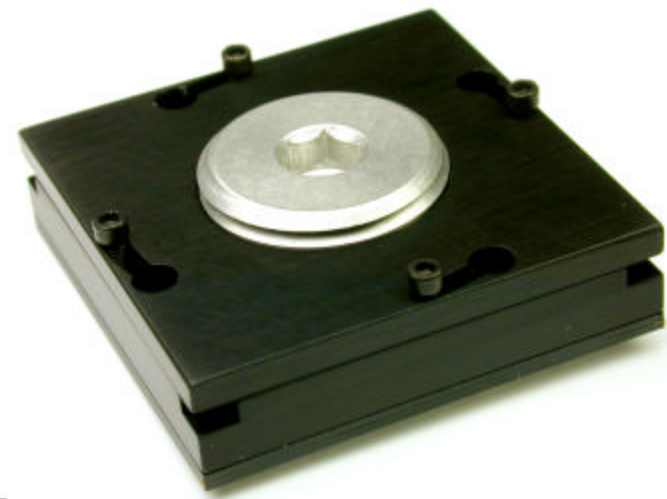




**Ironwood  
Electronics, Inc.**



**GHz-  
BGA/MLF  
Sockets**

# Ironwood Electronics Overview

- Over 5,000 products
- High Performance Adapters and Sockets
- Many Custom Designs
- Engineering – Electrical and Mechanical
- ISO9001:2000 Registration



# Socket Characteristics

- 6.5 and 10 GHz Bandwidth
- Tiny BGA Sockets
- Pitches of 0.5, 0.65, 0.8, 1.0, 1.27
- Body Sizes from 7 to 42.5 mm
- Ball Count to 1521
- Heatsink Capability

# Summary- GHz BGA Sockets

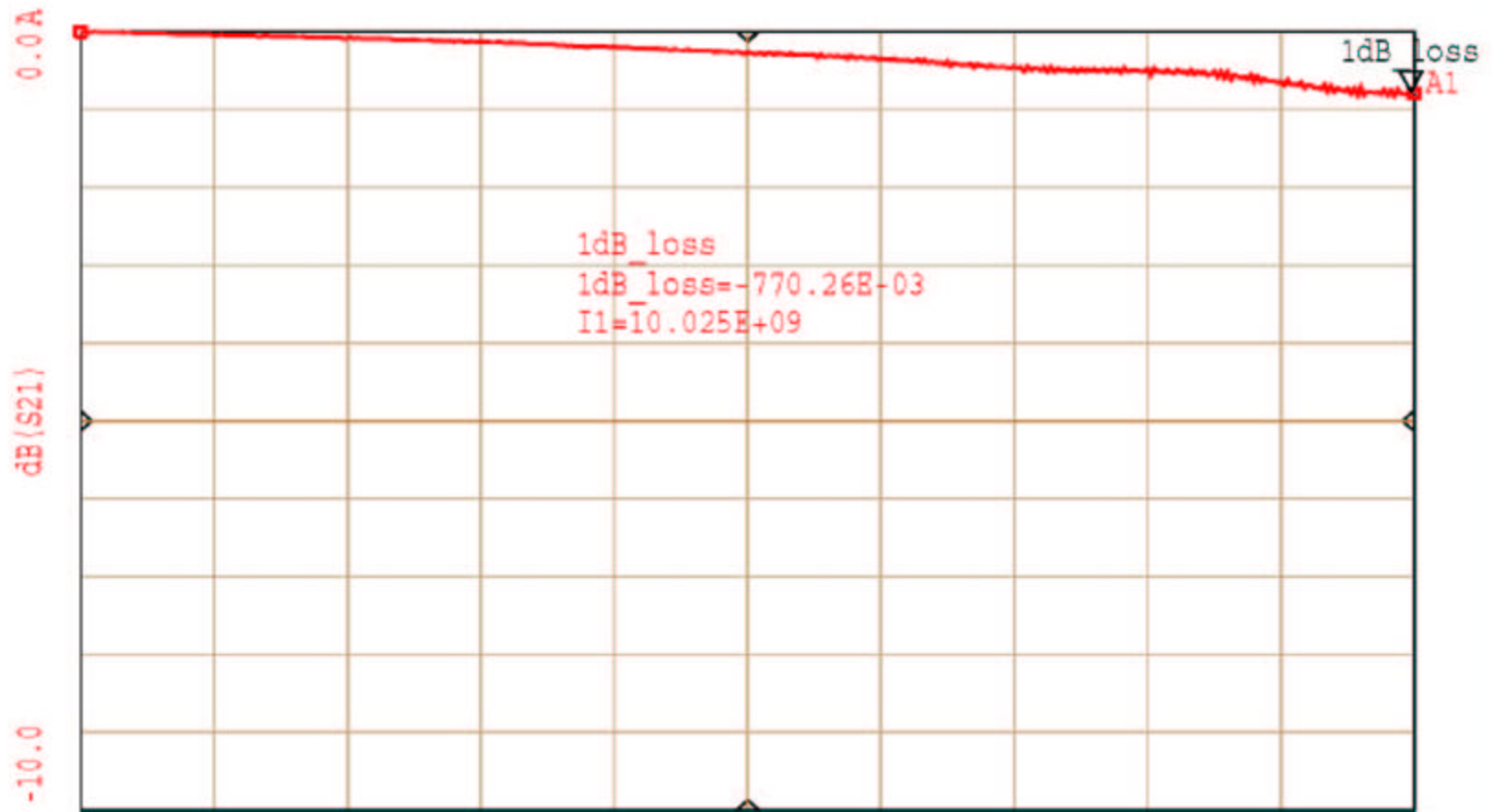
- Fast, Dense, and Durable
- Minimal Footprint
- Ideal In:
  - IC Prototype and System Testing
  - Field Upgradeable System Designs
- Custom Socket Designs Available
- GHz Applications – RF, Network, Computing

