AUK Semiconductor

STK830F

Advanced Power MOSFET

Features

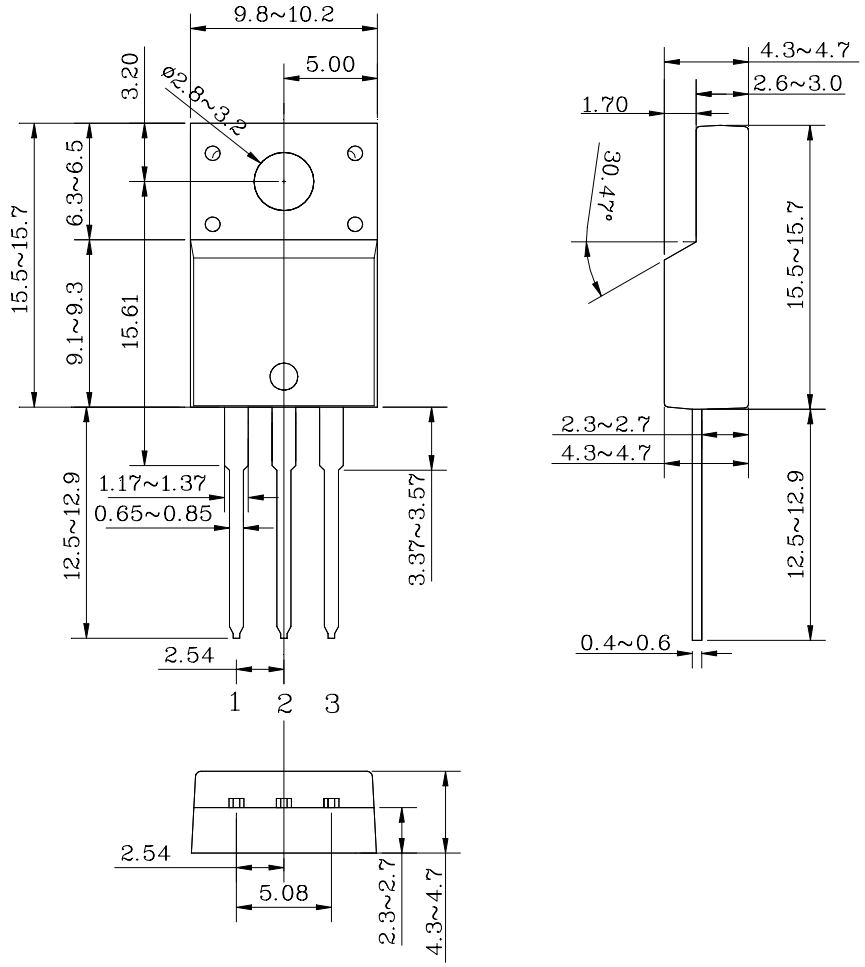
- Avalanche rugged technology.
- Low input capacitance.
- Improved gate charge.
- Low leakage current : 10uA (Max.) @ V_{DS}=500V.
- Low $R_{DS(ON)}$: 1.17Ω(Typ.)

Ordering Information

Type NO.	Marking	Package Code
STK830F	STK830	TO-220F

Outline Dimensions

unit : mm



PIN Connections
1. Gate
2. Drain
3. Source

Absolute maximum ratings

Characteristic	Symbol	Rating	Unit
Drain-Source voltage	V_{DSS}	500	V
Gate-Source voltage	V_{GS}	±30	V
Continuous Drain current (Tc=25℃)	I_D	4.5*	A
Continuous Drain current (Tc=100℃)	I_D	2.9*	A
Drain Current-Pulsed ①	I_{DM}	18	A
Power Dissipation (Tc=25℃) Linear Derating Factor	P_D	38 0.3	W W/℃
Single Pulsed Avalanche Energy ②	E_{AS}	270	mJ
Avalanche current ①	I_{AR}	4.5	A
Repetitive Avalanche Energy ①	E_{AR}	7.3	mJ
Peak Diode Recovery dv/dt	dv/dt	5.5	V/ns
Operating Junction and Storage temperature range	T_J , T_{stg}	-55~150	°C
Maximum lead temp. for soldering Purpose, 1/8" from case for 5-seconds	T_L	300	°C

