March 1999

FDR8508P

Dual P-Channel, Logic Level, PowerTrench™ MOSFET

General Description

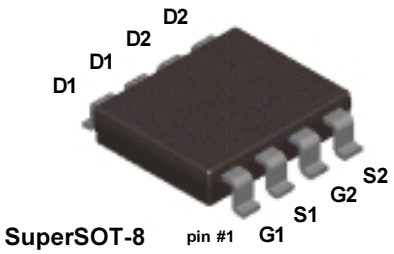
These P-Channel 2.5V specified MOSFETs are produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on state resistance and yet maintain low gate charge for superior switching performance.

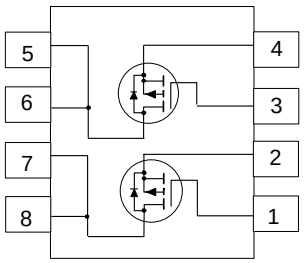
Applications

- Load switch
- DC/DC converter
- Motor driving

Features

- -3.0 A, -30 V. $R_{DS(ON)}$ = 0.052Ω @ V_{GS} = -10V
  $R_{DS(ON)}$ = 0.086Ω @ V_{GS} = -4.5V.
- Low gate charge. (8nC typical).
- High performance trench technology for extremely low $R_{DS(ON)}$
- High power and current handling capability.
- Small footprint (38% smaller than a standard SO-8); low profile package (1 mm thick); power handling capability similar to SO-8.





Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		FDR8508P	Units
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Drain Current - Continuous	(Note 1a)	-3	A
	- Pulsed		-20	
P_D	Power Dissipation		0.8	W
T_J, T_{stg}	Operating and Storage Junction Temperature Range		-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	156	°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
.8508	FDR8508P	13”	12mm	3000 units

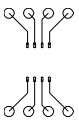
Electrical Characteristics

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
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = -250 µA, Referenced to 25°C		24		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24 V, V_{GS} = 0 V			-1	µA
I_{GSSF}	Gate-Body Leakage Current	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate-Body Leakage Current	V_{GS} = -20 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	-1.8	-3	V
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Temperature Coefficient	I_D = -250 µA, Referenced to 25°C		-4		mV/°C
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = -10 V, I_D = -3 A V_{GS} = -10 V, I_D = -3 A, T_J = 125°C V_{GS} = -4.5 V, I_D = -2.3 A		0.040 0.057 0.058	0.052 0.078 0.086	Ω Ω Ω
$I_{D(on)}$	On-State Drain Current	V_{GS} = -10 V, V_{DS} = -5 V	-20			A
g_{FS}	Forward Transconductance	V_{DS} = -5 V, I_D = -3 A		9		mS
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15 V, V_{GS} = 0 V, f = 1.0 MHz		750		pF
C_{oss}	Output Capacitance			220		pF
C_{rss}	Reverse Transfer Capacitance			100		pF
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15 V, I_D = -1 A, V_{GS} = -10 V, R_{GEN} = 6 Ω		12	22	ns
t_r	Turn-On Rise Time			14	25	ns
$t_{d(off)}$	Turn-Off Delay Time			24	38	ns
t_f	Turn-Off Fall Time			16	27	ns
Q_g	Total Gate Charge	V_{DS} = -15 V, I_D = -3A, V_{GS} = -5 V,		8	12	nC
Q_{gs}	Gate-Source Charge			1.8		nC
Q_{gd}	Gate-Drain Charge			3		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				-0.67	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = -0.67 A (Note 2)		-0.75	-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. $R_{\theta JA}$ shown below for single device operation on FR-4 board instill air.



156°C/W when mounted on a 0.0025 in^2 pad of 2oz copper.

