



达晨科技

# MPVA8N50

Power MOSFET

## SWITCHING REGULATOR APPLICATIONS

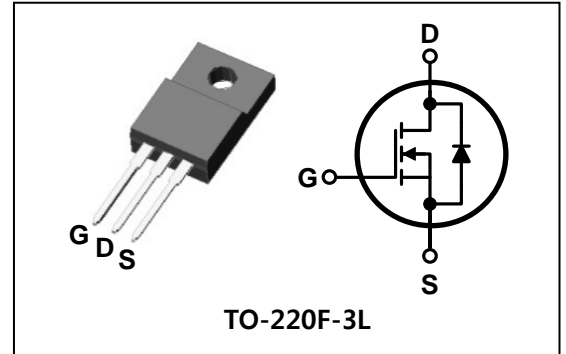
### Features

- High Voltage :  $BV_{DSS}=500V(\text{Min.})$
- Low  $C_{rss}$  :  $C_{rss}=13.7pF(\text{Typ.})$
- Low gate charge :  $Q_g=34nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=0.85\Omega(\text{Max.})$

### Ordering Information

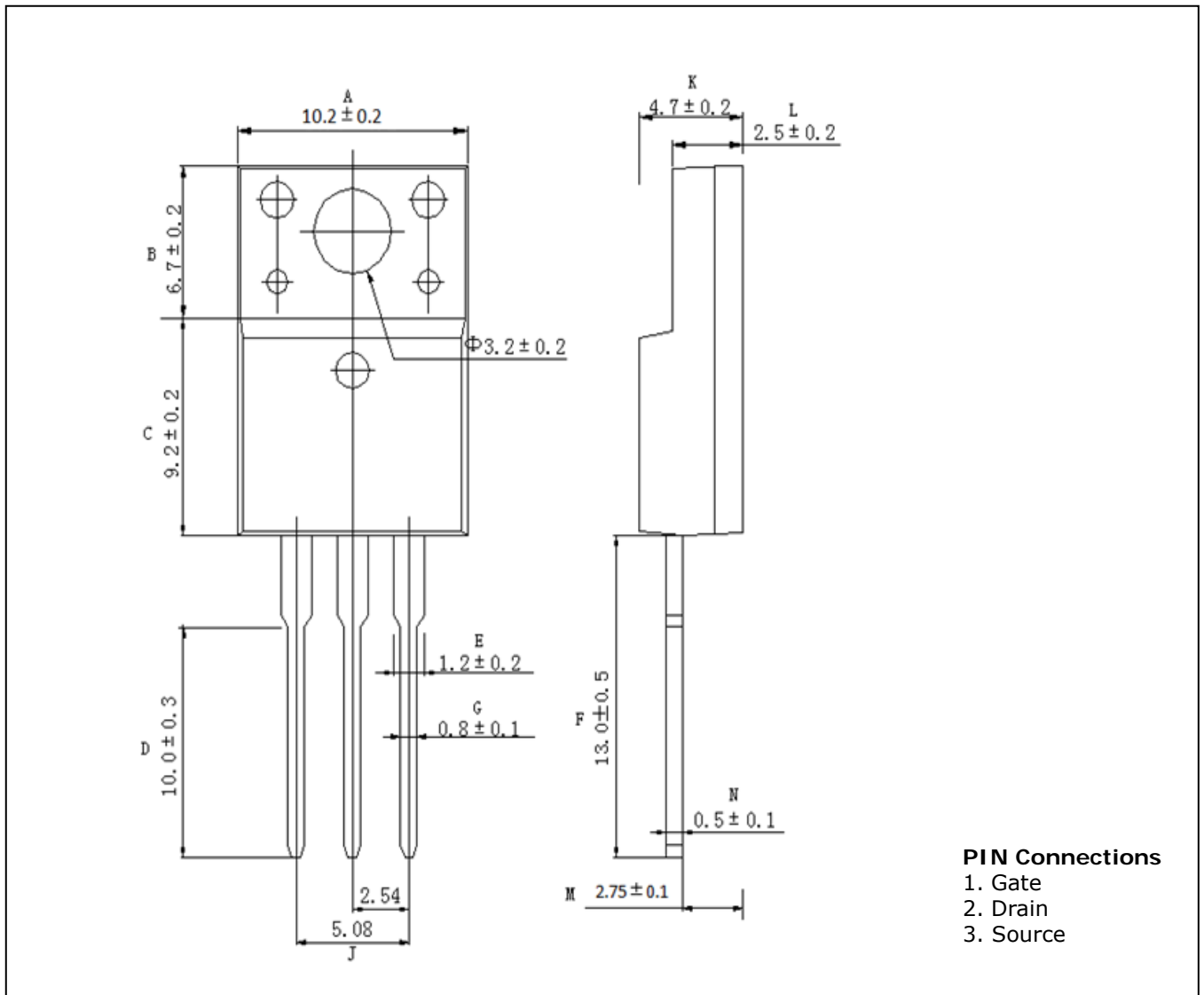
Type No.	Marking	Package Code
MPVA8N50	MPVA8N50	TO-220F-3L

