



XTMF30N59E

300V N-Channel MOSFET

Product Description

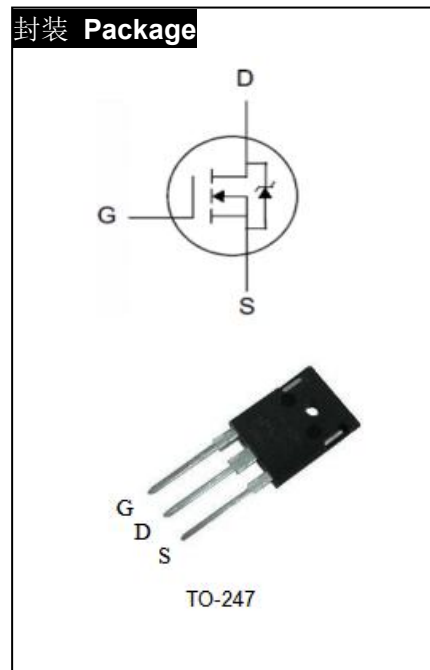
BV_{DSS}	300	V
I_D	59	A
$R_{DS(ON), Typ.}$	29	m Ω

General Features

- ESD Improved Capability
- $R_{DS(ON), typ.} = 29 \text{ m}\Omega @ V_{GS} = 10V$
- Low Gate Charge Minimize Switching Loss
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications

- Power switch circuit of POWER



Device	Package	Marking
XTMF30N59E	TO-247	XTMF30N59E

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	300	V
V_{GSS}	Gate-to-Source Voltage	± 30	
I_D	Continuous Drain Current	59	A
	Continuous Drain Current @ $T_c = 100^\circ\text{C}$	35	
I_{DM}	Pulsed Drain Current at $V_{GS} = 10V$	236	
E_{AS}	Single Pulse Avalanche Energy	3600	mJ
P_D	Power Dissipation	500	W
	Derating Factor above 25°C	4	W/ $^\circ\text{C}$
T_L	Maximum Temperature for Soldering	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	0.25	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	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	300	-	-	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	μA	$V_{DS}=300\text{V}, V_{GS}=0\text{V}$
		-	-	100		$V_{DS}=240\text{V}, V_{GS}=0\text{V}, T_j=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	-	-	+100	nA	$V_{GS}=+30\text{V}, V_{DS}=0\text{V}$
		-	-	-100		$V_{GS}=-30\text{V}, V_{DS}=0\text{V}$

ON Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	29	36	$\text{m}\Omega$	$V_{GS}=10\text{V}, I_D=30\text{A}$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	-	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
gfs	Forward Transconductance	-	55	-	S	$V_{DS}=30\text{V}, I_D=30\text{A}$

**Dynamic Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
C_{iss}	Input Capacitance	-	5300	-	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$
C_{rSS}	Reverse Transfer Capacitance	-	80	-		
C_{OSS}	Output Capacitance	-	730	-		
Q_g	Total Gate Charge	-	120	-	nC	$V_{DD}=150V$, $I_D=30A$, $V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	-	22	-		
Q_{gd}	Gate-to-Drain (Miller) Charge	-	45	-		

Resistive Switching Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
$t_{d(ON)}$	Turn-on Delay Time	-	160	-	nS	$V_{DD}=150V$, $I_D=30A$, $V_{GS}=10V$ $R_g=25\Omega$
t_{rise}	Rise Time	-	560	-		
$t_{d(OFF)}$	Turn-Off Delay Time	-	240	-		
t_{fall}	Fall Time	-	200	-		

Source-Drain Body Diode Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Test Condition
I_{SD}	Continuous Source Current ^[1]	-	-	59	A	Integral PN-diode in MOSFET
I_{SM}	Pulsed Source Current ^[1]	-	-	236		
V_{SD}	Diode Forward Voltage	-	-	1.5	V	$I_S=30A$, $V_{GS}=0V$
t_{rr}	Reverse Recovery Time	-	360	-	ns	$V_{GS}=0V$ $I_S=30A$, $di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	7.2	-	uC	

