NINETEENTH ANNUAL

BiTS

Burn-in & Test Strategies Workshop

™

March 4 - 7, 2018

Hilton Phoenix / Mesa Hotel
Mesa, Arizona

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Low cost / High performance
One piece spring probe pins for Burn-in test

AJ Park / IWIN Co., Ltd

Introduction

- Burn-in and Test for semiconductor processes are some of the most challenging interconnect applications due to the combination of harsh operating conditions and high performance requirements at fine pitch.
- New technologies developed for spring probe pins enable low cost and high pin-count burn-in sockets
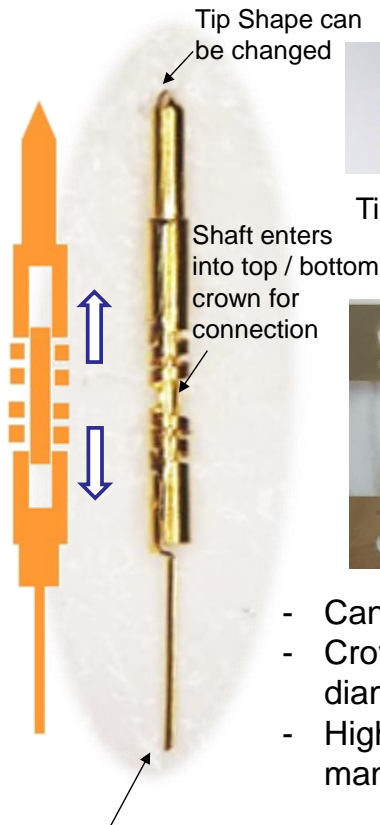
Design consideration

- Cost/Quality/Lead time management - Need for innovative progressive stamping technology.
- One stamping tool – Need for flexibility and easy to modify with least cost and shortest lead time

Various types of Progressive stamped Pin
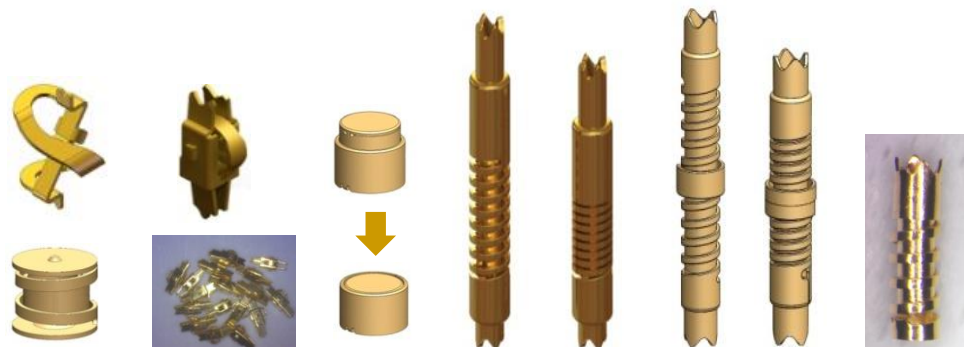
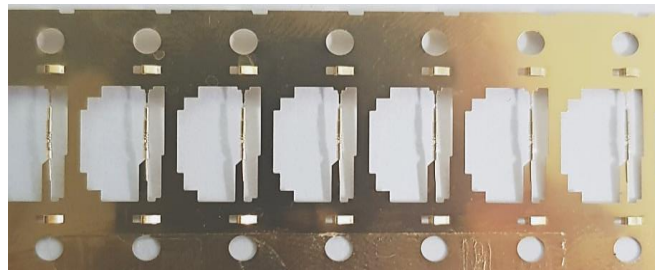## Case study: One Piece Stamped Spring Probe for Burn-in

Tip Shape can be changed

Tip Shape can be changed for BGA, QFN, LGA

Shaft enters into top / bottom crown for connection

- Can control very tight dimensional tolerances
- Crown shape, spring force and spring diameter can be optional
- High productivity / low cost method to manufacture spring probes in large volume

Tail for soldering can be changed to dome or cone-shaped

Mechanical Specifications

Pin height : 5.70 mm
Top plunger : 1.20 mm
Contact spring force : 18 gF / 0.30 mm
Recommend stroke : PKG 0.30 mm
Operating temperature : -40~125 ℃
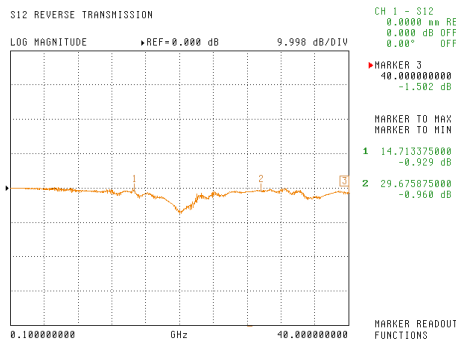Life cycle : Standard 100,000

