

# MPVP10N60

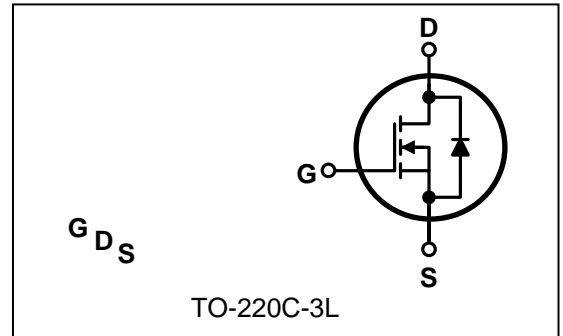
Power MOSFET

## SWITCHING REGULATOR APPLICATIONS

### Features

- High Voltage :  $BV_{DSS}=600V(\text{Min.})$
- Low  $C_{rss}$  :  $C_{rss}=18pF(\text{Typ.})$
- Low gate charge :  $Qg=35nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=0.75\Omega(\text{Max.})$

## PIN Connection

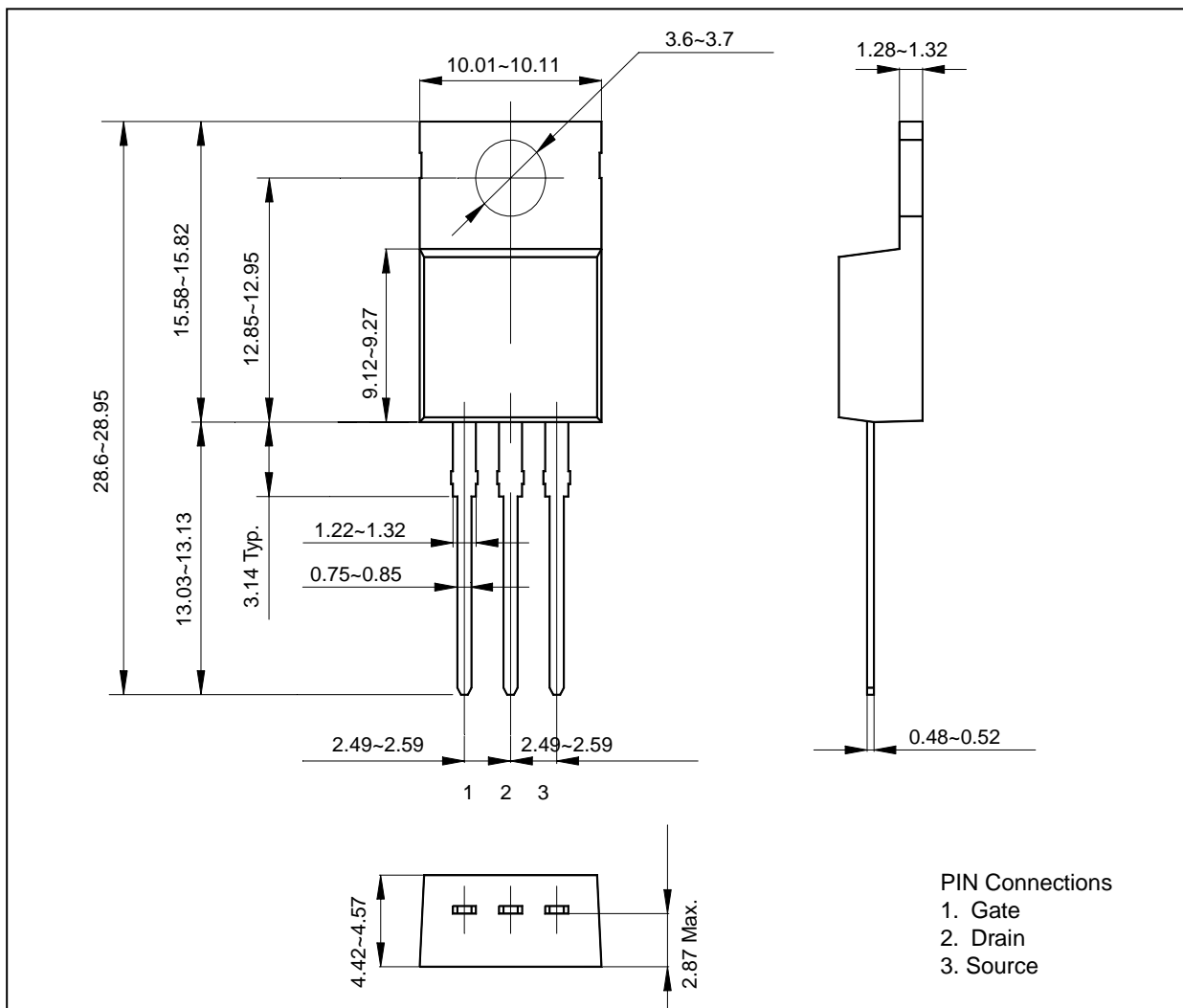


## Ordering Information

Type NO.	Marking	Package Code
MPVP10N60	MPVP10N60	TO-220C-3L

## Outline Dimensions

unit : mm



# MPVP10N60

Power MOSFET

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

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	$V_{DSS}$	600	V	
Gate-source voltage	$V_{GSS}$	$\pm 30$	V	
Drain current (DC) *	$I_D$	$T_C=25^{\circ}\text{C}$	10	A
		$T_C=100^{\circ}\text{C}$	5.8	A
Drain current (Pulsed) *	$I_{DM}$	38	A	
Power dissipation	$P_D$	40	W	
Avalanche current (Single) ②	$I_{AS}$	10	A	
Single pulsed avalanche energy ②	$E_{AS}$	480	mJ	
Avalanche current (Repetitive) ①	$I_{AR}$	10	A	
Repetitive avalanche energy ①	$E_{AR}$	11.6	mJ	
Junction temperature	$T_J$	150	$^{\circ}\text{C}$	
Storage temperature range	$T_{stg}$	-55~150		

\* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max.	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	3.1	$^{\circ}\text{C}/\text{W}$
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

# MPVP10N60

Power MOSFET

## Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250uA, V <sub>GS</sub> =0V	600	-	-	V	
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =250uA, V <sub>DS</sub> =V <sub>GS</sub>	2.0	-	4.0	V	
