



XTMT10N100T

100V N-Channel MOSFET

Product Description

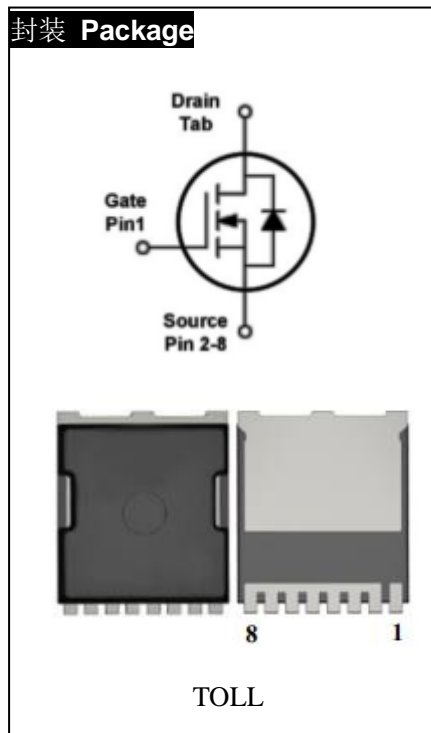
BV_{DSS}	100	V
I_D	100	A
$R_{DS(ON),Typ.}$	1.1	m Ω

General Features

- Excellent gate charge x RDS(ON) product (FOM)
 $R_{DS(ON),typ.}=1.1\text{ m}\Omega@V_{GS}=10V$
- Low on-resistance RDS(ON)
- 150°C operating temperature

Applications

- DC/DC Converter
- Power switch
- Motor drives



Device	Package	Marking
XTMT10N100T	TOLL	XTMT10N100T

Absolute Maximum Ratings $T_j=25^\circ\text{C}$

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	100	V
V_{GSS}	Gate-to-Source Voltage	± 20	
I_D	Continuous Drain Current	100	A
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$	400	
E_{AS}	Single Pulse Avalanche Energy	1750	mJ
P_D	Power Dissipation	431	W
	Derating Factor above 25°C	3.45	
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	°C

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.



Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.29	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics $T_j=25^{\circ}\text{C}$

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	100	-	-	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	uA	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$
		-	-	100		$V_{DS}=80\text{V}, V_{GS}=0\text{V}, T_J=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	-	-	+100	nA	$V_{GS}=+20\text{V}, V_{DS}=0\text{V}$
		-	-	-100		$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	1.1	1.5	m Ω	$V_{GS}=10\text{V}, I_D=33\text{A}$
$V_{GS(TH)}$	Gate Threshold Voltage	2.2	-	3.8	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$



Dynamic Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	15650	-	pF	$V_{GS}=0V,$ $V_{DS}=50V,$ $f=1.0MHz$
C_{rss}	Reverse Transfer Capacitance	-	45	-		
C_{oss}	Output Capacitance	-	2100	-		
Q_g	Total Gate Charge	-	258	-	nC	$V_{DD}=50V,$ $I_D=33A, V_{GS}=0$ to 10V
Q_{gs}	Gate-to-Source Charge	-	59	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	69	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	64	-	ns	$V_{DD}=50V,$ $I_D=33A,$ $V_{GS}=10V$ $R_g=6\Omega$
t_{rise}	Rise Time	-	61	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	221	-		
t_{fall}	Fall Time	-	104	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current ^[1]	-	-	100	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current ^[1]	-	-	400		
V_{SD}	Diode Forward Voltage	-	-	1.1	V	$I_S=33A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	-	116	-	ns	$I_F=33A,$ $di_F/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	405	-	nC	

