

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 guestions@onsemi.com.

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



November 2013

FCI7N60

N-Channel SuperFET[®] MOSFET 600 V, 7 A, 600 m Ω

Features

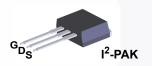
- 650V @ T_J = 150°C
- Typ. $R_{DS(on)}$ = 530 m Ω
- Ultra Low Gate Charge (Typ. Q_g = 23 nC)
- Low Effective Output Capacitance (Typ. C_{oss(eff.)} = 60 pF)
- · 100% Avalanche Tested
- · RoHS compliant

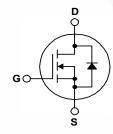
Application

- · Lighting
- · Solar Inverter
- · AC-DC Power Supply

Description

SuperFET® MOSFET is Fairchild Semiconductor's first generation of high voltage super-junction (SJ) MOSFET family that is utilizing charge balance technology for outstanding low onresistance and lower gate charge performance. This technology is tailored to minimize conduction loss, provide superior switching performance, dv/dt rate and higher avalanche energy. Consequently, SuperFET MOSFET is very suitable for the switching power applications such as PFC, server/telecom power, FPD TV power, ATX power and industrial power applications.





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

Symbol		Parameter	FCI7N60	Unit
V_{DSS}	Drain to Source Voltage		600	V
	Drain Current	- Continuous (T _C = 25°C)	7	^
ID L	Drain Current	- Continuous (T _C = 100°C)	4.4	Α
I _{DM}	Drain Current	- Pulsed (Note 1)	21	Α
V_{GSS}	Gate to Source Voltage		±30	V
E _{AS}	Single Pulsed Avalanche E	nergy (Note 2)	230	mJ
I _{AR}	Avalanche Current	(Note 1)	7	А
E _{AR}	Repetitive Avalanche Energ	gy (Note 1)	8.3	mJ
dv/dt	Peak Diode Recovery dv/d	t (Note 3)	4.5	V/ns
D	Power Dissipation	(T _C = 25°C)	83	W
P_{D}	Power Dissipation	- Derate Above 25°C	0.67	W/°C
T _J , T _{STG}	Operating and Storage Ten	nperature Range	-55 to +150	°C
T_L	Maximum Lead Temperatu	re for Soldering, 1/8" from Case for 5 Seconds	300	°C

Thermal Characteristics

Symbol	Parameter	FCI7N60	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	°C/W

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FCI7N60	FCI7N60	I ² -PAK	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					
D\/	Drain to Course Progledown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}, T_C = 25^{\circ}\text{C}$	600	-	-	V
BV _{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}, T_C = 150^{\circ}\text{C}$	-	650	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	-	0.6	-	V/°C
BV _{DS}	Drain-Source Avalanche Breakdown Voltage	V _{GS} = 0 V, I _D = 7 A	-	700	-	V
	Zoro Coto Voltago Droin Current	V _{DS} = 600 V, V _{GS} = 0 V	-	-	1	^
IDSS	Zero Gate Voltage Drain Current	$V_{DS} = 480 \text{ V}, T_{C} = 125^{\circ}\text{C}$	-	-	10	μΑ
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±30 V, V _{DS} = 0 V	-	-	±100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{D} = 250 \mu\text{A}$	3.0	-	5.0	V
R _{DS(on)}	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 3.5 \text{ A}$	-	0.53	0.6	Ω
9 _{FS}	Forward Transconductance	$V_{DS} = 40 \text{ V}, I_{D} = 3.5 \text{ A}$	-	6	-	S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	-	710	920	pF
C _{oss}	Output Capacitance		-	380	500	pF
C _{rss}	Reverse Transfer Capacitance		-	34	-	pF
C _{oss}	Output Capacitance	V _{DS} = 480 V, V _{GS} = 0 V, f = 1 MHz	-	22	29	pF
C _{oss(eff.)}	Effective Output Capacitance	V _{DS} = 0 V to 400 V, V _{GS} = 0 V	-	60	-	pF

Switching Characteristics

t _{d(on)}	Turn-On Delay Time		-	35	80	ns
t _r	Turn-On Rise Time	$V_{DD} = 300 \text{ V}, I_D = 7 \text{ A},$	-	55	120	ns
t _{d(off)}	Turn-Off Delay Time	V_{GS} = 10 V, R_G = 25 Ω	- /	75	160	ns
t _f	Turn-Off Fall Time	(Note 4)	-	32	75	ns
Q _{g(tot)}	Total Gate Charge at 10V	V _{DS} = 480 V, I _D = 7 A,	/-	23	30	nC
Q _{gs}	Gate to Source Gate Charge	V _{GS} = 10 V	/ -	4.2	5.5	nC
Q_{gd}	Gate to Drain "Miller" Charge	(Note 4)	-	11.5	1	nC

