800V N-Channel Power MOSFET

FEATURES

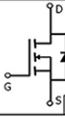
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Parameters Summary

VDS:*800V* ID (at VGS=10V) :*50A* Rds(on) (at VGS=10V):*120mΩ(Typ.)*



Symbol

XBP50N80FX

Device Ordering Marking Packing Information

Ordering Number	Package	Marking	Packing
XBP50N80FX	SOT-227	XBP50N80FX	Tube

SMD Device Halogen Free

Pb-free

RoHS COMPLIANT

Absolute Maximum Ratings T_C = 25°C, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)		V_{DSS}	800	V
Continuous Drain Current		I_D	50	A
Pulsed Drain Current	(note1)	I_{DM}	200	A
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulse Avalanche Energy	(note2)	E_{AS}	4500	mJ
Repetitive Avalanche Energy	(note1)	E_{AR}	60	mJ
Power Dissipation (T_C = 25°C)		P_D	690	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	°C

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

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	0.18	°C/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	40	

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =800, V_{GS} = 0V, T_J = 25ºC	--	--	1.0	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5	--	4.5	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A	--	120	130	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	14600	--	pF
Output Capacitance	C_{oss}		--	1300	--	
Reverse Transfer Capacitance	C_{rss}		--	66	--	
Total Gate Charge	Q_g	V_{DD} = 400V, I_D = 50A, V_{GS} = 10V	--	360	--	nC
Gate-Source Charge	Q_{gs}		--	80	--	
Gate-Drain Charge	Q_{gd}		--	120	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D = 50A, R_G = 10 Ω	--	110	--	ns
Turn-on Rise Time	t_r		--	200	--	
Turn-off Delay Time	$t_{d(off)}$		--	160	--	
Turn-off Fall Time	t_f		--	185	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 °C	--	--	50	A
Pulsed Diode Forward Current	I_{SM}		--	--	400	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 25A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = 50A, di_F/dt =100A /μs	--	520	--	ns
Reverse Recovery Charge	Q_{rr}		--	5.0	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Figure 1. Maximum Transient Thermal Impedance

