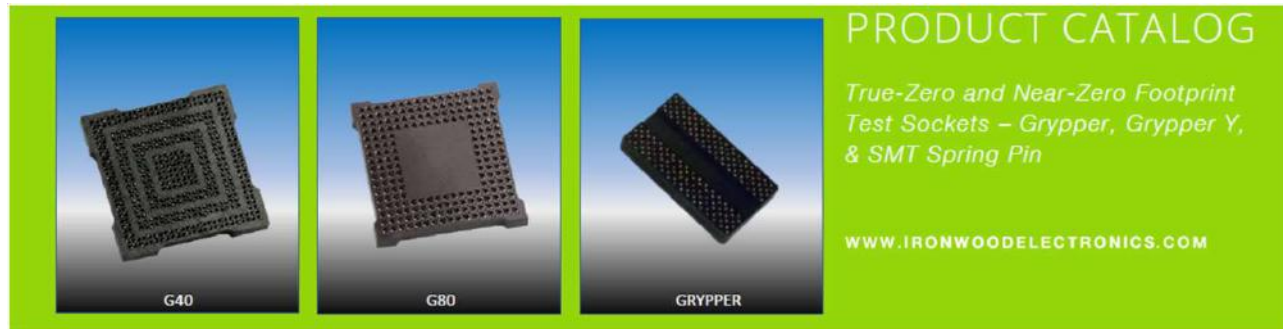




Ironwood
ELECTRONICS
www.ironwoodelectronics.com



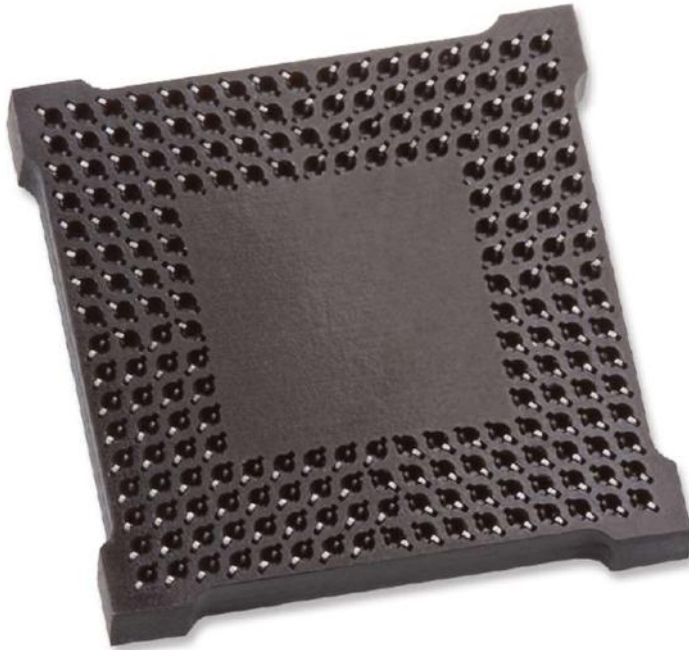
Toll Free: (800) 404-0204 U.S. Only

Tel: (952) 229-8200

Fax: (952) 229-8201

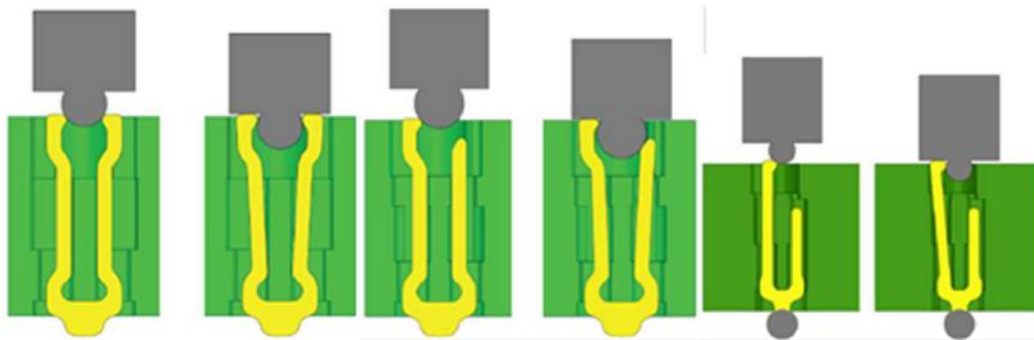
email: info@ironwoodelectronics.com

Zero Footprint Sockets



Features

- No lid required
- Socket same size as device

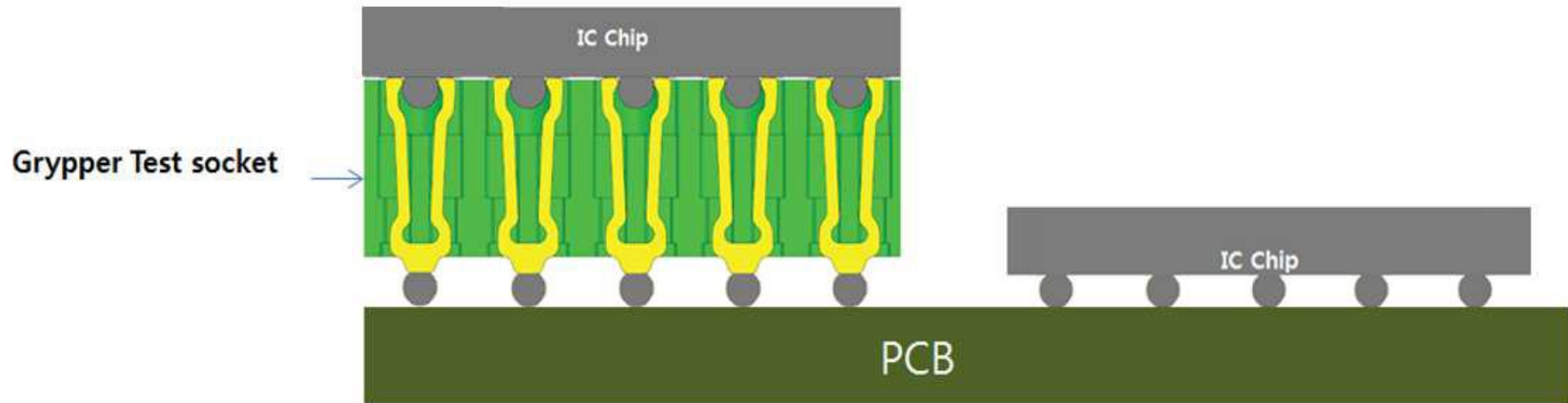


Grypper

G80

G40/G35

