

### 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 <a href="www.onsemi.com">www.onsemi.com</a>. 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





# FDC608PZ

# P-Channel 2.5V Specified PowerTrench® MOSFET

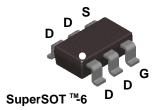
### **General Description**

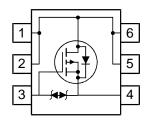
This P-Channel 2.5V specified MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

These devices are well suited for battery power applications: load switching and power management, battery power circuits, and DC/DC conversions.

#### **Features**

- -5.8 A, -20 V.  $R_{DS(ON)} = 30 \ m\Omega \ @ \ V_{GS} = -4.5 \ V$   $R_{DS(ON)} = 43 \ m\Omega \ @ \ V_{GS} = -2.5 \ V$
- · Low Gate Charge
- High performance trench technology for extremely low Research.
- SuperSOT <sup>™</sup> –6 package: small footprint (72% smaller than standard SO–8) low profile (1mm thick).





Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

	<u> </u>			
Symbol	Parameter		Ratings	Units
V <sub>DSS</sub>	Drain-Source Voltage		-20	V
V <sub>GSS</sub>	Gate-Source Voltage		±12	V
I <sub>D</sub>	Drain Current - Continuous	(Note 1a)	-5.8	А
	- Pulsed		-20	
P <sub>D</sub>	Maximum Power Dissipation	(Note 1a)	1.6	W
		(Note 1b)	0.8	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range		-55 to +150	°C

## **Thermal Characteristics**

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	78	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	30	°C/W

**Package Marking and Ordering Information** 

Device Marking	Device	Reel Size	Tape width	Quantity	
.608Z	FDC608PZ	7"	8mm	3000 units	

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Char	acteristics					
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	-20			V
<u>ΔBV<sub>DSS</sub></u> ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	$I_D = -250 \mu A$ , Referenced to 25°C		-10		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	$V_{DS} = -16 \text{ V},  V_{GS} = 0 \text{ V}$			-1	μΑ
I <sub>GSS</sub>	Gate-Body Leakage	$V_{GS} = \pm 12 \text{ V}, \qquad V_{DS} = 0 \text{ V}$			±10	μΑ
On Char	acteristics (Note 2)					
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	-0.4	-1.0	-1.5	V
$\Delta V_{GS(th)} \over \Delta T_J$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250 \mu A$ , Referenced to 25°C		3		mV/°C
R <sub>DS(on)</sub>	Static Drain–Source On–Resistance	$V_{GS} = -4.5V$ , $I_D = -5.8 \text{ A}$ $V_{GS} = -2.5V$ , $I_D = -5.0 \text{ A}$ $V_{GS} = -4.5V$ , $I_D = -5.8A$ , $I_{J} = 125^{\circ}\text{C}$		26 38 35	30 43	mΩ
I <sub>D(on)</sub>	On–State Drain Current	$V_{GS} = -4.5 \text{ V}, \qquad V_{DS} = -5 \text{ V}$	-20			Α
g <sub>FS</sub>	Forward Transconductance	$V_{DS} = -10 \text{ V}, \qquad I_{D} = -5.8 \text{ A}$		22		S
Dynamic	Characteristics					
C <sub>iss</sub>	Input Capacitance	$V_{DS} = -10 \text{ V},  V_{GS} = 0 \text{ V},$		1330		pF
Coss	Output Capacitance	f = 1.0 MHz		270		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			230		pF
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> = 15 mV, f = 1.0 MHz		12		Ω
Switchin	ng Characteristics (Note 2)					
t <sub>d(on)</sub>	Turn-On Delay Time	$V_{DD} = -10 \text{ V}, \qquad I_{D} = -1 \text{ A},$		13	24	ns
t <sub>r</sub>	Turn-On Rise Time	$V_{GS} = -4.5 \text{ V}, \qquad R_{GEN} = 6 \Omega$		8	16	ns
t <sub>d(off)</sub>	Turn-Off Delay Time	7		91	145	ns
t <sub>f</sub>	Turn-Off Fall Time			60	96	ns
Qg	Total Gate Charge	$V_{DS} = -10 \text{ V}, \qquad I_{D} = -5.8 \text{ A},$		17	23	nC
Q <sub>gs</sub>	Gate-Source Charge	$V_{GS} = -4.5 \text{ V}$		3		nC
$Q_{gd}$	Gate-Drain Charge			6		nC
Drain-Se	ource Diode Characteristics	and Maximum Ratings				
Is	Maximum Continuous Drain-Source				-1.3	Α
$V_{SD}$	Drain–Source Diode Forward Voltage	$V_{GS} = 0 \text{ V},  I_{S} = -1.3 \text{ A}  \text{(Note 2)}$		-0.7	-1.2	V
t <sub>rr</sub>	Diode Reverse Recovery Time	$I_F = -5.8 \text{ A},  d_{iF}/d_t = 100 \text{A}/\mu \text{s}$		40	60	ns
Q <sub>rr</sub>	Diode Reverse Recovery Charge	$I_F = -5.8 \text{ A},  d_{iF}/d_t = 100 \text{A}/\mu \text{s}$		15	23	nC

#### Notes

- 1.  $R_{\theta,JA}$  is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta,JC}$  is guaranteed by design while  $R_{\theta,CA}$  is determined by the user's board design.
  - a.  $78^{\circ}\text{C/W}$  when mounted on a  $1\text{in}^2$  pad of 2oz copper on FR-4 board.
  - b. 156°C/W when mounted on a minimum pad.
- 2. Pulse Test: Pulse Width  $\leq 300~\mu s,~Duty~Cycle \leq 2.0\%$

# **Typical Characteristics**

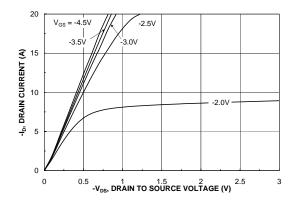


Figure 1. On-Region Characteristics.

