

# FDC6330L

## Integrated Load Switch

### General Description

This device is particularly suited for compact power management in portable electronic equipment where 3V to 20V input and 2.3A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) which drives a large P-Channel power MOSFET (Q2) in one tiny SuperSOT™-6 package.

### Applications

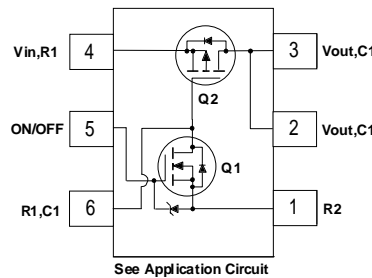
- Power management
- Load actuation

### Features

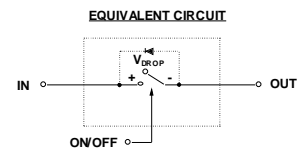
- $V_{\text{DROP}} = 0.2\text{V} @ V_{\text{IN}} = 12\text{V}, I_{\text{L}} = 2.5\text{A}, R_{\text{ON}} = 0.08\ \Omega$   
 $V_{\text{DROP}} = 0.2\text{V} @ V_{\text{IN}} = 5\text{V}, I_{\text{L}} = 1.6\text{A}, R_{\text{ON}} = 0.125\ \Omega$
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6kV Human Body Model).
- High performance PowerTrench™ technology for extremely low on-resistance.
- SuperSOT™-6 package design using copper lead frame for superior thermal and electrical capabilities.



SuperSOT™-6



See Application Circuit



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

Symbol	Parameter	Ratings	Units
V <sub>IN</sub>	Input Voltage Range (Note 1)	3 - 20	V
V <sub>ON/OFF</sub>	On/Off Voltage Range	1.5 - 8	V
I <sub>D</sub>	Load Current - Continuous (Note 2)	2.3	A
		10	
P <sub>D</sub>	Maximum Power Dissipation (Note 1)	0.7	W
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Temperature Range	-55 to +150	°C
ESD	Electrostatic Discharge Rating MIL-STD-883D Human-Body-Model (100pf/1500 Ohm)	6	kV

### Thermal Characteristics

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 2)	180	°C/W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case (Note 2)	60	°C/W

### Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
.330 (. Denotes pin 1)	FDC6330L	7"	8mm	3000 units

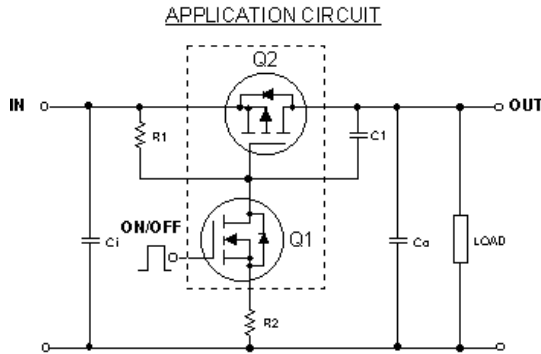
**Electrical Characteristics** T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>OFF Characteristics</b>						
I <sub>FL</sub>	Leakage Current	V <sub>IN</sub> = 20 V, V <sub>ON/OFF</sub> = 250 μA			1	μA
<b>ON Characteristics</b> (Note 3)						
V <sub>DROP</sub>	Conduction Voltage	V <sub>IN</sub> = 12 V, V <sub>ON/OFF</sub> = 3.3 V, I <sub>L</sub> = 2.5 A			0.2	V
		V <sub>IN</sub> = 5 V, V <sub>ON/OFF</sub> = 3.3 V, I <sub>L</sub> = 1.6 A			0.2	V
R <sub>(ON)</sub>	Q <sub>2</sub> - Static On-Resistance	V <sub>GS</sub> = -12 V, I <sub>D</sub> = -2.3 A V <sub>GS</sub> = -5 V, I <sub>D</sub> = -1.9 A		0.054 0.081	0.08 0.125	Ω
I <sub>L</sub>	Load Current	V <sub>DROP</sub> = 0.2 V, V <sub>IN</sub> = 12 V, V <sub>ON/OFF</sub> = 3.3 V	2.5			A
		V <sub>DROP</sub> = 0.2 V, V <sub>IN</sub> = 5 V, V <sub>ON/OFF</sub> = 3.3 V	1.6			

Notes:

1. Range of V<sub>in</sub> can be up to 30V, but R<sub>1</sub> and R<sub>2</sub> must be scaled such that V<sub>GS</sub> of Q2 does not exceed 20V.
2. R<sub>θJA</sub> 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<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%.

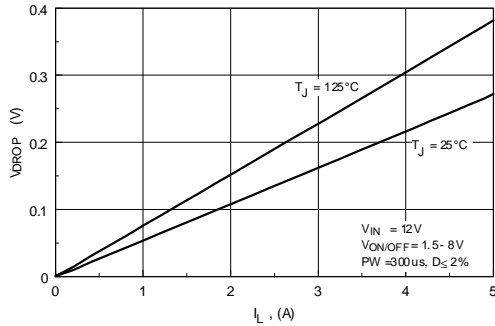
**FDC6330L Load Switch Application**



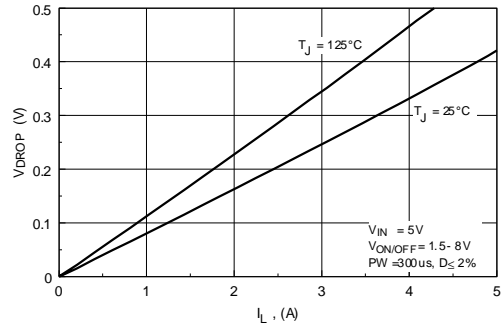
**External Component Recommendation:**

- For applications where Co ≤ 1μF.
- For slew rate control, select R2 in the range of 1k - 4.7kΩ .
- For additional in-rush current control, C1 ≤ 1000pF can be added.
- Select R1 so that the R1/R2 ratio ranges from 10 - 100. R1 is required to turn Q2 off.

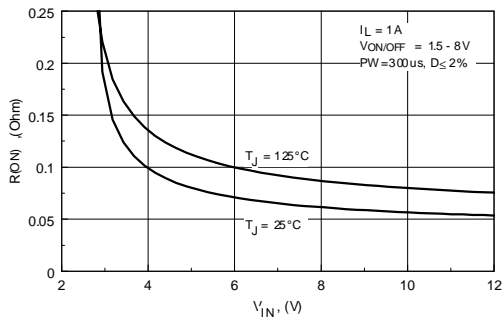
**Typical Characteristics** (continued)



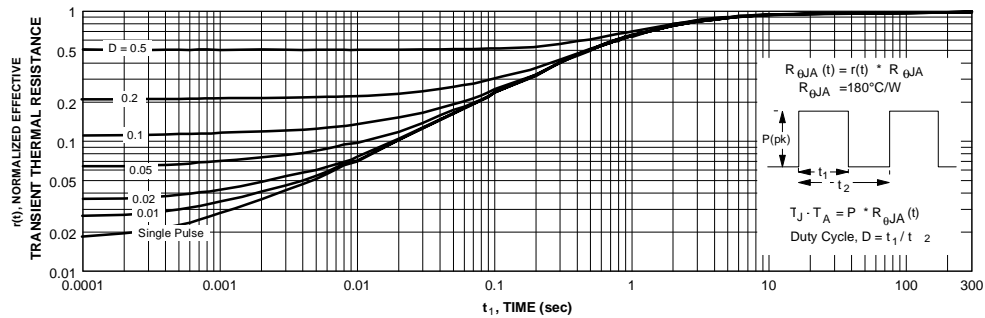
**Figure 1. Conduction Voltage Drop Variation with Load Current.**



