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## **ON Semiconductor**®

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## FDB120N10 N-Channel PowerTrench<sup>®</sup> MOSFET 100 V, 74 A, 12 mΩ

## Features

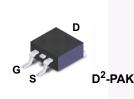
- $R_{DS(on)}$  = 9.7 m $\Omega$  (Typ.) @  $V_{GS}$  = 10 V,  $I_D$  = 74 A
- · Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extremely Low  $R_{\text{DS}(\text{on})}$
- High Power and Current Handling Capability
- RoHS Compliant

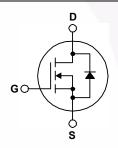
## Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench<sup>®</sup> 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
- Micro Solar Inverter





### MOSFET Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted.

Symbol		FDB120N10	Unit	
V <sub>DSS</sub>	Drain to Source Voltage	100	V	
V <sub>GSS</sub>	Gate to Source Voltage	±20	V	
I <sub>D</sub>	Drain Current	- Continuous (T <sub>C</sub> = 25 <sup>o</sup> C)	74	
	Drain Current	- Continuous (T <sub>C</sub> = 100 <sup>o</sup> C)	52	- A
I <sub>DM</sub>	Drain Current	- Pulsed (Note 1)	296	Α
E <sub>AS</sub>	Single Pulsed Avalanche Energy (Note 2)		198	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		6.0	V/ns
P <sub>D</sub>	Davida Dia dia atian	$(T_{\rm C} = 25^{\rm o}{\rm C})$	170	W
	Power Dissipation	- Derate Above 25°C	1.14	W/ºC
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range		-55 to +175	°C
TL	Maximum Lead Temperat	300	°C	

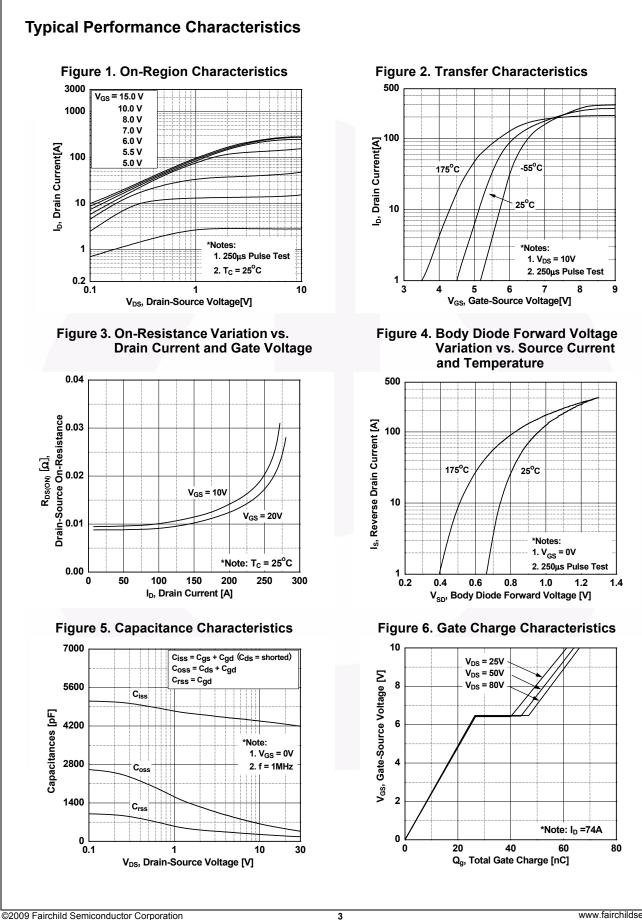
## **Thermal Characteristics**

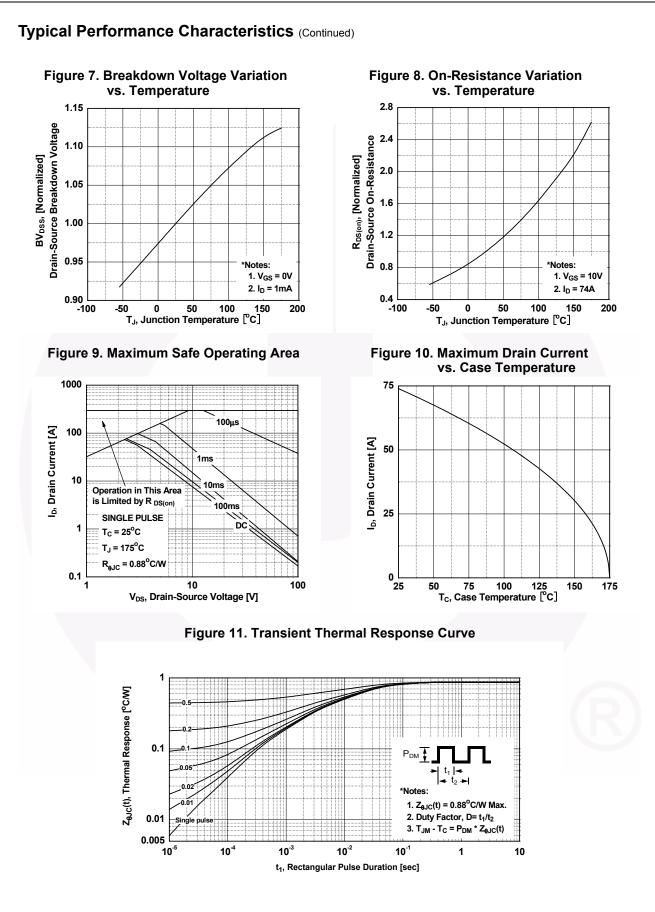
Symbol	Parameter	FDB120N10	Unit
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	0.88	
Р	Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max.	62.5	°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient (1 in <sup>2</sup> Pad of 2-oz Copper), Max.	40	