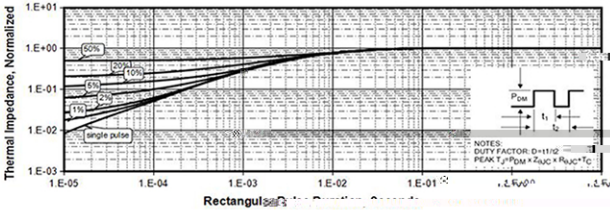


Figure 2 . Maximum Power Dissipation vs Tc

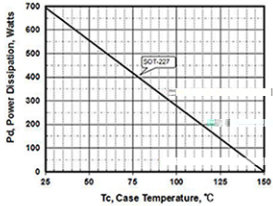


Figure 3 .Maximum Continuous Drain Current vs Tc

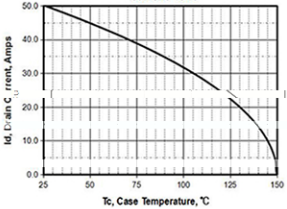


Figure 4. Output Characteristics

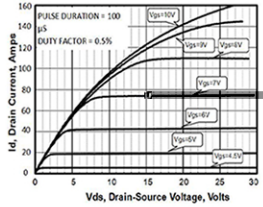


Figure 5. Rds(on) vs Gate Voltage

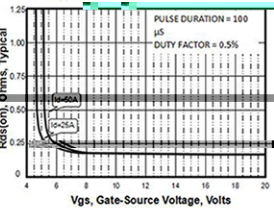


Figure 6. Peak Current Capability

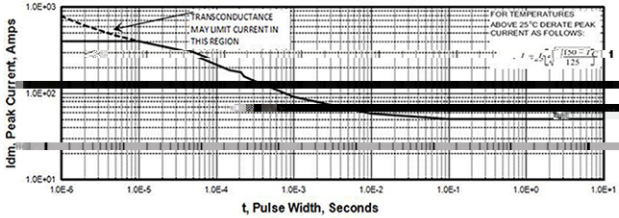


Figure 7. Transfer Characteristics

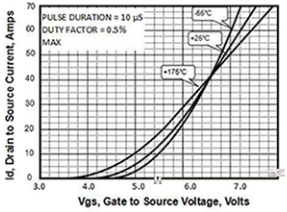


Figure 8. Unclamped Inductive Switching Capability

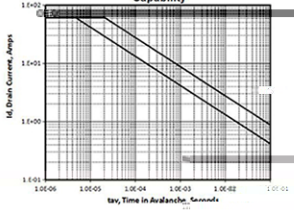


Figure 9. Drain to Source ON Resistance vs Drain Current

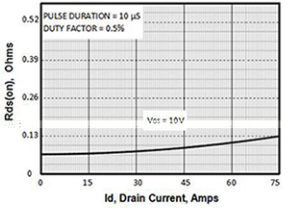


Figure 10. Rdson vs Junction Temperature

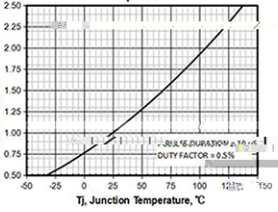


Figure 11. Breakdown Voltage vs Temperature

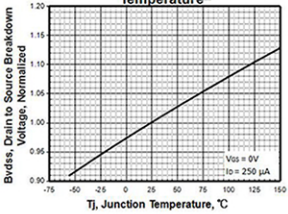


Figure 12. Threshold Voltage vs Temperature

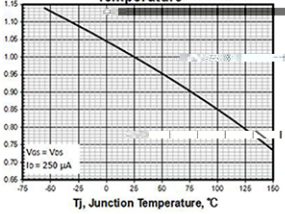


Figure 13 . Maximum Safe Operating Area

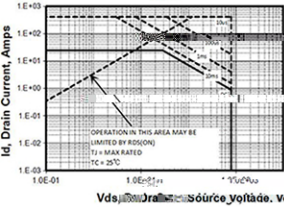


Figure 14. Capacitance vs Vds

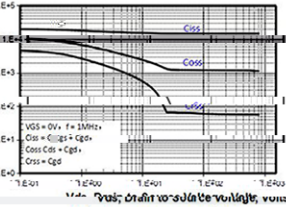


Figure 15 .Typical Gate Charge

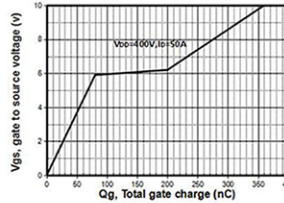
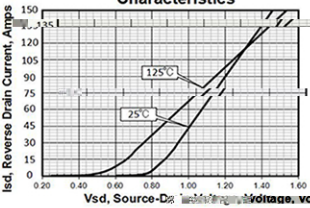


Figure 16.Body Diode Transfer Characteristics



TEST CIRCUITS AND WAVEFORMS

Figure A：Gate Charge Test Circuit and Waveform

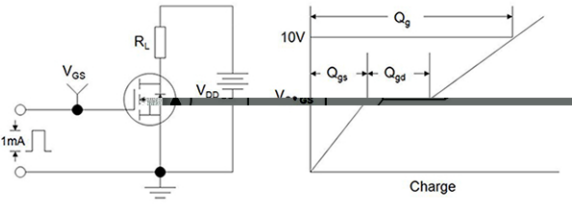


Figure B：Resistive Switching Test Circuit and Waveform

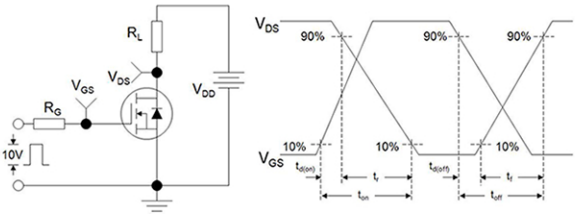


Figure C：Unclamped Inductive Switching Test Circuit and Waveforms