

**Portable Equipment Application.**

**Notebook Application.**

**Features**

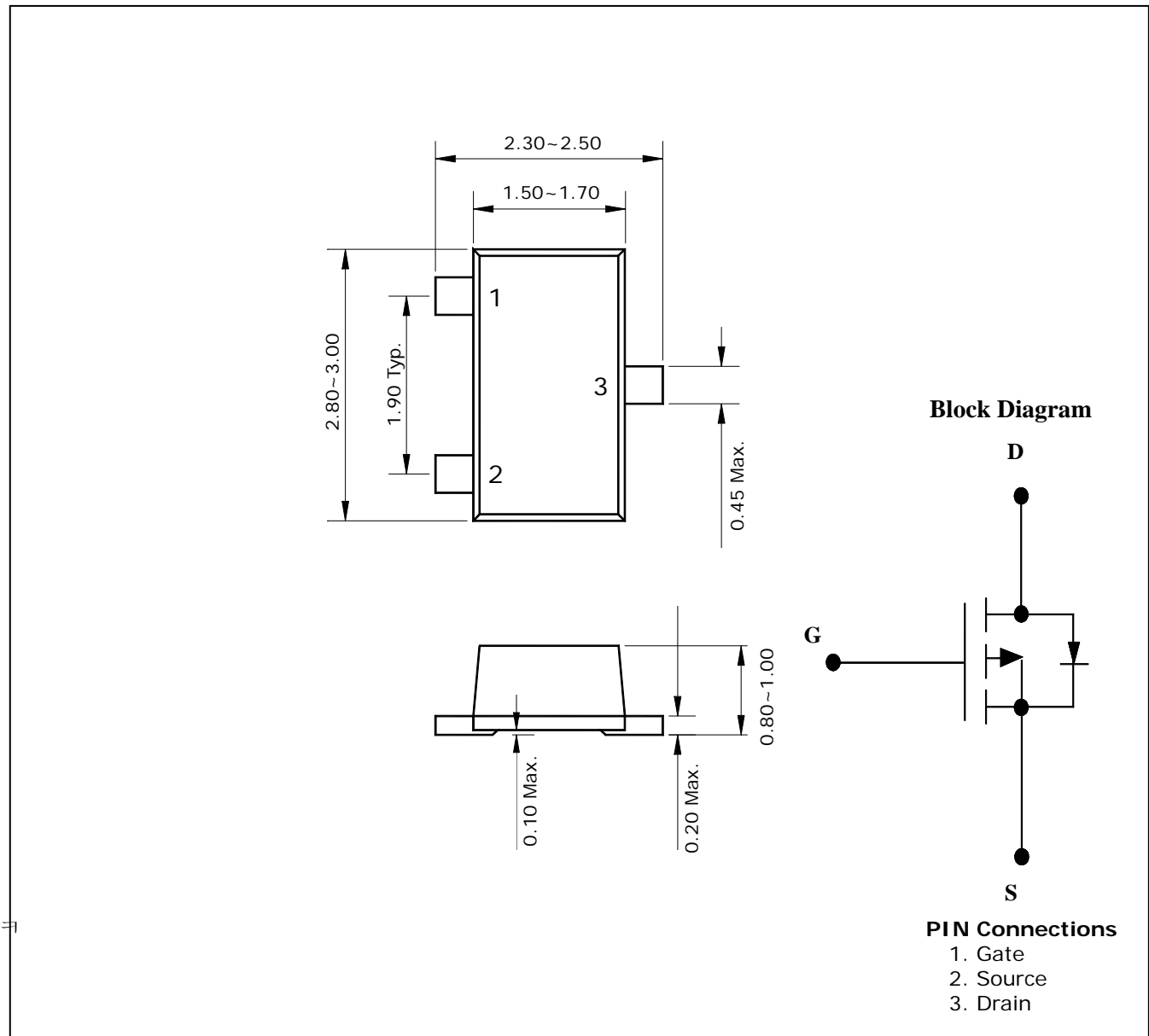
- Low  $V_{GS(th)}$  :  $V_{GS(th)} = -0.7 \sim -1.4V$
- Small footprint due to small package
- Low  $R_{DS(ON)}$  :  $R_{DS(ON)} = 61m\Omega$  (Typ.)