### PIN Connection



### Outline Dimensions

unit : mm



# MPVA8N50

Power MOSFET

## Absolute maximum ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	$V_{DSS}$	500	V	
Gate-source voltage	$V_{GSS}$	$\pm 30$	V	
Drain current (DC) *	$I_D$	$T_C=25^\circ\text{C}$	8	A
		$T_C=100^\circ\text{C}$	4.8	A
Drain current (Pulsed) *	$I_{DM}$	32	A	
Power dissipation	$P_D$	39	W	
Avalanche current (Single) ②	$I_{AS}$	8	A	
Single pulsed avalanche energy ②	$E_{AS}$	266	mJ	
Avalanche current (Repetitive) ①	$I_{AR}$	8	A	
Repetitive avalanche energy ①	$E_{AR}$	11.6	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	$R_{th(J-C)}$	-	3.2	°C/W
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

# MPVA8N50

## Power MOSFET

### Electrical Characteristics ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}$ , $V_{DS}=V_{GS}$	3.0	-	5.0	V
Drain-source cut-off current	$I_{DSS}$	$V_{DS}=500\text{V}$ , $V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
Gate leakage current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 30\text{V}$	-	-	$\pm 100$	nA
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10\text{V}$ , $I_D=4.0\text{A}$	-	0.76	0.85	$\Omega$
Forward transfer conductance ④	$g_{fs}$	$V_{DS}=10\text{V}$ , $I_D=4.0\text{A}$	-	11	-	S
Input capacitance	$C_{iss}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ $f=1\text{ MHz}$	-	1206	2007	pF
Output capacitance	$C_{oss}$		-	148	185	
Reverse transfer capacitance	$C_{rss}$		-	13.7	17.1	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300\text{V}$ , $I_D=8\text{A}$ $R_G=25\Omega$	-	23	-	ns
Rise time	$t_r$		-	69	-	
Turn-off delay time	$t_{d(off)}$		-	144	-	
Fall time	$t_f$		-	77	-	
Total gate charge	$Q_g$	$V_{DS}=560\text{V}$ , $V_{GS}=10\text{V}$ $I_D=8\text{A}$	-	32	40	nC
Gate-source charge	$Q_{gs}$		-	9	-	
Gate-drain charge	$Q_{gd}$		-	8	-	

