



XTMF100N10E

1000V N-Channel MOSFET

Product Description

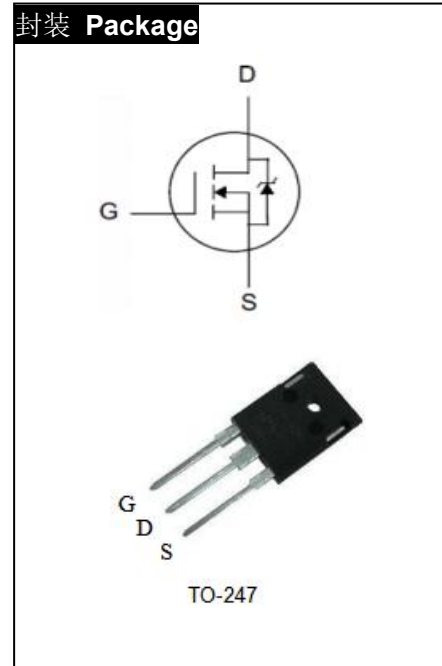
BV_{DSS}	1000	V
I_D	10	A
$R_{DS(ON),Typ.}$	1.0	Ω

General Features

- RoHS Compliant
- $R_{DS(ON),typ.}=1.0\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

Applications

- Adaptor
- Charger
- SMPS Standby Power



Device	Package	Marking
XTMF100N10E	TO-247	XTMF100N10E

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	1000	V
V_{GSS}	Gate-to-Source Voltage	± 30	
I_D	Continuous Drain Current	10	A
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$	40	
E_{AS}	Single Pulse Avalanche Energy	900	mJ
P_D	Power Dissipation	298	W
	Derating Factor above 25°C	2.38	W/ $^\circ\text{C}$
T_L	Maximum Temperature for Soldering Leads at 0.063in (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	0.42	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	55	$^{\circ}C/W$

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

OFF Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
BV_{DSS}	Drain-to-Source Breakdown Voltage	1000	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	uA	$V_{DS}=1000V, V_{GS}=0V$
		--	--	100		$V_{DS}=800V, V_{GS}=0V, T_J=125^{\circ}C$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	$V_{GS}=+30V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	1.0	1.25	Ω	$V_{GS}=10V, I_D=5A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.5	--	4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	Forward Transconductance	--	7.0	--	S	$V_{DS}=15V, I_D=5A$

**Dynamic Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	--	2800	--	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$
C_{rss}	Reverse Transfer Capacitance	--	45	--		
C_{oss}	Output Capacitance	--	250	--		
Q_g	Total Gate Charge	--	72	--	nC	$V_{DD}=500V$, $I_D=10A$, $V_{GS}=0$ to 10V
Q_{gs}	Gate-to-Source Charge	--	16	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	30	--		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	45	-	nS	$V_{DD}=500V$, $I_D=10A$, $V_{GS}=10V$ $R_g=9.1\ \Omega$
t_{rise}	Rise Time	-	48	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	57	-		
t_{fall}	Fall Time	-	52	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current ^[1]	--	--	10	A	Integral PN-diode in MOSFET
I_{SM}	Pulsed Source Current ^[1]	--	--	40		
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_S=10A$, $V_{GS}=0V$
t_{rr}	Reverse Recovery Time	--	850	--	ns	$V_{GS}=0V$ $I_F=10A$, $di_F/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	--	4.4	--	uC	