[1] Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$



Typical Characteristics

Fig.1 Typ. transfer characteristics

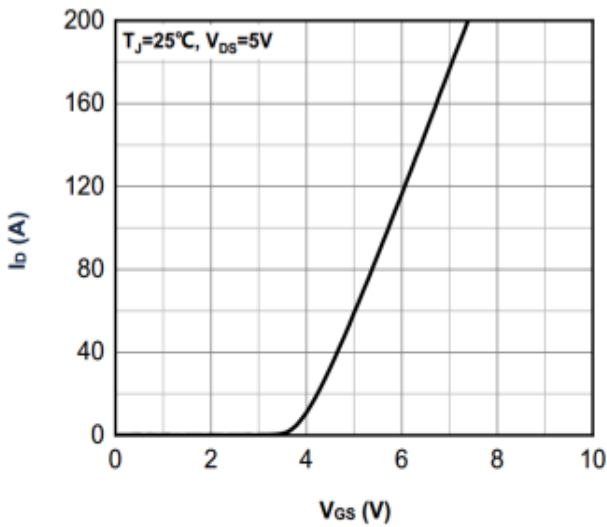


Fig.2 Typ. output characteristics

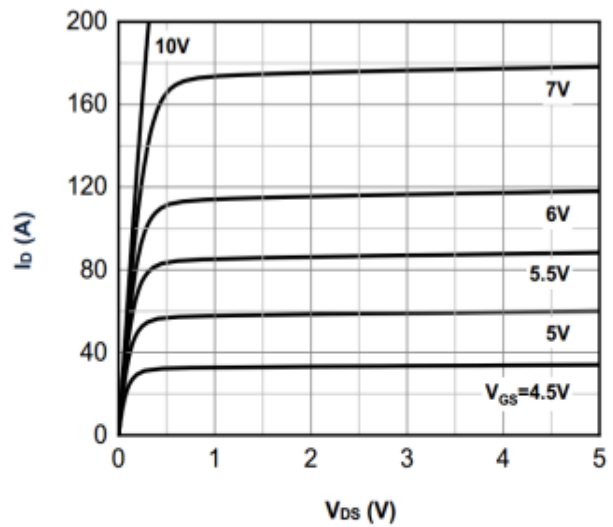


Fig.3 Normalized on-resistance vs drain current