### Source-Drain Diode Ratings and Characteristics ( $T_C=25^\circ\text{C}$ unless otherwise noted)

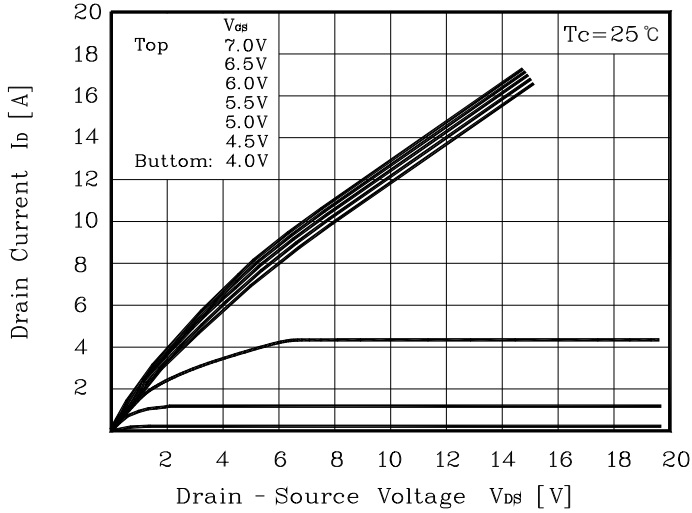
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	$I_S$	Integral reverse diode in the MOSFET	-	-	8	A
Source current (Pulsed) ①	$I_{SM}$		-	-	32	
Forward voltage ④	$V_{SD}$	$V_{GS}=0\text{V}$ , $I_S=8\text{A}$	-	-	1.4	V
Reverse recovery time	$t_{rr}$	$I_S=8\text{A}$ , $V_{GS}=0\text{V}$ $dI_F/dt=100\text{A}/\mu\text{s}$	-	420	-	ns
Reverse recovery charge	$Q_{rr}$		-	4.2	-	$\mu\text{C}$

Note ;

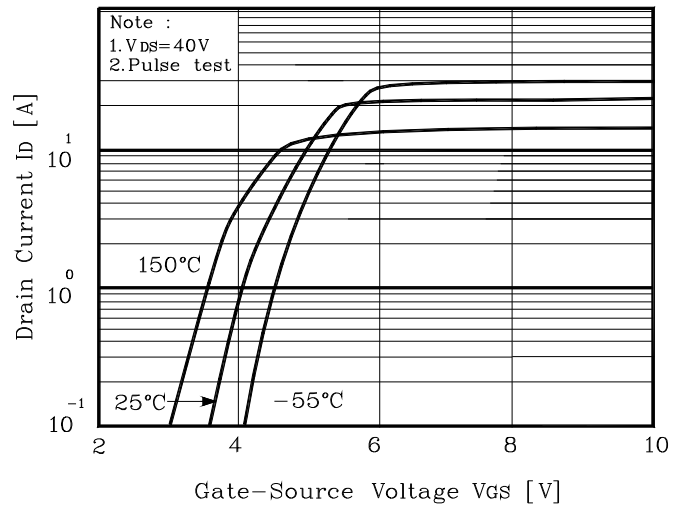
- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ②  $L=7.74\text{mH}$ ,  $I_{AS}=8\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
- ③ Pulse Test : Pulse width $\leq 300\mu\text{s}$ , Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