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



Typical Characteristics

Fig. 1 Output Characteristics

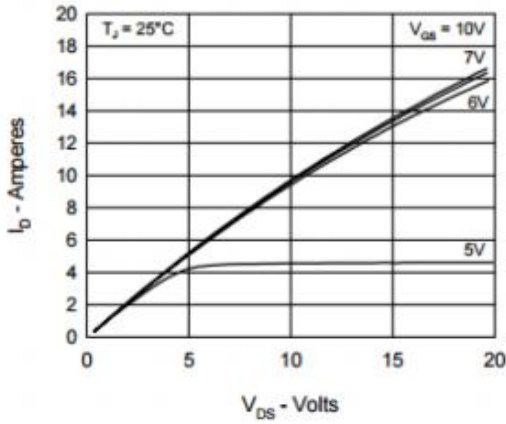


Fig. 2 Input Admittance

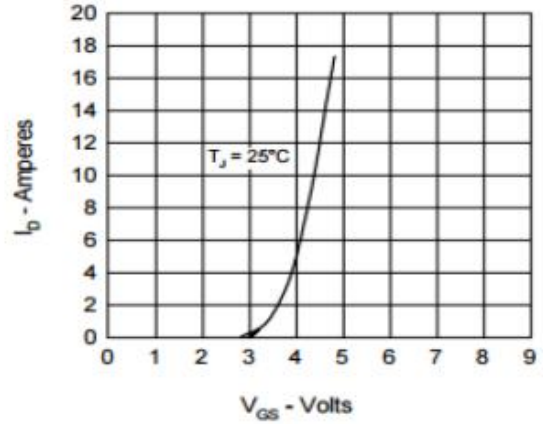


Fig. 3 $R_{DS(on)}$ vs. Drain Current

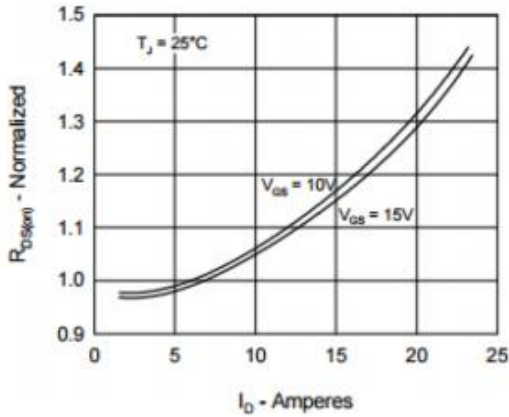


Fig. 4 Temperature Dependence of Drain to Source Resistance

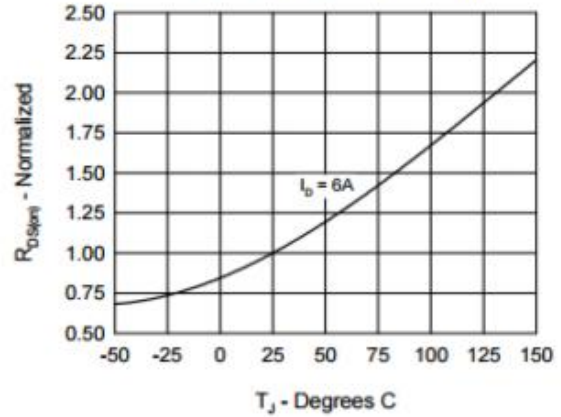


Fig. 5 Drain Current vs. Case Temperature

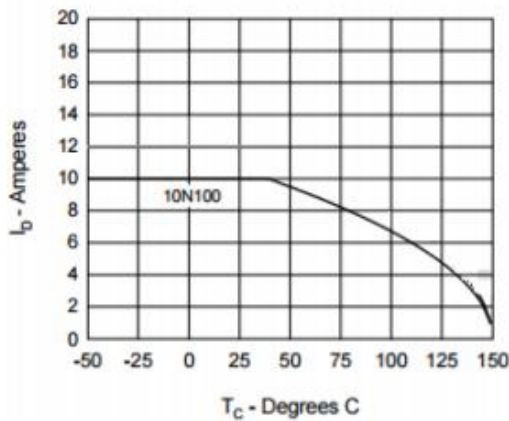
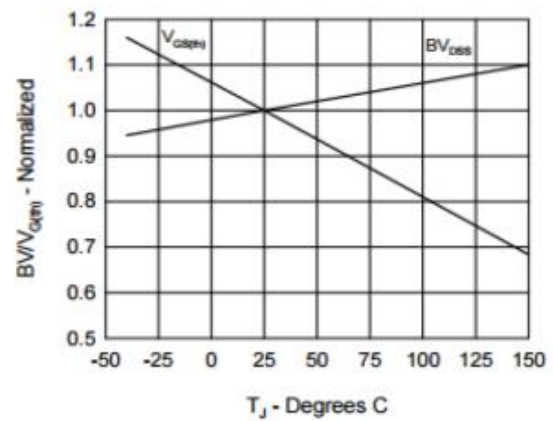


