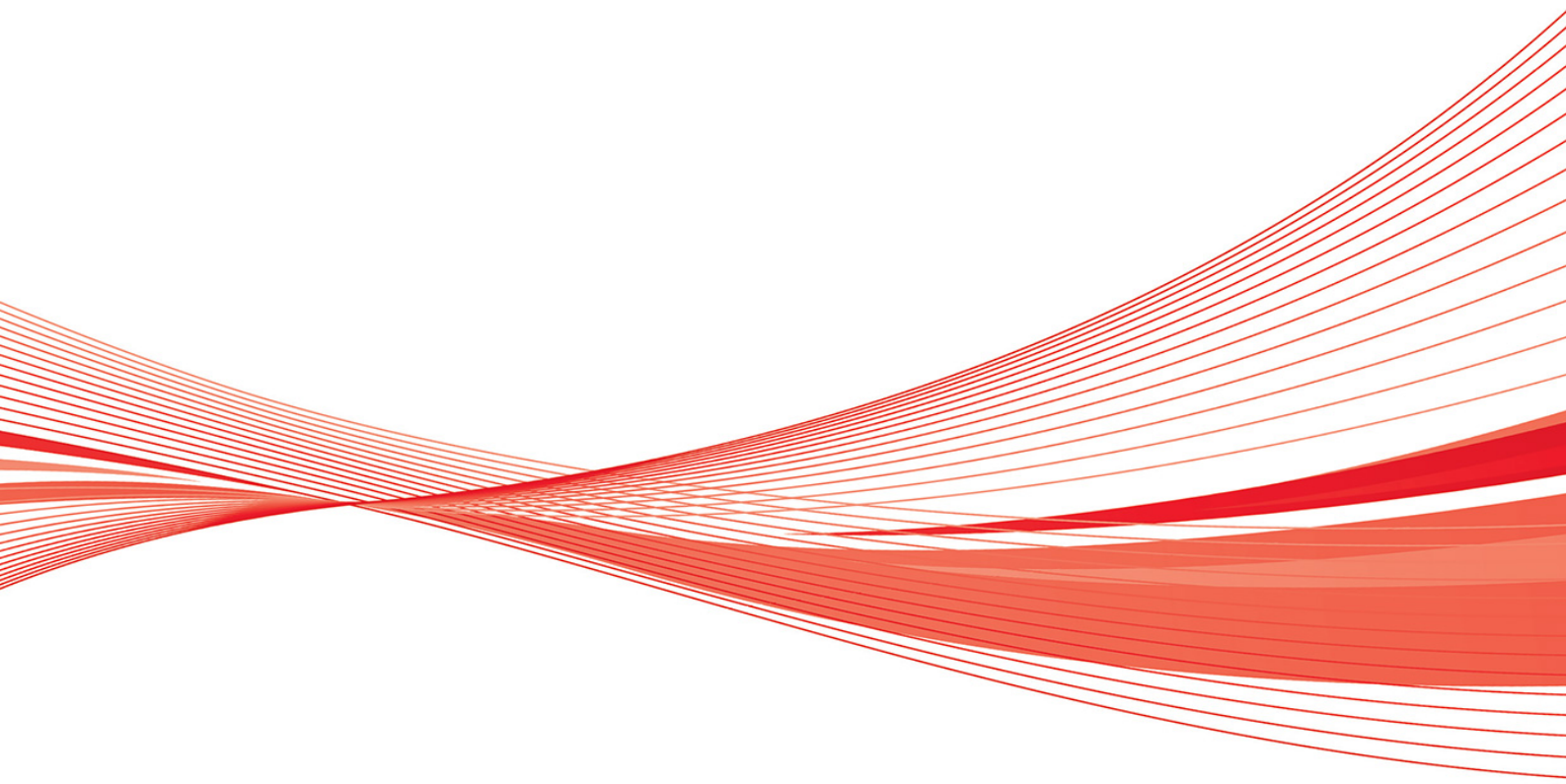
Harwin Test Report Summary

HT00703

Mechanical and Electrical Testing of S9101-46R (PCB Contact Clip)



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Introduction.

1.1. Description and Purpose.

The following tests were performed on the S9101-46R SMT Contact Clip to test for Deflection forces along with Insertion and Withdrawal forces before and after deflection, Temperature rise and contact resistance.

1.2. Conclusion.

The following test data has been taken from Harwin test report 555, 589, 591 and 1837.

