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_questions@onsemi.com.

FAIRCHILD SEMICONDUCTOR™

January 2001

Si4542DY

30V Complementary PowerTrench®MOSFET

General Description

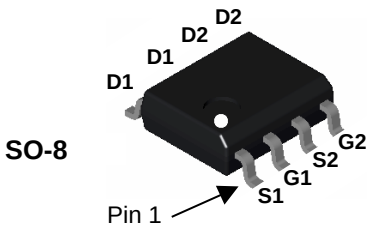
This complementary MOSFET device is produced using Fairchild's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

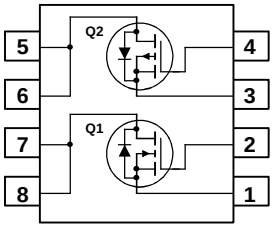
Applications

- DC/DC converter
- Power management

Features

- **Q1**: **N-Channel**
  6 A, 30 V $R_{DS(on)}$ = 28 mΩ @ V_{GS} = 10V
  $R_{DS(on)}$ = 35 mΩ @ V_{GS} = 4.5V
- **Q2**: **P-Channel**
  –6 A, –30 V $R_{DS(on)}$ = 32 mΩ @ V_{GS} = –10V
  $R_{DS(on)}$ = 45 mΩ @ V_{GS} = –4.5V





Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Q1	Q2	Units
V_{DSS}	Drain-Source Voltage		30	–30	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Drain Current - Continuous	(Note 1a)	6	–6	A
	- Pulsed		20	–20	
P_D	Power Dissipation for Dual Operation		2		W
	Power Dissipation for Single Operation	(Note 1a)	1.6		
		(Note 1b)	1.2		
		(Note 1c)	1		
T_J, T_{STG}	Operating and Storage Junction Temperature Range		–55 to +175		°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)	40	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
4542	Si4542DY	13"	12mm	2500 units

Electrical Characteristics

T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
Off Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 µA V_{GS} = 0 V, I_D = –250 µA	Q1 Q2	30 –30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 µA, Referenced to 25°C I_D = –250 µA, Referenced to 25°C	Q1 Q2		23 –21		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V V_{DS} = –24 V, V_{GS} = 0 V	Q1 Q2			1 –1	µA
I_{GSS}	Gate-Body Leakage	V_{GS} = ±20 V, V_{DS} = 0 V V_{GS} = ±20 V, V_{DS} = 0 V	Q1 Q2			±100 ±100	nA
On Characteristics (Note 2)							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA V_{DS} = V_{GS}, I_D = –250 µA	Q1 Q2	1 –1	1.5 –1.7	3 –3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = 250 µA, Referenced to 25°C I_D = –250 µA, Referenced to 25°C	Q1 Q2		–4 4		mV/°C
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 6 A V_{GS} = 10 V, I_D = 6 A, T_J = 125°C V_{GS} = 4.5 V, I_D = 5 A	Q1		19 32 25	28 48 35	mΩ
		V_{GS} = –10 V, I_D = –6 A V_{GS} = –10 V, I_D = –6 A, T_J = 125°C V_{GS} = –4.5 V, I_D = –5 A	Q2		21 29 30	32 51 45	
$I_{D(on)}$	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 5 V V_{GS} = –10 V, V_{DS} = –5 V	Q1 Q2	20 –20			A
g_{FS}	Forward Transconductance	V_{DS} = 15 V, I_D = 6 A V_{DS} = –10 V, I_D = –6 A	Q1 Q2		18 16		S
Dynamic Characteristics							
C_{iss}	Input Capacitance	Q1 V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0 MHz Q2 V_{DS} = –15 V, V_{GS} = 0 V, f = 1.0 MHz	Q1 Q2		830 1540		pF
C_{oss}	Output Capacitance		Q1 Q2		185 400		pF
C_{rss}	Reverse Transfer Capacitance		Q1 Q2		80 170		pF

Electrical Characteristics (continued)

T_A = 25°C unless otherwise noted

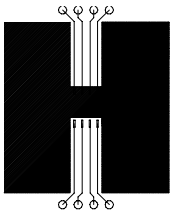
Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
Switching Characteristics (Note 2)							
$t_{d(on)}$	Turn-On Delay Time	Q1 V_{DS} = 15 V, I_D = 1 A, V_{GS} = 10V, R_{GEN} = 6 Ω Q2 V_{DS} = –15 V, I_D = –1 A, V_{GS} = –10 V, R_{GEN} = 6 Ω	Q1 Q2		6 13	12 24	ns
t_r	Turn-On Rise Time		Q1 Q2		10 22	18 35	ns
$t_{d(off)}$	Turn-Off Delay Time		Q1 Q2		18 47	29 75	ns
t_f	Turn-Off Fall Time		Q1 Q2		5 18	12 30	ns
Q_g	Total Gate Charge	Q1 V_{DS} = 15 V, I_D = 7.5 A, V_{GS} = 5 V Q2 V_{DS} = –10 V, I_D = –6 A, V_{GS} = –5V	Q1 Q2		9 15	13 20	nC
Q_{gs}	Gate-Source Charge		Q1 Q2		2.8 4		nC
Q_{gd}	Gate-Drain Charge		Q1 Q2		3.1 5		nC

Drain-Source Diode Characteristics and Maximum Ratings

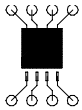
I_S	Maximum Continuous Drain-Source Diode Forward Current		Q1 Q2			1.3 –1.3	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 1.3 A (Note 2) V_{GS} = 0 V, I_S = –1.3 A (Note 2)	Q1 Q2		0.7 –0.7	1.2 –1.2	V

Notes:

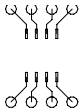
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 78°C/W when mounted on a 0.5 in^2 pad of 2 oz copper



b) 125°C/W when mounted on a .02 in^2 pad of 2 oz copper



c) 135°C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2.0%

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.

ACEx™	FAST ®	PACMAN™	SuperSOT™-3
Bottomless™	FASTr™	POP™	SuperSOT™-6
CoolFET™	GlobalOptoisolator™	PowerTrench ®	SuperSOT™-8
CROSSVOLT™	GTO™	QFET™	SyncFET™
DenseTrench™	HiSeC™	QS™	TinyLogic™
DOME™	ISOPLANAR™	QT Optoelectronics™	UHC™
EcoSPARK™	LittleFET™	Quiet Series™	UltraFET®
E^2CMOS^{TM}	MicroFET™	SILENT SWITCHER ®	VCX™
EnSigna™	MICROWIRE™	SMART START™	
FACT™	OPTOLOGIC™	Star* Power™	
FACT Quiet Series™	OPTOPLANAR™	Stealth™	

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.

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 in order 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 in order 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.

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:

SI4542DY

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_4
moschip.ru_6
moschip.ru_9