

Si Integrated Heat Spreaders for fcCSP Packages

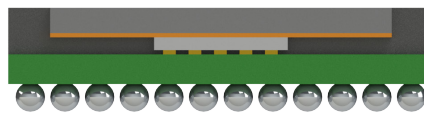
Si is an effective alternative to Cu as a heat spreader material.

Si Integrated Heat Spreader Considerations

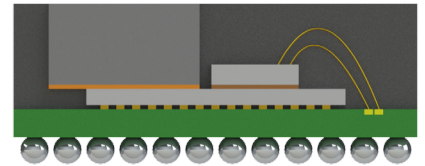
Amkor's package enhancement can be embedded inside of a mold to expose the top surface to an external heat sink.

- ▶ As a result of robust thermal conductivity and ease of processing, Si is an effective alternative to Cu as a heat spreader material
- ▶ Si Integrated Heat Spreaders (IHS) can be embedded inside the mold, while exposing its top surface to an external heat sink

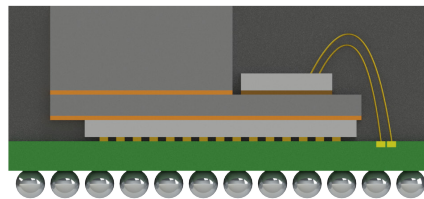
Example constructions include:



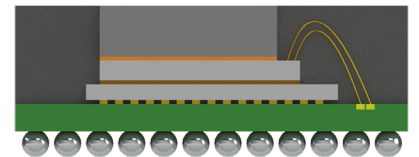
Embedded and Exposed Si IHS in a Single-die fcCSP



Embedded and Exposed Si IHS in a Side-by-Side Hybrid Structure












Dual Si IHS in a Hybrid Structure



Embedded and Exposed Si IHS in a Stacked Hybrid Structure

Key

	Si Integrated Heat Spreader (IHS)		Flip Chip Die Bump
	Thermal Interface Material (TIM)		Wirebond Bondfinger
	Active Si (Flip Chip or Wirebond)		Substrate
	Wirebond Die Attach Material		Solder Ball
			Wirebond

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