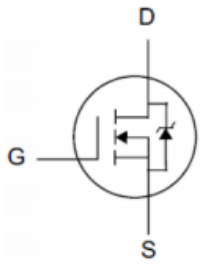
XTMT15N50F1

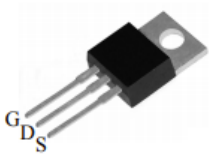
150V N-Channel MOSFET

Product Description

BV_{DSS}	150	V
I_D	50	A
$R_{DS(ON),Typ.}$	0.03	Ω

封装 **Package**





TO-220

General Features

- Proprietary New Planar Technology
- $R_{DS(ON),typ.}$=30 mΩ@V_{GS}=10V
- Fast Recovery Body Diode
- Low Gate Charge Minimize Switching Loss

Applications

- Uninterruptible Power Supply
- Power Switching application

Device	Package	Marking
XTMT15N50F1	TO-220	XTMT15N50F1

Absolute Maximum Ratings T_j=25℃

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	150	V
V_{GSS}	Gate-to-Source Voltage	±20	
I_D	Continuous Drain Current	50	A
I_{DM}	Pulsed Drain Current at V_{GS}=10V	180	
E_{AS}	Single Pulse Avalanche Energy	295	mJ
P_D	Power Dissipation	151	W
	Derating Factor above 25℃	1.20	W/℃
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	℃
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	0.83	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	℃/W

Electrical Characteristics T_j=25℃

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	150	-	-	V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	uA	V_{DS}=150V, V_{GS}=0V
		-	-	100		V_{DS}=120V, V_{GS}=0V, T_J=125℃
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	-	30	38	mΩ	V_{GS}=10V, I_D=30A
$V_{GS(TH)}$	Gate Threshold Voltage	3.0	3.7	4.5	V	V_{DS}=V_{GS}, I_D=250uA

Dynamic Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	2447	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{rss}	Reverse Transfer Capacitance	-	41	-		
C_{oss}	Output Capacitance	-	153	-		
R_G	Gate Series Resistance		2.5		Ω	f=1.0MHz
Q_g	Total Gate Charge	-	56	-	nC	V_{DD}=100V, I_D=30A, V_{GS}=0 to 10V
Q_{gs}	Gate-to-Source Charge	-	12	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	18	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	28	-	ns	V_{DD}=100V, I_D=30A, V_{GS}=10V Rg=2.5Ω
t_{rise}	Rise Time	-	30	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	95	-		
t_{fall}	Fall Time	-	40	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current[1]	-	-	50	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current[1]	-	-	180		
V_{SD}	Diode Forward Voltage	-	0.85	1.3	V	I_S=30A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	-	48	-	ns	I_F=30A, di_F/dt=100A/μs
Q_{rr}	Reverse Recovery Charge	-	78	-	uC	