**Figure 2. Conduction Voltage Drop Variation with Load Current.**



**Figure 3. On-Resistance Variation with Input Voltage.**

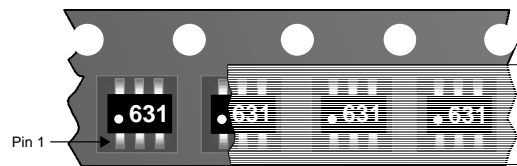
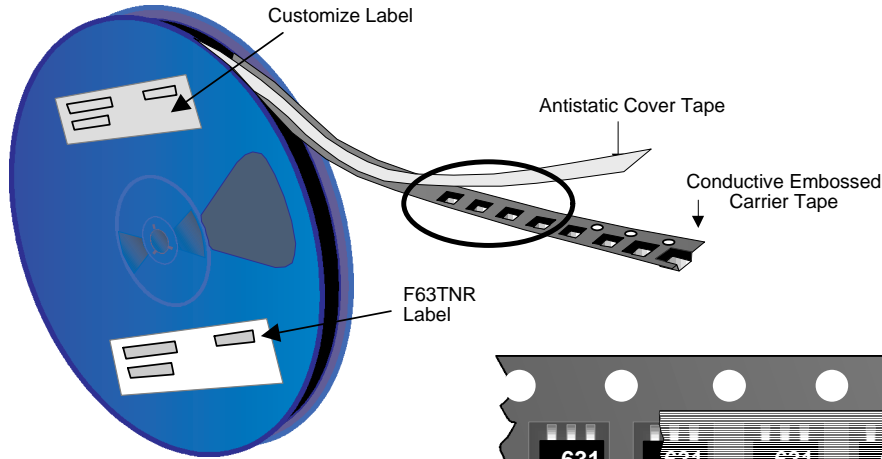


**Figure 4. Transient Thermal Response Curve.**

Thermal characterization performed using the conditions described in Note 2. Transient thermal response will change depending on the circuit board design.

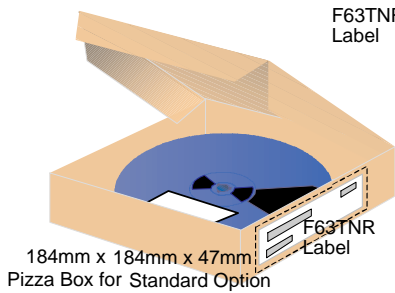
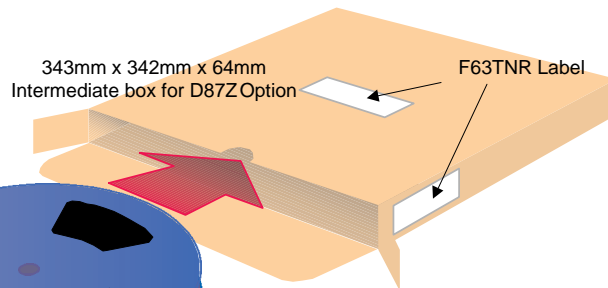
# SuperSOT™-6 Tape and Reel Data and Package Dimensions

**SSOT-6 Packaging**  
Configuration: Figure 1.0



SSOT-6 Packaging Information		
Packaging Option	Standard (no flow code)	D87Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	10,000
Reel Size	7" Dia	13"
Box Dimension (mm)	184x187x47	343x343x64
Max qty per Box	9,000	20,000
Weight per unit (gm)	0.0158	0.0158
Weight per Reel (kg)	0.1440	0.4700
Note/Comments		

