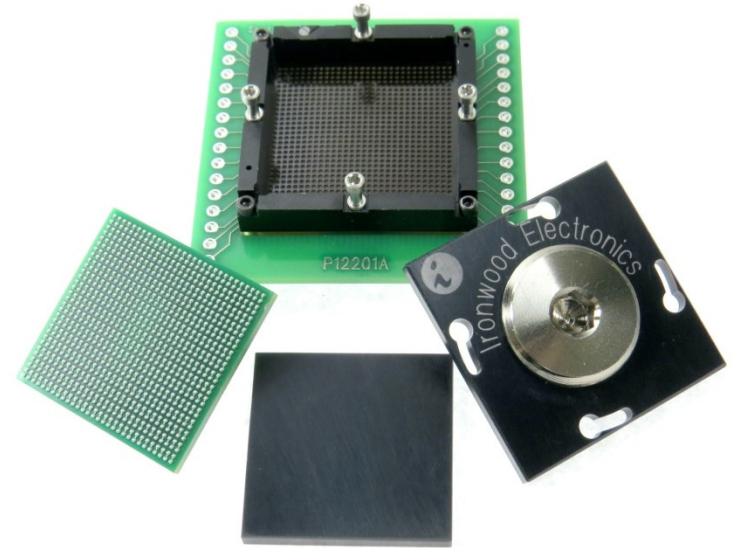




**Ironwood**  
**ELECTRONICS**  
[www.ironwoodelectronics.com](http://www.ironwoodelectronics.com)



## **SG & CG – Socket for Lab and Engineering Applications**

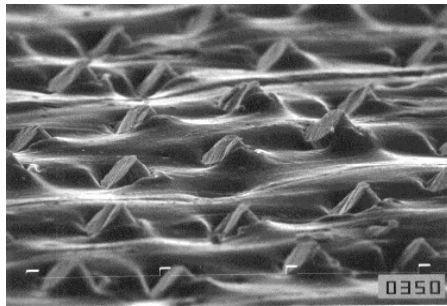
**High Performance  
IC Sockets And  
Test Adaptors**

# Application Need & Solution

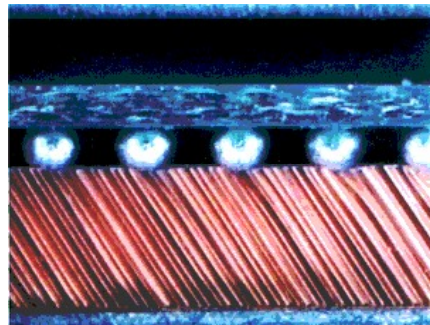
- Low cost for small quantity
- High bandwidth
- Low inductance
- Low contact resistance
- Low cycle count



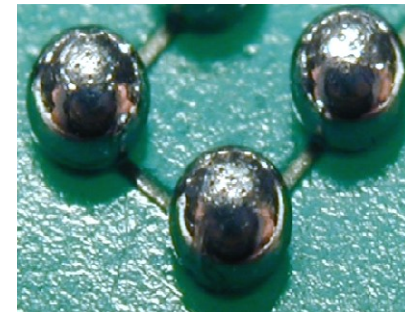
GHz BGA socket technology provide >40GHz bandwidth in a small, cost effective ZIF socket for prototype and test applications. The GHz BGA socket is a simple mechanical socket based on elastomer contact technology.



Protruded wire from elastomer



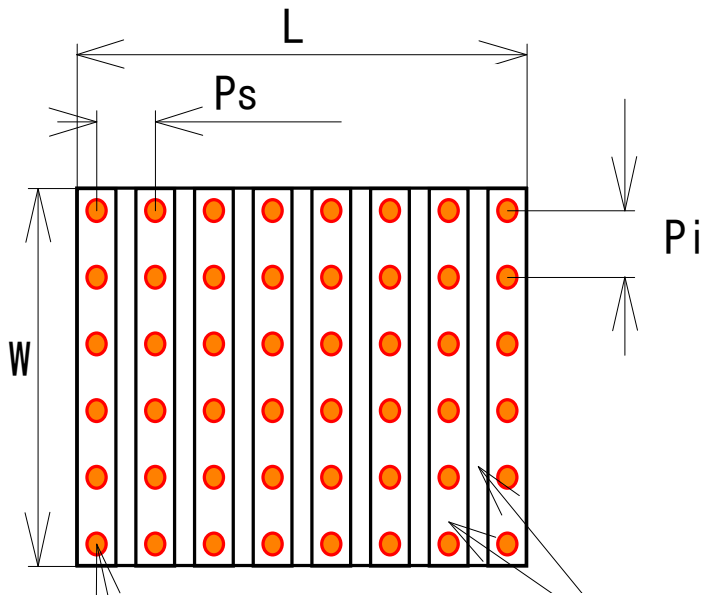
BGA compressed on Elastomer



Wire marks on BGA

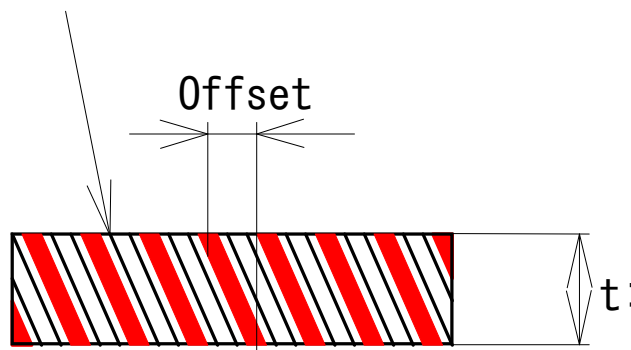
The elastomer consists of a fine pitch wire matrix which are embedded at a 63-degree angle in a soft insulating sheet of silicone rubber. The insulation resistance between connections with 500V DC is 1000 M $\Omega$ . The elastomer is ideal for high-current (30mA to 50mA per filament) applications where a thin, high-density anisotropic connector is required. The gold-plated brass filaments protrude several microns from the top and bottom surfaces of the silicone sheet to penetrate heavily oxidized solder ball. The operating temperature range for the elastomer is -35° to 125° C.

