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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

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



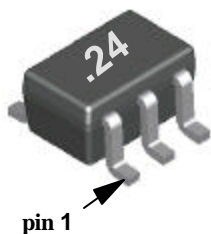
SuperSOT™-8



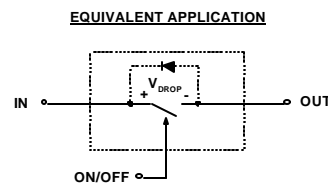
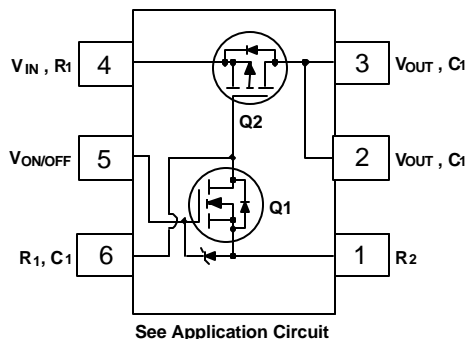
SO-8



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<br>Human Body Model (100pf/1500Ohm) | 6                     | kV               |

### THERMAL CHARACTERISTICS

|                 |  |     |                    |
|-----------------|--|-----|--------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 415 | $^\circ\text{C/W}$ |
|-----------------|--|-----|--------------------|

## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

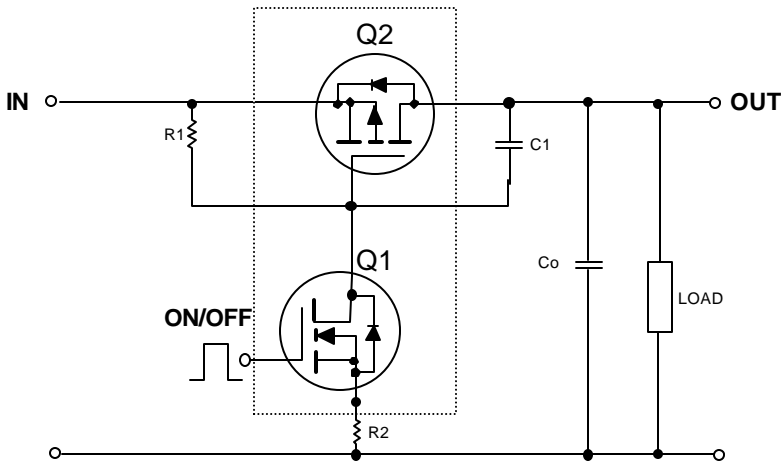
| Symbol                             | Parameter                             | Conditions   | Min  | Typ  | Max  | Units |
|------------------------------------|---------------------------------------|--|------|------|------|-------|
| <b>OFF CHARACTERISTICS</b>         |                                       |  |      |      |      |       |
| 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.

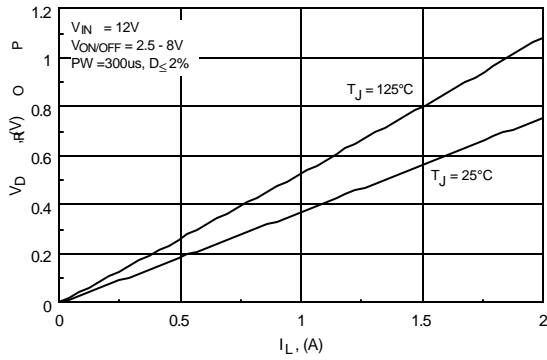
R2 and C1 are optional for slew rate control.

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

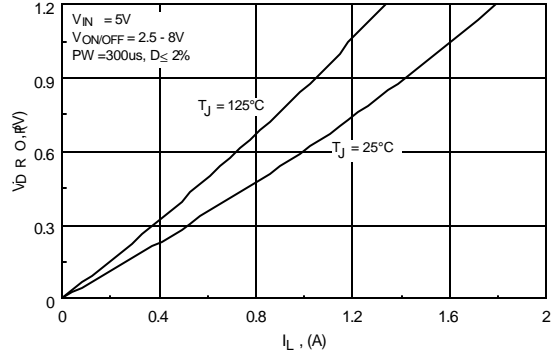
Then select R1 such that the ratio R1/R2 is maintained between 10-100.

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

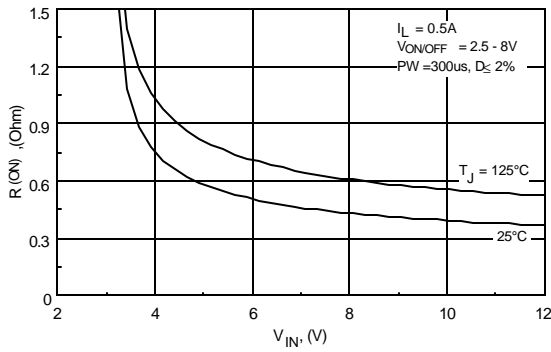
**Typical Electrical Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)



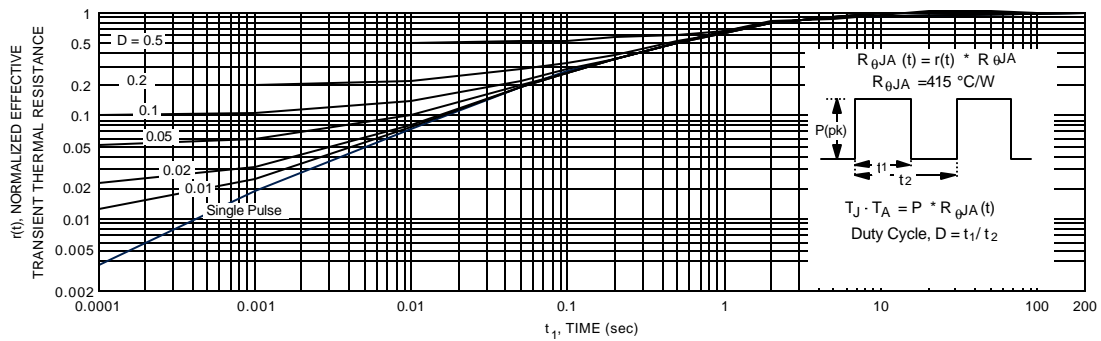
**Figure 1. Conduction Voltage Drop Variation with Load Current.**



**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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| E <sup>2</sup> CMOS™ | PowerTrench™  |            |
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| FAST®                | Quiet Series™ |            |
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