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# Application note – Balancing OP-amp TLV8801

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# Introduction

## Overview

In energy-efficient designs with supercapacitors, achieving reliable cell balancing is essential for maximizing performance and lifespan. Selecting a low-power, cost-effective operational amplifier (op-amp) for active balancing can effectively maintain the charge balance between two supercapacitors. This application note discusses the features, benefits, and common use cases of a low-current rail-to-rail op-amp for active balancing in supercapacitor applications.

The TLV8801 op-amp provides efficient, low-cost active balancing to manage supercapacitor leakage, offering a stable solution for extending supercapacitor operational time.

### TLV8801 Features

- Active balancing with ultra-low current consumption of approximately 500nA
- Capable of sourcing or sinking up to 4.7mA of current
- Actively supplies or sinks the difference in leakage current between the two cells to maintain balance
- The total current consumption of the supercapacitor and balancing circuit is 1uA + supercapacitor leakage current. (2  $\mu$ A Ligna Energy S-Power 2S)
- Starting at 0.241 USD each for quantities of 1k+
- Industry Standard Packages
  - Single in 5-pin SOT-23
  - Dual in 8-pin VSSOP

# Typical Applications

The figure shows a typical application of an active balancing circuit for two supercapacitors using a low-power op-amp. The op-amp balances the voltage between the capacitors by sourcing or sinking current from the midpoint to keep the voltage of the 2 supercapacitor cells exactly equal. This helps keep the capacitors evenly charged, extending their lifespan and supporting reliable performance.

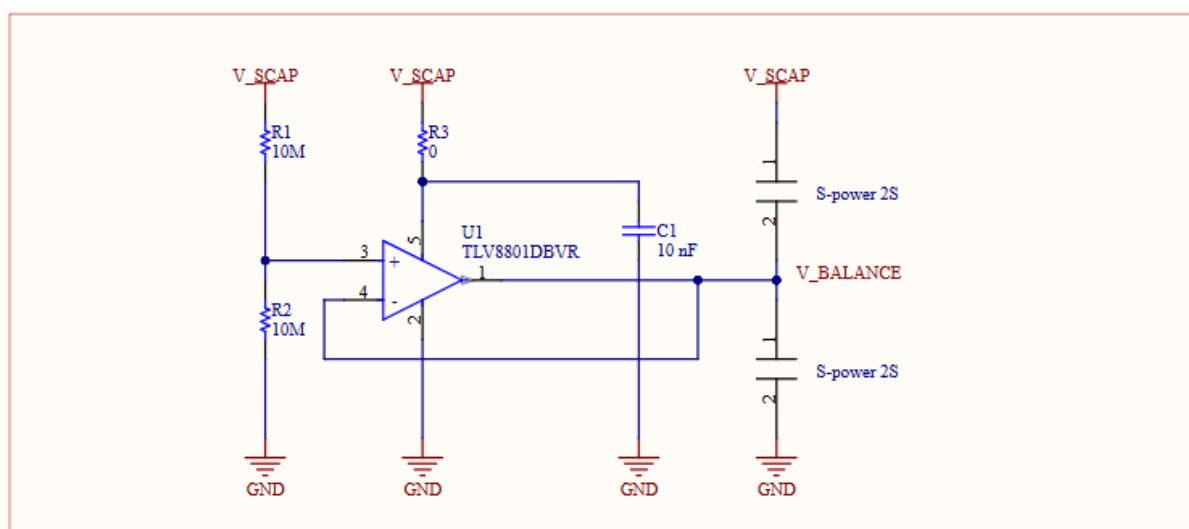


Figure 1, Typical application