



August 1998

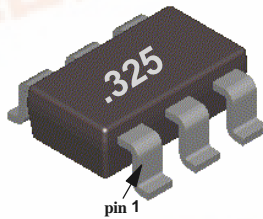
FDC6325L Integrated Load Switch

General Description

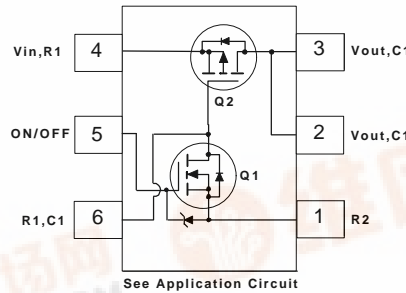
This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 1.8A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) which drives a large P-Channel power MOSFET (Q2) in one tiny SuperSOT™-6 package.

Features

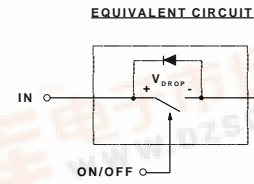
- $V_{\text{DROP}}=0.2\text{V}$ @ $V_{\text{IN}}=5\text{V}$, $I_{\text{L}}=1.5\text{A}$. $R_{\text{(ON)}} = 0.13\Omega$
 $V_{\text{DROP}}=0.2\text{V}$ @ $V_{\text{IN}}=3.3\text{V}$, $I_{\text{L}}=1.2\text{A}$. $R_{\text{(ON)}} = 0.16\Omega$
 $V_{\text{DROP}}=0.2\text{V}$ @ $V_{\text{IN}}=2.5\text{V}$,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



SuperSOT™-6



See Application Circuit

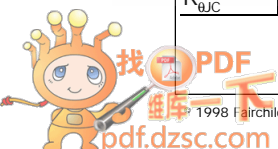


Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	FDC6325L	Units
V_{IN}	Input Voltage Range	2.5 - 8	V
$V_{\text{ON/OFF}}$	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
$T_{\text{J}}, T_{\text{STG}}$	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
ESD	Electrostatic Discharge Rating MIL-STD-883D Human Body Model (100pf/1500Ohm)	6	kV

THERMAL CHARACTERISTICS

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



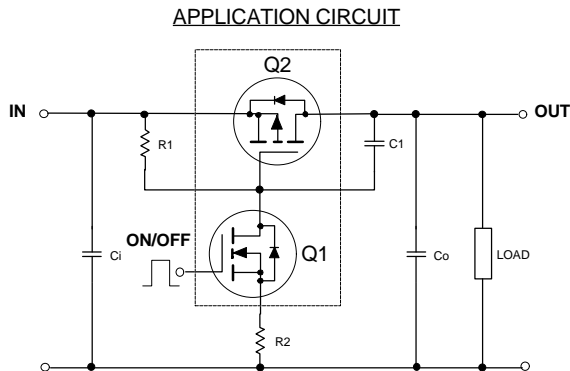
Electrical Characteristics (T_A = 25°C unless otherwise noted)

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} = 2.5 V, V _{ON/OFF} = 3.3 V	1			

Notes:

- V_{IN} = 8V, V_{ON/OFF} = 8V, T_A = 25°C
- R_{θJA} 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_{θJC} is guaranteed by design while R_{θCA} is determined by the user's board design.
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%.

FDC6325L Load Switch Application



External Component Recommendation

For C₀ ≤ 1μF 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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

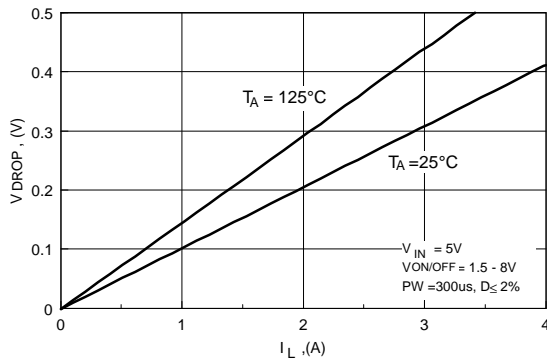


Figure 1. Conduction Voltage Drop Variation with Load Current.

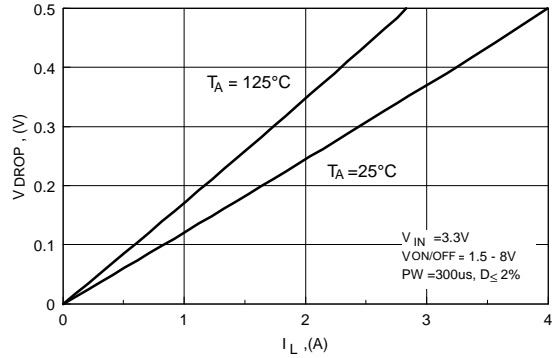


Figure 2. Conduction Voltage Drop Variation with Load Current.

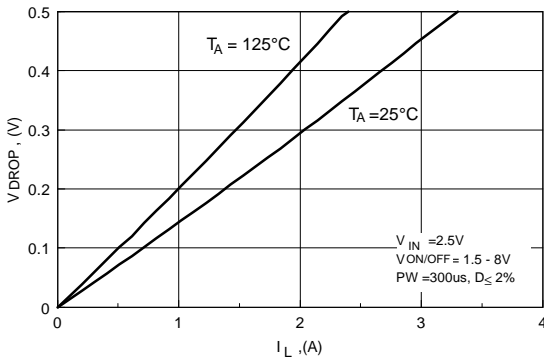


Figure 3. Conduction Voltage Drop Variation with Load Current.

