

November 2013

FDP032N08B

N-Channel PowerTrench[®] MOSFET 80 V, 211 A, 3.3 m Ω

Features

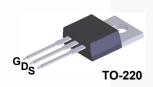
- $R_{DS(on)}$ = 2.85 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 50 A
- Low FOM R_{DS(on)} * Q_G
- · Low Reverse-Recovery Charge, Qrr
- · Soft Reverse-Recovery Body Diode
- Enables High Efficiency in Synchronous Rectification
- · Fast Switching Speed
- · 100% UIL Tested
- RoHS Compliant

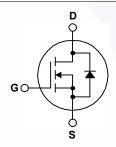
Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- · Battery Protection Circuit
- · Motor Drives and Uninterruptible Power Supplies
- Renewable System





MOSFET Maximum Ratings T_C = 25°C unless otherwise noted.

Symbol		Parameter	FDP032N08B_F102	Unit
V_{DSS}	Drain to Source Voltage		80	V
V_{GSS}	Gate to Source Voltage		±20	V
		- Continuous (T _C = 25°C, Silicon Limited)	211*	
I _D	Drain Current	- Continuous (T _C = 100°C, Silicon Limited)	149*	Α
		- Continuous (T _C = 25°C, Package Limited)	120	
I _{DM}	Drain Current - Pulsed (Note 1)		844	Α
E _{AS}	Single Pulsed Avalanche Energy	Single Pulsed Avalanche Energy (Note 2)		
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	6.0	V/ns
D	Payer Dissipation	$(T_C = 25^{\circ}C)$	263	W
P_{D}	Power Dissipation	- Derate Above 25°C	1.75	W/°C
T _J , T _{STG}	Operating and Storage Temperat	-55 to +175	οС	
TL	Maximum Lead Temperature for	Soldering, 1/8" from Case for 5 Seconds	300	°C

^{*} Package limitation current is 120A.

Thermal Characteristics

Symbol	Parameter FDP032N08B_F102		Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max. 62.5		30/00

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDP032N08B_F102	FDP032N08B	TO-220	Tube	N/A	N/A	50 units

Electrical Characteristics $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
Off Charac	cteristics					
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{V}$	80	-	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	-	0.04	-	V/°C
1	Zero Gate Voltage Drain Current	V _{DS} = 64 V, V _{GS} = 0 V	-	-	1	μА
I _{DSS} Zero	zero Gale voltage Drain Current	$V_{DS} = 64 \text{ V}, T_{C} = 150^{\circ}\text{C}$	-	-	500	μΑ
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V	-	-	±100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{D} = 250 \mu A$	2.5	-	4.5	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 100 A	-	2.85	3.3	$m\Omega$
9 _{FS}	Forward Transconductance	V _{DS} = 10 V, I _D = 100 A	-	168	-	S

Dynamic Characteristics

-							
C _{iss}	Input Capacitance	V 40 V V 0 V		-	8245	10965	pF
Coss	Output Capacitance	$V_{DS} = 40 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHz		-	1250	1660	pF
C _{rss}	Reverse Transfer Capacitance	1 - 1 WH12		-\	28	-	pF
C _{oss(er)}	Energy Related Output Capacitance	V _{DS} = 40 V, V _{GS} = 0 V		- \	2337	-	pF
Q _{g(tot)}	Total Gate Charge at 10V			- \	111	144	nC
Q _{gs}	Gate to Source Gate Charge	V _{DS} = 40 V, I _D = 100 A, V _{GS} = 10 V		-	44	-	nC
Q_{gd}	Gate to Drain "Miller" Charge			-	23	-	nC
V _{plateau}	Gate Plateau Volatge	(No	ote 4)	-	5.6	-	V
Q _{sync}	Total Gate Charge Sync.	V _{DS} = 0 V, I _D = 50 A		-	98.2	-	nC
Q _{oss}	Output Charge	V _{DS} = 40 V, V _{GS} = 0 V		-	114	-	nC
ESR	Equivalent Series Resistance (G-S)	f = 1 MHz		-	2.3	-	Ω

Switching Characteristics

t _{d(on)}	Turn-On Delay Time		-	38	86	ns
t _r	Turn-On Rise Time	$V_{DD} = 40 \text{ V}, I_{D} = 100 \text{ A},$	/ -	44	97	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GS} = 10 \text{ V}, R_G = 4.7 \Omega$	-	71	152	ns
t _f	Turn-Off Fall Time	(Note 4)	-	31	72	ns

Drain-Source Diode Characteristics

I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	211	Α
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	844	Α
V_{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 100 A	-	-	1.3	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, V _{DD} = 40 V, I _{SD} = 100 A,	-	75	// -	ns
Q _{rr}	Reverse Recovery Charge	$dI_{F}/dt = 100 A/\mu s$	-	102	-	nC