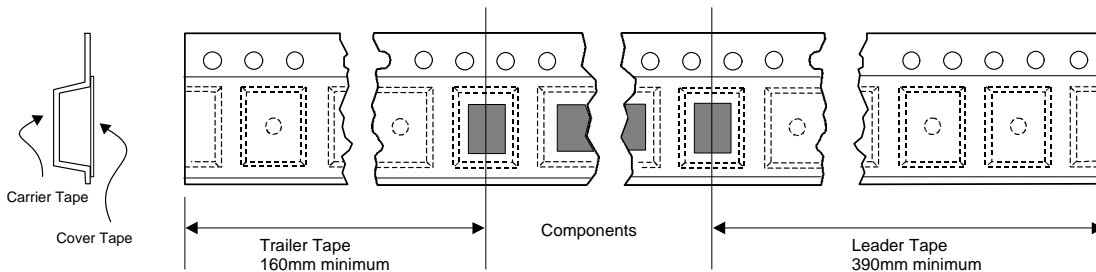
**SSOT-6 Unit Orientation**



**F63TNR Label sample**

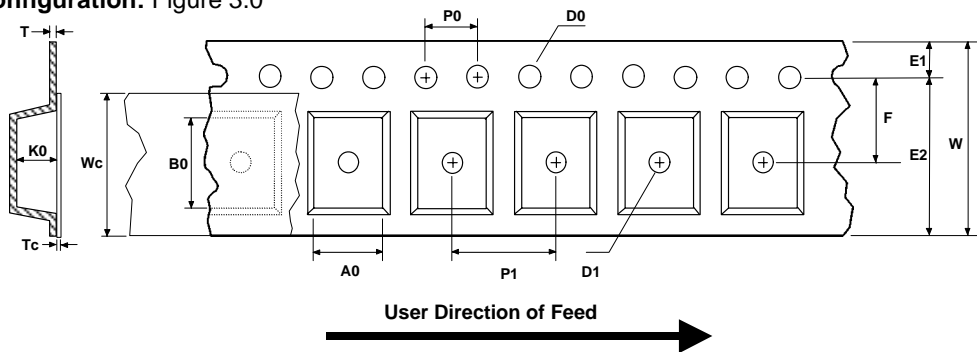


**SSOT-6 Tape Leader Trailer Configuration: Figure 2.0**



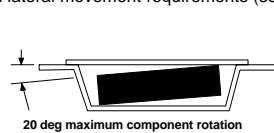
# SuperSOT™-6 Tape and Reel Data and Package Dimensions, continued

## SSOT-6 Embossed Carrier Tape Configuration: Figure 3.0

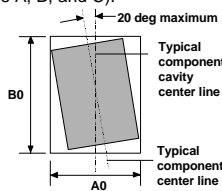


Dimensions are in millimeter														
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SSOT-6 (8mm)	3.23 +/-0.10	3.18 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.00 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.37 +/-0.10	0.255 +/-0.150	5.2 +/-0.3	0.06 +/-0.02

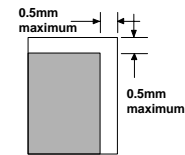
Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)  
Component Rotation