**Ordering Information**

Type NO.	Marking	Package Code
STJ004SF	J04	SOT-23F

**Outline Dimensions**

**unit : mm**



## Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	-30	V
Gate-source voltage	$V_{GSS}$	±12	V
Drain current (DC) **	$I_D$	-2.4	A
Drain current (Pulsed) *	$I_{DP}$	-9.6	A
Total Power dissipation **	$P_D$	0.35	W
Avalanche current (Single) ②	$I_{AS}$	-2.4	A
Single pulsed avalanche energy ②	$E_{AS}$	13	mJ
Avalanche current (Repetitive) ①	$I_{AR}$	-2.4	A
Repetitive avalanche energy ①	$E_{AR}$	1.1	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

## P-CH Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	$BV_{DSS}$	$I_D = -250\mu A, V_{GS} = 0$	-30	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$I_D = -250\mu A, V_{DS} = V_{GS}$	-0.7	-	-1.4	V	
Drain-source cut-off current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$	-	-	1	$\mu A$	
Gate leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 12V$	-	-	$\pm 100$	nA	
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -1.2A$	-	61	91	m $\Omega$	
		$V_{GS} = -2.5V, I_D = -1.2A$	-	86	129	m $\Omega$	
Forward transfer conductance ④	$g_{fs}$	$V_{DS} = -5V, I_D = -2.4A$	-	13.2	-	S	
Input capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = -10V,$ $f = 1MHz$	-	398	-	pF	
Output capacitance	$C_{oss}$		-	82	-		
Reverse transfer capacitance	$C_{rss}$		-	46	-		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10V, I_D = -2.4A$ $R_G = 10\Omega$	-	11	-	ns	
Rise time	$t_r$		-	5.3	-		
Turn-off delay time	$t_{d(off)}$		③④	-	7.6		-
Fall time	$t_f$		-	5.3	-		
Total gate charge	$Q_g$	$V_{DD} = -10V, V_{GS} = -5V$ $I_D = -2.4A$	-	6.4	9.6	nC	
Gate-source charge	$Q_{gs}$		③④	-	2.8		4.2
Gate-drain charge	$Q_{gd}$		-	1.7	2.6		

## Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

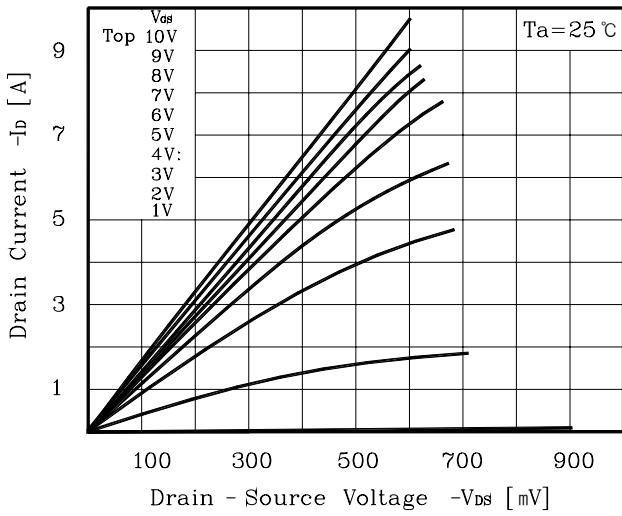
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current	$I_S$	Integral reverse diode in the MOSFET	-	-	-0.5	A
Sourcecurrent(Plused) ①	$I_{SM}$		-	-	-2.0	
Forward voltage ④	$V_{SD}$	$V_{GS} = 0V, I_S = -0.5A$	-	-0.7	-1.2	V
Reverse recovery time	$t_{rr}$	$I_S = -2.4A$	-	29	-	ns
Reverse recovery charge	$Q_{rr}$	$di_S/dt = 100A/us$	-	130	-	$\mu C$

Note ;