Drain-source cut-off current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	1	uA	
Gate leakage current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V	-	-	±100	nA	
Drain-source on-resistance ④	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A	-	0.60	0.75	Ω	
Forward transfer conductance ④	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =5.0A	-	8.0	-	S	
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V f=1 MHz	-	2000	2350	pF	
Output capacitance	C <sub>oss</sub>		-	160	215		
Reverse transfer capacitance	C <sub>rss</sub>		-	18	-		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =300V, I <sub>D</sub> =10A R <sub>G</sub> =25Ω	-	23	-	ns	
Rise time	t <sub>r</sub>		-	69	-		
Turn-off delay time	t <sub>d(off)</sub>		③④	-	144		-
Fall time	t <sub>f</sub>		-	77	-		
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =480V, V <sub>GS</sub> =10V I <sub>D</sub> =10A	-	35	57	nC	
Gate-source charge	Q <sub>gs</sub>		-	9	-		
Gate-drain charge	Q <sub>gd</sub>		③④	-	10		-

## Source-Drain Diode Ratings and Characteristics (T<sub>C</sub>=25°C unless otherwise noted)

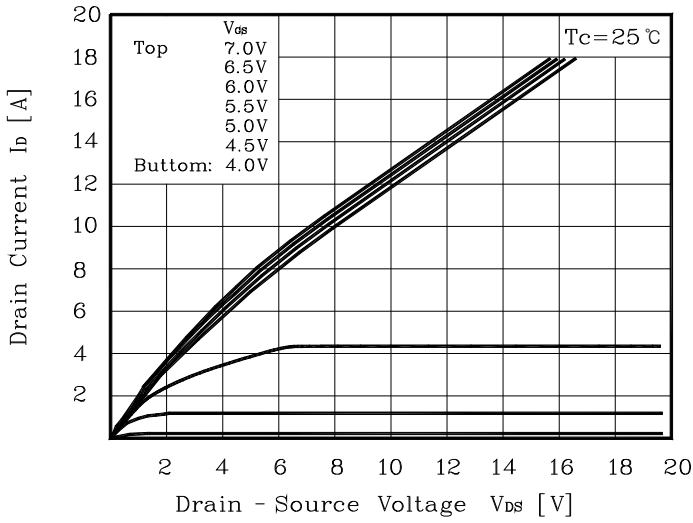
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I <sub>S</sub>	Integral reverse diode in the MOSFET	-	-	10	A
Source current (Pulsed) ①	I <sub>SM</sub>		-	-	40	
Forward voltage ④	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-	-	1.4	V
Reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V dI <sub>F</sub> /dt=100A/us	-	470	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	6	-	uC

Note ;

