FAIRCHILD™

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®

May 2009

FDS4141_F085

P-Channel PowerTrench® MOSFET

-40V, -10.8A, 19.0mΩ

Features

- Typ $r_{DS(on)}$ = 10.5mΩ at V_{GS} = -10V, I_D = -10.5A

- Typ $r_{DS(on)}$ = 14.8mΩ at V_{GS} = -4.5V, I_D = -8.4A

- Typ $Q_{g(TOT)}$ = 35nC at V_{GS} = -10V

- High performance trench technology for extremely low $r_{DS(on)}$

- RoHS Compliant

- Qualified to AEC Q101

Applications

- Control switch in synchronous & non-synchronous buck

- Load switch

- Inverter

100% RoHS COMPLIANT

SO-8

Pin 1

D
D
D
D

G
S
S
S

D	5			4	G
D	6			3	S
D	7			2	S
D	8			1	S

1
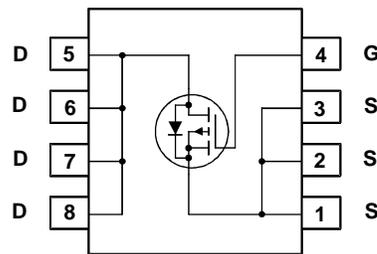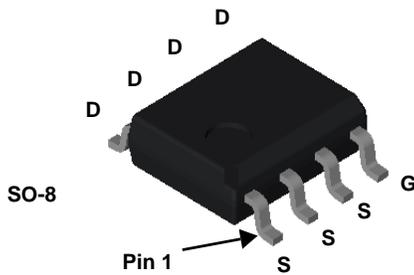
MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	-40	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (V_{GS} = 10V)	-10.8	A
	Pulsed	-36	
E_{AS}	Single Pulse Avalanche Energy	229	mJ
P_D	Power Dissipation	1.6	W
T_J, T_{STG}	Operating and Storage Temperature	-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case	30	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient SO-8, 1in^2 copper pad area	81	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDS4141	FDS4141_F085	SO-8	13"	12mm	2500 units

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Off Characteristics

B_{VDSS}	Drain to Source Breakdown Voltage	I_D = -250µA, V_{GS} = 0V	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -32V,	-	-	-1	µA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V,	-	-	±100	nA

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250µA	-1.0	-1.7	-3.0	V
$r_{DS(on)}$	Drain to Source On Resistance	I_D = -10.5A, V_{GS} = -10V	-	10.5	13.0	mΩ
		I_D = -8.4A, V_{GS} = -4.5V	-	14.8	19.0	
		I_D = -10.5A, V_{GS} = -10V, T_J = 125°C	-	15.3	19.0	
g_{FS}	Forward Transconductance	I_D = -10.5A, V_{DD} = -5V		34		S

Dynamic Characteristics

C_{iss}	Input Capacitance	V_{DS} = -20V, V_{GS} = 0V, f = 1MHz	-	2005	-	pF
C_{oss}	Output Capacitance		-	355	-	pF
C_{rss}	Reverse Transfer Capacitance		-	190	-	pF
R_g	Gate Resistance	f = 1MHz	-	5.0	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at -10V	V_{GS} = 0 to -10V	-	35	45	nC
$Q_{g(-5)}$	Total Gate Charge at -5V	V_{GS} = 0 to -5V, V_{DD} = -20V, I_D = -10.5A	-	18.6	24.2	nC
Q_{gs}	Gate to Source Gate Charge		-	5.2	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		-	6.6	-	nC

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t_{on}	Turn-On Time	V_{DD} = -20V, I_D = -10.5A V_{GS} = -10V, R_{GEN} = 6Ω	-	-	25	ns
$t_{d(on)}$	Turn-On Delay Time		-	9.7	-	ns
t_r	Rise Time		-	4.4	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	41	-	ns
t_f	Fall Time		-	11.6	-	ns
t_{off}	Turn-Off Time		-	-	84	ns

