XPX50N06FD

60V N-Channel Enhancement Mode MOSFET

RoHS COMPLIANT

■ *DESCRIPTION*

The XPX50N06FD is N channel enhancement mode power effect transitor which is produced using high cell density advanced trench technology.

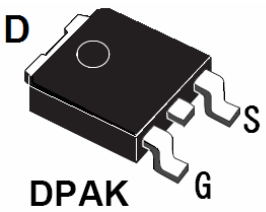
The high density process is especially able to minize on-state resistance.These devices are. especially suited for low voltage application power management DC-DC converters.

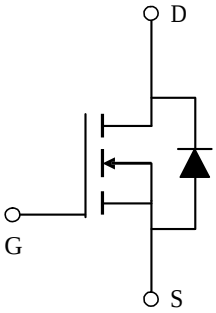
■ *APPLICATIONS*

- Power Management
- DC/DC Converter
- Load Switch

■ *FEATURE*

- ***60V/50 A, $R_{DS(ON)}$=12mΩ(typ.)@VGS= 10V***
- Super high design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and Maximum DC current capability
- Full RoHS compliance
- TO252 package design
- 100% UIS Tested
- 100% Rg tested





Device Marking and Package Information		
Device	**Package**	**Marking**
XPX50N06FD	TO-252	50N06

■ *ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ Unless otherwise noted)*

Symbol	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_A = 25℃	Continuous Drain Current, V_{GS} @ 10V	50	A
I_D @ T_A = 100℃	Continuous Drain Current, V_{GS} @ 10V	30	
I_D @ $T_{C(Bottom)}$ = 25℃	Continuous Drain Current, V_{GS} @ 10V	50	
I_D @ $T_{C(Bottom)}$ = 100℃	Continuous Drain Current, V_{GS} @ 10V	35	
I_D @ T_C = 25℃	Continuous Drain Current, V_{GS} @ 10V (Package Limited)	40	
I_{DM}	Pulsed Drain Current	90	
P_D @T_A = 25℃	Power Dissipation	2.1	W
P_D @$T_{C(Bottom)}$ = 25℃	Power Dissipation	20	
	Linear Derating Factor	0.03	W/℃
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	℃

Thermal Resistance			
Parameter	**Symbol**	**Value**	**Unit**
Thermal Resistance, Junction-to-Case	R_{thJC}	2.1	°C/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	

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	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		V_{DS} = 60V, V_{GS} = 0V, T_J = 150ºC	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.1	--	2.5	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	12	15	mΩ
		V_{GS} = 4.5V, I_D = 18A	--	15	19	
Forward Transconductance (Note3)	g_{fs}	V_{DS} = 5V, I_D = 20A	--	100	--	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V, f = 1.0MHz	--	1134	--	pF
Output Capacitance	C_{oss}		--	123	--	
Reverse Transfer Capacitance	C_{rss}		--	12	--	
Total Gate Charge	Q_g(10V)	V_{DD} = 30V, I_D = 20A, V_{GS} = 10V	--	21	--	nC
	Q_g(4.5V)		--	11	--	
Gate-Source Charge	Q_{gs}		--	3.1	--	
Gate-Drain Charge	Q_{gd}		--	5.1	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 30V, I_D = 20A, R_G = 3Ω	--	7	--	ns
Turn-on Rise Time	t_r		--	3	--	
Turn-off Delay Time	$t_{d(off)}$		--	20	--	
Turn-off Fall Time	t_f		--	3	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	30	A
Pulsed Diode Forward Current	I_{SM}		--	--	90	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 1A, V_{GS} = 0V	--	0.72	1	V
Reverse Recovery Time	t_{rr}	I_F = 20A, di_F/dt = 500A/μs	--	17	--	ns
Reverse Recovery Charge	Q_{rr}		--	60	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. I_{AS} = 20A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

