

MBARI Application Report

Hesse Mechatronics

Jack Gilson

03/13/2024

Agenda

- **Summary**
- **Consumables and Set-Up**
- **Part Images**
- **Weld Settings**
- **Pull and Shear Results**

- Able to get good bonds between Al pad and ENIG PCB
- Improvements:
 - Improving fixturing of PCB will improve weld process and make welding more consistent

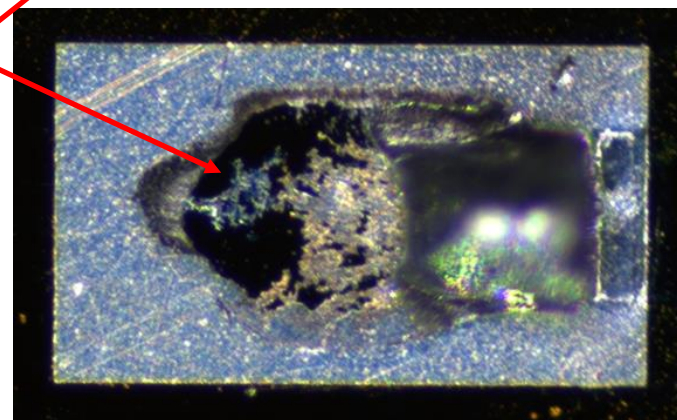
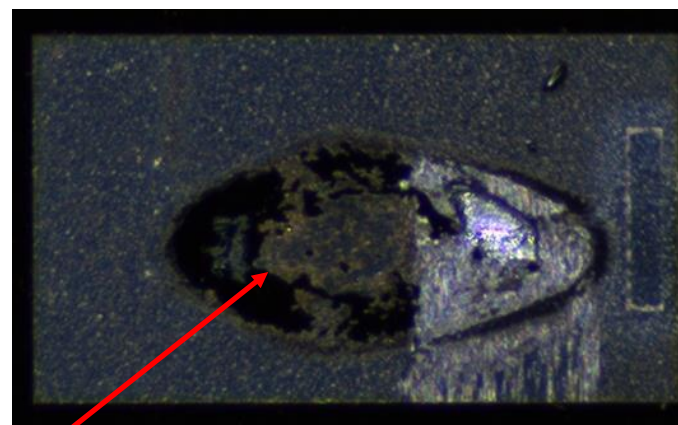
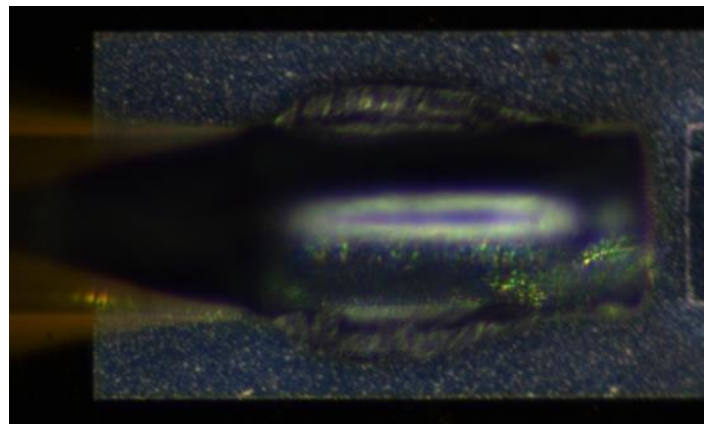
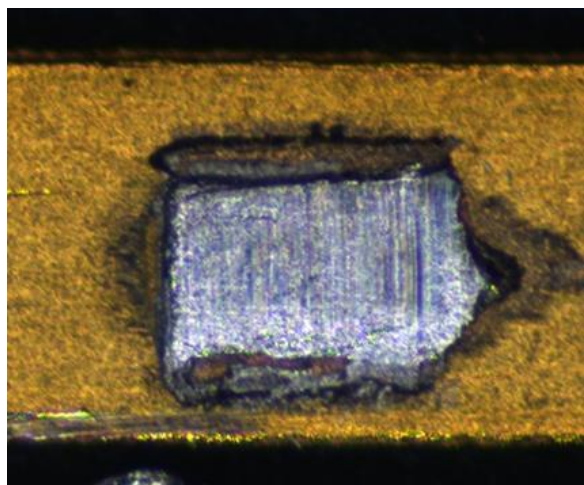
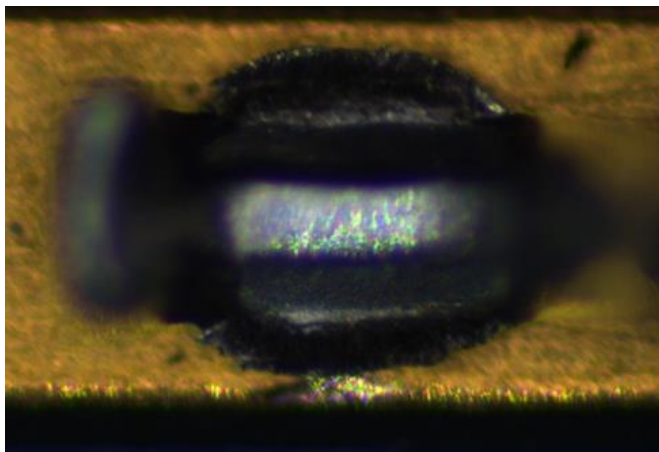
■ Wedge Bond