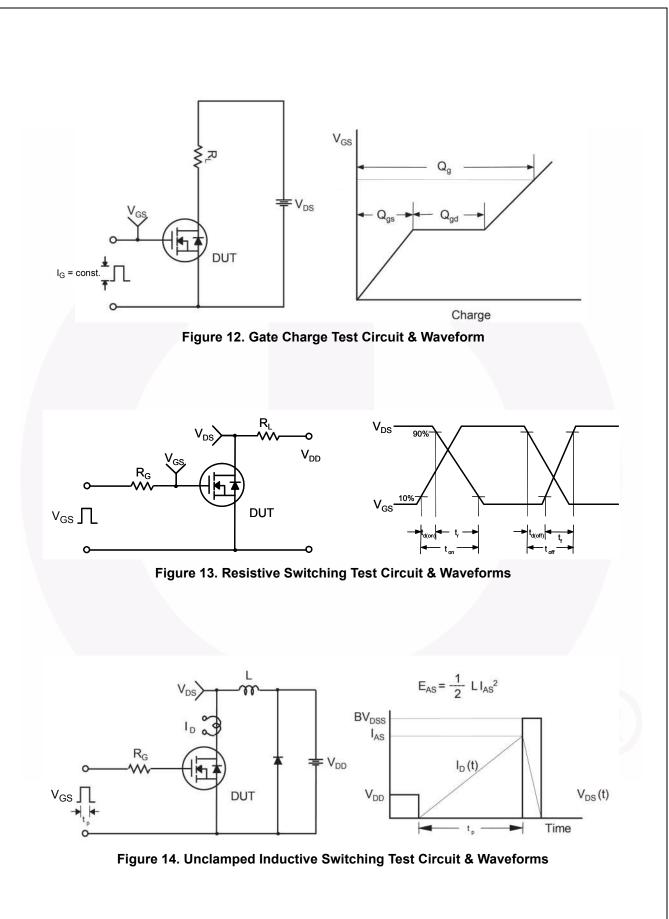
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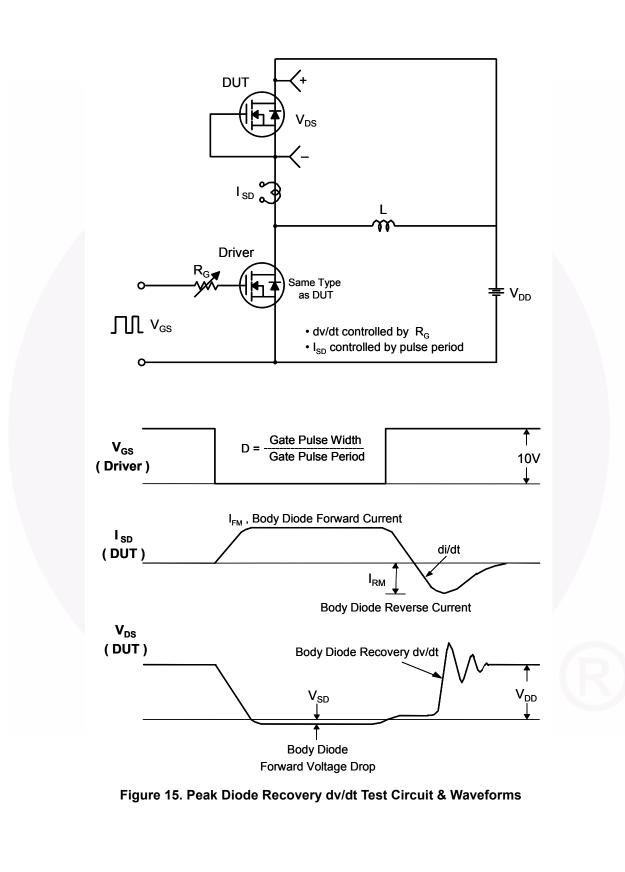
•		Package	Packing Method	Reel Size	Тар	e Width	Qua	ntity	
		D <sup>2</sup> -PAK	PAK Tape and Reel 330 mm		24 mm		800 units		
Electrica	l Chara	acteristics T <sub>C</sub> = 25%	C unless ot	herwise noted.					
Symbol		Parameter		Test Conditi	ions	Min.	Тур.	Max.	Unit
Off Charac	teristics	6							
BV <sub>DSS</sub>	Drain to Source Breakdown Voltage		e I	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0 V, T <sub>C</sub> = 25°C		100	-	-	V
$\Delta BV_{DSS}$		wn Voltage Temperature					0.4		V/00
$/\Delta T_J$		Coefficient		$I_D = 250 \ \mu$ A, Referenced to $25^{\circ}$ C		-	0.1	-	V/ºC
I	Zero Ga	te Voltage Drain Current		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V		-	-	1	цΑ
DSS	Zero Gate Voltage Drain Current			$V_{DS}$ = 100 V, $V_{GS}$ = 0 V, $T_{C}$ = 150°C		-	-	500	μA
I <sub>GSS</sub>	Gate to	Body Leakage Current	١	$V_{\rm GS}$ = ±20 V, V <sub>DS</sub> = 0 V	V	-	-	±100	nA
On Charac	teristics								
V <sub>GS(th)</sub>		reshold Voltage	N	/ <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μ	A	2.5	-	4.5	V
R <sub>DS(on)</sub>		ain to Source On Resistar		$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 74 \text{ A}$		-	9.7	12	mΩ
9FS	Forward	Transconductance		$V_{\rm DS} = 10 \text{ V}, \text{ I}_{\rm D} = 74 \text{ A}$		-	105	-	S
	horooto	riation							
Dynamic C					V <sub>GS</sub> = 0 V,	-	4215	5605	۳E
C <sub>iss</sub> C <sub>oss</sub>	-	pacitance Capacitance	· · · ·	/ <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V		-	405	540	pF pF
C <sub>oss</sub> C <sub>rss</sub>	-	Transfer Capacitance	f	f = 1 MHz			170	255	pF
Q <sub>g(tot)</sub>		te Charge at 10V				-	66	86	nC
Q <sub>g(tot)</sub>		Source Gate Charge		$V_{DS} = 80 V I_D = 74 A,$		-	26	-	nC
Q <sub>gd</sub>		Drain "Miller" Charge		GS - 10 V	<sub>GS</sub> = 10 V (Note 4)		20	_	nC
Switching									
t <sub>d(on)</sub>		Delay Time				-	27	64	ns
t <sub>r</sub>		Rise Time		/ <sub>DD</sub> = 50 V, I <sub>D</sub> = 74 A, / <sub>GS</sub> = 10 V, R <sub>G</sub> = 4.7 s		•	105	220	ns
t <sub>d(off)</sub>		Delay Time			-	-	39	88	ns
t <sub>f</sub>	Turn-Oπ	Fall Time			(Note 4)		15	40	ns
Drain-Sou	rce Diod	e Characteristics							
I <sub>S</sub>	Maximum Continuous Drain to Source D		rce Diode I	ode Forward Current		7 -	-	74	Α
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode		Diode Forw	Forward Current		-	-	296	Α
V <sub>SD</sub>	Drain to Source Diode Forward Voltage $V_{GS} = 0 V$ , $I_{SD} = 74 A$			-	-	1.3	V		
t <sub>rr</sub>	Reverse	Recovery Time	١	$V_{GS} = 0 V, I_{SD} = 74 A,$ $dI_F/dt = 100 A/\mu s$		-	44	-	ns
Q <sub>rr</sub>	Reverse	Recovery Charge	C			-	67		nC