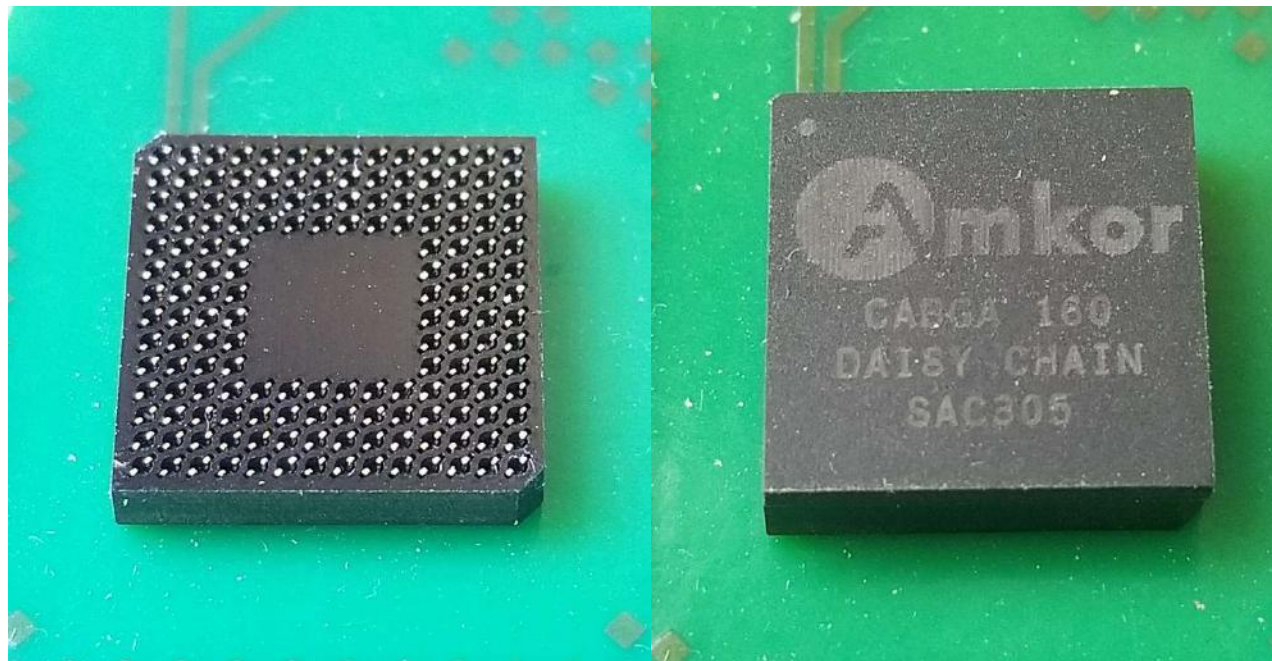
Zero Footprint Sockets



Same size as
device

Left - just
socket

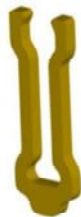
Right - device
inserted



Zero Footprint Sockets

Grypper Design Rules

	Grypper	G80	G40/G35
Numbers of pins	<200 I/O	>200 I/O	Based on pitch
Device Pitch	>0.65mm	>0.65mm	>0.35 to 0.50mm
Insertion force	95grams	40grams	20grams
Number of cycles	100	50	50
Electricals	-1db@40Ghz	-1db@30.8Ghz	-1db@24Ghz