Scale 1 : 1 on letter size paper

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

Typical Characteristics

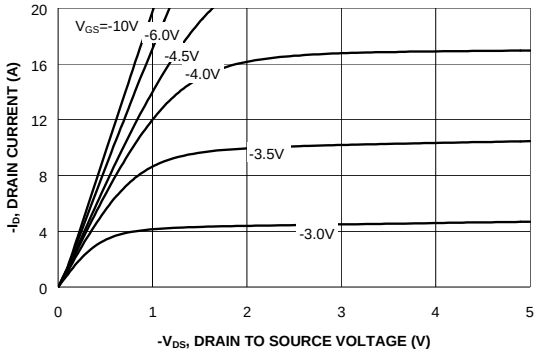


Figure 1: On-Region Characteristics

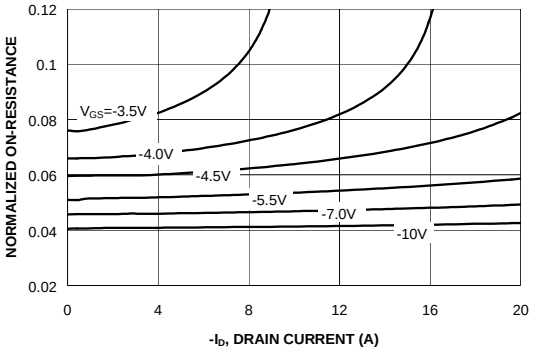


Figure 2: On-Resistance Variation vs Drain Current and Gate Voltage

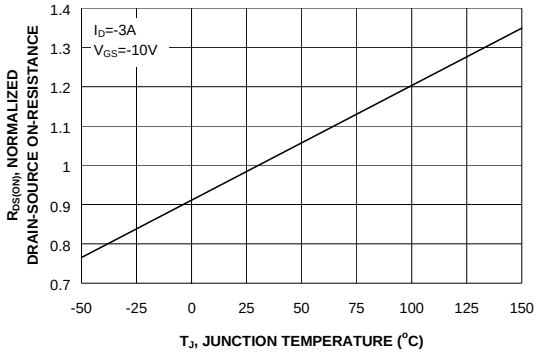


Figure 3: On-Resistance Variation vs Temperature

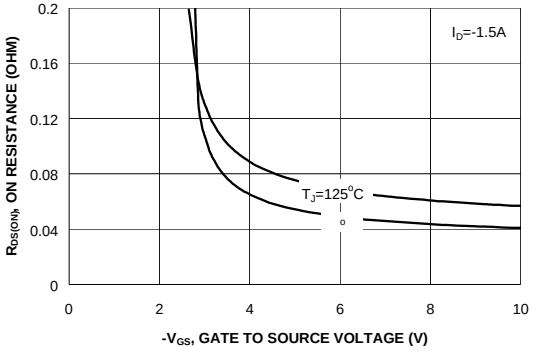


Figure 4: On-Resistance Variation vs Gate-To-Source Voltage

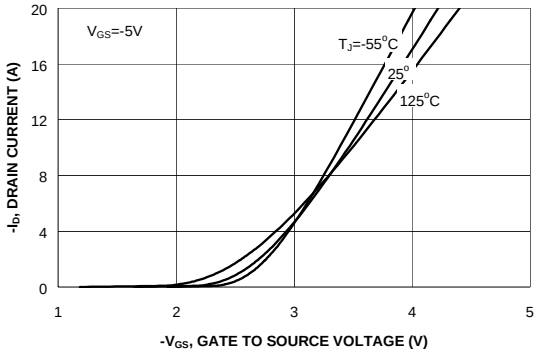


Figure 5: Transfer Characteristics

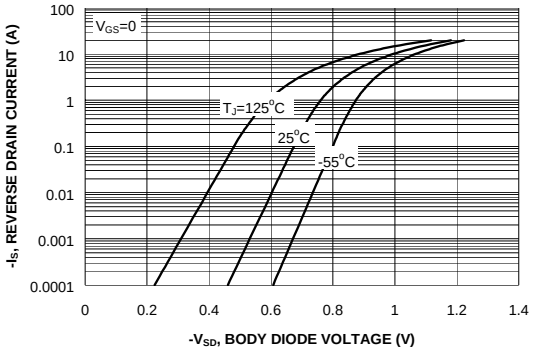


Figure 6: Body Diode Forward Voltage Variation vs Source Current and Temperature

Typical Characteristics (continued)