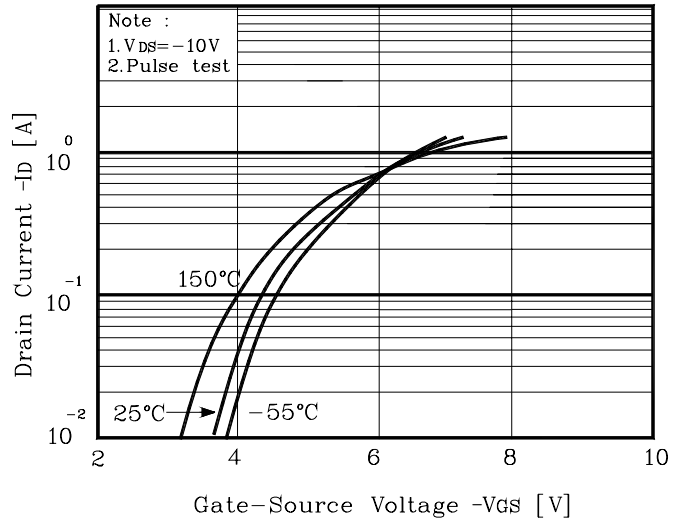
- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=2.0mH, I_{AS}=-2.9A, V_{DD}=-15V, R_G=25\Omega$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## P-CH Electrical Characteristic Curves