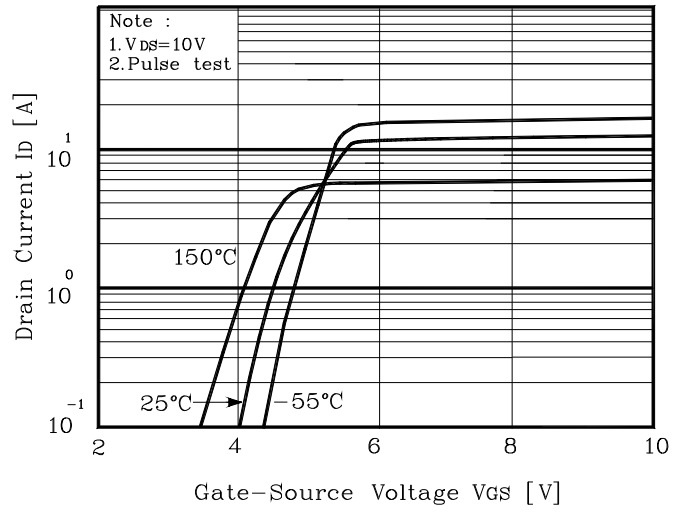
- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② L=10mH, I<sub>AS</sub>=9.5A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
- ③ Pulse Test : Pulse width≤300us, Duty cycle≤2%
- ④ Essentially independent of operating temperature

