

Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild <a href="general-regarding-numbers-n

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any EDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officer



April 2015

FDB390N15A

N-Channel PowerTrench[®] MOSFET 150 V, 27 A, 39 m Ω

Features

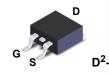
- $R_{DS(on)}$ = 33.5 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 27 A
- · Fast Switching Speed
- Low Gate Charge, Q_G = 14.3 nC (Typ.)
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- · High Power and Current Handling Capability
- RoHS Compliant

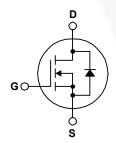
Description

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

- · Consumer Appliances
- LED TV
- · Synchronous Rectification
- · Uninterruptible Power Supply
- · Micro Solar Inverter





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

Symbol		Parameter	FDB390N15A	Unit	
V _{DSS}	Drain to Source Voltage		150	V	
V	Cata to Course Valtage	- DC	±20	V	
V_{GSS}	Gate to Source Voltage	- AC (f > 1 Hz)	±30	V	
I _D	Drain Current	- Continuous (T _C = 25°C,Silicon Limited)	27	A	
	Drain Current	- Continuous (T _C = 100°C,Silicon Limited)	19		
I _{DM}	Drain Current	- Pulsed (Note 1)	108	Α	
E _{AS}	Single Pulsed Avalanche Energy	(Note 2)	78	mJ	
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	6.0	V/ns	
D	Daniel Bianie attan	$(T_C = 25^{\circ}C)$	75	W	
P_{D}	Power Dissipation	- Derate Above 25°C	0.5	W/°C	
T _J , T _{STG}	Operating and Storage Temperat	ure Range	-55 to +175	οС	
T _L	Maximum Lead Temperature for	Soldering, 1/8" from Case for 5 Seconds.	300	οС	

Thermal Characteristics

Symbol	Parameter FDB390N15A		Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	2.0	
Б	Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max.	62.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (1 in ² Pad of 2-oz Copper), Max.	40	

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FDB390N15A	FDB390N15A	D ² -PAK	Tape and Reel	330 mm	24 mm	800 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	$I_D = 250 \mu A, V_{GS} = 0 V$	150	-	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	-	0.1	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 120 V, V _{GS} = 0 V	-	-	1	
		$V_{DS} = 120 \text{ V}, T_{C} = 150^{\circ}\text{C}$	-	-	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	$V_{GS} = V_{DS}, I_D = 250 \mu A$	2.0	-	4.0	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 27 A	-	33.5	39.0	mΩ
9 _{FS}	Forward Transconductance	V _{DS} = 10 V, I _D = 27 A	-	33	-	S

Dynamic Characteristics

C _{iss}	Input Capacitance	V - 75 V V - 0 V	-	965	1285	pF
C _{oss}	Output Capacitance	$V_{DS} = 75 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1 MHz	-	96	130	pF
C _{rss}	Reverse Transfer Capacitance	1 - 1 1011 12	-\	5.8	-	pF
C _{oss(er)}	Energy Related Output Capacitance	V _{DS} = 75 V, I _D = 27 A		169	-	pF
Q _{g(tot)}	Total Gate Charge at 10V		-	14.3	18.6	nC
Q_{gs}	Gate to Source Gate Charge	V _{DS} = 75 V, I _D = 27 A,		5.0	-	nC
Q _{gs2}	Gate Charge Threshold to Plateau	V _{GS} = 10 V	-	2.0	-	nC
Q_{gd}	Gate to Drain "Miller" Charge	(Note 4)	-	3.5	-	nC
ESR	Equivalent Series Resistance (G-S)	f = 1 MHz	-	1.4	-	Ω

Switching Characteristics

t _{d(on)}	Turn-On Delay Time		-	14	38	ns
t _r		$V_{DD} = 75 \text{ V}, I_{D} = 27 \text{ A},$	-/	10	30	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GS} = 10 \text{ V}, R_G = 4.7 \Omega$	-	20	50	ns
t _f	Turn-Off Fall Time	(Note 4)	/ -	5	20	ns

Drain-Source Diode Characteristics

I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	27	Α
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current			-	108	Α
V_{SD}	Drain to Source Diode Forward Voltage V _{GS} = 0 V, I _{SD} = 27 A		-	- ,,,/	1.25	V
t _{rr}	Reverse Recovery Time	$V_{GS} = 0 \text{ V}, I_{SD} = 27 \text{ A}, V_{DD} = 75 \text{ V},$ $dI_{F}/dt = 100 \text{ A}/\mu\text{s}$	-	63		ns
Q _{rr}	Reverse Recovery Charge	dI _F /dt = 100 A/μs	-	131	-	nC

Notes

- ${\it 1. Repetitive\ rating: pulse-width\ limited\ by\ maximum\ junction\ temperature.}$
- 2. Starting T_J = 25°C, L = 3 mH, I_{SD} = 7.2 A.
- 3. I $_{SD} \le 27$ A, di/dt ≤ 200 A/µs, V $_{DD} \le BV _{DSS},$ starting T $_{J}$ = 25°C.
- 4. Essentially independent of operating temperature typical characteristics.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

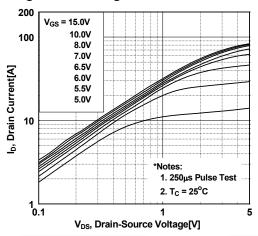


Figure 3. On-Resistance Variation vs.