# Elastomer Classification



Insulation Silicone Rubber

Inclined Gold plated brass wire



## SG-6000 series

$P_s, P_i = 0.1\text{mm}$

$L, W = 1\text{mm to } 50\text{mm}$

$t = 0.75\text{mm}$

BGA, QFN, etc,  $\geq 0.75\text{mm pitch}$

## SG-7000 series

$P_s, P_i = 0.05\text{mm}$

$L, W = 1\text{mm to } 50\text{mm}$

$t = 0.5\text{mm}$

BGA, QFN, etc,  $\geq 0.3\text{mm pitch}$

## SG-8000 series

$P_s, P_i = 0.1\text{mm}$

$L, W = 1\text{mm to } 50\text{mm}$

$t = 0.5\text{mm}$

BGA, QFN, etc,  $\geq 0.75\text{mm pitch}$

## SG-9000 series

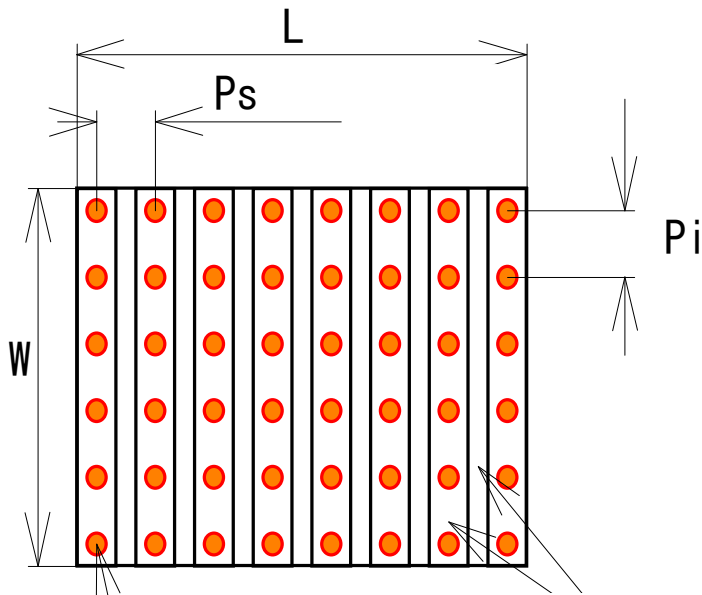
$P_s, P_i = 0.075\text{mm}$

$L, W = 1\text{mm to } 50\text{mm}$

$t = 0.5\text{mm}$

BGA, QFN, etc,  $\geq 0.4\text{mm pitch}$

# Elastomer Classification



## SG25 - series

$P_s, P_i = 0.05\text{mm}$

$L, W = 1\text{mm to } 25\text{mm}$

$t = 0.25\text{mm}$

BGA, QFN, etc,  $\geq 0.3\text{mm pitch}$

## SG15 - series

$P_s, P_i = 0.05\text{mm}$

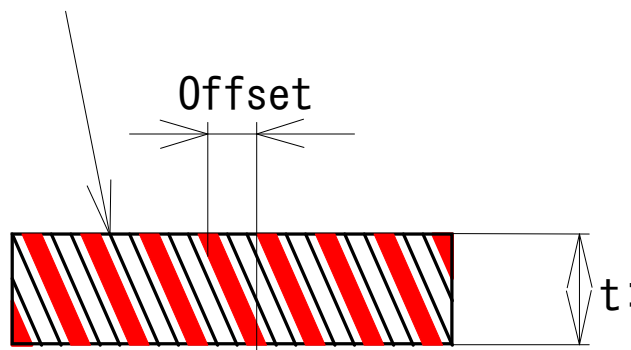
$L, W = 1\text{mm to } 25\text{mm}$

$t = 0.15\text{mm}$

BGA, QFN, etc,  $\geq 0.3\text{mm pitch}$

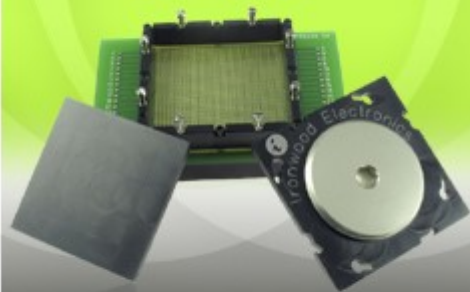
Insulation Silicone Rubber

Inclined Gold plated brass wire



# Socket Lid Options

## IMPROVED SWIVEL LID



- Easier-to-use swivel lid
- Maintains low-profile design
- Quick IC installation