### Electrical Characteristic Curves

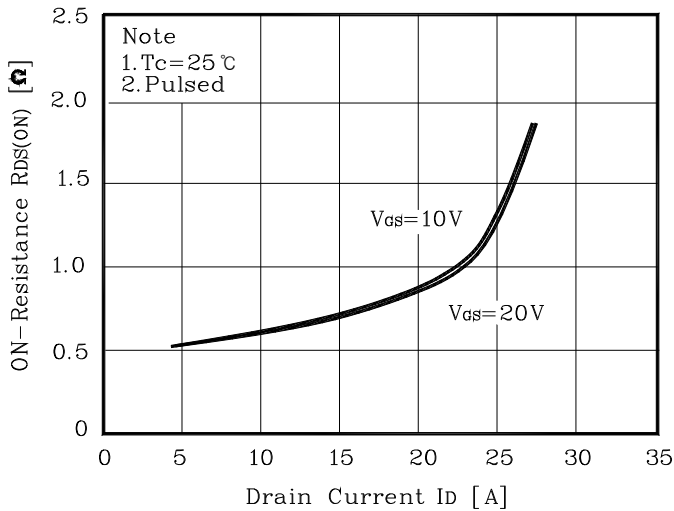
**Fig. 1  $I_D - V_{DS}$**



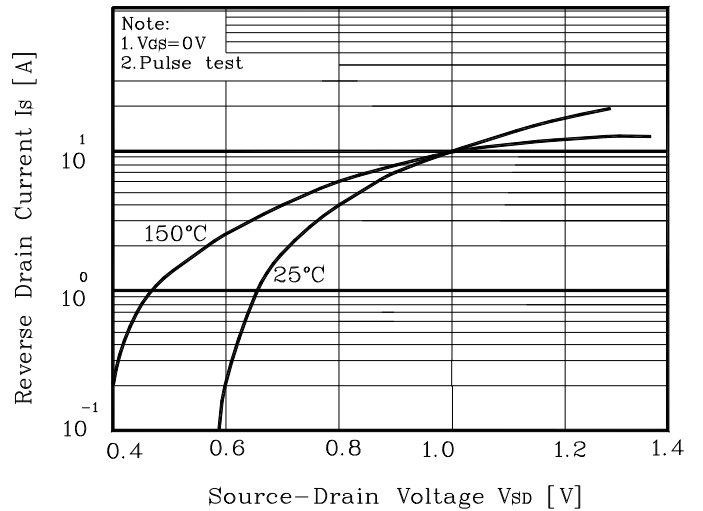
**Fig. 2  $I_D - V_{GS}$**



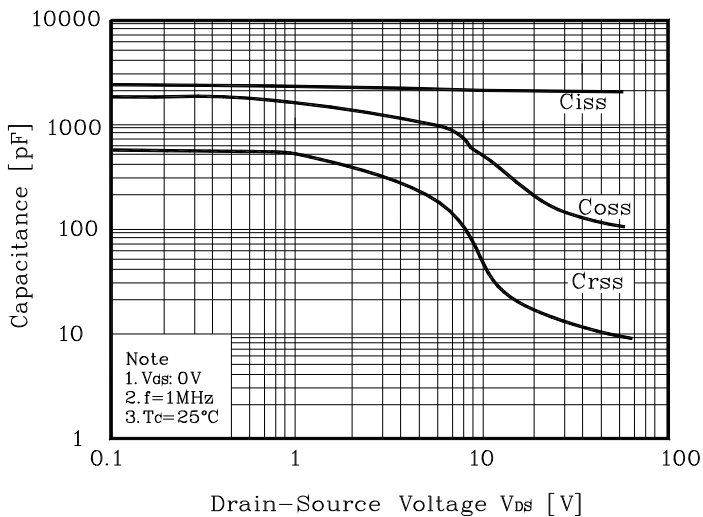
**Fig. 3  $R_{DS(on)} - I_D$**



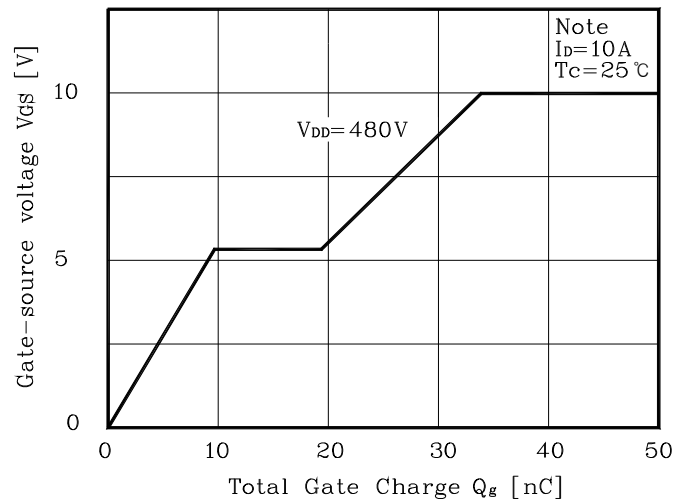
**Fig. 4  $I_S - V_{SD}$**



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



