



XTMT12N40L

120V N-Channel MOSFET

Product Description

BV_{DSS}	120	V
I_D	40	A
$R_{DS(ON), Typ.}$	0.013	Ω

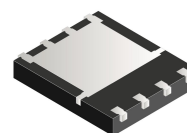
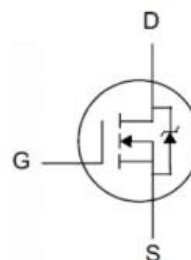
General Features

- Proprietary New Planar Technology
- $R_{DS(ON), typ.} = 13 \text{ m}\Omega @ V_{GS} = 10V$
- Fast Recovery Body Diode
- Low Gate Charge Minimize Switching Loss

Applications

- Synchronous Rectification
- UPS Inverter

封装 Package



PDFN 5×6

Device	Package	Marking
XTMT12N40L	PDFN5*6	XTMT12N40L

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	120	V
V_{GSS}	Gate-to-Source Voltage	± 20	
I_D	Continuous Drain Current	40	A
I_{DM}	Pulsed Drain Current at $V_{GS} = 10V$	160	
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	$^\circ\text{C}$
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	

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	3.13	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	$^{\circ}C/W$

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

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	120	-	-	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	uA	$V_{DS}=120V, V_{GS}=0V$
		-	-	100		$V_{DS}=96V, V_{GS}=0V, T_j=125^{\circ}C$
I_{GSS}	Gate-to-Source Leakage Current	-	-	+100	nA	$V_{GS}=+20V, V_{DS}=0V$
		-	-	-100		$V_{GS}=-20V, V_{DS}=0V$

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	13	16	m Ω	$V_{GS}=10V, I_D=20A$
		-	17	21		$V_{GS}=4.5V, I_D=20A$
$V_{GS(TH)}$	Gate Threshold Voltage	1.1	1.7	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$



Dynamic Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	1570	-	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$
C_{rSS}	Reverse Transfer Capacitance	-	28	-		
C_{oss}	Output Capacitance	-	696	-		
Q_g	Total Gate Charge	-	23	-	nC	$V_{DD}=60V$, $I_D=20A$, $V_{GS}=0$ to 10V
Q_{gs}	Gate-to-Source Charge	-	4	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	4	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	14	-	ns	$V_{DD}=60V$, $I_D=20A$, $V_{GS}=10V$ $R_g=3\Omega$
t_{rise}	Rise Time	-	7	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	37	-		
t_{fall}	Fall Time	-	9	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current ^[1]	-	-	40	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current ^[1]	-	-	160		
V_{SD}	Diode Forward Voltage	-	-	1.2	V	$I_S=20A$, $V_{GS}=0V$
t_{rr}	Reverse Recovery Time	-	58	-	ns	$I_F=20A$, $di_F/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	74	-	uC	

