

## FDS8433A

### Single P-Channel 2.5V Specified MOSFET

#### **General Description**

This P-Channel enhancement mode power field effect transistors is produced using Fairchild's proprietary, high cell density, DMOS technology. This very high density processis especially tailored to minimize on-state resistance and provide superior switching performance.

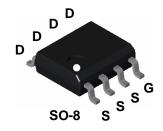
### **Applications**

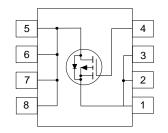
- Load switch
- DC/DC converter
- Battery protection

#### **Features**

• -5 A, -20 V. R 
$$_{DS(on)}$$
 = 0.047  $\Omega$  @ V  $_{GS}$  = -4.5 V  $_{DS(on)}$  = 0.070  $\Omega$  @ V  $_{GS}$  = -2.5 V

- Fast switching speed.
- High density cell design for extremely low R<sub>DS(on)</sub>.
- High power and current handling capability.





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

Symbol	Parameter	FDS8433A	Units	
V <sub>DSS</sub>	Drain-Source Voltage		-20	V
V <sub>GSS</sub>	Gate-Source Voltage		<u>+</u> 8	V
I <sub>D</sub>	Drain Current - Continuous	(Note 1a)	-5	А
	- Pulsed		-50	
P <sub>D</sub>	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 Temperatu	-55 to +150	∘C	

### **Thermal Characteristics**

$R_{\theta^{JA}}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	50	°C/W
R <sub>0</sub> Jc	Thermal Resistance, Junction-to-Case	(Note 1)	25	∘C/W

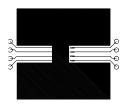
**Package Outlines and Ordering Information** 

Device Marking	Device	Reel Size	Tape Width	Quantity
FDS8433A	FDS8433A	13"	12mm	2500 units

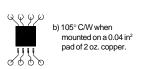
Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Char	acteristics					
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_{D} = -250 \mu\text{A}$	-20			V
BVpss ΔΤ,	Breakdown Voltage Temperature Coefficient	$I_D$ = -250 $\mu$ A, Referenced to 25°C		-25		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	$V_{DS} = -16 \text{ V}, V_{GS} = 0 \text{ V}$			-1	μΑ
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> = 8 V, V <sub>DS</sub> = 0 V			100	nA
$I_{GSSR}$	Gate-Body Leakage Current, Reverse	$V_{GS} = -8 \text{ V}, V_{DS} = 0 \text{ V}$			-100	nA
On Char	acteristics (Note 2)					
V <sub>GS(th)</sub>	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = -250 \mu\text{A}$	-0.4	-0.6	-1	V
$\Delta V_{GS(th)} = \Delta T_{J}$	Gate Threshold Voltage Temperature Coefficient	$I_D$ = -250 μA, Referenced to 25°C		4		mV/°C
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	$V_{GS} = -4.5 \text{ V}, I_D = -5 \text{ A}$ $V_{GS} = -4.5 \text{ V}, I_D = -5 \text{ A}, T_J = 125^{\circ}\text{C}$		0.036 0.050	0.047 0.085	Ω Ω
		$V_{GS} = -2.5 \text{ V}, I_D = -4.3 \text{ A}$		0.047	0.070	Ω
I <sub>D(on)</sub>	On-State Drain Current	$V_{GS} = -4.5 \text{ V}, V_{DS} = -5 \text{ V}$	-25			A
<b>g</b> <sub>FS</sub>	Forward Transconductance	$V_{DS} = -5 \text{ V}, I_{D} = -5 \text{ A}$		16		S
<u>Dynamic</u>	Characteristics	<u>,                                      </u>		ı	ı	
C <sub>iss</sub>	Input Capacitance	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V},$		1130		pF
Coss	Output Capacitance	f = 1.0 MHz		480		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			120		pF
Switchin	ng Characteristics (Note 2)					
t <sub>d(on)</sub>	Turn-On Delay Time	$V_{DD} = -10 \text{ V}, I_{D} = -1 \text{ A},$		8	16	ns
t <sub>r</sub>	Turn-On Rise Time	$V_{GS}$ = -4.5 V, $R_{GEN}$ = 6 $\Omega$		23	37	ns
t <sub>d(off)</sub>	Turn-Off Delay Time			260	360	ns
t <sub>f</sub>	Turn-Off Fall Time			90	125	ns
Q <sub>g</sub>	Total Gate Charge	$V_{DS} = -5 \text{ V}, I_{D} = -5 \text{ A},$		20	28	nC
Q <sub>gs</sub>	Gate-Source Charge	$V_{GS} = -5 V$ ,		2.8		nC
$Q_{gd}$	Gate-Drain Charge			3.2		nC
Drain-Sc	ource Diode Characteristics and	d Maximum Ratings				
I <sub>s</sub>	Maximum Continuous Drain-Source Dic				-2.1	Α

#### Notes:

<sup>1:</sup> R<sub>BJA</sub> 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) 50° C/W when mounted on a 1 in² pad of 2 oz. copper.



