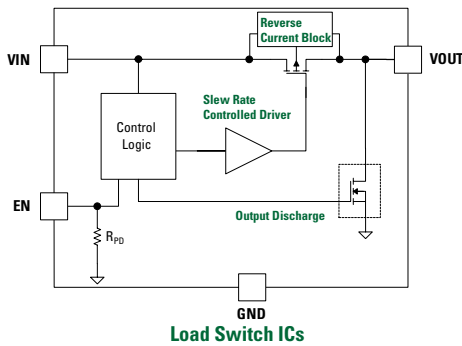


# Load Switch ICs Overview

## Overview

The integrated Load Switch ICs incorporate cutting-edge technology that achieves industry-leading performance in ultra-low power consumption (low  $I_Q$ ,  $I_{SD}$  and  $RDS(on)$ ) empowering designers to curtail parasitic leakage current, enhance system efficiency, and extend battery lifespan.

**Figure 1. Function Block Diagram Example**



## Benefits

### Ultra Low Power Consumption

Improved system efficiency helps designers reduce parasitic leakage current, reducing the total energy consumption and prolonging battery life.

The Load Switch ICs industry-leading low  $RDS(on)$  and low  $I_Q$  performance in operation mode ensures substantial power savings. (See Figure 2 below.)

**Figure 2. Power Dissipation Equation**

$$P_D = V_{IN} \times I_Q + I_{Load}^2 \times RDS(on)$$

Meanwhile, in standby mode, the superb low  $I_{SD}$  value affirms low current leakage and hence delivers significant low power loss.

### Integration in the Miniaturized Packages

The Load Switch ICs provide integrated features such as soft start, reverse current blocking, and quick output discharge in tiny chip-scale packages.

### Direct Drop-in Compatibility and Great Performance

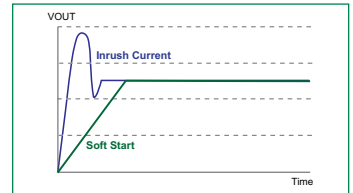
The Load Switch ICs accelerate a new product's time to market by enabling quick pin-to-pin replacement across existing industry-popular solutions, easy assembly, and component savings during the design-in phase.

## Features

### Slew Rate Control/Soft Start

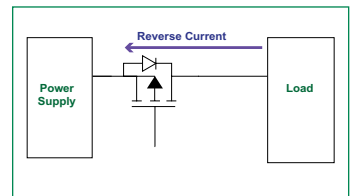
The Load Switch ICs can control the output voltage slew rate that can limit the inrush current.

**Figure 3. Illustration Diagrams**



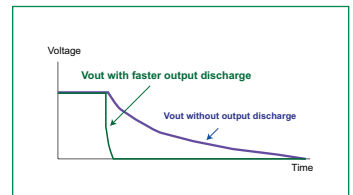
### Reverse Current Blocking

Detects when there is a higher system output voltage than the system input voltage, blocking backward current flow through the system.



### Quick Output Discharge

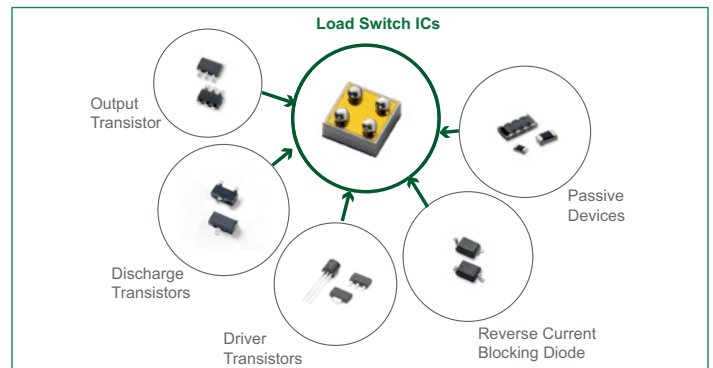
When the load switch IC turns off, it may be necessary for the output capacitor to discharge quickly to prevent unpredictable behavior of the downstream devices due to slow capacitor discharge.



