

Chip Balances Supercapacitors Rated At 3.0 V And Higher

[Advanced Linear Devices'](#) ALD810030 precision MOSFET array is an addition to the quad family of Supercapacitor Auto Balancing (SAB) MOSFETs. The precision MOSFET array offers a simple, economical and effective method to balance and regulate supercapacitors rated at a higher voltage. The chip is built using ALD EPAD proven production technology. The ALD810030 stabilizes supercapacitors that can be used in a wide variety of applications, such as actuators, telematics, solar panels, emergency lighting, security equipment, barcode scanners, advanced metering boxes and battery backup systems.

The MOSFETs can balance two to four supercaps (see the figure) with very small voltage differences and dissipate no power beyond the actual leakage current differences between the two cells. When $V_{IN} = 3.00$ V is applied to the array, its I_{OUT} is 1 μ A. For a 100-mV increase in V_{IN} to 3.10 V, I_{OUT} increases by about tenfold. For an additional increase in V_{IN} to 3.24 V, I_{OUT} increases one hundredfold to 100 μ A.

Conversely, for a 100-mV decrease in V_{IN} to 2.90V, I_{OUT} decreases to one-tenth of its previous value, to 0.1 μ A. Another 100-mV decrease in input voltage would reduce I_{OUT} to 0.01 μ A.

"Once again, ALD's technology leadership has created a product that is always on for balancing larger supercapacitors that uses virtually no power," said Robert Chao, president and founder of ALD. "The ability to offer power management for cells 3.00 V or more is a market breakthrough."

The ALD810030 offers a set of unique, precise operating voltage and current characteristics for each of the four matched SAB MOSFET channels. The product, available in quad packages, is scalable and can be used to balance up to four supercapacitors connected in parallel or series.

It features a precision gate threshold voltage in the V_t mode, which is 3.00 V when the gate-drain source terminals ($V_{GS} = V_{DS}$) are connected at a drain-source current of $I_{DS(ON)} = 1$ μ A. Additionally, the operating temperature is -40°C to +85°C.

The ALD810030SCLI is now available at either Digi-Key or Mouser, starting at \$3.29 each in hundred-piece quantities. For more information, see the Precision Supercapacitor Auto Balancing (SABTM) MOSFETs [page](#).

SCHEMATIC DIAGRAM OF A TYPICAL CONNECTION FOR A FOUR-SUPERCAP STACK

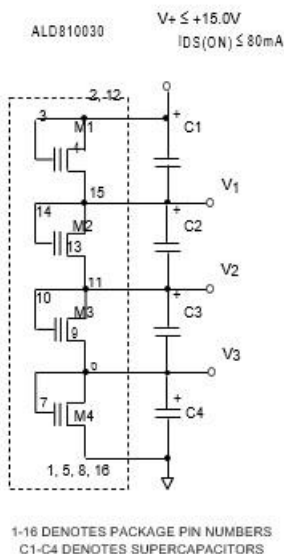


Figure. The SAB MOSFET array automatically balances supercaps, is always on, offers near-zero leakage current and power dissipation while using no operating power and provides unprecedented cell protection, according to the vendor.