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FAIRCHILD SEMICONDUCTOR®

September 2007

FDG6342L

Integrated Load Switch

Features

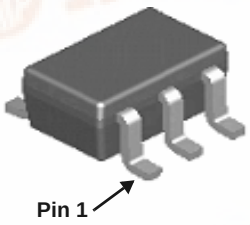
- Max $r_{DS(on)}$ = 150mΩ at V_{GS} = 4.5V, I_D = –1.5A
- Max $r_{DS(on)}$ = 195mΩ at V_{GS} = 2.5V, I_D = –1.3A
- Max $r_{DS(on)}$ = 280mΩ at V_{GS} = 1.8V, I_D = –1.1A
- Max $r_{DS(on)}$ = 480mΩ at V_{GS} = 1.5V, I_D = –0.9A
- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (>4KV Human body model)
- High performance trench technology for extremely low $r_{DS(on)}$
- Compact industry standard SC70-6 surface mount package
- RoHS Compliant

General Description

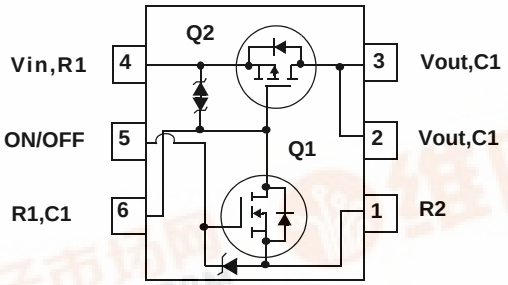
This device is particularly suited for compact power management in portable electronic equipment where 1.5V to 8V input and 1.5A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) that drives a large P-Channel power MOSFET (Q2) in one tiny SC70-6 package.

Applications

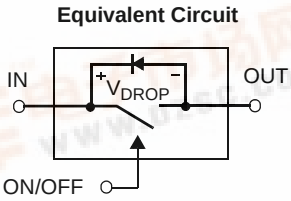
- Power management
- Load switch



SC70-6



See Application Circuit



MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{IN}	Gate to Source Voltage (Q2)		±8	V
$V_{ON/OFF}$	Gate to Source Voltage (Q1)		–0.5 to 8	V
I_{Load}	Load Current -Continuous	(Note 2)	–1.5	A
	-Pulsed	(Note 2)	–6	
P_D	Power Dissipation for Single Operation	(Note 1a)	0.36	W
		(Note 1b)	0.3	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		–55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient Single operation	(Note 1a)	350	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient Single operation	(Note 1b)	415	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
.42	FDG6342L	SC70-6	7”	8mm	3000units

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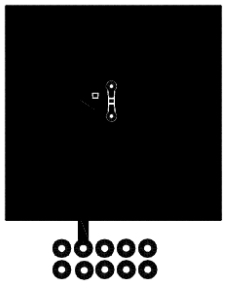
Electrical Characteristics T_J = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{IN}	V_{IN} Breakdown Voltage	I_D = -250μA, $V_{ON/OFF}$ = 0V	8			V
I_{Load}	Zero Gate Voltage Drain Current	V_{IN} = -6.4V, $V_{ON/OFF}$ = 0V			–1	μA
I_{FL}	Leakage Current, Forward	V_{IN} = 8V, $V_{ON/OFF}$ = 0V			10	μA
I_{RL}	Leakage Current, Reverse	V_{IN} = -8V, $V_{ON/OFF}$ = 0V			–10	μA
On Characteristics (note 2)						
$V_{ON/OFF(th)}$	Gate Threshold Voltage	V_{IN} = $V_{ON/OFF}$, I_D = -250μA	0.65	0.8	1.5	V
$r_{DS(on)}$	Static Drain to Source On Resistance (Q2)	V_{IN} = 4.5V, I_D = –1.5A		125	150	mΩ
		V_{IN} = 2.5V, I_D = –1.3A		150	195	
		V_{IN} = 1.8V, I_D = –1.1A		200	280	
		V_{IN} = 1.5V, I_D = –0.9A		250	480	
	Static Drain to Source On Resistance (Q1)	V_{IN} = 4.5V, I_D = 0.4A		2.6	4.0	Ω
		V_{IN} = 2.7V, I_D = 0.2A		3.3	5.0	
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain to Source Diode Forward Current				–0.25	V
V_{SD}	Source to Drain Diode Forward Voltage	$V_{ON/OFF}$ = 0V, I_S = –0.25A (Note 2)		–0.6	–1.2	V

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1in^2 pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.

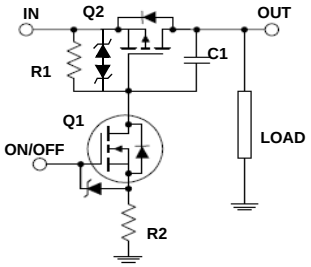


a. 350°C/W when mounted on a 1 in^2 pad of 2 oz copper .

b. 415°C/W when mounted on a minimum pad of 2 oz copper.