* Limited by Maximum junction Temperature

Thermal Resistance

Characteristic	Symbol	Typ.	Max	Units
Junction-to-Case	$R_{\theta JC}$		3.31	℃/W
Case-to-Sink	$R_{\theta CS}$	0.5		
Junction-to-Ambient	$R_{\theta JA}$		62.5	

Electrical Characteristics (Tc=25°C unless otherwise specified)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-Source breakdown voltage	BV_{DSS}	I_D=250μA, V_{GS}=0	500			V
Gate-Threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}=5V	2.0		4.0	V
Drain-source leakage current	I_{DSS}	V_{DS}=500V			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=2.25A			1.5	Ω
Forward transconductance ④	g_{fs}	V_{DS}=50V, I_D=2.25A		3.87		S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz		760	900	pF
Output capacitance	Coss			85	100	
Reverse transfer capacitance	Crss			15	22	
Turn-on delay time	$t_{d(on)}$	V_{DD}=250V,I_D=4.5A R_G=12Ω ④⑤		15	40	ns
Rise time	t_r			16	40	
Turn-off delay time	$t_{d(off)}$			66	140	
Fall time	t_f			22	55	
Total gate charge	Q_g	V_{DS}=400V,V_{GS}=10V, I_D=4.5A ④⑤		33	43	nC
Gate-source charge	Q_{gs}			4.4		
Gate-drain("Miller")charge	Q_{gd}			16.6		

Source-Drain Diode Ratings and Characteristics

Characteristic	Symbol	Test Condition	Min	Typ	Max	Units
Continuous source current	I_S	Integral reverse pn-diode in the MOSFET			4.5	A
Pulsed-source current ①	I_{SM}				18	
Diode forward voltage ④	V_{SD}	T_J=25℃, V_{GS}=0V, I_S=4.5A			1.4	V
Reverse recovery time	t_{rr}	T_J=25℃,I_F=4.5A di_F/dt=100A/us ④		285		ns
Reverse recovery charge	Q_{rr}			2.0		uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=30mH, I_{AS}=4.5A, V_{DD}=50V, R_G=27Ω , starting T_J=25℃

