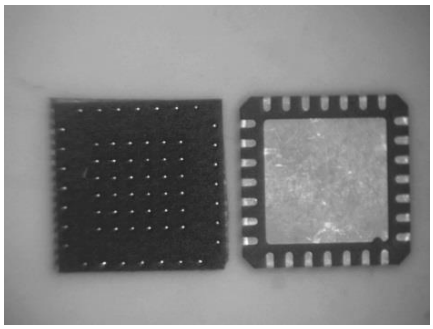
Reballing a QFN Simplifies the Process

While the there are many different methods for reworking a leadless device such as a QFN, there is a newly developed method for placement of these package styles. Instead of attempting to replicate the original manufacturing process by paste printing on the board or “bumping” the part, the leadless device is transformed into a solder ball array connected device.

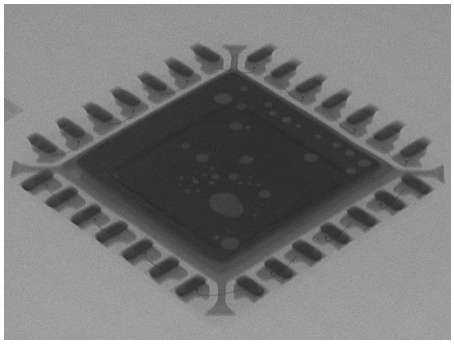
The idea with this technique is to reball the leadless package and then place the reballed device just like you would a BGA. Ball sizing and ball pattern and spacing needs to be properly designed so as not to have too much solder volume in the center ground which would raise the part and have the IO be no connects. Conversely the IO pads solder paste volume has to be sufficient yet not to voluminous to potentially violate minimum electrical clearances. Since the BGA placement process is well-developed and well-understood, the device can more easily and quickly be reworked once he balls are placed.

The process is documented below:

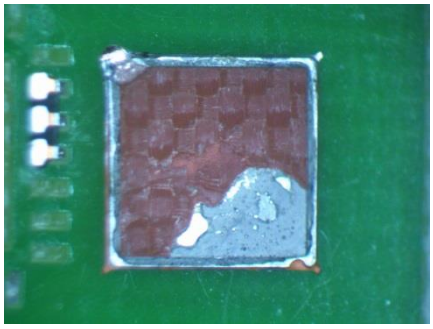


Lead Free reballing preform pattern (left) for the QFN on the right

Reballed and placed the QFN is reflowed onto the board



X-Ray image of placed QFN (measured 24% voiding percentage)



After prying off the device, the thermal ground pad ripped mostly from board indicating an adequate connection

The potential downside of the process is that the standoff height of the device is a few mils greater than that of an originally-placed device (typically 7 mils versus the original 3.5-4 mils) meaning it may not work in cases where such devices are placed underneath an RF shield. While the overall processing time for this rework technique is faster than other methods, the material costs are greater as the consumable reballing preforms add U$3-8 per EZReball™ device.

There are several **benefits** to this process over other techniques including:

A greater final standoff height allows for greater clearance meaning voiding opportunities are lessened and the cleaning clearances for easier removal of flux residue underneath the device are greater.

First pass yields are greater using the reballing technique

The total rework time of a typical QFN is lessened from 20-25 minutes down to 15 minutes

There is no messy, potentially disturbing wet solder paste used in the process