Zero Footprint Sockets

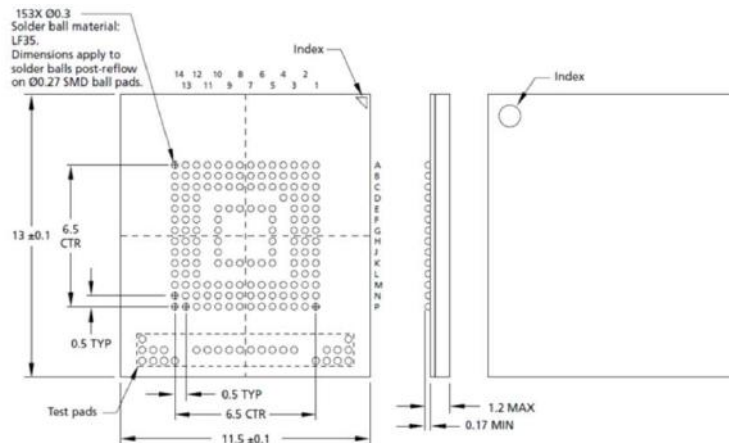
Grypper Design Rules



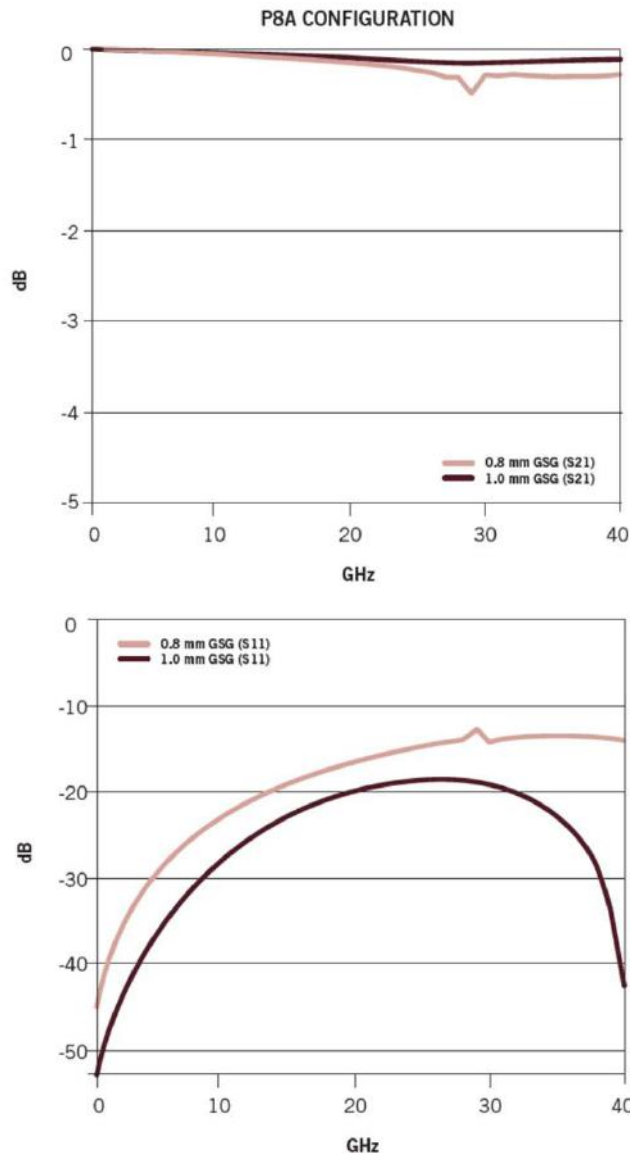
Grypper Product	Solder Ball Diameter* Nominal +/-0.050 mm (b)	Typical* Min Ball Exposure (A1) $\approx 1/2b + 0.05$	Minimum Typical Pitch (array)	Maximum Contact Width (MW)	Min spacing diagonal ball to ball based on (MW)	Reference HSIO Contact P/N
G35 Grypper	G35 Contact is used for Fine Pitch @ 0.35 mm					
	0.20	0.130	0.35	0.355		104468-0028
G40 Grypper	Standard G40 Grypper is used for 0.4 to 0.5 pitch devices					
	0.25	0.175	0.40	0.425		104468-0014
	0.30	0.200	0.50	0.500		104468-0015
	0.35	0.225	0.50	0.500		104468-0025
	0.45	0.275	0.65	0.575		104468-0050