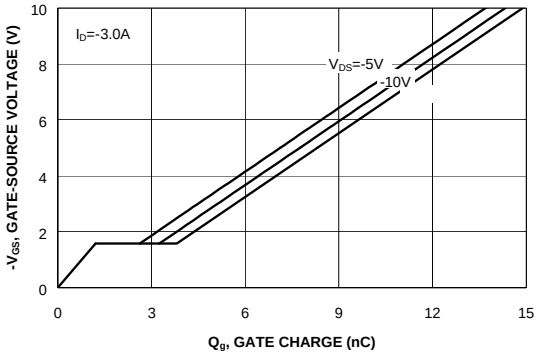


Figure 7: Gate-Charge Characteristics

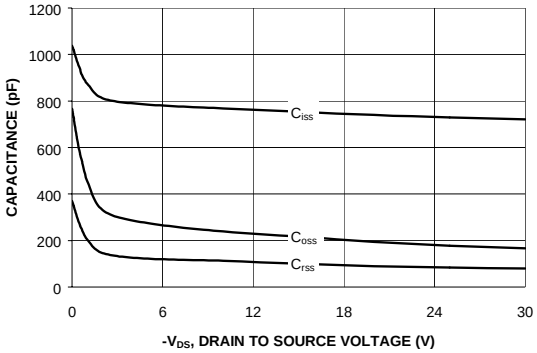


Figure 8: Capacitance Characteristics

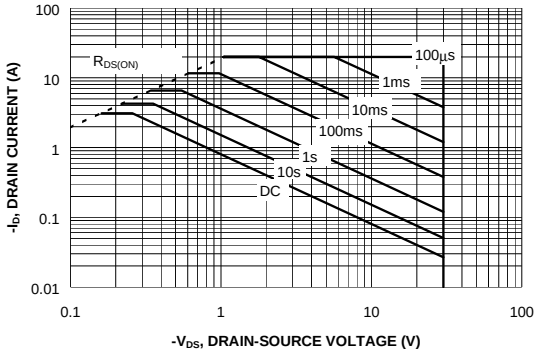


Figure 9: Maximum Safe Operating Area

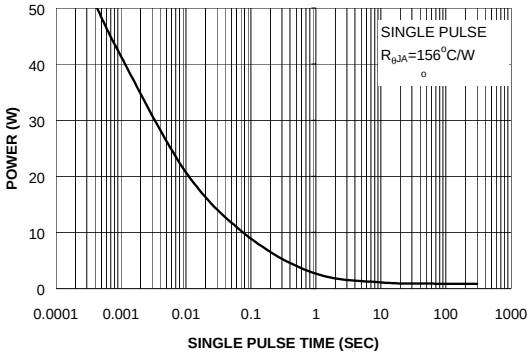


Figure 10: Single Pulse Maximum Power Dissipation

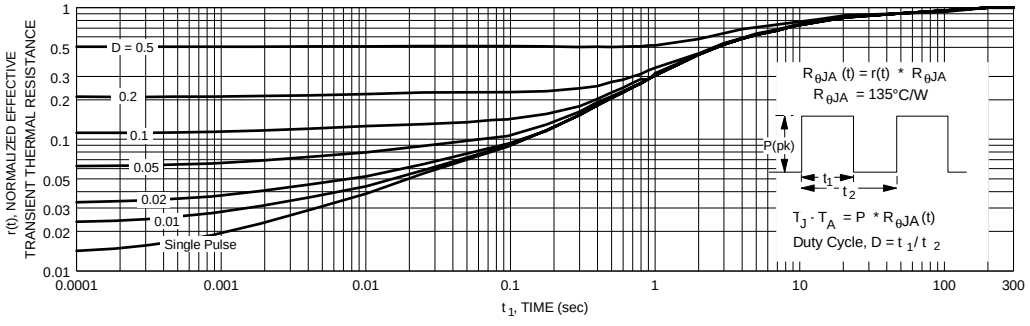


Figure 11. Transient Thermal Response Curve.

