FDG6324L
Integrated Load Switch

General Description

This device is intended to be configured as a load switch and is particularly suited for compact computer peripheral switching applications where 3V to 20V input and 0.6A output current capability are needed. This device features a small N-Channel MOSFET (Q1) together with a large P-Channel Power MOSFET (Q2) in a single SC70-6 package.

Features

- V_{DROP}=0.2V @ V_{IN}=12V, I_L=0.36A. $R_{(ON)}$ = 0.55Ω. V_{DROP}=0.2V @ V_{IN}=5V, I_L=0.27A. $R_{(ON)}$ = 0.75Ω.

- Very small package outline (SC70-6).

- Control MOSFET (Q1) includes Zener protection for ESD ruggedness (> 6KV Human Body Model).

- High density cell design for extremely low on-resistance.
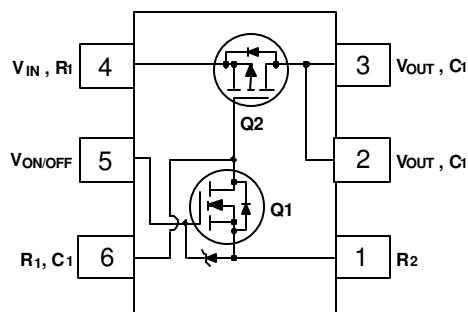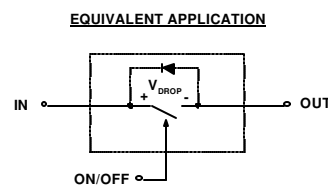
SC70-6	SOT-23	SuperSOT™-6	SuperSOT™-8	SO-8	SOT-223

pin 1

SC70-6

V_{IN} , R_1	4	3	V_{OUT} , C_1
$V_{ON/OFF}$	5	2	V_{OUT} , C_1
R_1, C_1	6	1	R_2

Q2

Q1

See Application Circuit

EQUIVALENT APPLICATION

IN — V_{DROP} — OUT

ON/OFF

Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		FDG6324L	Units
V_{IN}	Input Voltage Range		3 - 20	V
$V_{ON/OFF}$	On/Off Voltage Range		2.5 - 8	V
I_L	Load Current - Continuous (Note 1)		0.6	A
	- Pulsed (Note 1 & 3)		1.8	
P_D	Maximum Power Dissipation (Note 2)		0.3	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150	°C
ESD	Electrostatic Discharge Rating Human Body Model (100pf/1500Ohm)		6	kV
THERMAL CHARACTERISTICS				
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)		415	°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	$V_{IN} = 20$ V, $V_{ON/OFF} = 0$ V			1	µA
ON CHARACTERISTICS (Note 3)						
V_{DROP}	Conduction Voltage Drop	$V_{IN} = 12$ V, $V_{ON/OFF} = 3.3$ V, $I_L = 0.36$ A		0.14	0.2	V
		$V_{IN} = 5$ V, $V_{ON/OFF} = 3.3$ V, $I_L = 0.27$ A		0.16	0.2	
$R_{(ON)}$	Q_2 - Static On-Resistance	$V_{GS} = -12$ V, $I_D = -0.6$ A		0.37	0.55	Ω
		$V_{GS} = -5$ V, $I_D = -0.5$ A		0.58	0.75	
I_L	Load Current	$V_{DROP} = 0.2$ V, $V_{IN} = 12$ V, $V_{ON/OFF} = 3.3$ V	0.36			A
		$V_{DROP} = 0.2$ V, $V_{IN} = 5$ V, $V_{ON/OFF} = 3.3$ V	0.27			

Notes:

1. Range of V_{in} can be up to 25V, but R_1 and R_2 must be scaled such that V_{GS} of Q2 does not exceed -20V.

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. Thermal ratings based on minimum mounting pad.

3. Pulse Test: Pulse Width $\leq$ 300µs, Duty Cycle $\leq$ 2.0%

FDG6324L Load Switch Application

APPLICATION CIRCUIT
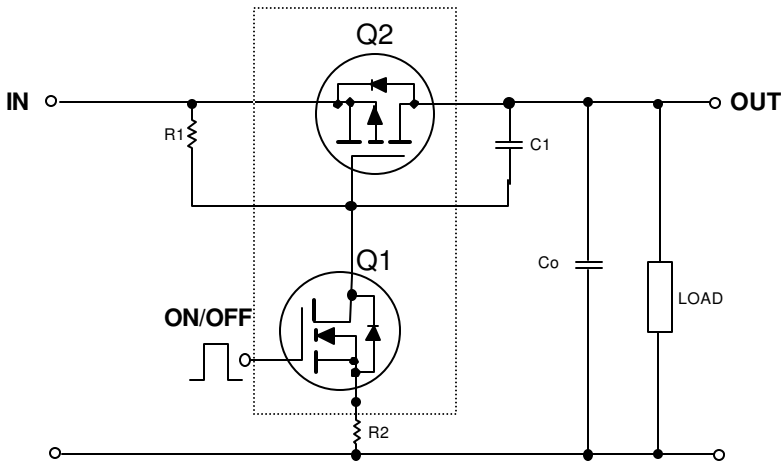
External Component Recommendation

For Co $\leq$ 1uF applications:

R1 is required to turn Q2 off.