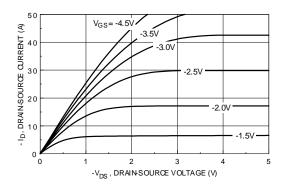


c) 125° C/W on a minimum mounting pad of 2 oz. copper.

Scale 1: 1 on letter size paper

2: Pulse Test: Pulse Width  $\leq$  300  $\mu$ s, Duty Cycle  $\leq$  2.0%

### **Typical Characteristics**



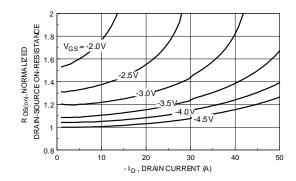
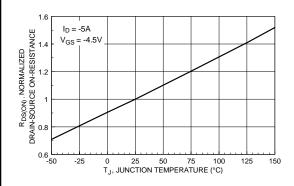


Figure 1. On-Region Characteristics.

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



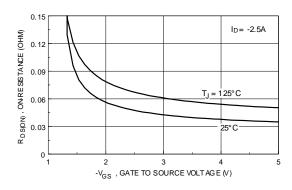
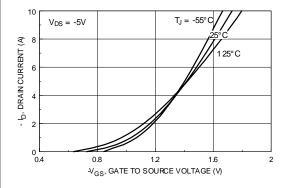


Figure 3. On-Resistance Variation with Temperature.

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



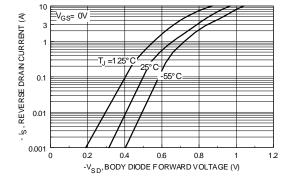
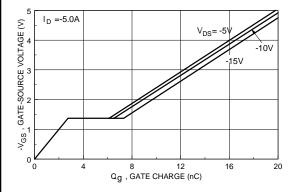


Figure 5. Transfer Characteristics.

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

### Typical Characteristics (continued)



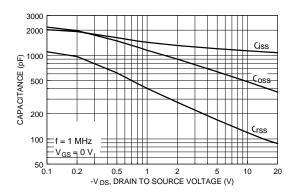
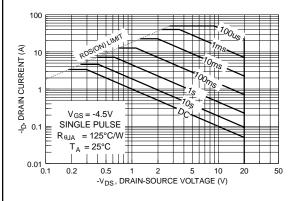


Figure 7. Gate-Charge Characteristics.





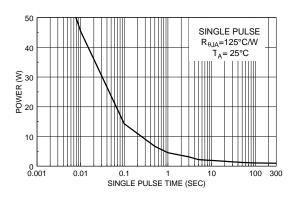


Figure 9. Maximum Safe Operating Area.

Figure 10. Single Pulse Maximum Power Dissipation.

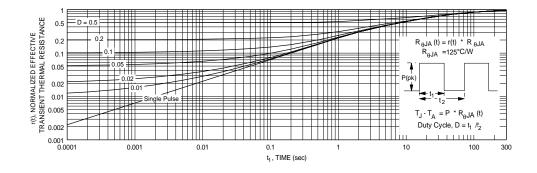


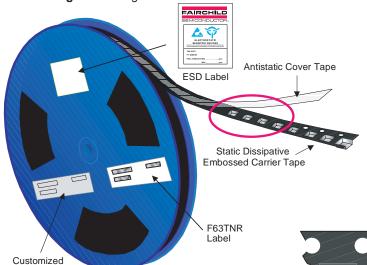
Figure 11. Transient Thermal Response Curve.

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

### **SO-8 Tape and Reel Data and Package Dimensions**



#### SOIC(8lds) Packaging Configuration: Figure 1.0



Packaging	Description

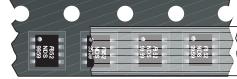
Packaging Description:

SOIC-8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and amit-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13° or 300cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 500 units per 7° or 177cm diameter reel. This and some other options are further described in the Packaging Information table.

These full reles are individually barcode labeled and placed inside a standard intermediate box (illustrated in figure 1.0) made of recyclable corrugated brown paper. One box contains two reels maximum. And these boxes are placed inside a barcode labeled shipping box which comes in different sizes depending on the number of parts shipped.

