

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

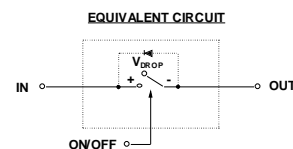
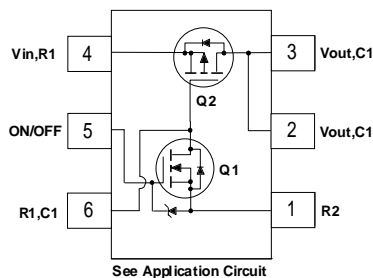
- Power management
- Load actuation

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



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{IN}	Input Voltage Range (Note 1)	3 - 20	V
$V_{\text{ON/OFF}}$	On/Off Voltage Range	1.5 - 8	V
I_{D}	Load Current - Continuous (Note 2)	2.3	A
		10	
P_{D}	Maximum Power Dissipation (Note 1)	0.7	W
$T_{\text{J}}, T_{\text{stg}}$	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

$R_{\theta\text{JA}}$	Thermal Resistance, Junction-to-Ambient (Note 2)	180	°C/W
$R_{\theta\text{JC}}$	Thermal Resistance, Junction-to-Case (Note 2)	60	°C/W

Package Marking and Ordering Information

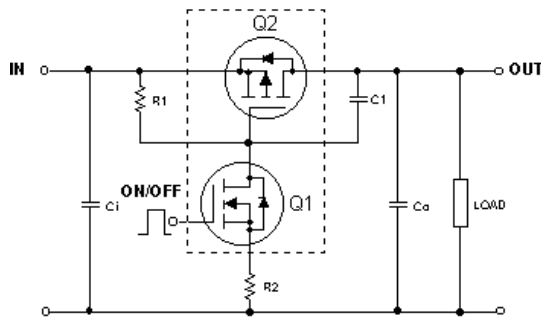
Device Marking	Device	Reel Size	Tape width	Quantity
.330 (. Denotes pin 1)	FDC6330L	7"	8mm	3000 units

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF Characteristics						
I_{FL}	Leakage Current	$V_{IN} = 20\text{ V}$, $V_{ON/OFF} = 250\text{ }\mu\text{A}$			1	μA
ON Characteristics (Note 3)						
V_{DROP}	Conduction Voltage	$V_{IN} = 12\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 2.5\text{ A}$			0.2	V
		$V_{IN} = 5\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$, $I_L = 1.6\text{ A}$			0.2	V
$R_{(ON)}$	Q_2 - Static On-Resistance	$V_{GS} = -12\text{ V}$, $I_D = -2.3\text{ A}$ $V_{GS} = -5\text{ V}$, $I_D = -1.9\text{ A}$		0.054 0.081	0.08 0.125	Ω
I_L	Load Current	$V_{DROP} = 0.2\text{ V}$, $V_{IN} = 12\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$	2.5			A
		$V_{DROP} = 0.2\text{ V}$, $V_{IN} = 5\text{ V}$, $V_{ON/OFF} = 3.3\text{ V}$	1.6			

Notes:

1. Range of V_{IN} can be up to 30V, but R_1 and R_2 must be scaled such that V_{GS} of Q_2 does not exceed 20V.
2. $R_{\theta JA}$ 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 $R_{\theta JA}$ is determined by the user's board design.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

FDC6330L Load Switch ApplicationAPPLICATION CIRCUIT**External Component Recommendation:**For applications where $C_0 \leq 1\mu\text{F}$.For slew rate control, select R_2 in the range of $1\text{ k} - 4.7\text{ k}\Omega$.For additional in-rush current control, $C_1 \leq 1000\text{ pF}$ can be added.Select R_1 so that the R_1/R_2 ratio ranges from 10 - 100. R_1 is required to turn Q_2 off.

Typical Characteristics (continued)

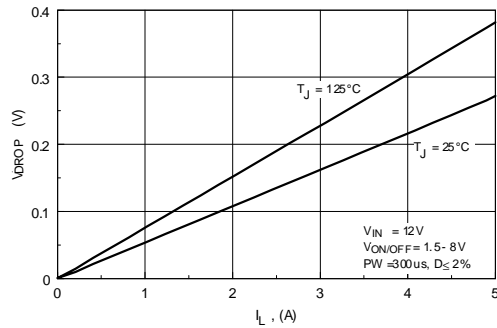


Figure 1. Conduction Voltage Drop Variation with Load Current.

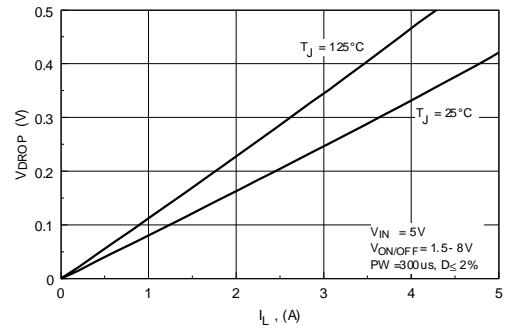


Figure 2. Conduction Voltage Drop Variation with Load Current.