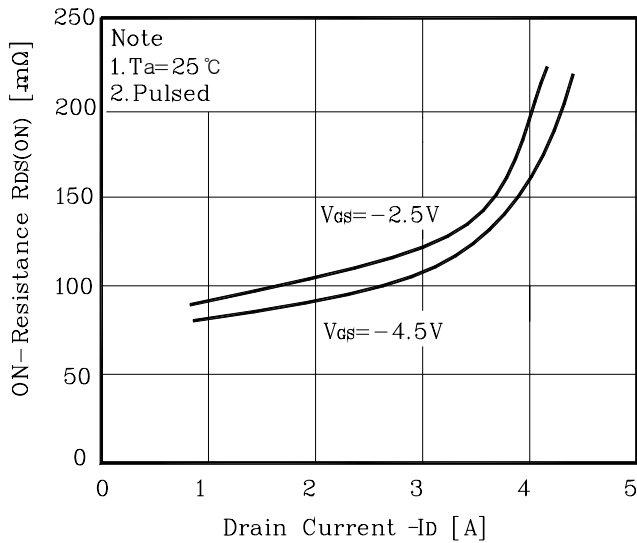
**Fig. 1  $I_D - V_{DS}$**



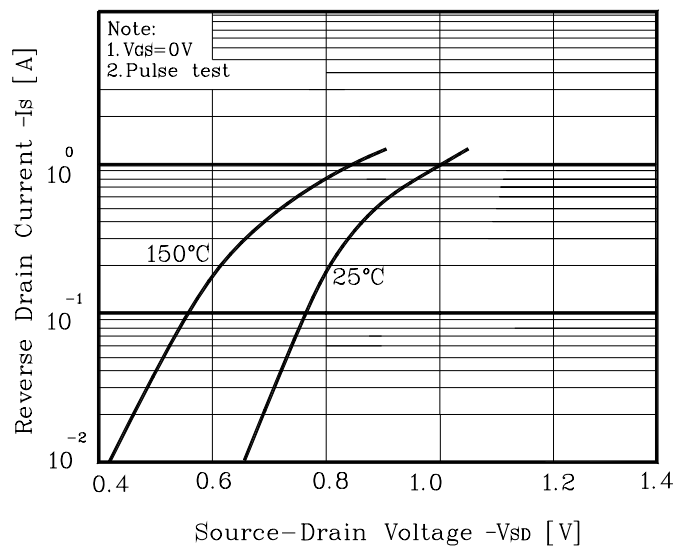
**Fig. 2  $I_D - V_{GS}$**



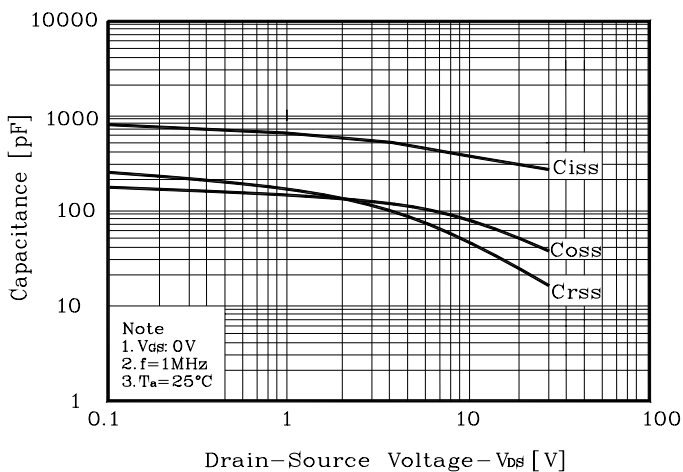
**Fig. 3  $R_{DS(on)} - I_D$**



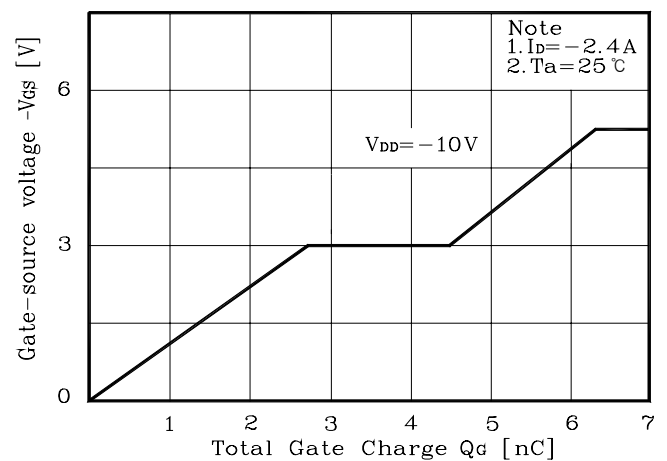
