Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - **Class V Space Level**
- Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

October 2001

FDS9435A

## 30V P-Channel PowerTrench$^{\oplus}$ MOSFET

General Description

This P-Channel MOSFET is a rugged gate version of Fairchild Semiconductor's advanced PowerTrench process. It has been optimized for power management applications requiring a wide range of gave drive voltage ratings (4.5V – 25V).

Applications

- Power management
- Load switch
- Battery protection

Features

- –5.3 A, –30 V $R_{DS(ON)} = 50~m\Omega$ @ $V_{GS} = -10$ V
  $R_{DS(ON)} = 80~m\Omega$ @ $V_{GS} = -4.5$ V

- Low gate charge

- Fast switching speed

- High performance trench technology for extremely low $R_{DS(ON)}$

- High power and current handling capability

SO-8

Pin 1
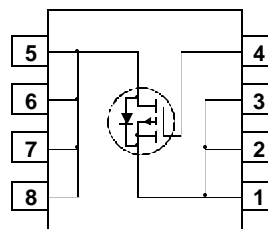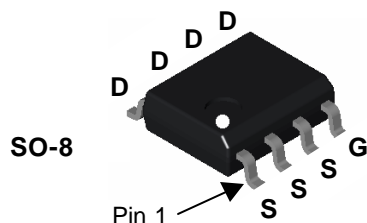
Absolute Maximum Ratings $T_A=25^oC$ unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DSS}	Drain-Source Voltage		–30	V
V_{GSS}	Gate-Source Voltage		±25	V
I_D	Drain Current – Continuous	(Note 1a)	–5.3	A
	– Pulsed		–50	
P_D	Power Dissipation for Single Operation	(Note 1a)	2.5	W
		(Note 1b)	1.2	
		(Note 1c)	1	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		–55 to +175	$^\circ$C

Thermal Characteristics

|				
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	50	$^\circ$C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1c)	125	$^\circ$C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	25	$^\circ$C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDS9435A	FDS9435A	13"	12mm	2500 units

Electrical Characteristics $T_A = 25°C$ unless otherwise noted

| Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0$ V, $I_D = -250$ μA	–30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250$ μA, Referenced to 25°C		–23		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -24$ V, $V_{GS} = 0$ V			–1	μA
I_{GSSF}	Gate–Body Leakage, Forward	$V_{GS} = 25$ V, $V_{DS} = 0$ V			100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	$V_{GS} = -25$ V $V_{DS} = 0$ V			–100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250$ μA	–1	–1.7	–3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250$ μA, Referenced to 25°C		4.5		mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	$V_{GS} = -10$ V, $I_D = -5.3$ A $V_{GS} = -4.5$ V, $I_D = -4$ A $V_{GS} = -10$ V, $I_D = -5.3$ A, $T_J = 125°C$		42 65 57	50 80 77	mΩ
$I_{D(on)}$	On–State Drain Current	$V_{GS} = -10$ V, $V_{DS} = -5$ V	–25			A
g_{FS}	Forward Transconductance	$V_{DS} = -5$ V, $I_D = -5.3$ A		10		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = -15$ V, $V_{GS} = 0$ V,		528		pF
C_{oss}	Output Capacitance	f = 1.0 MHz		132		pF
C_{rss}	Reverse Transfer Capacitance			70		pF
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	$V_{DD} = -15$ V, $I_D = -1$ A,		7	14	ns
t_r	Turn–On Rise Time	$V_{GS} = -10$ V, $R_{GEN} = 6$ Ω		13	24	ns
$t_{d(off)}$	Turn–Off Delay Time			14	25	ns
t_f	Turn–Off Fall Time			9	17	ns
Q_g	Total Gate Charge	$V_{DS} = -15$ V, $I_D = -4$ A,		10	14	nC
Q_{gs}	Gate–Source Charge	$V_{GS} = -10$ V		2.2		nC
Q_{gd}	Gate–Drain Charge			2		nC
Drain–Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain–Source Diode Forward Current				–2.1	A
V_{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0$ V, $I_S = -2.1$ A (Note 2)		–0.8	–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.
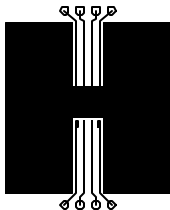
a) 50°C/W when mounted on a 1in^2 pad of 2 oz copper
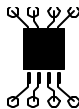
b) 105°C/W when mounted on a .04 in^2 pad of 2 oz copper
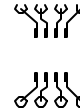
c) 125°C/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