# Elastomer Specifications

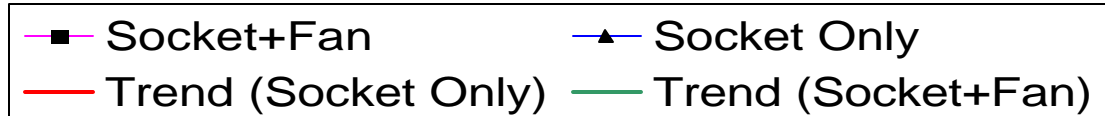
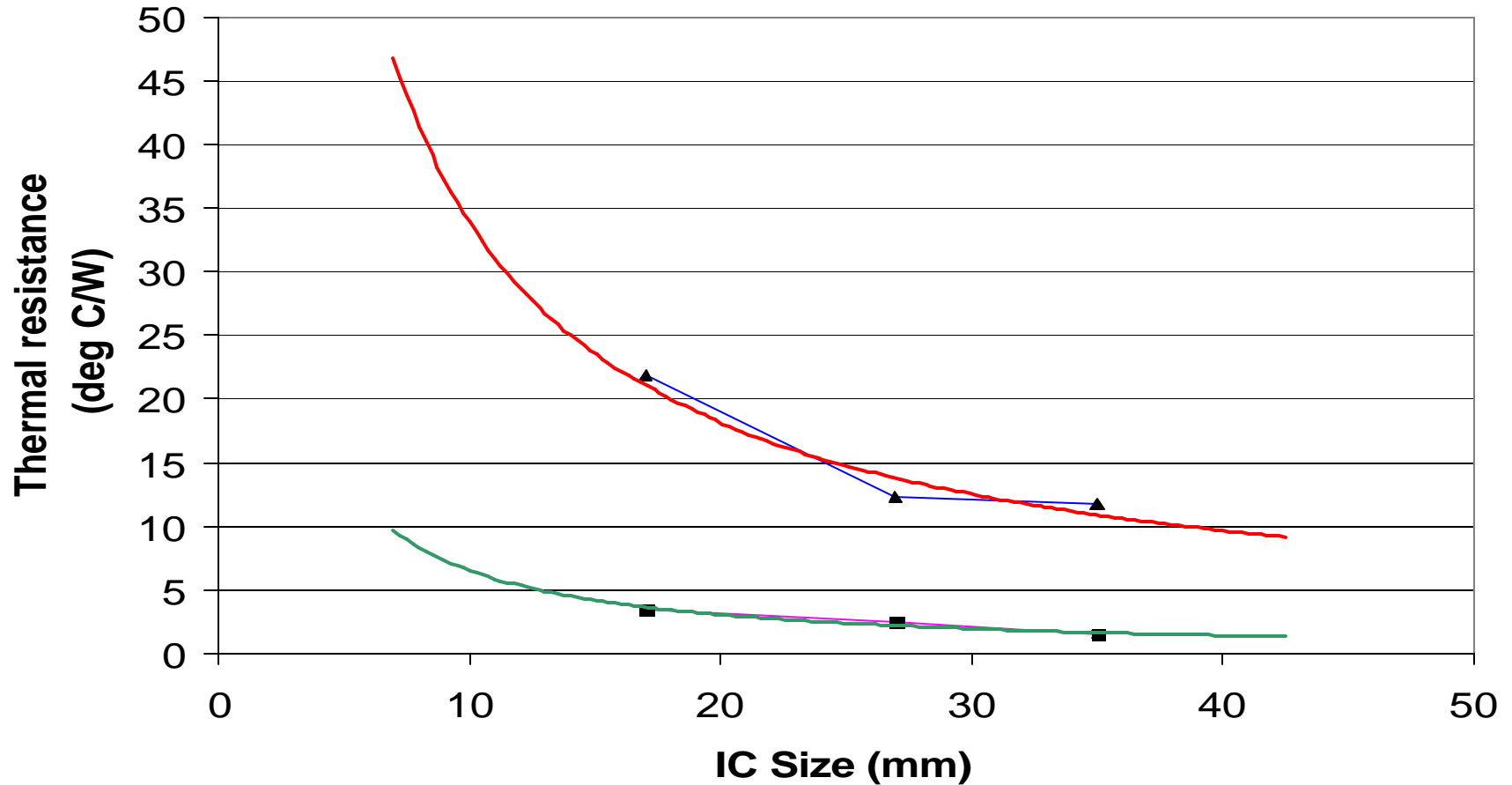
<b>Electrical Specifications</b>	<b>0.5mm Thick</b>	<b>0.75mm Thick</b>
Contact resistance:	23mΩ <sup>1</sup>	25mΩ <sup>1</sup>
Insulation resistance:	1000MΩ <sup>2</sup>	1000MΩ <sup>2</sup>
Self Inductance:	0.15nH <sup>3</sup>	0.28nH <sup>3</sup>
Bandwidth:	10.0GHz	6.5GHz <sup>4</sup>
Insertion loss:	1dB@10GHz	1dB@6.5GHz <sup>4</sup>
Mutual Capacitance (at PCB):	0.010pF <sup>5</sup>	0.011pF <sup>5</sup>
Mutual Capacitance (at device):	0.015pF <sup>5</sup>	0.015pF <sup>5</sup>
Current carrying capacity:	50mA/wire <sup>6</sup>	50mA/wire <sup>6</sup>
Operating Temperature	-35 C to 100 C	-35 C to 100 C
Shrinkage at 150C, 24 Hour	-4.50%	-4.50%

# Typical Bandwidth

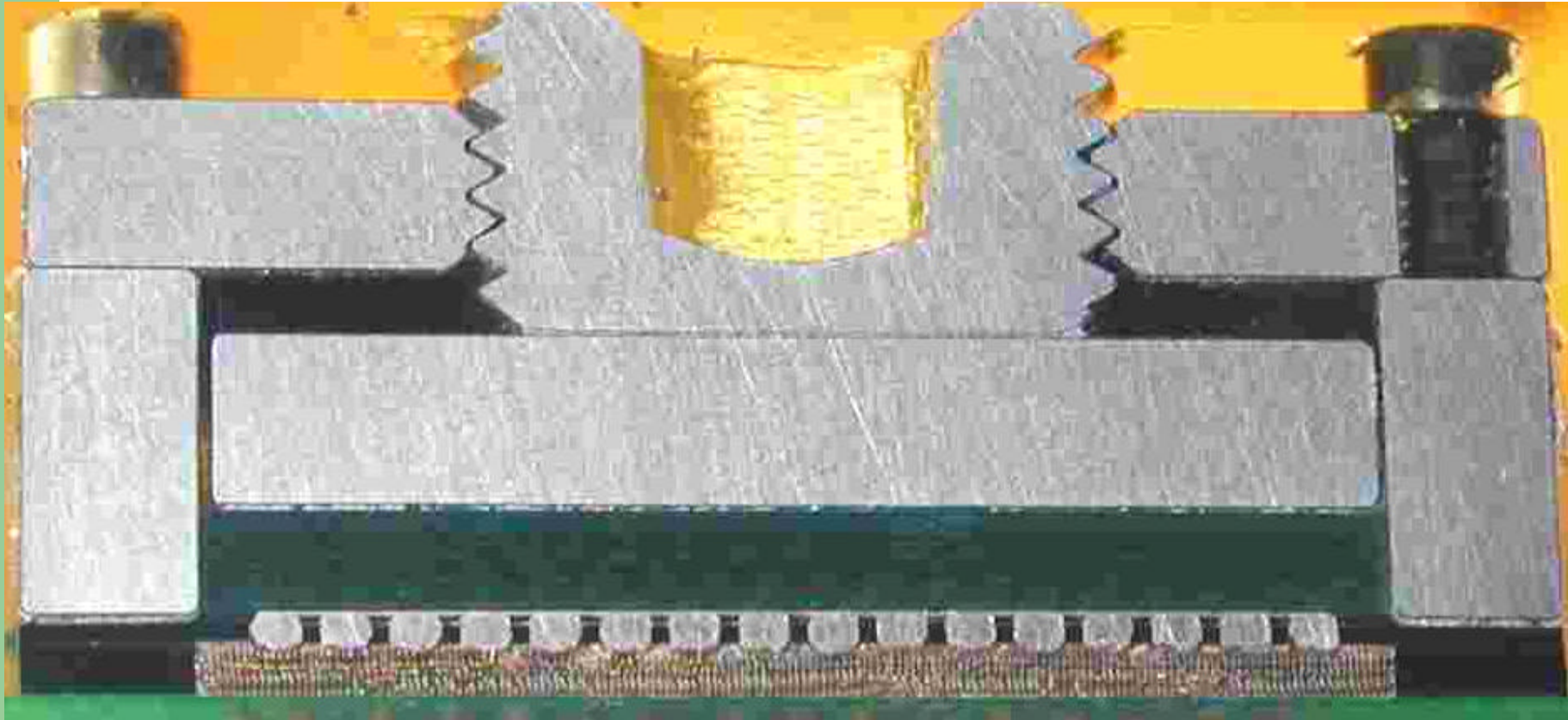
0.5mm BGA Contactor (0.5mm pitch)  
Loop-thru BW measurement