## SNAP LID WITH ADJUSTABLE PRESSURE SCREW SOCKET



- No tools required
- Reliable installation
- Available for all IC's

## LEVER LID SOCKET



- Fully removable lid
- Optional heat sink
- Easy access to IC

## HEAT SINK LID SOCKET



- Easy 2-in-1 installation
- Up to 100 watts
- Optional fan available

## CLAM-SHELL ADJUSTABLE HARD STOP SOCKET



- Easy to use snap lid
- Quick IC installation
- Low profile designs available

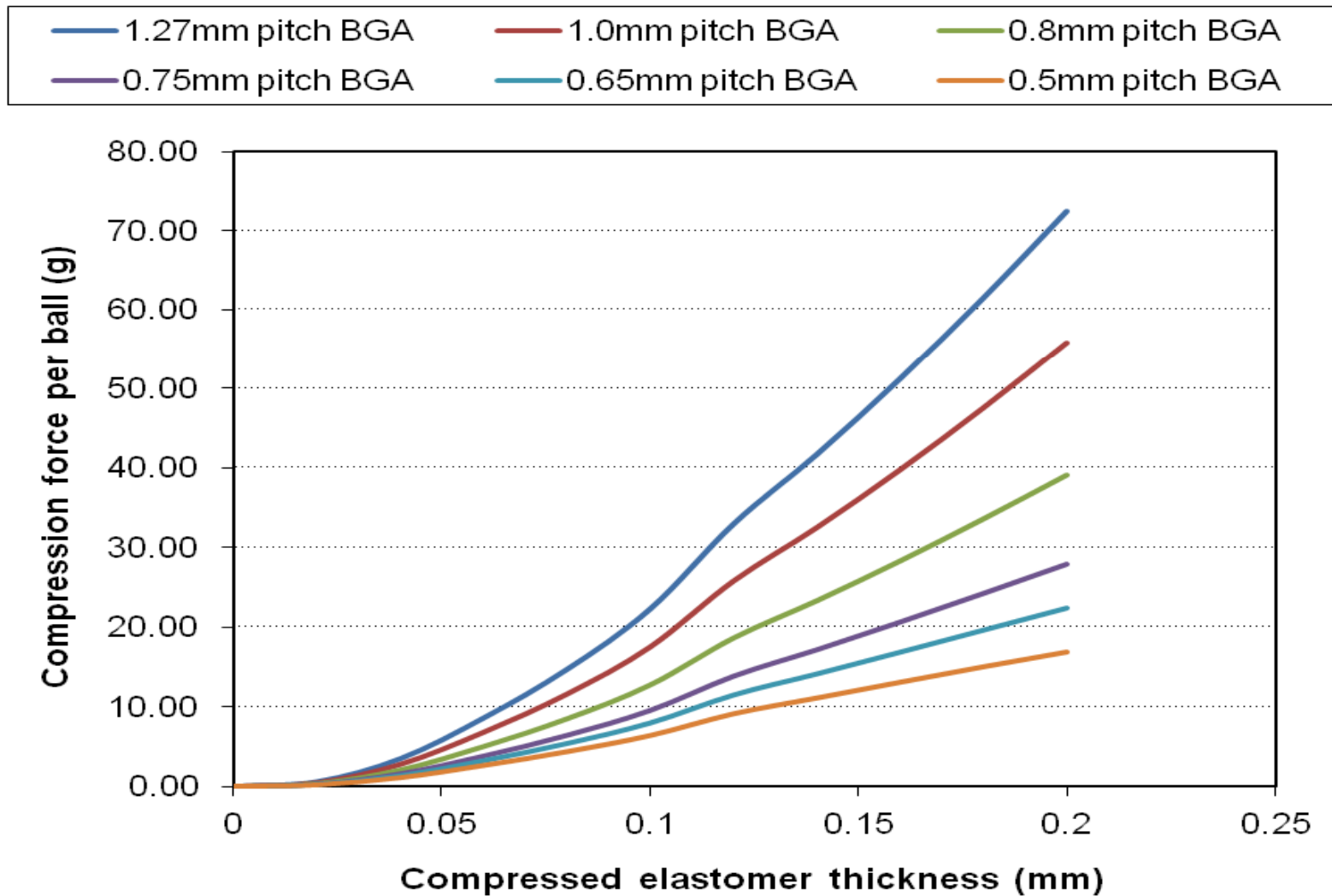
## OPEN TOP LID SOCKET



- Optical applications
- Easy access to chip
- Thermal applications

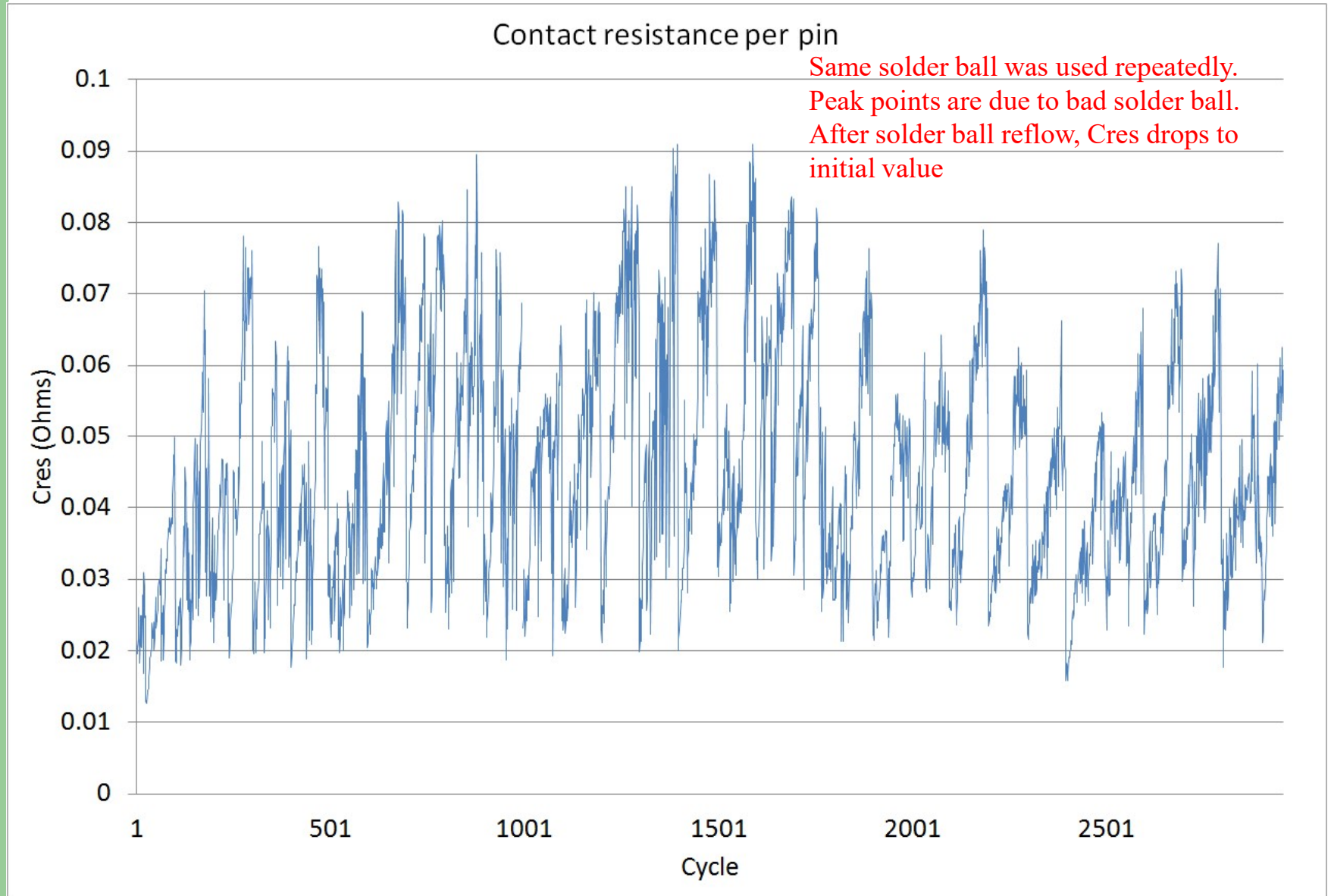
# Compression Force

Compression force per ball requirement