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

SuperSOT™-8 Tape and Reel Data and Package Dimensions

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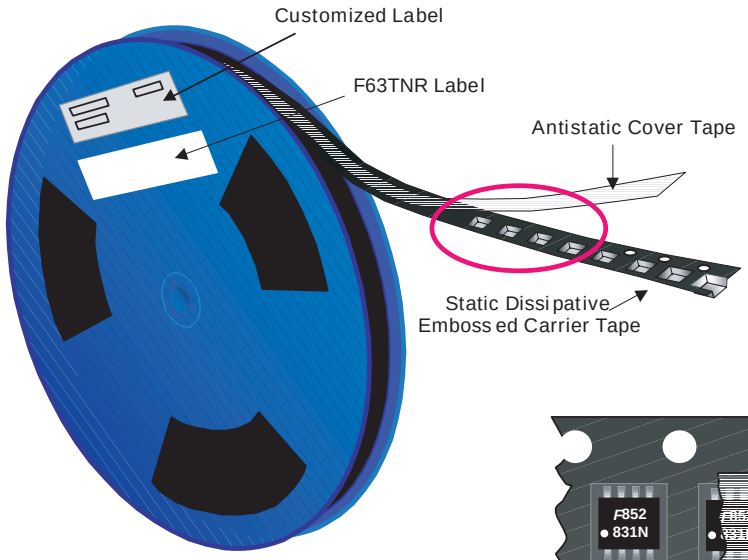
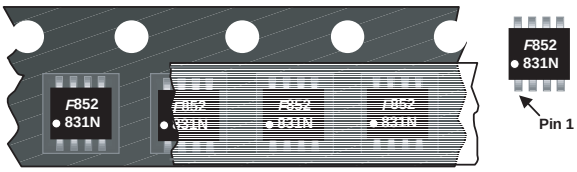
SSOT-8 Packaging Configuration: Figure 1.0



Packaging Description:

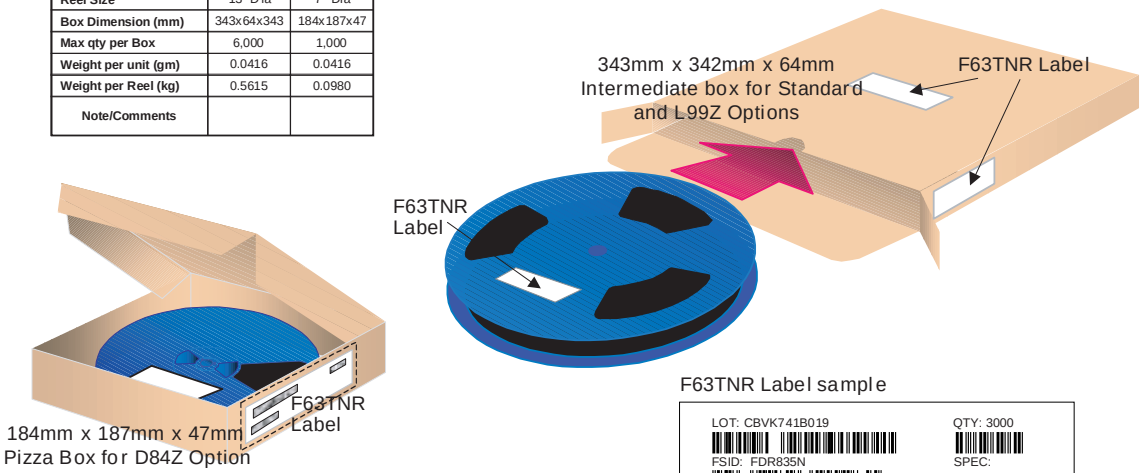
SSOT-8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 13" or 330cm 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 reels 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.

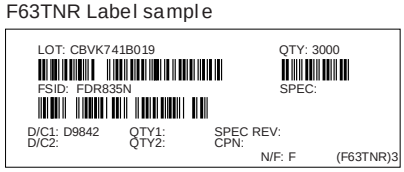


SSOT-8 Unit Orientation

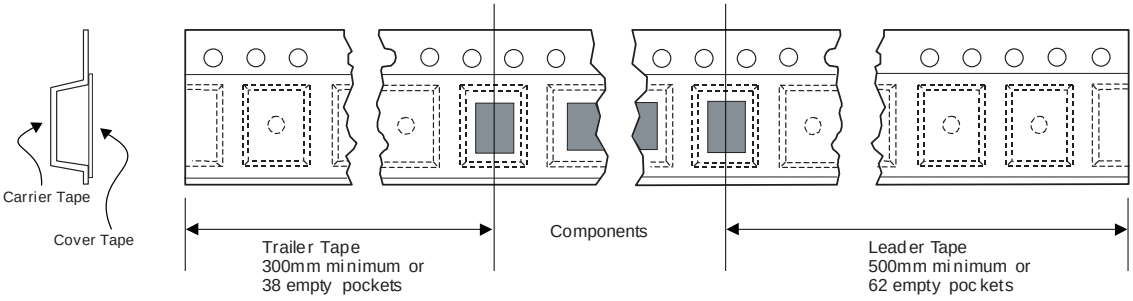
SSOT-8 Packaging Information		
Packaging Option	Standard (no flow code)	D84Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	500
Reel Size	13" Dia	7" Dia
Box Dimension (mm)	343x64x343	184x187x47
Max qty per Box	6,000	1,000
Weight per unit (gm)	0.0416	0.0416
Weight per Reel (kg)	0.5615	0.0980
Note/Comments		