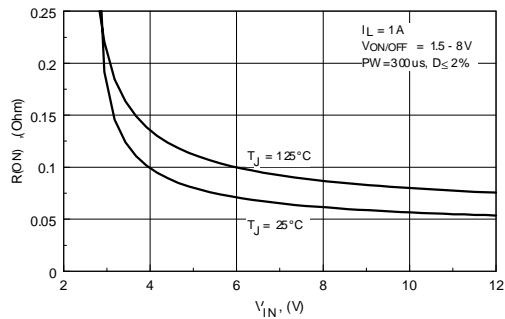


Figure 3. On-Resistance Variation with Input Voltage.

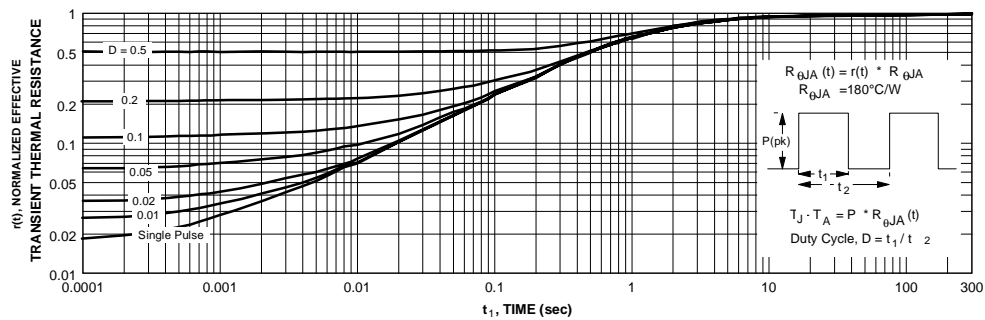


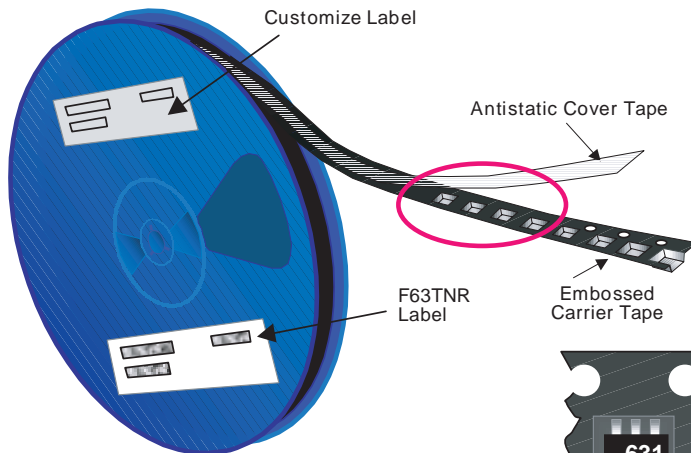
Figure 4. Transient Thermal Response Curve.

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

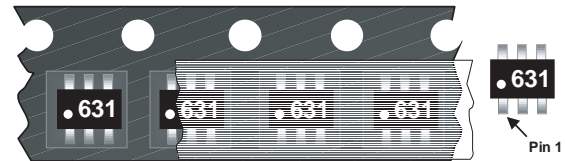


Packaging Description:

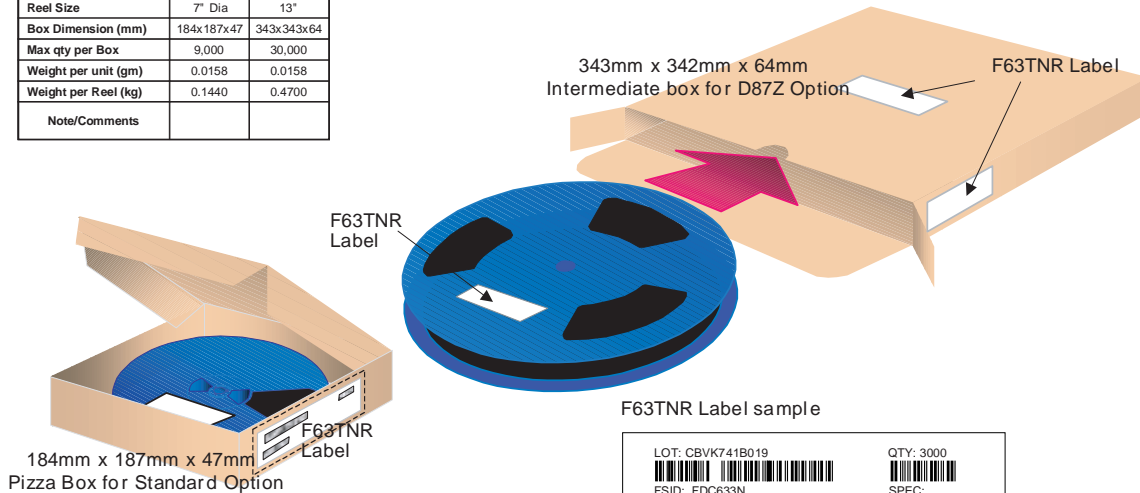
SSOT-6 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 10,000 units per 13" or 330cm diameter reel. This and some other options are described in the Packaging Information table.