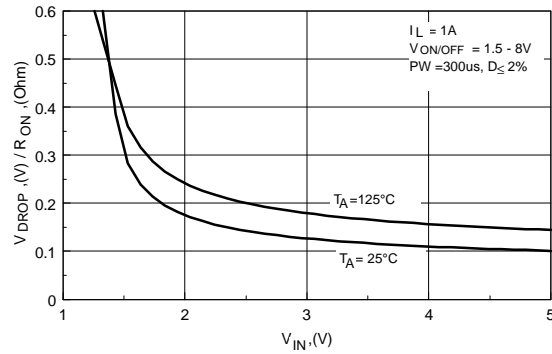


Figure 4. On-Resistance Variation with Input Voltage.

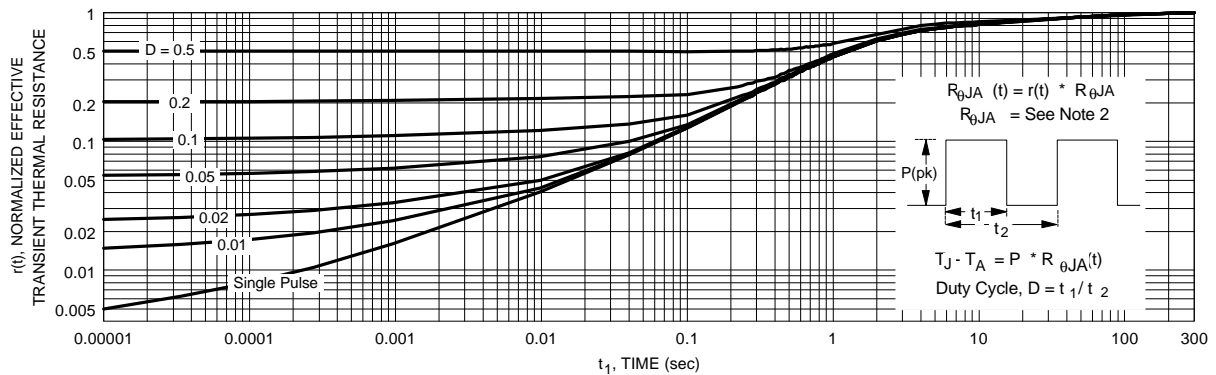
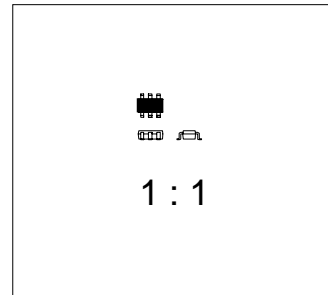
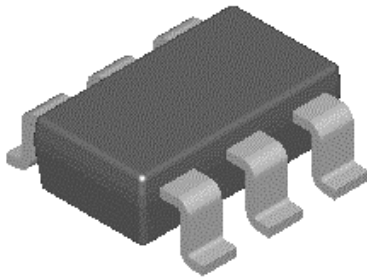


Figure 5. Transient Thermal Response Curve.

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

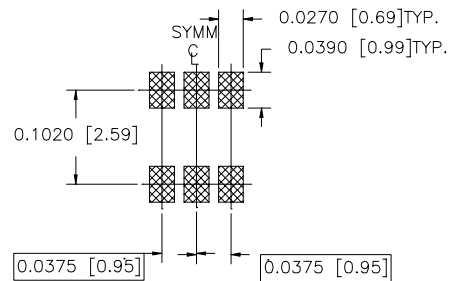
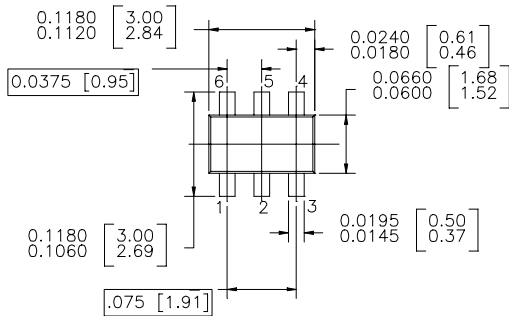
SuperSOT™-6 (FS PKG Code 31, 33)



Scale 1:1 on letter size paper

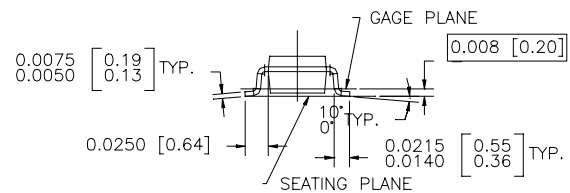
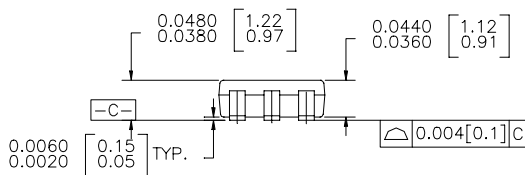
Dimensions shown below are in:
inches [millimeters]

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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FACT™	QS™
FACT Quiet Series™	Quite Series™
FAST®	SuperSOT™-3
FASTr™	SuperSOT™-6
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