Drain-Source Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Voltage	I_{SD} = -10.5A	-	-0.8	-1.3	V
		I_{SD} = -2.1A	-	-0.7	-1.2	
t_{rr}	Reverse Recovery Time	I_F = -10.5A, d_{SD}/dt = 100A/μs	-	26	34	ns
Q_{rr}	Reverse Recovery Charge		-	13.4	17.4	nC

Notes:

1: Starting T_J = 25°C, L = 6.2mH, I_{AS} = -8.6A

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: http://www.aecouncil.com/
All Fairchild Semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.
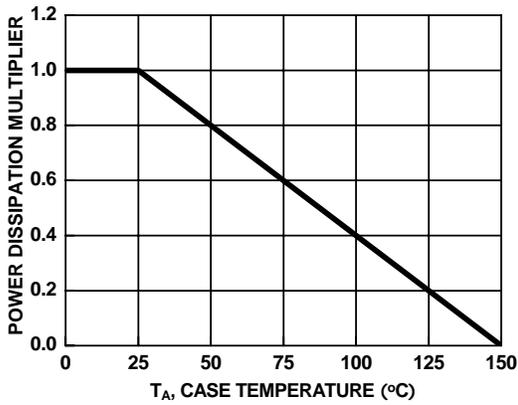
Typical Characteristics

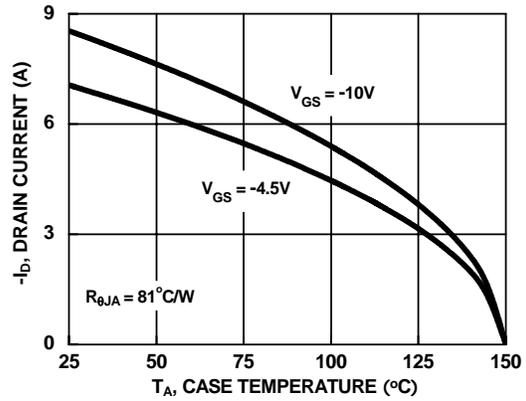Figure 1. **Normalized Power Dissipation vs Ambient Temperature**

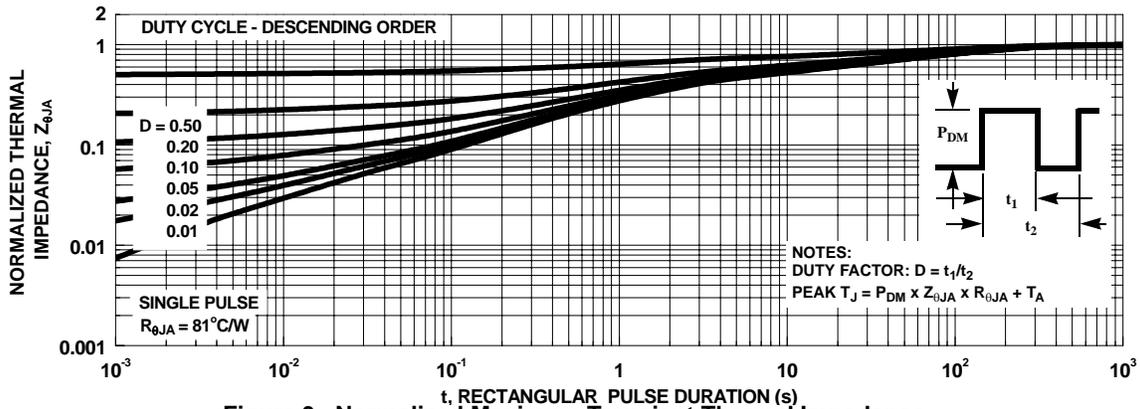Figure 2. **Maximum Continuous Drain Current vs Ambient Temperature**

NOTES:
DUTY FACTOR: $D = t_1/t_2$
PEAK $T_J = P_{DM} \times Z_{\theta JA} \times R_{\theta JA} + T_A$