Drain Current and Gate Voltage

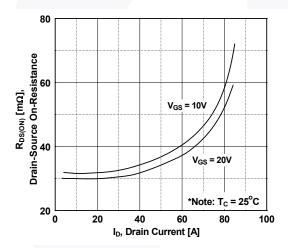


Figure 5. Capacitance Characteristics

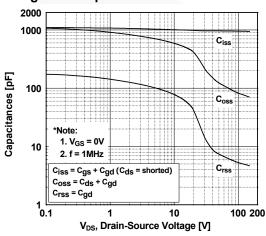


Figure 2. Transfer Characteristics

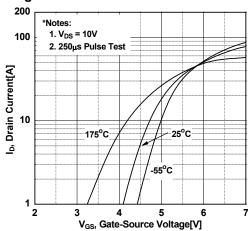


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

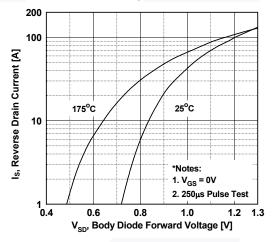
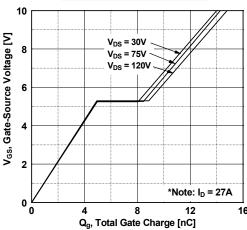


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

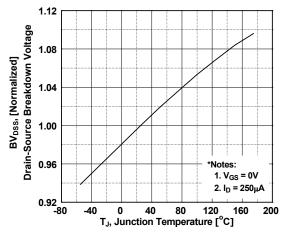


Figure 9. Maximum Safe Operating Area

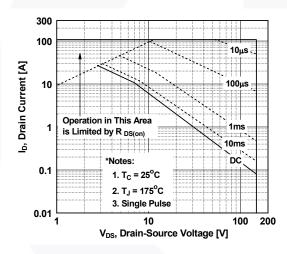


Figure 11. Eoss vs. Drain to Source Voltage

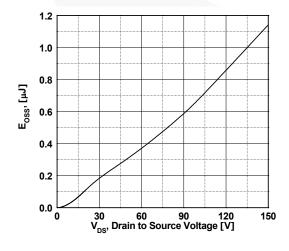


Figure 8. On-Resistance Variation vs. Temperature

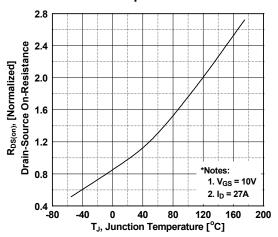


Figure 10. Maximum Drain Current vs. Case Temperature

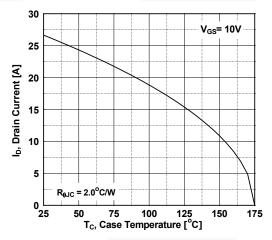
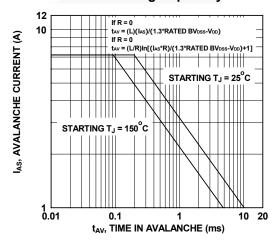
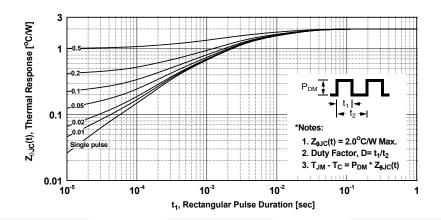


Figure 12. Unclamped Inductive Switching Capability



Typical Performance Characteristics (Continued)

