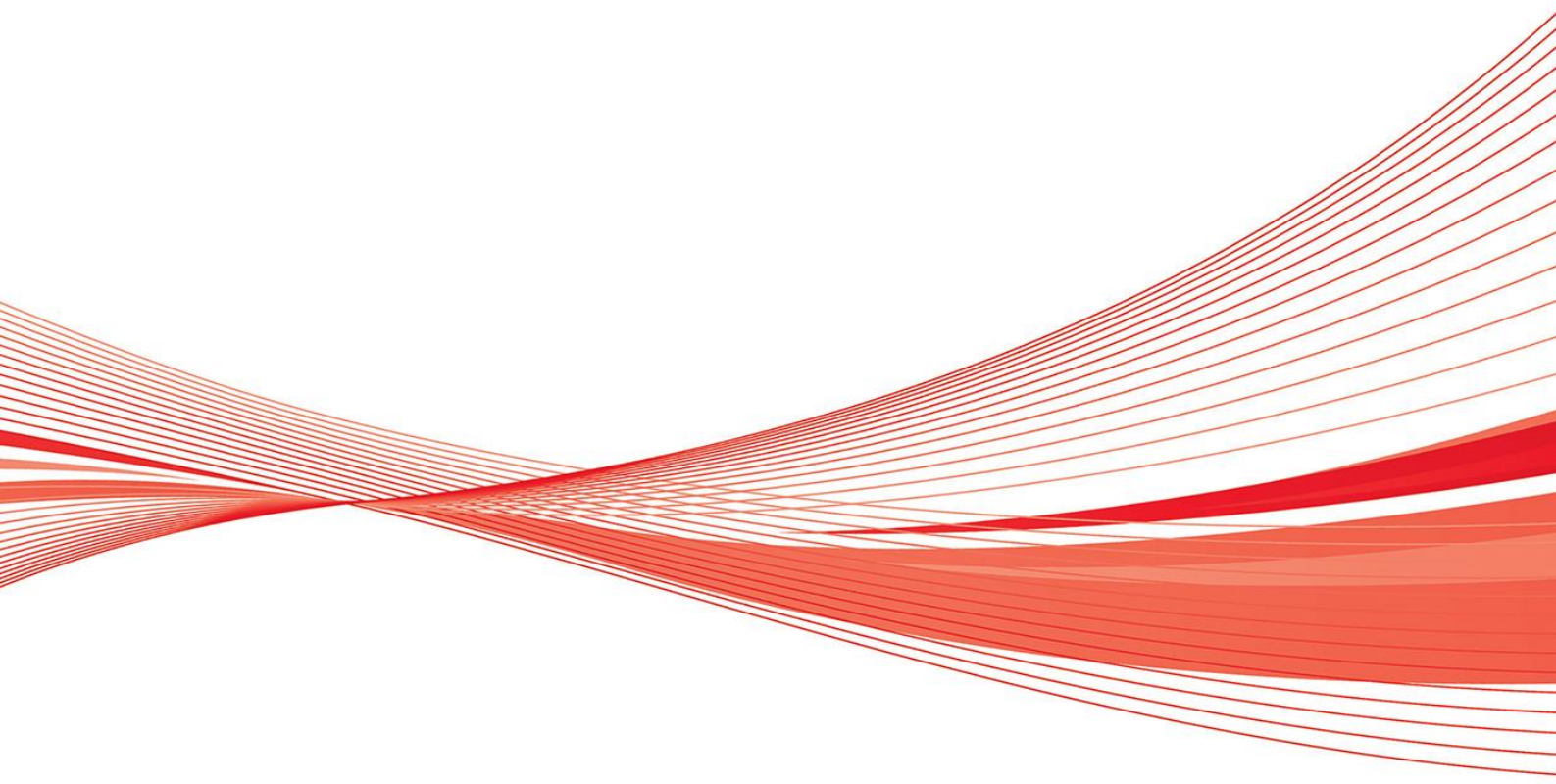
Harwin Test Report Summary

HT04201

Mechanical and Electrical Testing of S9091-46R (SMT Socket Contact)



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1. Introduction.

1.1. Description and Purpose.

The following tests were performed on the S9091-46R 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 1039.