Figure 3. **Normalized Maximum Transient Thermal Impedance**

$T_A = 25^oC$
FOR TEMPERATURES
ABOVE 25°C DERATE PEAK
CURRENT AS FOLLOWS:

$$I = I_{25} \left[\sqrt{\frac{150 - T_A}{125}} \right]$$
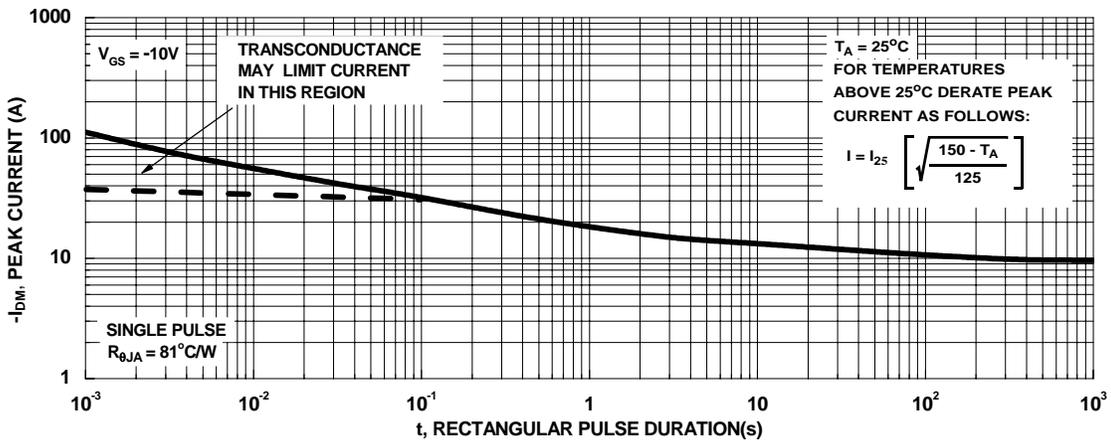
Figure 4. **Peak Current Capability**

Typical Characteristics
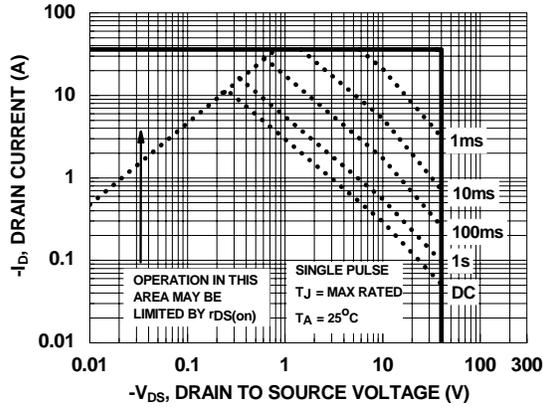
Figure 5. Forward Bias Safe Operating Area

