Valence Lithium-Ion Polymer
General Handling and Testing Do's and Don'ts

Scope: This application note provides general handling and testing guidelines for Valence Technology's Lithium- Ion Polymer cells.

The following are general handling and testing guidelines, provided to avoid potentially damaging and hazardous conditions. The cells will generally be shipped at 30% to 40% state-of-charge (SOC) and must be appropriately charged to utilize 100% of the available capacity.

General Handling:

- Do not expose the cell to extreme heat, including fire.
- Do not drop or impact the cell.
- Do not disassemble or modify the cell.
- Do not use soldering methods when connecting to the cell leads.
- Do not puncture the cell or in any way breach the cell packaging.
- Do not use a cell that appears to be damaged or deformed, is discolored or appears to have defects in the heat seal areas.
- Keep the cells dry and away from water.
- Avoid placing cells on metal surfaces. Avoid external short circuiting of cell leads in general.
- Do not fold, bend, or apply excessive pressure to the main body of the cell (inside the sealed areas). If heat seal flanges are to be folded, do so in a manner that mechanical pressure is not transmitted to internal components. It is recommended that Valence engineering be consulted in the event that any alteration of the edge fold is considered.
- The edge of the heat seal flange is electrically conductive (see Application Note, VT-AN-004). Avoid installation or placement of cells in such a manner that this edge could come in contact with other cell terminals, printed circuit boards or other conductive surfaces in general.

General Testing (charge/discharge cycling)

- Valence recommends constant current charging at a C/2 rate to a 4.2 volt cutoff, and then switching to constant 4.2 volt charging until the current tapers to C/20. Allow 10 minutes of rest prior to discharge. Recommended discharge current is C/2 to a voltage cutoff of 3.0 volts.
- For extended cycling at high temperature (e.g.: 50°C — 60°C) in Valence cell models with a "VM" prefix, a discharge cutoff voltage of 3.6 volts is recommended. As an alternative, linear temperature compensation of the discharge cut-off voltage from 3.0 volts at ambient room temperature to 3.6 volts at 60°C can be used to ex-tend cycle life at the elevated temperatures.
- Cell Polarity: Copper lead is negative (anode), Aluminum lead is positive (cathode), when in the discharge mode. Avoid connecting these in re-verse.
- Avoid sustained charging of cells at excessive currents. Maximum recommended charge rate is "C" rate and preferred charge rate is "C/2". External current limiting devices (i.e. "PTC's") are required in circuits using these cells to avoid excessive current demand on charge.
- Avoid charge fault conditions where voltage on individual cells would exceed 4.5 volts on cell models with the "VC" prefix and 5.0 volts on models with the "VM" prefix. Cells (single or multiple) assembled into a battery pack must be monitored on an individual cell voltage basis and the charge terminated if the voltage drop across any one cell reaches the value above. Several commercial IC manufacturers have circuits that provide this and other protection functions.
- Avoid discharging cells to below 2.4 volts in a fault mode.
- In testing with constant current, provide means to limit capacity delivered to cell in a fault mode to 30% over rated capacity. Limiting time on charge is one approach to accomplishing this.
- Contact Valence Technology before conducting abuse – hazard definition testing.

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