**Fig. 4  $I_S - V_{SD}$**



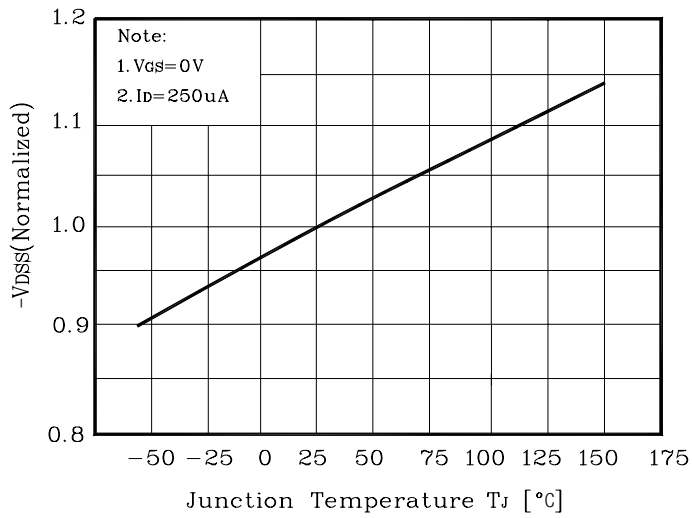
**Fig. 5 Capacitance -  $V_{DS}$**



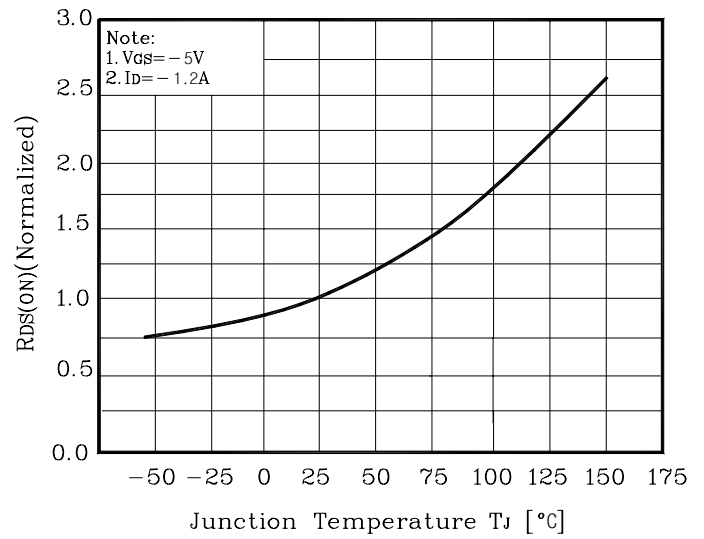
**Fig. 6  $V_{GS} - Q_G$**



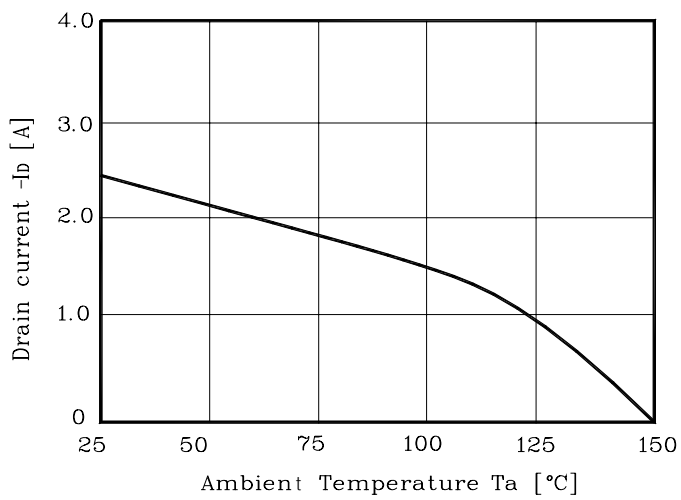
**Fig. 7  $V_{DSS} - T_J$**



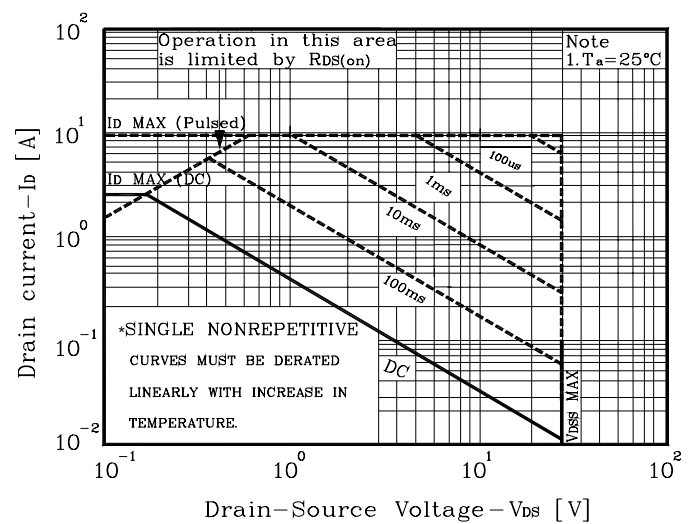