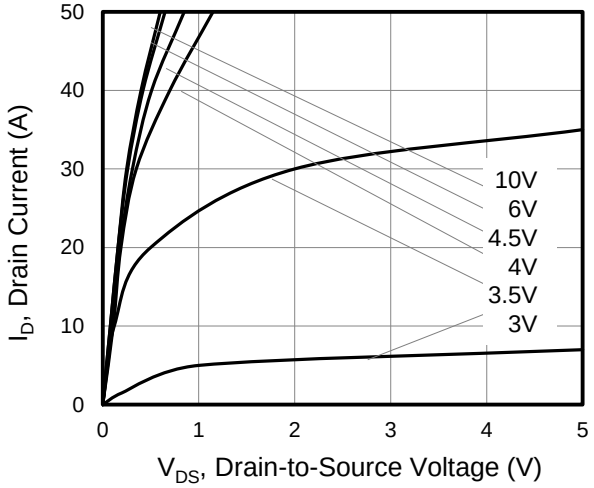


Figure 2. Transfer Characteristics

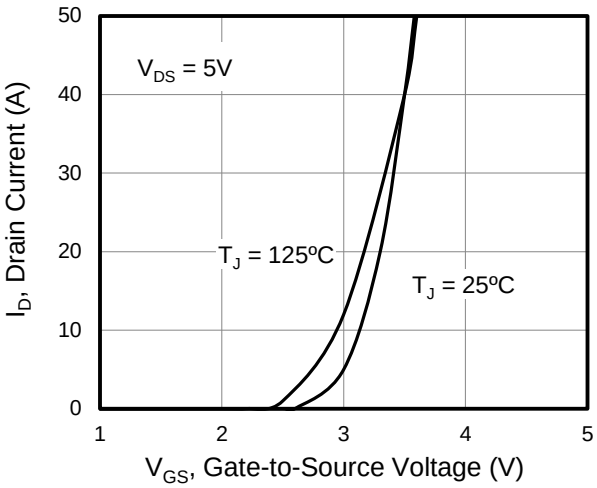


Figure 3. On-Resistance vs. Drain Current

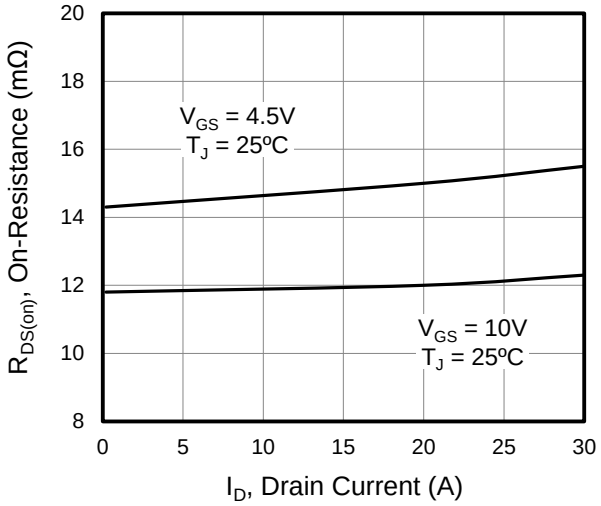


Figure 4. Capacitance

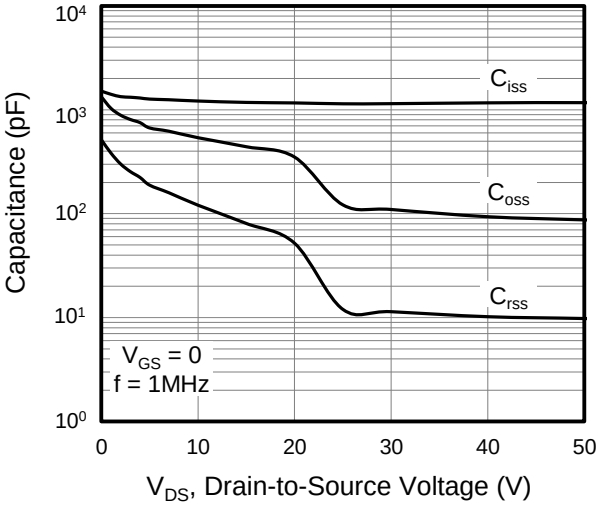


Figure 5. Gate Charge

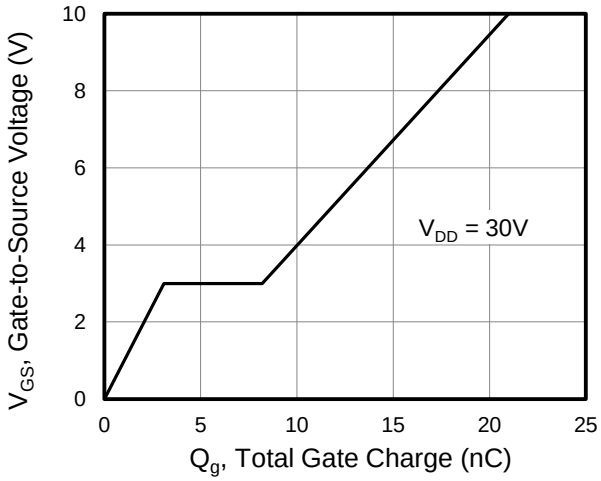
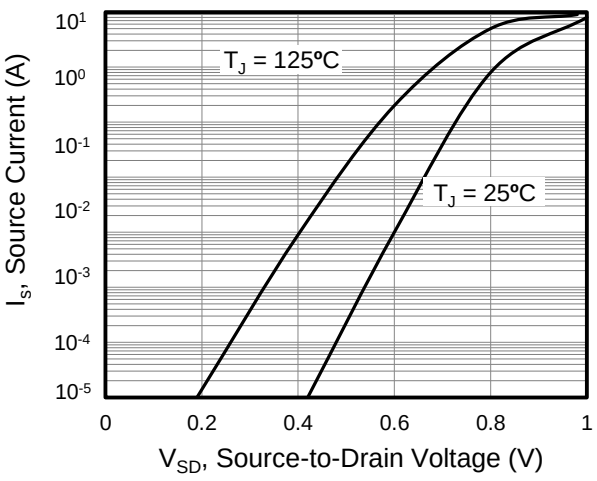


Figure 6. Body Diode Forward Voltage



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. On-Resistance vs. Junction Temperature

