August 1998

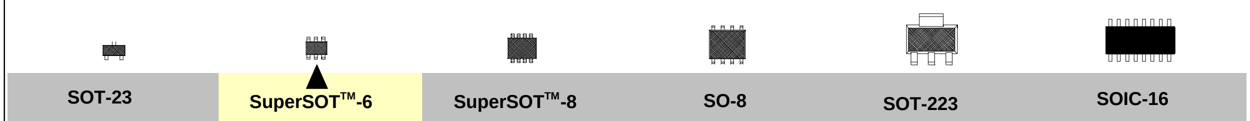
FDC6325L
Integrated Load Switch

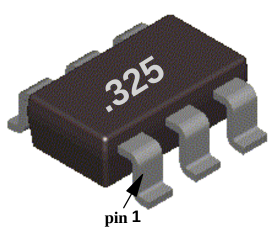
General Description

This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 1.8A 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.

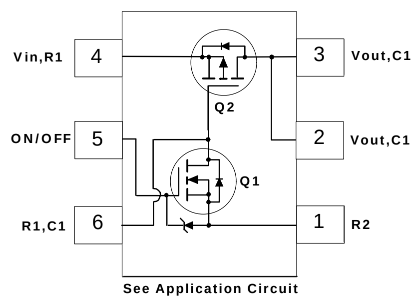
Features

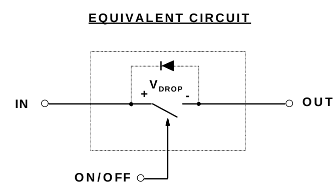
- V_{DROP}=0.2V @ V_{IN}=5V, I_L=1.5A. $R_{(ON)}$ = 0.13Ω
  V_{DROP}=0.2V @ V_{IN}=3.3V, I_L=1.2A. $R_{(ON)}$ = 0.16Ω
  V_{DROP}=0.2V @ V_{IN}=2.5V, I_L=1A. $R_{(ON)}$ = 0.18Ω.
- SuperSOT™-6 package design using copper lead frame for superior thermal and electrical capabilities.





SuperSOT ™-6





Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	FDC6325L	Units
V_{IN}	Input Voltage Range	2.5 - 8	V
$V_{ON/OFF}$	On/Off Voltage Range	1.5 - 8	V
I_L	Load Current - Continuous (Note 1)	1.8	A
	- Pulsed (Note 1 & 3)	5	
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)

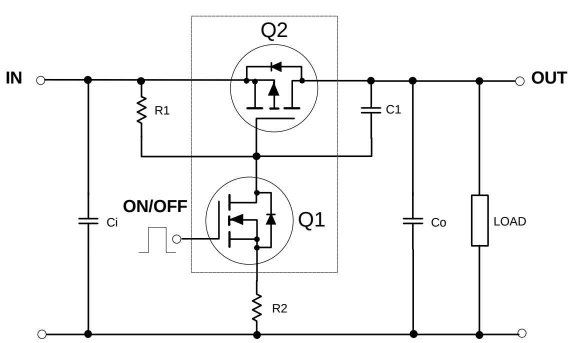
Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
I_{FL}	Forward Leakage Current	V_{IN} = 8 V, $V_{ON/OFF}$ = 0 V			1	µA
ON CHARACTERISTICS (Note 3)						
V_{DROP}	Conduction Voltage Drop	V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 V, I_L = 1.5 A		0.15	0.2	V
		V_{IN} = 3.3 V, $V_{ON/OFF}$ = 3.3 V, I_L = 1.2 A		0.145	0.2	
		V_{IN} = 2.5 V, $V_{ON/OFF}$ = 3.3 V, I_L = 1 A		0.13	0.2	
$R_{(ON)}$	Q_2 - Static On-Resistance	V_{GS} = -5 V, I_D = -1.8 A		0.115	0.13	Ω
		V_{GS} = -3.3 V, I_D = -1.6 A		0.13	0.16	
		V_{GS} = -2.5 V, I_D = -1.5 A		0.155	0.18	
I_L	Load Current	V_{DROP} = 0.13 V, V_{IN} = 5 V, $V_{ON/OFF}$ = 3.3 V	1			A
		V_{DROP} = 0.16 V, V_{IN} = 3.3 V, $V_{ON/OFF}$ = 3.3 V	1			
		V_{DROP} = 0.2 V, V_{IN} = 2.5V, $V_{ON/OFF}$ = 3.3 V	1			

Notes:

1. V_{IN}=8V, $V_{ON/OFF}$=8V, T_A=25°C
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%.

FDC6325L Load Switch Application

APPLICATION CIRCUIT



External Component Recommendation

For Co £ 1uF applications:

First select R2, 100 - 1kW, for Slew Rate control. C1 £ 1000pF can be added in addition to R2 for further In-rush current control.

Then select R1 such that R1/R2 ratio maintains between 10 - 100. R1 is required to turn Q2 off.