# Thermal Resistance

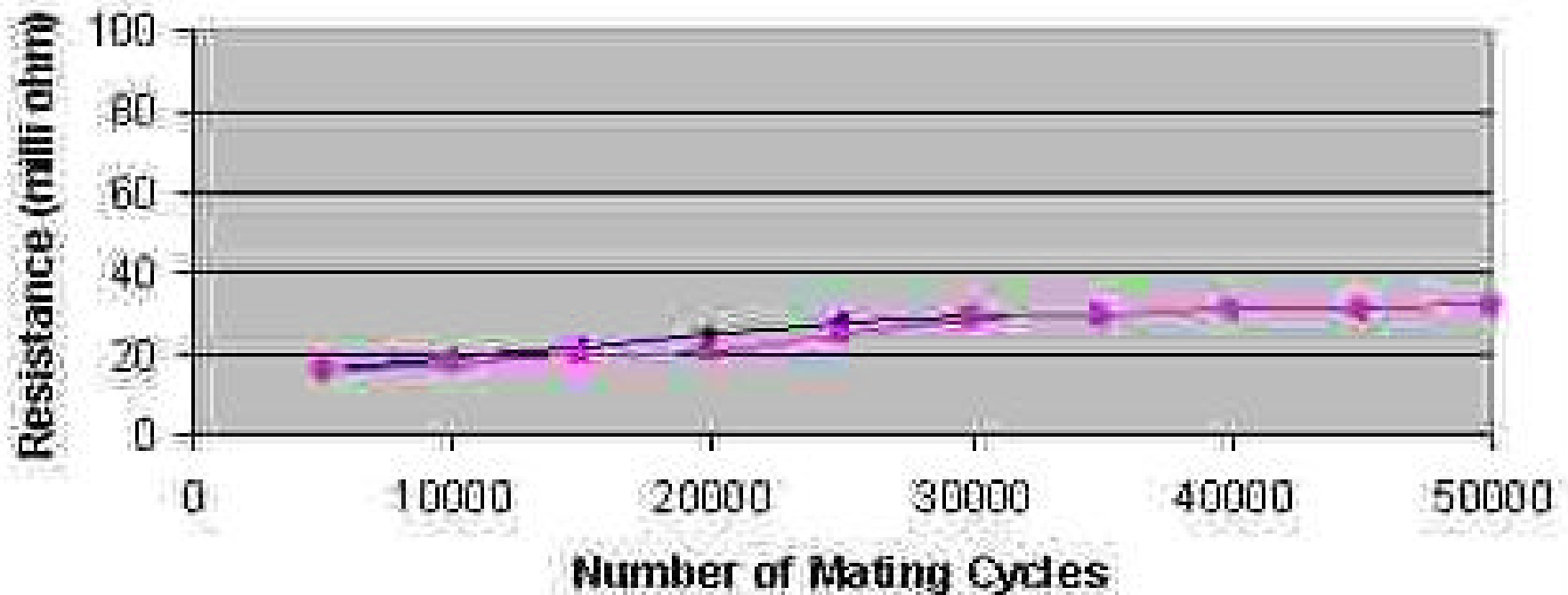


# Cross Section



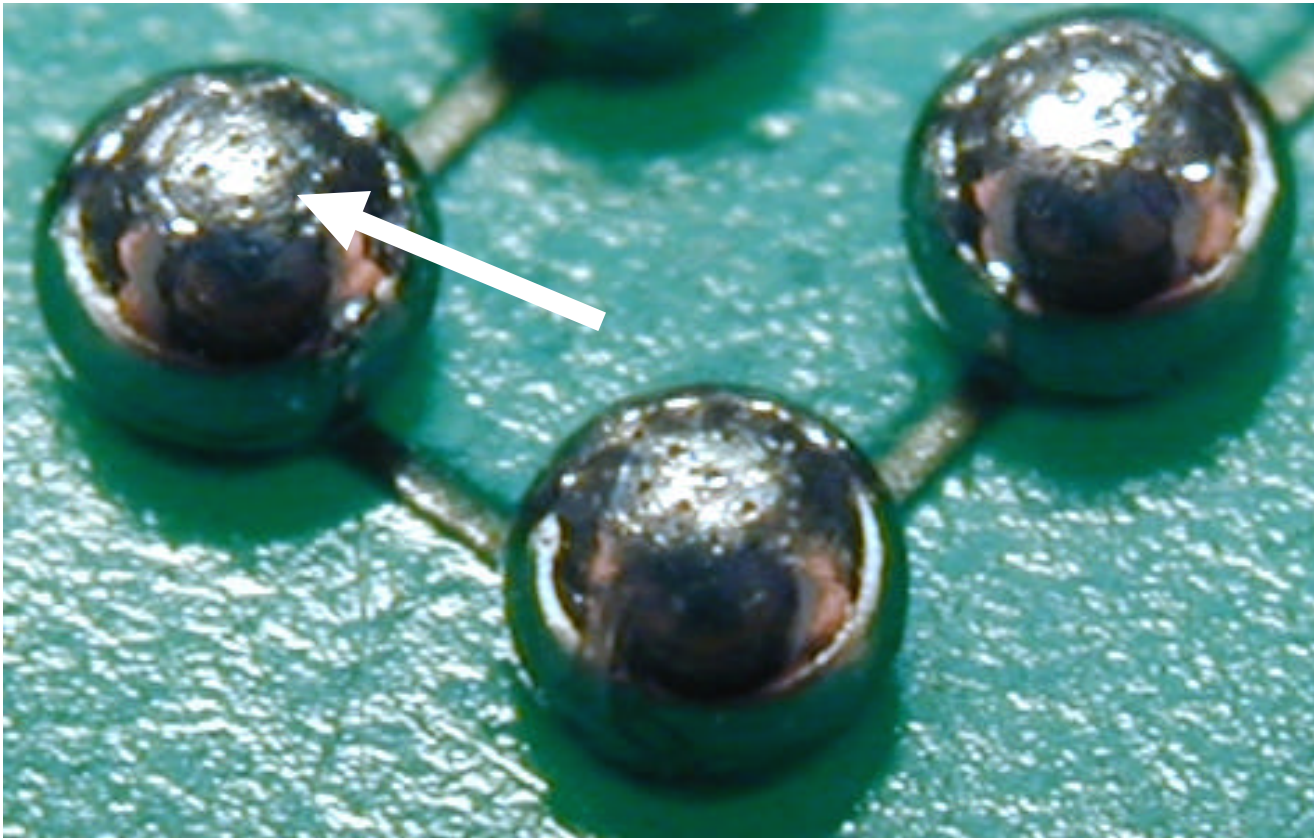
# Elastomer Endurance

**Cyclic Test**



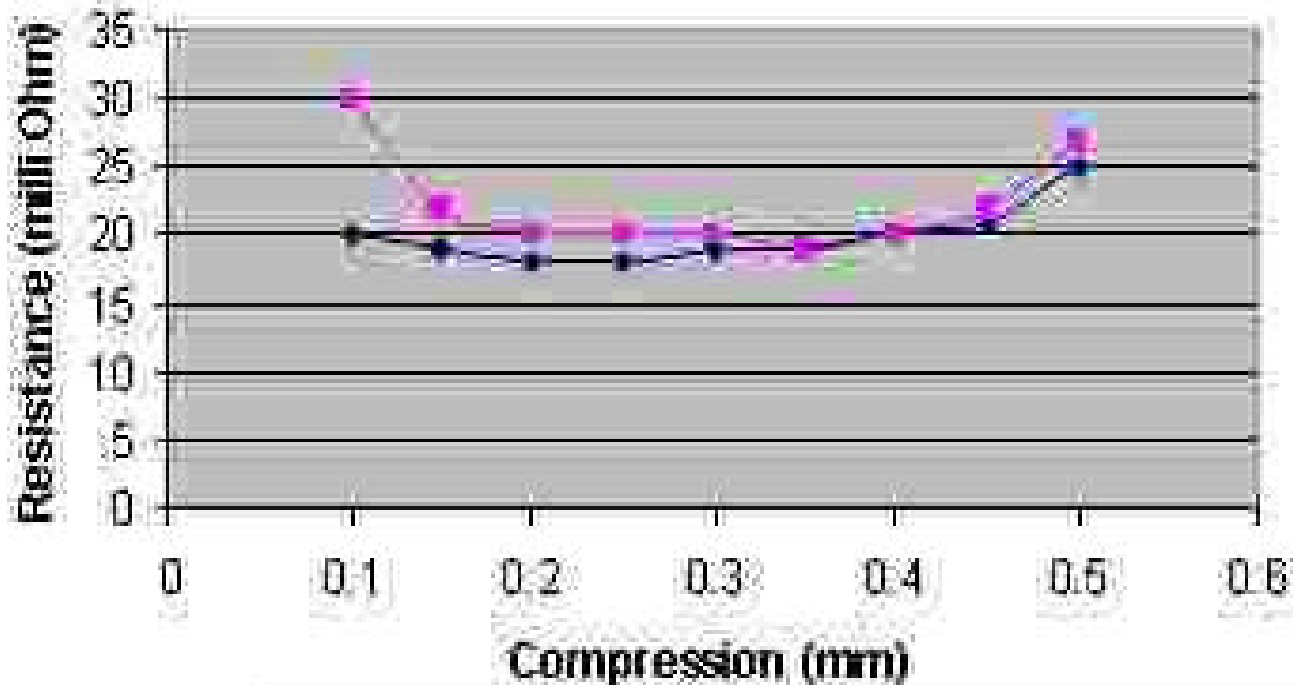
—●— 0.5mm thick Elastomer —■— 1.0mm thick Elastomer

