FAIRCHILD SEMICONDUCTOR TM

November 1998

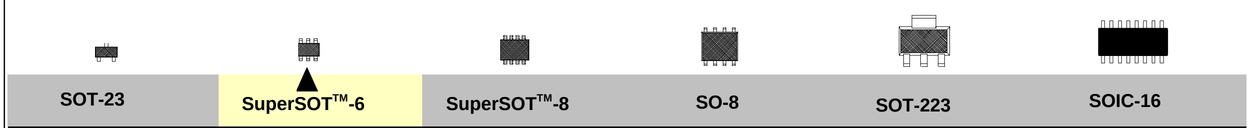
FDC6329L
Integrated Load Switch

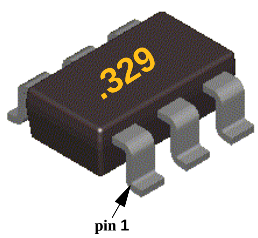
General Description

This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 2.5A 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[TM]-6 package.

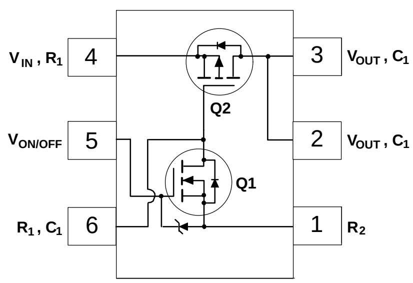
Features

- V_{DROP}=0.2V @ V_{IN}=5V, I_L=2.8A. $R_{(ON)}$ = 0.07Ω V_{DROP}=0.2V @ V_{IN}=2.5V, I_L=1.9A. $R_{(ON)}$ = 0.105Ω.
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6KV Human Body Model).
- High performance trench technology for extremely low on-resistance.
- SuperSOT[TM]-6 package design using copper lead frame for superior thermal and electrical capabilities.

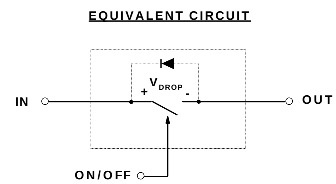




SuperSOT [TM]-6



See Application Circuit



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	FDC6329L	Units
V_{IN}	Input Voltage Range (Note 1)	2.5 - 8	V
$V_{ON/OFF}$	On/Off Voltage Range	1.5 - 8	V
I_L	Load Current - Continuous (Note 2)	2.5	A
	- Pulsed	10	
P_D	Maximum Power Dissipation (Note 2)	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/1500Ohm)	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

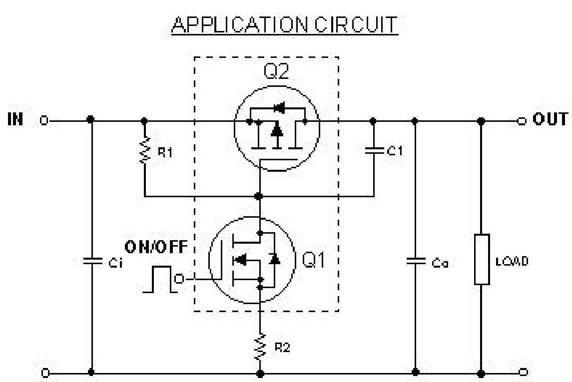
Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
I_{FL}	Forward Leakage Current	V_{IN} = 8 V, $V_{ON/OFF}$ = 0 V			1	µA
ON CHARACTERISTICS (Note 3)						
V_{DROP}	Conduction Voltage	V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 V, I_L = 2.8 A		0.12	0.2	V
		V_{IN} = 2.5 V, $V_{ON/OFF}$ = 3.3 V, I_L = 1.9 A		0.14	0.2	
$R_{(ON)}$	Q_2 - Static On-Resistance	V_{GS} = -5 V, I_D = -2.5 A		0.047	0.07	Ω
		V_{GS} = -2.5 V, I_D = -2.0 A		0.073	0.105	
I_L	Load Current	V_{DROP} = 0.2 V, V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 V	2.8			A
		V_{DROP} = 0.2 V, V_{IN} = 2.5V, $V_{ON/OFF}$ = 3.3 V	1.9			

Notes:

1. Range of V_{in} can be up to 8V, but R_1 and R_2 must be scaled such that V_{GS} of Q2 does not exceed -8V.
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 $R_{\theta CA}$ is determined by the user's board design.
3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2.0%.