[1] Pulse width≤380μs; duty cycle≤2%

Typical Characteristic

Figure 1: Power Dissipation

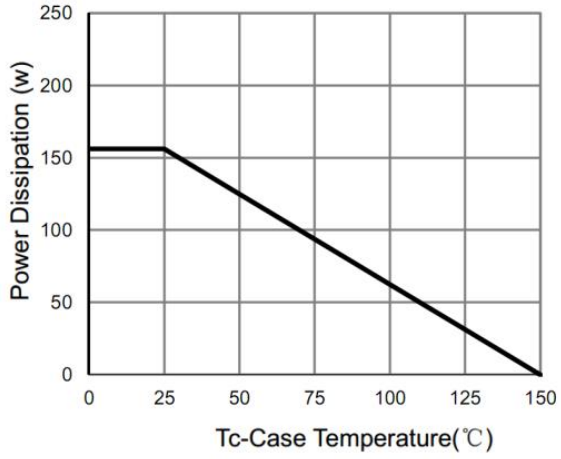


Figure 2: Drain Current

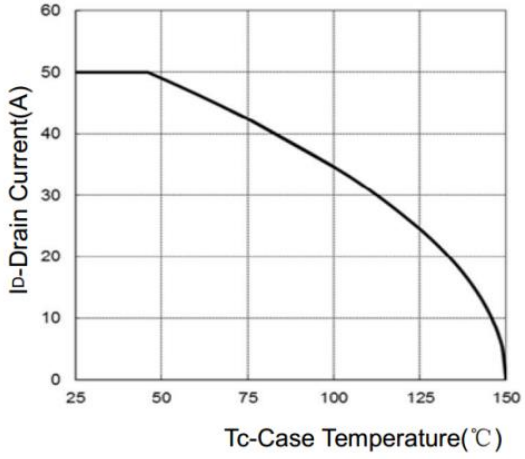


Figure 3: Safe Operation Area

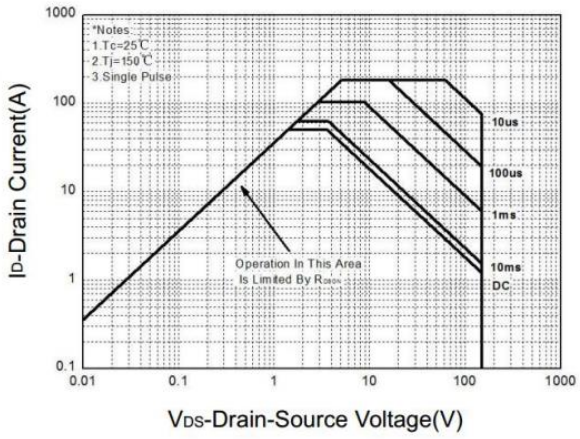
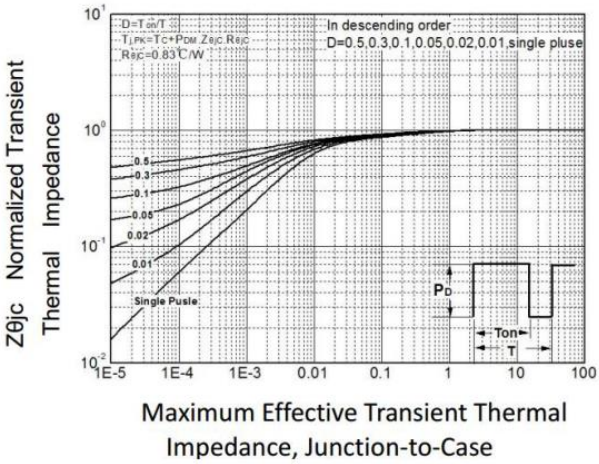


Figure 4: Thermal Transient Impedance



Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics

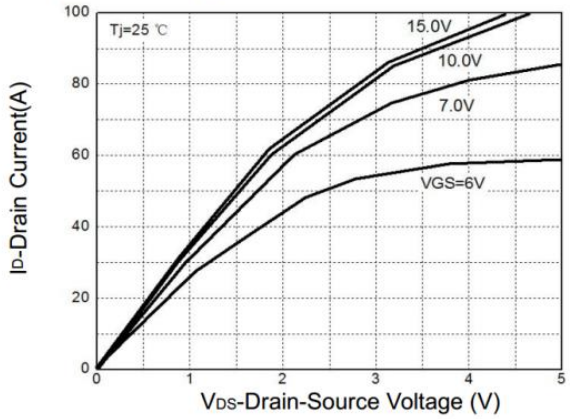
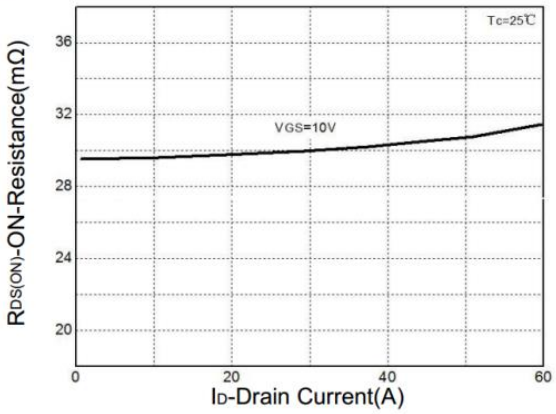