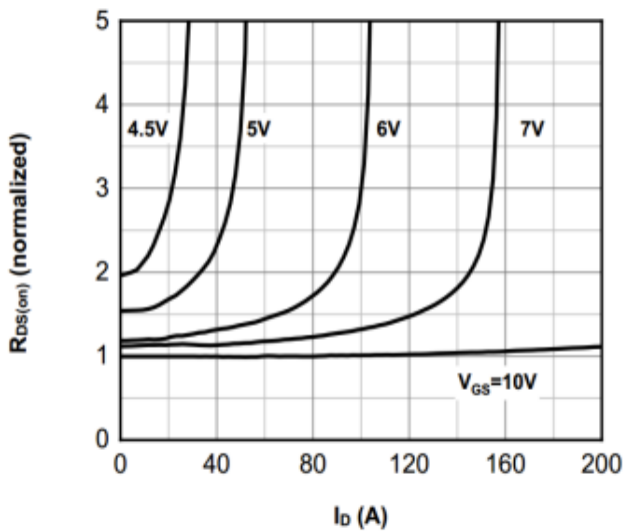


Fig.4 Typ. on-resistance vs gate-source voltage

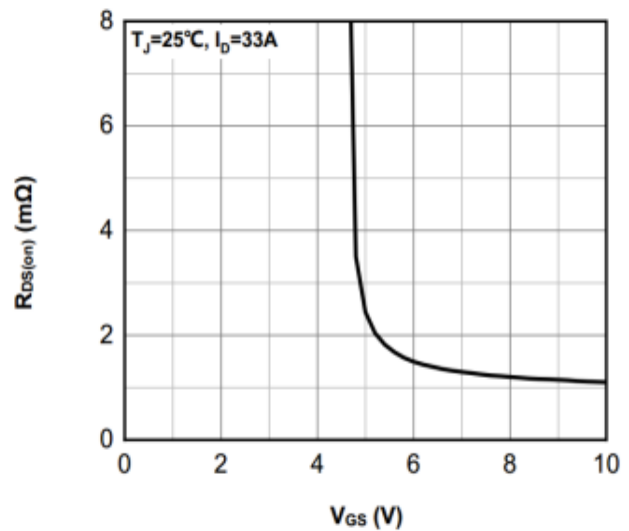


Fig.5 Normalized on-resistance vs junction temperature

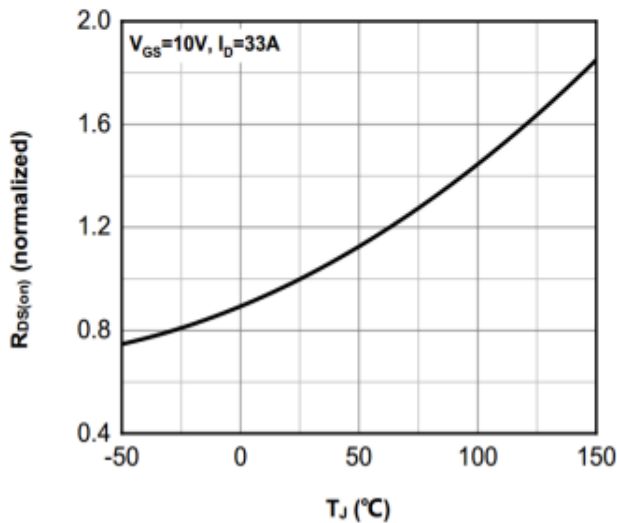
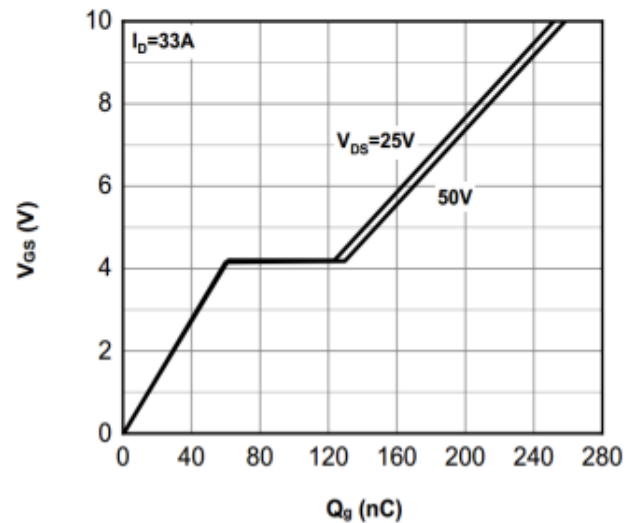


