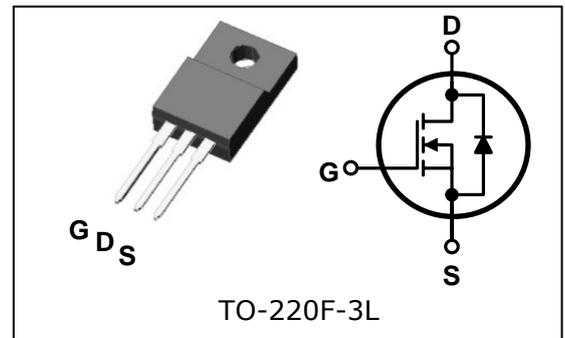


SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : $BV_{DSS}=500V(\text{Min.})$
- Low C_{RSS} : $C_{RSS}=23pF(\text{Typ.})$
- Low gate charge : $Q_g=30nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.8\Omega(\text{Max.})$

PIN Connection

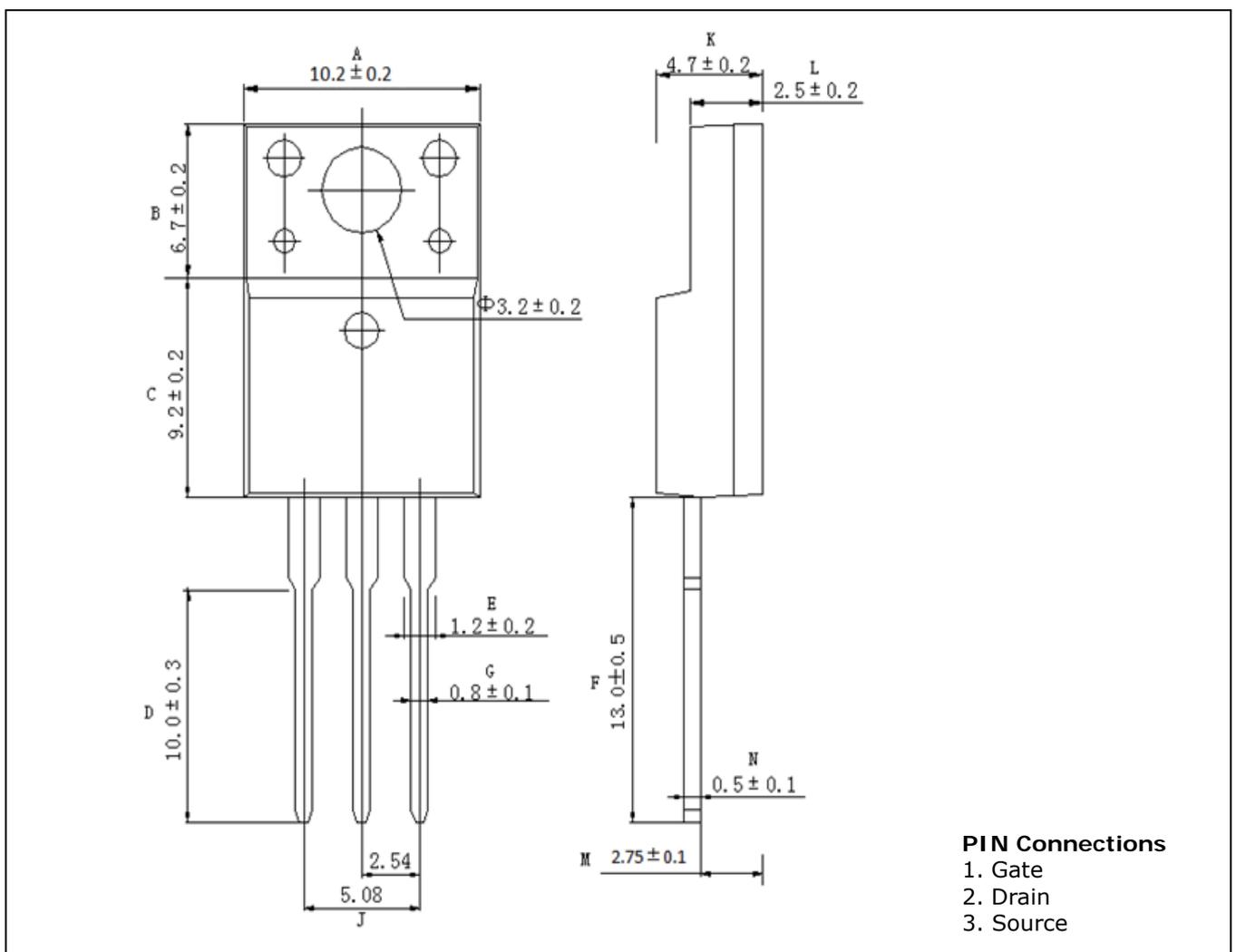


Ordering Information

Type NO.	Marking	Package Code
MF840	MF840	TO-220F-3L

Outline Dimensions

unit : mm



Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V _{DSS}	500	V	
Gate-source voltage	V _{GSS}	±30	V	
Drain current (DC) *	I _D	T _C =25°C	8	A
		T _C =100°C	4.5	A
Drain current (Pulsed) *	I _{DM}	32	A	
Power dissipation	P _D	40	W	
Avalanche current (Single) ②	I _{AS}	8	A	
Single pulsed avalanche energy ②	E _{AS}	360	mJ	
Avalanche current (Repetitive) ①	I _{AR}	8	A	
Repetitive avalanche energy ①	E _{AR}	7.5	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	-	3.12	°C/W
	Junction-ambient	-	62.5	

Electrical Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	500	-	-	V	
Gate threshold voltage	V _{GS(th)}	I _D =250μA, V _{DS} =V _{GS}	2.0	-	4.0	V	
Drain-source cut-off current	I _{DSS}	V _{DS} =500V, V _{GS} =0V	-	-	1	μA	
		V _{DS} =500V, V _{GS} =0V T _C =125°C	-	-	200		