Spherical BGA Ball

Diameter (b) and Exposure (A1) determine contact selection



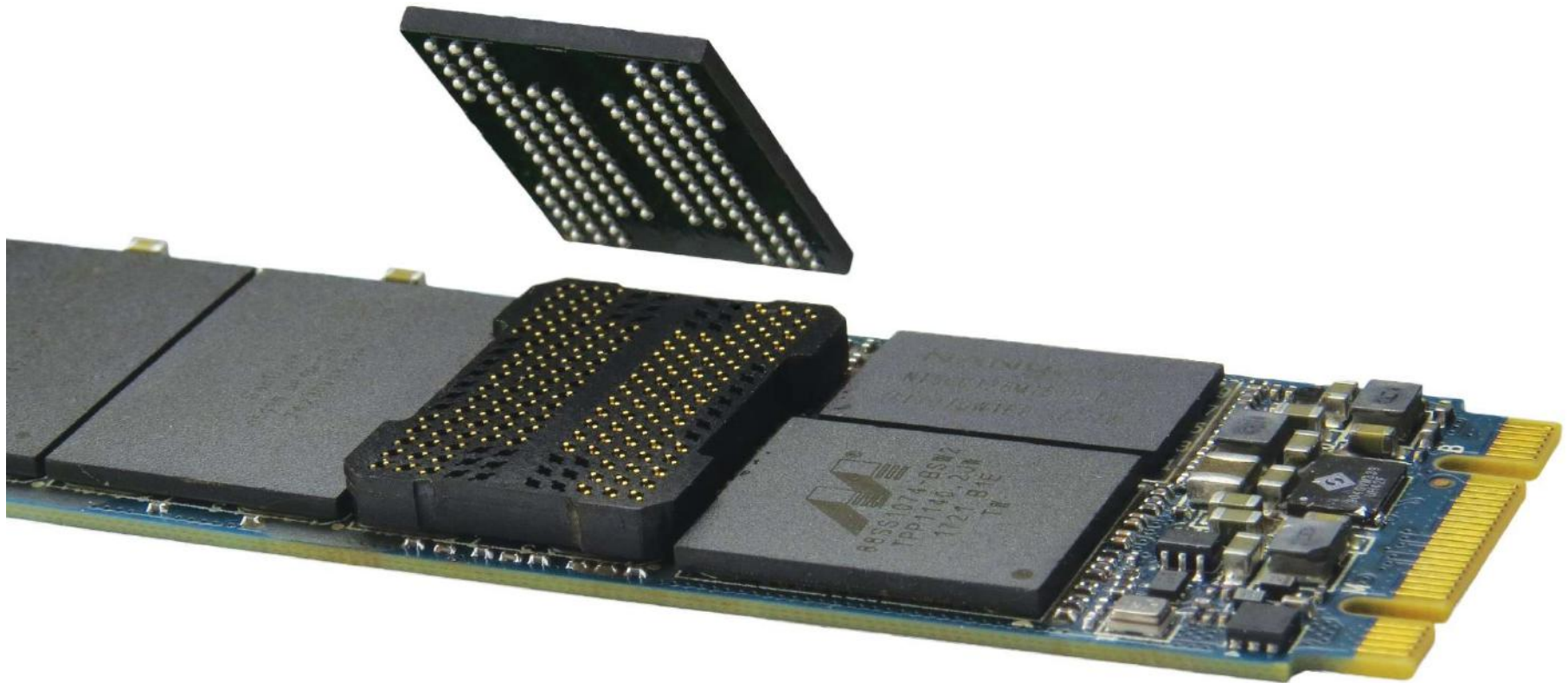
Zero Footprint Sockets



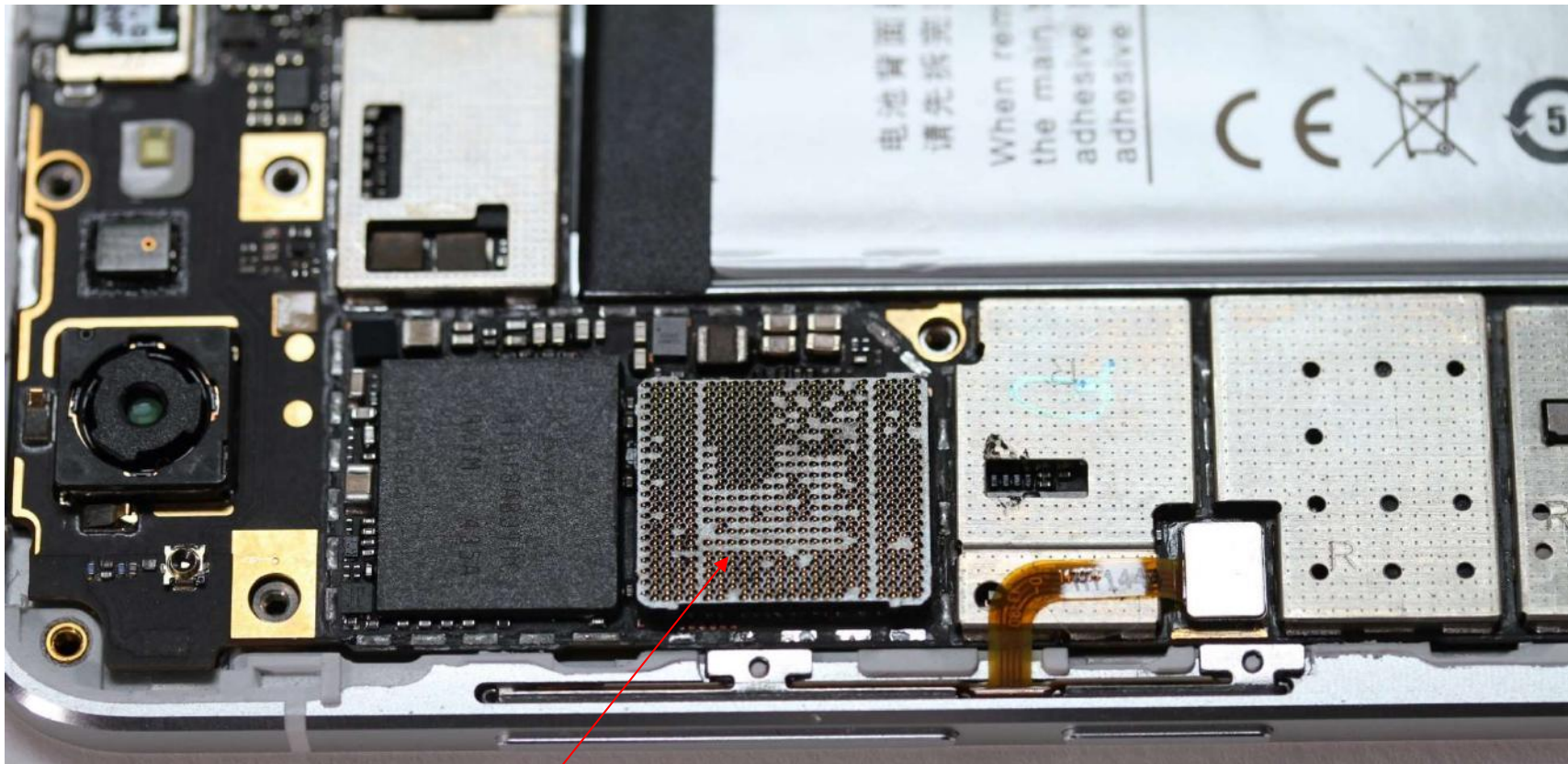
Grypper S-Parameters