Fig.6 Typ. gate charge





Typical Characteristics

Fig.7 Typ. forward characteristics of body diode

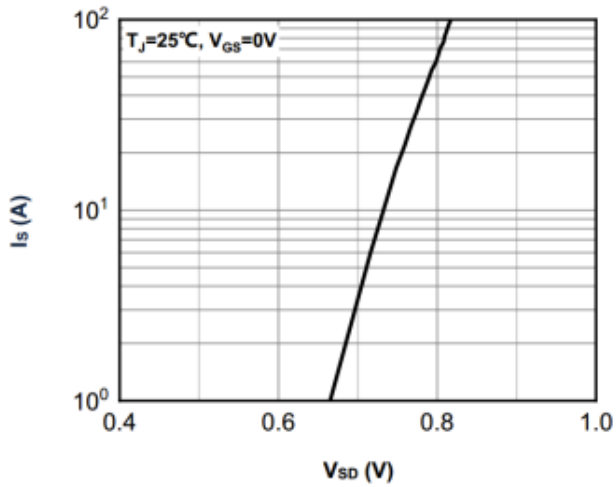


Fig.8 Safe operating area

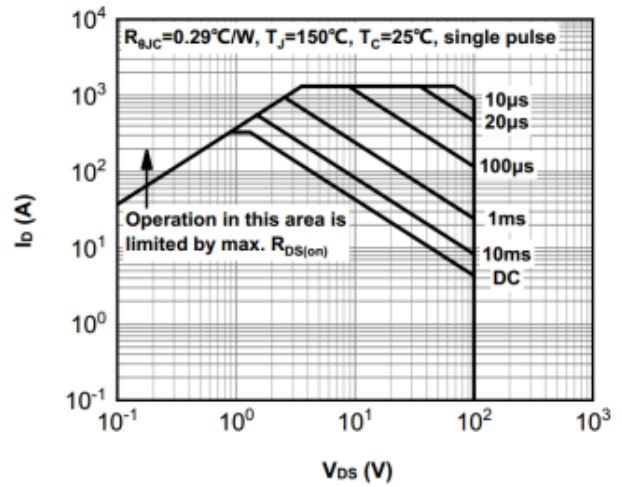


Fig.9 Typ. Capacitance

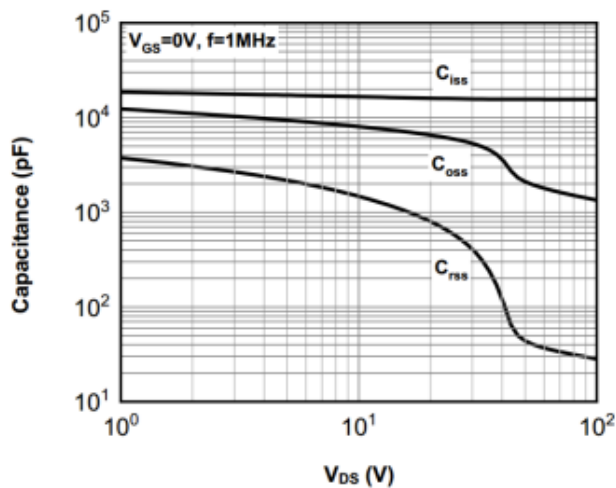


Fig.10 Single pulse maximum power dissipation

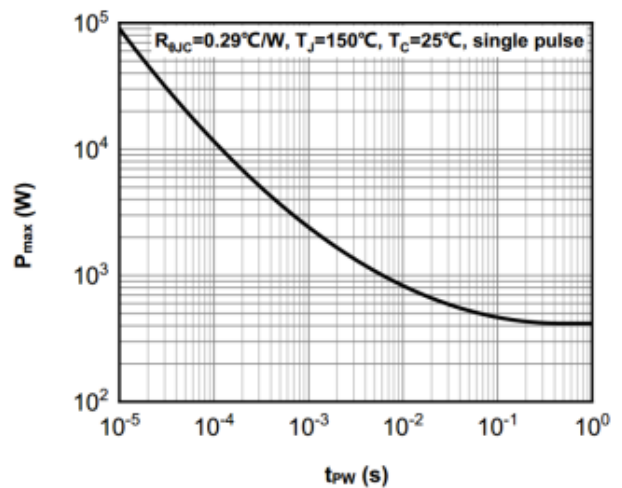


Fig.11 Max. power dissipation vs case temperature

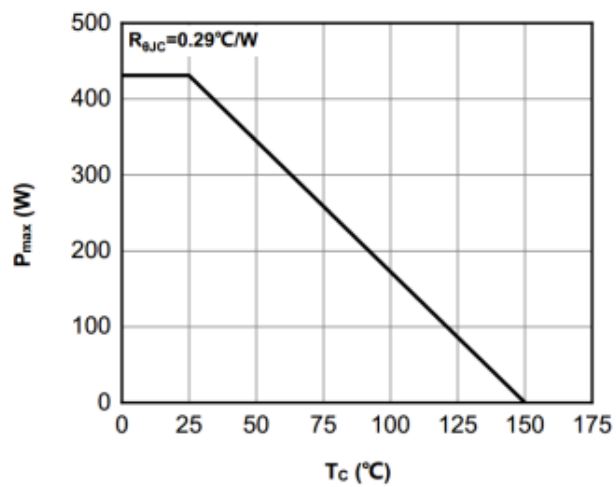
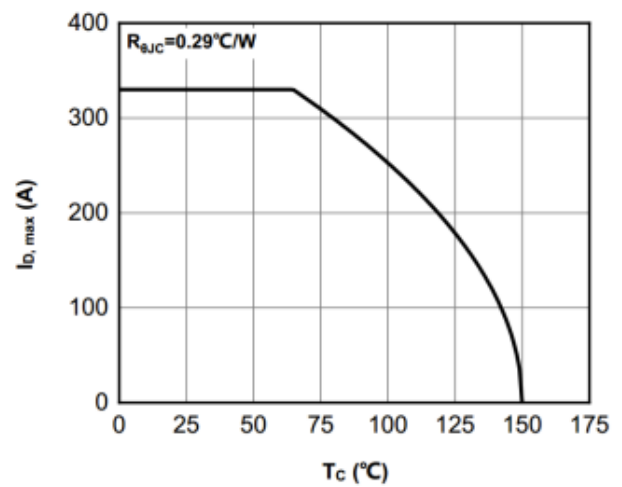