Gate leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA	
Drain-source on-resistance ④	R _{DS(on)}	V _{GS} =10V, I _D =4.0A	-	0.68	0.80	Ω	
Forward transfer conductance ④	g _{fs}	V _{DS} =10V, I _D =4.0A	-	6.5	-	S	
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V f=1 MHz	-	1216	1520	pF	
Output capacitance	C _{oss}		-	119	149		
Reverse transfer capacitance	C _{rss}		-	23	29		
Turn-on delay time	t _{d(on)}	V _{DD} =250V, I _D =8A R _G =25Ω	-	18	-	ns	
Rise time	t _r		-	65	-		
Turn-off delay time	t _{d(off)}		③④	-	93		-
Fall time	t _f		-	64	-		
Total gate charge	Q _g	V _{DS} =200V, V _{GS} =10V I _D =8A	-	26	32	nC	
Gate-source charge	Q _{gs}		③④	-	7.7		-
Gate-drain charge	Q _{gd}		-	6.4	-		

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I _S	Integral reverse diode in the MOSFET	-	-	8	A
Source current (Pulsed) ①	I _{SM}		-	-	32	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =8A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =8A, V _{GS} =0V dI _F /dt=100A/μs	-	335	-	ns
Reverse recovery charge	Q _{rr}		-	2.95	-	μC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② L=10.2mH, I_{AS}=8A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
- ③ Pulse Test : Pulse width≤300μs, Duty cycle≤2%
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

