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## 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

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



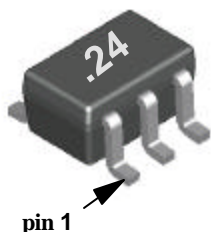
SuperSOT™-8



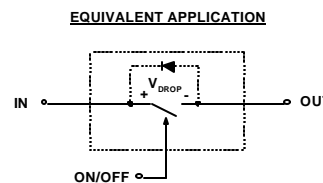
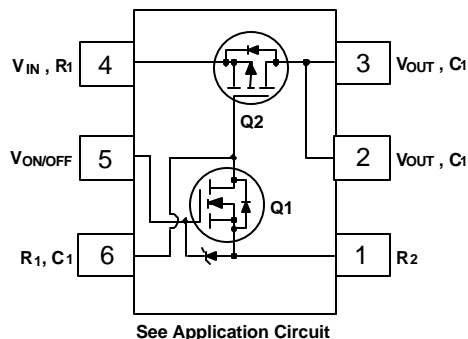
SO-8



SOT-223



SC70-6



### Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ 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
		- 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	$^\circ\text{C}$
ESD	Electrostatic Discharge Rating Human Body Model (100pf/1500Ohm)	6	kV

### THERMAL CHARACTERISTICS

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	415	$^\circ\text{C}/\text{W}$
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## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

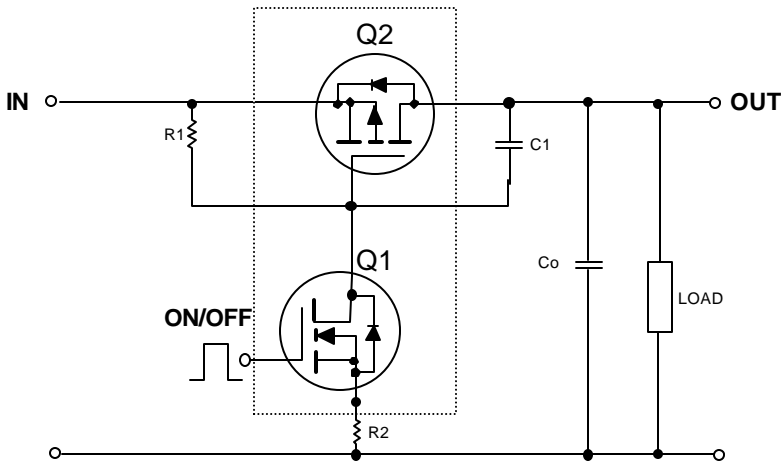
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
I <sub>FL</sub>	Forward Leakage Current	V <sub>IN</sub> = 20 V, V <sub>ON/OFF</sub> = 0 V			1	μA
<b>ON CHARACTERISTICS (Note 3)</b>						
V <sub>DROP</sub>	Conduction Voltage Drop	V <sub>IN</sub> = 12 V, V <sub>ON/OFF</sub> = 3.3 V, I <sub>L</sub> = 0.36 A		0.14	0.2	V
		V <sub>IN</sub> = 5 V, V <sub>ON/OFF</sub> = 3.3 V, I <sub>L</sub> = 0.27 A		0.16	0.2	
R <sub>(ON)</sub>	Q <sub>2</sub> - Static On-Resistance	V <sub>GS</sub> = -12 V, I <sub>D</sub> = -0.6 A		0.37	0.55	Ω
		V <sub>GS</sub> = -5 V, I <sub>D</sub> = -0.5 A		0.58	0.75	
I <sub>L</sub>	Load Current	V <sub>DROP</sub> = 0.2 V, V <sub>IN</sub> = 12 V, V <sub>ON/OFF</sub> = 3.3 V	0.36			A
		V <sub>DROP</sub> = 0.2 V, V <sub>IN</sub> = 5 V, V <sub>ON/OFF</sub> = 3.3 V	0.27			

### Notes:

- Range of V<sub>in</sub> can be up to 25V, but R<sub>1</sub> and R<sub>2</sub> must be scaled such that V<sub>GS</sub> of Q2 does not exceed -20V.
- R<sub>thJA</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<sub>thJC</sub> is guaranteed by design while R<sub>thCA</sub> is determined by the user's board design. Thermal ratings based on minimum mounting pad.
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

## FDG6324L Load Switch Application

### APPLICATION CIRCUIT



### External Component Recommendation

For Co ≤ 1μF applications:

R1 is required to turn Q2 off.