Fig.12 Max. continuous drain current vs case temperature





Test Circuits and Waveforms

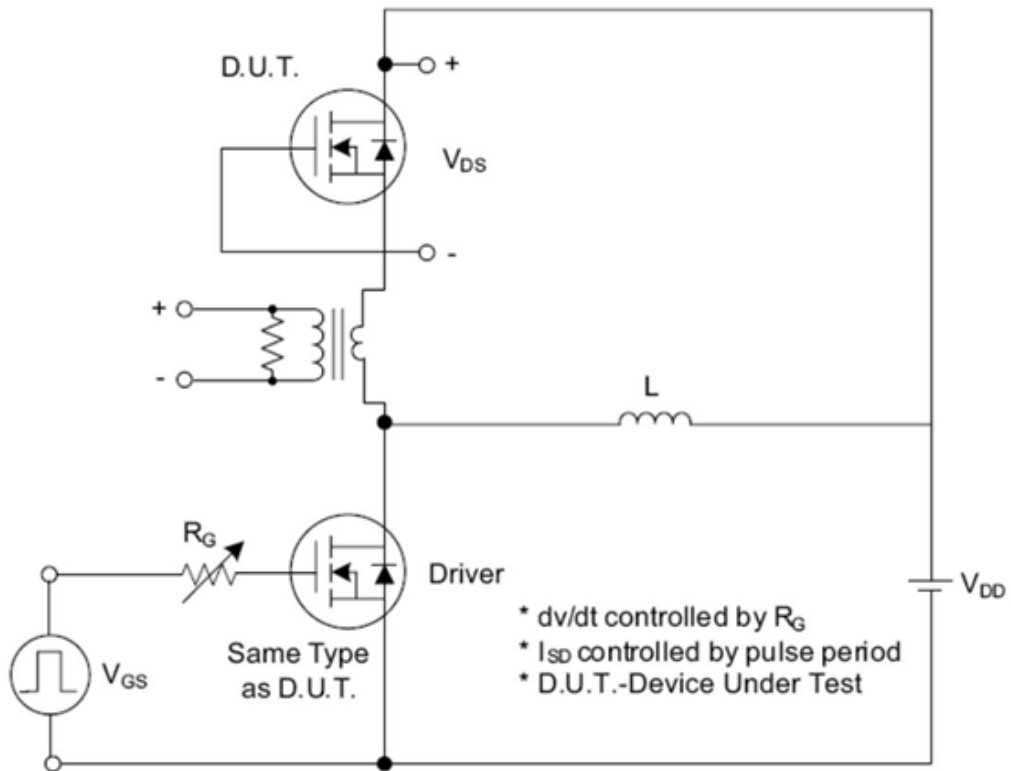


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

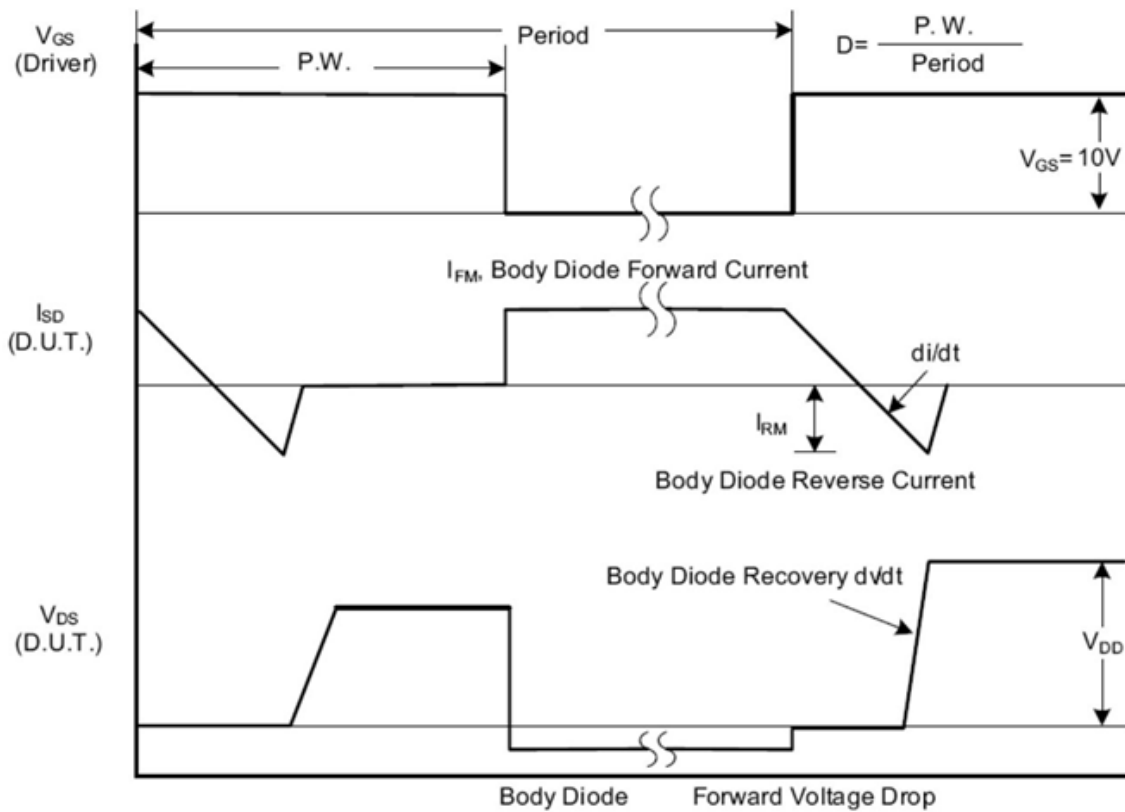


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms



Test Circuits and Waveforms (Cont.)