# Surface Effect on Solder Ball



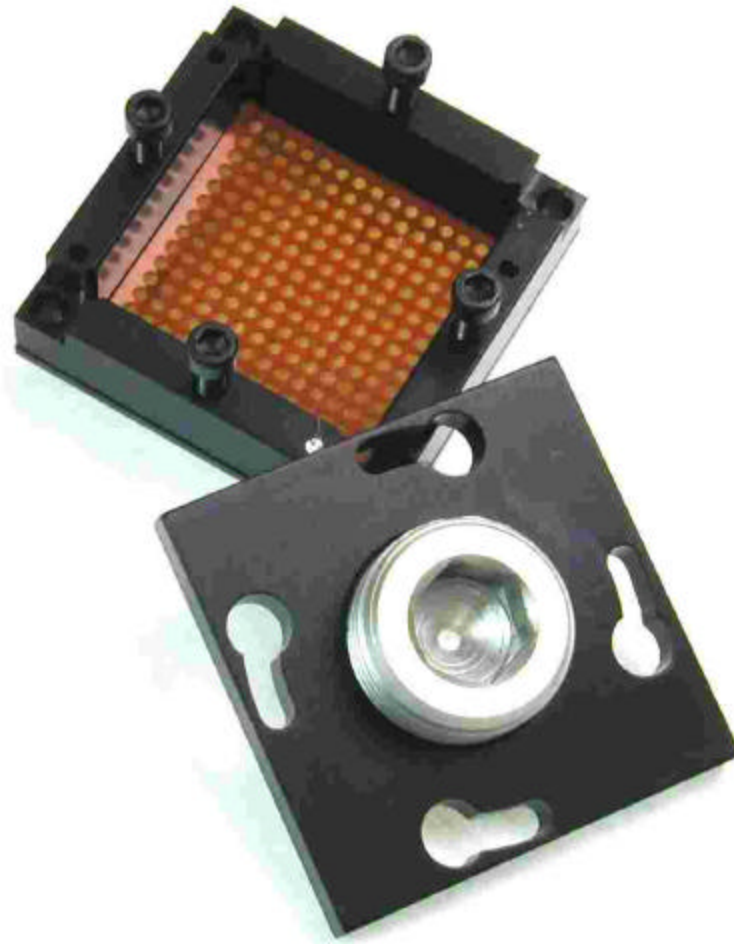
# Resistance/Compression

Resistance Vs Compression



—■— 0.5mm thick Elastomer —■— 1.0mm thick Elastomer

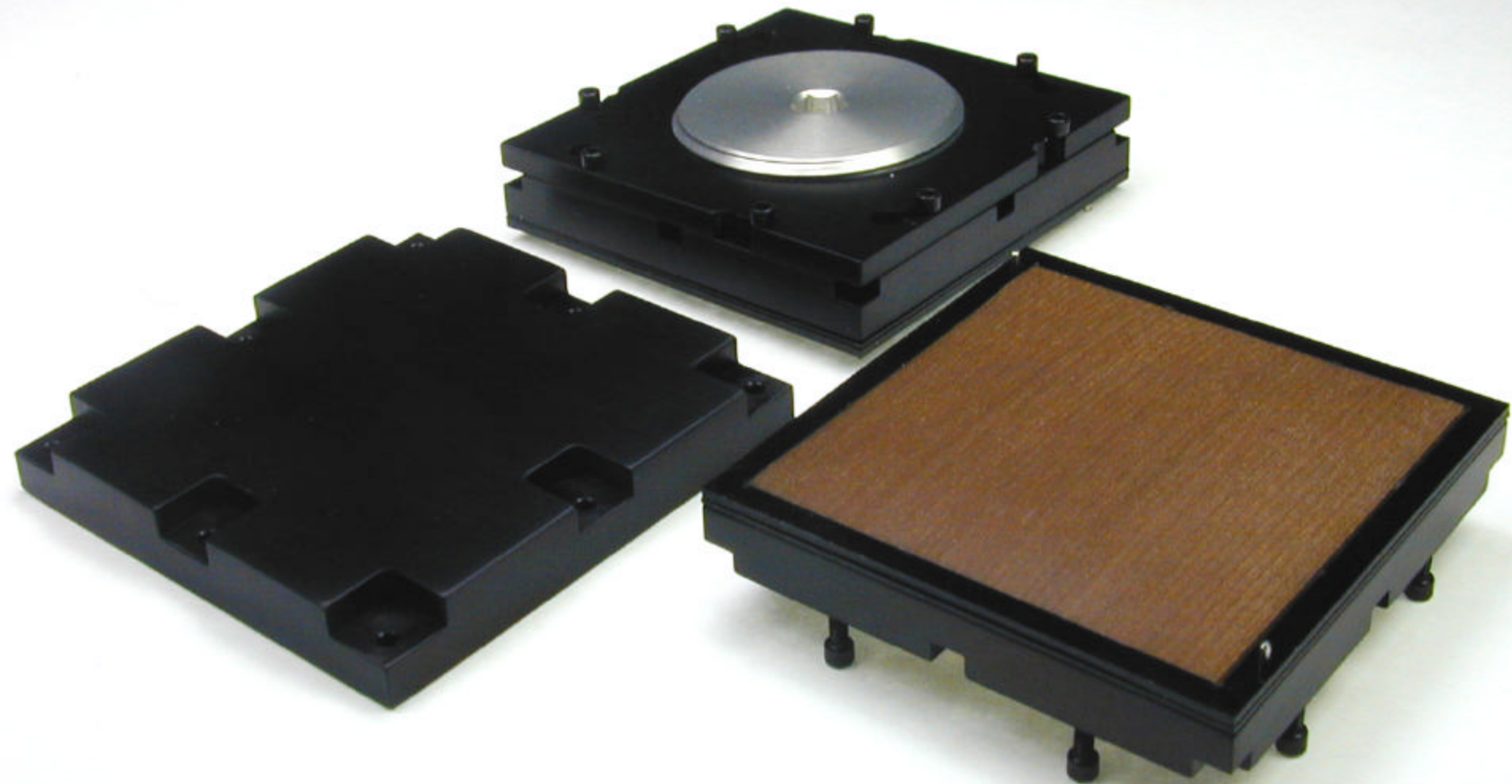
# Example 0.5mm Socket – 10mm



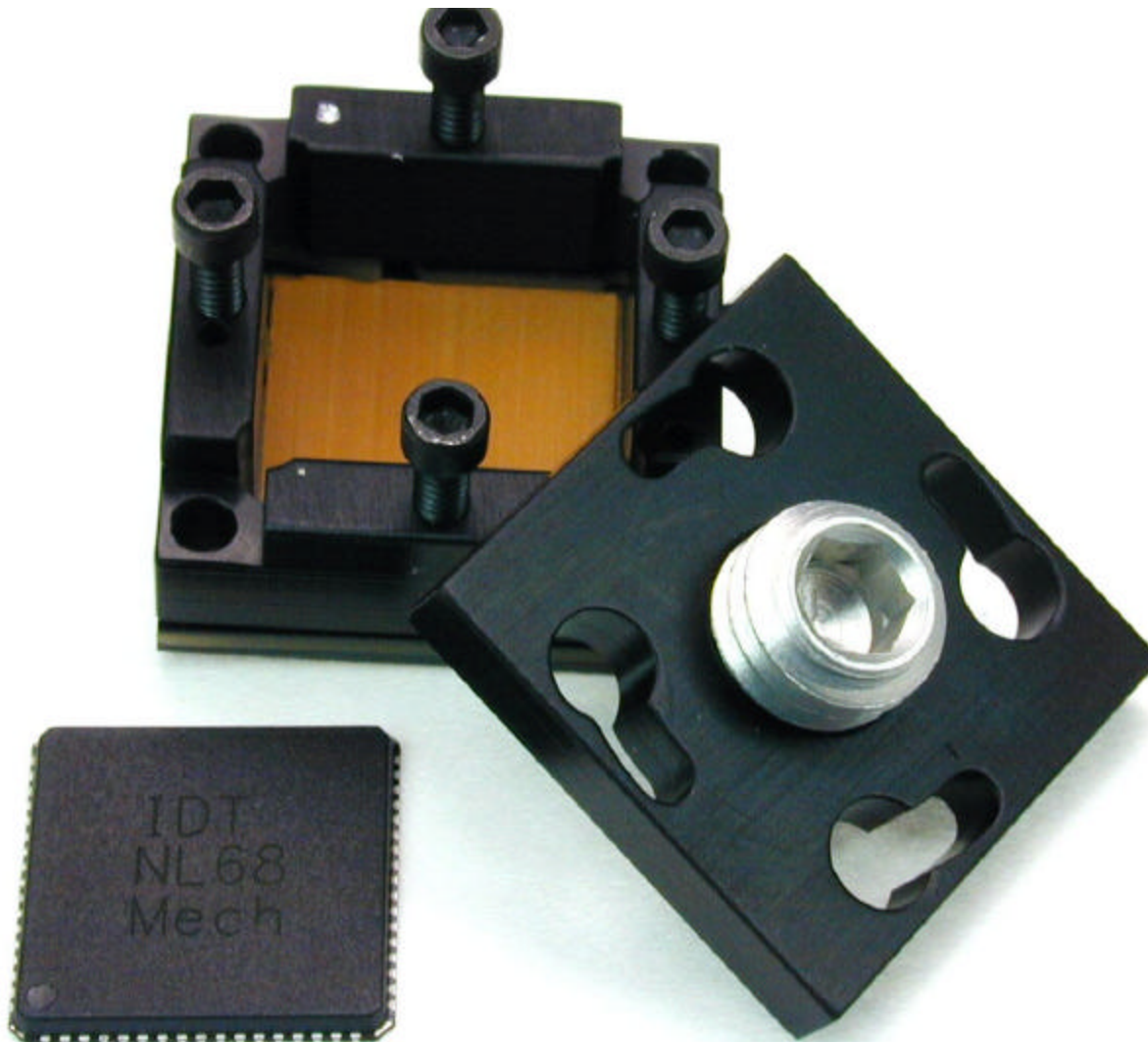
