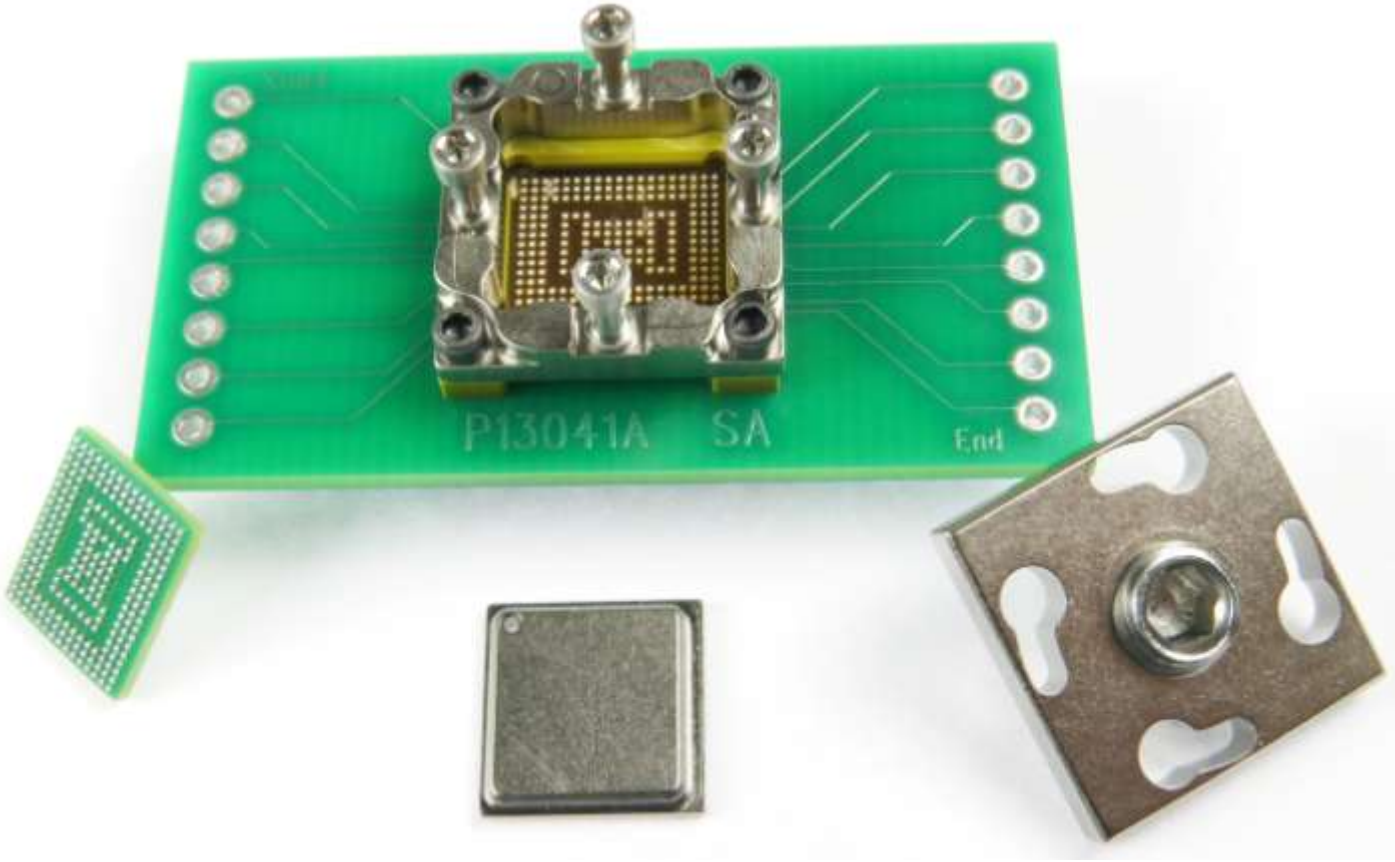
SM/SMP User Manual



Ironwood ELECTRONICS

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SM/SMP socket uses SM & SMP contact technology for high speed, low inductance, high endurance and wide temperature applications. SM Contact is a unique contact that has precise silver balls held together by a proprietary conductive formulation. These conductive columns (diameter optimized for 50 ohm impedance) are suspended in a non-conductive flexible elastomer substrate with a patented solid core for enhanced durability and reliable performance over time, temperature and cycles. This flexible substrate is very compliant and resilient and enables the conductive columns to revert back to original shape when the force is removed. Solutions are available for 0.25mm to 1.27mm LGA, BGA, QFN, CSP, POP, WLP and other packages