- Complete sets of electrical measured/modeled data available
- 3rd party measurement testing
- HFSS, SPICE, CST
- Custom simulations available

Zero Footprint Sockets

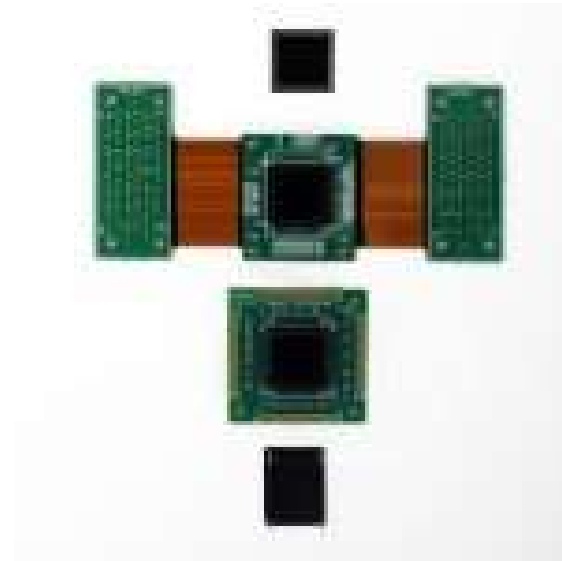
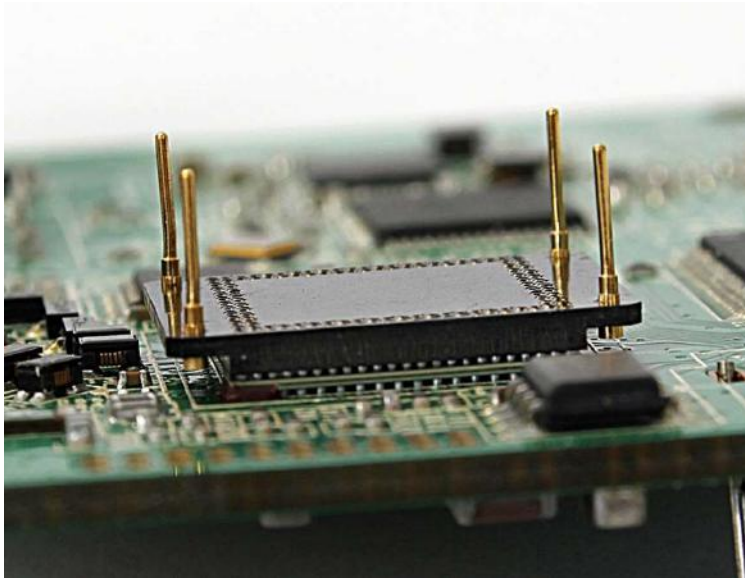