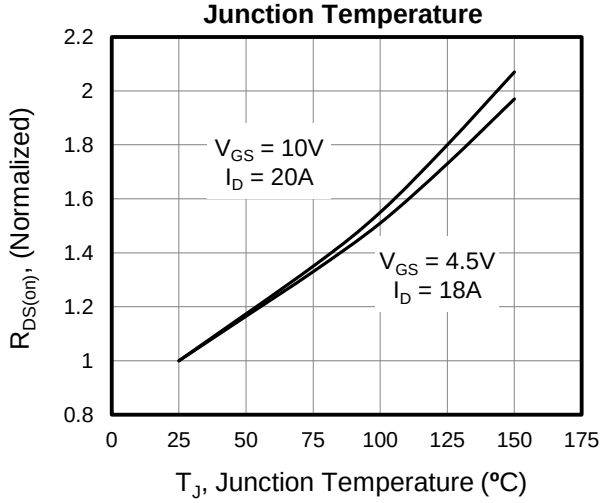


Figure 8. Threshold Voltage vs. Junction Temperature

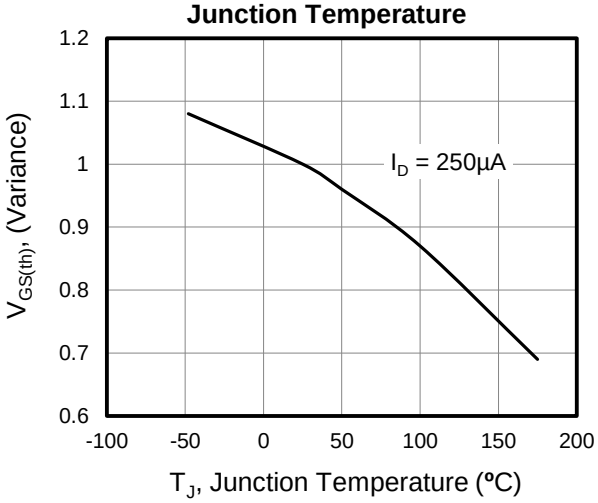


Figure 9. Transient Thermal Impedance

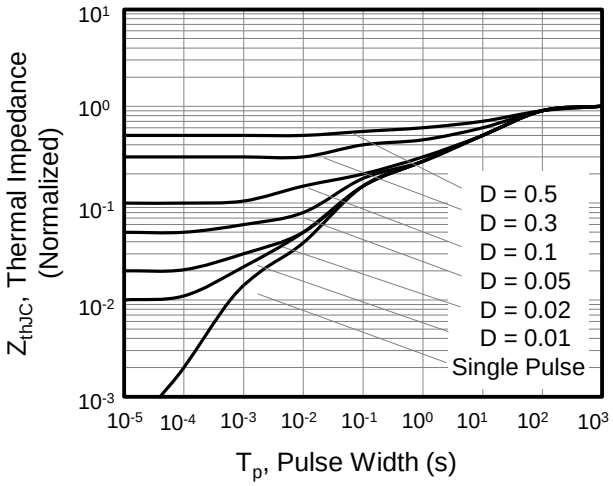