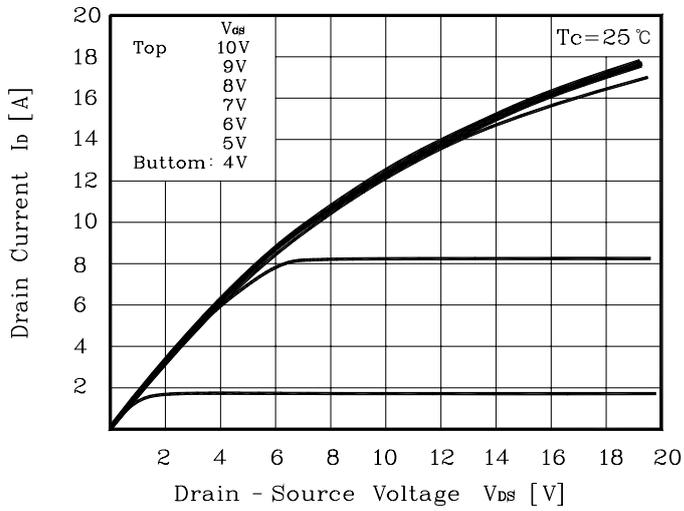


Fig. 2 $I_D - V_{GS}$

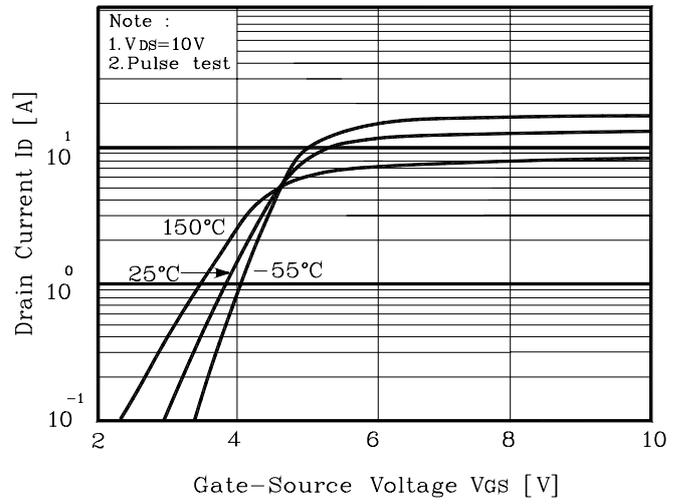


Fig. 3 $R_{DS(on)} - I_D$

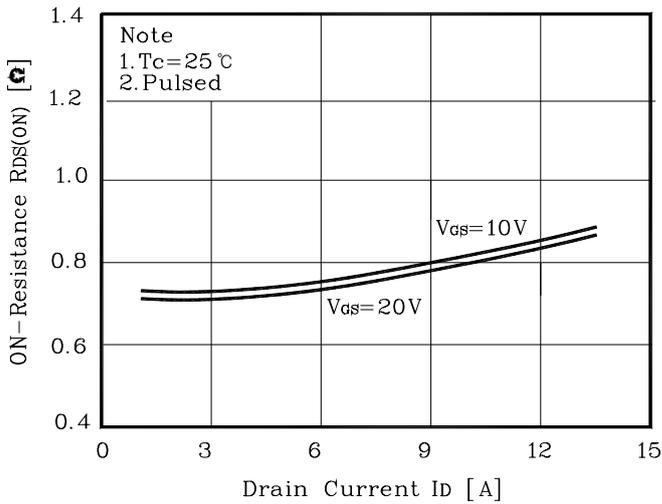


Fig. 4 $I_S - V_{SD}$

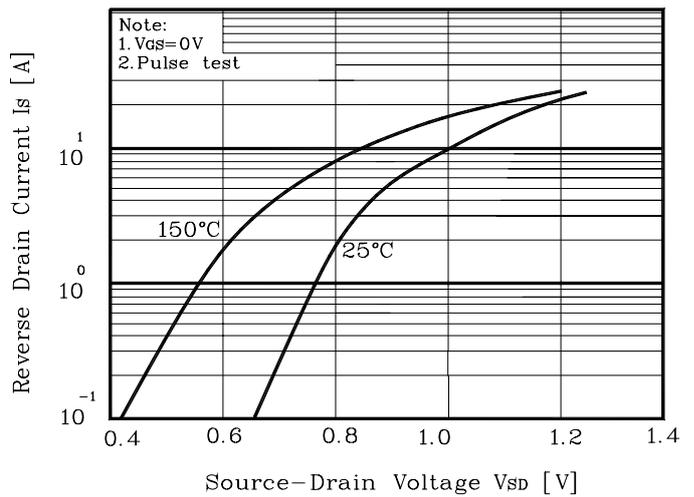