### Electrical Characteristic Curves

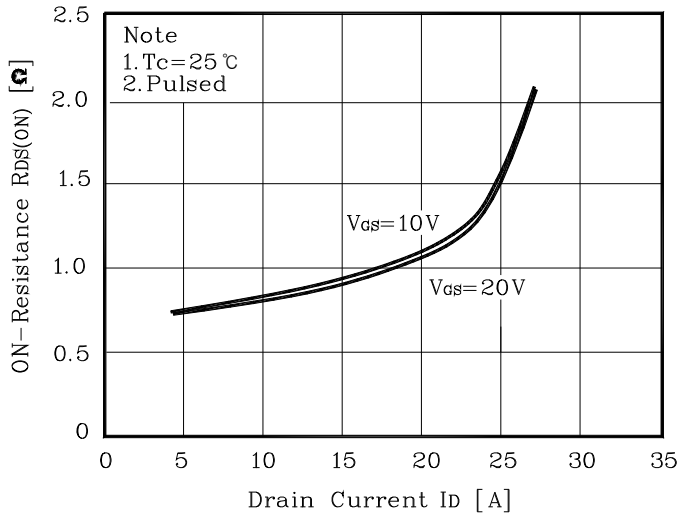
**Fig. 1  $I_D - V_{DS}$**



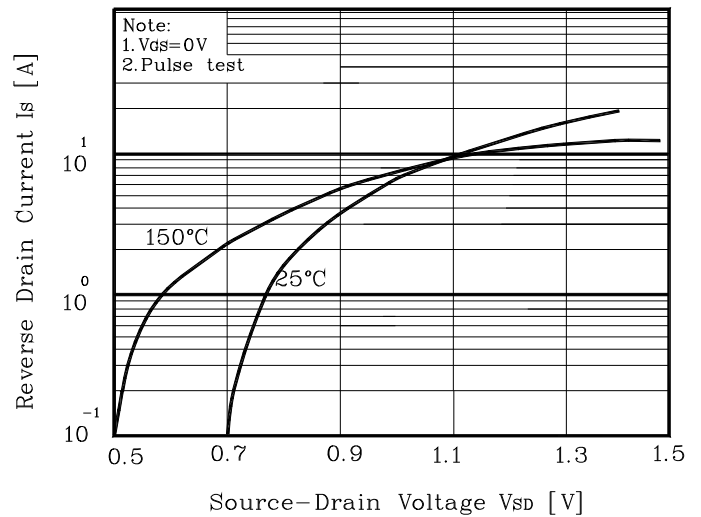
**Fig. 2  $I_D - V_{GS}$**



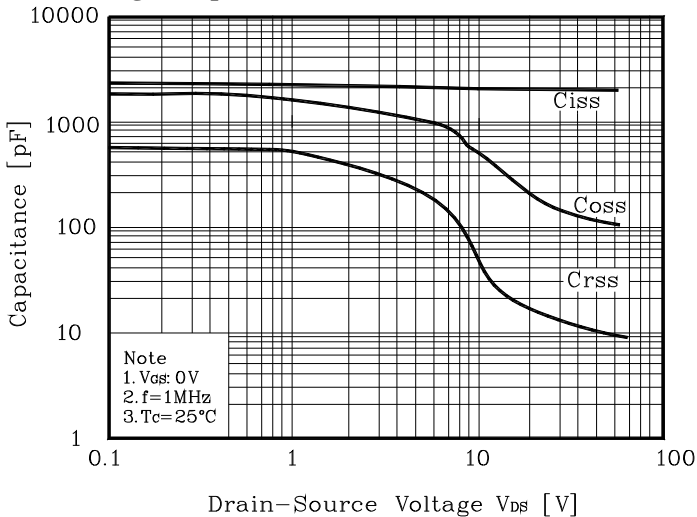
**Fig. 3  $R_{DS(on)} - I_D$**



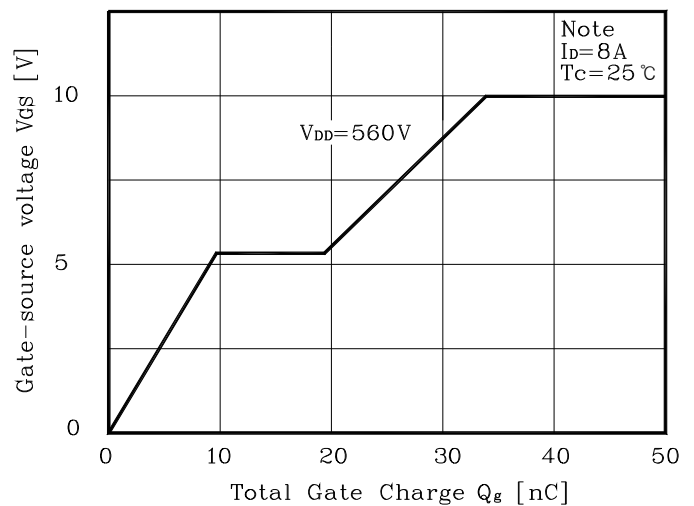