For SPICE simulation, users can download a "FDC6325L.MOD" Spice model from Fairchild Web Site at www.fairchildsemi.com

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

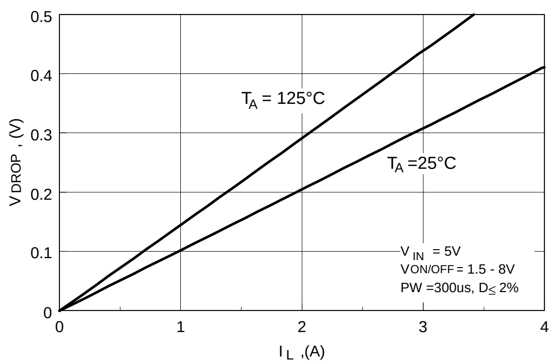


Figure 1. Conduction Voltage Drop Variation with Load Current.

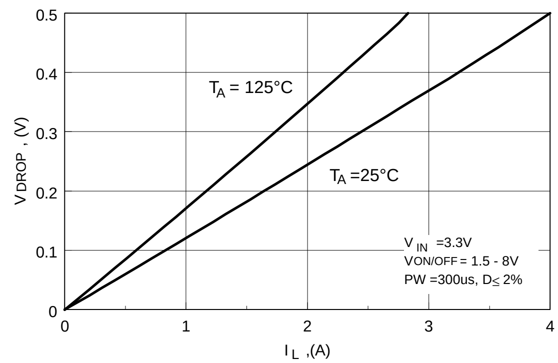


Figure 2. Conduction Voltage Drop Variation with Load Current.

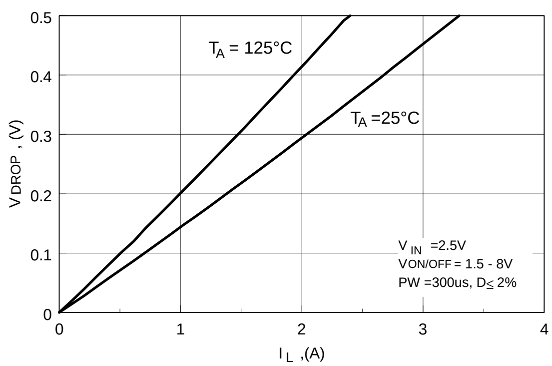


Figure 3. Conduction Voltage Drop Variation with Load Current.

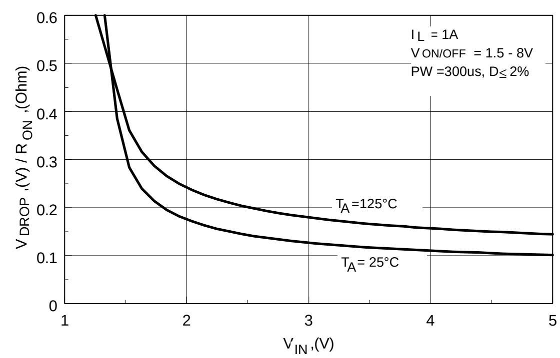


Figure 4. On-Resistance Variation with Input Voltage.

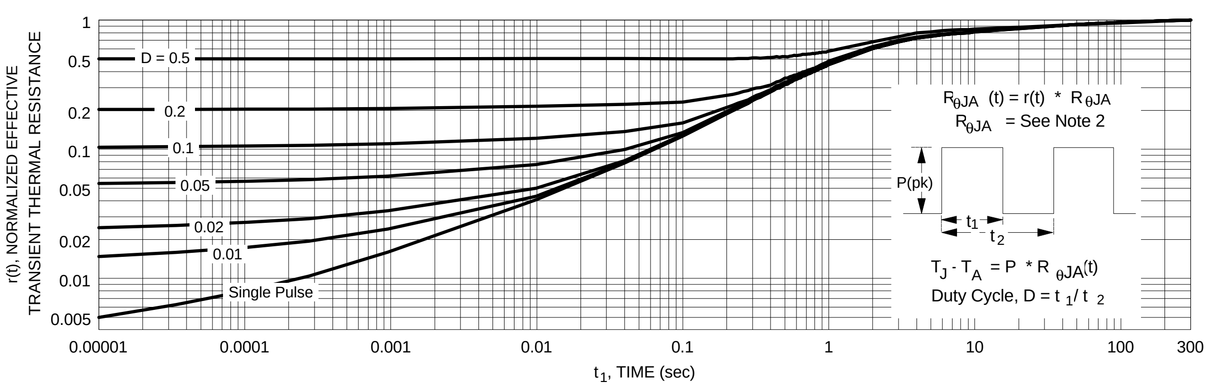


Figure 5. Transient Thermal Response Curve.
Thermal characterization performed on the conditions described in Note 2.
Transient thermal response will change depends on the circuit board design.

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