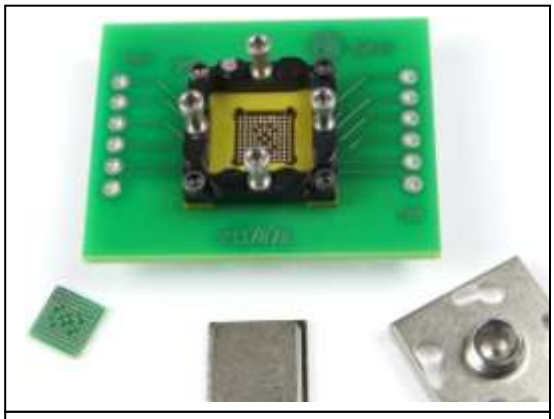

Figure 1: SM/SMP Socket with Swivel Lid

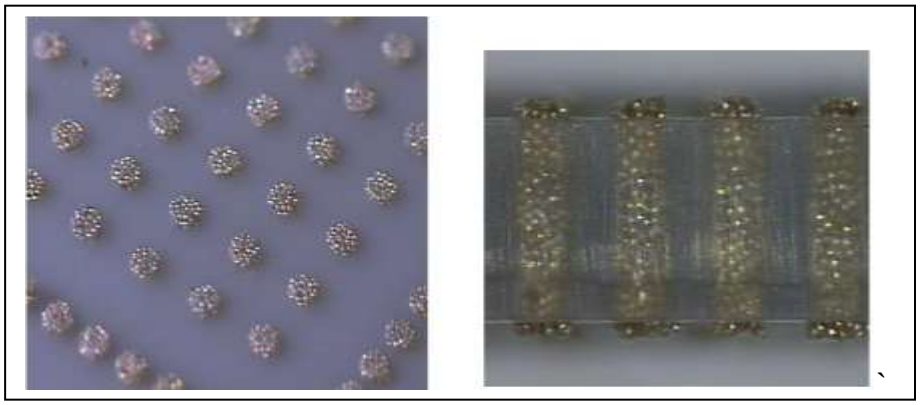

Figure 2: SM Elastomer

The silver ball matrix contact technology is also available with a protective plunger matrix (a gold plated copper cylinder) that sits on top of the conductive columns. This plunger matrix protects the conductive column from contamination from various solder ball interfaces. A quickly replaceable plunger matrix enables minimal downtime during final production test. The product family code for this line of sockets is SMP (SMP = Elastomer layer + Protective layer).

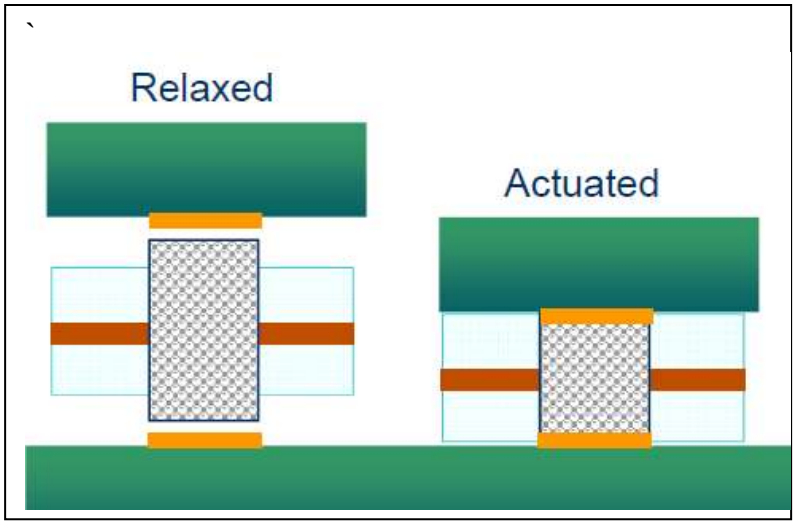

Figure 3: SM Elastomer

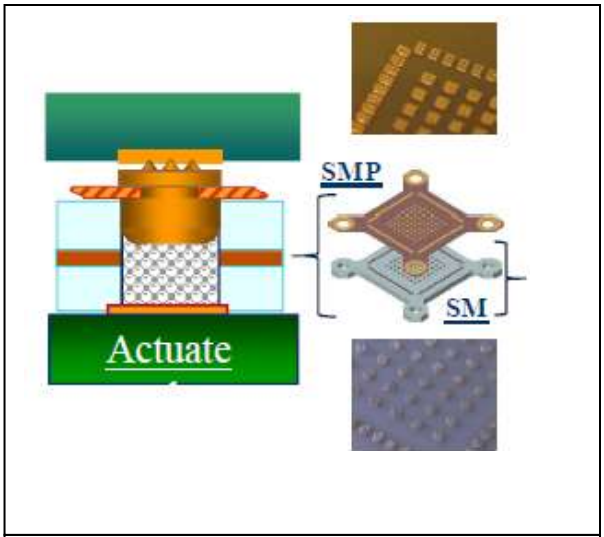

Figure 4: SMP Elastomer

SM Elastomer:

Electrical (0.5mm pitch)

Bandwidth (Frequency Response)	-1db @ > 40 GHz
Self Inductance	0.10 nH
Mutual Inductance	0.02 nH
Capacitance to Ground	0.14 pF
Mutual Capacitance	0.01 pF
Contact Resistance (Initial)	< 25 m Ω
Current Rating	4 amps @ 14C heat rise

Mechanical

Contact Length (Compressed)	0.45 mm
Pitch	< 0.3mm – Mixed Pitch Available
Packages	BGA, LGA, QFN, DFN, CSP, POP – Full and Partial Arrays Available
Compliance Range/Travel	Up to 0.23 mm
Contact Force/Lead (Initial)	40-50 grams/lead
Operating Temperature^{+++}	-55°C to +155°C
Expected Life*	> 10,000 actuations

SMP Elastomer:

Electrical (0.5mm pitch)

Bandwidth (Frequency Response)	-1db @ > 40 GHz
Self Inductance	<0.15 nH
Mutual Inductance	<0.05 nH
Capacitance to Ground	<0.14 pF
Mutual Capacitance	<0.02 pF
Contact Resistance (Initial)	< 25 m Ω
Current Rating	4 amps @ 14C heat rise

Mechanical

Contact Length (Compressed)	0.63 mm
Pitch	< 0.4mm – Mixed Pitch Available
Packages	BGA, LGA, QFN, DFN, CSP, POP – Full and Partial Arrays Available
Compliance Range/Travel	Up to 0.28 mm
Contact Force/Lead (Initial)	40-50 grams/lead
Operating Temperature	-55°C to +155°C
Expected Life*	P Flex layer > 2,000,000 actuations, SM elastomer > 500,000 actuations

*** Contact life is influenced by introduction of bias to the IC and the plating of the IC leads which will have an impact in the degradation of the contact performance.**

+++ In some cases socket will experience IC sticking issue for temperature tests above 60°C. After test device will get stuck on the elastomer and device might require tweezers to release the IC from the socket.

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Socket with SM Interposer - Assembly and Maintenance Instructions

Assembly of the SM Interposer to the Socket:

- The socket may come with the SM interposer already assembled to the socket body.
- To install or remove the SM, please proceed with the following steps.
- Blow off both sides with compressed air during assembly to remove any debris. Do not touch or rub the SM columns.
- Install the SM so the DUT leads touch the SM columns on one side and the PCB pads touch the SM columns on the other side.
- Gently press one of the SM tooling holes over a first corresponding guide pin.
- Do the same for the other tooling hole and guide pin diagonally opposite.
- When both tooling holes are on the guide pins, use a flat tip tweezers or similar tool to ease the SM further down onto the pins, alternating opposing corners until it is seated against the socket.
- Work carefully to avoid enlarging or deforming the SM tooling holes.
- Work the opposite direction to remove the SM, carefully easing it off the guide pins. Do not use a sharp instrument and/or grab one corner and pull it off the guide pins because it can cause damage to the SM tooling holes.

Assembly of the Socket to the PCB:

- Assure that the test site PCB pads and immediately surrounding surfaces are free of contaminants and any sticky or chemical residues. Then blow clean with compressed air.
- Place the socket's alignment pins into the corresponding holes in the PCB.
- Hold the socket stiffener on the back side of the PCB so it lines up with the mounting holes.
- Secure the socket to the PCB and stiffener using the mounting screws or fasteners. Assure that the socket is firmly seated and coplanar with the PCB.

Removal and Storage of the Socket:

- Remove the socket from the PCB and store with the SM attached in the protective packaging provided. Do not allow multiple sockets to rub against each other.
- If the SM interposer is separate from the socket, always keep it contained and protected in the supplied packaging box and/or small bags. This will keep the SM from being touched or damaged and prevent the accumulation of dust and debris.
- If the socket remains attached to the PCB, it is recommended to store the socket with the lid open so the SM remains un-actuated (not compressed) during that time, which will help extend the life.

Handling and Cleaning of the SM Interposer:

- Always handle the SM by the outside edges and avoid touching the top and bottom of the conductive columns.
- Important: Do not touch or rub the conductive columns of SM.
- Never use a stiff/wire brush on the SM interposer.
- Never use any alcohol or cleaning chemicals on the SM. If the PCB is cleaned with chemicals, always be sure it is completely dry prior to touching the SM.
- Use compressed air to blow dust/debris from the top and bottom of the SM prior to use and assembly.
- If there is debris that cannot be removed by air, use a soft animal hair brush to lightly clean the SM. It may also be helpful to use a microscope and tweezers to remove some contaminants.
- Note: Some loose silver particles from the SM conductive columns are normal and do not impact functionality. If there is excessive particle dispersion, please contact Ironwood Electronics at 1-800-404-0204 or info@ironwoodelectronics.com.