



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





Is Now Part of



**ON Semiconductor®**

To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.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](http://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 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 expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

# Si4542DY

## 30V Complementary PowerTrench® MOSFET

### General Description

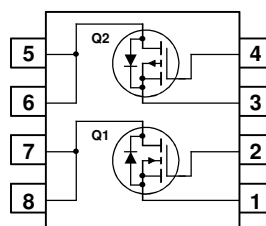
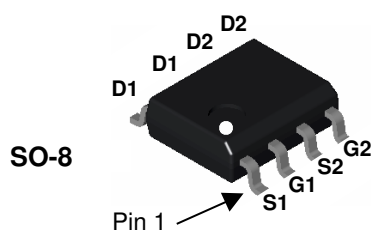
This complementary MOSFET device is produced using Fairchild's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

### Applications

- DC/DC converter
- Power management

### Features

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



### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Q1	Q2	Units
$V_{DSS}$	Drain-Source Voltage	30	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	$\pm 20$	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		$^\circ\text{C}$

### Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	78	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	40	$^\circ\text{C/W}$

### Package Marking and Ordering Information

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

**Electrical Characteristics** $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
<b>Off Characteristics</b>							
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$ $V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	Q1 Q2	30 -30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$ $I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	Q1 Q2		23 -21		mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$	Q1 Q2			1 -1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$ $V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	Q1 Q2			$\pm 100$ $\pm 100$	nA

**On Characteristics** (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ $V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	Q1 Q2	1 -1	1.5 -1.7	3 -3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$ $I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	Q1 Q2		-4 4		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}, I_D = 6\text{ A}, T_J = 125^\circ\text{C}$ $V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$ $V_{GS} = -10\text{ V}, I_D = -6\text{ A}$ $V_{GS} = -10\text{ V}, I_D = -6\text{ A}, T_J = 125^\circ\text{C}$ $V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$	Q1  Q2		19 32 25 21 29 30	28 48 35 32 51 45	m $\Omega$
$I_{D(on)}$	On-State Drain Current	$V_{GS} = 10\text{ V}, V_{DS} = 5\text{ V}$ $V_{GS} = -10\text{ V}, V_{DS} = -5\text{ V}$	Q1 Q2	20 -20			A
$g_{FS}$	Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 6\text{ A}$ $V_{DS} = -10\text{ V}, I_D = -6\text{ A}$	Q1 Q2		18 16		S

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	Q1 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$	Q1 Q2		830 1540		pF
$C_{oss}$	Output Capacitance	$f = 1.0\text{ MHz}$ Q2	Q1 Q2		185 400		pF
$C_{rss}$	Reverse Transfer Capacitance	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}$ $f = 1.0\text{ MHz}$	Q1 Q2		80 170		pF

**Electrical Characteristics (continued)** $T_A = 25^\circ\text{C}$  unless otherwise noted

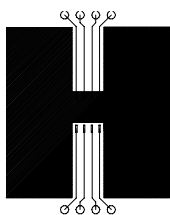
Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
<b>Switching Characteristics</b> (Note 2)							
$t_{d(on)}$	Turn-On Delay Time	Q1 $V_{DS} = 15\text{ V}, I_D = 1\text{ A}$	Q1 Q2		6 13	12 24	ns
$t_r$	Turn-On Rise Time	$V_{GS} = 10\text{ V}, R_{GEN} = 6\ \Omega$	Q1 Q2		10 22	18 35	ns
$t_{d(off)}$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

### Drain-Source Diode Characteristics and Maximum Ratings

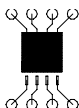
$I_S$	Maximum Continuous Drain-Source Diode Forward Current	Q1			1.3	A
		Q2			-1.3	
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1.3\text{ A}$ (Note 2)	Q1		0.7	V
		$V_{GS} = 0\text{ V}, I_S = -1.3\text{ A}$ (Note 2)	Q2		-0.7	-1.2

#### Notes:

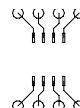
1.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



- a) 78°C/W when mounted on a 0.5 in<sup>2</sup> pad of 2 oz copper



- b) 125°C/W when mounted on a .02 in<sup>2</sup> 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.

ACE <sub>x</sub> <sup>TM</sup>	FAST <sup>®</sup>	PACMAN <sup>TM</sup>	SuperSOT <sup>TM</sup> -3
Bottomless <sup>TM</sup>	FAST <sub>r</sub> <sup>TM</sup>	POP <sup>TM</sup>	SuperSOT <sup>TM</sup> -6
CoolFET <sup>TM</sup>	GlobalOptoisolator <sup>TM</sup>	PowerTrench <sup>®</sup>	SuperSOT <sup>TM</sup> -8
CROSSVOLT <sup>TM</sup>	GTO <sup>TM</sup>	QFET <sup>TM</sup>	SyncFET <sup>TM</sup>
DenseTrench <sup>TM</sup>	HiSeC <sup>TM</sup>	QS <sup>TM</sup>	TinyLogic <sup>TM</sup>
DOMET <sup>TM</sup>	ISOPLANAR <sup>TM</sup>	QT Optoelectronics <sup>TM</sup>	UHC <sup>TM</sup>
EcoSPARK <sup>TM</sup>	LittleFET <sup>TM</sup>	Quiet Series <sup>TM</sup>	UltraFET <sup>®</sup>
E <sup>2</sup> CMOS <sup>TM</sup>	MicroFET <sup>TM</sup>	SILENT SWITCHER <sup>®</sup>	VCX <sup>TM</sup>
EnSigna <sup>TM</sup>	MICROWIRE <sup>TM</sup>	SMART START <sup>TM</sup>	
FACT <sup>TM</sup>	OPTOLOGIC <sup>TM</sup>	Star* Power <sup>TM</sup>	
FACT Quiet Series <sup>TM</sup>	OPTOPLANAR <sup>TM</sup>	Stealth <sup>TM</sup>	

## 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.

ON Semiconductor and  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](http://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 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 expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## 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](mailto: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](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative