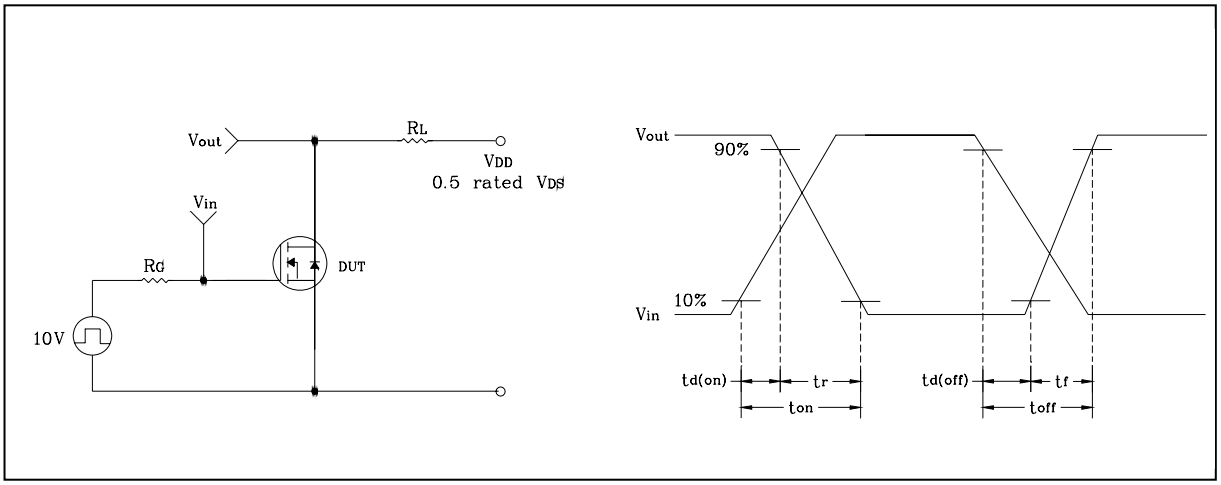


Fig. 12 E_{AS} Test Circuit & Waveform

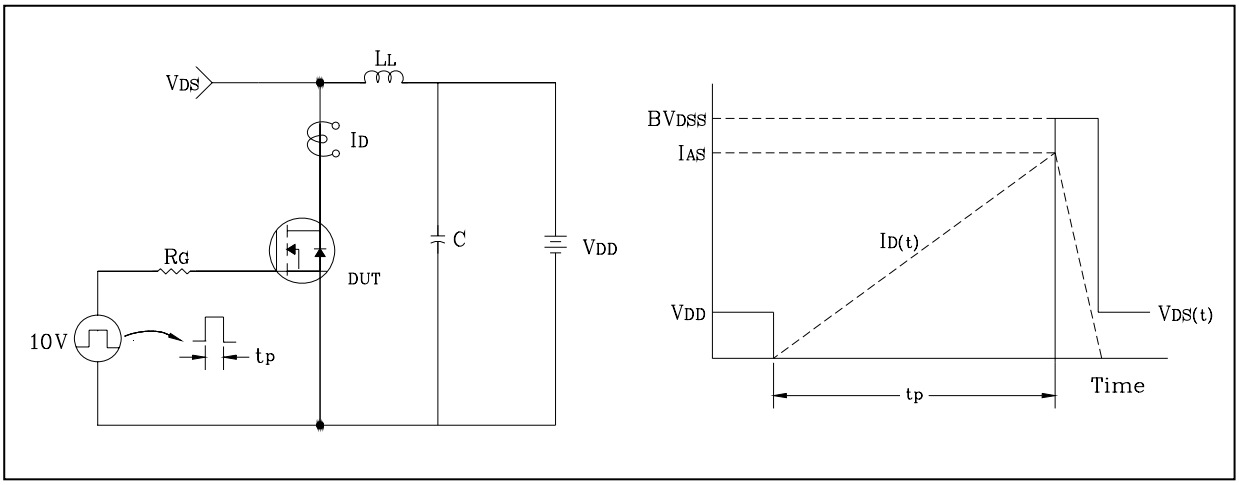
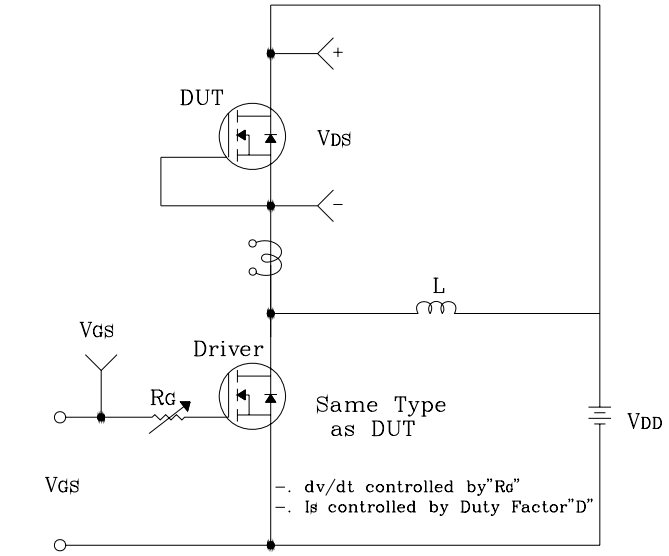
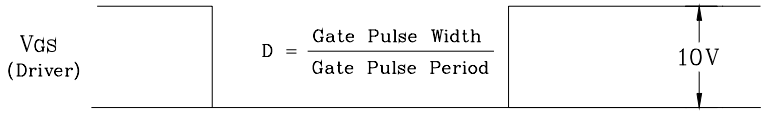
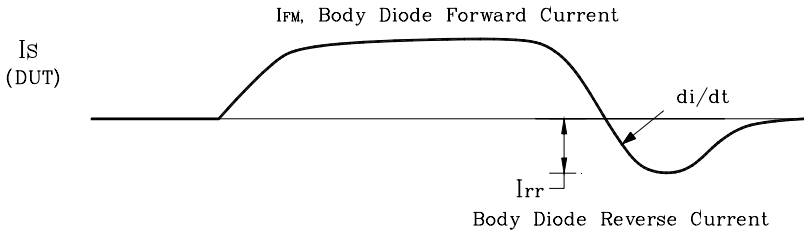
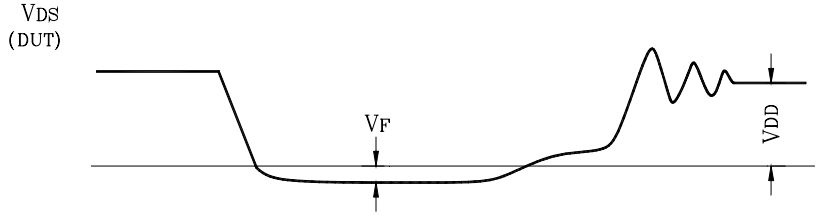


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform









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