F63TNR Label sample



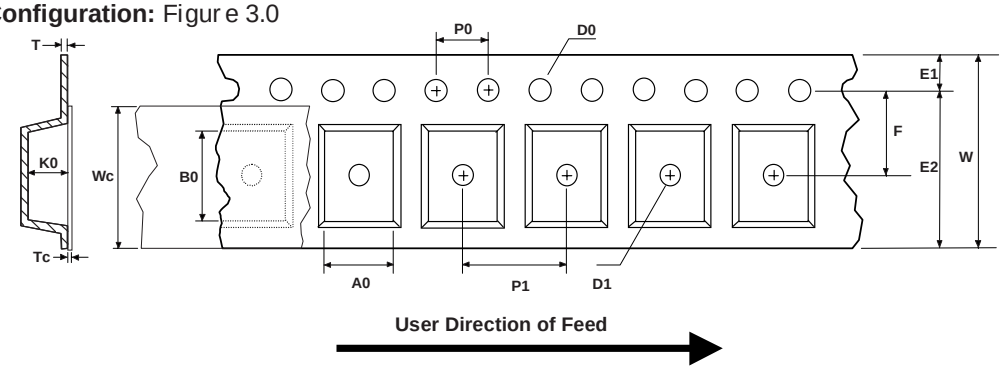
SSOT-8 Tape Leader and Trailer Configuration: Figure 2.0



SuperSOT™-8 Tape and Reel Data and Package Dimensions, continued

SSOT-8 Embossed Carrier Tape

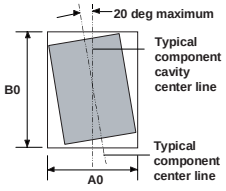
Configuration: Figure 3.0



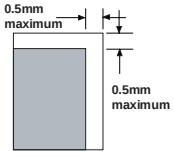
Dimensions are in millimeter														
Pkg type	**A0**	**B0**	**W**	**D0**	**D1**	**E1**	**E2**	**F**	**P1**	**P0**	**K0**	**T**	**Wc**	**Tc**
SSOT-8 (12mm)	4.47 +/-0.10	5.00 +/-0.10	12.0 +/-0.3	1.55 +/-0.05	1.50 +/-0.10	1.75 +/-0.10	10.25 min	5.50 +/-0.05	8.0 +/-0.1	4.0 +/-0.1	1.37 +/-0.10	0.280 +/-0.150	9.5 +/-0.025	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

