Section: 10.25	Revision: A	Revision Date: 11/16/09

DFM Subject: Heatsink Attachment, Pad Cratering Prevention

DFM Requirement:
The primary concern in this section is preventing BGA pad cratering defects caused by heatsink design or installation. There are 5 methods for attaching heatsinks (examples on page 2).

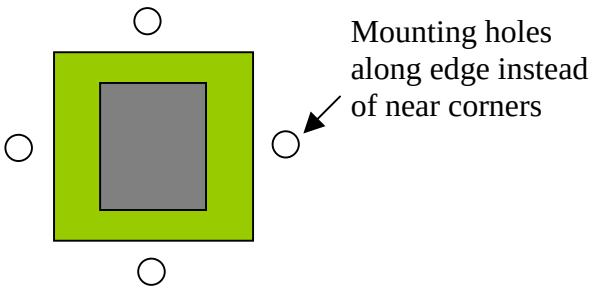
- Adhesive, thermally conductive – low risk of pad cratering
- Tape, pressure sensitive – moderate risk of pad cratering
- Clip-on, component – high risk of pad cratering
- Snap lock or push pin – high risk of pad cratering
- Hardware, screws – high risk of pad cratering

1. Adhesive attachment is generally a low risk method of attachment because it does not apply stress near the BGA corners. However, heatsink removal can cause defects.
2. Pressure sensitive tape shall be installed with the proper tools; the downward force used to activate the tape should not be excessive or uneven (more pressure in the corners).
3. Heatsinks that clip-on the edge of a BGA package shall be installed or removed with the proper tools (usually provided by the manufacturer).
4. Snap lock or push pin type heatsinks shall not bow or flex the PCB or BGA during or after installation, especially near BGA corners. Ideally, mounting holes should be located along the edge of the BGA instead of near BGA corners (see Figure 1).
5. Heatsinks attached with stand-offs and screws shall not bow or flex the PCB or BGA during or after installation, especially near BGA corners. If a single heatsink is used to cover multiple BGAs ensure there is a gap between all BGAs and the heatsink to avoid bowing the PCB.

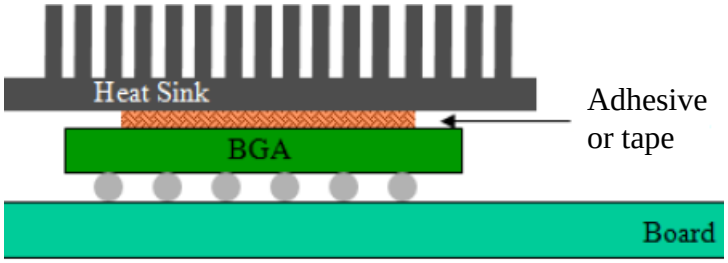
DFM Impact:
If not done correctly, the design, installation or removal of heatsinks can cause pad cratering. See pad cratering scorecard in Section 9.2.

DFM Details:

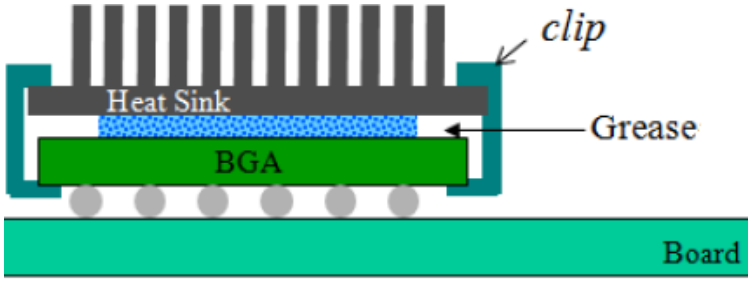
Figure 1:
Preferred mounting hole location



Heatsink attachment with adhesive or tape:



Heatsink attachment with clips:



Heatsink attachment with snap locks or push pins: