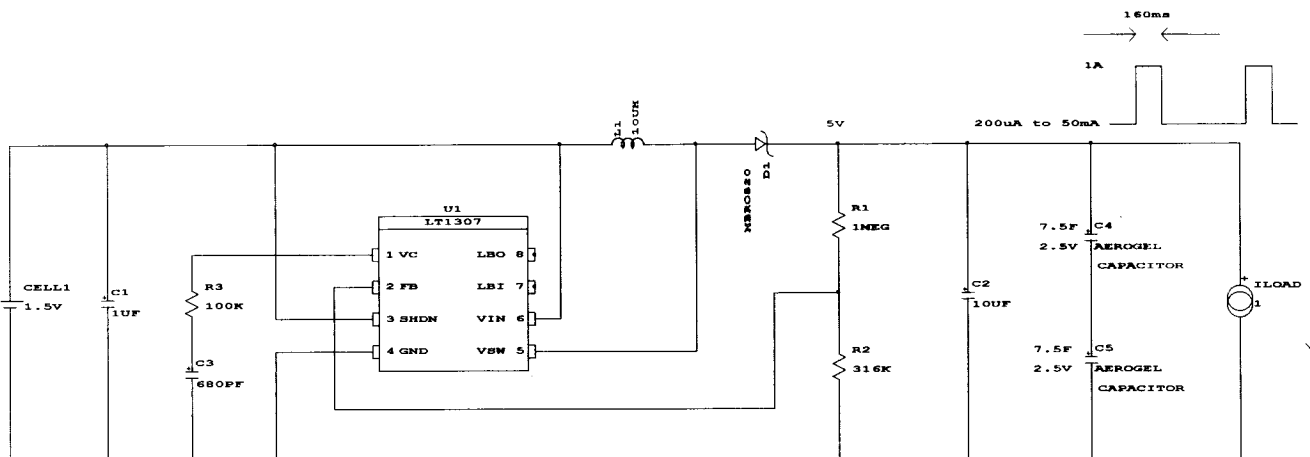# *Aerogel Capacitor Improves Regulator Performance*

Using PolyStor Aerogel Capacitors For Pulse Power Applications

Palm-top computers and personal communications appliances require nominal load currents from 200µA to 50mA. These devices also demand infrequent high current pulses of 0.6A to 1.2A. Such load conditions are problematic for micropower switching regulators that are usually tightly constrained in PC board area. The use of PolyStor Aerogel Capacitors in the regulator's output filter is an effective means for providing high current output pulses without significantly changing the design.

The circuit shown in Figure 1 uses an LT1307 regulator to boost a single 1.5V alkaline cell to 5V. Maximum DC load for this circuit is 60mA. If two PolyStor Aerogel Capacitors are used in the output filter, the circuit can easily provide infrequent load current pulses of 1.2A for 160ms in duration. In the time between pulses, the regulator charges the output capacitor in addition to driving the nominal DC load. The product of pulsed load and the duty cycle must not exceed the circuit's maximum DC output power capabilities, otherwise the circuit will simply go out of regulation.

Figure 1. Single Cell Micropower Switching Regulator using the LT1307.
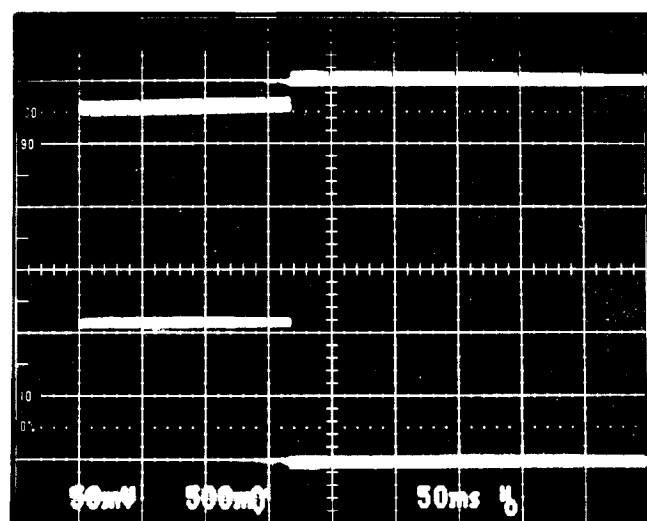
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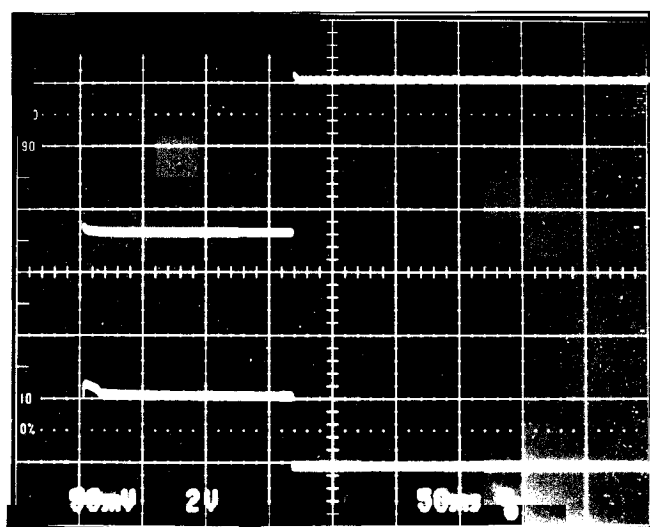
Photo 1: **Pulsed Load without PolyStor Aerogel Capacitors.**

Top Trace:	Output voltage @ 2V/div
Bottom Trace:	Load current @ 0.5A/div

Note the output voltage completely collapses to zero even when the load current pulse is only 0.5A.

Photo 2: **Pulsed Load using two PolyStor Aerogel Capacitors in the regulator's output filter.**

Top Trace:	Output voltage @ 0.5V/div (AC Coupled)
Bottom Trace:	Load current @ 0.5A/div

The output voltage differential is 0.25V under the 1.2A load, and this value remains approximately constant for the full 160ms pulse duration.