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



# MPVP10N60

Power MOSFET

## Electrical Characteristic Curves

Fig. 7  $V_{DSS} - T_J$

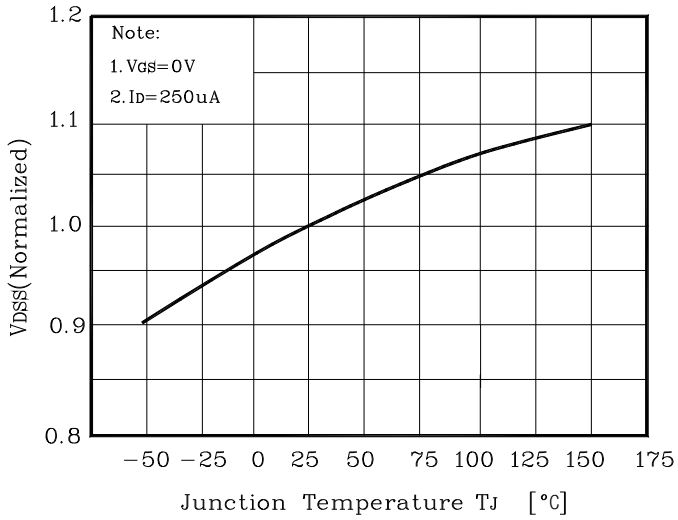


Fig.8  $R_{DS(on)} - T_J$

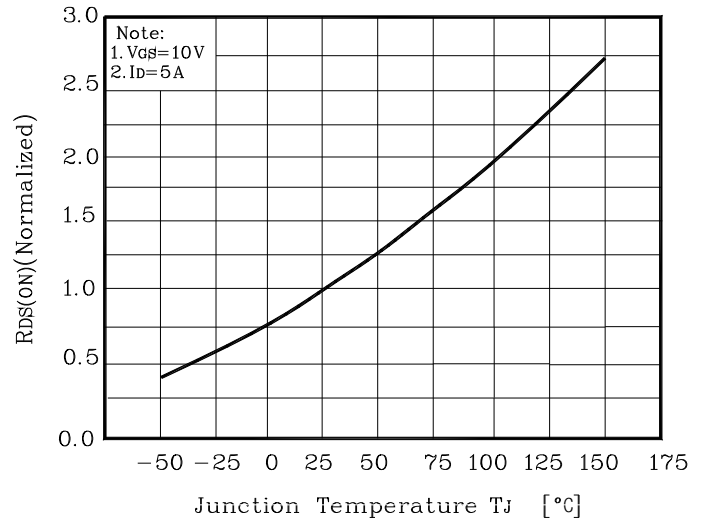


Fig. 9  $I_D - T_C$

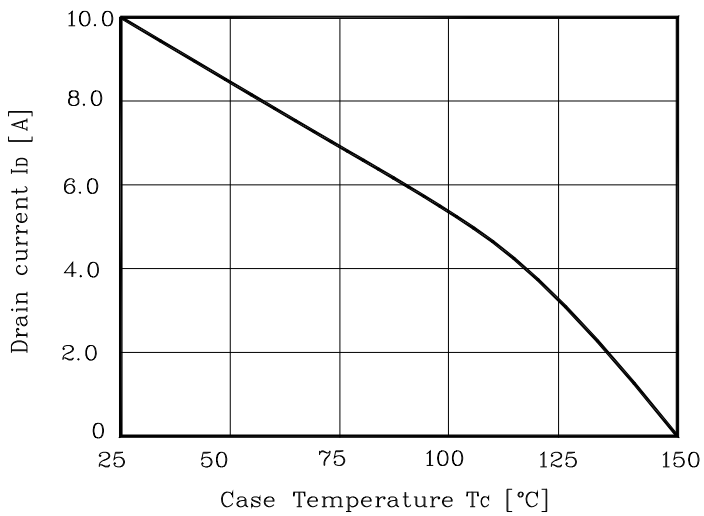
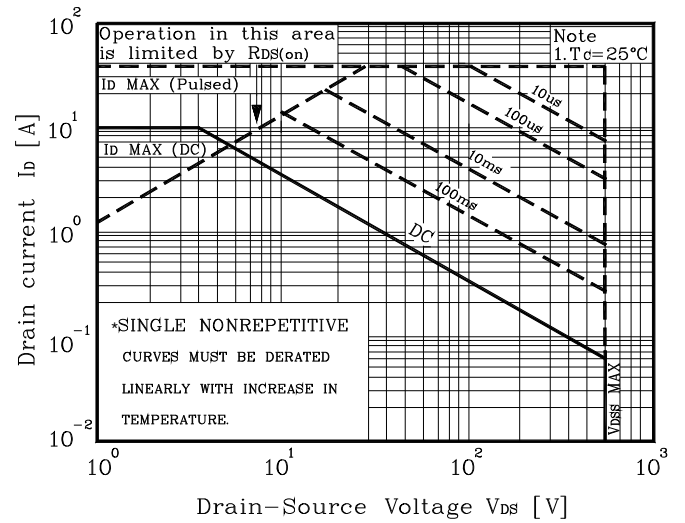
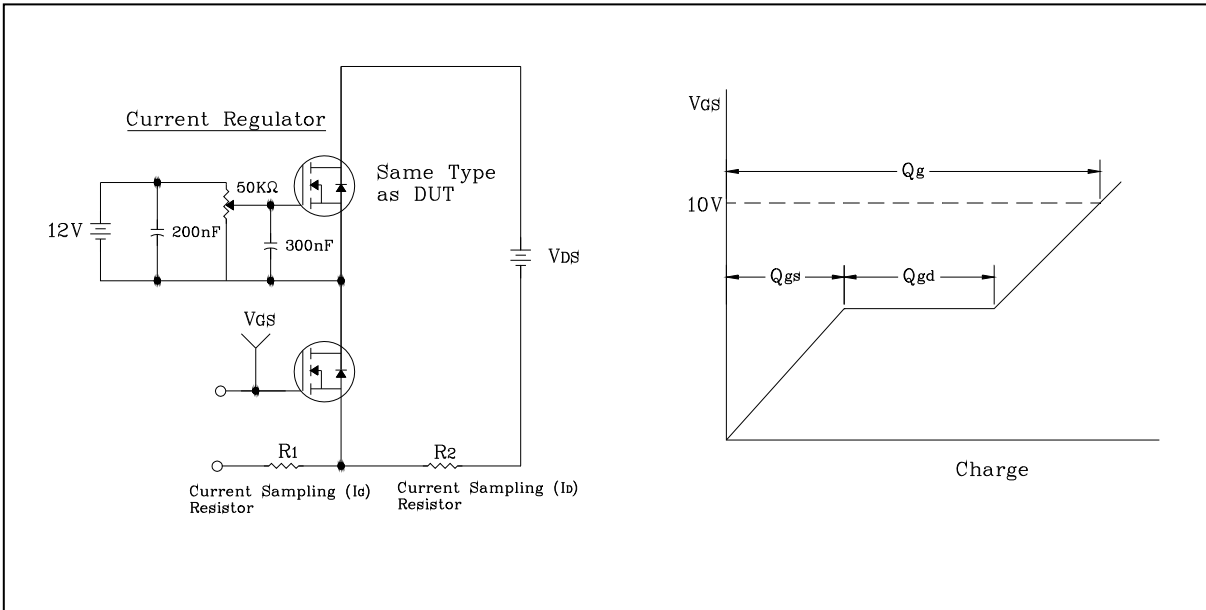