FDC6329L 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 Electrical Characteristics (T_A = 25 °C unless otherwise noted)

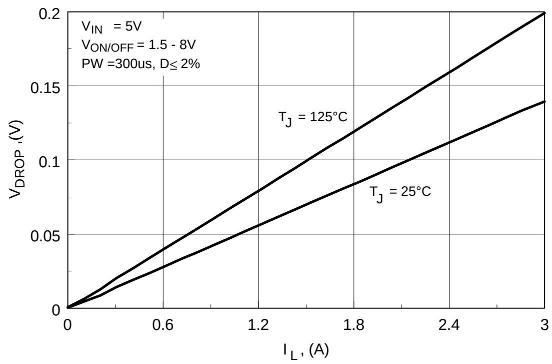


Figure 1. Conduction Voltage Drop Variation with Load Current.

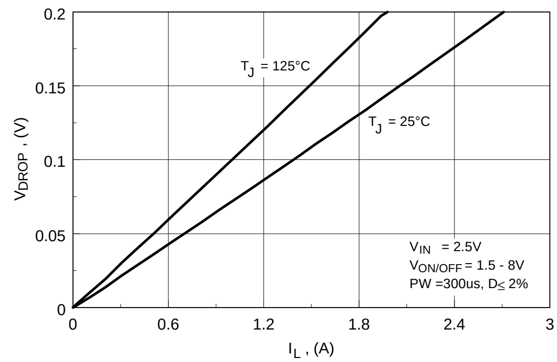


Figure 2. Conduction Voltage Drop Variation with Load Current.

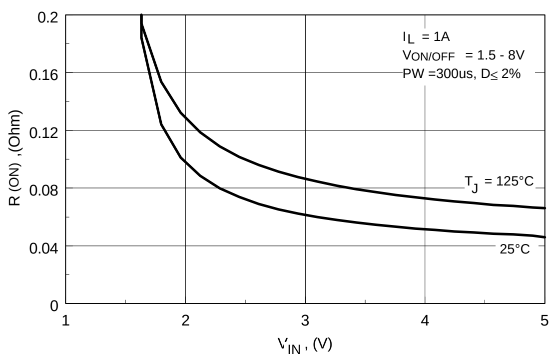


Figure 3. On-Resistance Variation with Input Voltage.

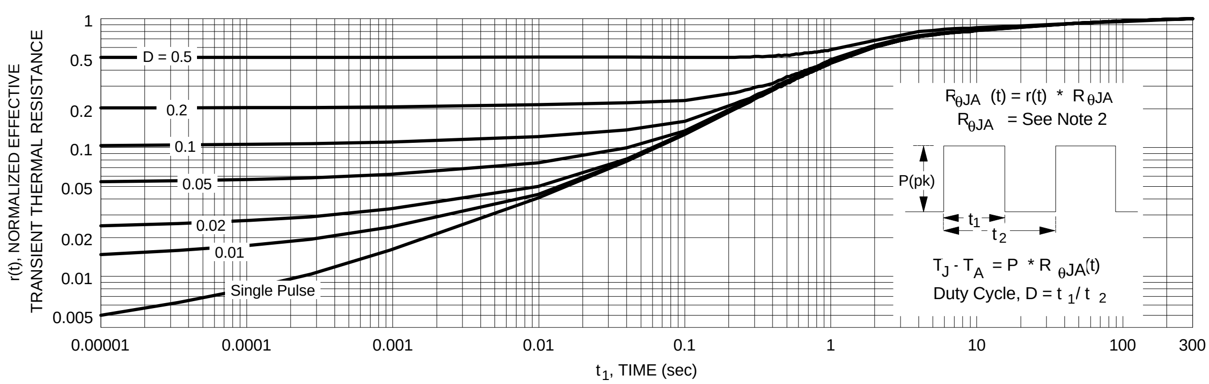


Figure 4. Transient Thermal Response Curve.

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

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