Fig. 5 Capacitance - V_{DS}

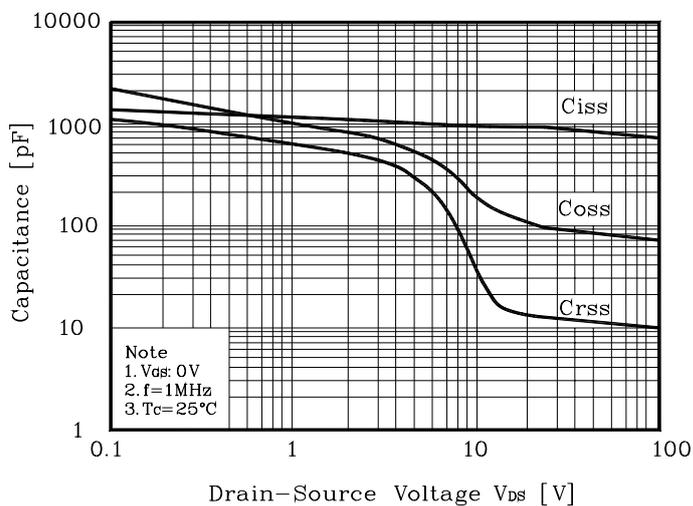


Fig. 6 $V_{GS} - Q_G$

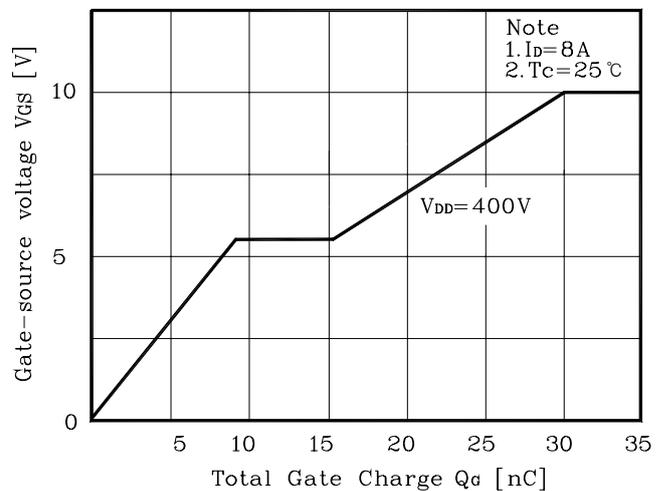


Fig. 7 $V_{DSS} - T_J$

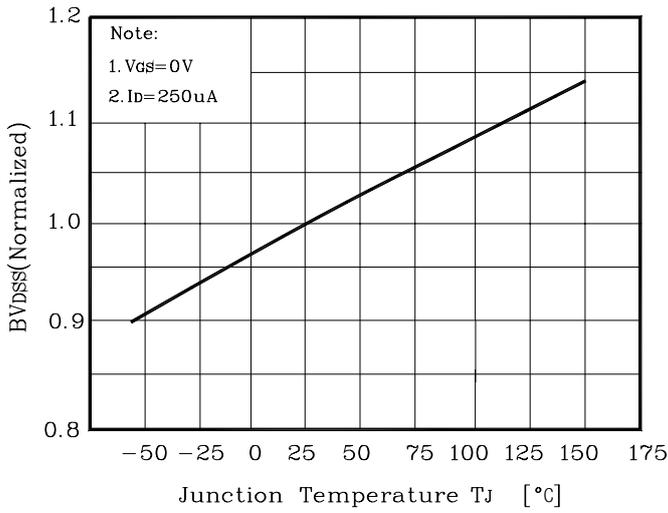


Fig.8 $R_{DS(on)} - T_J$