# Example 7 mm Body Skt



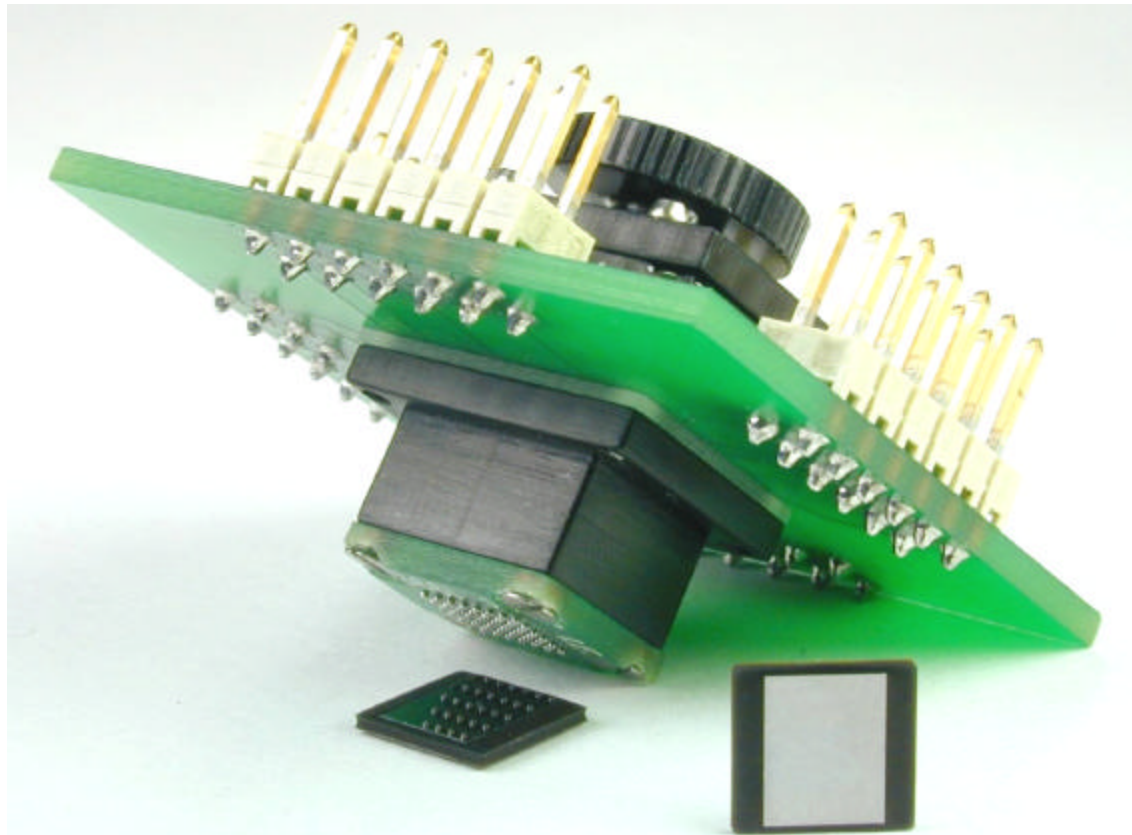
# Example 40 mm Body Skt



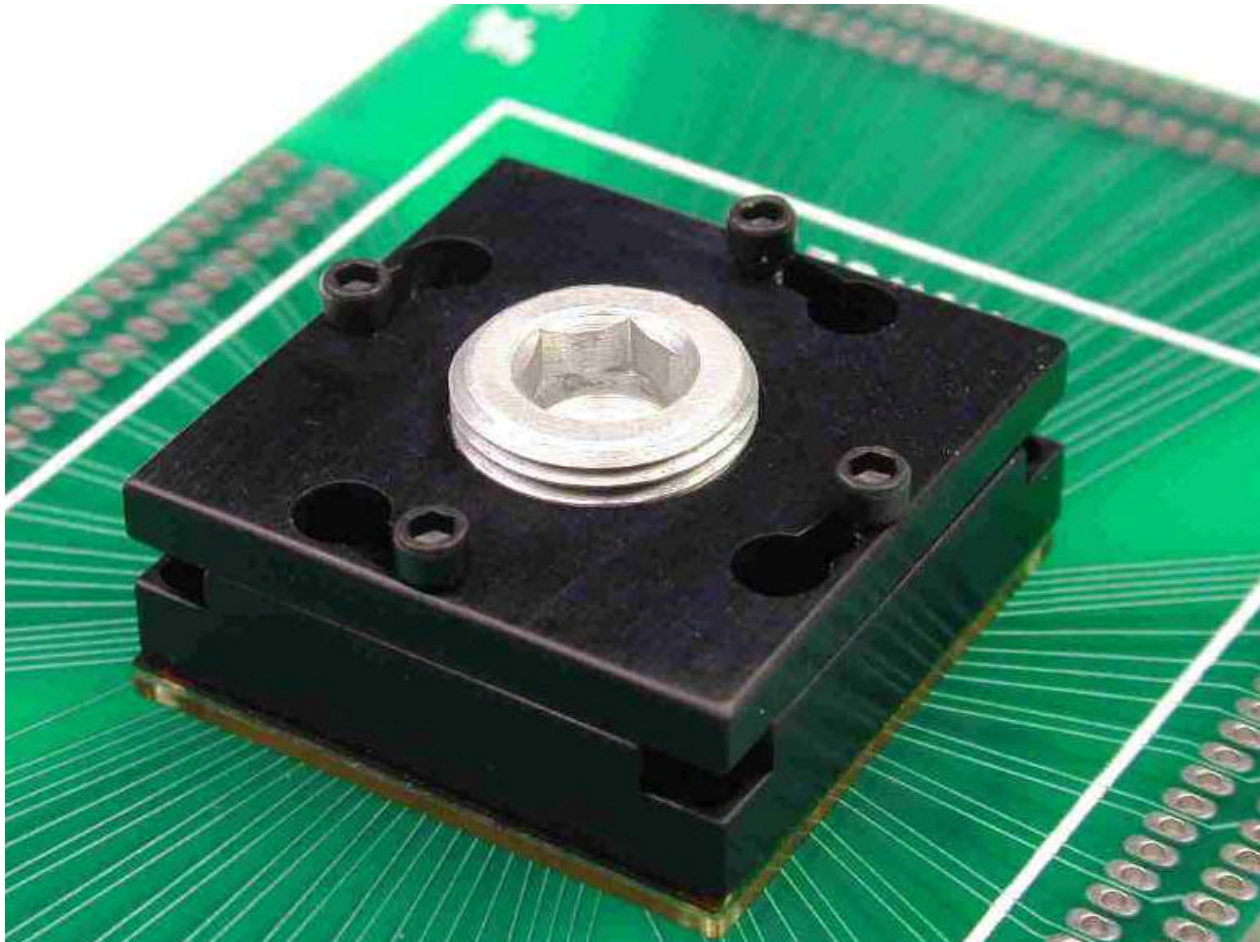
# MLF Socket – 10 mm



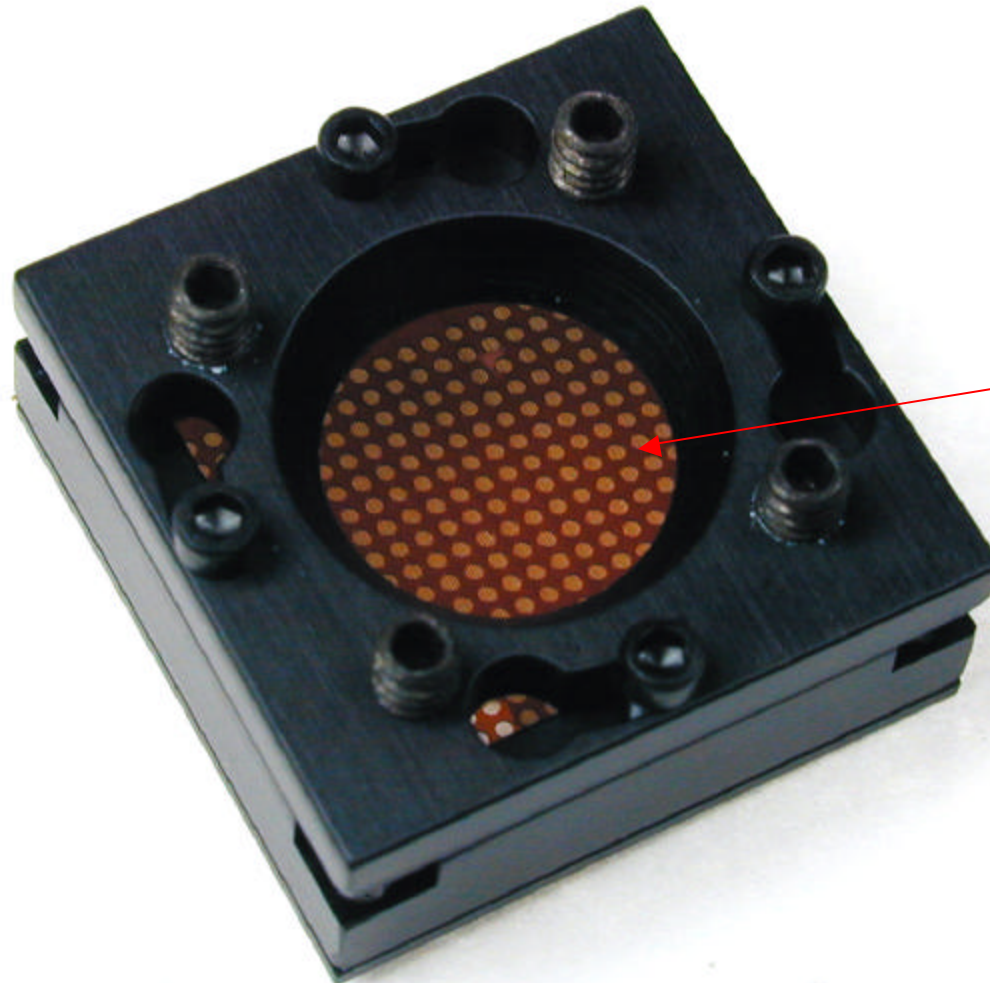
# CSP (0.75mm) Probing Adaptor



# Mounted