Handling & Soldering of Cymbet™ EnerChip™ Batteries

Introduction

Cymbet™ EnerChip™ thin film, solid state batteries feature all solid state construction, are packaged in standard integrated circuit packages, and can be reflow soldered for high volume PCB assembly. They are ideal as rechargeable backup power sources for clocks, memories, microcontrollers and other low-power circuits where data or timing information must be retained in the absence of primary power.

This document provides general handling guidelines and precautions for the batteries. These include device handling and storage, protection against electrostatic discharge (ESD), reflow solder, and in-circuit use.

Device Handling & Storage

- EnerChip batteries are packaged and shipped in moisture barrier bags, and are sensitive to moisture absorption. They must be kept in the sealed bag until ready for board mounting and reflow soldering.
- If the batteries are removed from the sealed bag more than 12 hours prior to board mounting, they must be baked at 125°C for a minimum of 24 hours prior to board mounting and reflow soldering.
- Store the batteries in an environment where the temperature and humidity do not undergo large fluctuations. Store at 10°C to 30°C and at less than 60% relative humidity.

Electrostatic Discharge (ESD)

- Similar to integrated circuits, the batteries are sensitive to ESD damage prior to receiving a charge cycle. Therefore, adherence to ESD prevention guidelines is required.
- Remove devices from protective shipping and storage containers at approved ESD workstations only.
- All equipment used to process the devices must be configured to minimize the generation of static charges. This includes soldering and de-soldering equipment and tools, pick-and-place equipment, test equipment, and all other tools and equipment used to handle or process the devices.
- Failure to observe these precautions can lead to premature failure and shall void product warranty.

Soldering

- The maximum number of times the battery may be reflow soldered is three times.
- The surface temperature of the battery must not exceed 260°C.
- The recommended solder reflow profile is shown in Figure 1 below; refer to Table I for time and temperature requirements.

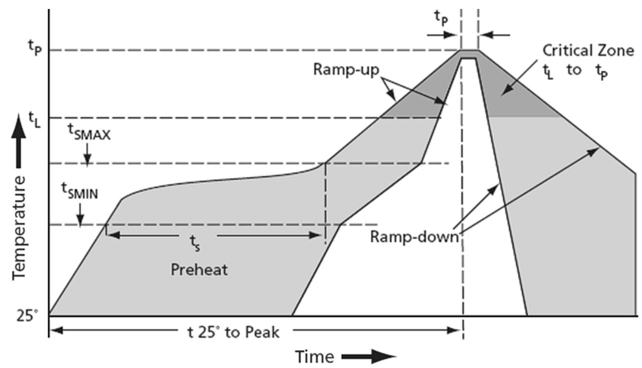

Figure 1. Recommended solder reflow profile.

Parameter	Sn/Pb	Pb-free
Max ramp-up rate	6°C/sec	6°C/sec
Soak temperature, min, T_{SMIN}	135°C	150°C
Soak temperature, max, T_{SMAX}	155°C	200°C
Soak time, max, T_S	2 min	3 min
Liquid temperature, T_L	183°C	220°C
Max time above T_L	150 sec	150 sec
Max peak temperature, T_P	225°C	260°C
Max time at peak, T_P	30 sec	30 sec
Max ramp-down rate	10°C/sec	10°C/sec

Table 1. Solder reflow parameters.

In-circuit Use Guidelines

- Do not connect these batteries to other types of batteries except through an approved charging circuit.
- To increase battery life, avoid installing near heat generating sources.

PCB Layout & Board Contamination

- Electrical resistance of solder flux residue can be low enough to discharge the cell at a much higher rate than in the normal backup mode. Therefore, solder flux must be thoroughly washed from the board following soldering

- The PCB layout can make this problem worse if the cell's positive and negative terminals are routed near each other and under the package, where it is difficult to wash the flux residue away.
- In the example in *Figure 2*, the negative connection is routed from the negative pad to a via placed under the package near the positive pad. In this scenario, solder flux residue can wick from the positive solder pad, covering both the positive pad and the via, resulting in a high resistance current path. This current path will make the cell appear to be defective or make the application circuit appear to be drawing too much current.
- Make sure positive and negative traces are routed outside of the package footprint to ensure that flux residue will not cause a discharge path between the positive and negative pads.

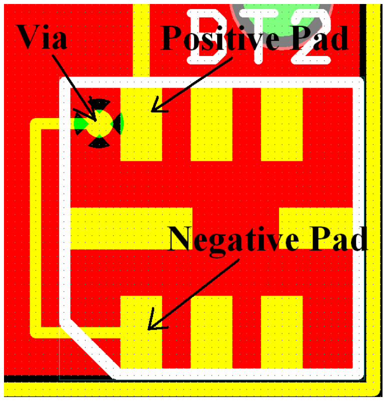

Figure 2. PCB traces resulting in a low resistance leakage path.