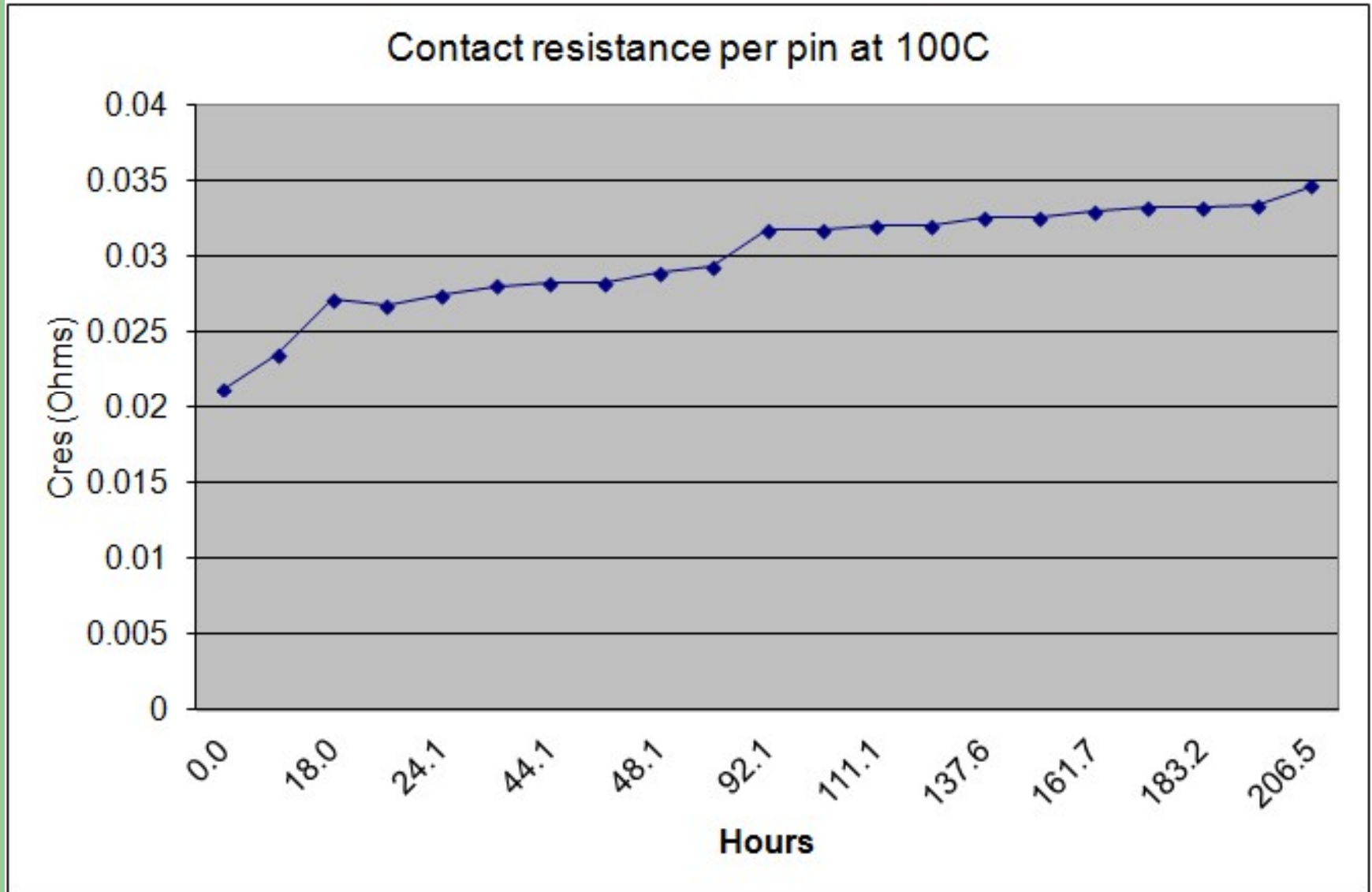




# Room Temperature Cycle Data

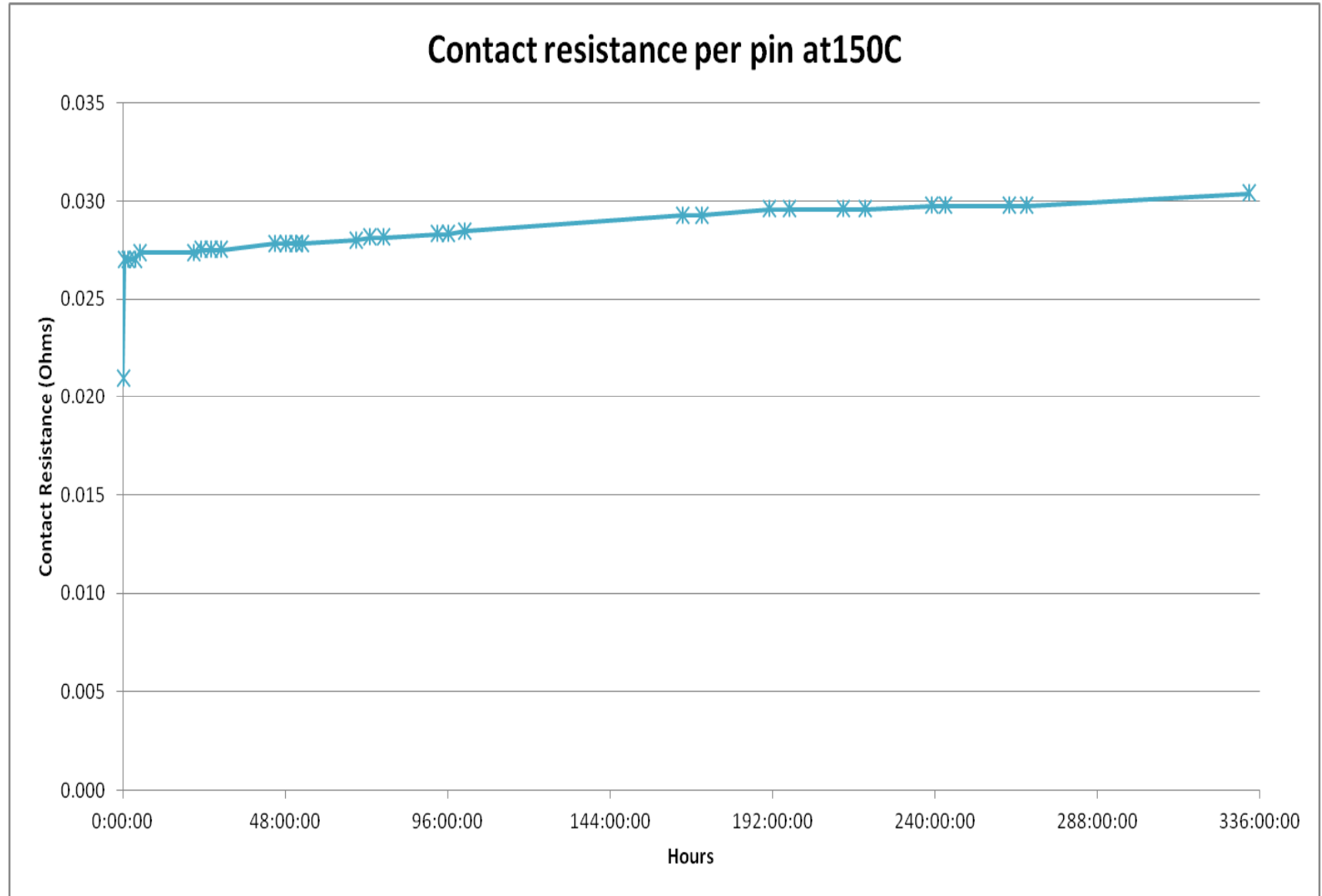


# 100C Temperature Test Data

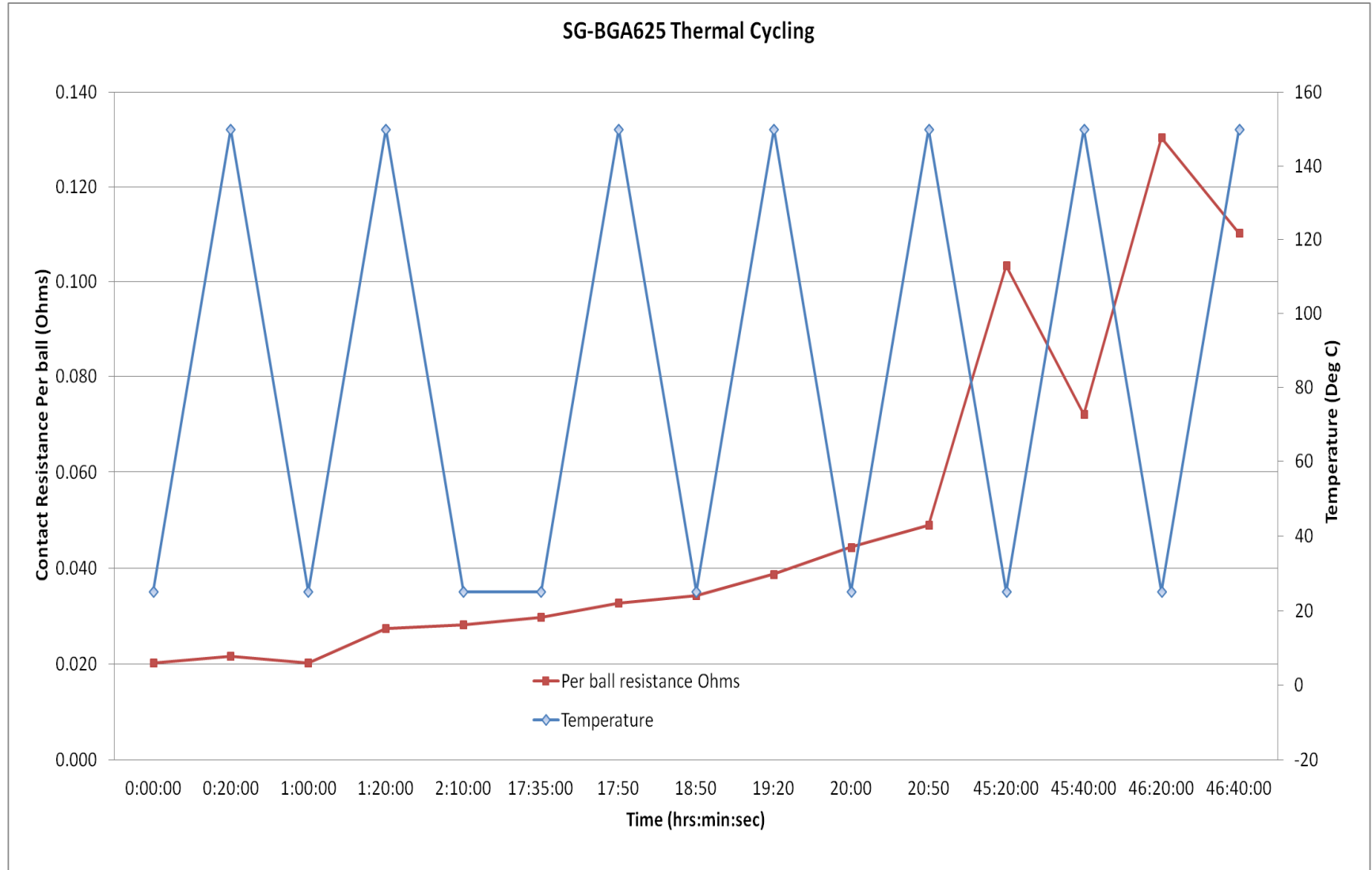




# 150C Temperature Test Data

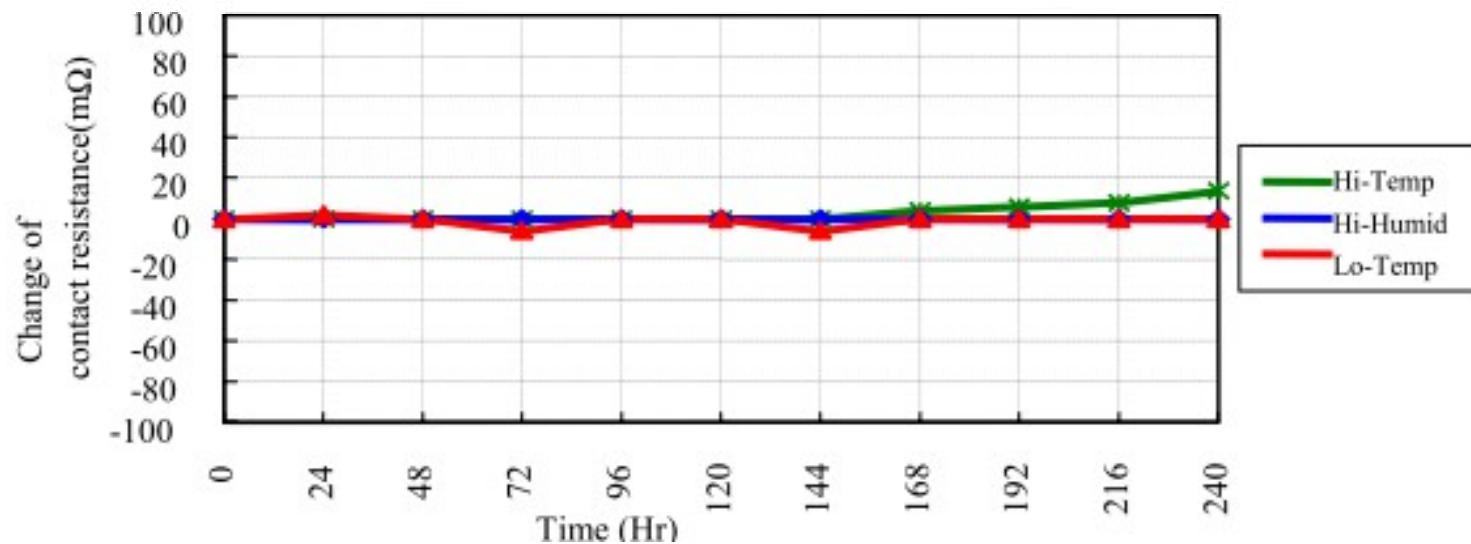


# Thermal Cycle Data



# Environmental Test Data

