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March 2015

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.

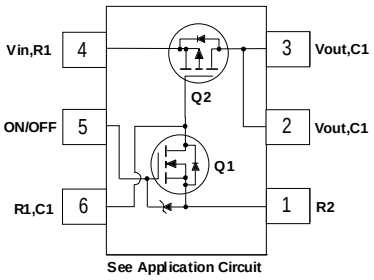
Applications

- Power management
- Load actuation

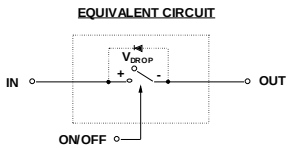
Features

- V_{DROP} = 0.2V @ V_{IN} = 12V, I_L =2.5 A. $R_{(ON)}$ = 0.08 Ω
  V_{DROP} = 0.2V @ V_{IN} = 5V,I_L = 1.6 A. $R_{(ON)}$ = 0.125 Ω.
- 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_A=25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{IN}	Input Voltage Range	(Note 1)	3 - 20	V
$V_{ON/OFF}$	On/Off Voltage Range		1.5 - 8	V
I_D	Load Current - Continuous	(Note 2)	2.3	A
	- Pulsed		10	
P_D	Maximum Power Dissipation	(Note 1)	0.7	W
T_J, T_{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

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

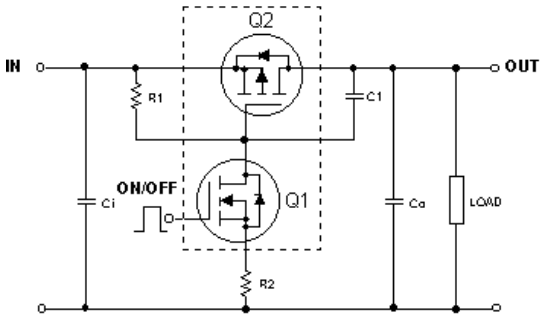
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF Characteristics						
I_{FL}	Leakage Current	V_{IN} = 20 V, $V_{ON/OFF}$ = 0 V			1	µA
ON Characteristics (Note 3)						
V_{DROP}	Conduction Voltage	V_{IN} = 12 V, $V_{ON/OFF}$ = 3.3 V, I_L = 2.5 A			0.2	V
		V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 V, I_L = 1.6 A			0.2	V
$R_{(ON)}$	Q_2 - Static On-Resistance	V_{GS} = -12 V, I_D = -2.3 A V_{GS} = -5 V, I_D = -1.9 A		0.054 0.081	0.08 0.125	Ω
I_L	Load Current	V_{DROP} = 0.2 V, V_{IN} = 12 V, $V_{ON/OFF}$ = 3.3 V	2.5			A
		V_{DROP} = 0.2 V, V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 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 Q2 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 ≤ 300µs, Duty Cycle ≤ 2.0%.

FDC6330L Load Switch Application

APPLICATION CIRCUIT



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)

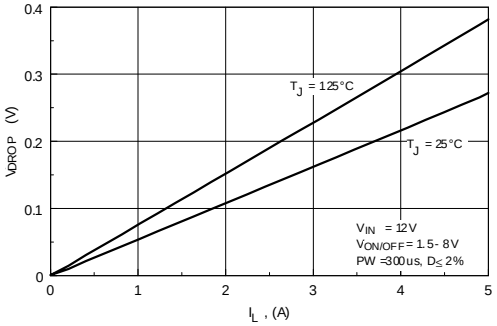


Figure 1. Conduction Voltage Drop Variation with Load Current.

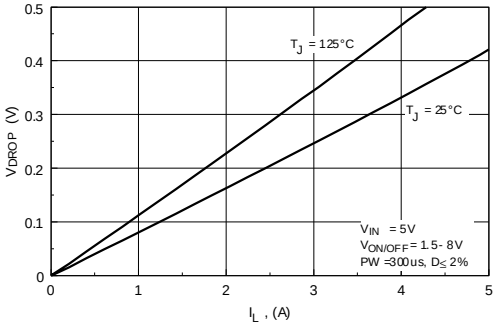


Figure 2. Conduction Voltage Drop Variation with Load Current.

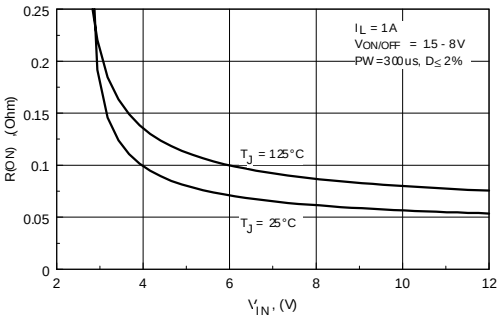


Figure 3. On-Resistance Variation with Input Voltage.