**Fig. 4  $I_S - V_{SD}$**



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

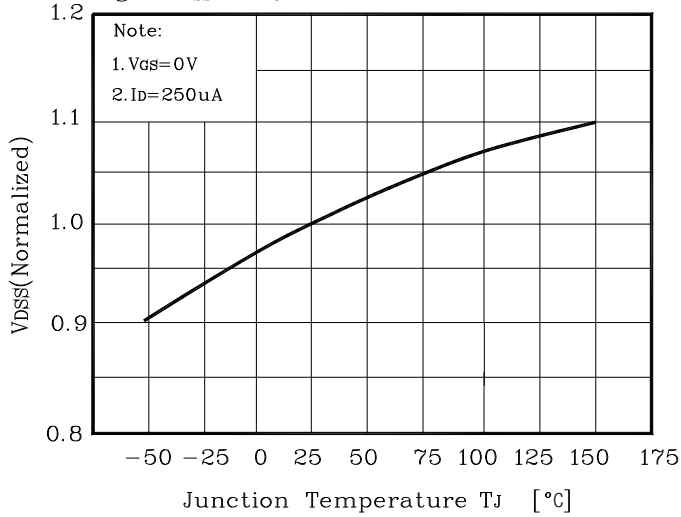


**Fig. 6  $V_{GS} - Q_g$**

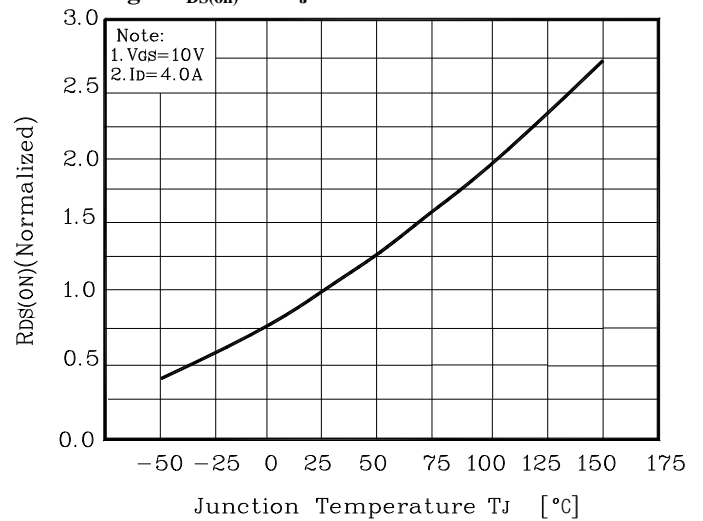


### Electrical Characteristic Curves

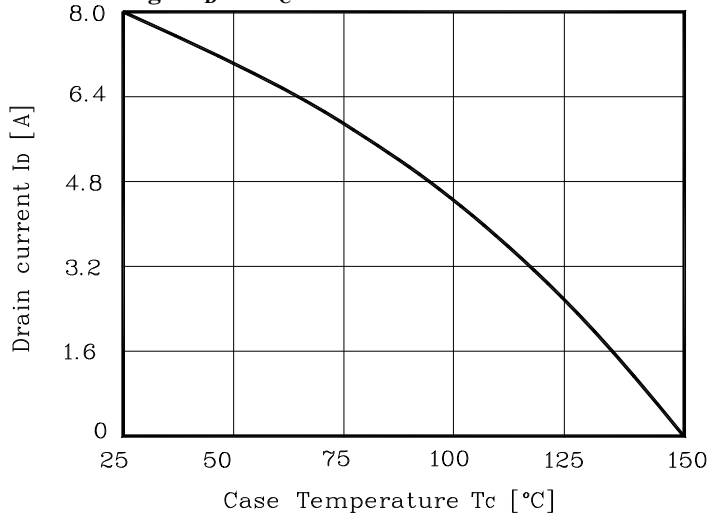