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage





Typical Characteristics

Fig.7 Gate Charge Characteristic Curve

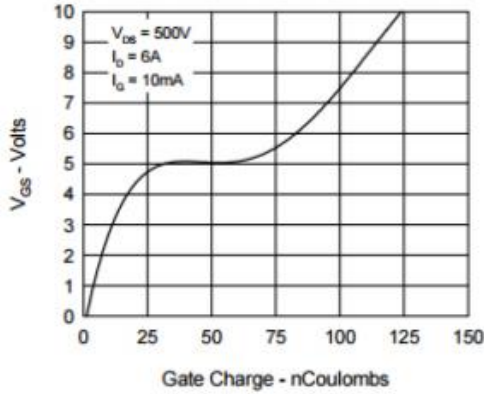


Fig.8 Forward Bias Safe Operating Area

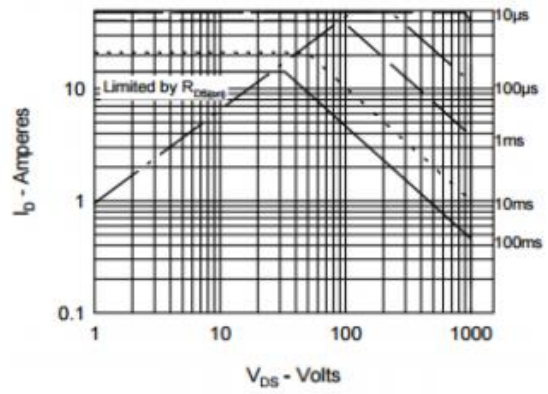


Fig.9 Capacitance Curves

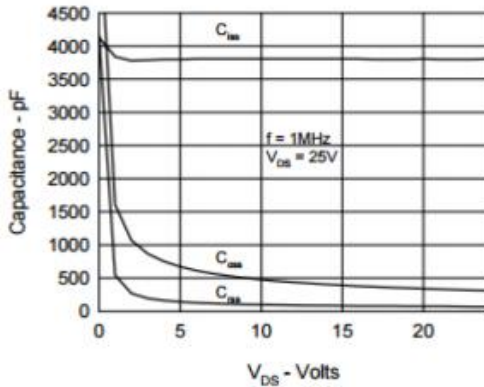


Fig.10 Source Current vs. Source to Drain Voltage

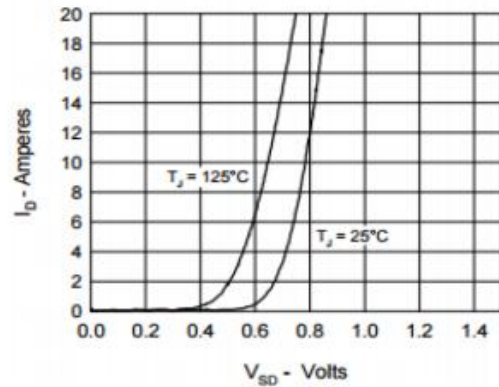
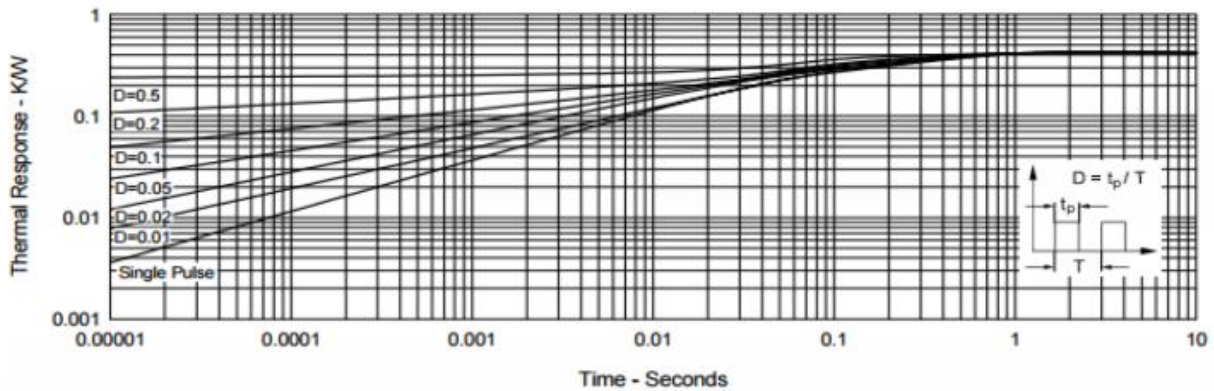


Fig.11 Transient Thermal Impedance





Test Circuits and Waveforms (Cont.)