Figure 6: Drain-Source On Resistance



Typical Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

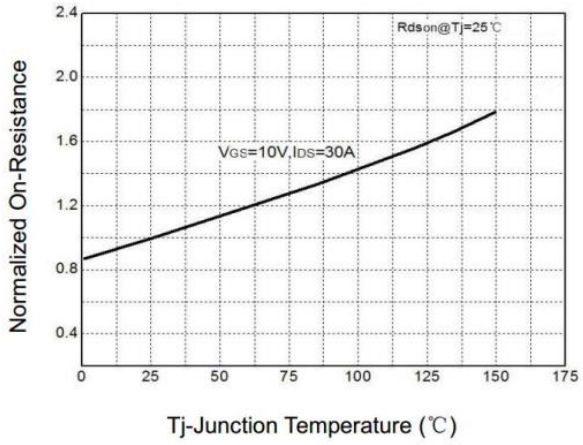


Figure 8: Source-Drain Diode Forward

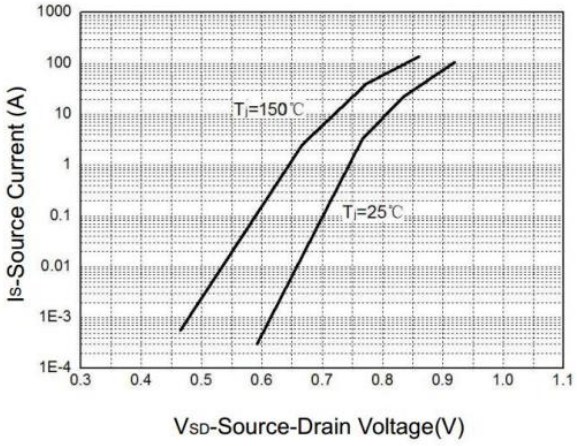


Figure 9: Capacitance Characteristics

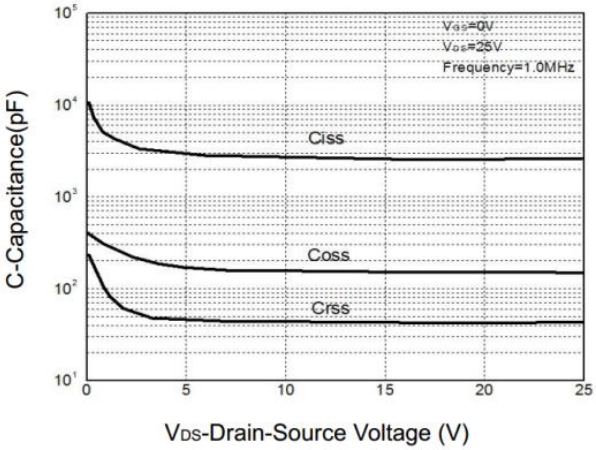
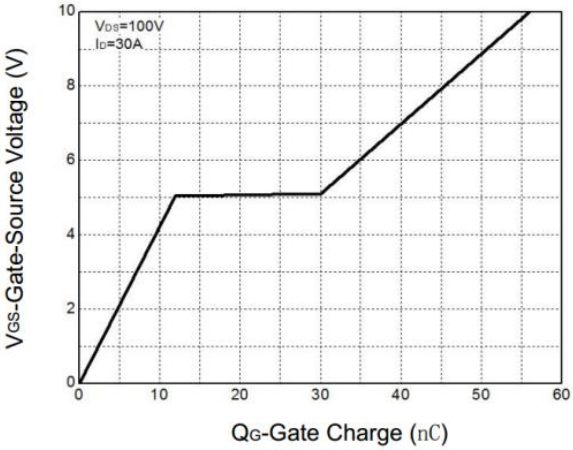