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



Typical Characteristics

Figure 1. On-Region Characteristics

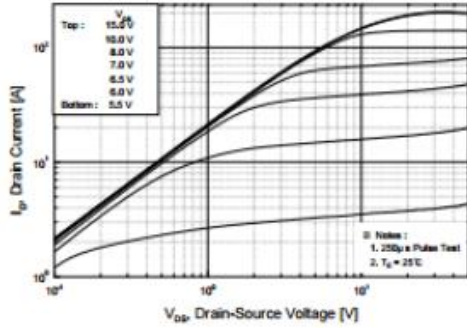


Figure 2. Transfer Characteristics

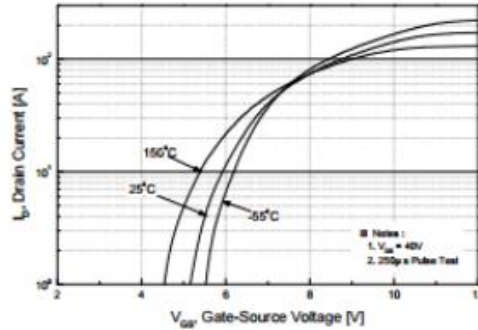


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

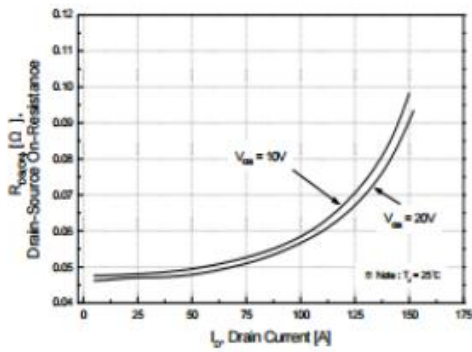


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

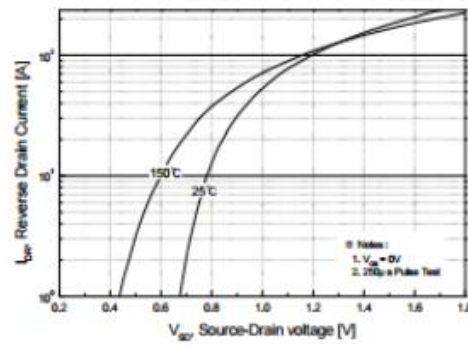


Figure 5. Capacitance Characteristics

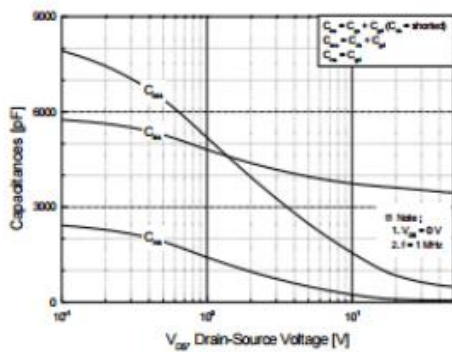
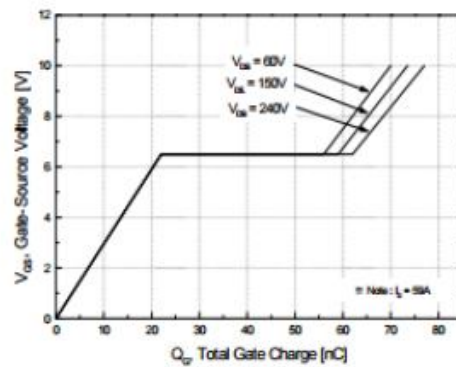


Figure 6. Gate Charge Characteristics





Typical Characteristics(Cont.)

Figure 7. Breakdown Voltage Variation vs. Temperature

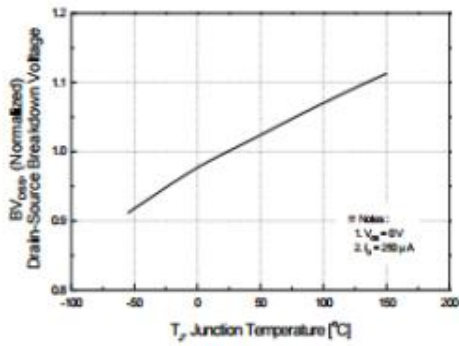


Figure 8. On-Resistance Variation vs. Temperature

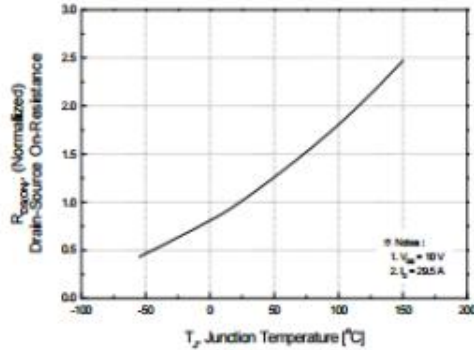


Figure 9. Maximum Safe Operating Area

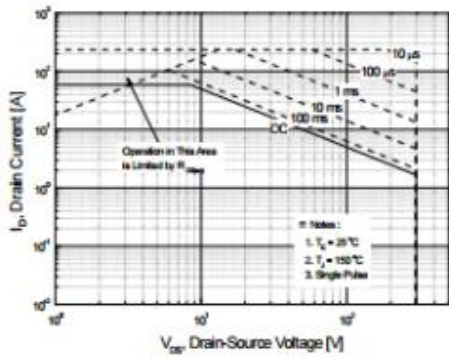


Figure 10. Maximum Drain Current vs. Case Temperature

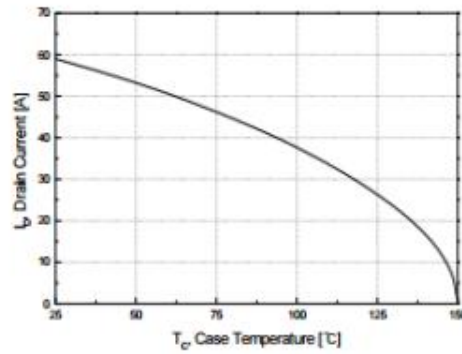


Figure 11. Transient Thermal Response Curve