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

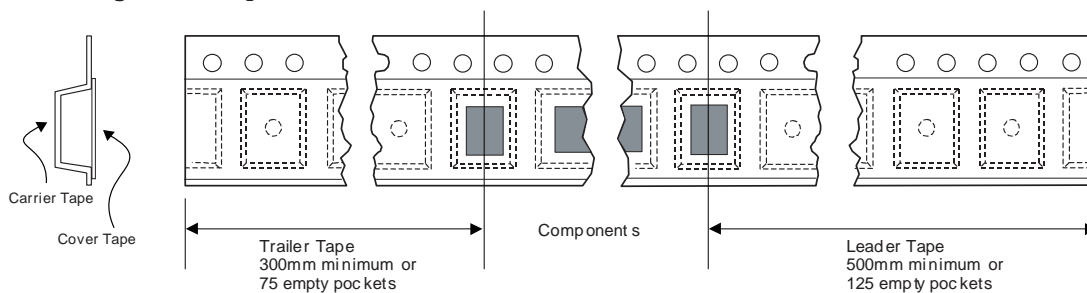
SSOT-6 Packaging Information		
Packaging Option	Standard (no flow code)	D87Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	10,000
Reel Size	7" Dia	13"
Box Dimension (mm)	184x187x47	343x343x64
Max qty per Box	9,000	30,000
Weight per unit (gm)	0.0158	0.0158
Weight per Reel (kg)	0.1440	0.4700
Note/Comments		



SSOT-6 Unit Orientation

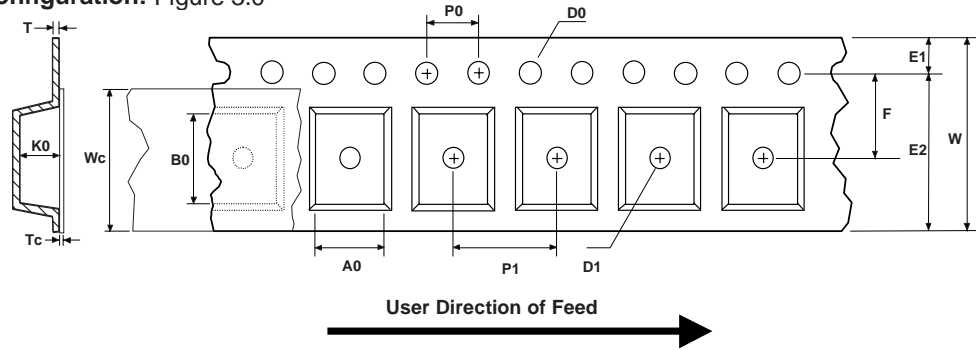


SSOT-6 Tape Leader and Trailer Configuration: Figure 2.0



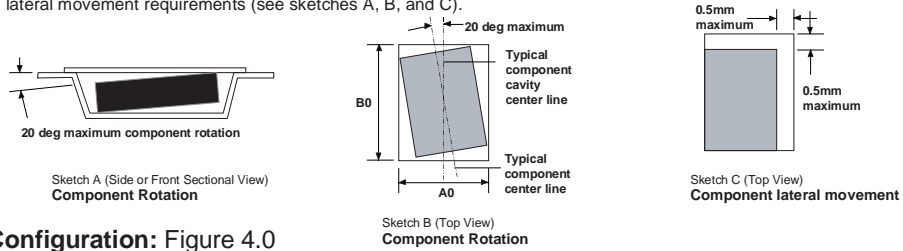
SuperSOT™-6 Tape and Reel Data and Package Dimensions, continued