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

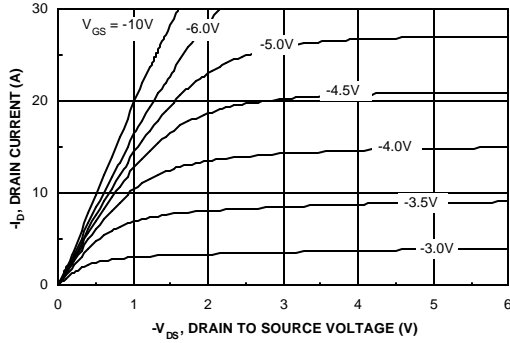## Typical Characteristics

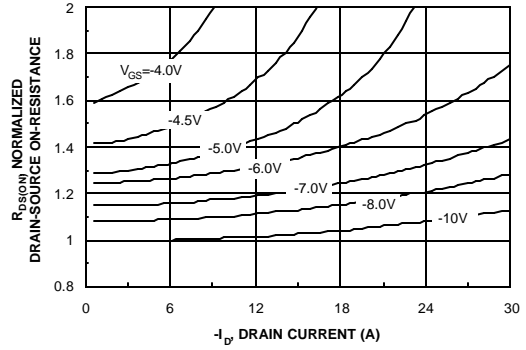**Figure 1. On-Region Characteristics.**

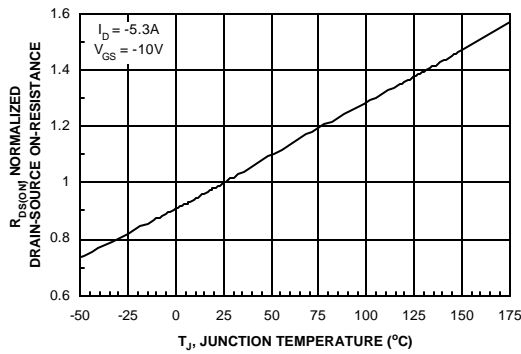**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.**

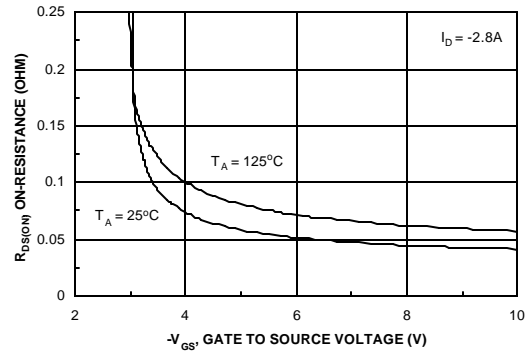**Figure 3. On-Resistance Variation with Temperature.**

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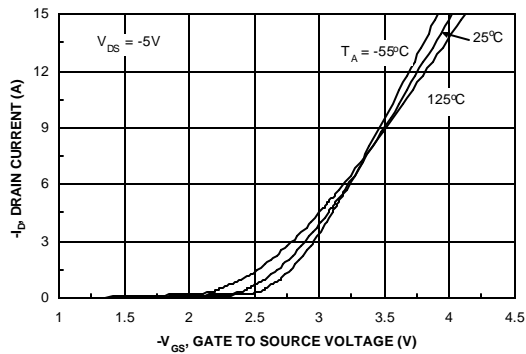

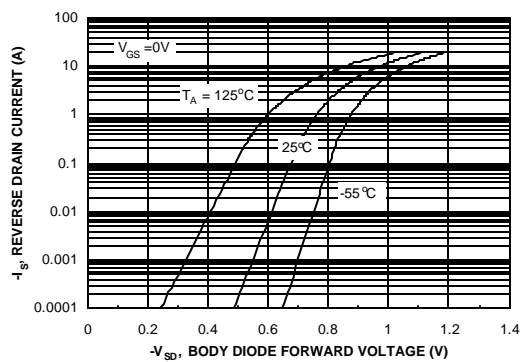**Figure 5. Transfer Characteristics.**

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

Typical Characteristics
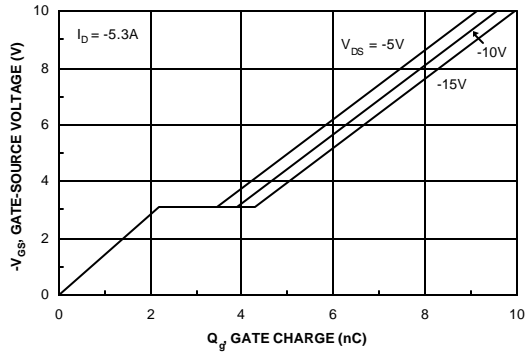

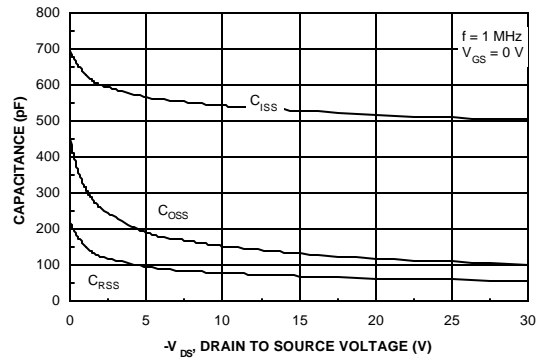Figure 7. Gate Charge Characteristics.