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

FDG6342LLoad 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

Typical Characteristics T_J = 25°C unless otherwise noted

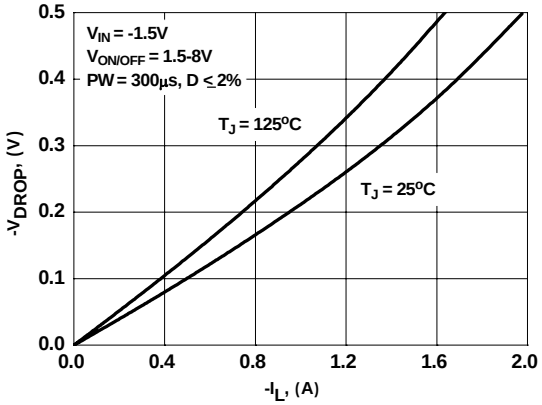


Figure 1. Conduction Voltage Drop Variation with Load Current.

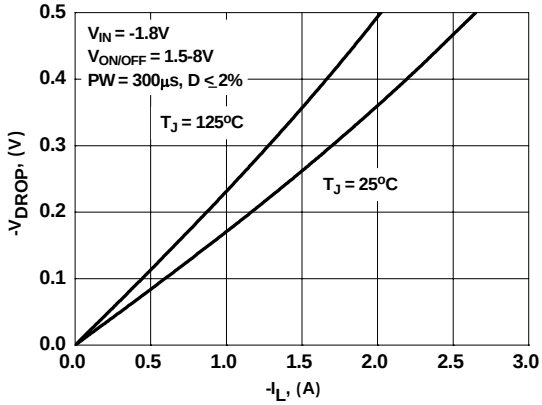


Figure 2. Conduction Voltage Drop Variation with Load Current.

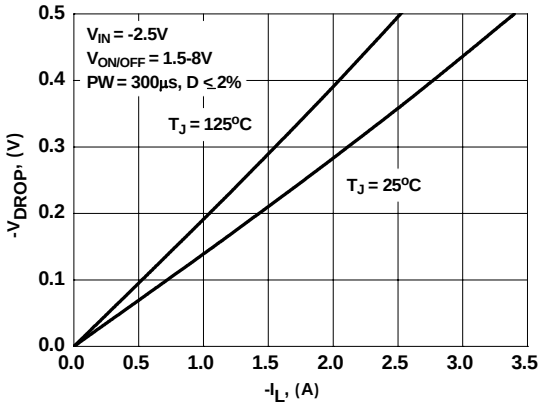


Figure 3. Conduction Voltage Drop Variation with Load Current.

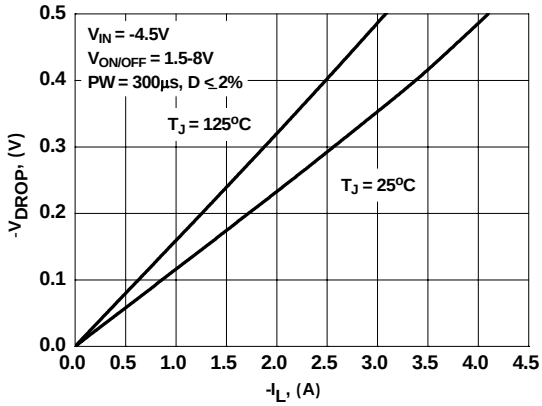


Figure 4. Conduction Voltage Drop Variation with Load Current.

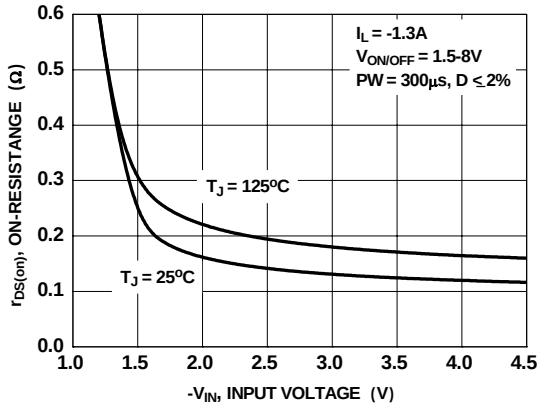


Figure 5. On-Resistance Variation With Input Voltage

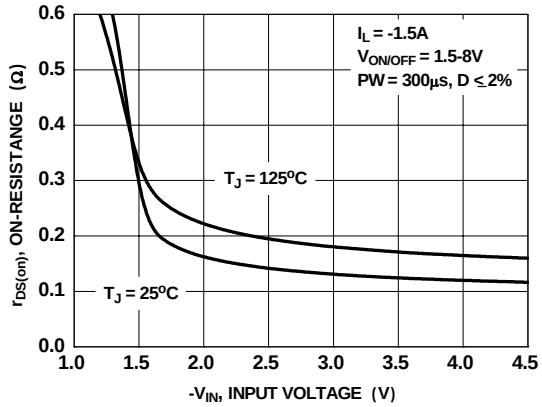


Figure 6. On-Resistance Variation With Input Voltage

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