**Fig. 8  $R_{DS(on)} - T_J$**



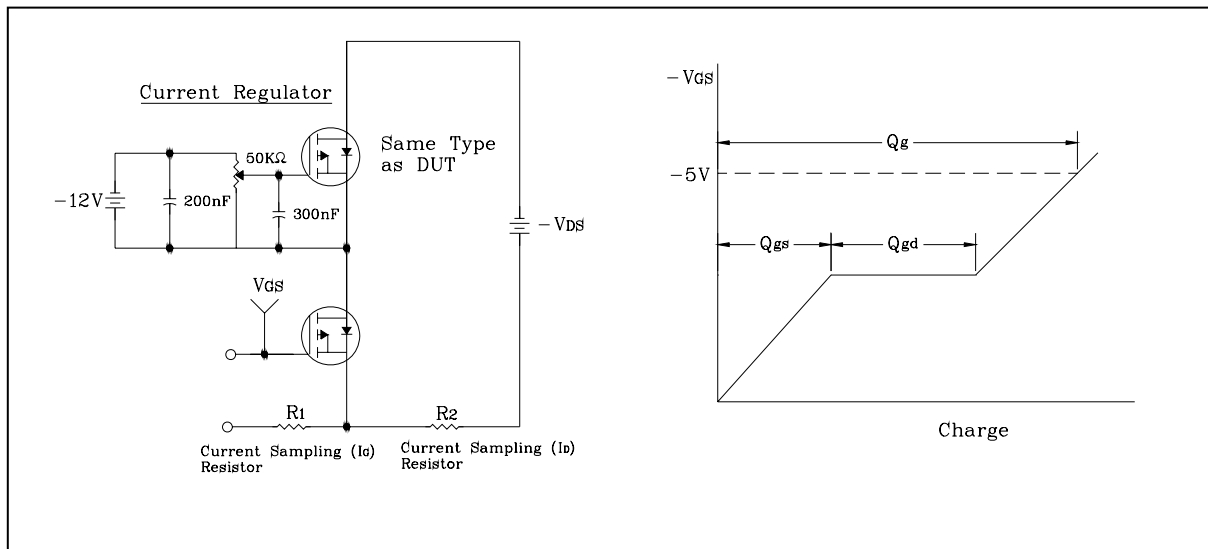
**Fig. 9  $I_D - T_a$**



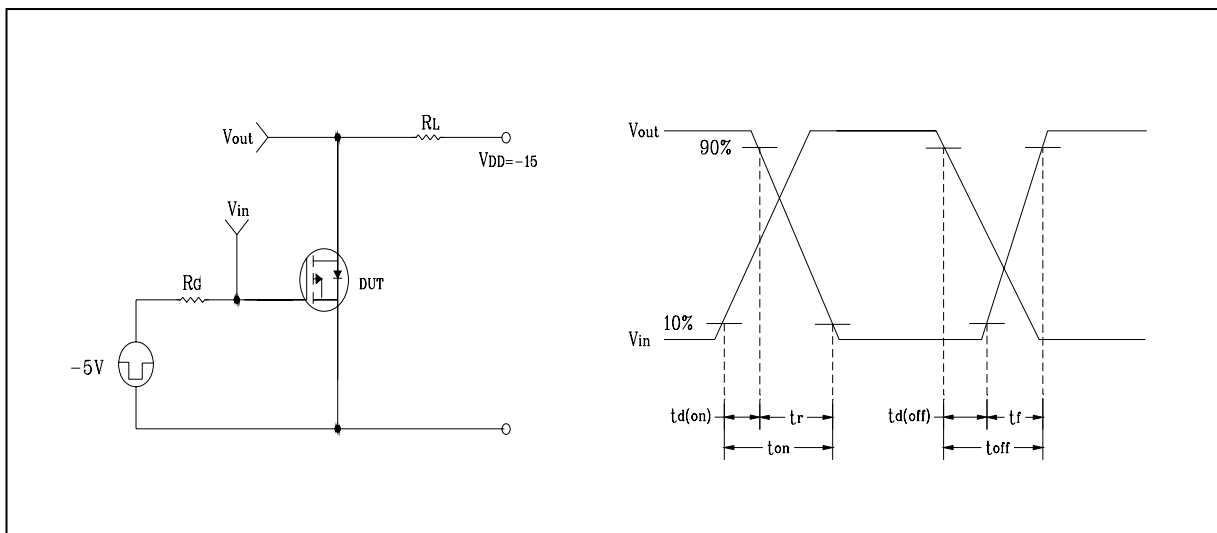
**Fig. 10 Safe Operating Area**



**Fig. 11 Gate Charge Test Circuit & Waveform**



**Fig. 12 Resistive