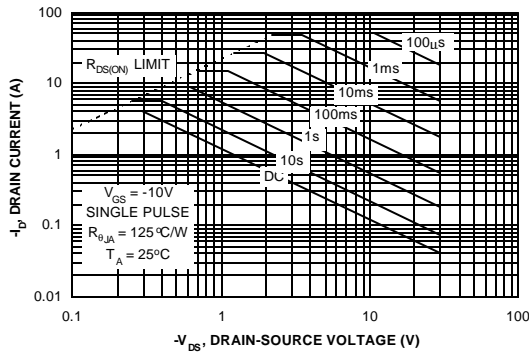Figure 8. Capacitance Characteristics.
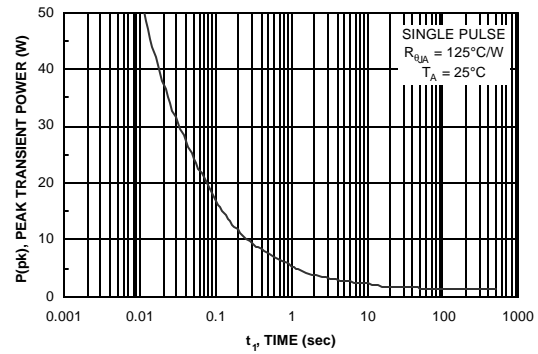

Figure 9. Maximum Safe Operating Area.

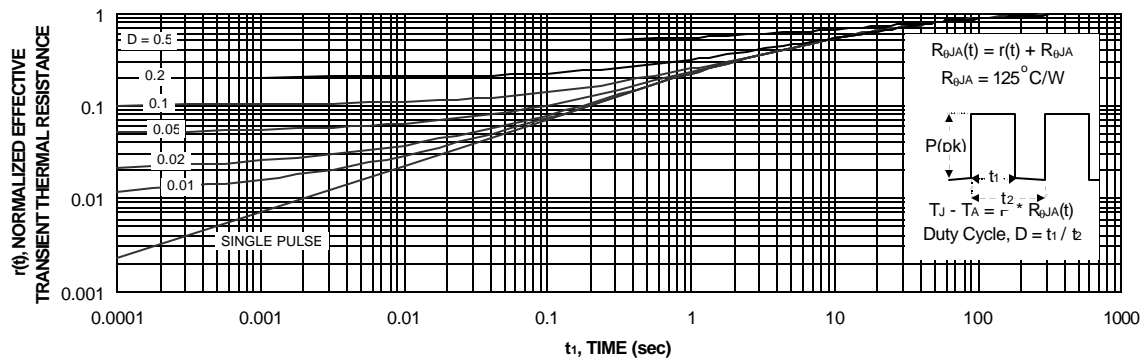Figure 10. Single Pulse Maximum
Power Dissipation.

Figure 11. Transient Thermal Response Curve.

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

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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.
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FDS9435A

30V P-Channel PowerTrench MOSFET

Contents

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- Features
- Applications
- Product status/pricing/packaging

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General description

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Features

- -5.3 A, -30 V
  - $R_{DS(ON)}$ = 50 mΩ @ V_{GS} = -10 V
  - $R_{DS(ON)}$ = 80 mΩ @ V_{GS} = - 4.5 V.
- Low gate charge
- Fast switching speed
- High density cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability

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Applications

- Power management
- Load switch
- Battery protection

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Product status/pricing/packaging

BUY

Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**
FDS9435A	Full Production	Full Production	$0.393	SO-8	8	TAPE REEL	Line 1: **$Y** (Fairchild logo) **&Z** (Asm. Plant Code) **&2** (2-Digit Date Code) **&T** (Die Trace Code) Line 2: FDS Line 3: 9435A

* Fairchild 1,000 piece Budgetary Pricing
** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a [Fairchild distributor](#) to obtain samples

Indicates product with Pb-free second-level interconnect. For more information [click here.](#)

Package marking information for product FDS9435A is available. [Click here for more information](#) .

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Models

Package & leads	Condition	Temperature range	Software version	Revision date
PSPICE				
SO-8-8	[Electrical](#)	25°C to 125°C	Orcad 9.1	Oct 2, 2003

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Qualification Support

Click on a product for detailed qualification data

Product
[FDS9435A](#)

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