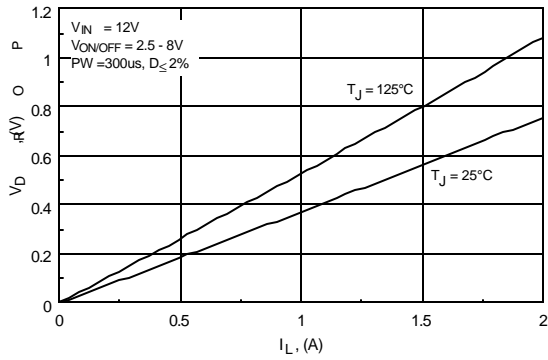
R2 and C1 are optional for slew rate control.

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

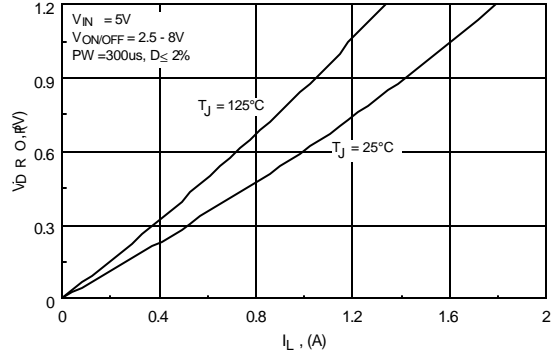
Then select R1 such that the ratio R1/R2 is maintained between 10-100.

SPICE model (FDG6324L.MOD) available at [www.fairchildsemi.com](http://www.fairchildsemi.com).

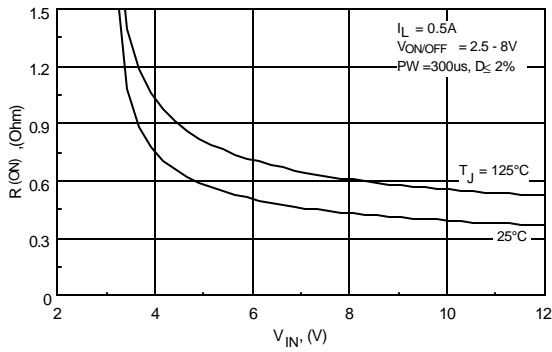
**Typical Electrical Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)



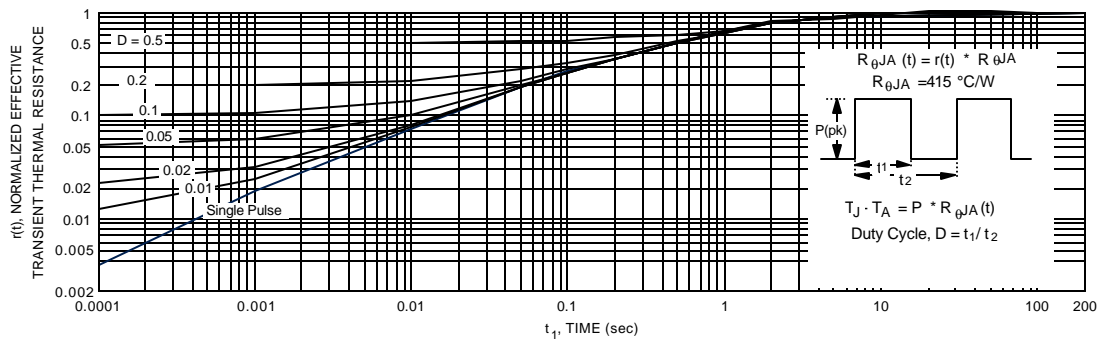
**Figure 1. Conduction Voltage Drop Variation with Load Current.**



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



**Figure 3. 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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