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TM

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

AJ Park / IWIN Co., Ltd

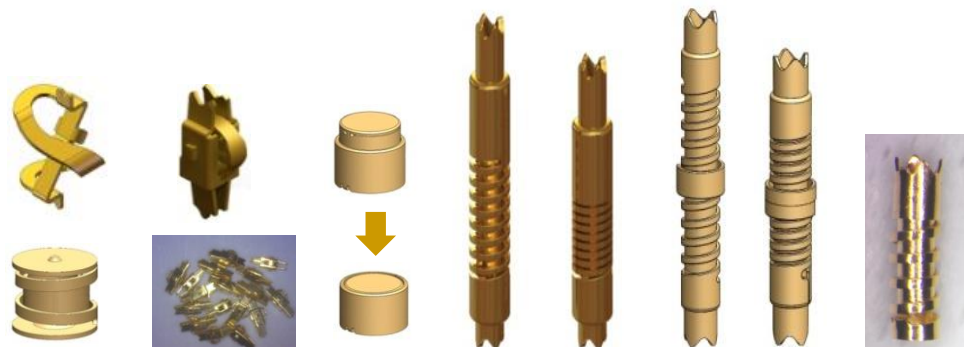
Introduction

- 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

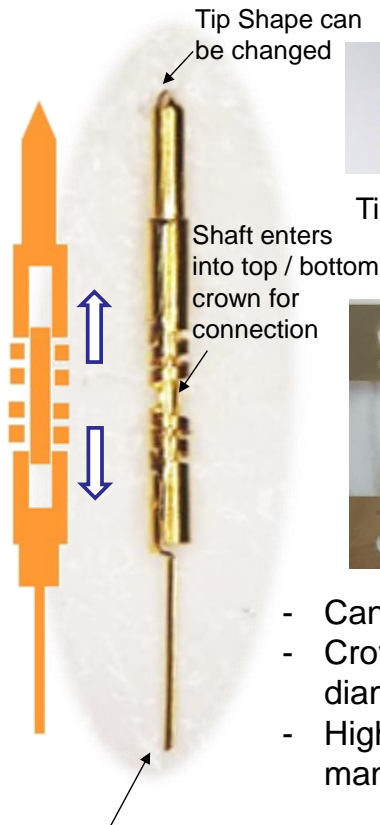
Design consideration

- 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

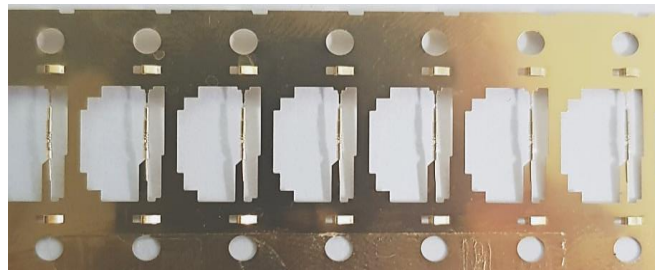


Tip Shape can be changed



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

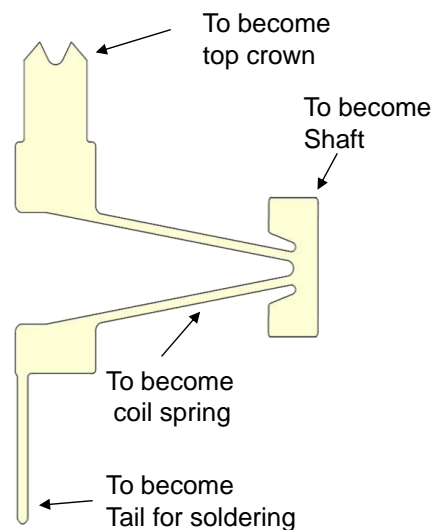
Tail for soldering can be changed to dome or cone-shaped

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 °C
 Life cycle : Standard 100,000

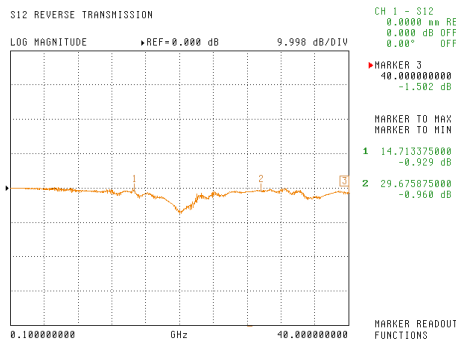
Electrical Specifications

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

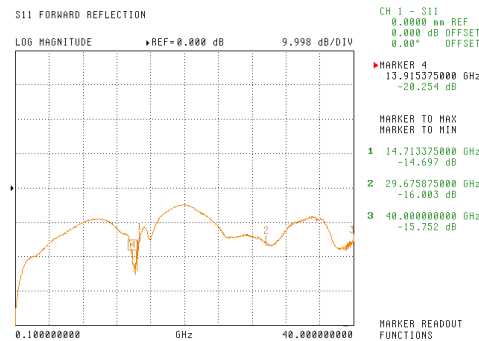


Planar view for stamping

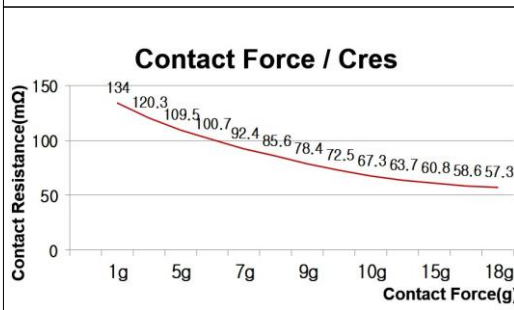
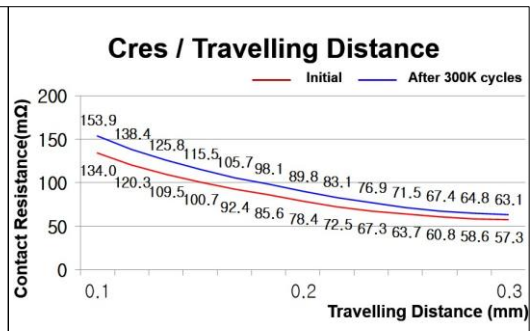
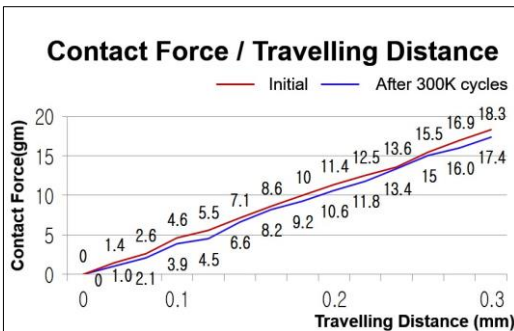
Case study with One Piece Stamped Spring Probe



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