ON Semiconductor®

# FDG6323L
# Integrated Load Switch

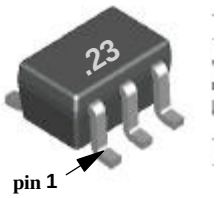
### General Description

This device is particularly suited for compact power management in portable electronic equipment where 2.5V to 8V input and 0.6A output current capability are needed. This load switch integrates a small N-Channel power MOSFET (Q1) which drives a large P-Channel power MOSFET (Q2) in one tiny SC70-6 package.

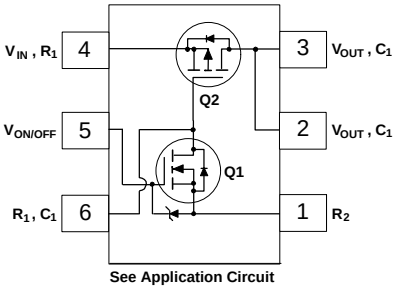
### Features

- $V_{DROP}$=0.2V @ $V_{IN}$=5V, $I_L$=0.36A. $R_{(ON)}$ = 0.55Ω
  $V_{DROP}$=0.2V @ $V_{IN}$=2.5V, $I_L$=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.
- Compact industry standard SC70-6 surface mount package.

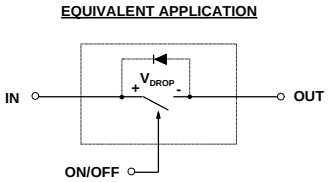
| SC70-6 | SOT-23 | SuperSOT™-6 | SuperSOT™-8 | SO-8 | SOT-223 |
|---|---|---|---|---|---|




**SC70-6**




See Application Circuit




## Absolute Maximum Ratings $T_A$ = 25°C unless otherwise noted

| Symbol | Parameter | FDG6323L | Units |
|---|---|---|---|
| $V_{IN}$ | Input Voltage Range | 2.5 - 8 | V |
| $V_{ON/OFF}$ | On/Off Voltage Range | 1.5 - 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 MIL-STD-883D Human Body Model (100pf/1500Ohm) | 6 | kV |
| **THERMAL CHARACTERISTICS** | | | |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 415 | °C/W |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Publication Order Number:
FDG6323L/D

## Electrical Characteristics ($T_A$ = 25°C unless otherwise noted)

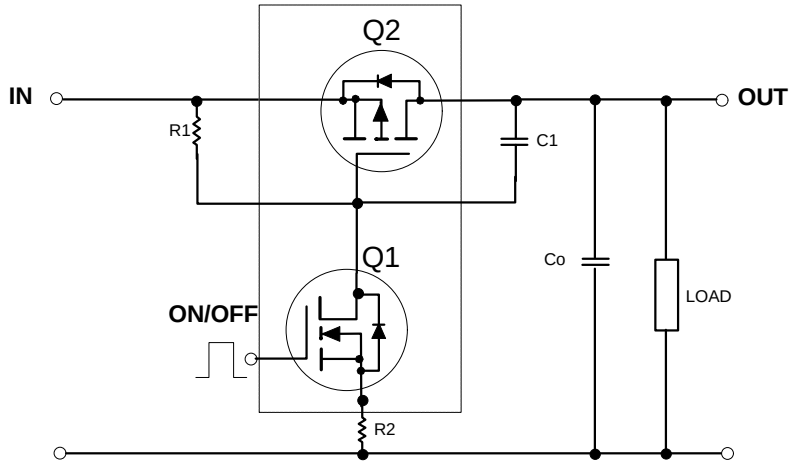
| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $I_{FL}$ | Forward Leakage Current | $V_{IN}$ = 8 V, $V_{ON/OFF}$ = 0 V | | | 1 | μA |
| **ON CHARACTERISTICS** (Note 3) | | | | | | |
| $V_{DROP}$ | Conduction Voltage Drop | $V_{IN}$ = 5 V, $V_{ON/OFF}$ = 3.3 V, $I_L$ = 0.36 A | | 0.14 | 0.2 | V |
| | | $V_{IN}$ = 2.5 V, $V_{ON/OFF}$ = 3.3 V, $I_L$ = 0.27 A | | 0.15 | 0.2 | |
| $R_{(ON)}$ | $Q_2$ - Static On-Resistance | $V_{GS}$ = -5 V, $I_D$ = -0.6 A | | 0.41 | 0.55 | Ω |
| | | $V_{GS}$ = -2.5 V, $I_D$ = -0.5 A | | 0.58 | 0.75 | |
| $I_L$ | Load Current | $V_{DROP}$ = 0.2 V, $V_{IN}$ = 5 V, $V_{ON/OFF}$ = 3.3 V | 0.36 | | | A |
| | | $V_{DROP}$ = 0.2 V, $V_{IN}$ = 2.5 V, $V_{ON/OFF}$ = 3.3 V | 0.27 | | | |