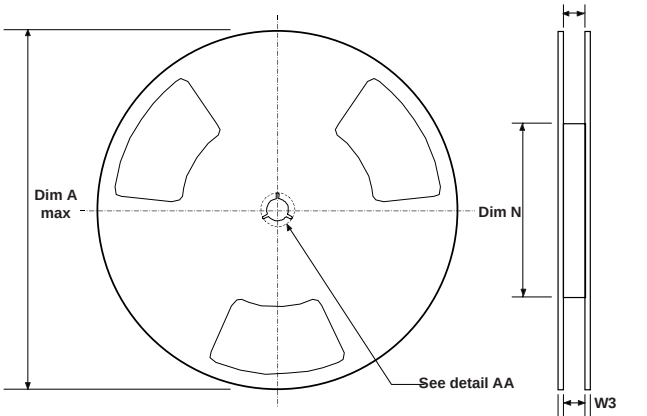


Sketch B (Top View)
Component Rotation

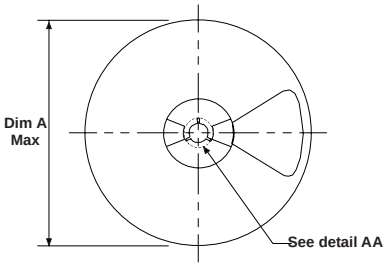


Sketch C (Top View)
Component lateral movement

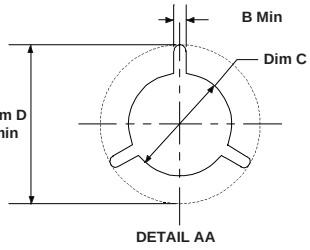
SSOT-8 Reel Configuration: Figure 4.0



13" Diameter Option



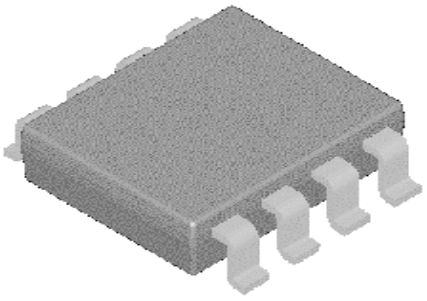
7" Diameter Option

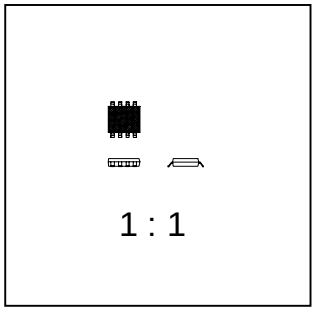


Dimensions are in inches and millimeters									
Tape Size	**Reel Option**	**Dim A**	**Dim B**	**Dim C**	**Dim D**	**Dim N**	**Dim W1**	**Dim W2**	**Dim W3 (LSL-USL)**
12mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	5.906 150	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469 – 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

SuperSOT™-8 Tape and Reel Data and Package Dimensions, continued

SuperSOT™-8 (FS PKG Code 34, 35)

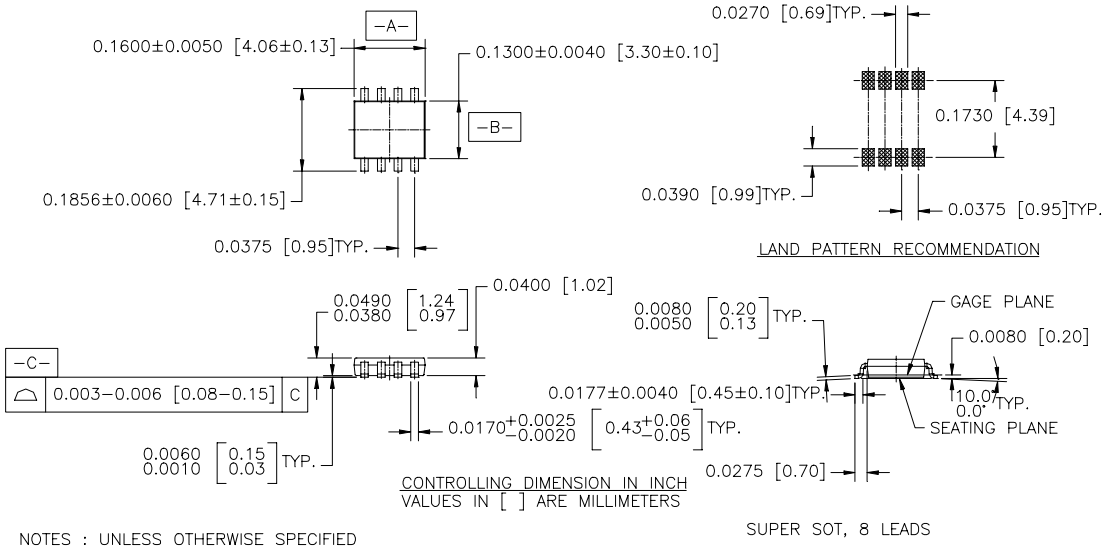




Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0416



NOTES : UNLESS OTHERWISE SPECIFIED

1. STANDARD LEAD FINISH TI BE 200 MICROINCHES / 5.08 MICROMETERS MINIMUM TIN/LEAD (SOLDER) ON COPPER.
2. NO JEDEC REGISTRATION AS JAN. 1996

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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.

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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.
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