

Portable Equipment Application.

Notebook Application.

Features

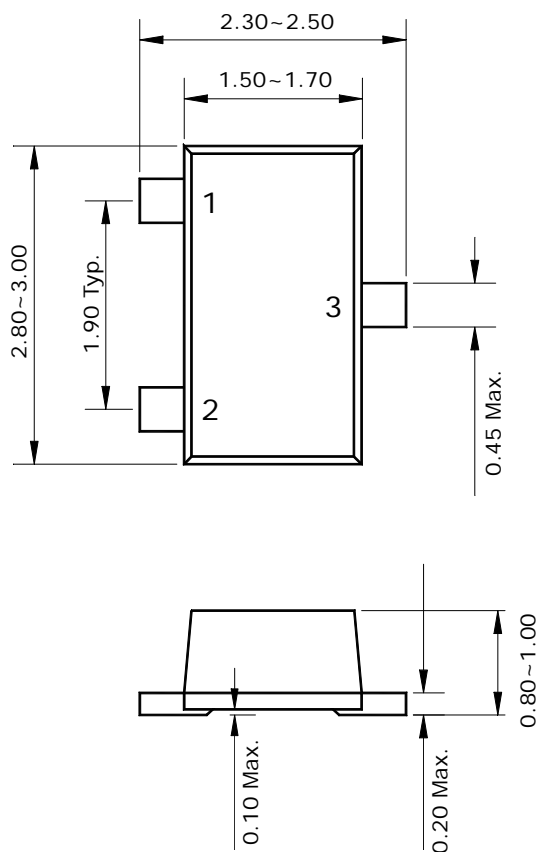
- Low $V_{GS(th)}$: $V_{GS(th)}=0.6\sim 1.2V$
- Small footprint due to small package
- Low $R_{DS(ON)}$: $R_{DS(ON)}= 19m\Omega$ (Typ.)

Ordering Information

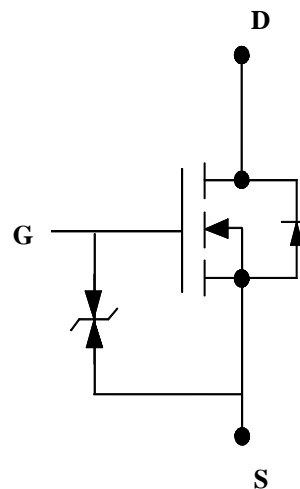
Type NO.	Marking	Package Code
STK004SF	K04	SOT-23F

Outline Dimensions

unit : mm



Block Diagram



PIN Connections

1. Gate
2. Source
3. Drain

Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	20	V
Gate-source voltage	V_{GSS}	±12	V
Drain current (DC) **	I_D	4.2	A
Drain current (Pulsed) *	I_{DP}	16.8	A
Total Power dissipation **	P_D	0.35	W
Avalanche current (Single) ②	I_{AS}	4.2	A
Single pulsed avalanche energy ②	E_{AS}	27	mJ
Avalanche current (Repetitive) ①	I_{AR}	4.2	A
Repetitive avalanche energy ①	E_{AR}	2.5	mJ
Junction temperature	T_J	150	°C
Storage temperature range	T_{stg}	-55 ~ 150	

* Limited by maximum junction temperature

** Device mounted on a glass-epoxy board

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-ambient	$R_{th(J-a)}$ **	-	357	°C/W

N-CH Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0$	20	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	0.6	-	1.2	V	
Drain-source cut-off current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA	
Gate leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 10	μA	
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=2.1A$	-	19	40	m Ω	
		$V_{GS}=2.5V, I_D=2.1A$	-	27	45	m Ω	
Forward transfer conductance ④	g_{fs}	$V_{DS}=2V, I_D=4.2A$	-	22	-	S	
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=10V,$ $f=1MHz$	-	390	590	pF	
Output capacitance	C_{oss}		-	90	135		
Reverse transfer capacitance	C_{rss}		-	40	60		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=10V, I_D=4.2A$ $R_G=10\Omega$	-	2.0	-	ns	
Rise time	t_r		-	1.9	-		
Turn-off delay time	$t_{d(off)}$		③④	-	2.8		-
Fall time	t_f		-	1.9	-		
Total gate charge	Q_g	$V_{DD}=10V, V_{GS}=4.5V$ $I_D=4.2A$	-	4.0	6.0	nC	
Gate-source charge	Q_{gs}		③④	-	1.0		1.5
Gate-drain charge	Q_{gd}		-	-	1.6		2.4

Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current	I_S	Integral reverse diode in the MOSFET	-	-	0.5	A
Sourcecurrent(Plused) ①	I_{SM}		-	-	2.0	
Forward voltage ④	V_{SD}	$V_{GS}=0V, I_S=0.5A$	-	0.7	1.2	V
Reverse recovery time	t_{rr}	$I_S=0.5A, V_{DD}=10V$ $di_S/dt=100A/us$	-	57	-	ns
Reverse recovery charge	Q_{rr}		-	240	-	μC

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② $L=2.0mH, I_{AS}=4.2A, V_{DD}=10V, R_G=25\Omega$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle ≤ 2%
- ④ Essentially independent of operating temperature

N-CH Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

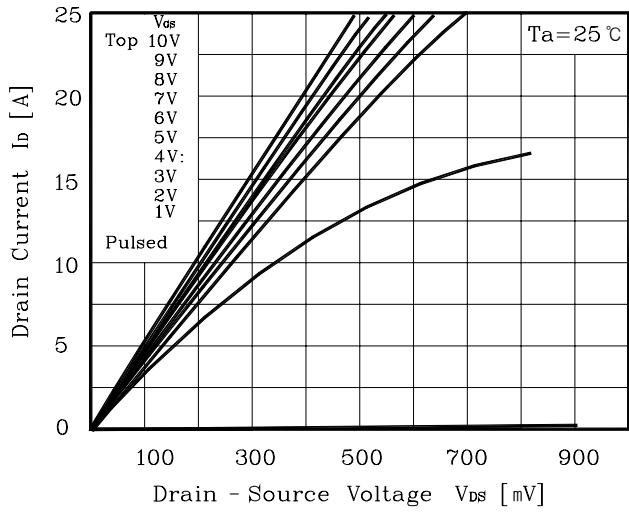


Fig. 2 $I_D - V_{GS}$

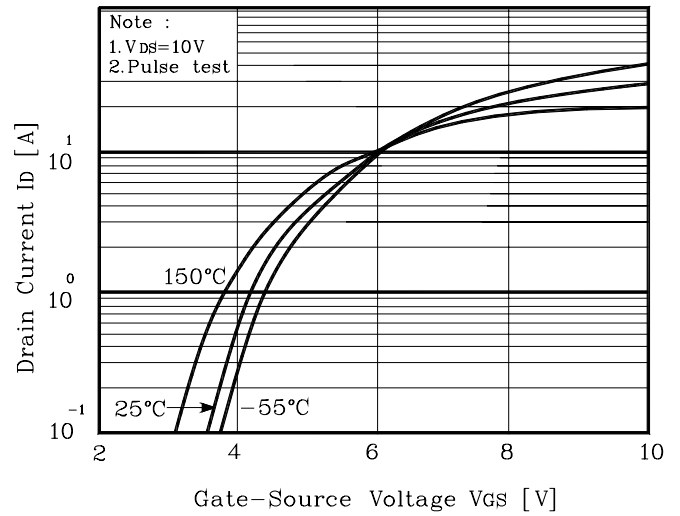


Fig. 3 $R_{DS(on)} - I_D$

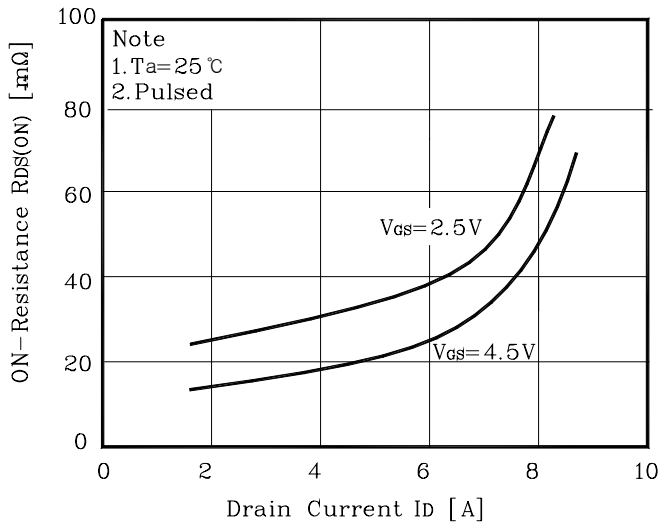


Fig. 4 $I_S - V_{SD}$

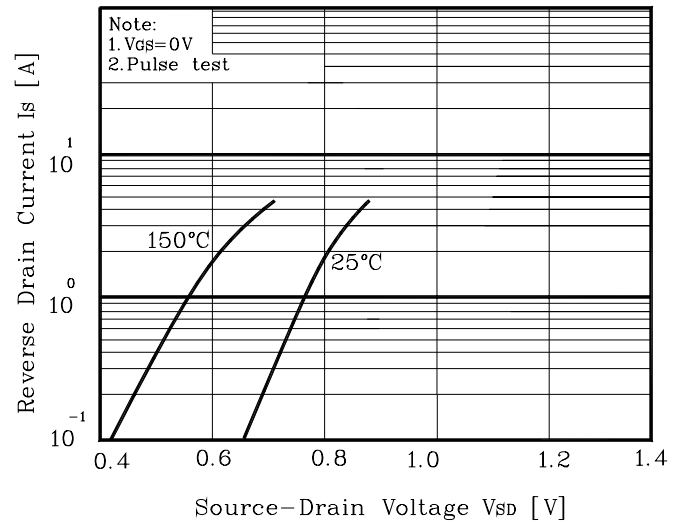