Drain-Source Diode Characteristics

I _S	Maximum Continuous Drain to Source Diode Forward Current			-	7	Α
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current			-	21	Α
V_{SD}	Drain to Source Diode Forward Voltage V _{GS} = 0 V, I _{SD} = 7 A		-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _{SD} = 7 A,	-	360	// -	ns
Q _{rr}	Reverse Recovery Charge	$V_{GS} = 0 \text{ V, } I_{SD} = 7 \text{ A,}$ $dI_F/dt = 100 \text{ A/}\mu\text{s}$	-	4.5	-	μC

Notes

- 1. Repetitive rating: pulse-width limited by maximum junction temperature.
- 2. I $_{AS}$ = 3.5 A, V $_{DD}$ = 50 V, R $_{G}$ = 25 Ω , starting T $_{J}$ = 25 $^{\circ}$ C.
- 3. I $_{SD} \le 7$ 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

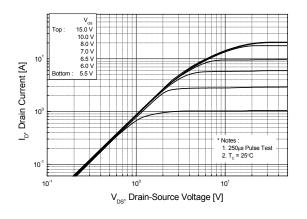


Figure 2. Transfer Characteristics

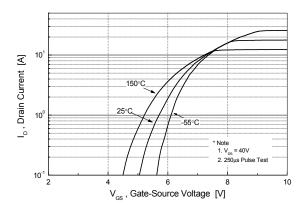


Figure 3. On-Resistance Variation vs.

Drain Current and Gate Voltage

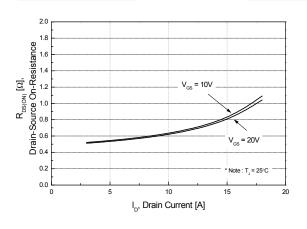


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperatue

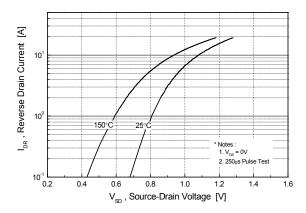


Figure 5. Capacitance Characteristics

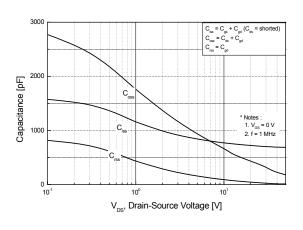
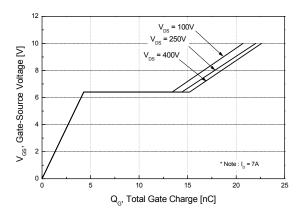


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

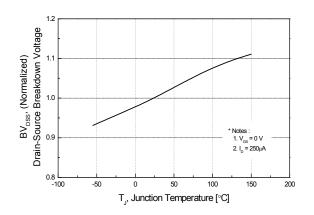


Figure 8. On-Resistance Variation vs. Temperature

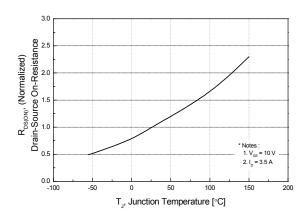


Figure 9. Maximum Safe Operating Area

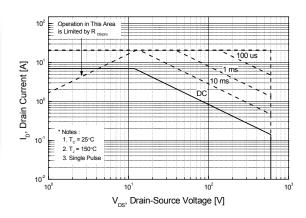


Figure 10. Maximum Drain Current vs. Case Temperature

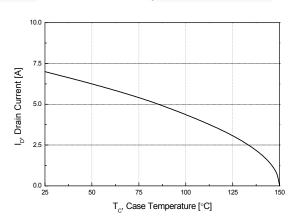
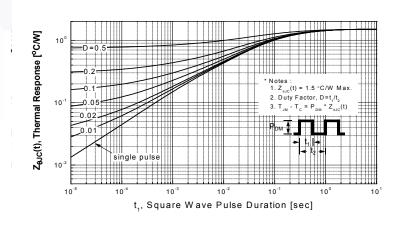