③ I_{SD} ≤ 4.5A, di/dt≤ 130A/us, V_{DD}≤ BV_{DSS}, starting T_J=25℃

④ Pulse Test : Pulse Width=250us, Duty cycle≤ 2%

⑤ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

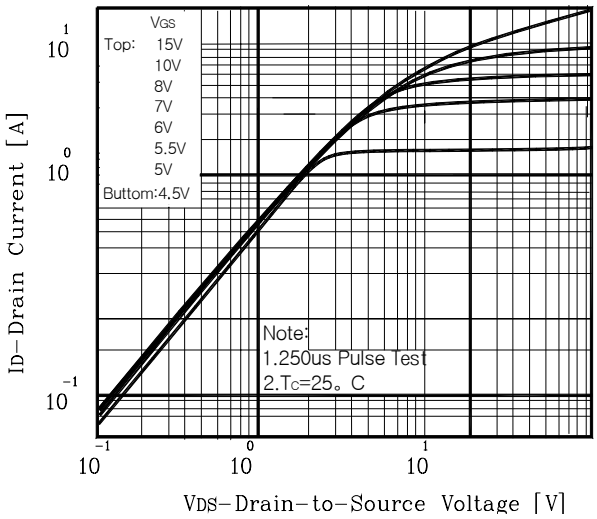


Fig. 2 I_D - V_{GS}

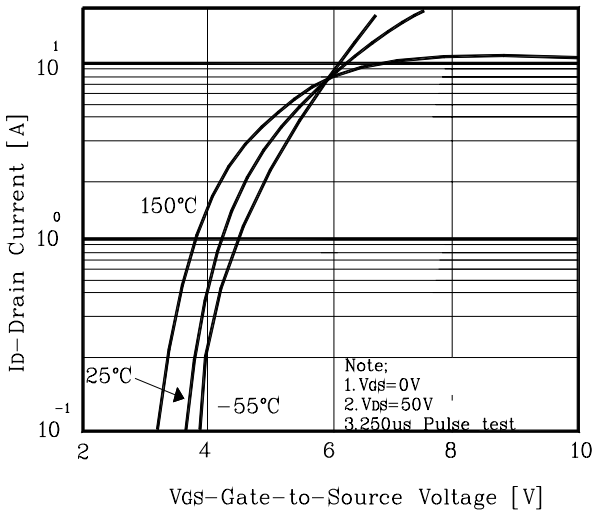