Fig. 5 Capacitance - V_{DS}

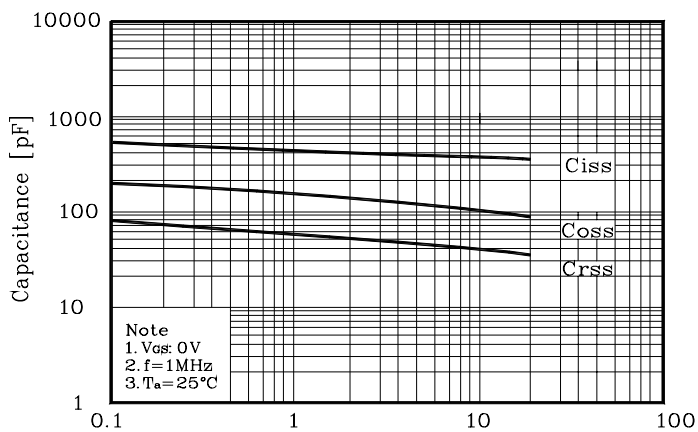


Fig. 6 $V_{GS} - Q_G$

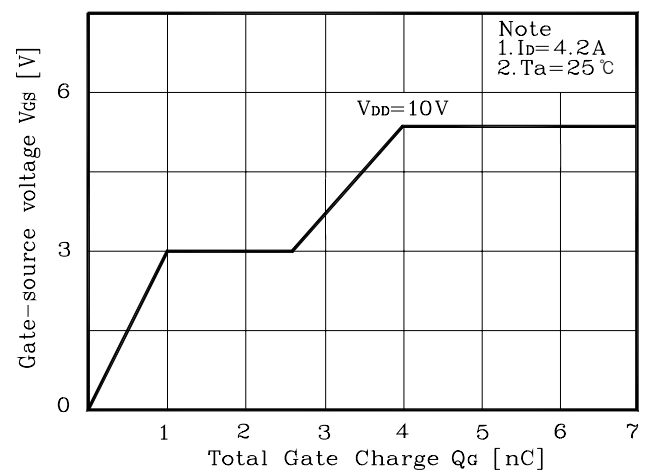


Fig. 7 $V_{DSS} - T_J$

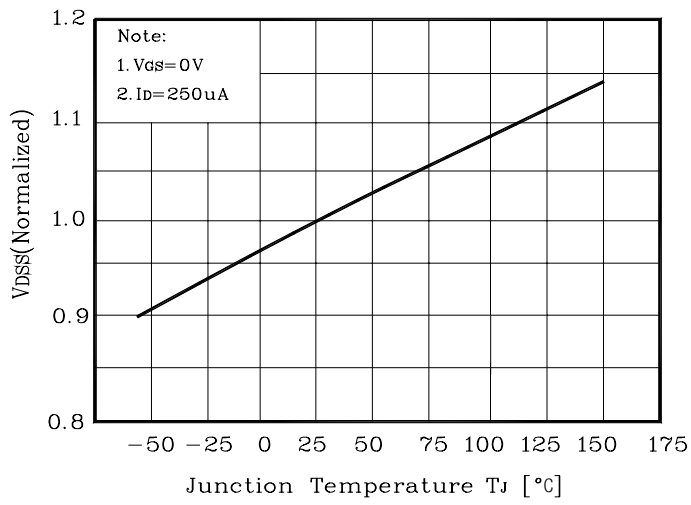


Fig. 8 $R_{DS(on)} - T_J$

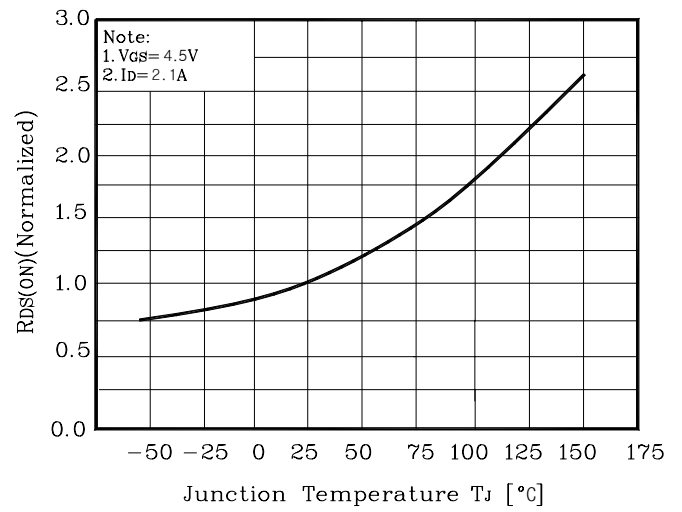