Figure 6. Unclamped Inductive Switching Capability
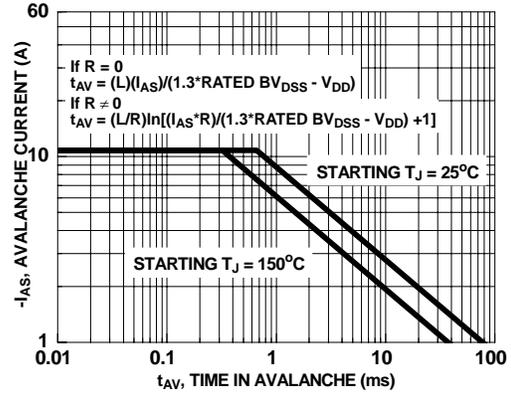
NOTE: Refer to Fairchild Application Notes AN7514 and AN7515
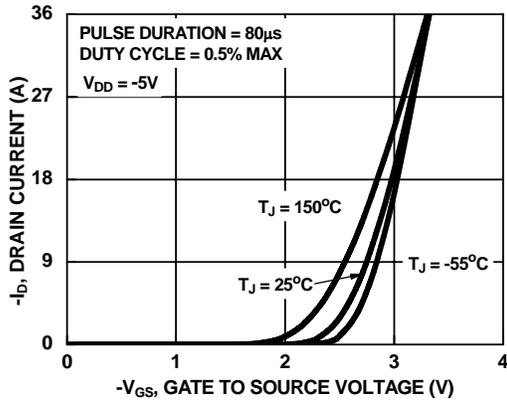
Figure 7. Transfer Characteristics
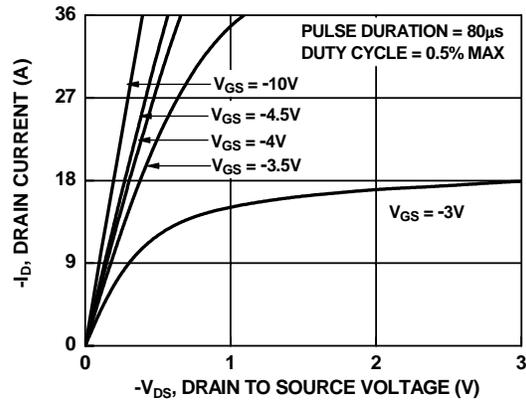
Figure 8. Saturation Characteristics
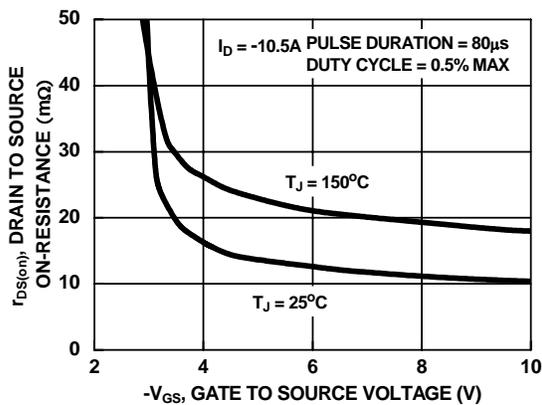
Figure 9. Drain to Source On-Resistance Variation vs Gate to Source Voltage
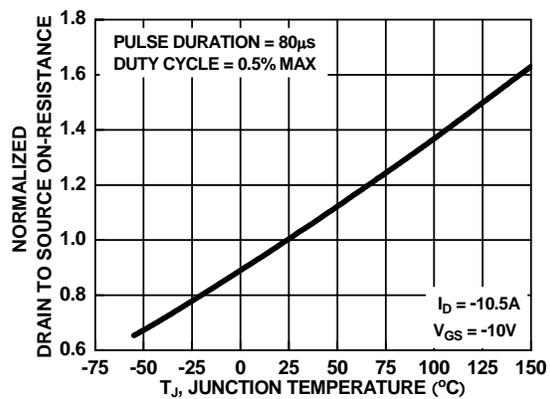
Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature
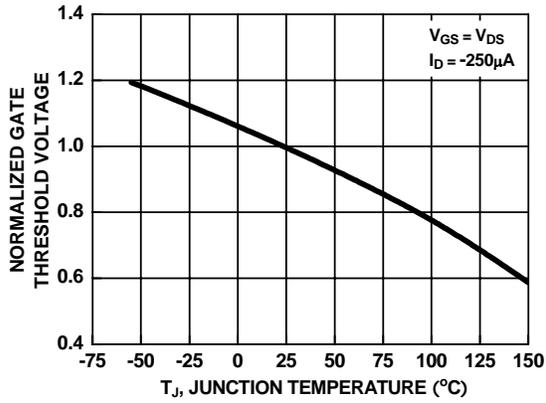
Typical Characteristics

Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature
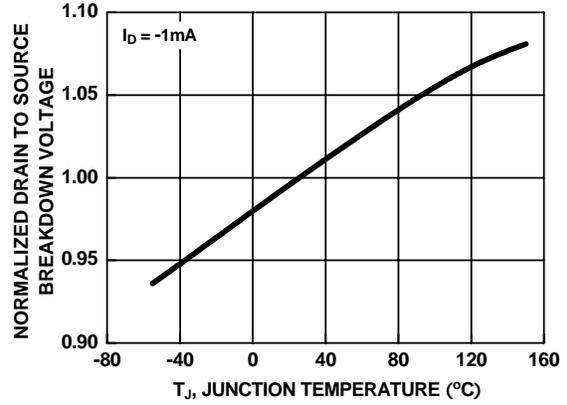
Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature
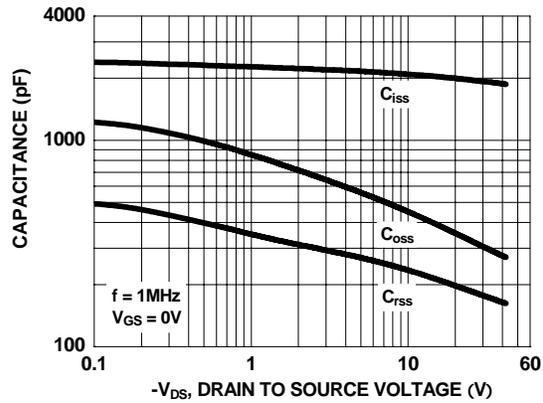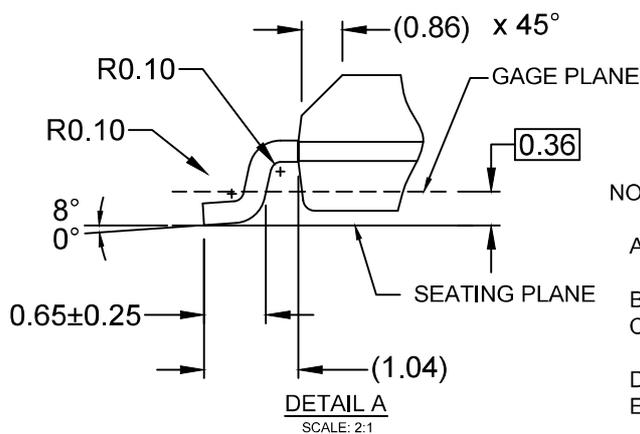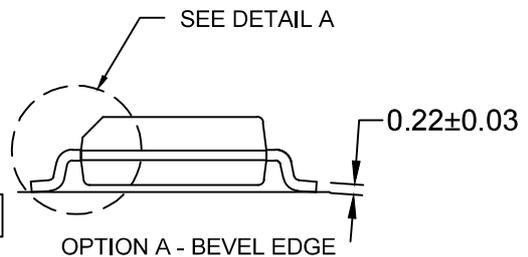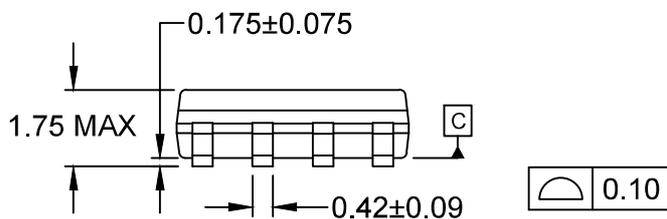

Figure 13. Capacitance vs Drain to Source Voltage
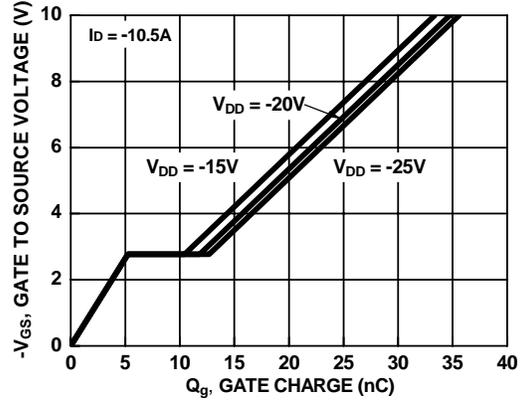
Figure 14. Gate Charge vs Gate to Source Voltage