Fig. 3 $R_{DS(on)}$ - I_D

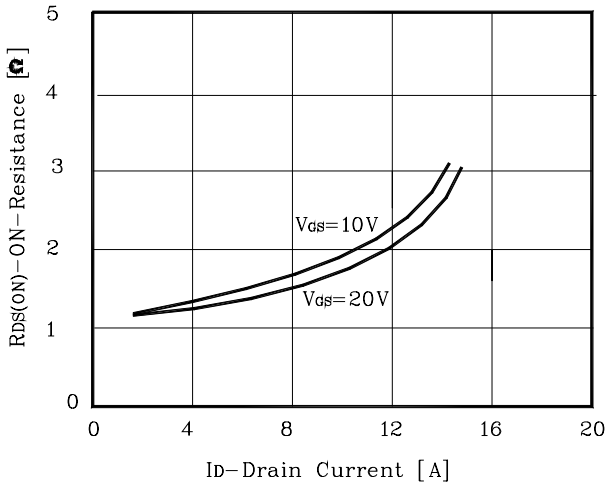


Fig. 4 I_{DR} - V_{SD}

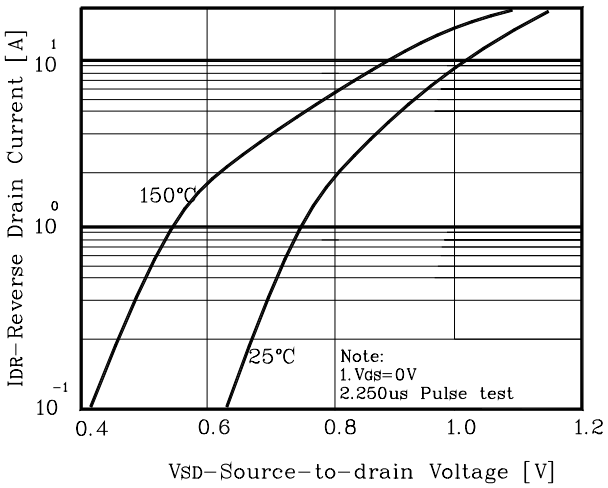


Fig. 5 Capacitance - V_{DS}

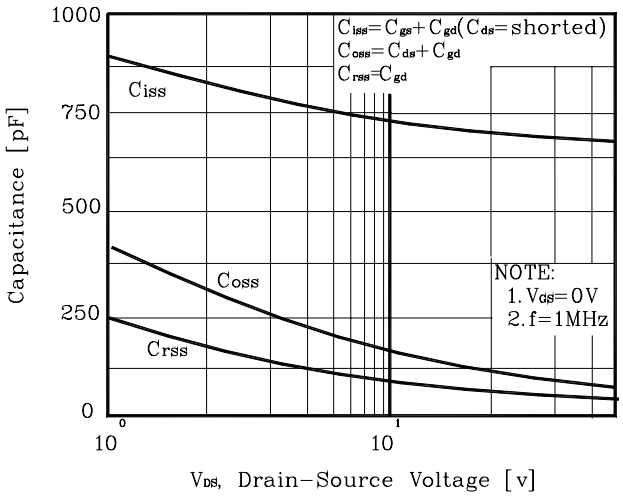


Fig. 6 V_{GS} - Q_G

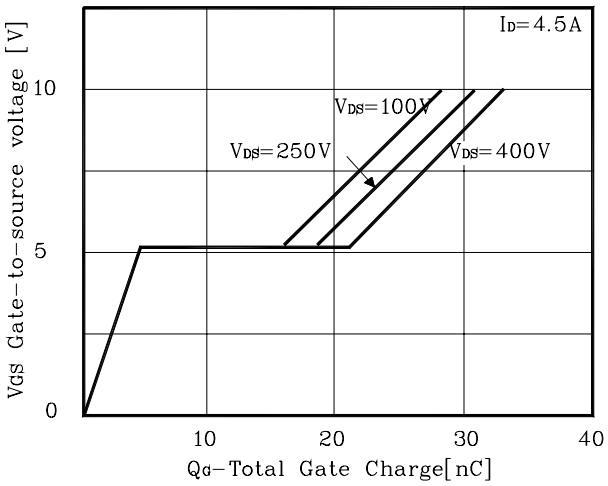


Fig. 7 BV_{DSS} - T_J