R2 and C1 are optional for slew rate control.

First select R2, 100 -1KΩ, for slew rate control.

Then select R1 such that the ratio R1/R2 is maintained between 10-100.

SPICE model (FDG6324L.MOD) available at www.fairchildsemi.com.

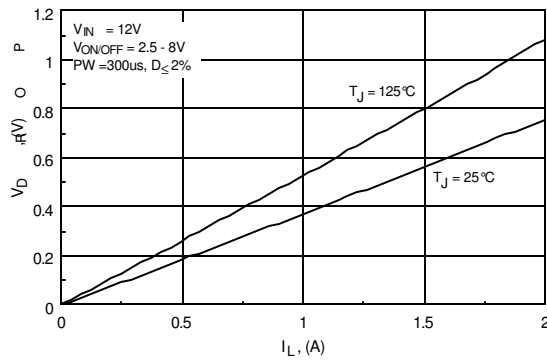## Typical Electrical Characteristics $(T_A = 25\ ^\circ C$ unless otherwise noted $)$

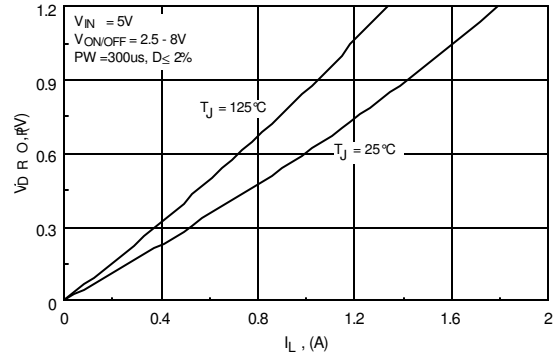**Figure 1. Conduction Voltage Drop Variation with Load Current.**

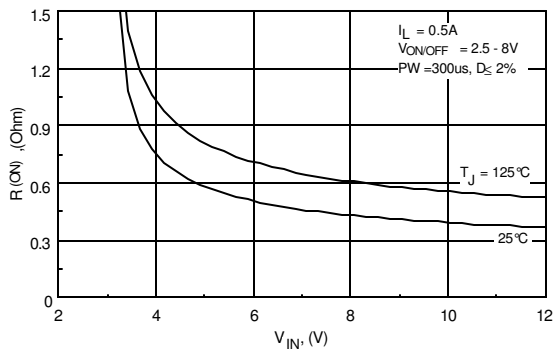**Figure 2. Conduction Voltage Drop Variation with Load Current.**

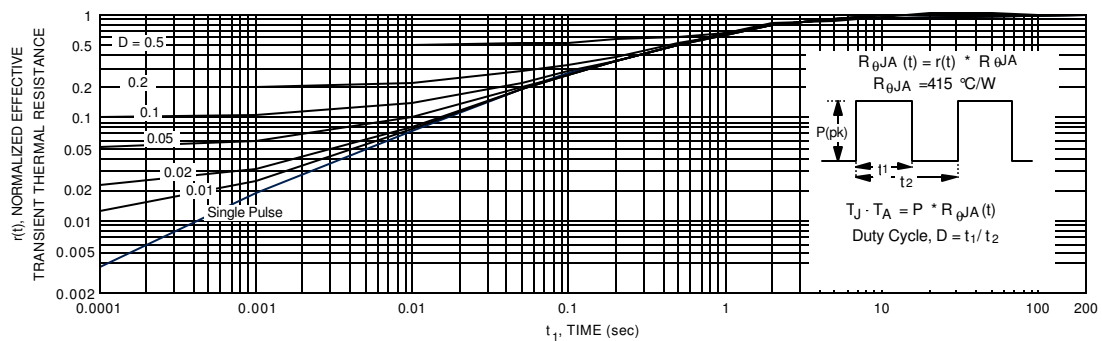**Figure 3. On-Resistance Variation with Input Voltage.**

Figure 4. Transient Thermal Response Curve.

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

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GTO™	SuperSOT™-6	
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