Figure 11. Transient Thermal Response Curve



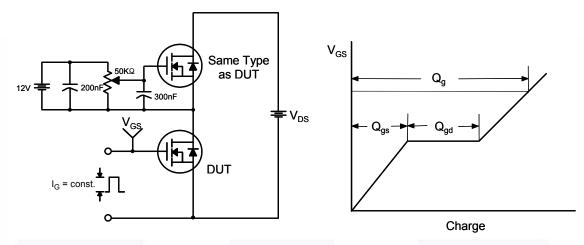


Figure 12. Gate Charge Test Circuit & Waveform

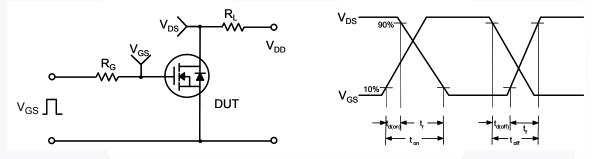


Figure 13. Resistive Switching Test Circuit & Waveforms

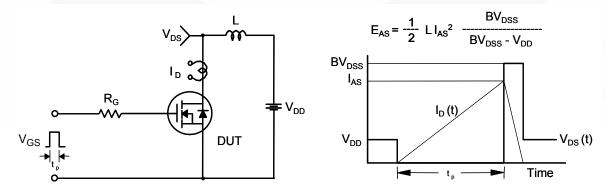


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

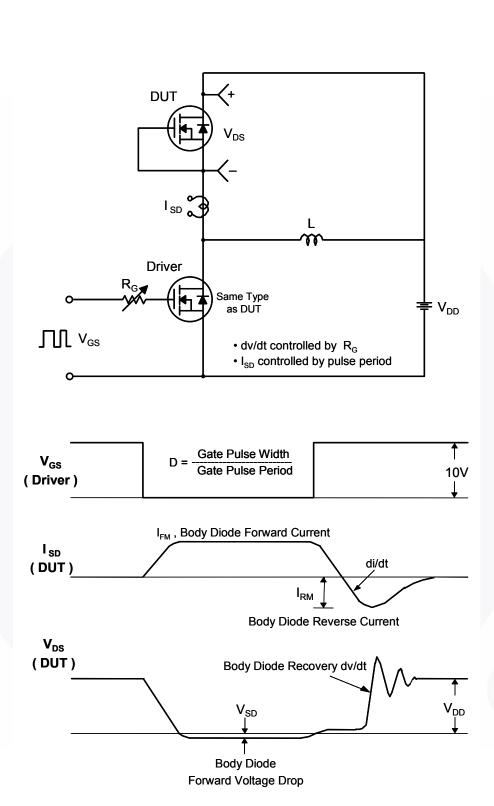
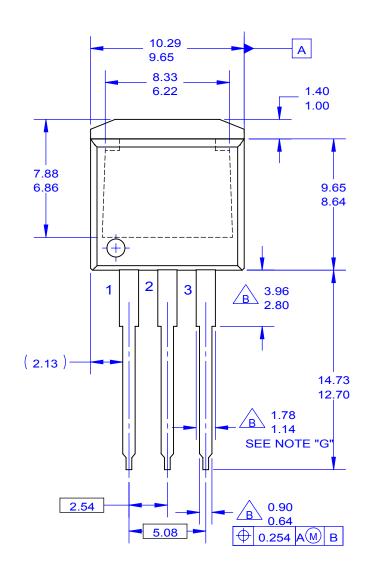
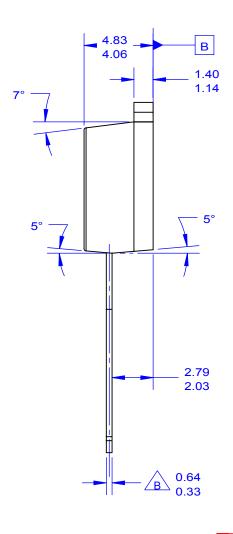


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO
TO262 JEDEC VARIATION AA.
B DOES NOT COMPLY JEDEC STD. VALUE.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS,
MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DIMENSION AND TOLERANCE AS PER ANSI
Y14 5-1904

Y14.5-1994

F. LOCATION OF PIN HOLE MAY VARY
(LOWER LEFT CORNER, LOWER CENTER
AND CENTER OF PACKAGE)
G. MAXIMUM WIDTH FOR F102 DEVICE = 1.35 MAX.
H. DRAWING FILE NAME: TO262A03REV6



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:

FCI7N60

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