

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



Absolute Maximum Ratings $T_C = 25^{\circ}\text{C}$, unless otherwise noted

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

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	$R_{\theta JC}$	0.18	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	40	

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)OSS}$	$V_{GS} = 0V, I_D = 250\mu A$	800	--	--	V
Zero Gate Voltage Drain Current	I_{OSS}	$V_{DS} = 800, V_{GS} = 0V, T_J = 25^\circ C$	--	--	1.0	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 30V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 250V, I_D = 250\mu A$	4.5	--	4.5	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 25A$	--	120	130	m Ω
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	$V_{DS} = 100V, I_D = 50A,$ $V_{GS} = 10V$	--	360	--	nC
Gate-Source Charge	Q_{gs}		--	110	--	
Gate-Drain Charge	Q_{gd}		--	120	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 100V, I_D = 50A,$ $R_G = 10\Omega$	--	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	$T_J = 25^\circ C$	--	--	50	A
Pulsed Diode Forward Current	I_{SM}		--	--	400	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 25A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_S = 30A,$ $di/dt = 100A/\mu s$	--	520	--	ns
Reverse Recovery Charge	Q_{rr}		--	5.0	--	nC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $V_{DS} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Figure 1. Maximum Transient Thermal Impedance

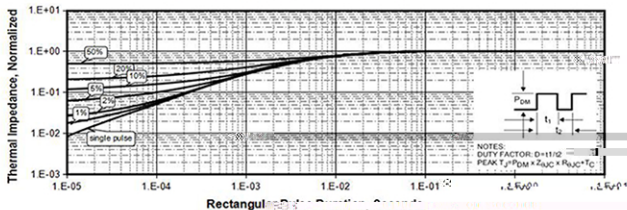


Figure 2. Maximum Power Dissipation vs T_C

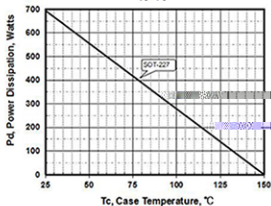


Figure 3. Maximum Continuous Drain Current vs T_C

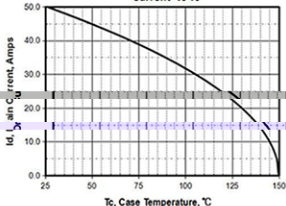


Figure 4. Output Characteristics

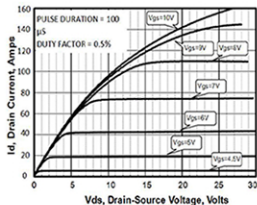


Figure 5. $R_{DS(on)}$ vs Gate Voltage

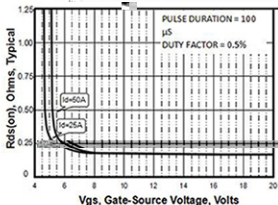


Figure 6. Peak Current Capability

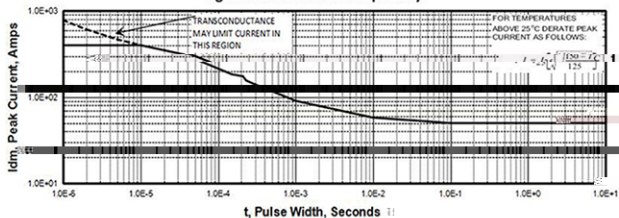


Figure 7. Transfer Characteristics

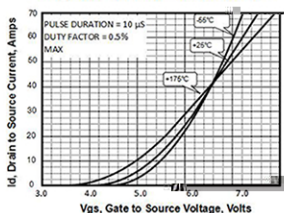


Figure 8. Unclamped Inductive Switching Capability

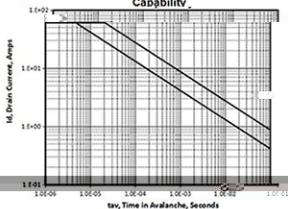


Figure 9. Drain to Source ON Resistance vs Drain Current

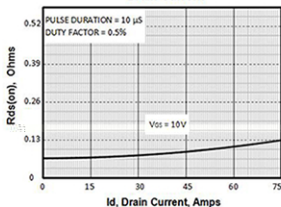


Figure 10. Rds(on) vs Junction Temperature

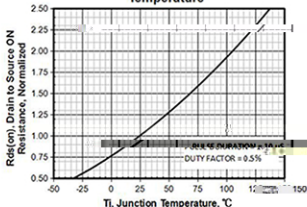


Figure 11. Breakdown Voltage vs. Temperature

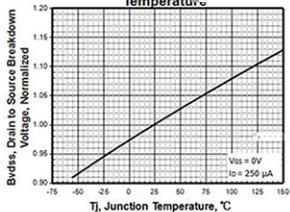


Figure 13. Maximum Safe Operating Area

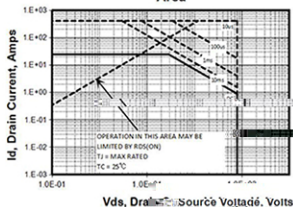


Figure 15. Typical Gate Charge

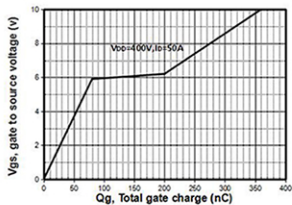


Figure 12. Threshold Voltage vs. Temperature

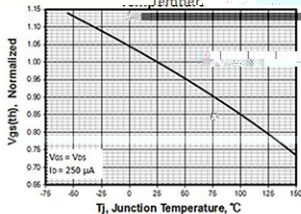


Figure 14. Capacitance vs Vds

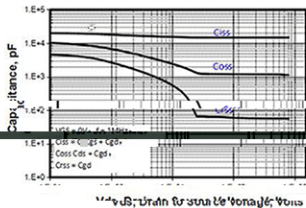
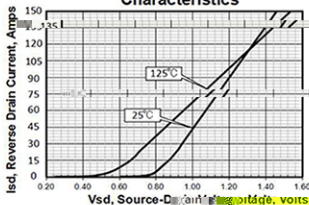


Figure 16. Body Diode Transfer Characteristics



TEST CIRCUITS AND WAVEFORMS

Figure A: Gate Charge Test Circuit and Waveform

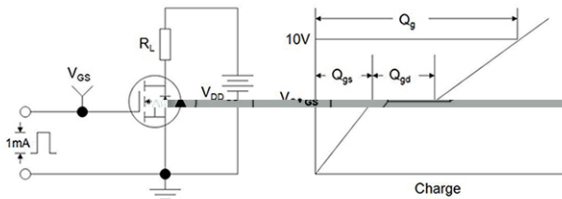


Figure B: Resistive Switching Test Circuit and Waveform

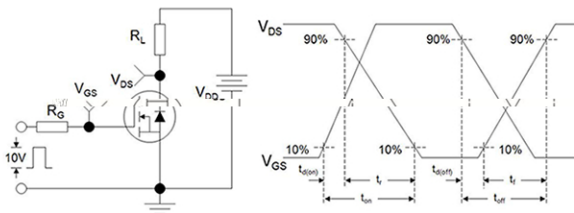


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