Figure 13. Transient Thermal Response Curve



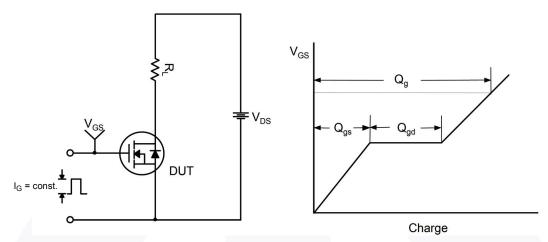


Figure 14. Gate Charge Test Circuit & Waveform

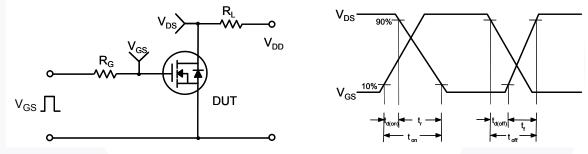


Figure 15. Resistive Switching Test Circuit & Waveforms

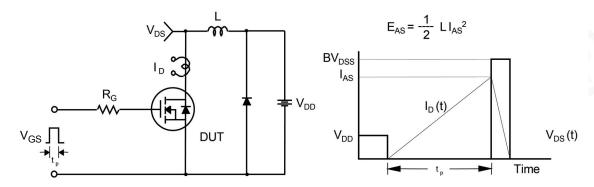


Figure 16. Unclamped Inductive Switching Test Circuit & Waveforms

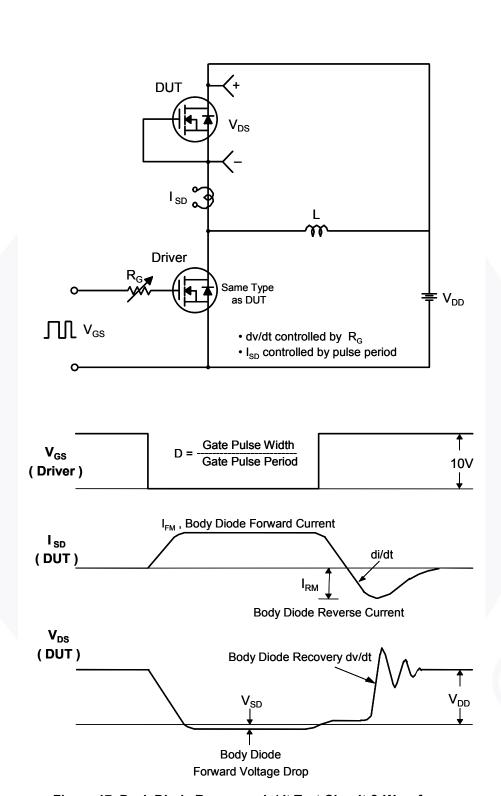
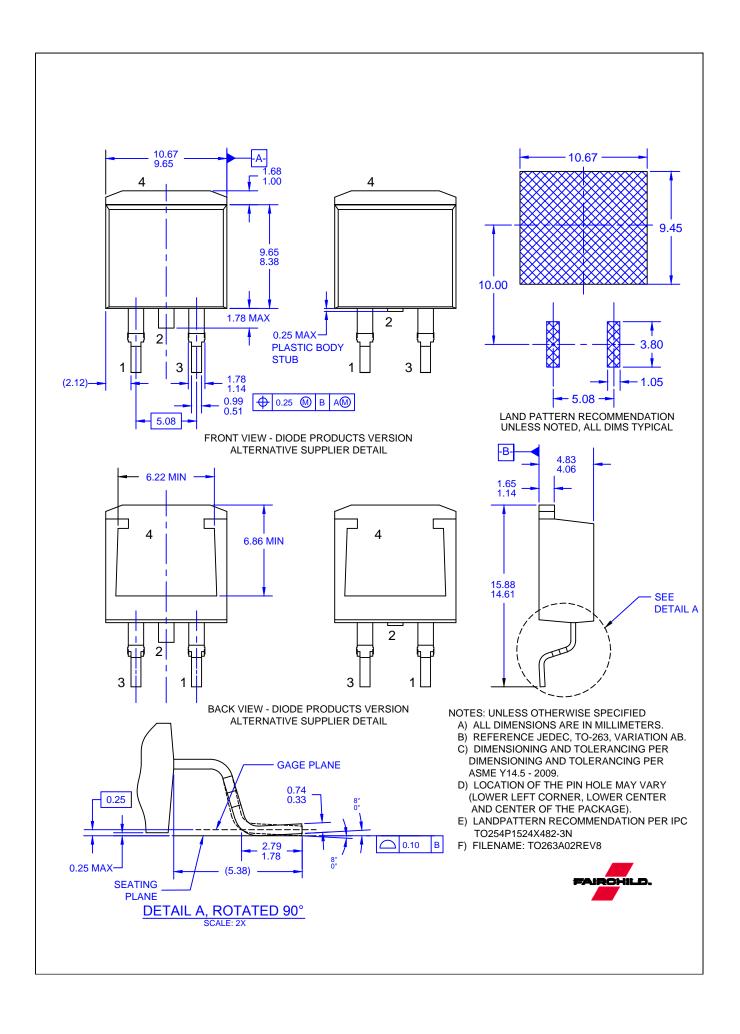


Figure 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms



ON Semiconductor and in are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdt/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and exp

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor 19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada Email: orderlit@onsemi.com N. American Technical Support: 800-282-9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

ON Semiconductor: FDB390N15A

ПОСТАВКА ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru_4 moschip.ru_9