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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_A=25°C unless otherwise noted

Symbol	Parameter			Ratings	Units				
V _{IN}	Gate-Source Voltage (Q2)			± 8	V				
V _{ON/OFF}	Gate-Source Voltage (Q1)			–0.5 to 8	V				
I _{Load}	Load Curren	t – Continuous	(Note 2)	-0.8	A				
		- Pulsed	(Note 2)	-2.4					
P _D	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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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 _{Load}	Zero Gate Voltage Drain Current	$V_{IN} = -6.4 \text{ V}, V_{ON/OFF} = 0 \text{ V}$			-1	μΑ
I _{FL}	Leakage Current, Forward	$V_{ON/OFF} = 0 V, V_{IN} = 8 V$			100	nA
I _{RL}	Leakage Current, Reverse	$V_{ON/OFF} = 0 V, V_{IN} = -8 V$			-100	nA
On Char	acteristics (Note 2)					
V _{ON/OFF (th)}	Gate Threshold Voltage	$V_{IN} = V_{ON/OFF}, I_D = -250 \ \mu A$	0.4	0.9	1.5	V
R _{DS(on)}	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 _{DS(on)}	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 _{SD}	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_{0JA} 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)



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