Figure 10: Gate Charge Characteristics



Test Circuits and Waveforms

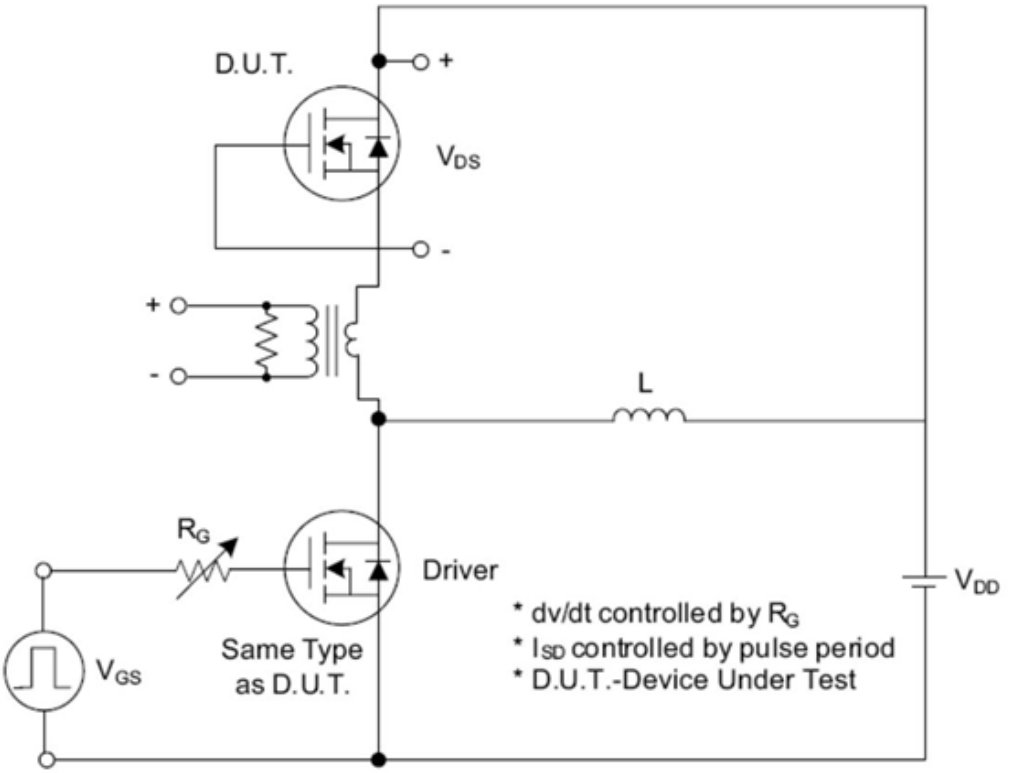


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

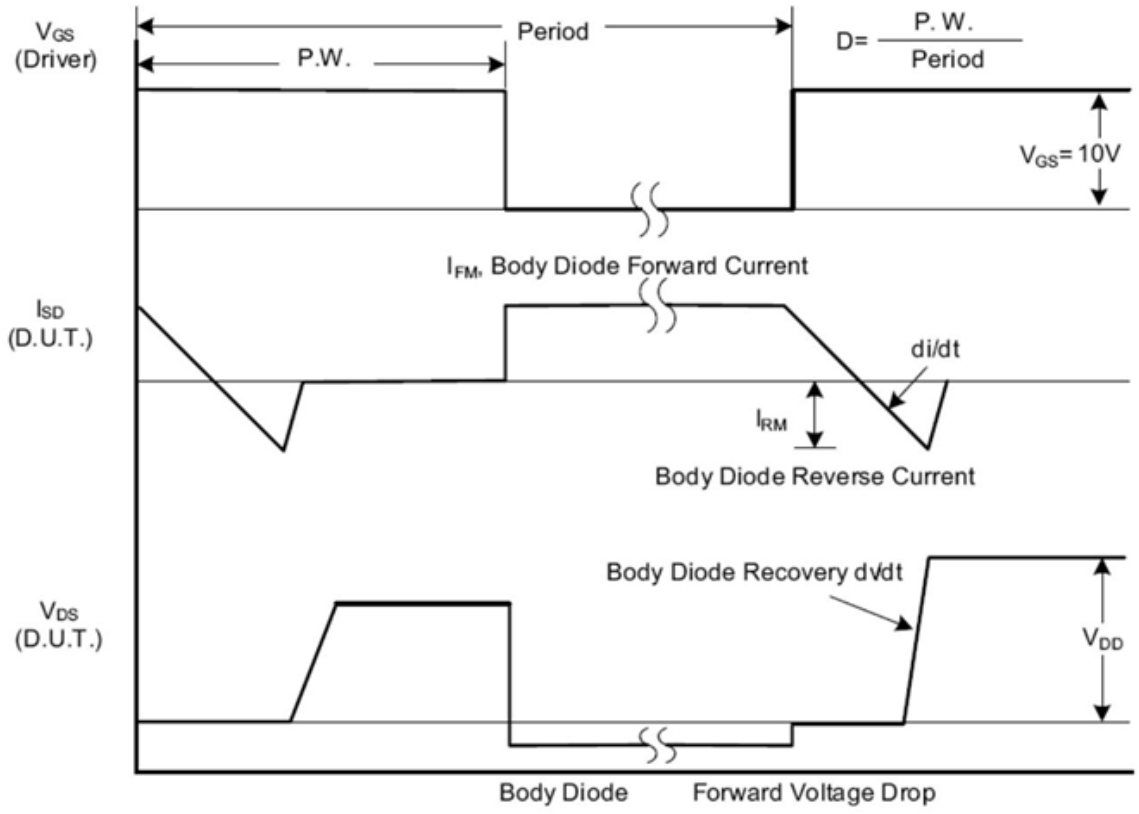


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

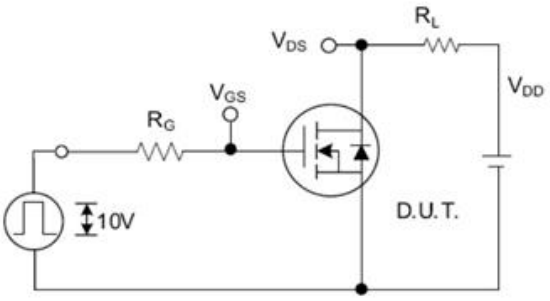


Fig. 2.1 Switching Test Circuit

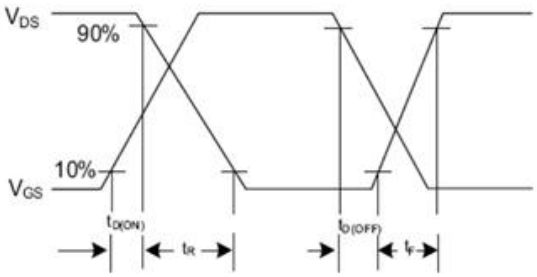