**Fig. 7  $V_{DSS} - T_J$**



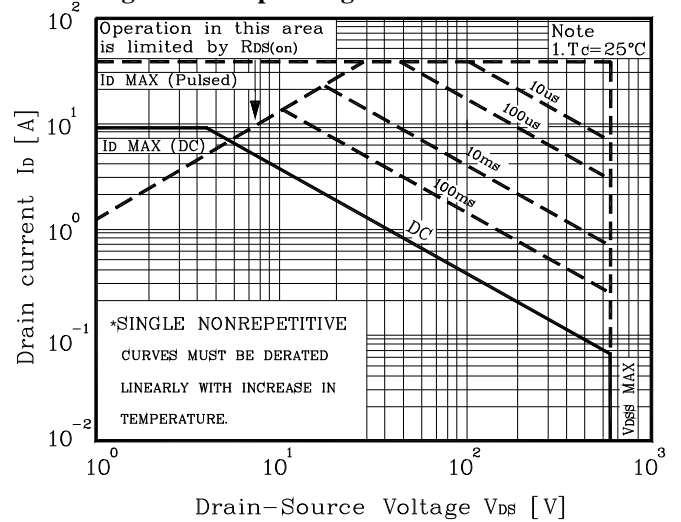
**Fig.8  $R_{DS(on)} - T_J$**



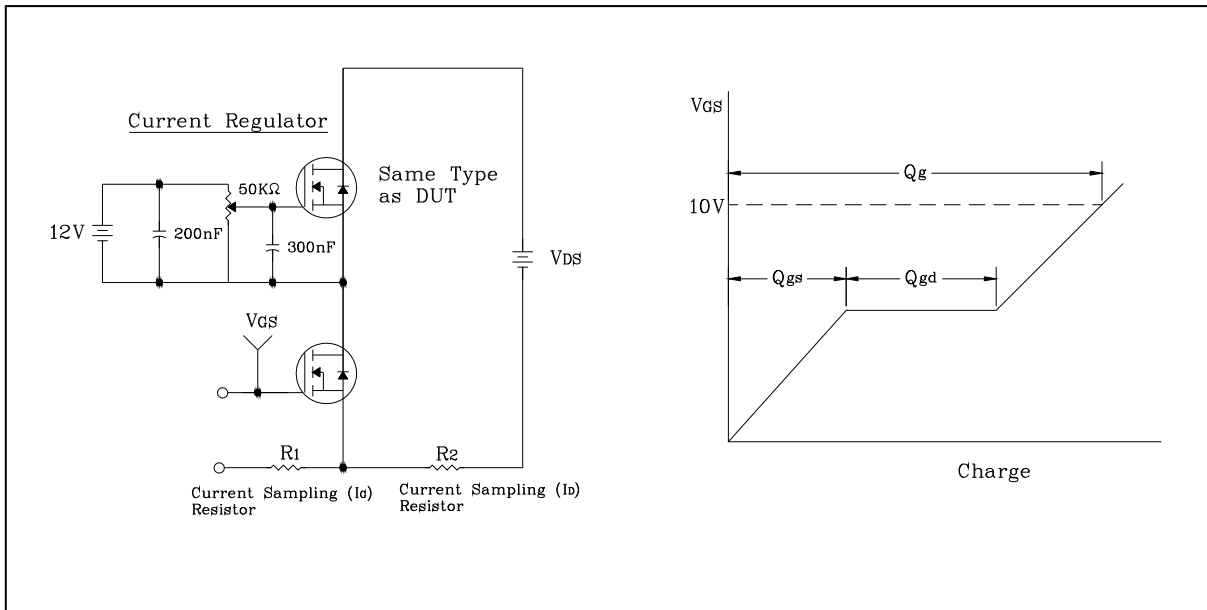
**Fig. 9  $I_D - T_C$**



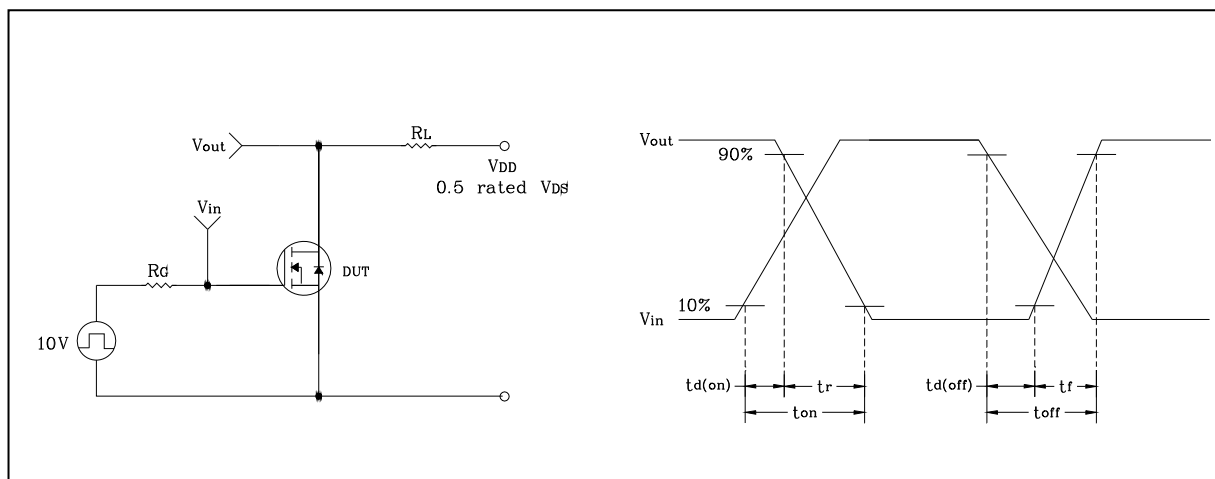