Socket – 17 mm

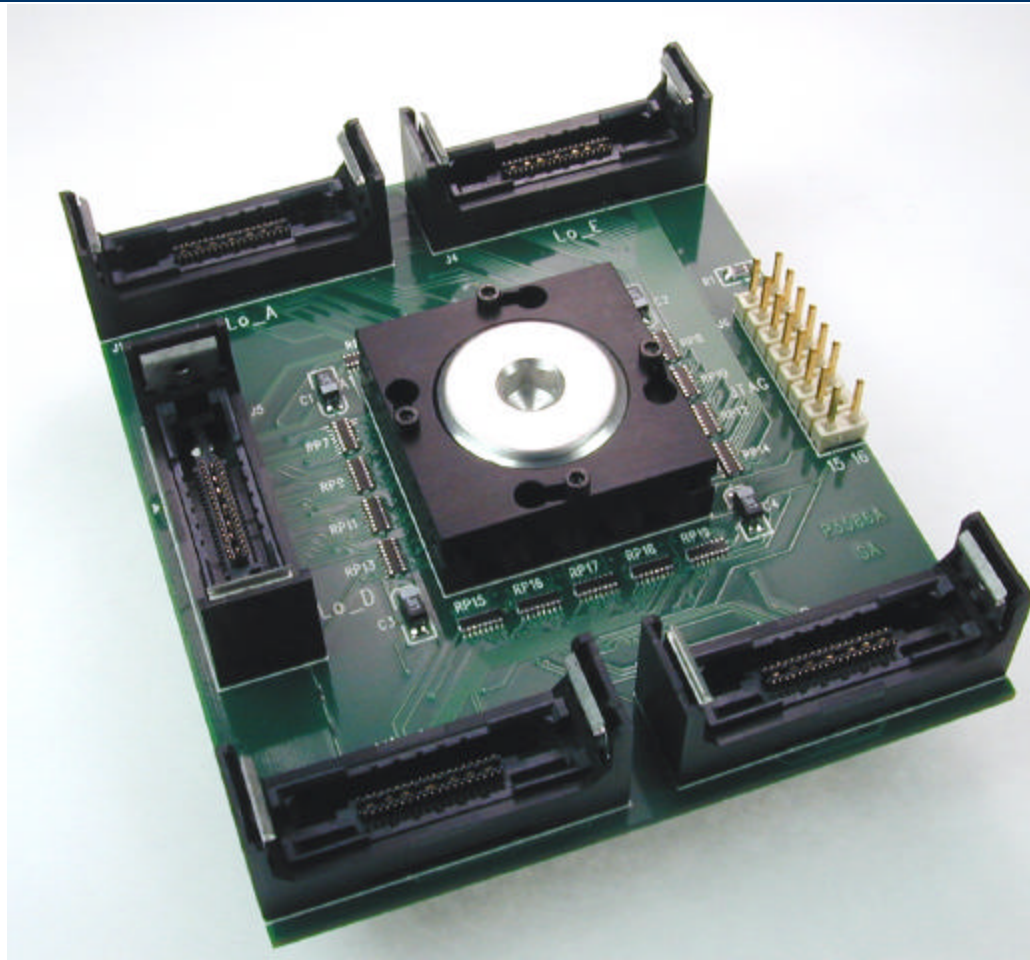


# Probing Socket – 17 mm



Picoprobe  
Access

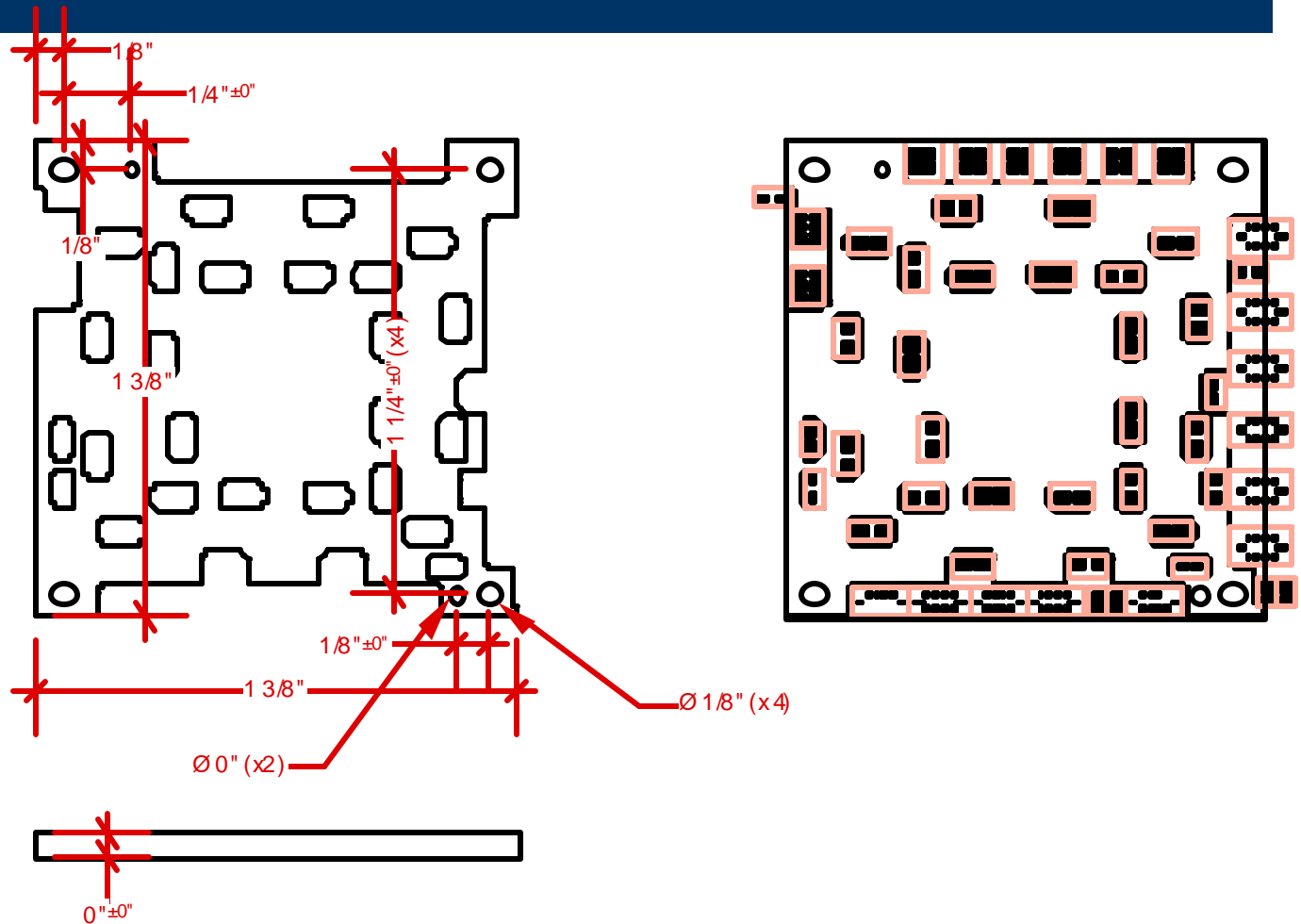
# Socket on PCB



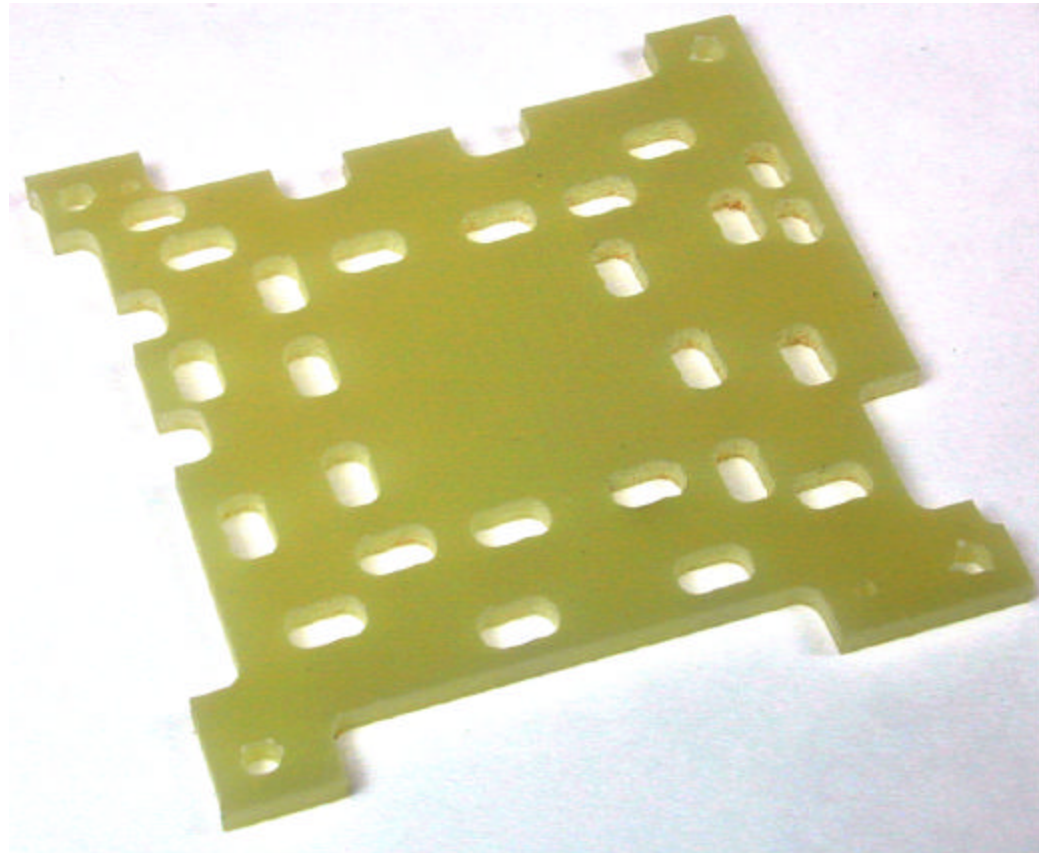
# Backing/Insulation Plate

- Backing Plate Required for Large Sockets