ESD Label

F63TN Label





**SOIC-8 Unit Orientation** 

343mm x 342mm x 64mm Standard Intermediate box

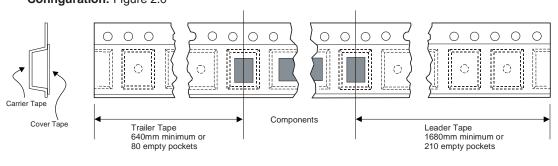
#### SOIC (8lds) Packaging Information Packaging Option Standard o flow code) L86Z D84Z Rail/Tube TNR Packaging type TNR TNR Qty per Reel/Tube/Bag 2.500 4.000 500 Reel Size 13" Dia 13" Dia 7" Dia Box Dimension (mm) 343y64y343 530x130x83 343y64y343 184v187v47 Max qty per Box 5,000 30,000 8,000 1,000 Weight per unit (gm) 0.0774 0.0774 0.0774 0.0774 Weight per Reel (kg) 0.6060 0.9696 0.1182 Note/Comments

#### F63TNR Label sample

Label



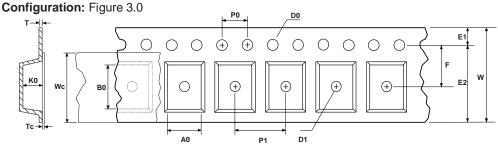
# SOIC(8lds) Tape Leader and Trailer Configuration: Figure 2.0



F63TNL



### SOIC(8lds) Embossed Carrier Tape





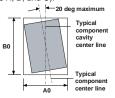
	Dimensions are in millimeter													
Pkg type	A0	В0	w	D0	D1	E1	E2	F	P1	P0	K0	т	Wc	Тс
SOIC(8lds) (12mm)	6.50 +/-0.10	5.30 +/-0.10	12.0 +/-0.3	1.55 +/-0.05	1.60 +/-0.10	1.75 +/-0.10	10.25 min	5.50 +/-0.05	8.0 +/-0.1	4.0 +/-0.1	2.1 +/-0.10	0.450 +/- 0.150	9.2 +/-0.3	0.06 +/-0.02

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



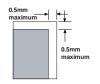
Sketch A (Side or Front Sectional View)
Component Rotation

13" Diameter Option



Sketch B (Top View)

Component Rotation

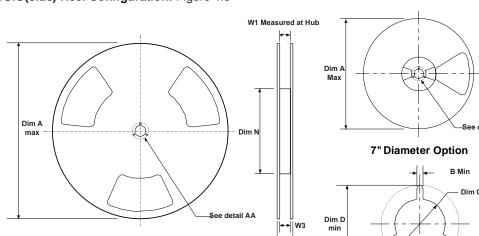


Sketch C (Top View)

Component lateral movement

DETAIL AA

### SOIC(8lds) Reel Configuration: Figure 4.0

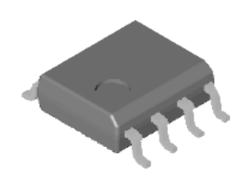


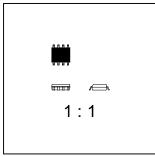
	Dimensions are in inches and millimeters								
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
12mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469 - 0.606 11.9 - 15.4
12mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	7.00 178	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469 - 0.606 11.9 - 15.4

W2 max Measured at Hub

### SO-8 Tape and Reel Data and Package Dimensions, continued

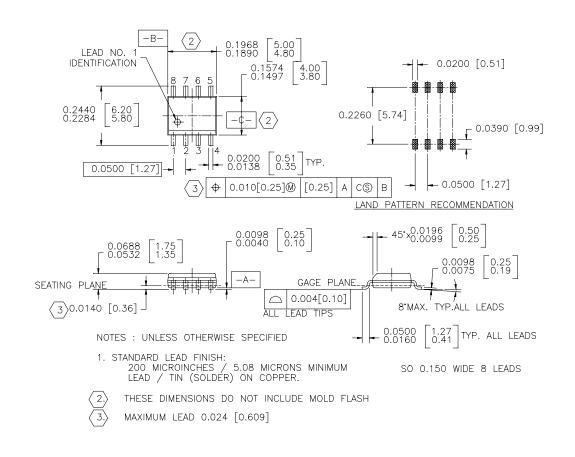
## SOIC-8 (FS PKG Code S1)





Scale 1:1 on letter size paper
Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0774



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Datasheet Identification	Product Status	Definition
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