- Hi-temp/Hi-humidity 40 ° C – 95% (Standard: MIL-STD-202 METHOD 103 CONDITION A)
- Hi-temp 155 ° C (Standard: IEC 68-2-2)
- Low-temp -55 ° C (Standard: IEC 68-2-1)



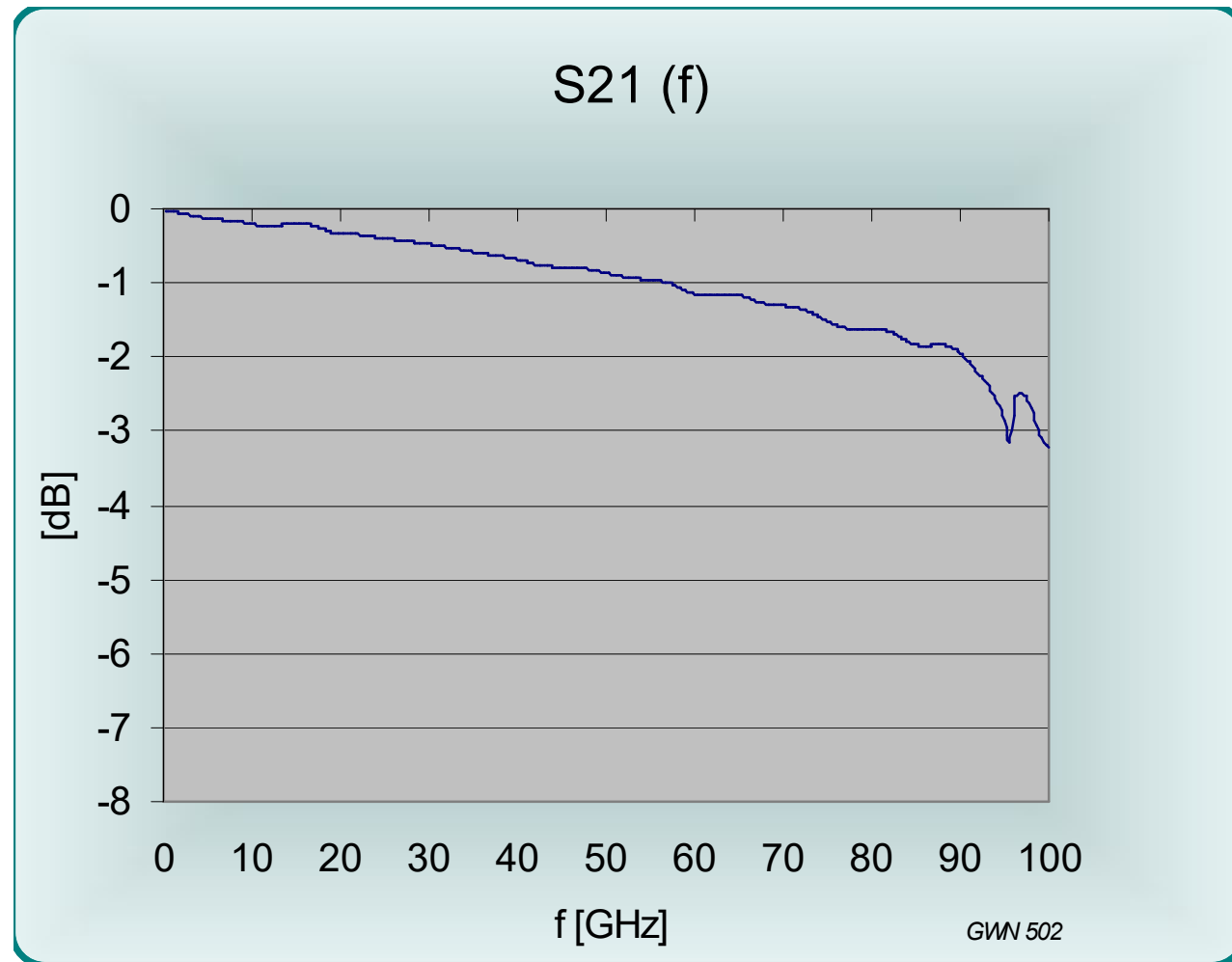
# AC Data – 0.4mm Pitch

SG-7000 series 0.5mm thick elastomer  
0.40 mm pitch

Parameter	Value
Inductance	0.118 nH
Mutual Inductance	0.025 nH
Capacitance to Ground*	0.229 pF
Mutual Capacitance	0.025 pF
S21 (insertion loss) @ -1dB, GSG	19.7 GHz
S21 (insertion loss) @ -1dB, GSSG	30.5 GHz
S11 (return loss) @ -20 dB, GSG	5.2 GHz
S11 (return loss) @ -20 dB, GSSG	13.3 GHz
Crosstalk at -20dB	40.0 GHz
Impedance, GSG	39.2 $\Omega$
Impedance, GSSG	46.0 $\Omega$