Electrical Specifications

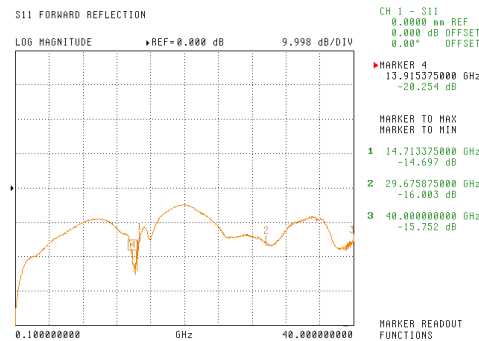Contact resistance : < 60 mili-ohms
Current rating : 2.5 Amps

To become top crown

To become Shaft

To become coil spring

To become Tail for soldering
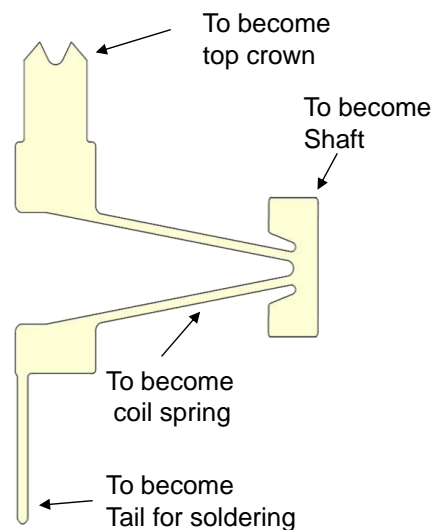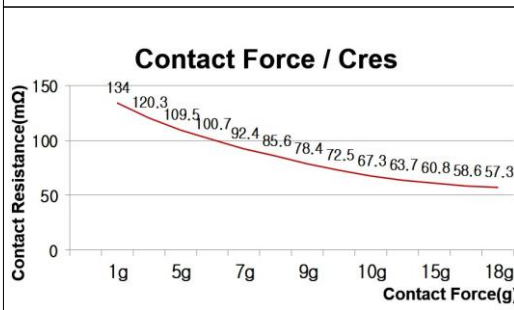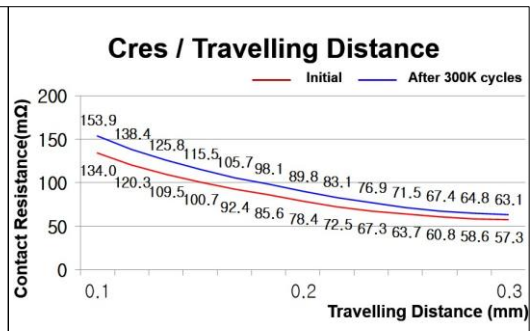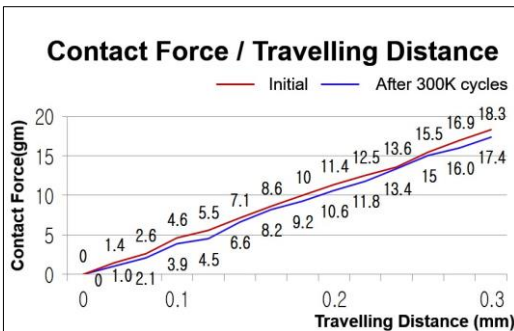
Planar view for stamping

Case study with One Piece Stamped Spring Probe

Insertion Loss: -1dB @ 14.71 GHz

Return Loss: -20dB @ 13.91 GHz

Current Carrying Capacity Measuring

* Result
- in 3.5~4.0 Amp, contact force was changed

Current	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1.0A	OK	OK	OK	OK	OK
1.5A	OK	OK	OK	OK	OK
2.0A	OK	OK	OK	OK	OK
2.5A	OK	OK	OK	OK	OK
3.0A	OK	OK	OK	OK	OK
3.5A	OK	C/F Changed	OK	C/F Changed	OK
4.0A	C/F Changed		C/F Changed		C/F Changed

Summaries and the next plan

1. High-speed production (parts/minute) by stamping is possible
2. Relatively easier quality management once stamping tool is designed and qualified
3. Challenges:
   - Develop extremely low cost pin for high volume application
   - Reduce lead time for stamping tool for a new pin development

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