The force deflection data was used to determine the deflection required to produce a nominal 1.2N 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 Ø0.80mm or 0.80mm Square, the contact force would provide a stable connection. Permanent set on the single contact finger is achieved at 1.30mm deflection.

With up to ten insertion and withdrawals on the contacts, the forces achieved using the Ø1.00mm and Ø1.50mm pins remain consistent. 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 6A exceeds 30°C, therefore Harwin recommend the maximum current to be used is 5A; which consistently acheives less than a 30°C rise. 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.

S9091-46R SMT Socket Contacts were used for all of the tests outlined in this report. Various mating parts were used for some of the tests; these will be detailed in each section.

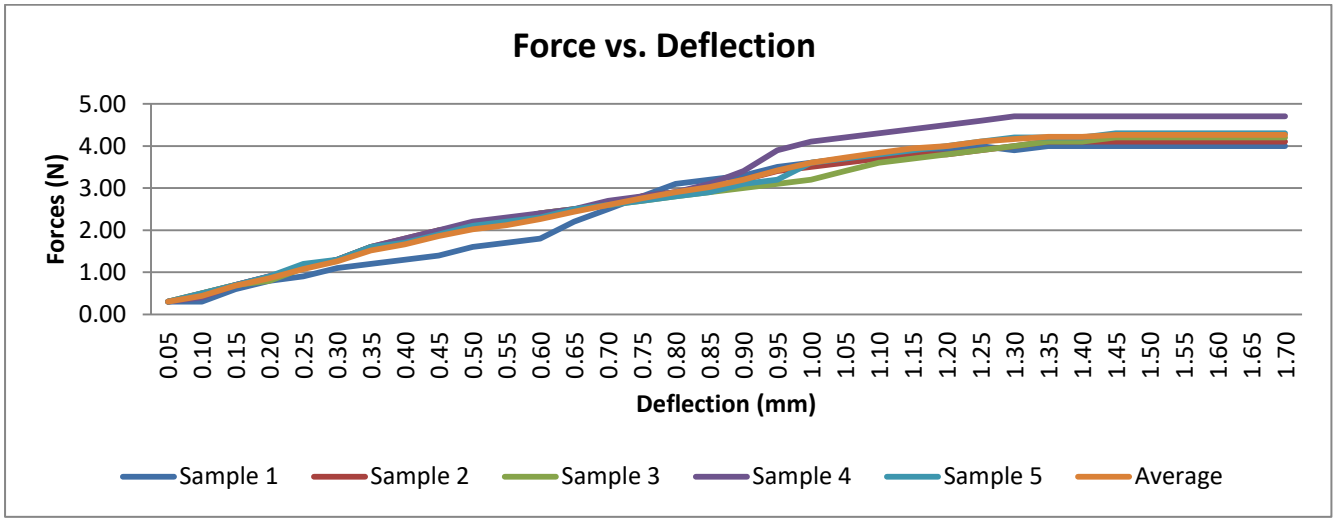
2.2. Specification Parameters.

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 so that the normal force required to deflect one contact beam could be measured at specific deflections.