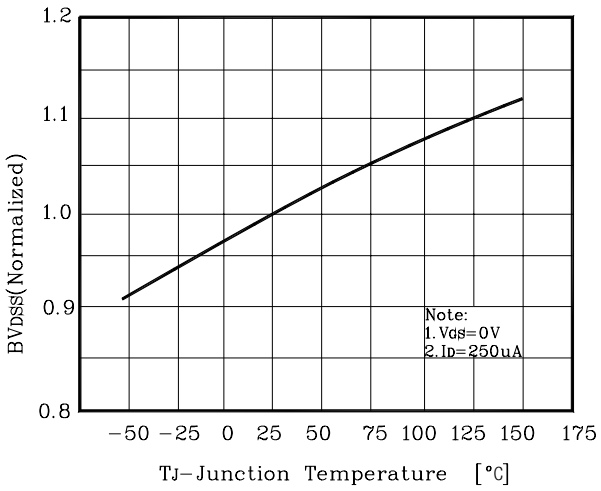


Fig. 8 $R_{DS(on)}$ - T_J

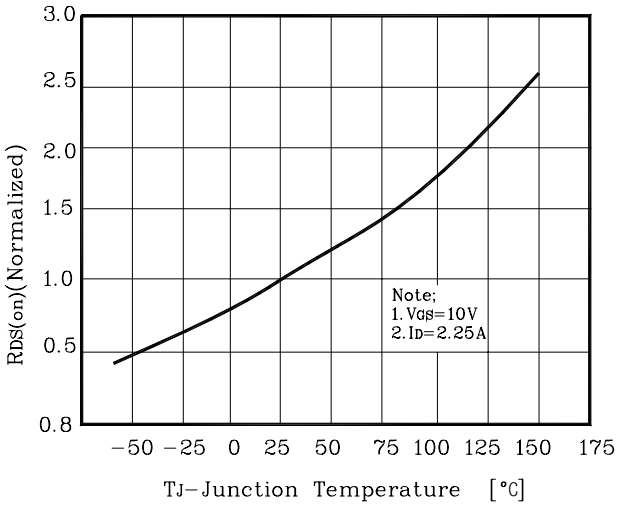


Fig. 9 I_D - T_C

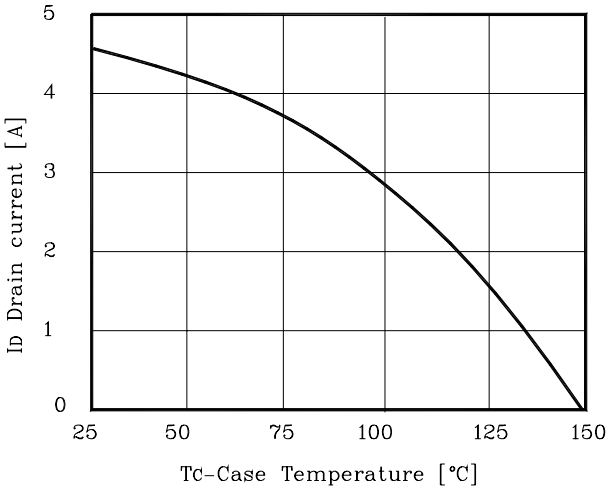


Fig. 10 Safe operating Area

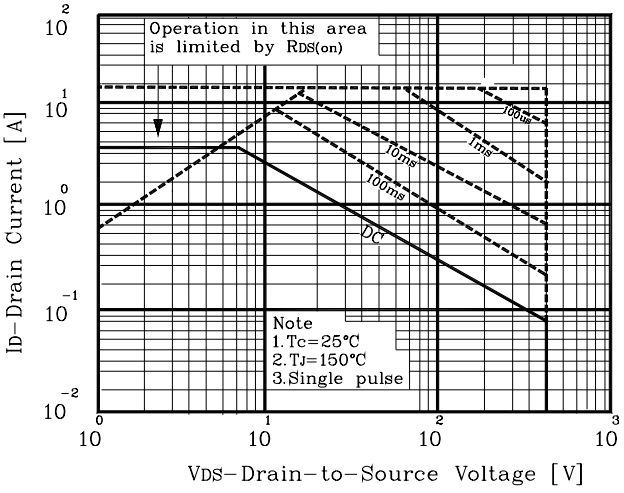


Fig. 11 Thermal Response

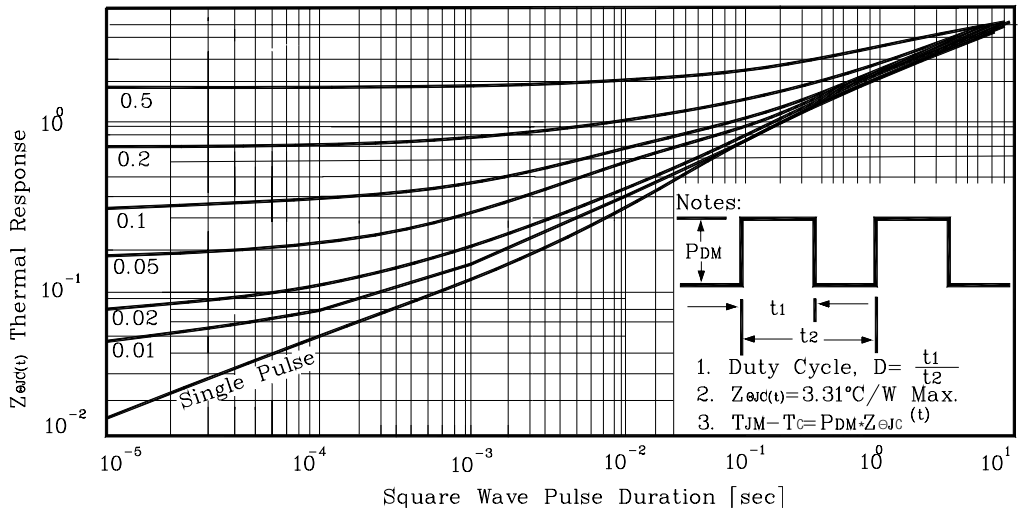