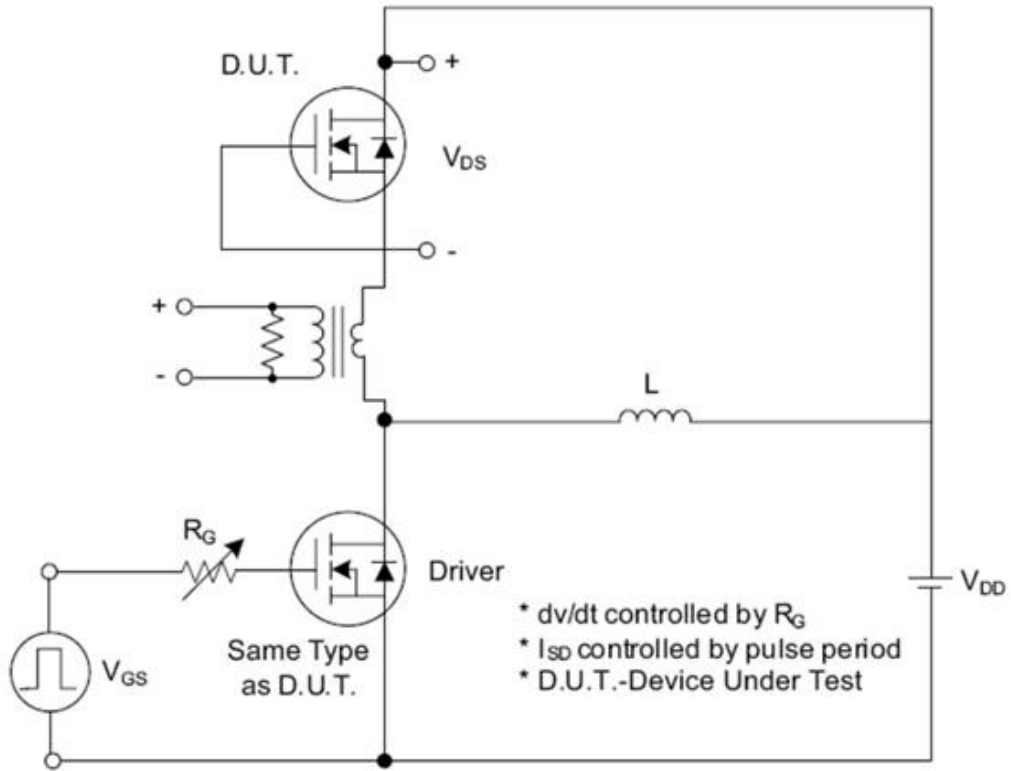


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

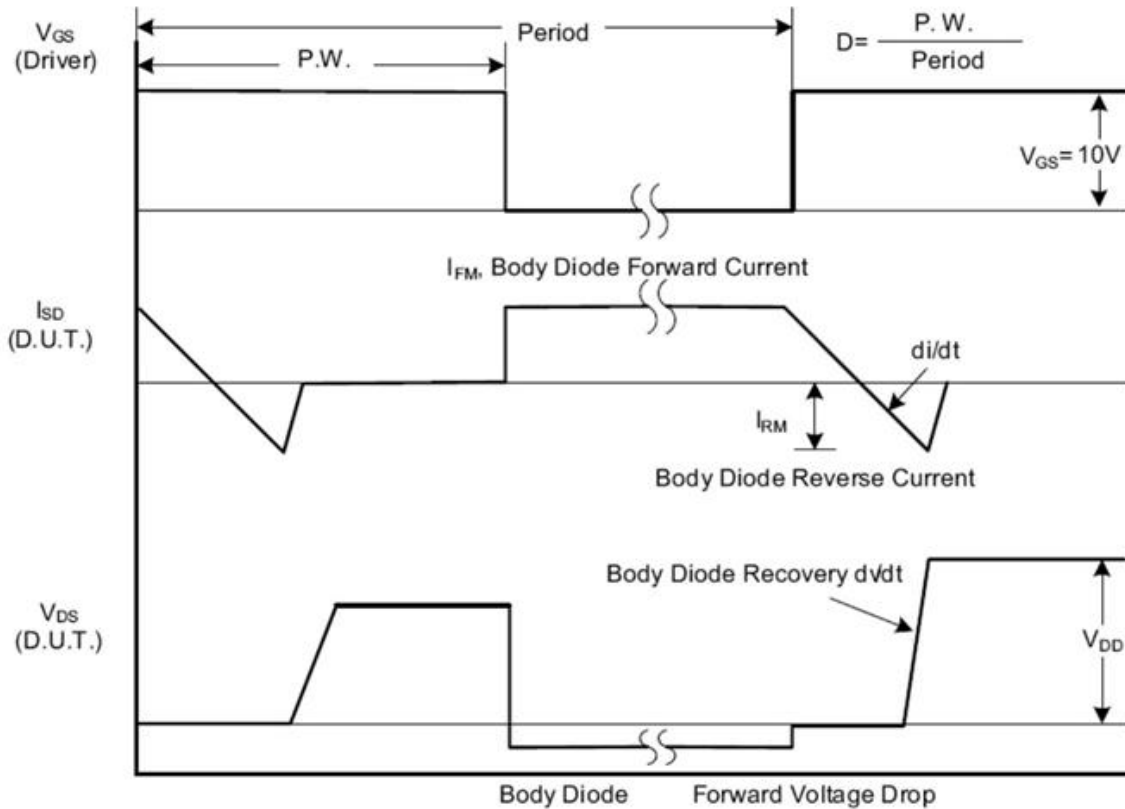


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms



Test Circuits and Waveforms (Cont.)