The force deflection data was used to determine the deflection required to produce a nominal 1N at the contact point; determined as sufficient force to produce a sound electrical contact on the plated surface. With this confirmed; using the minimum specified pin diameter of Ø1.10mm OR 1.10mm Square, the contact force would provide a stable connection.

With up to four cycles on the same contact, little change in insertion/withdrawal force values was evident, thus confirming a stable performance.

The measured contact insertion and withdrawal forces are satisfactory for this type of contact, which is likely to be used in isolation or with small numbers of other contacts, providing sufficient retention for general purpose applications. Temperature rise of the component at 10A exceeds 30°C, therefore Harwin recommend the maximum current to be used is 9A. Contact resistance testing shows that this contact is confirmed to have low contact resistance.

2. Test Method, Requirements and Results.

2.1. List of Test Samples.

Six different samples of S9101-46R were used for the first three tests, ten further samples were used for temperature rise, and a final three samples were used for contact resistance.

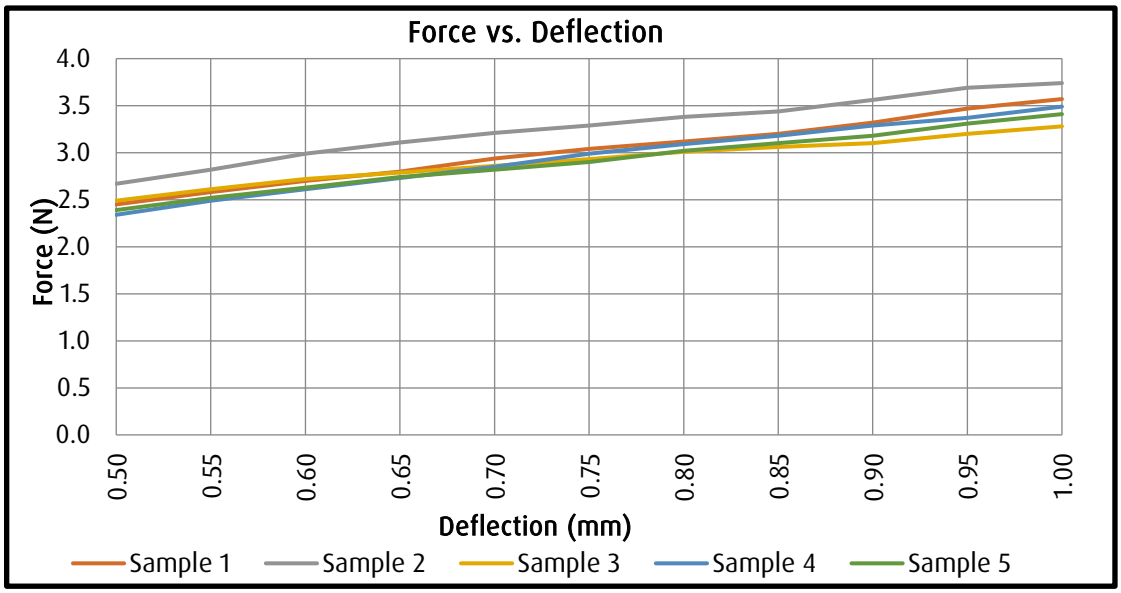
2.2. Specification Parameters.

The purpose of this test was to determine the future specification of this product, so no initial target figures existed for the contact.

2.3. Test Method and Results.

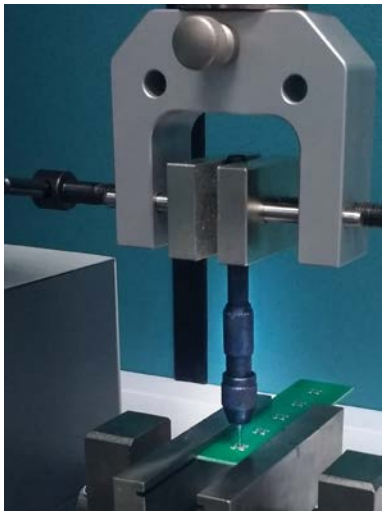
a) Deflection forces.
The contact beam was supported such that the normal force required to deflect one contact beam could be measured at specific deflections.