Figure A：Gate Charge Test Circuit and Waveform

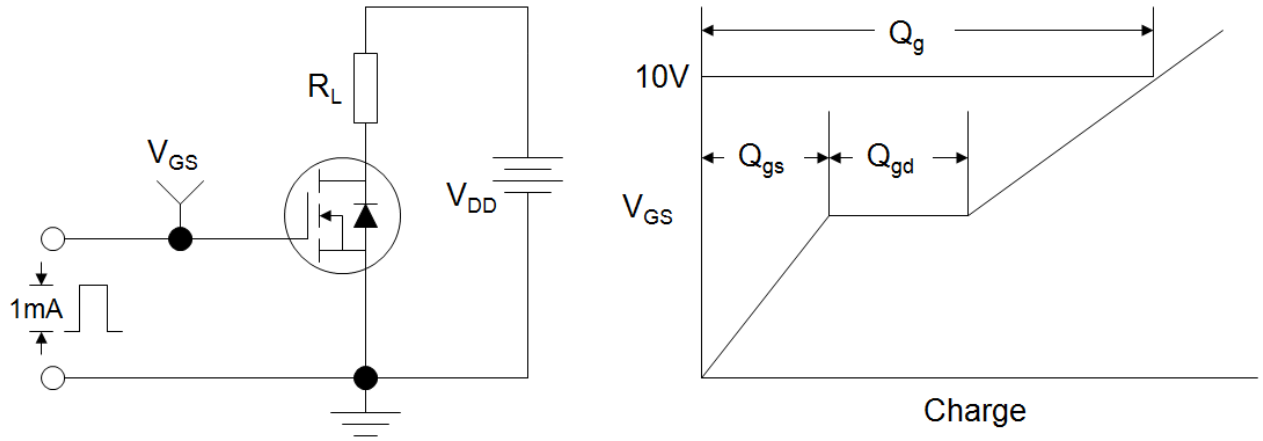


Figure B：Resistive Switching Test Circuit and Waveform

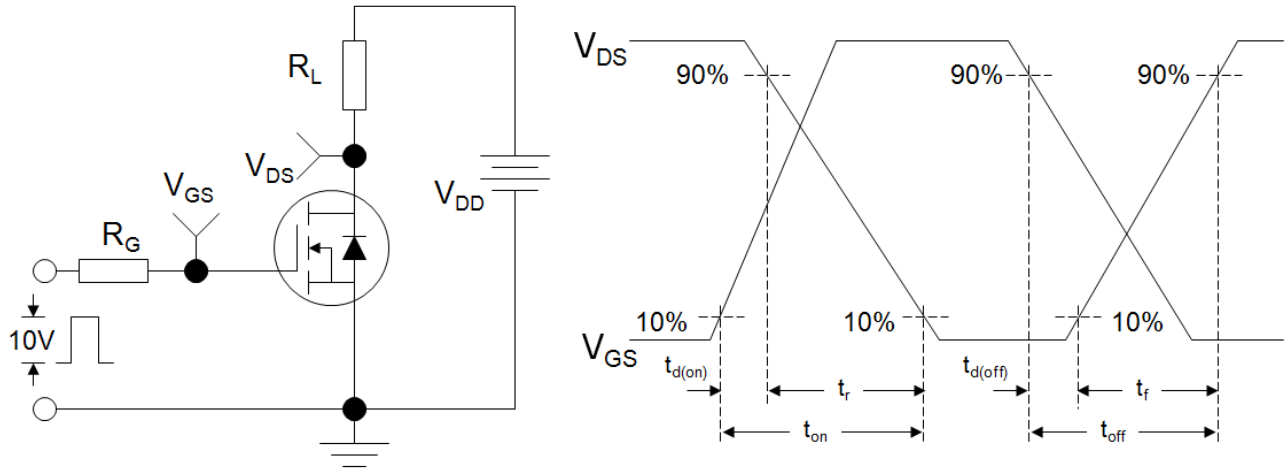
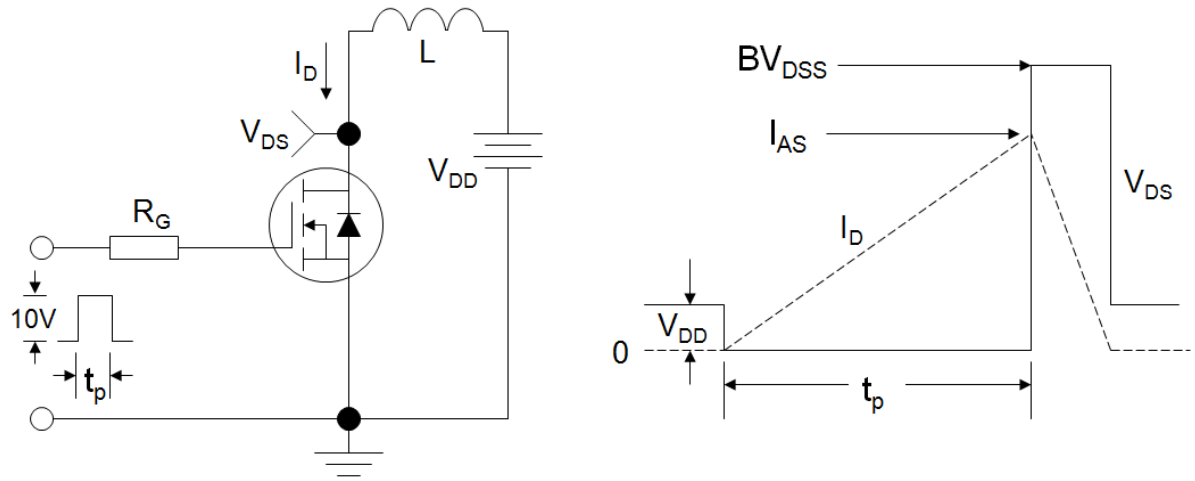