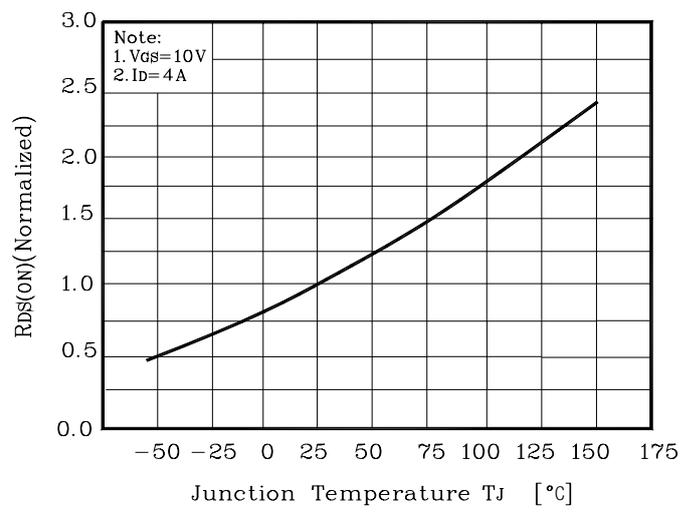


Fig. 9 $I_D - T_C$

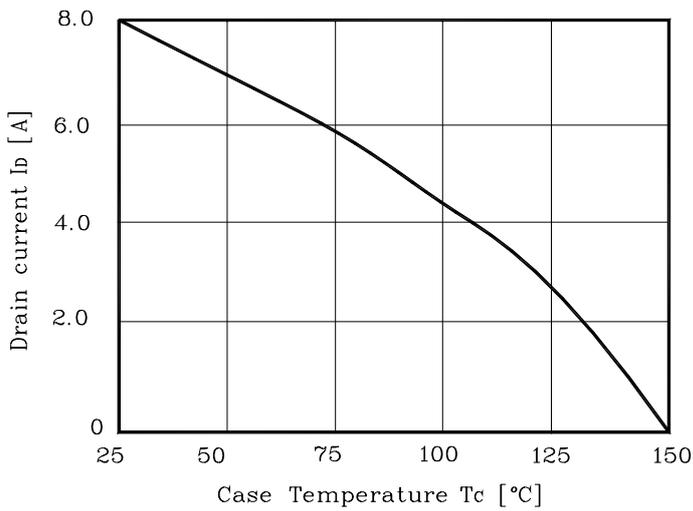


Fig. 10 Safe Operating Area

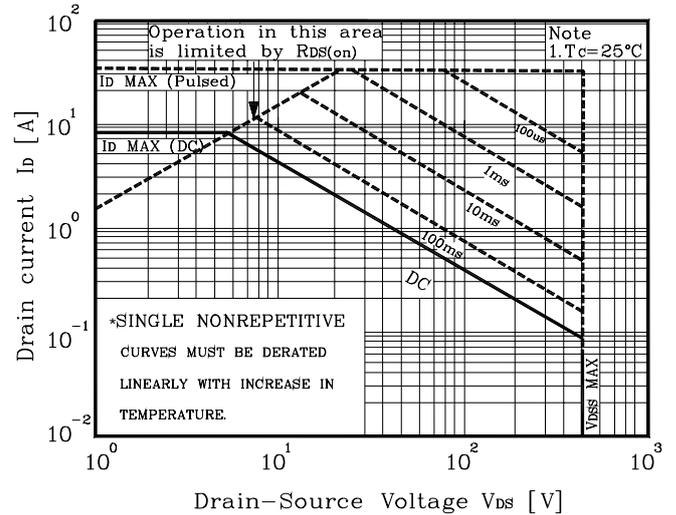


Fig. 11 Gate Charge Test Circuit & Waveform

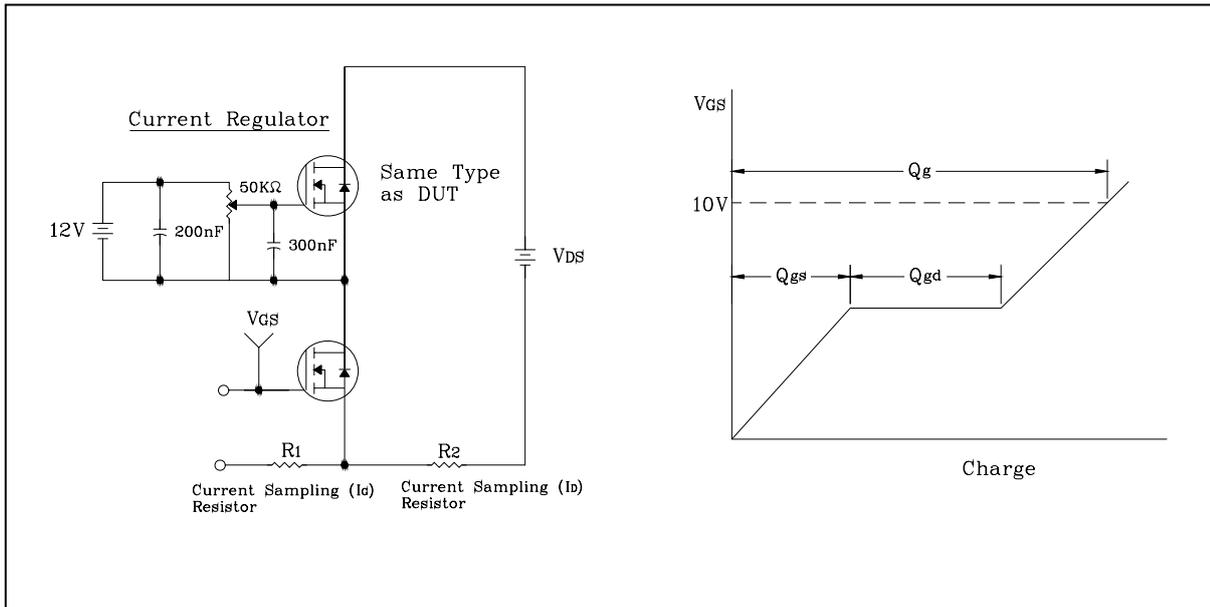


