Heat Sink Attachment Methods

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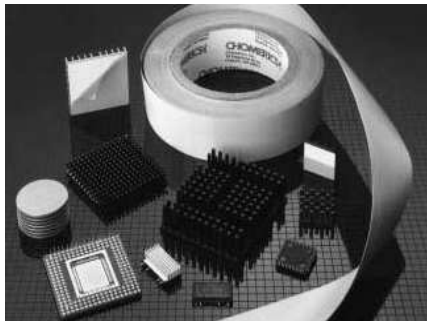
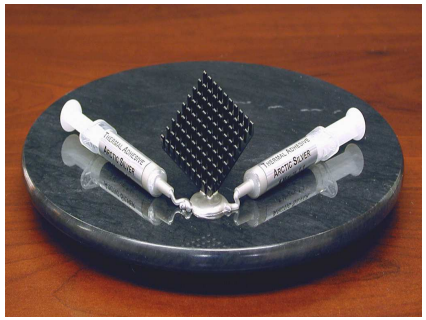
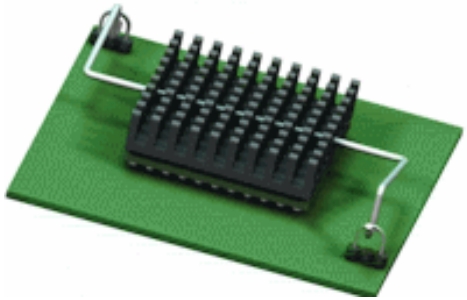
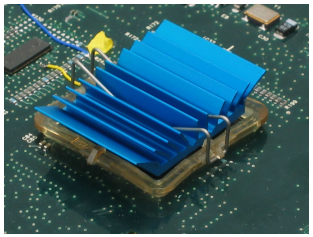
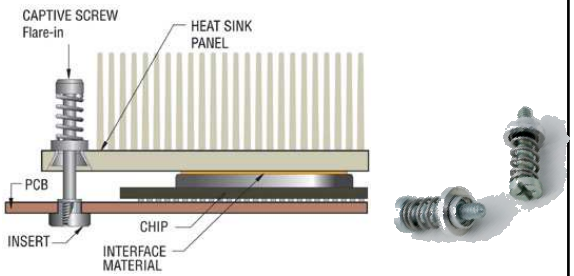
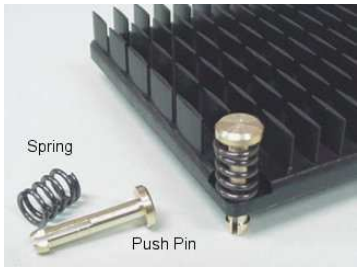
Innovations in Thermal Management®

		
Thermal Tape	**Epoxy**	**Wire Form "Z-Clips"**
Pressure sensitive adhesive tape, acrylic	Single or dual-part mixed adhesive with thermally conductive fillers	Stainless steel wire formed clip
 		
Clips	**Threaded Stand-Offs (PEMs) and Compression Springs**	**Push-Pins & Compression Springs**
Plastic or plastic/wire clips that grip the components	Threaded mechanical assemblies that offer the highest level of retention and stability	Plastic or brass push-pin that offer quick and easy mechanical attachment

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•Method	•Pros	•Cons	•Cost
•Thermal Tape	• Easy to attach • Inexpensive	• Does not perform well with heavier heat sinks • Surface must be cleaned for optimal adhesion • Moderate to low thermal conductivity	• $
•Epoxy	• Strong mechanical adhesion • Relatively Inexpensive	• Makes board rework difficult and can damage the component • Surface must be cleaned for optimal adhesion	• $$
•Wire Form (Z-Clips)	• Strong mechanical attachment • Easy removal/rework • Applies a preload to the TIM, improving thermal performance	• Requires holes in the board or solder anchors • More expensive than tape or epoxy • Custom designs	• $$ $
•Clip-on	• Applies a preload to the TIM, improving thermal performance • Requires no holes or anchors • Easy removal/rework	• Must design in the attachment for proper keep-out zone around BGA • Extra assembly steps	• $$ $
•Push-pin w/ Compression springs	• Strong mechanical attachment • Highest TIM preload • Ideal for large HS • Easy removal and installation	• Requires holes in the board, limiting amount of trace on the PCB • Cost	• $$ $$
•Stand-offs w/ Compression Springs	• Strongest mechanical attachment • Highest TIM preload • Ideal for large HS	• Requires holes in the board, limiting amount of trace on the PCB • Complicated assembly • Cost	• $$ $$ $