**Table 1. Discrete Solutions vs. Load Switch ICs By Features**

Features	Discrete Solutions	Load Switch ICs
Low Power Leakage ( $I_Q/I_{SD}$ )	$\gg 1 \mu A$	nA Rating
Power Consumption $RDS(on)$	2-3x	Under 50 mΩ
Solution Size	> Several mm <sup>2</sup> include FETs + Passive	Chip Scale Packages
Functional Integrations	Needs extra external components as FETs, OP, Passive, etc.	Slew Rate Control Output Discharge Reverse Current Blocking Low $RDS(on)$

**Figure 4. Enable Simple Design With Integration**

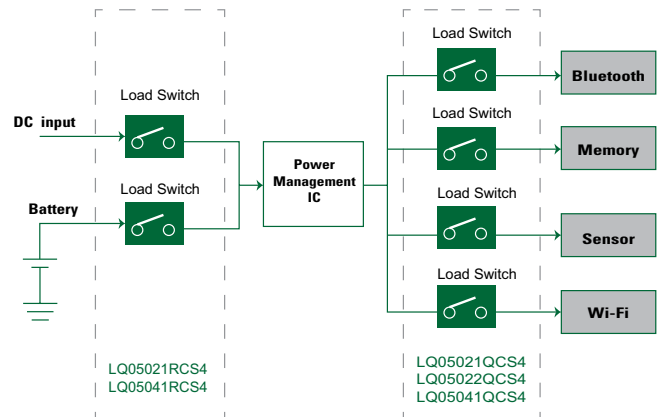


## Applications

The Load Switch ICs are ideal for battery-charged device power saving, power sequency control and power MUX (PMUX) application. Below is a list of the examples.

- Bluetooth Headset
- Computing Electronics
- Data Storage, SSD
- Doorbell
- Door Lock
- IoT (Internet of Things) Devices
- Smart Tag
- Smart Meter (Gas/Water)
- Tablet/POS
- Virtual Reality (VR) Headset
- Wearable/Smart Watch

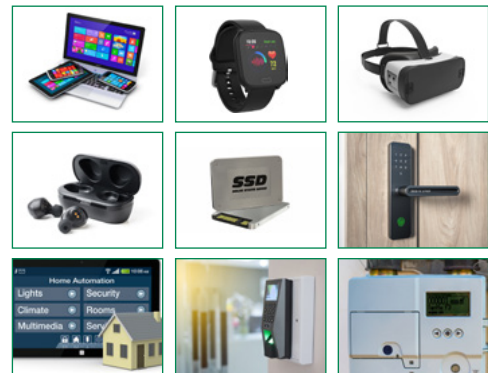
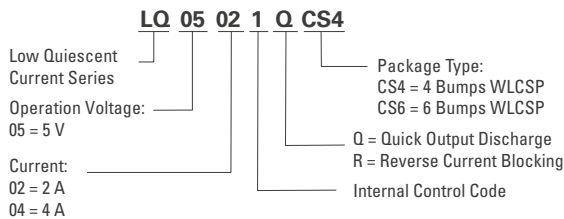
**Figure 6.** Load Switch ICs Applications and Diagram



## Part System Classification

The easy-to-use part number system helps define the product's specifications, such as operation voltage, current, package types, and key functions.

**Figure 5.** Part Number System



## Available Parts

**Table 2.** Parts List

Part Number	Voltage Range	Vmax	Current	RDS(on)	I <sub>Q</sub>	I <sub>SD</sub>	Rise Time (Soft Start)	Reverse Current-Blocking (RCB)	Control Active	Quick Output Discharge	Package	Image
	(V)	(V)	(A)	(mΩ)	(nA)	(nA)	(μs)			(Ω)	(mm)	
<a href="#">LQ05021QCS4</a>	1.1-5.5	6	2	34	1 (520*)	19	430	No	High	85	CSP4 (0.77x0.77x0.46)	
<a href="#">LQ05021RCS4</a>	1.1-5.5	6	2	37	450	20	570	Yes	High	85	CSP4 (0.77x0.77x0.46)	
<a href="#">LQ05022QCS4**</a>	1.1-5.5	6	2	31	7 (570*)	23	335	No	High	85	CSP4 (0.97x0.97x0.55)**	
<a href="#">LQ05041QCS6</a>	1.1-5.5	6	4	15	3 (540*)	50	400	No	High	85	CSP6 (0.97x1.47x0.55)	
<a href="#">LQ05041RCS6</a>	1.1-5.5	6	4	14	1300	40	730	Yes	High	No	CSP6 (0.97x1.47x0.55)	

**Notes:**  
\*This device includes the Enable pin leakage.  
\*\* This is an alternative version of CSP4 package.