Notes

- 1. Repe titive rating: pulse-width limited by maximum junction temperature.
- 2. L = 3 mH, I_{AS} = 20.8 A, starting T_J = 25°C.
- 3. $I_{SD} \le 100$ A, di/dt ≤ 200 A/ μ s, $V_{DD} \le BV_{DSS}$, starting $T_J = 25^{\circ}C$.
- 4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

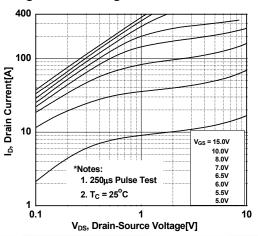


Figure 3. On-Resistance Variation vs.

Drain Current and Gate Voltage

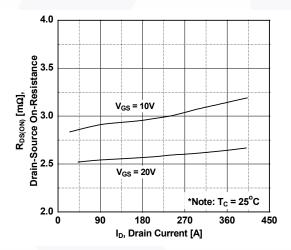


Figure 5. Capacitance Characteristics

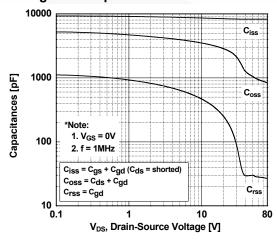


Figure 2. Transfer Characteristics

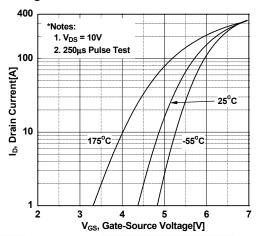


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

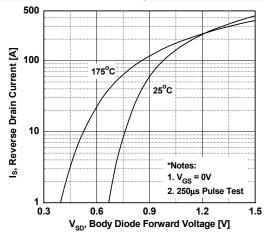
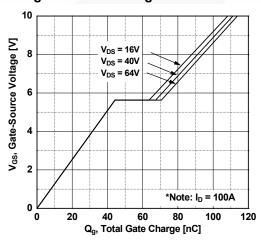


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

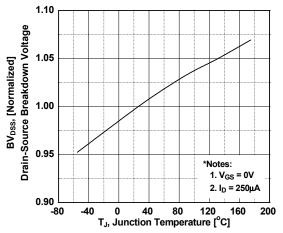


Figure 9. Maximum Safe Operating Area

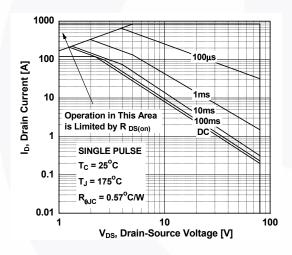


Figure 11. Eoss vs. Drain to Source Voltage

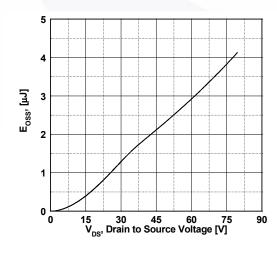


Figure 8. On-Resistance Variation vs. Temperature

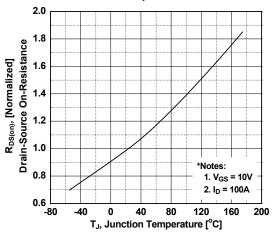


Figure 10. Maximum Drain Current vs. Case Temperature

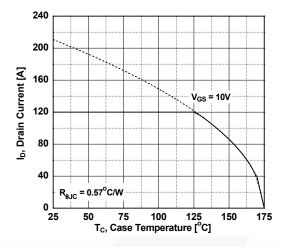
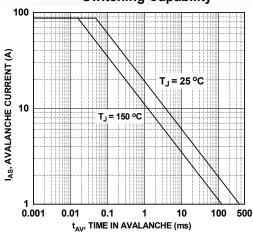
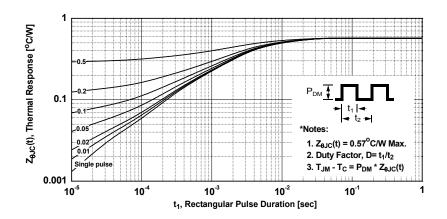


Figure 12. Unclamped Inductive Switching Capability



Typical Performance Characteristics (Continued)