Fig. 12 Resistive Switching Test Circuit & Waveform

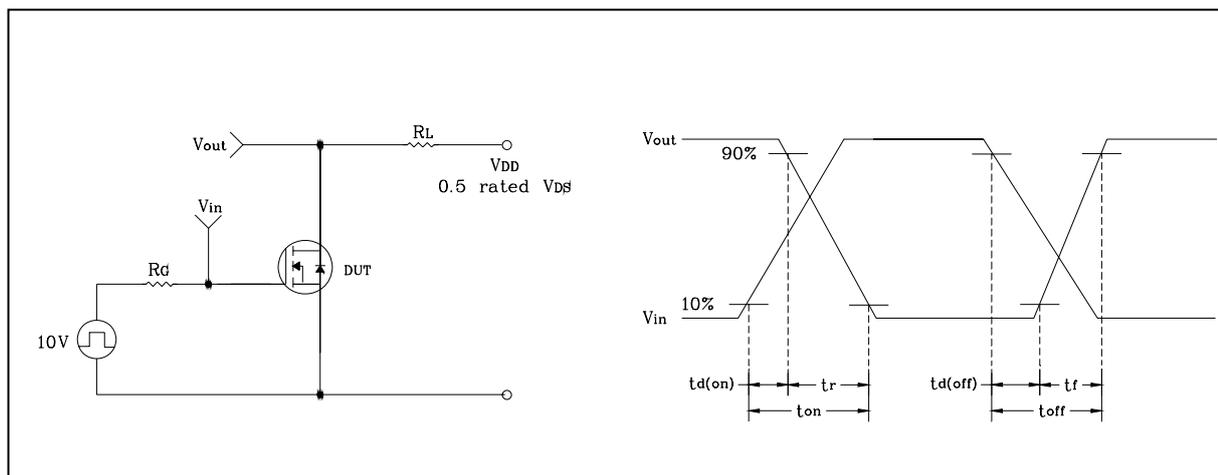


Fig. 13 EAS Test Circuit & Waveform

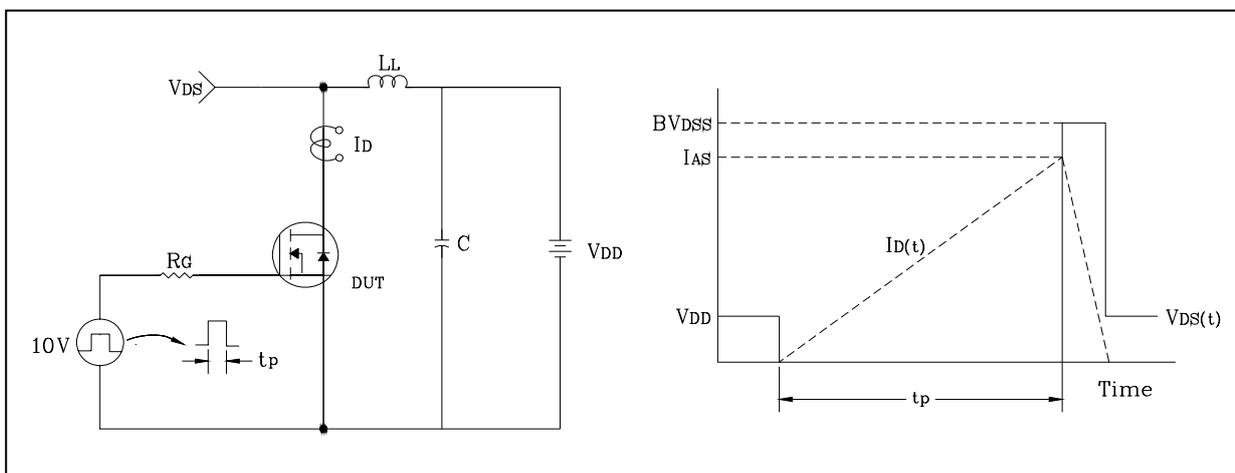


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