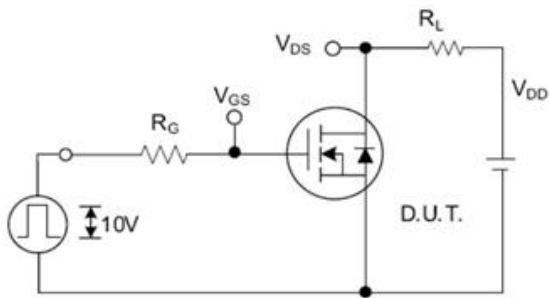


Fig. 2.1 Switching Test Circuit

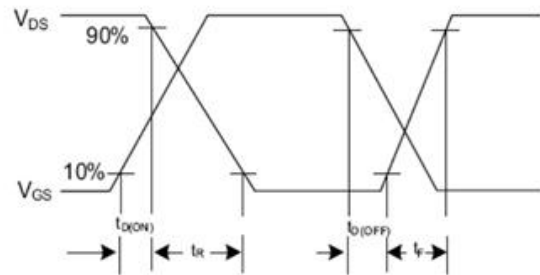


Fig. 2.2 Switching Waveforms

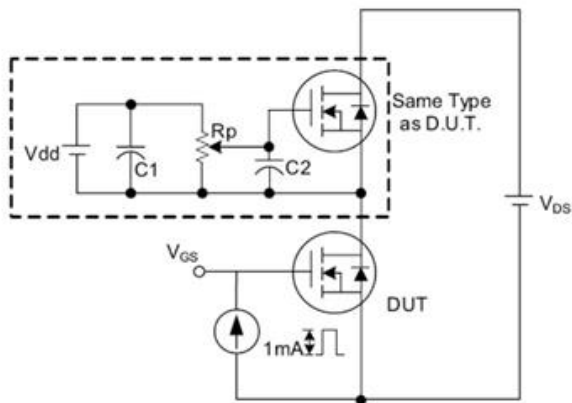


Fig. 3.1 Gate Charge Test Circuit

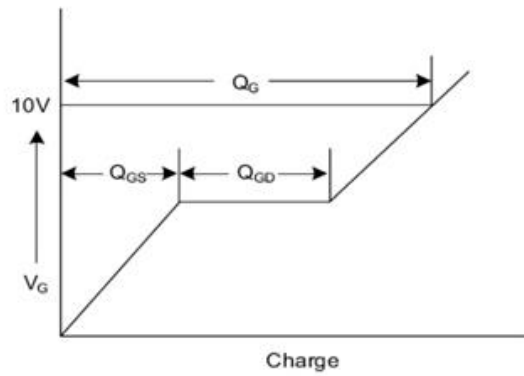


Fig. 3.2 Gate Charge Waveform

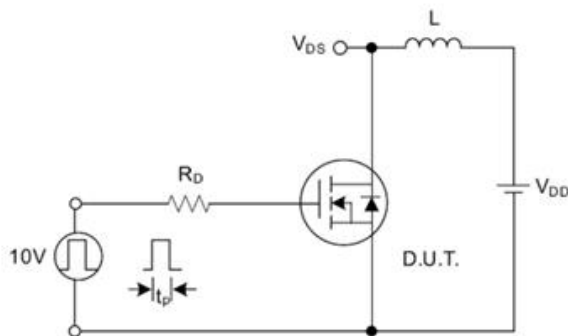


Fig. 4.1 Unclamped Inductive Switching Test Circuit

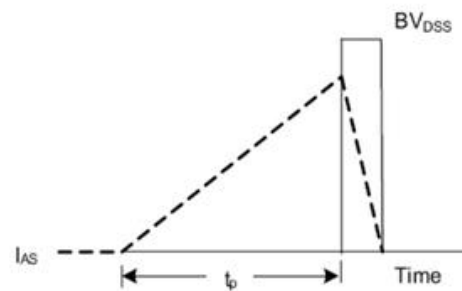


Fig. 4.2 Unclamped Inductive Switching Waveforms