Fig. 12 Gate Charge Test Circuit & Waveform

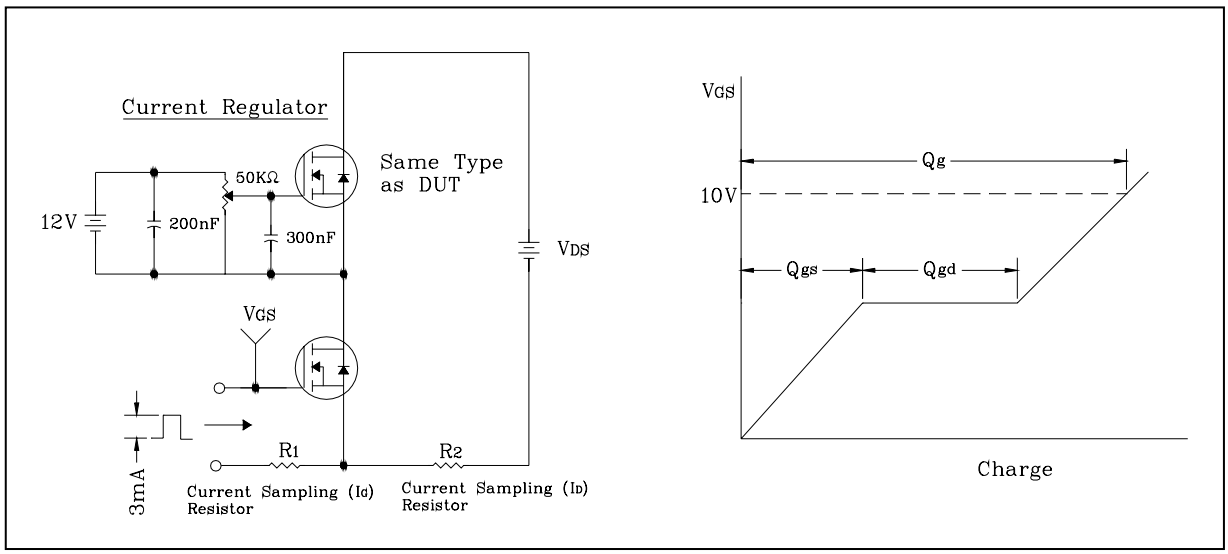


Fig. 13 Resistive Switching Test Circuit & Waveform

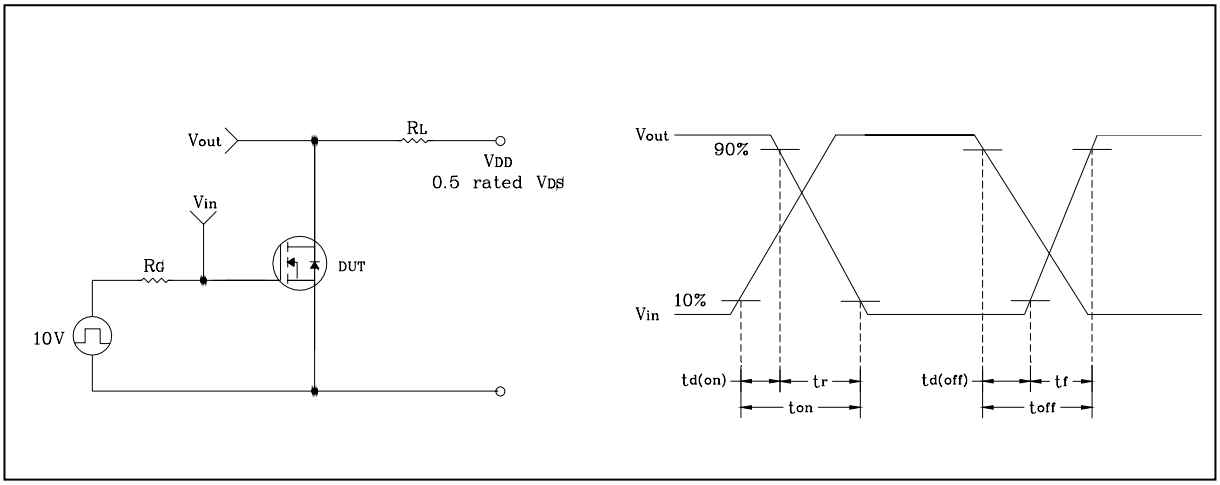


Fig. 14 Unclamped Inductive Switching Test Circuit & Waveform

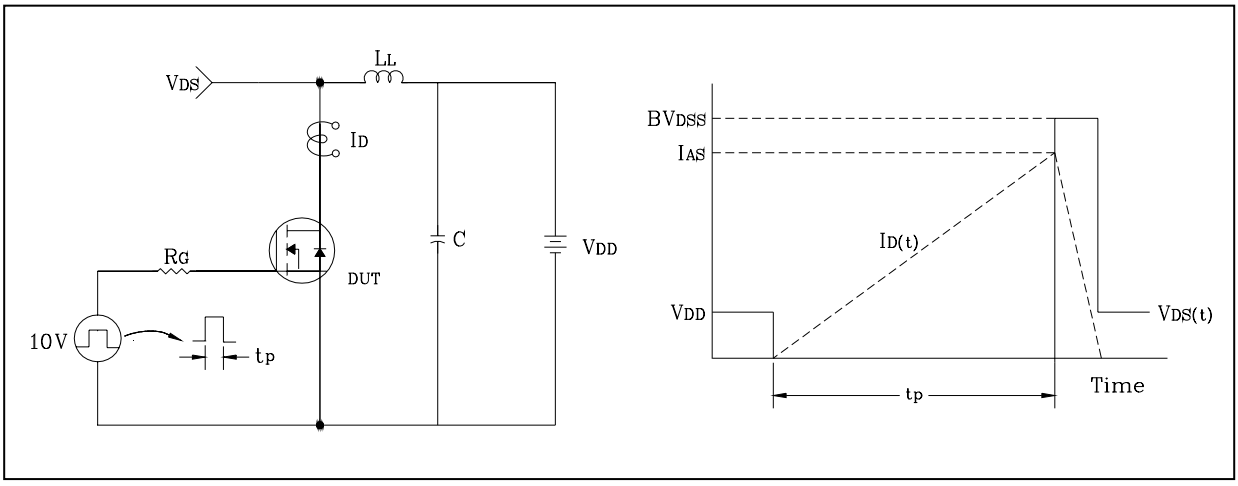