Fig. 2.2 Switching Waveforms

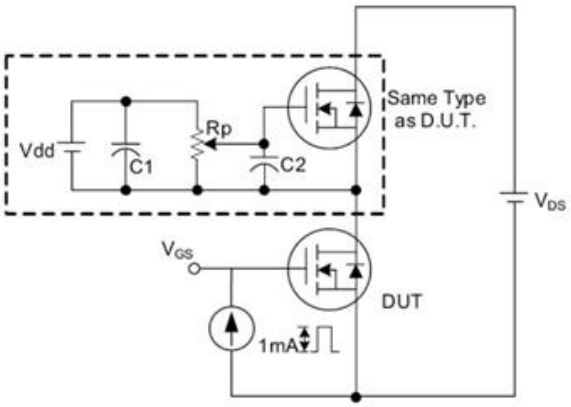


Fig. 3 . 1 Gate Charge Test Circuit

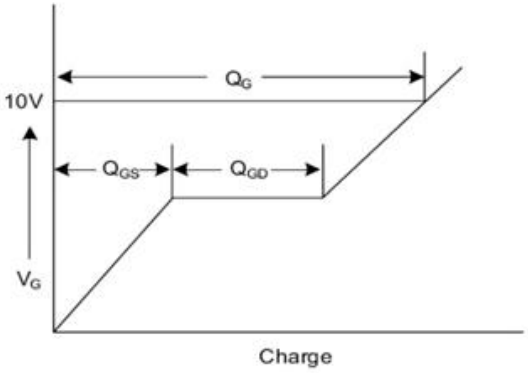


Fig. 3 . 2 Gate Charge Waveform

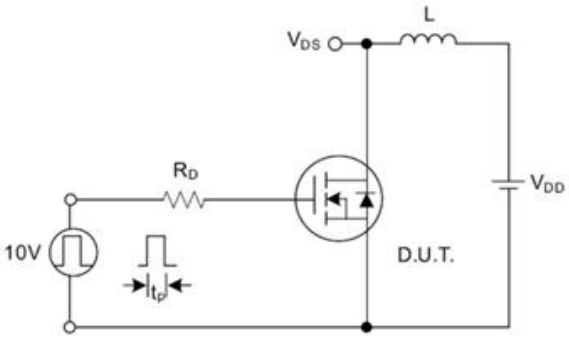


Fig. 4.1 Unclamped Inductive Switching Test Circuit

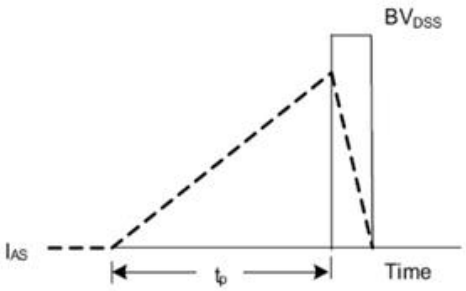


Fig. 4.2 Unclamped Inductive Switching Waveforms