Switching Test Circuit & Waveform**



**Fig. 13 EAS Test Circuit & Waveform**

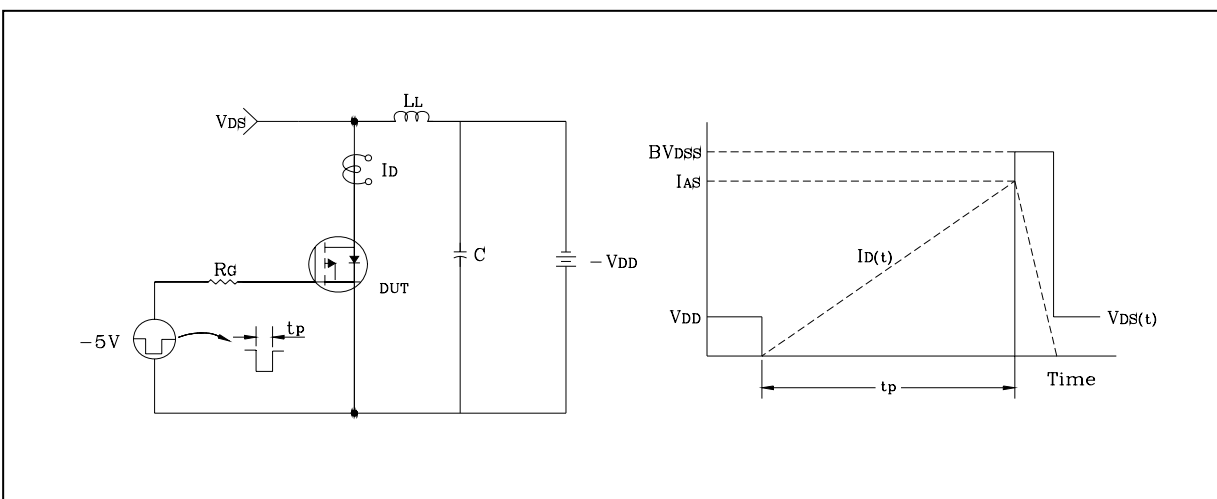
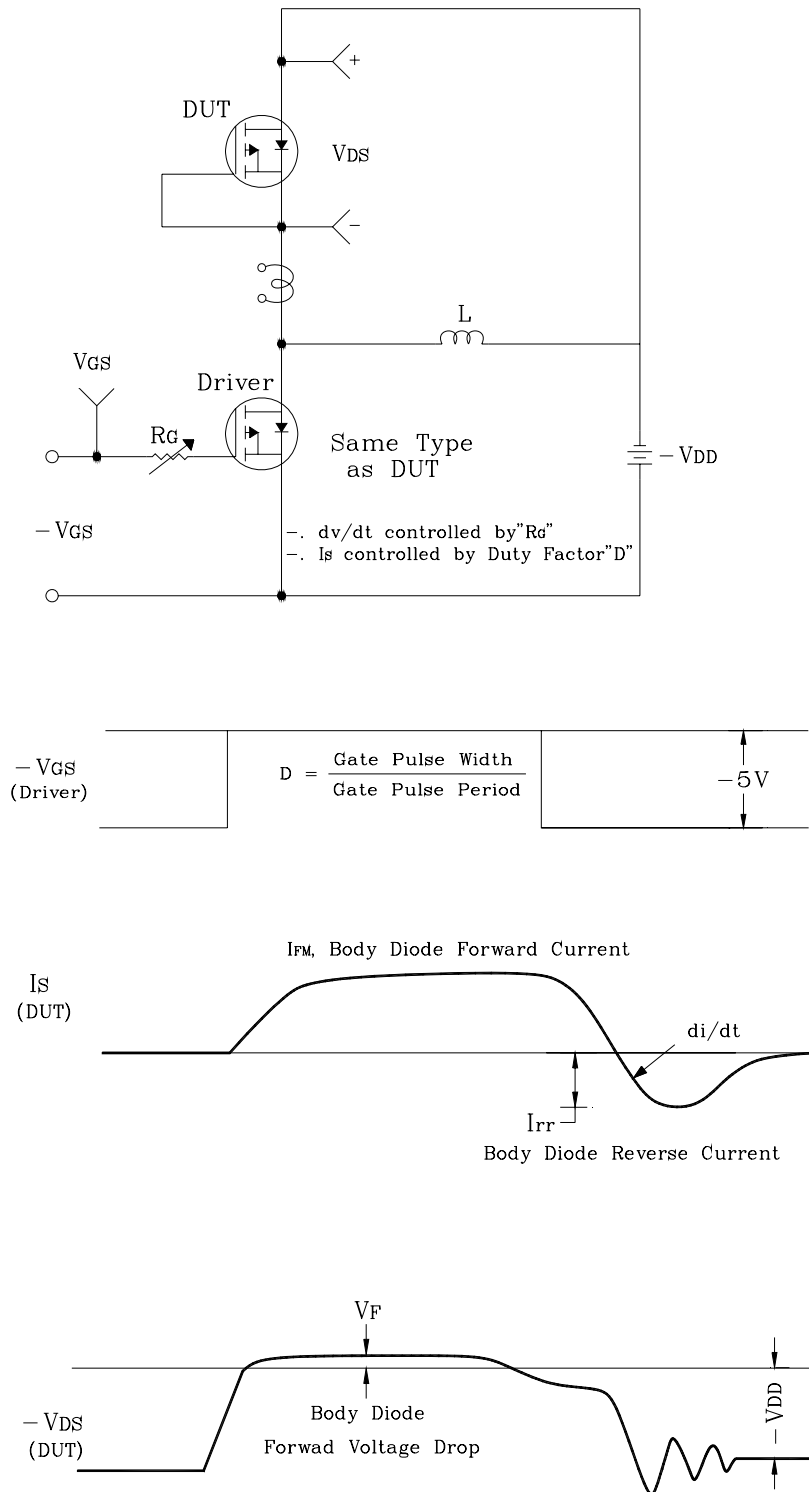


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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