Fig. 9 $I_D - T_a$

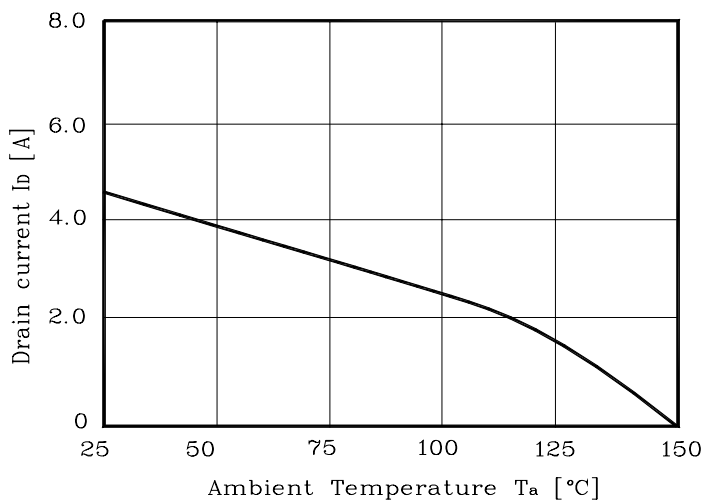


Fig. 10 Safe Operating Area

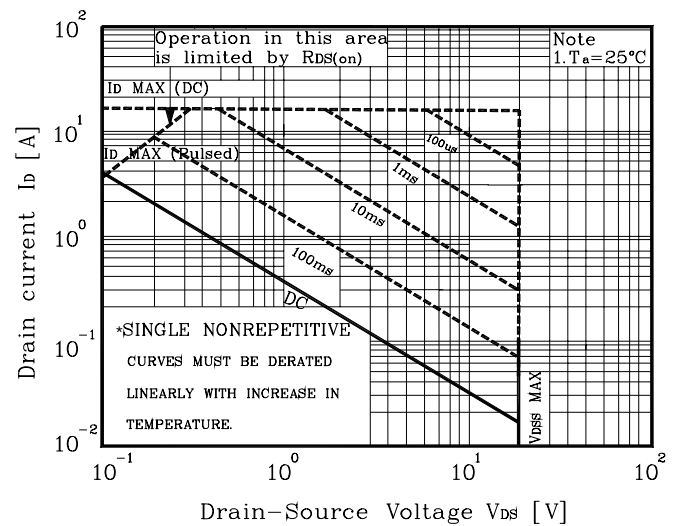


Fig. 11 Gate Charge Test Circuit & Waveform

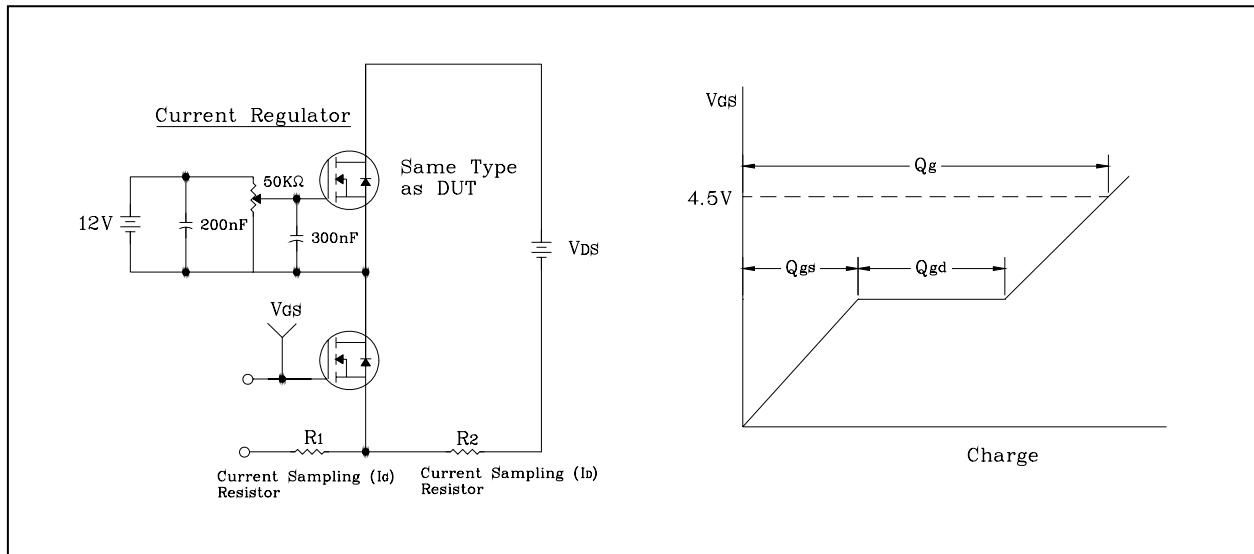


Fig. 12 Resistive Switching Test Circuit & Waveform

