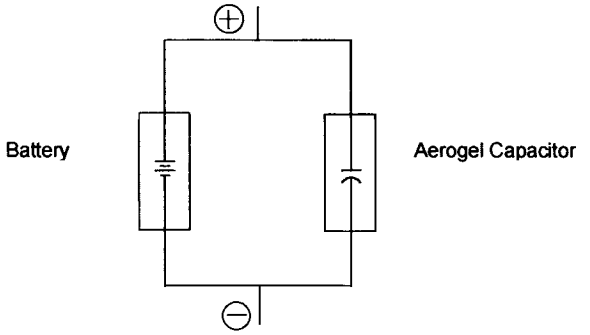
PolyStor
CORPORATION

Application Brief #2

Hybrid Power Packs

Using PolyStor Aerogel Capacitors For Medium to High Pulse Power Applications

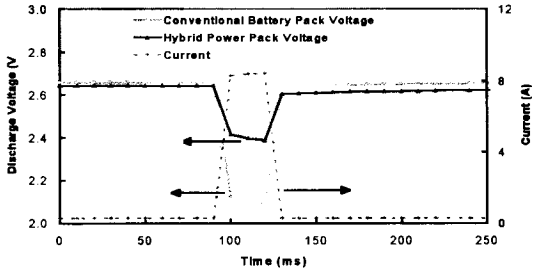
Hybrid Power Pack Configuration



Conventional Battery Pack (Control) consists of battery only.

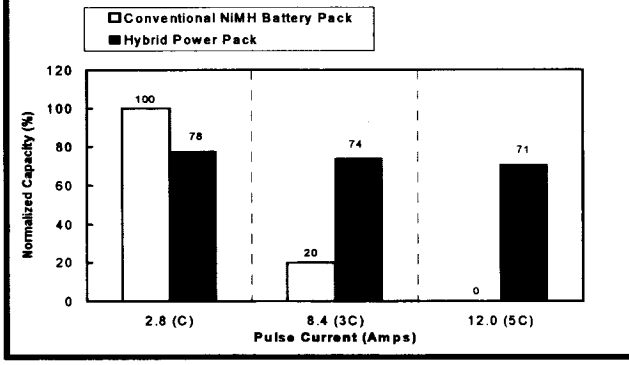
- Aerogel Capacitors connected in parallel with batteries lower the overall pack impedance.
- Aerogel Capacitors have low ESR resulting in minimal voltage (IR) losses and battery drain. ESR ≈ 25mΩ.
- Lower impedance Hybrid Power Packs increase run-times for medium to high pulse power applications.

Single Pulse Discharge Example for NiMH



- The effect of a lower impedance Hybrid Power Pack is demonstrated in this example:
  - Conventional battery pack: 2 x 4/3A NiMH cells
  - Hybrid Power Packs: 2 x 4/3A NiMH cells + 1 AA Aerogel Capacitor
- Discharge sequence:
  - pulse load is 8.4A for 30 msec
  - standby load is 0.28A for 30 sec
- Lower impedance Hybrid Power Pack has significantly lower voltage drop when pulse load is applied.

Hybrid Power Pack Outperforms Conventional NiMH Battery Pack



- Conventional NiMH battery pack handles low rate (C or 1 hour discharge rate) 30 msec pulses.
- Results are normalized for volume, thus at low rate the Hybrid Power Pack has lower capacity.
- At 3C and 5C pulse rates, Hybrid Power Packs outperform conventional NiMH battery packs. Similar results are obtained for alkaline, NiCd, and Lithium-ion battery packs.

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