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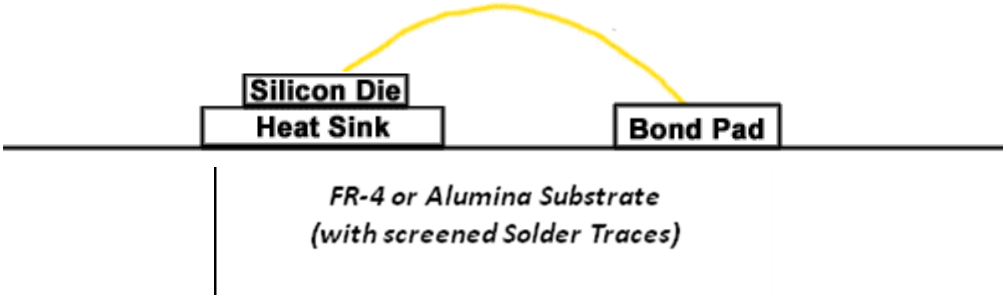
ELECTRONIC COMPONENTS
AND PACKAGING

Data Sheet: Aluminum-Clad-Copper Bond Pad

Clad Alloy Composition	Aluminum - 99.99% (Al-1145) Copper - 99.99% (Cu-CDA102, CDA194)
Al-Clad ratios available	5-35% (thickness)
Al-Clad thickness	12.5µm (.0005”) min, for wedge bonding up to 200 µm (.008”)diameter wire. 125µm (.005”) max, for Al4N/5N or AlMg heavy wire wedge bonding
Bond Pad Height	150 µm to 750 µm (.006” to .030”)
Density	Depending Al/Cu ratio
Coefficient of Thermal Expansion	≈17 x 10^{-6} K^{-1} (Depending Al/Cu ratio)
Hardness	Compatible with wedge bonding
Thermal Conductivity	375 W $m^{-1}K^{-1}$ (est.)
Electrical Resistivity	2 x 10^{-8}Ω-cm (est.)

Application: The Aluminum-Clad-Copper Bond Pad is especially developed for the automotive and power semiconductor industries. It is used for making an electrical connection between the Al-based circuitry on the semiconductor die and the Cu or Au-based circuitry on the PCB side. The method is mostly used for preventing a direct connection between Al and Au, which may result in loose connections. Over time Au and Al build an intermetallic (aka “Purple Plague) as well as creating voids (aka “Kirkendall voids”) by diffusion rate differences between the 2 elements into each other.



Currently Bond Pads are mostly used for realizing a high-current, conductive connection with Al-wire/ribbon between a power semiconductor and Cu-based PCB. The Bond Pad is typically connected at the Copper side to the PCB by soldering and at the topside to the Al-wire by ultrasonic wedge bonding. For thin gauge wire only a thin Al-clad is needed. The thicker high-conductive pure aluminum wire needs a thicker Al-clad on the pad. The ultimate dimensions for the Bond Pad are specified by the requirements of the application.