## April 2001

# FDG6331L Integrated Load Switch

FAIRCHILD

## **General Description**

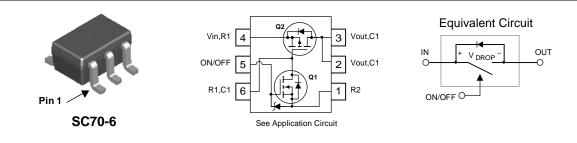
This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 0.8A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) that drives a large P-Channel power MOSFET (Q2) in one tiny SC70-6 package.

# Applications

- Power management
- Load switch

## Features

- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>6KV Human body model)
- High performance trench technology for extremely low  $R_{\text{DS}(\text{ON})}$
- Compact industry standard SC70-6 surface mount package



# Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Symbol	Parameter			Ratings	Units				
V <sub>IN</sub>	Gate-Source Voltage (Q2)			± 8	V				
V <sub>ON/OFF</sub>	Gate-Source Voltage (Q1)			–0.5 to 8	V				
I <sub>Load</sub>	Load Curren	t – Continuous	(Note 2)	-0.8	A				
		- Pulsed	(Note 2)	-2.4					
P <sub>D</sub>	Maximum Power Dissipation		(Note 1)	0.3	W				
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range			-55 to +150	°C				
Therma	I Charact	eristics							
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)			415	°C/W				
Package Marking and Ordering Information									
Device Marking		Device	Reel Size	Tape width	Quantity				
.31		FDG6331L	7"	8mm	3000 units				

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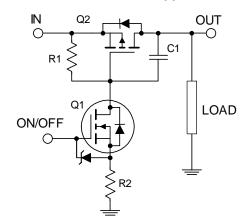
FDG6331L

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Cha	racteristics					
BVIN	Vin Breakdown Voltage	$V_{ON/OFF} = 0 \text{ V}, I_D = -250 \mu\text{A}$	8			V
I <sub>Load</sub>	Zero Gate Voltage Drain Current	$V_{IN} = -6.4 \text{ V},  V_{ON/OFF} = 0 \text{ V}$			-1	μΑ
I <sub>FL</sub>	Leakage Current, Forward	$V_{ON/OFF} = 0 V, V_{IN} = 8 V$			100	nA
I <sub>RL</sub>	Leakage Current, Reverse	$V_{ON/OFF} = 0 V, V_{IN} = -8 V$			-100	nA
On Char	acteristics (Note 2)					
V <sub>ON/OFF (th)</sub>	Gate Threshold Voltage	$V_{IN} = V_{ON/OFF}, I_D = -250 \ \mu A$	0.4	0.9	1.5	V
R <sub>DS(on)</sub>	Static Drain–Source On–Resistance (Q2)	$ \begin{array}{ll} V_{IN} = 4.5 \ V, & I_D = -0.8 \ A \\ V_{IN} = 2.5 \ V, & I_D = -0.7 \ A \\ V_{IN} = 1.8 \ V, & I_D = -0.6 \ A \end{array} $		155 193 248	260 330 450	mΩ
R <sub>DS(on)</sub>	Static Drain–Source On–Resistance (Q1)	$ \begin{array}{ll} V_{IN} = 4.5 \ V, & I_D = 0.4 A \\ V_{IN} = 2.7 \ V, & I_D = 0.2 \ A \end{array} $		310 380	400 500	mΩ
Drain-S	ource Diode Characteristics	and Maximum Ratings				
Is	Maximum Continuous Drain-Source				-0.25	Α
V <sub>SD</sub>	Drain–Source Diode Forward Voltage	$V_{ON/OFF} = 0 \text{ V}, \text{ I}_{S} = -0.25 \text{ A}(\text{Note 2})$			-1.2	V

Notes: 1. R<sub>0JA</sub> 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.

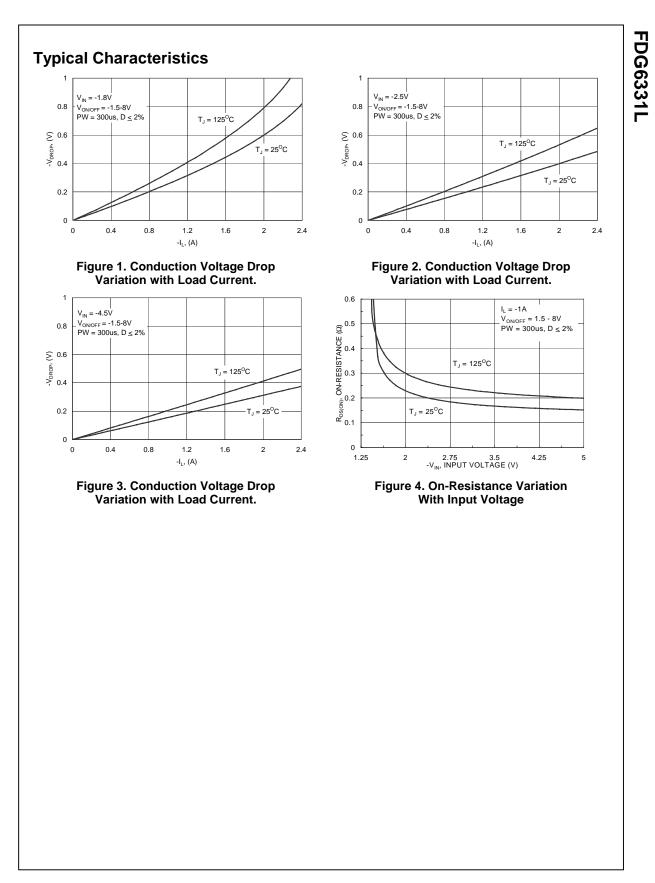
2. Pulse Test: Pulse Width < 300µs, Duty Cycle < 2.0%.

#### FDG6331L Load Switch Application Circuit



External Component Recommendation: For additional in-rush current control, R2 and C1 can be added. For more information, see application note AN1030.

FDG6331L Rev B (W)



FDG6331L Rev B (W)

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