



Development of 5G Electrical Contact for use in Test, Burn-In, & Tri-Temp

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Plastronics

Plastronics saw a need to develop an H-Pin product that meet the following criteria:

1. Signal Speeds greater the 30 GHz at -1db
2. A test height of 1 mm or less
3. Pitch of 0.4 mm
4. An impedance of 50 Ohms
5. Contact resistance of 35 milliohms or less initially

The following are the designs used to meet those criteria

BGA Version

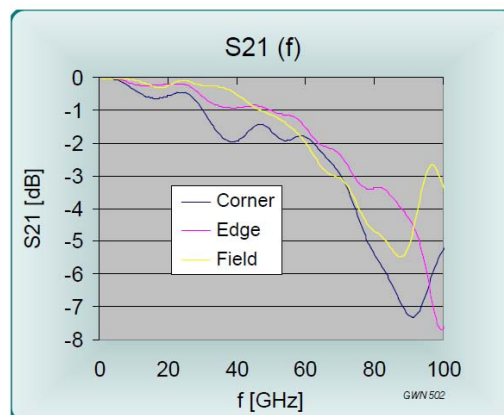


LGA Version



To insure good electrical performance, contacts were place at a 45° to each other to increase distance between pins which would also improve electrical performance.

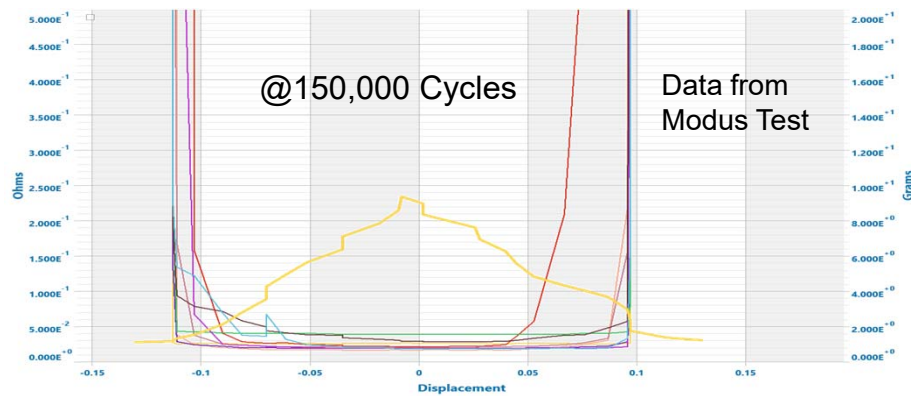
Data from
Gateway



Measurement results:

Data from
Gatewave
Northern

	Corner	Edge	Field	
Delay	7.6	6.3	6.6	ps
Risetime open	28.5	28.5	28.5	ps
Risetime short	34.5	30	79.5	ps
Risetime thru, 50Ω	15	13.5	13.5	ps
Insertion loss (1dB)	30.5	50.1	47.4	GHz
Insertion loss (3dB)	70.8	74.1	68.6	GHz
VSWR (2:1)	83.9	>100	50.1	GHz



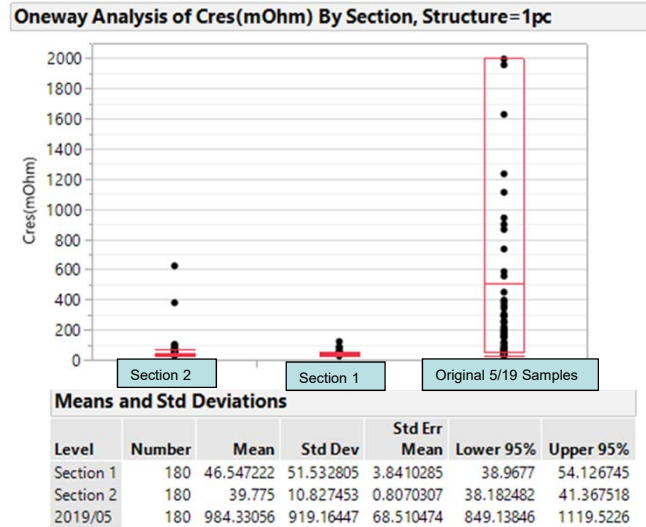
Summary:

1. We tested at 50.1 for field pins at -1db
2. Test height at 1.0 mm
3. Pitch as tested at 0.4 mm with pins on 45 angle
4. Measured impedance of 54.9 Ohms
5. Measured initial resistance at 28 milliohms

CRITERIA MET!!

Next Objective: To pass tri-temp testing at three temperatures of 125C, 26C, and -55C at 100,000 cycles. LLCR is used as criteria for Pass/Fail. Initial results dated 05/2019 had a large deviation. Added lubricant to cleaned parts (section 2) and added same lubricant over a Au sealer (section 1). We also considered a 1 vs 2 piece plastic housing design in the same tests.

LLCR
after
100,000
cycles



Data above shows significant difference between adding low-temp Lube (section2) vs low-temp lube added over Au sealer (section 1)

	Temp(C)	Housing structure	No sealing agent	Section 1	Section 2	
Stuck	LT	2pcs	-	No	No	Section 1 had no stuck pins
	RT	1pc	Yes	No	No	
	RT	1pc	Yes	No	No	
	HT	1pc	Yes	No	Yes	
Open	LT	2pcs	-	Yes	Yes	Section 1 had no open pins in 1pc design
	RT	1pc	Yes	No	No	
	RT	1pc	Yes	No	No	
	HT	1pc	No	No	Yes	

Section 1 had no stuck pins or open pins, but only in the 1 piece plastic design. Solution is lube over sealer and use 1 piece housing design.

PASSED TESTING!!!

Further areas of study:

1. Can 2 piece body be made to work?
2. How do LLCR results compare to adding lube during plating process vs post addition?

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