Zero Footprint Sockets



Grypper socket mounted on iPhone

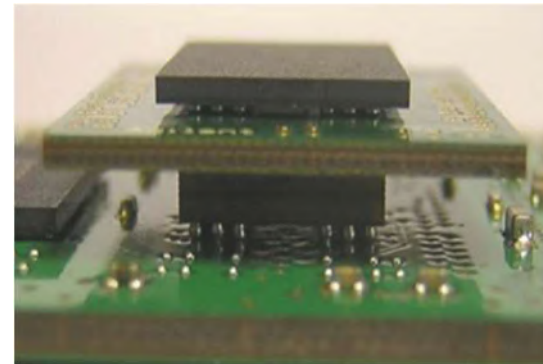
Zero Footprint Sockets



Snoop Out/Probe Board

Partners with:

- Tektronics-Nexus Technologies
- Agilent-Keysight



Zero Footprint Sockets

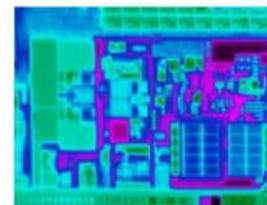
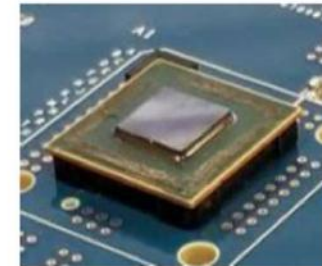
Failure Analysis

- No lid allows for easy access to entire die
- SIL LENS accessible to corners - no alignment frame interference
- Can work with existing socket hardware

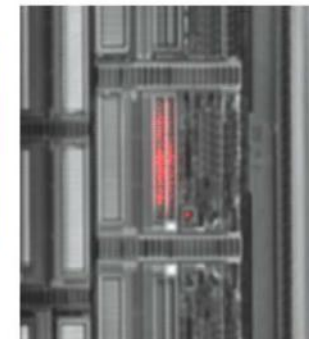
SIL LENS Application

SIL Lens used with a Grypper Test socket allowing the top of the thinned device totally open - NO LID above the device / die allowing the SIL lens to scan across the entire die area

This application has a Grypper as the device carrier working with the lower Spring Pin socket

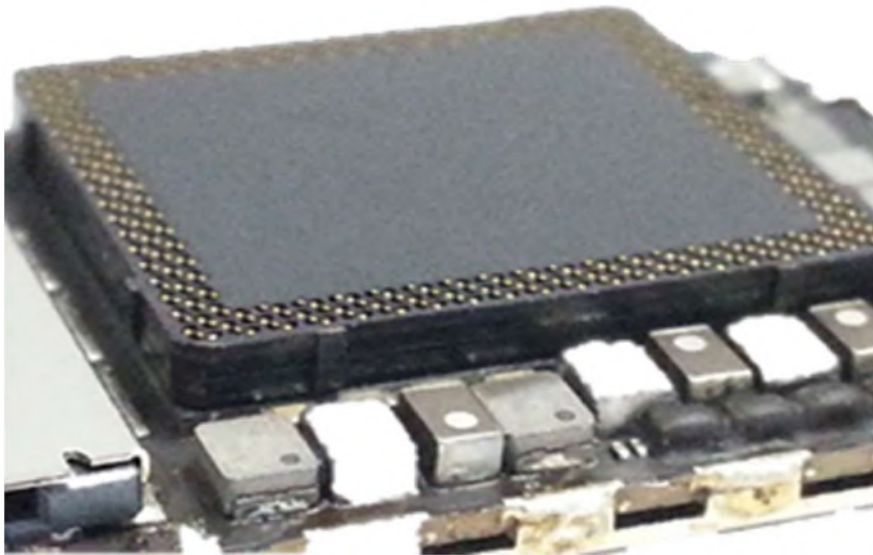


Thermal Image of Die



Area showing ESD

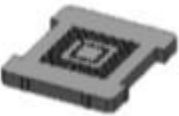
Zero Footprint Sockets



POP Application

- Grypper Socket mounted to the top of the processor for receiving memory package
- Swap memory devices out without sacrificing processor