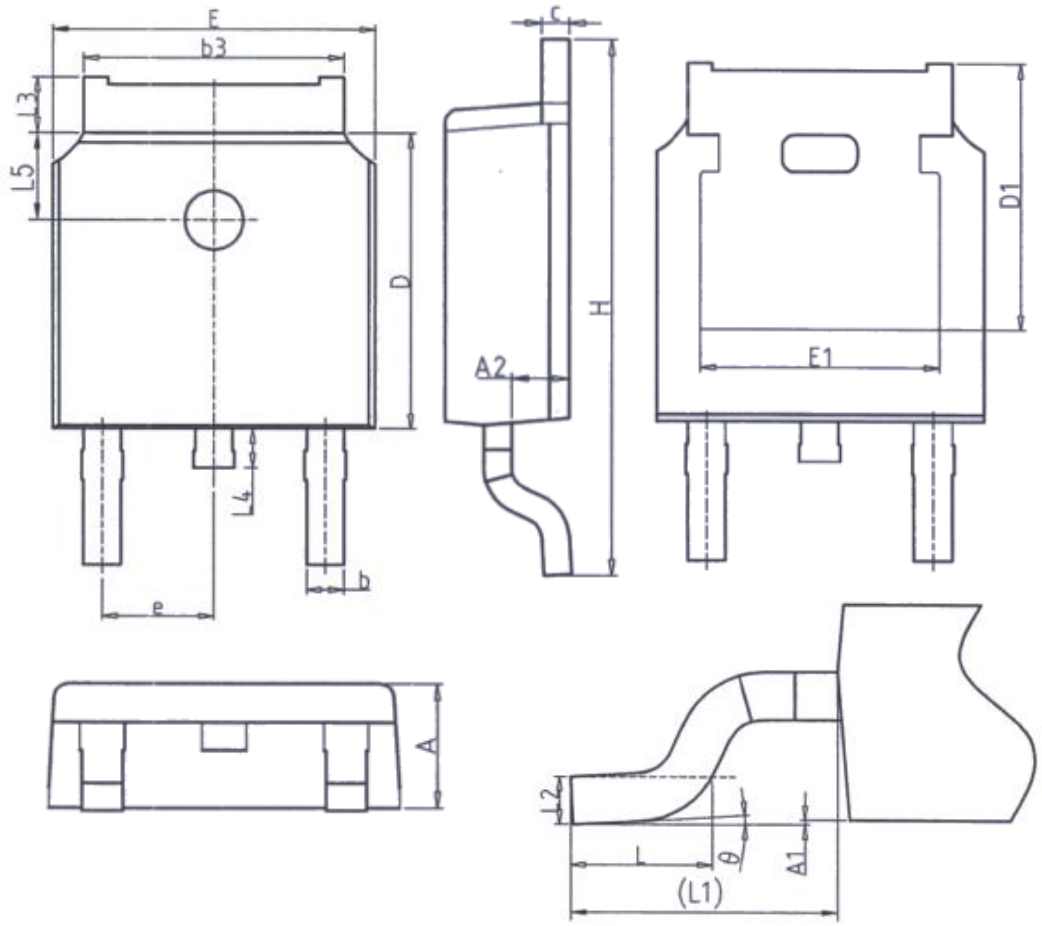


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



TO-252



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	–

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	–	1.00
L5	1.65	1.95
θ	0°	8°