Deflection (mm)	Forces (N)					
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average
0.05	0.30	0.30	0.30	0.30	0.30	**0.30**
0.10	0.30	0.50	0.50	0.40	0.50	**0.44**
0.15	0.60	0.70	0.70	0.70	0.70	**0.68**
0.20	0.80	0.90	0.80	0.90	0.90	**0.86**
0.25	0.90	1.10	1.10	1.10	1.20	**1.08**
0.30	1.10	1.30	1.30	1.30	1.30	**1.26**
0.35	1.20	1.60	1.60	1.60	1.60	**1.52**
0.40	1.30	1.80	1.70	1.80	1.70	**1.66**
0.45	1.40	2.00	2.00	2.00	1.90	**1.86**
0.50	1.60	2.10	2.10	2.20	2.10	**2.02**
0.55	1.70	2.20	2.20	2.30	2.20	**2.12**
0.60	1.80	2.40	2.40	2.40	2.30	**2.26**
0.65	2.20	2.50	2.50	2.50	2.50	**2.44**
0.70	2.50	2.60	2.60	2.70	2.60	**2.60**
0.75	2.80	2.80	2.70	2.80	2.70	**2.76**
0.80	3.10	2.90	2.80	2.90	2.80	**2.90**
0.85	3.20	3.00	2.90	3.10	2.90	**3.02**
0.90	3.30	3.20	3.00	3.40	3.10	**3.20**
0.95	3.50	3.40	3.10	3.90	3.20	**3.42**
1.00	3.60	3.50	3.20	4.10	3.60	**3.60**
1.05	3.70	3.60	3.40	4.20	3.70	**3.72**
1.10	3.80	3.70	3.60	4.30	3.80	**3.84**
1.15	3.90	3.80	3.70	4.40	3.90	**3.94**
1.20	3.90	3.80	3.80	4.50	4.00	**4.00**
1.25	4.00	3.90	3.90	4.60	4.10	**4.10**
1.30	3.90	4.00	4.00	4.70	4.20	**4.16**
1.35	4.00	4.10	4.10	4.70	4.20	**4.22**
1.40	4.00	4.10	4.10	4.70	4.20	**4.22**
1.45	4.00	4.10	4.20	4.70	4.30	**4.26**
1.50	4.00	4.10	4.20	4.70	4.30	**4.26**
1.55	4.00	4.10	4.20	4.70	4.30	**4.26**
1.60	4.00	4.10	4.20	4.70	4.30	**4.26**
1.65	4.00	4.10	4.20	4.70	4.30	**4.26**
1.70	4.00	4.10	4.20	4.70	4.30	**4.26**



b) Insertion & Withdrawal Force.

Four different size pins were used for insertion and withdrawal testing; ten samples of each pin. The results below show the average force from the ten samples. Ten cycles of insertion and withdrawal were performed.

Insertion & Withdrawal Forces								
Cycle No.	Sample							
	Ø1.50mm		Ø1.00mm		0.64mm square		Ø0.50mm	
	Ins	Wth	Ins	Wth	Ins	Wth	Ins	Wth
1	12.5	3.3	4.3	2.2	2.0	0.8	1.0	0.6
2	8.7	2.2	2.7	1.4	1.3	0.4	0.9	0.4
3	7.1	2.0	3.0	1.1	1.4	0.5	0.8	0.4
4	8.1	2.2	3.1	1.3	1.5	0.4	0.8	0.3
5	6.0	2.1	3.2	1.3	1.5	0.6	0.9	0.3
6	6.3	1.9	3.0	1.1	1.3	0.6	0.9	0.3
7	5.8	1.7	3.0	1.5	1.4	0.6	0.8	0.3
8	5.1	1.5	3.0	1.1	1.3	0.6	0.9	0.3
9	5.3	1.5	2.9	1.1	1.3	0.4	0.9	0.3
10	5.2	1.7	2.8	1.3	1.2	0.3	0.9	0.2

c) Current vs. Temperature Rise.
Five samples were monitored for temperature rise with an applied current of up to six amps without a mating pin.

Applied Current (Amps)	Temperature Rise (°C)				
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
1	1.02	0.95	1.10	1.15	0.90
2	3.75	4.05	4.00	4.90	4.03
3	8.48	8.56	8.82	9.70	8.53
4	14.38	14.90	15.36	16.49	14.61
5	23.06	23.46	22.94	25.58	22.98
6	33.34	32.98	32.99	36.51	33.22

Three samples were monitored for temperature rise with an applied current of up to five amps with a Ø1.00mm mating pin.

Applied Current (Amps)	Temperature Rise (°C)		
	Sample 1	Sample 2	Sample 3
1	1.66	1.16	1.24
2	4.99	4.22	4.35
3	10.35	8.80	9.37
4	16.76	16.10	15.15
5	25.55	24.86	24.16

d) Contact Resistance.
Five contacts were mated with a Ø1.00mm and five with a Ø1.50mm pin. Contact resistance was measured after 1, 50 and 100 cycles. The average results are displayed below.

No. Of Cycles	Contact Resistance	
	Sample + Ø1.50mm pin	Sample + Ø1.00mm pin
1	2mΩ	2mΩ
50	1mΩ	2mΩ
100	2mΩ	2mΩ