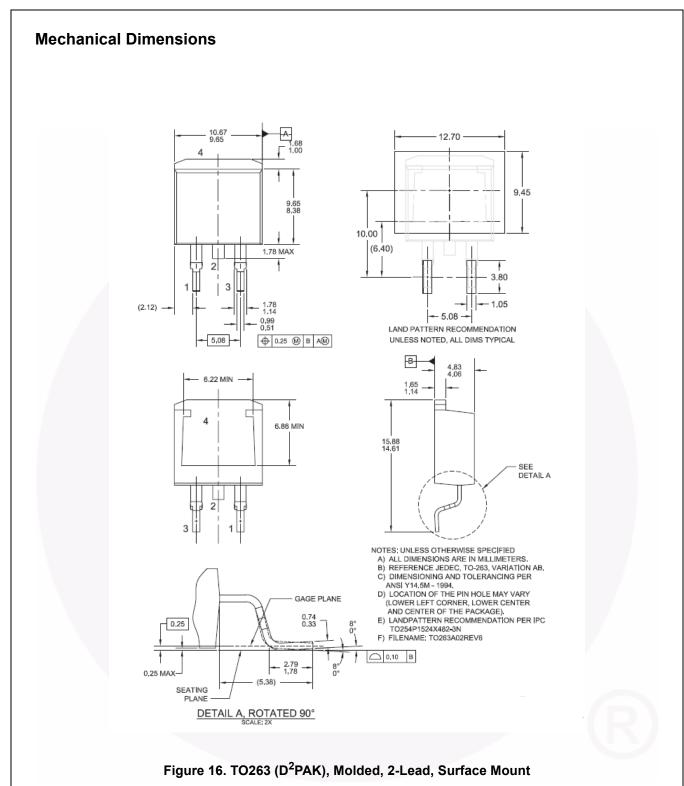
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