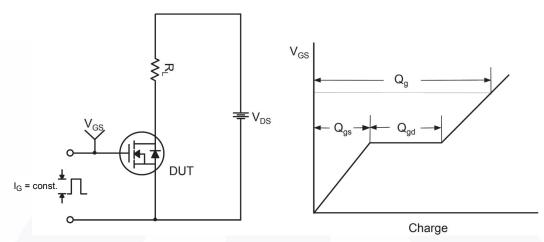


Figure 14. Gate Charge Test Circuit & Waveform

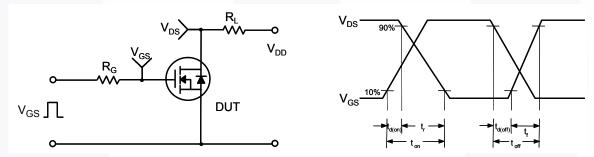


Figure 15. Resistive Switching Test Circuit & Waveforms

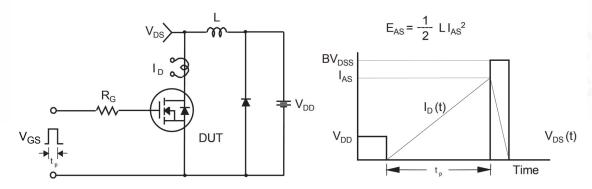


Figure 16. Unclamped Inductive Switching Test Circuit & Waveforms

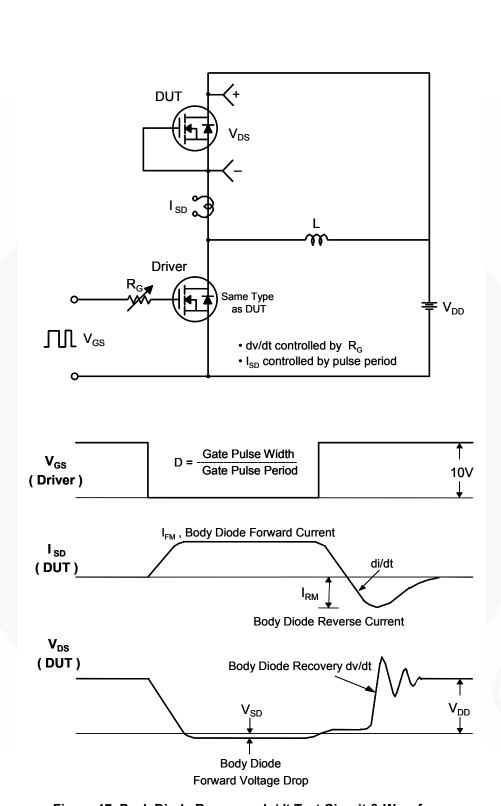


Figure 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms

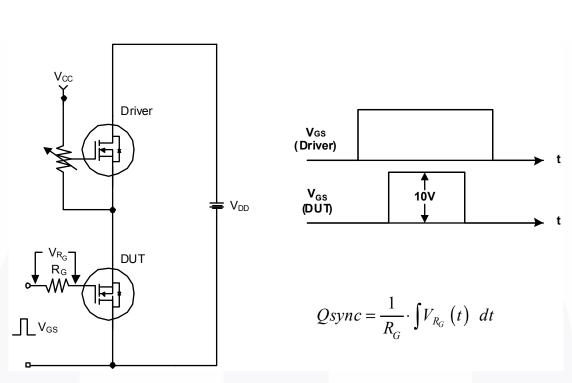


Figure 18. Total Gate Charge Qsync. Test Circuit & Waveforms

Mechanical Dimensions

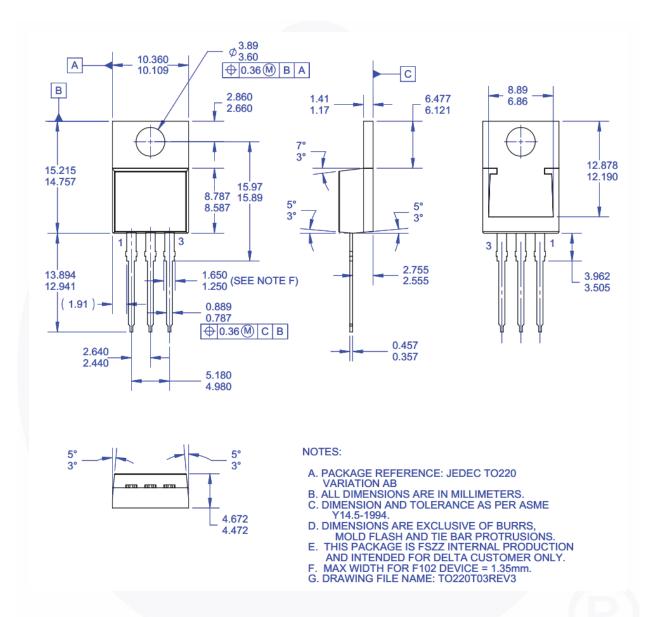


Figure 19. TO-220, Molded, 3-Lead, Jedec Variation AB (Delta)

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