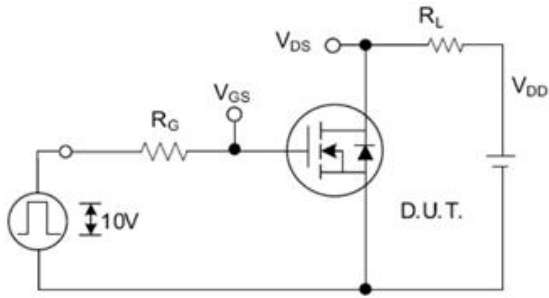


Fig. 2.1 Switching Test Circuit

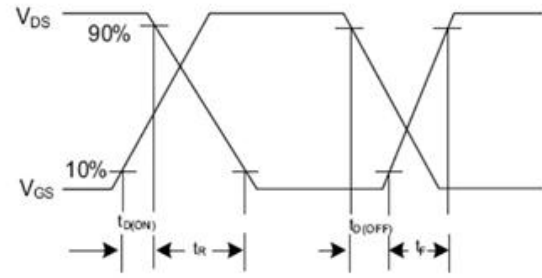


Fig. 2.2 Switching Waveforms

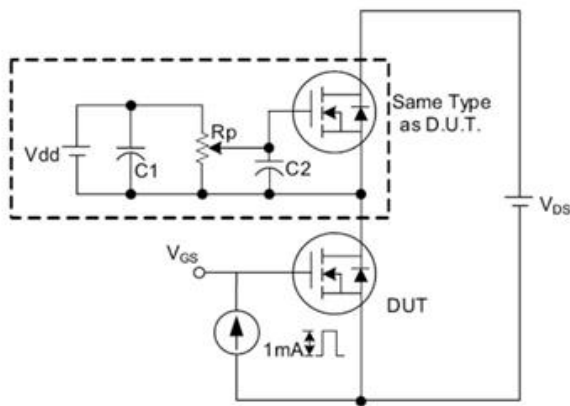


Fig. 3.1 Gate Charge Test Circuit

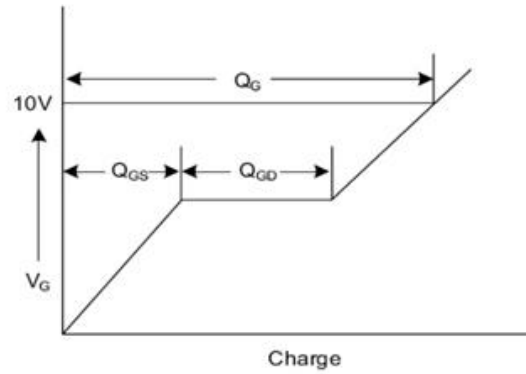


Fig. 3.2 Gate Charge Waveform

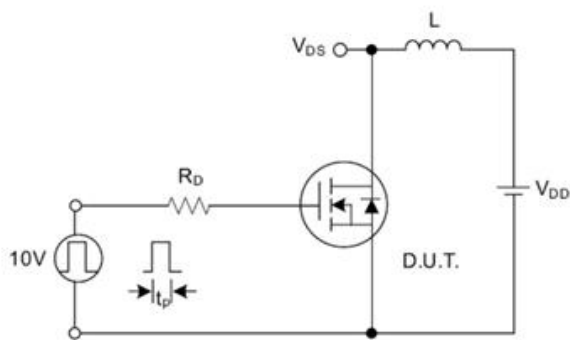


Fig. 4.1 Unclamped Inductive Switching Test Circuit

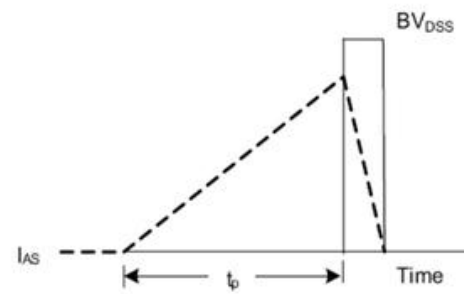


Fig. 4.2 Unclamped Inductive Switching Waveforms