SSOT-6 Embossed Carrier Tape Configuration: Figure 3.0

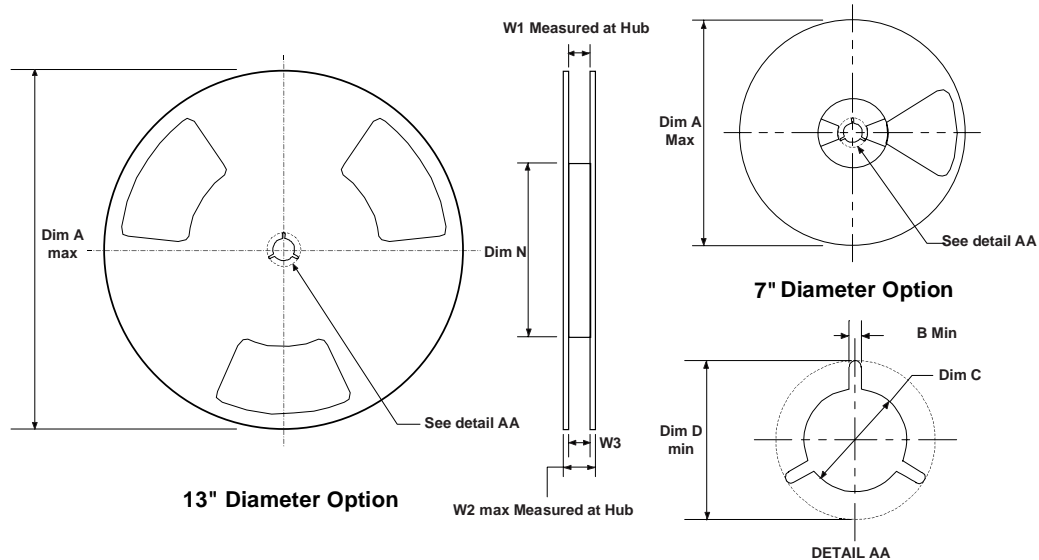


Dimensions are in millimeter														
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SSOT-6 (8mm)	3.23 +/-0.10	3.18 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.37 +/-0.10	0.255 +/-0.150	5.2 +/-0.3	0.06 +/-0.02

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).



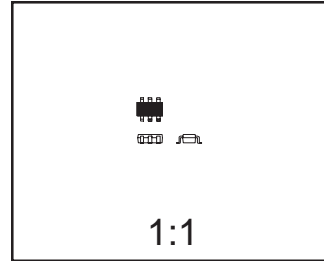
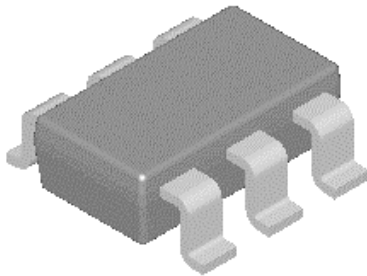
SSOT-6 Reel Configuration: Figure 4.0



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

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

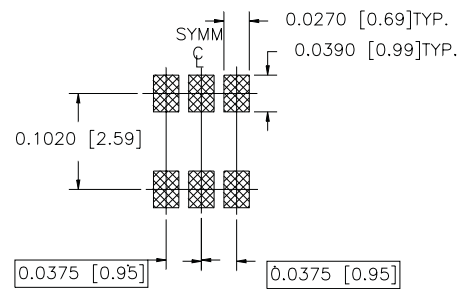
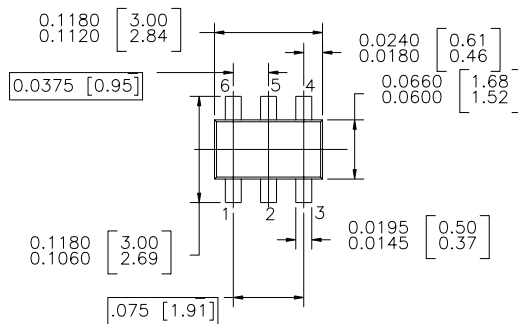
SuperSOT -6 (FS PKG Code 31, 33)



Scale 1:1 on letter size paper

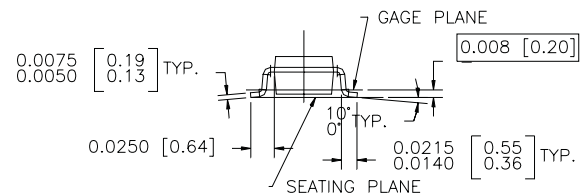
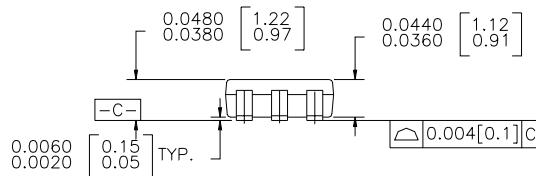
Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0158



LAND PATTERN RECOMMENDATION

CONTROLLING DIMENSION IS INCH
VALUES IN [] ARE MILLIMETERS



NOTES : UNLESS OTHERWISE SPECIFIED

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

2.0 NO JEDEC REGISTRATION AS OF JULY 1996

SUPER SOT 6 LEADS

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