Zero Footprint Sockets

	Ball Count-Socket Size- Pitch	Device Solder Ball Diameter +/-0.05mm	Standard with SAC 305 Solder Balls	Option with Eutectic Solder Balls	Option with No Solder Balls
	153 - 11.5 x 13.0 - 0.5	0.30	107250-0026	108387-0026	107248-0026
	Alignment Frame		108639-0003		
	Device Press - 11.5 x 13.0		103864-0128		
	Stencil - 153 - 11.5 x 13.0		N/R	N/R	104553-0220



Alignment Frame

Used for positioning the BGA device into the socket (G35/G40)



Device Press

Recommended to ensure even pressure across the top of the device



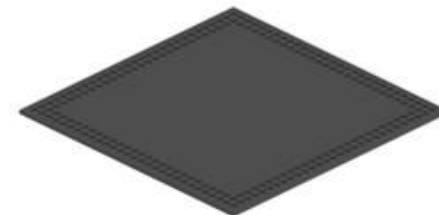
Extraction Tool

105900-0004 – Used for device removal

Standard catalog items available for:

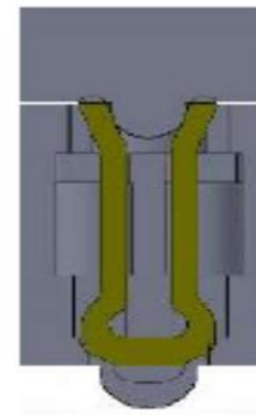
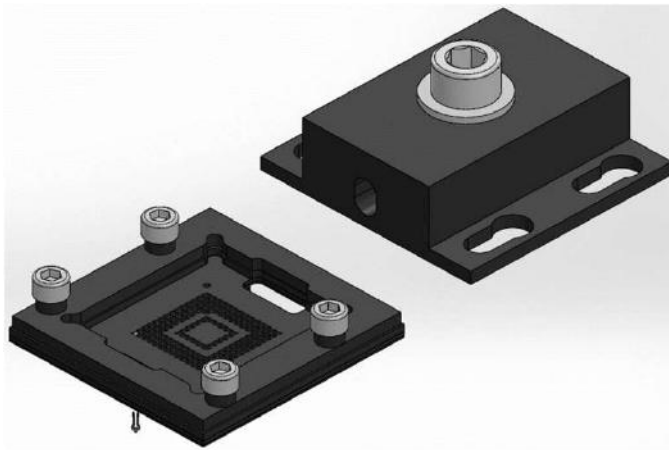
- eMMC
- LPDDR
- DDR
- ONFI(NAND)

Stencil for Grypper and G80 socket attachment



Near Zero Footprint Sockets

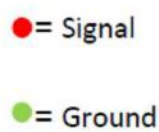
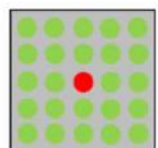
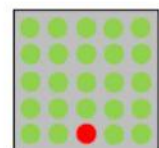
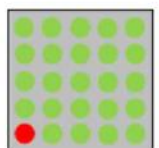
- “Y” contact sockets
- Near zero footprint
- Great for shock/vibration testing
- Low insertion forces
- Soft contacting, minimal ball marking
- Test same device 20+ times
- Excellent electrical performance