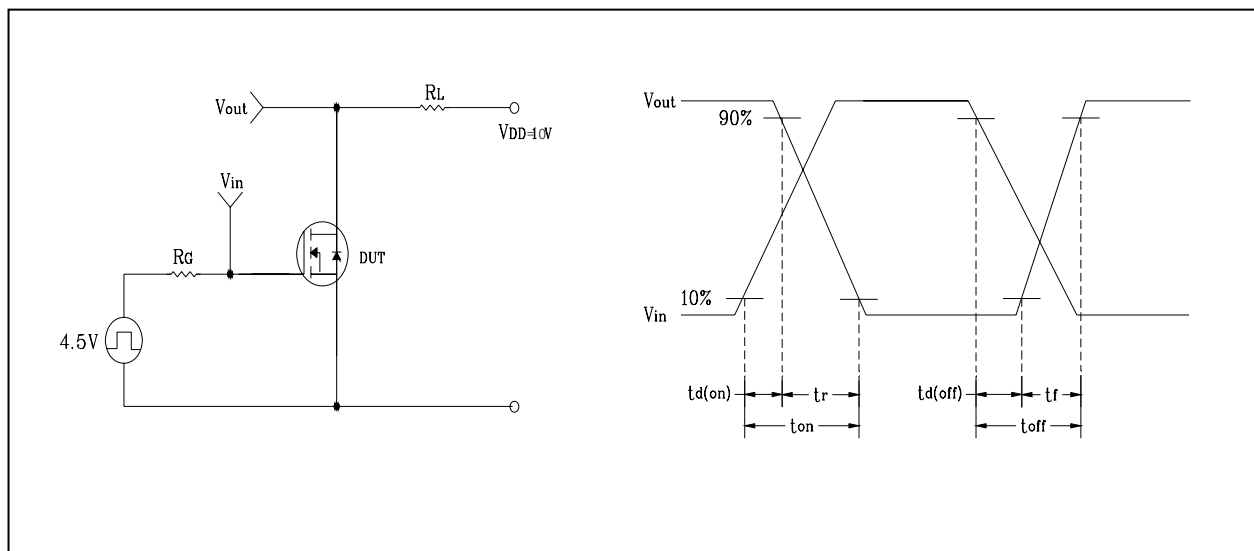


Fig. 13 EAS Test Circuit & Waveform

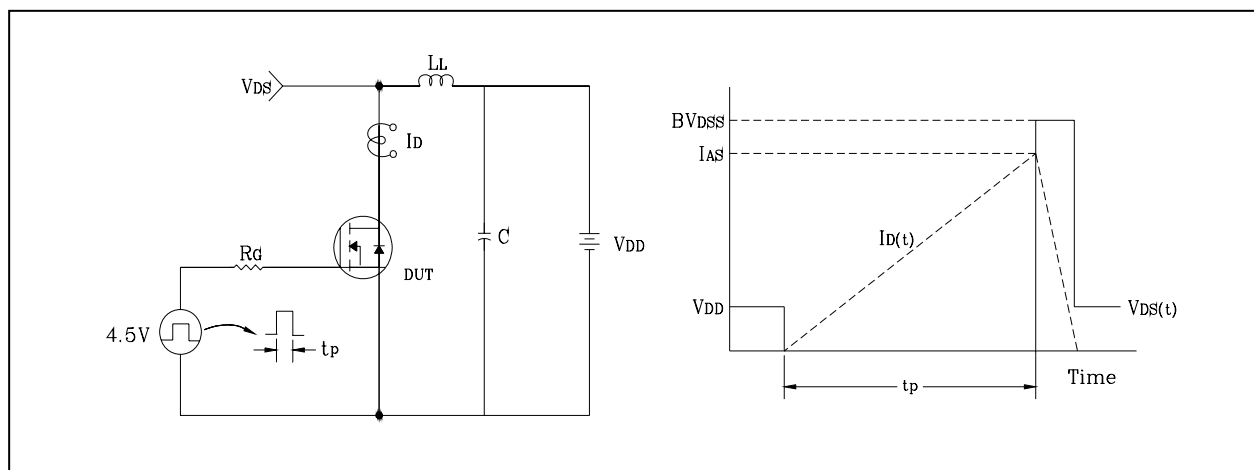
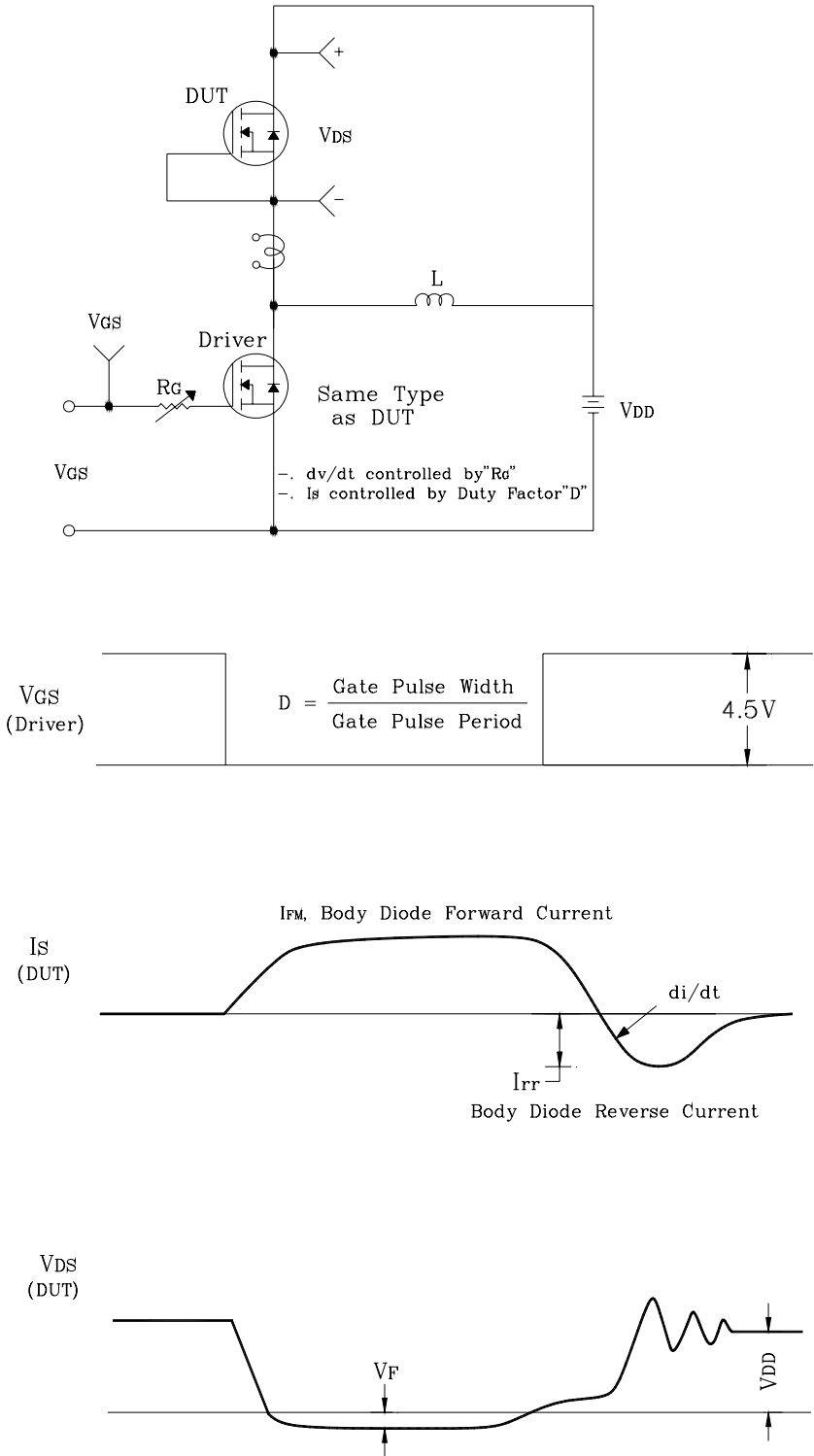


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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