- Wedge Manufacturer: Hesse
- Specification of Wedge: 125um

- Wire Manufacturer: Heraeus
- Wire Material: ALW-49P
- Breaking Load: > 350g
- Elongation: 10-20%

- Bond Head: HBK10, Backcut
- Amplifier: 200W
- Transducer Frequency: 60kHz

Part Images



Tearing Al
pad

125um Wire to Al Pad

Process phase	[3, [8.0, 8.24, linear, 20.0, 120.0, 40.0], [9.0, 9.27, linear, 75.0, 200.0, 50.0, 100.0], [5.0, 5.15, linear, 20.0, 80.0, 20.0, 80.0]]
Count	3
Process phase 1	[8.0, 8.24, linear, 20.0, 120.0, 40.0]
Voltage [V]	8.0
Voltage effective [V]	8.24
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	20.0
Bondforce [cN]	120.0
Phase duration [ms]	40.0
Process phase 2	[9.0, 9.27, linear, 75.0, 200.0, 50.0, 100.0]
Voltage [V]	9.0
Voltage effective [V]	9.27
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	75.0
Bondforce [cN]	200.0
Force ramp [ms]	50.0
Phase duration [ms]	100.0
Process phase 3	[5.0, 5.15, linear, 20.0, 80.0, 20.0, 80.0]
Voltage [V]	5.0
Voltage effective [V]	5.15
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	20.0
Bondforce [cN]	80.0
Force ramp [ms]	20.0
Phase duration [ms]	80.0

125um Wire to ENIG

Input method	value
Process phase	[3, [8.0, 8.24, linear, 25.0, 150.0, 50.0], [4.5, 4.635, linear, 50.0, 80.0, 50.0, 100.0], [3.0, 3.09, linear, 50.0, 40.0, 50.0, 75.0]]
Count	3
Process phase 1	[8.0, 8.24, linear, 25.0, 150.0, 50.0]
Voltage [V]	8.0
Voltage effective [V]	8.24
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	25.0
Bondforce [cN]	150.0
Phase duration [ms]	50.0
Process phase 2	[4.5, 4.635, linear, 50.0, 80.0, 50.0, 100.0]
Voltage [V]	4.5
Voltage effective [V]	4.635
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	50.0
Bondforce [cN]	80.0
Force ramp [ms]	50.0
Phase duration [ms]	100.0
Process phase 3	[3.0, 3.09, linear, 50.0, 40.0, 50.0, 75.0]
Voltage [V]	3.0
Voltage effective [V]	3.09
Ultrasonic ramp profile	linear
Ultrasonic ramp [ms]	50.0
Bondforce [cN]	40.0
Force ramp [ms]	50.0
Phase duration [ms]	75.0