**Fig. 10 Safe Operating Area**



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



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



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

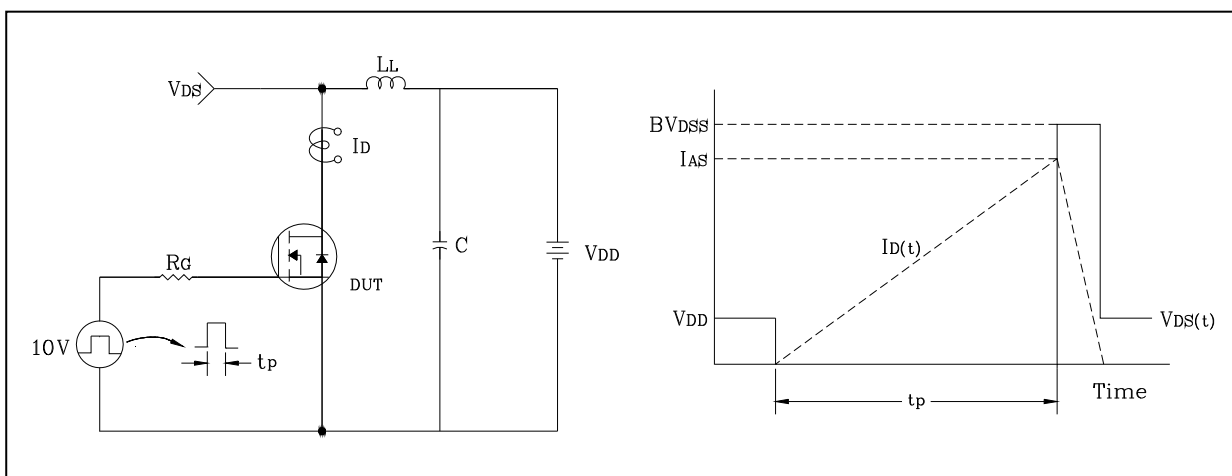


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