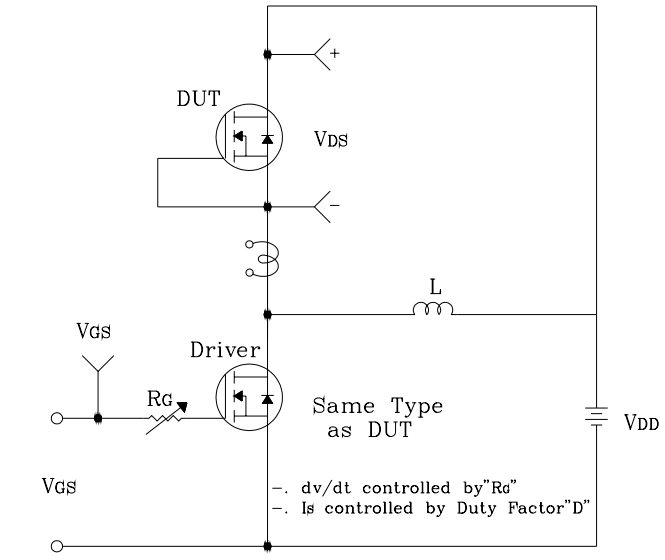
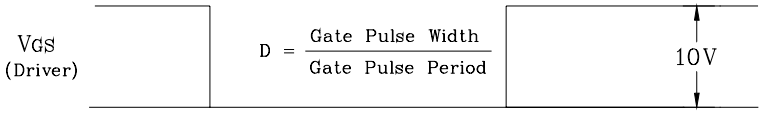
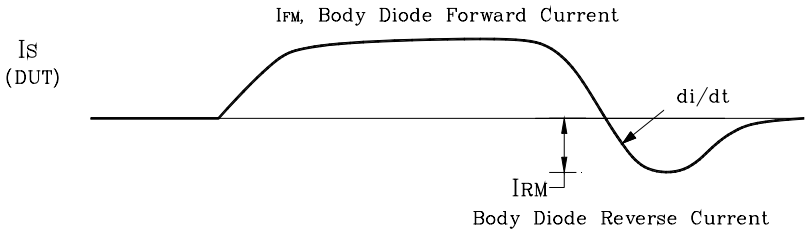
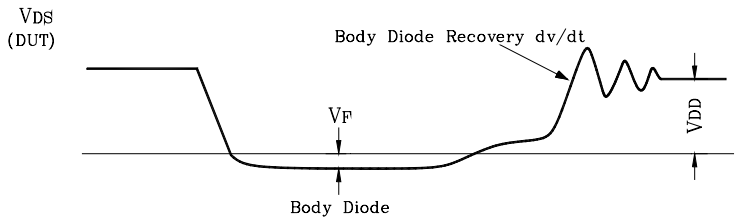


Fig. 15 Peak Diode Recovery dv/dt Test Circuit & Waveform









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