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



Test Circuits and Waveforms

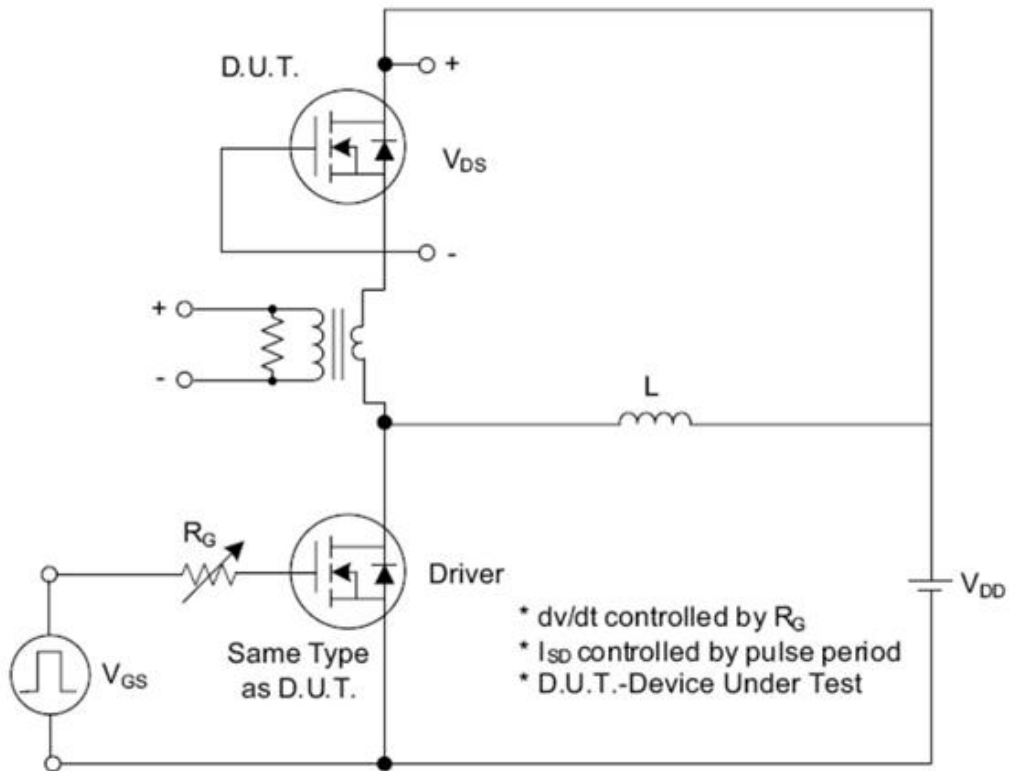


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

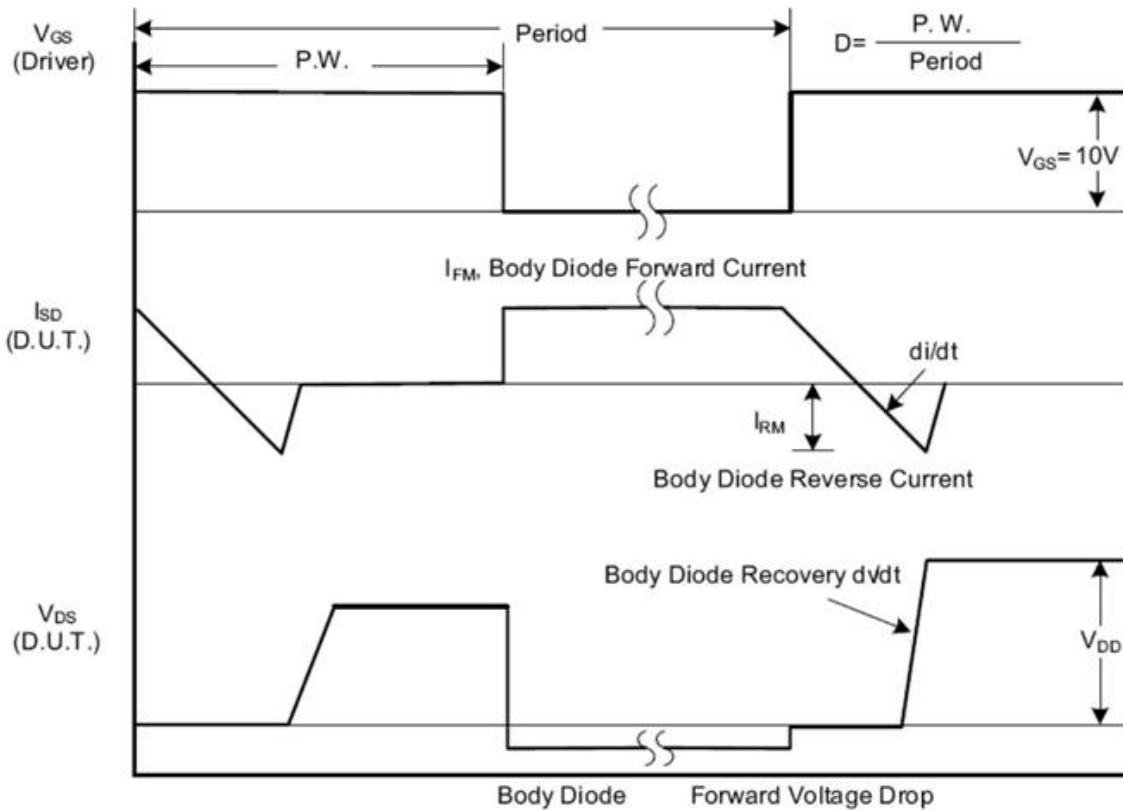


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms



Test Circuits and Waveforms (Cont.)