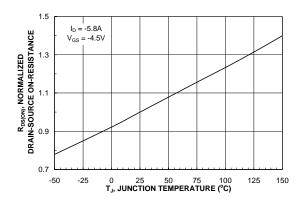


Figure 3. On-Resistance Variation with Temperature.

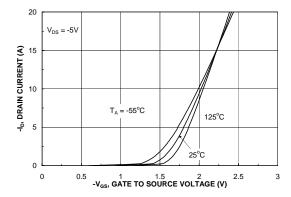


Figure 5. Transfer Characteristics.

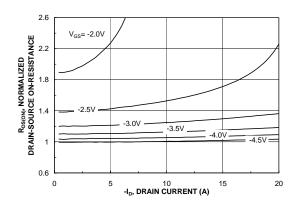


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

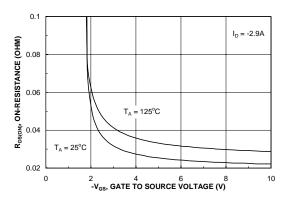


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

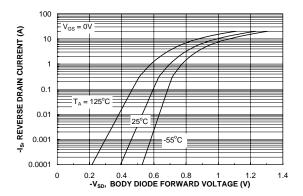
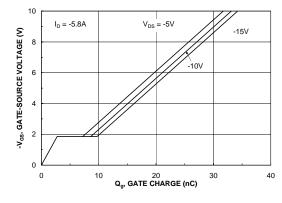


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

# **Typical Characteristics**



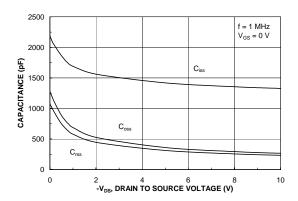
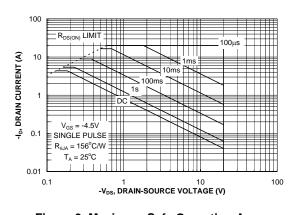


Figure 7. Gate Charge Characteristics.





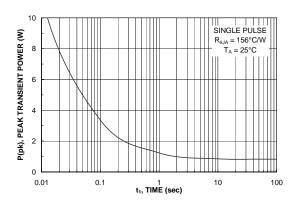


Figure 9. Maximum Safe Operating Area.

Figure 10. Single Pulse Maximum Power Dissipation.

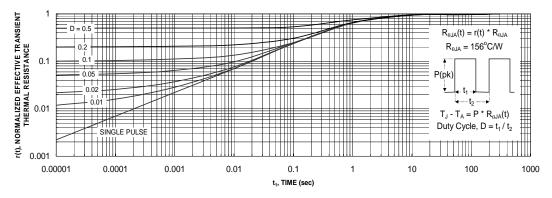


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b. Transient thermal response will change depending on the circuit board design.

#### **TRADEMARKS**

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

SILENT SWITCHER®  $ACEx^{TM}$ FACT Quiet Series™  $OCX^{TM}$ UniFET™  $\mathsf{UltraFET}^{\circledR}$ ActiveArray™ GlobalOptoisolator™  $OCXPro^{TM}$ SMART START™  $\mathsf{OPTOLOGIC}^{\circledR}$ GTO™ SPM™ VCX™ Bottomless™ Build it Now™ HiSeC™ OPTOPLANAR™ Stealth™ Wire™ CoolFET™ I<sup>2</sup>CTM  $\mathsf{PACMAN^{TM}}$ SuperFET™ SuperSOT™-3 i-Lo™ POP™ CROSSVOLT™ DOME™  $ImpliedDisconnect^{\mathsf{TM}}$ Power247™ SuperSOT™-6 EcoSPARK™ IntelliMAX™ PowerEdge™ SuperSOT™-8 E<sup>2</sup>CMOS™ ISOPLANAR™ PowerSaver™ SyncFET™ EnSigna™ LittleFET™ PowerTrench<sup>®</sup> ТСМ™  $\mathsf{MICROCOUPLER}^{\mathsf{TM}}$ QFET® FACT™ TinyBoost™  $\mathsf{FAST}^{\circledR}$ QS™ TinyBuck™ MicroFET™ . TinyPWM™ FASTr™ MicroPak™ QT Optoelectronics™ FPS™ MICROWIRE™ Quiet Series™ TinyPower™  $\mathsf{TinyLogic}^{\mathbb{R}}$  $RapidConfigure^{\intercal_{M}}$  $\mathsf{FRFET}^\mathsf{TM}$  $MSX^{TM}$ MSXPro™ RapidConnect™ TINYOPTO™ μSerDes™ TruTranslation™ Across the board. Around the world.™ The Power Franchise® UHC™ ScalarPump™ Programmable Active Droop™

#### **DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

#### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

#### As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

#### **PRODUCT STATUS DEFINITIONS**

#### **Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

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 <a href="www.onsemi.com/site/pdt/Patent-Marking.pdf">www.onsemi.com/site/pdt/Patent-Marking.pdf</a>. 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:** 

FDC608PZ

# **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

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