Notes:

1. Range of $V_{in}$ can be up to 8V, but $R_1$ and $R_2$ must be scaled such that $V_{GS}$ of Q2 does not exceed -8V.
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.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2.0%

## FDG6323L Load Switch Application

APPLICATION CIRCUIT




### External Component Recommendation

R1 is required to turn Q2 off.
R2 is optional for Slew Rate Control.

For Co ≤ 1uF applications:
First select R2,100 - 1KΩ, for Slew Rate control.
Then select R1 such that R1/R2 ratio maintains between 10 - 100.

## Typical Electrical Characteristics ($T_A$ = 25 °C unless otherwise noted )

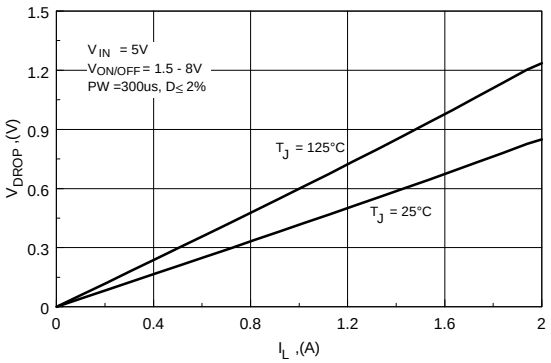



**Figure 1. Conduction Voltage Drop Variation with Load Current.**

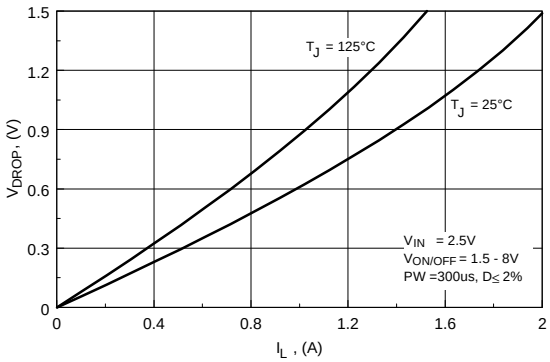



**Figure 2. Conduction Voltage Drop Variation with Load Current.**

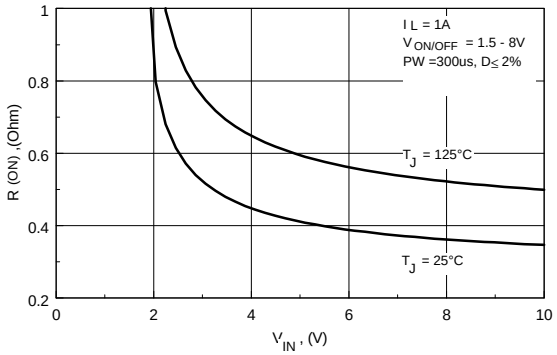



**Figure 3. On-Resistance Variation with Input Voltage.**

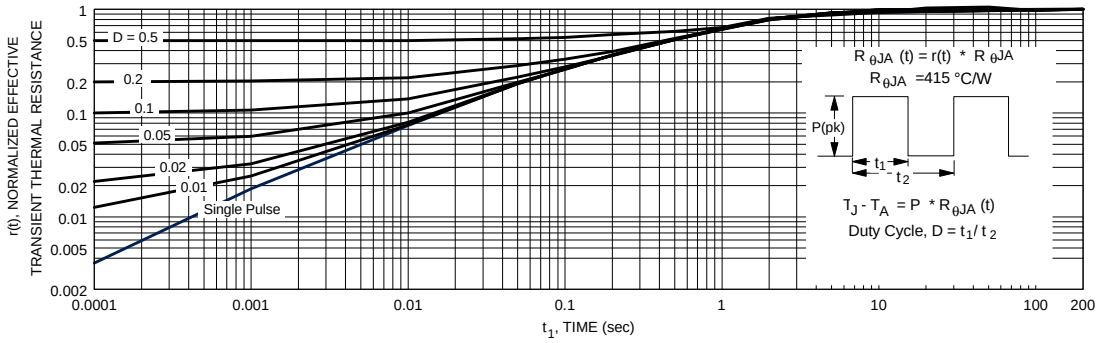



**Figure 4. Transient Thermal Response Curve.**

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

## PUBLICATION ORDERING INFORMATION

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