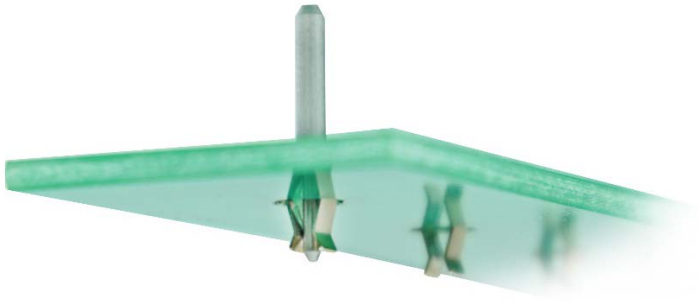
Deflection	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
0.50mm	2.45N	2.67N	2.49N	2.34N	2.39N
0.55mm	2.58N	2.82N	2.61N	2.49N	2.52N
0.60mm	2.70N	2.99N	2.72N	2.61N	2.63N
0.65mm	2.80N	3.11N	2.79N	2.73N	2.74N
0.70mm	2.94N	3.21N	2.86N	2.85N	2.82N
0.75mm	3.04N	3.29N	2.93N	2.99N	2.90N
0.80mm	3.12N	3.38N	3.01N	3.09N	3.02N
0.85mm	3.20N	3.44N	3.06N	3.18N	3.10N
0.90mm	3.32N	3.56N	3.10N	3.29N	3.18N
0.95mm	3.47N	3.69N	3.20N	3.37N	3.31N
1.00mm	3.57N	3.74N	3.28N	3.49N	3.41N



b) Insertion Force – different size pins.
Samples 1 to 4 are the same as the clips used in test (a), Sample 5 is a new clip.

The contacts were manually soldered to a printed circuit board before mating with a pin from above (shown below in photos). A range of pin sizes were used and results were recorded for Insertion/Withdrawal forces.





Pin Size	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average Force
Ø1.00mm	1.58N	1.03N	0.84N	0.71N	1.13N	1.06N
Ø1.10mm	2.10N	2.50N	2.10N	2.30N	2.20N	2.24N
Ø1.19mm	2.40N	1.52N	1.81N	1.61N	2.13N	1.89N
Ø1.29mm	2.25N	1.67N	1.84N	1.74N	1.94N	1.89N
Ø1.38mm	3.62N	2.17N	2.72N	2.28N	2.53N	2.66N
Ø1.52mm	2.58N	2.22N	2.20N	1.88N	1.84N	2.14N
Ø1.64mm	3.25N	2.41N	3.12N	2.56N	2.02N	2.67N
Ø1.75mm	4.06N	2.81N	2.98N	2.81N	2.56N	3.04N
Ø1.81mm	5.30N	5.80N	5.80N	5.60N	5.60N	5.62N

c) Withdrawal Force.
These clips are the same as those used in test (b).

Pin Size	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average Force
Ø1.00mm	0.92N	0.39N	0.44N	0.44N	0.48N	0.53N
Ø1.10mm	0.50N	0.80N	1.10N	1.10N	1.20N	0.94N
Ø1.19mm	0.41N	0.35N	0.36N	0.39N	0.53N	0.41N
Ø1.29mm	0.71N	0.46N	0.52N	0.49N	0.54N	0.54N
Ø1.38mm	0.85N	0.73N	0.73N	0.67N	0.78N	0.75N
Ø1.52mm	0.94N	0.63N	0.77N	0.68N	0.67N	0.74N
Ø1.64mm	0.73N	0.63N	0.66N	0.60N	0.61N	0.65N
Ø1.75mm	0.92N	0.84N	0.83N	0.78N	0.80N	0.83N
Ø1.81mm	1.00N	1.50N	2.20N	2.40N	2.40N	1.92N

d) Current v. Temperature Rise.
Ten samples were tested for temperature rise at 10 and 11 Amps, using a Ø1.10mm mating pin.

Sample No	Temperature rise at 10A	Temperature Rise at 11A
1	17.5°C	29.4°C
2	28.0°C	35.3°C
3	20.2°C	30.0°C
4	24.1°C	29.0°C
5	27.4°C	30.1°C
6	30.9°C	33.8°C
7	22.2°C	27.3°C
8	23.0°C	28.8°C
9	16.8°C	32.0°C
10	17.8°C	30.2°C
Max Temperature Rise	**30.9°C**	**35.3°C**
Average Temperature Rise	**23.38°C**	**30.72°C**

e) Contact Resistance.
Three samples mated with a Ø1.10mm pin were tested for resistance before and after cycling.

Sample No	Contact Resistance (initial)	Contact Resistance (after 50 cycles)	Contact Resistance (after 500 cycles)
1	2mΩ	4mΩ	2mΩ
2	3mΩ	2mΩ	
3	3mΩ	2mΩ	
Average	**2.67mΩ**	**2.67mΩ**	**2mΩ**