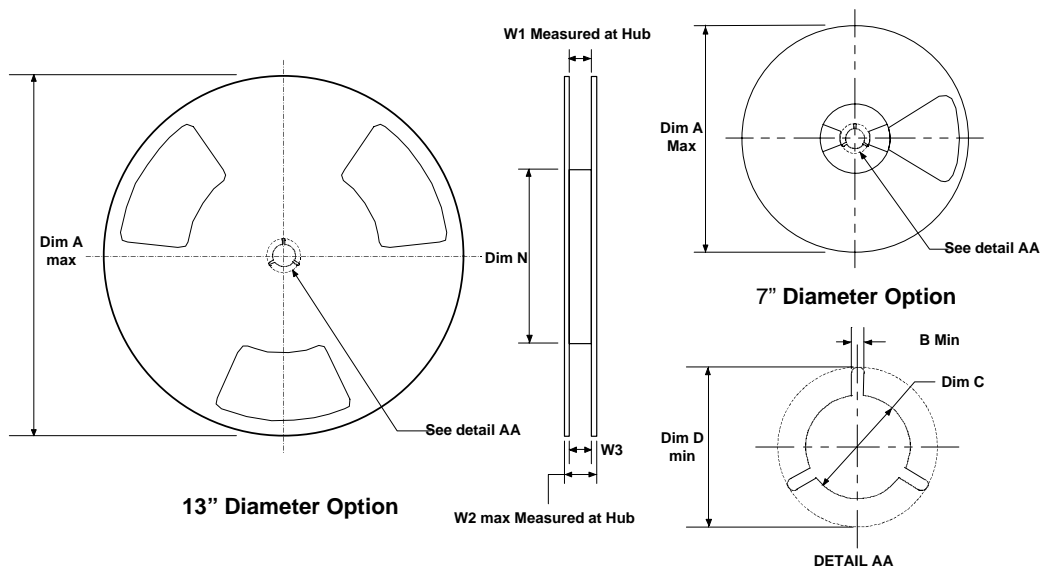


Sketch B (Top View)  
Component Rotation



Sketch C (Top View)  
Component lateral movement

## SSOT-6 Reel Configuration: Figure 4.0

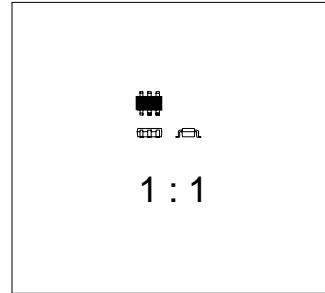
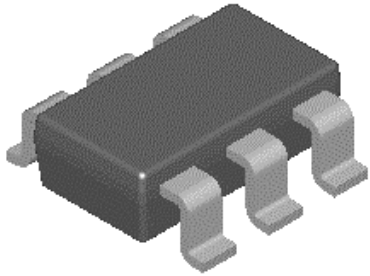


Dimensions are in inches and millimeters									
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9
8mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	4.00 100	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9

December 1998, Rev. B

# SuperSOT™-6 Tape and Reel Data and Package Dimensions, continued

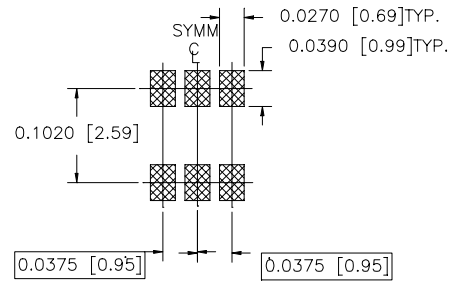
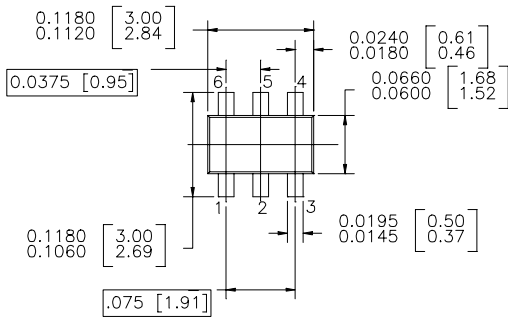
## SuperSOT™-6 (FS PKG Code 31, 33)



Scale 1:1 on letter size paper

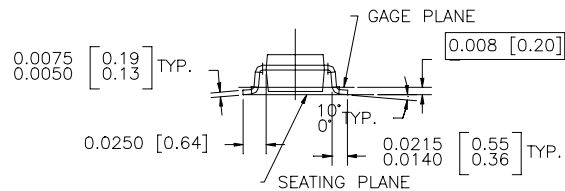
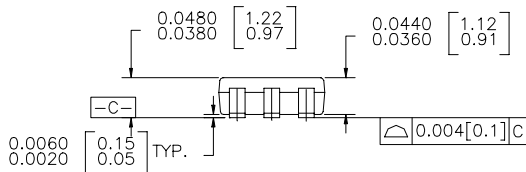
Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 0.0158



LAND PATTERN RECOMMENDATION

CONTROLLING DIMENSION IS INCH  
VALUES IN [ ] ARE MILLIMETERS



SUPER SOT 6 LEADS

NOTES : UNLESS OTHERWISE SPECIFIED

1.0 STANDARD LEAD FINISH : 150 MICRONS 93.81 MICROMETERS)  
MINIMUM TIN / LEAD (SOLDER) ON COPPER.

2.0 NO JEDEC REGISTRATION AS OF JULY 1996

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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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