Top View (Package Outline)

4.90±0.10 ⟦A⟧

(0.635)

⟦B⟧

8   5

6.00±0.20   3.90±0.10

1   4

PIN ONE
INDICATOR

1.27

⟦⊕ | 0.25 Ⓜ | C | B | A⟧

Land Pattern Recommendation

0.65

1.75

5.60

1.27

LAND PATTERN RECOMMENDATION

Side View

0.175±0.075

1.75 MAX

⟦C⟧

0.42±0.09

⟦⌒ | 0.10⟧

SEE DETAIL A

0.22±0.03

OPTION A - BEVEL EDGE

OPTION B - NO BEVEL EDGE

Detail A

(0.86) x 45°

R0.10

R0.10   GAGE PLANE

⟦0.36⟧

8°
0°

0.65±0.25

SEATING PLANE

(1.04)

DETAIL A
SCALE: 2:1
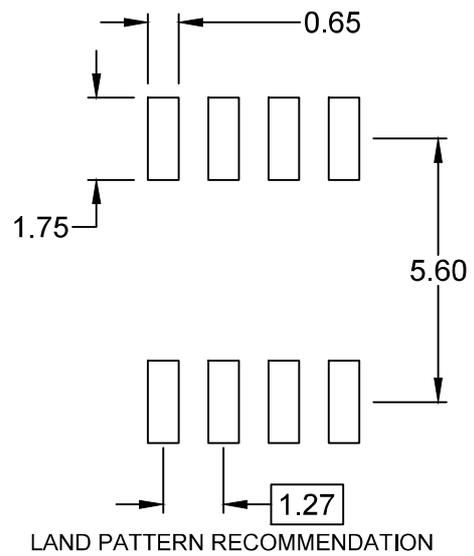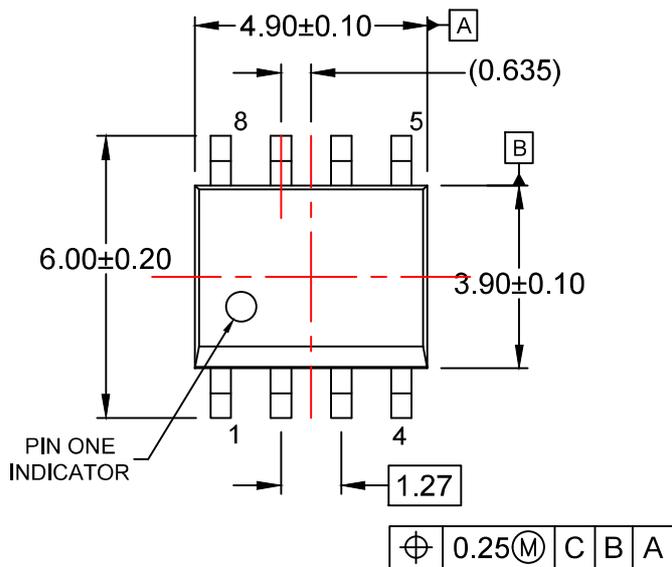
NOTES:

A) THIS PACKAGE CONFORMS TO JEDEC
   MS-012, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD
   FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M
E) DRAWING FILENAME: M08Arev16

FAIRCHILD.

PUBLICATION ORDERING INFORMATION

© Semiconductor Components Industries, LLC

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor](#):
  [FDS4141_F085](#) [FDS4141-F085](#)

MOSCHIP.RU
ВМЕСТЕ МЫ СОЗДАЕМ БУДУЩЕЕ

ПОСТАВКА
ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

☎ **+7 495 668 12 70**

✉ info@moschip.ru

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