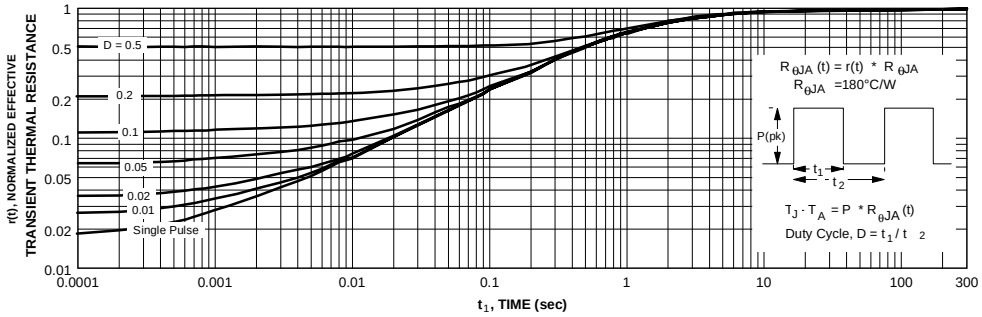
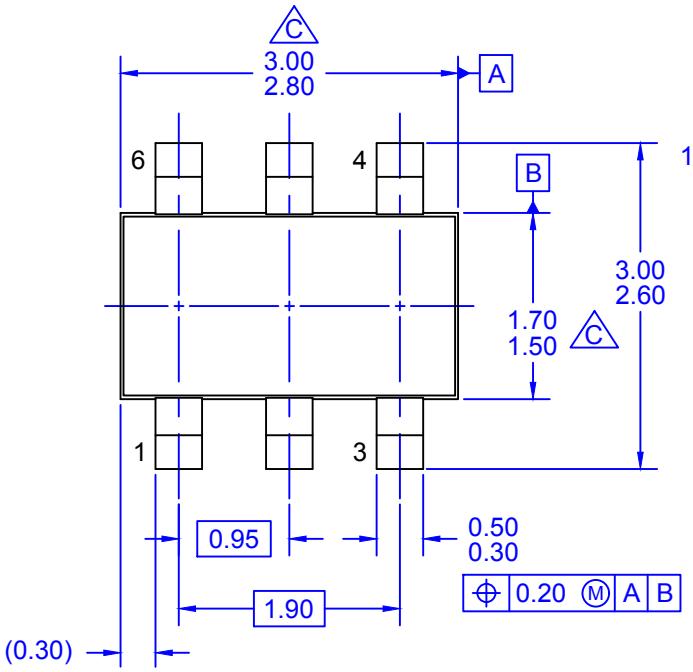
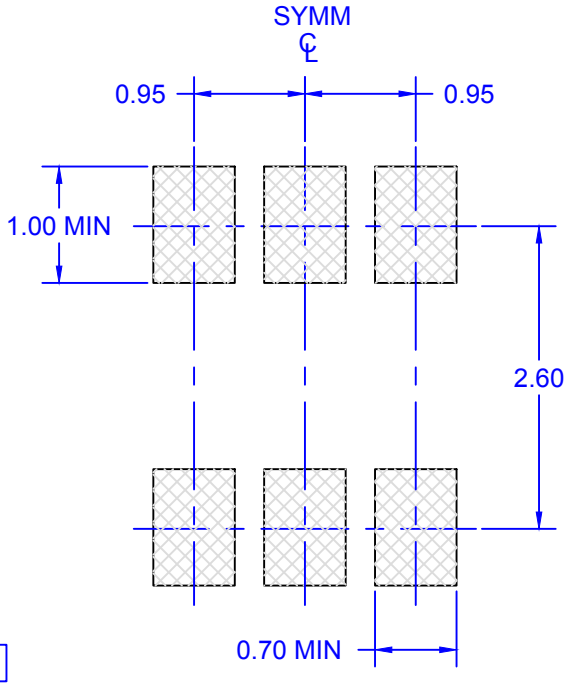


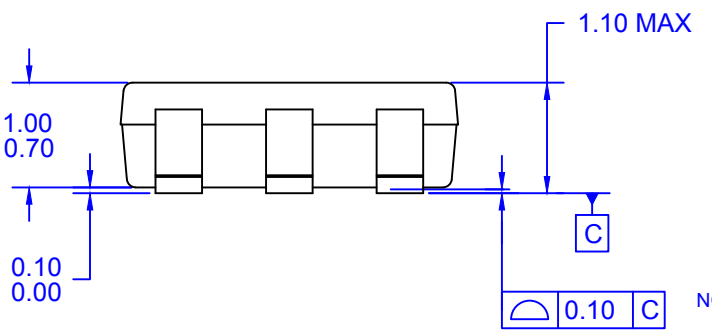
Figure 4.Transient Thermal Response Curve.

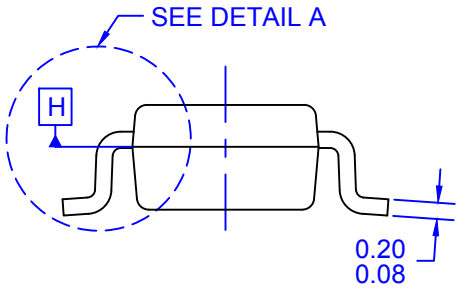
Thermal characterization performed using the conditions described in Note 2.
Transient themal response will change depending on the circuit board design.

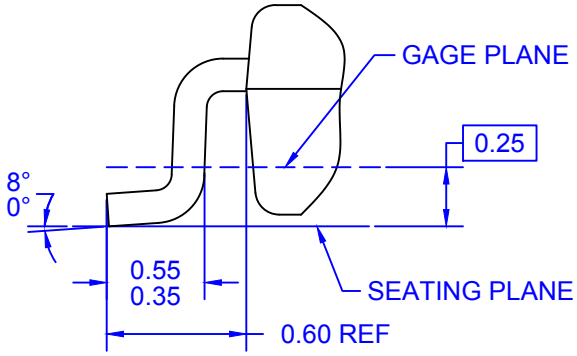




LAND PATTERN RECOMMENDATION







DETAIL A
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B) ALL DIMENSIONS ARE IN MILLIMETERS.

C) PACKAGE LENGTH DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25mm PER END. PACKAGE WIDTH DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25mm PER SIDE. PACKAGE LENGTH AND WIDTH DIMENSIONS ARE DETERMINED AT DATUM H.

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