

**B-Id**

## **UHF RFID INLAY COMPARISON**



## Polyimide / Copper UHF RFID Inlays from B-ID

B-Id has introduced a new family of UHF RFID inlay products based on polyimide (PI) and copper (Cu) structure.

This new family of PI / Cu inlays exhibit excellent detection performance, high reliability, and superior stability characteristics. Thanks to the usage of PI and Cu as their core building materials and SMT manufacturing process, these inlays can endure harsh environmental variations which CAN NOT be done with typical PET / Aluminum inlays based on flipchip process.

As the result of secondary chip packaging, B-Id's inlays adopt most of the commercially available UHF chip technology, B-Id's PI / Cu UHF inlays have additional protection for inlay's most critical component. A stronger and rigid connection between the UHF IC and the antenna is the direct benefit of the SMT process. Compared to traditional PET / Aluminum inlays based on flipchip process where the inlay's UHF chip and the antenna is "glued" by "conductive gels", and can suffer loss of adhesion due to moisture absorption under humid environment. However, SMT solder joints do not suffer from humidity caused connectivity degradation and can work with expected stable performance.

With the usage of better electrical conducting material, copper, for antenna, B-Id UHF inlays deliver better RF performance and hence much stable performance.

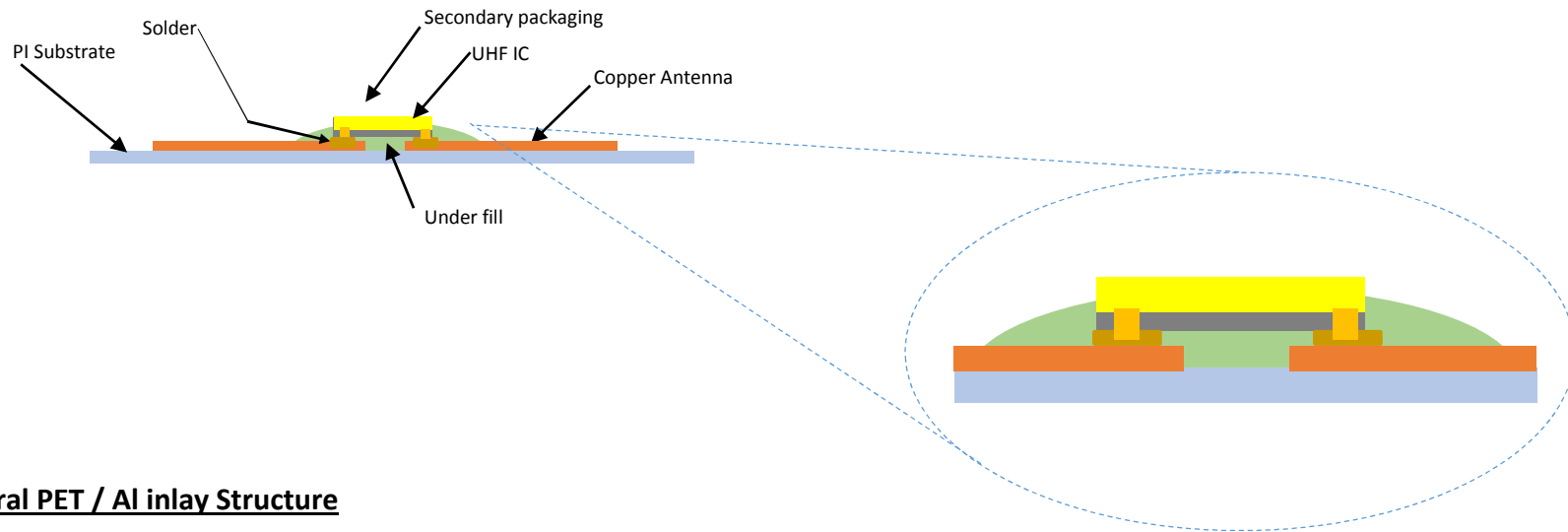
For comparisons of characteristics between PI / Cu and PET / Al inlays, please see the table below. For further questions, please send inquiries to [info@b-id-us.com](mailto:info@b-id-us.com). For additional product information, please visit B-Id's websites: <http://www.b-id-us.com>.

## Polyimide / Copper UHF RFID Inlays from B-ID

Inlay Characteristic Comparisons		
	B-Id's PI / Cu Inlays	Typical PET / Al Inlays
Manufacturing process	Automated SMT process using lead-free solder	Automated flipchip process using ACP conductive glue
IC protection	<b>Yes,</b> Sealed secondary packaging to protect dice	<b>No protection,</b> bare dice
Heat resistance	<b>Yes,</b> high temperature tolerant, Polyimide substrate has storage temperature up to 120°C for wet inlays and over 150°C for dry inlays. Moreover, solder joint can well withstand over 200°C. The high storage temperature characteristic allows for final product post-processing requiring heat.	<b>No,</b> PET substrate and ACP conductive glue CAN NOT tolerate high temperature. Typical storage temperature up to only +50°C
UHF IC / Antenna bonding material	<b>Metallic solder</b>	Rubber like conductive glue
UHF IC / Antenna interface	<b>Strong and rigid</b> molecular bonding; stable and low resistance between contacts	Relies on glue's conductive particle contacts at interface; resistance varies depending on pressure and temperature
RF performance	<b>Excellent</b> reliable and stable RF / Microwave performance. Good impedance matching between IC and antenna	<b>Performance may varies with temperature, humidity, and flatness of ACP joints.</b> RF Impedance between IC and antenna varies.
Operation in harsh environment	<b>YES,</b> can withstand temperature and humidity cycles and maintaining performance stability	<b>Not recommended or require expensive exterior packaging.</b> ACP glue adhesion degradation will result due to material expansion caused by humidity and temperature cycling and lead to final inlay failure
Antenna material	<b>Copper,</b> much better physical electrical conductive characteristic than aluminum	Use <b>Aluminum</b> as electrical conductor
Cost	<b>Low cost / cost effective</b>	Low cost / cost effective

## Polyimide / Copper UHF RFID Inlays from B-ID

### General PI / Cu Inlay Structure



### General PET / Al inlay Structure