# AC Data – 0.6mm Pitch

SG15 Series – 0.15mm thick Elastomer

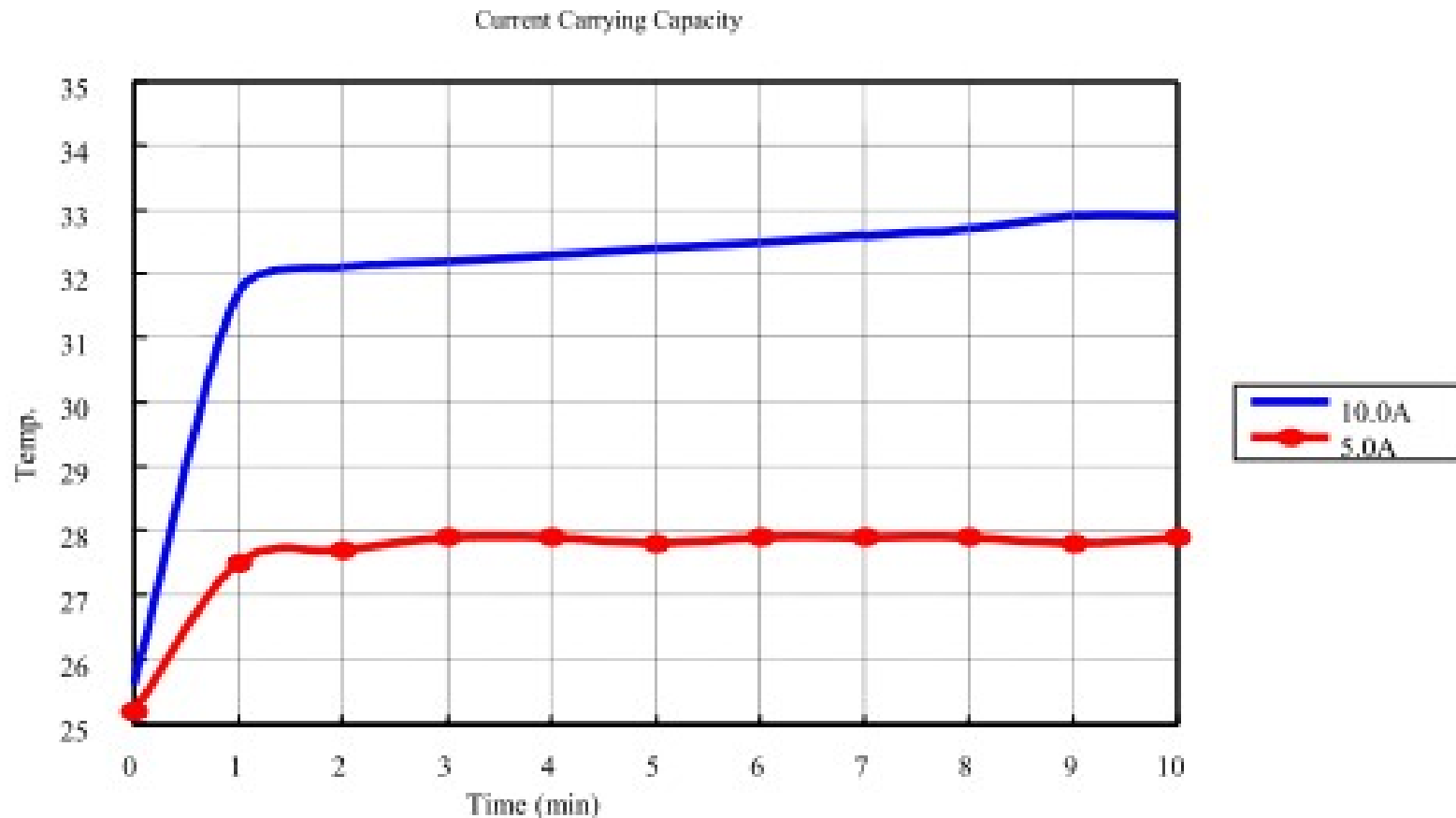


Insertion loss S2,1

# DC data

Measured the temperature increase while the current is flowing.  
Current capacity measured using 60 wires.

Sample: thickness 1.0mm





# Elastomer Current Data

- 40 Micron Diameter Cu wire fusing limit is 750mA/wire.  
Recommended safe amount = 50mA/wire
- 23 Micron Diameter BeCu wire fusing limit is 350mA/wire.  
Recommended safe amount = 30mA/wire
- Maximum amount should not be reached, but higher limits can be achieved as long as the test can handle higher temperature ranges.
- For example: a couple of hundred mA per wire would be fine for a short term test (< 5 sec), but if the test is being held for hours, a heat sink may be necessary to pull off excess heat that may be produced from pushing large amounts of current through each wire.

# Value Proposition

- SG elastomer contact enables repeatable electrical/mechanical performance in all lab and engineering applications.
- Custom socket configurations can be produced using SG elastomer contact in 4 weeks.
- SG elastomer sockets accommodate temperature range (-35C to +125C).
- SG elastomer sockets are robust and can be used in application demonstration modules for multiple handling process without contact degradation.