Pull and Shear Testing

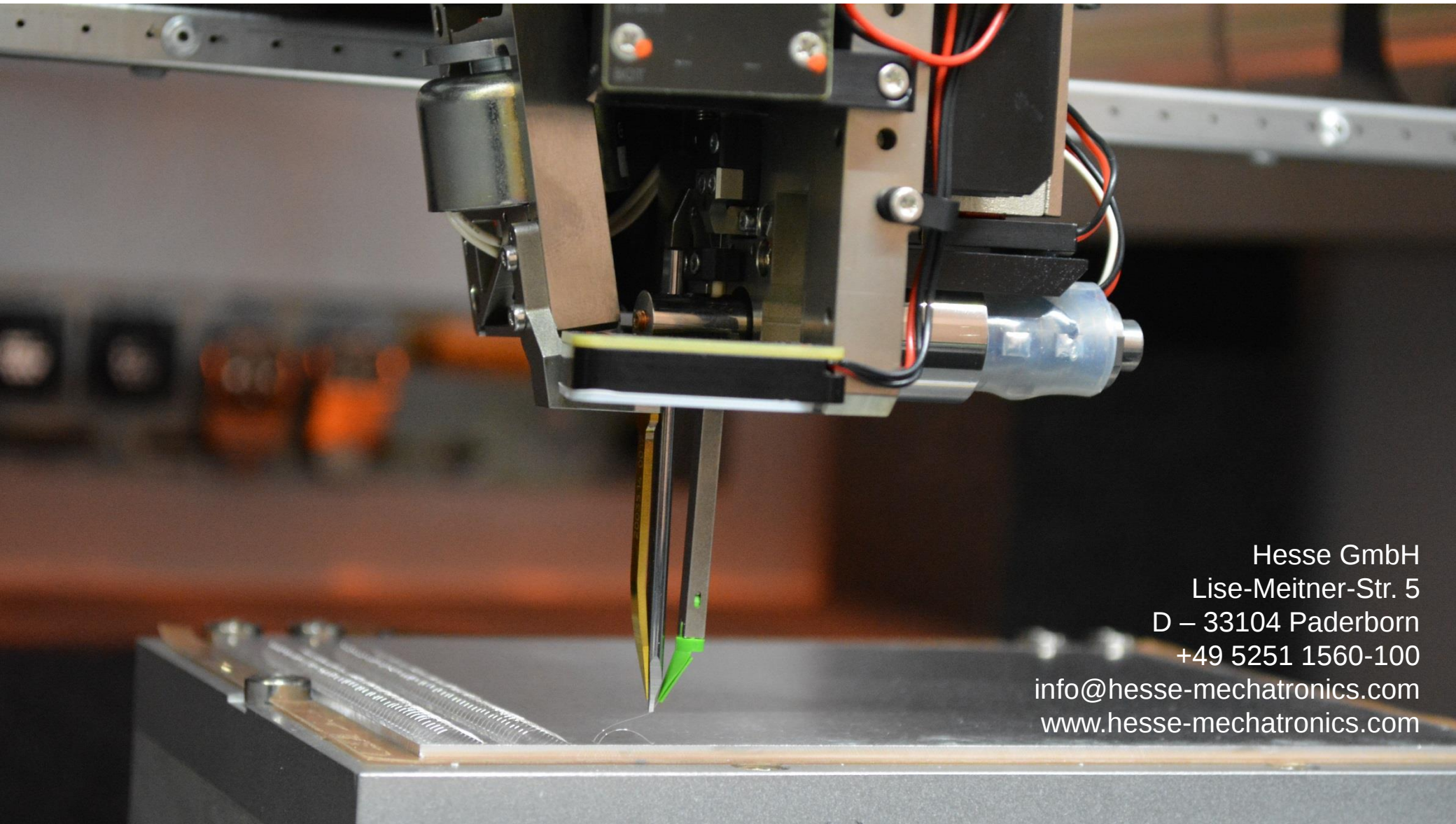
Pull Testing

Average Pull Force (g)	Min. Pull Force (g)	Max Pull Force (g)	St. Deviation (g)
165.72	129	286.4	38.01

Shear Testing

Average Shear Force (g)	Min. Shear Force (g)	Max Shear Force (g)	St. Deviation (g)
195.30	125.6	258.23	38.28

Thank you for your kind attention!



Hesse GmbH
Lise-Meitner-Str. 5
D – 33104 Paderborn
+49 5251 1560-100
info@hesse-mechatronics.com
www.hesse-mechatronics.com