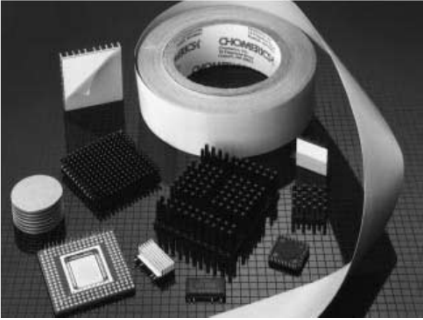
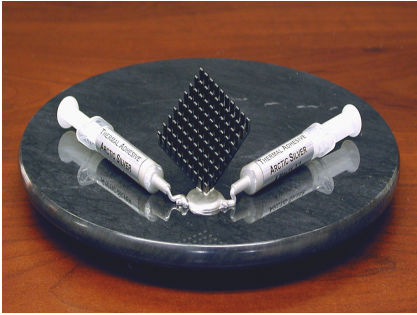
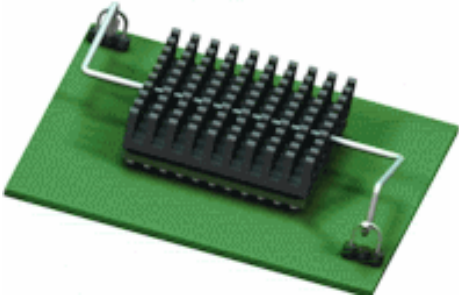
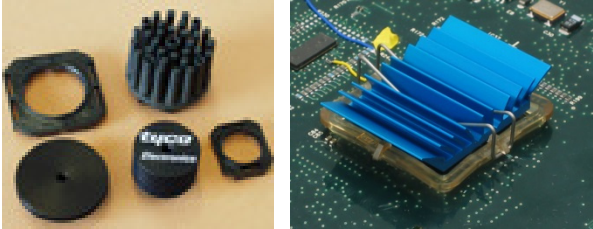
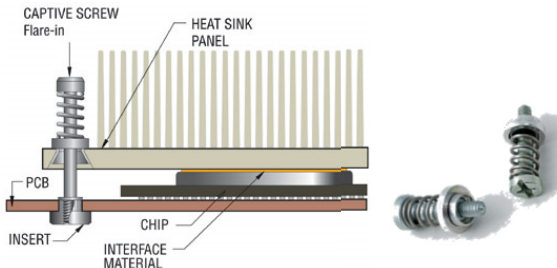
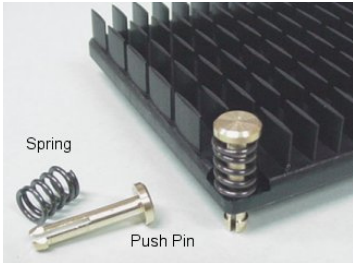


Advanced Thermal Solutions – <http://www.qats.com>

Heat Sink Attachment Cheat Sheet – Attachment Types

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

Advanced Thermal Solutions – <http://www.qats.com>

Heat Sink Attachment Cheat Sheet – Pros & Con List



Method	Pros	Cons	•Cost
Thermal Tape	<ul style="list-style-type: none"> • Easy to attach • Inexpensive 	<ul style="list-style-type: none"> • Does not perform well with heavier heat sinks • Surface must be cleaned for optimal adhesion • Moderate to low thermal conductivity 	• \$
Epoxy	<ul style="list-style-type: none"> • Strong mechanical adhesion • Relatively Inexpensive 	<ul style="list-style-type: none"> • Makes board rework difficult and can damage the component • Surface must be cleaned for optimal adhesion 	• \$\$
Wire Form (Z-Clips)	<ul style="list-style-type: none"> • Strong mechanical attachment • Easy removal/rework • Applies a preload to the TIM, improving thermal performance 	<ul style="list-style-type: none"> • Requires holes in the board or solder anchors • More expensive than tape or epoxy • Custom designs 	• \$\$\$
Clip-on	<ul style="list-style-type: none"> • Applies a preload to the TIM, improving thermal performance • Requires no holes or anchors • Easy removal/rework 	<ul style="list-style-type: none"> • Must design in the attachment for proper keep-out zone around BGA • Extra assembly steps 	• \$\$\$
Push-pin w/ Compression springs	<ul style="list-style-type: none"> • Strong mechanical attachment • Highest TIM preload • Ideal for large HS • Easy removal and installation 	<ul style="list-style-type: none"> • Requires holes in the board, limiting amount of trace on the PCB • Cost 	• \$\$\$\$
Stand-offs w/ Compression Springs	<ul style="list-style-type: none"> • Strongest mechanical attachment • Highest TIM preload • Ideal for large HS 	<ul style="list-style-type: none"> • Requires holes in the board, limiting amount of trace on the PCB • Complicated assembly • Cost 	• \$\$\$\$ \$