- Insulation Plate Sandwiched Between PCB/Backing Plate
- Cutouts for CAPs, Discretes in Insulation Plate

# Insulation Plate



# Insulation Plate Photo

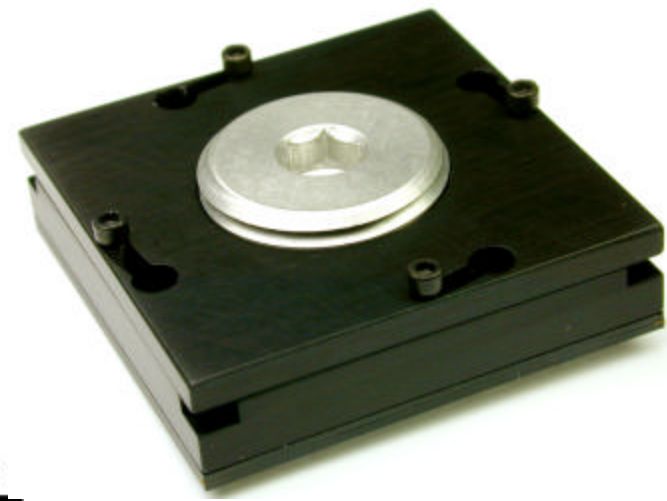


# GHz Socket Plan

- Develop More Standard BGA Sockets
- Develop More High Density BGA Sockets  
– 0.65 and 0.5mm
- Develop MLF Sockets
- SMT Adapters
- High Durability Pin on Elastomer
- Compatible Pogo Pin Sockets
- Burn-in Sockets



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## **GHz- BGA/MLF Sockets**

**Fast, Dense, Durable**