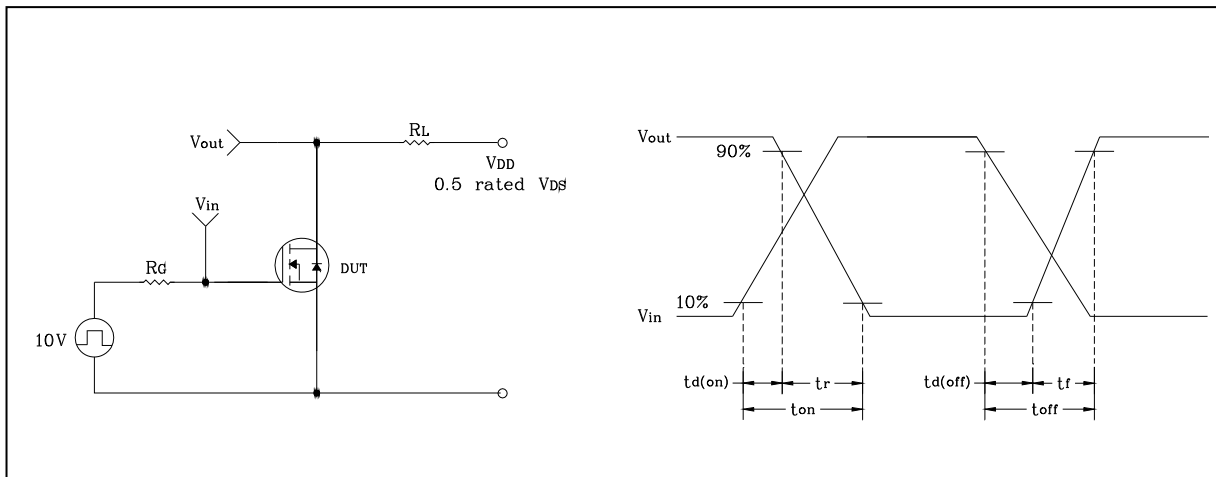
Fig. 10 Safe Operating Area



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



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



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

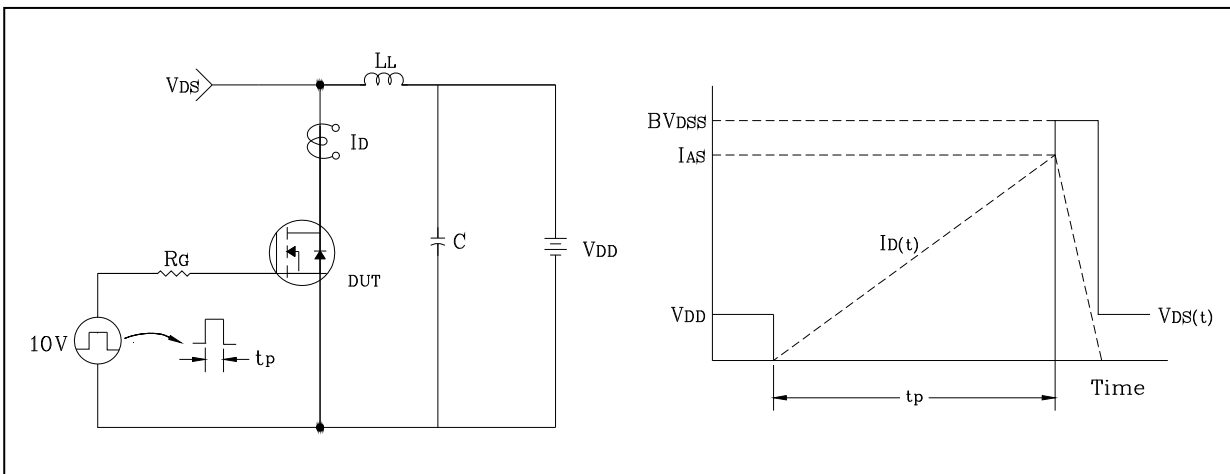


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