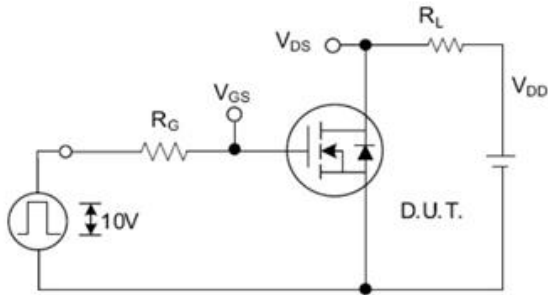


Fig. 2.1 Switching Test Circuit

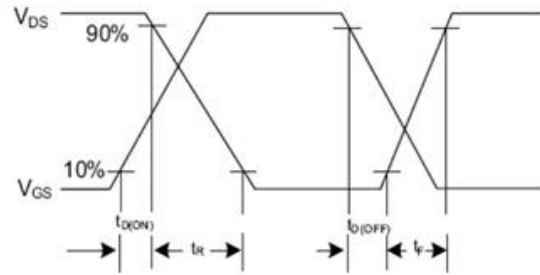


Fig. 2.2 Switching Waveforms

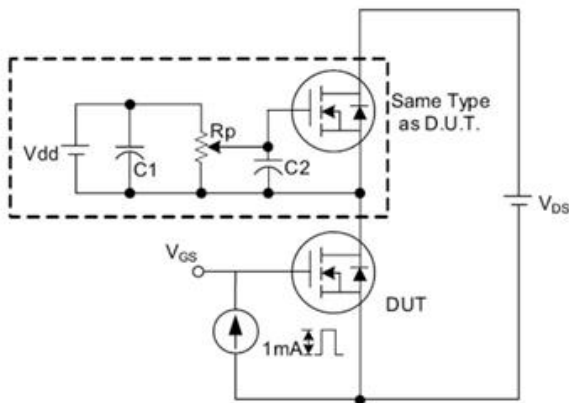


Fig. 3. 1 Gate Charge Test Circuit

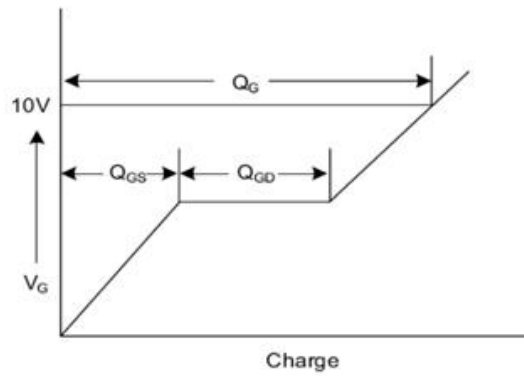


Fig. 3. 2 Gate Charge Waveform

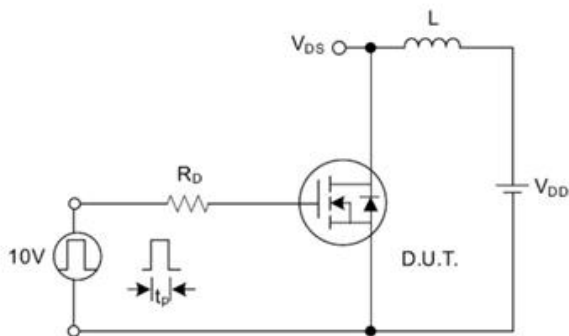


Fig. 4.1 Unclamped Inductive Switching Test Circuit

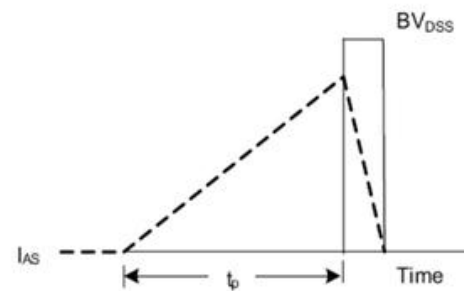


Fig. 4.2 Unclamped Inductive Switching Waveforms