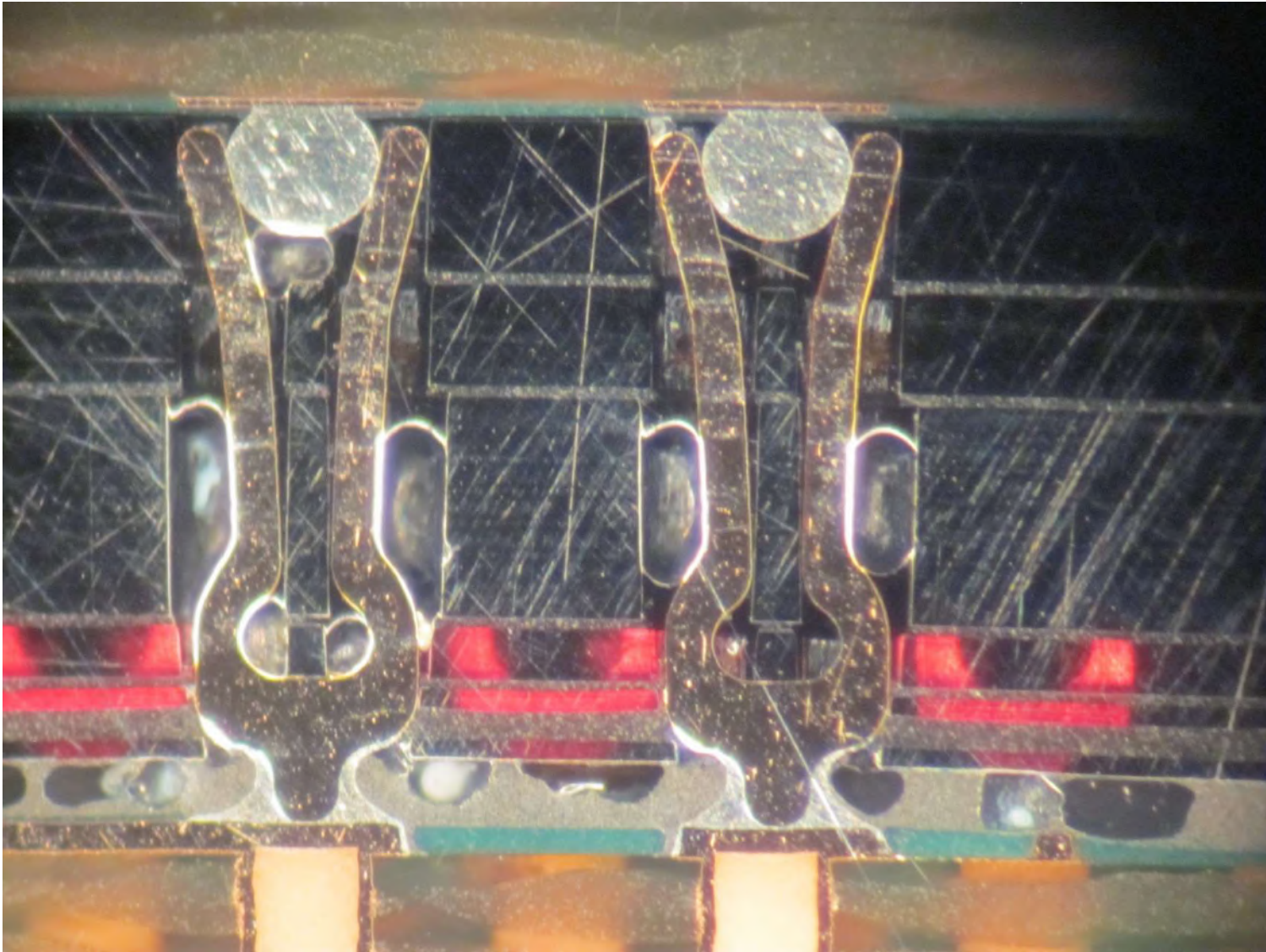
Near Zero Footprint Sockets

ELECTRICAL SPECIFICATIONS

Measured result listed below for 0.8 pitch- 104468-0051 configuration – Contact for RF simulation and model reports, HFSS and S parameter files.

				
		Field	Edge	Corner
Loop inductance		0.540 nH	0.630 nH	0.720 nH
Mutual inductance		0.139 nH	0.141 nH	0.161 nH
Capacitance		0.227 pF	0.218 pF	0.209 pF
Mutual Capacitance		0.046 pF	0.050 pF	0.640 pF
S21 Insertion loss (-1 dB)		>40 GHz	>40 GHz	16.1 GHz
S11 Return loss (-20 dB)		>40 GHz	13.2 GHz	8.6 GHz
S41 Crosstalk (GSSG)		N/A	-20dB @>40 GHz	N/A
Impedance		53.6 Ω	56.2 Ω	60.1 Ω
Time Delay		12.7 ps	12.9 ps	13.5ps
Current Carrying Capacity		6.4 Amps DC @ 20 ^o C Rise		
CRES		<50 m Ω	<50 m Ω	<50 m Ω

Near Zero Footprint Sockets



Near Zero Footprint Sockets



200 BGA
LPDDR4 device

- Validation board
- Easily swap devices
different memory
manufacturers
- No soldering each device
- Minimal ball marking

Custom Capability

- Custom designs available upon request
- Designs available up to 1500 I/O
- Delivery on new designs 4-5 weeks
- Delivery on repeats 2-3 weeks
- We look forward to working with you on your next project.