



HARWIN

Test Report Summary

HT04202

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



1. Introduction

1.1. Description and Purpose

The following tests were performed on the S9091-46R SMT PCB Socket to test for Deflection, 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 achieves 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. 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.

2.2. List of Test Samples

S9091-46R SMT PCB Sockets 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.

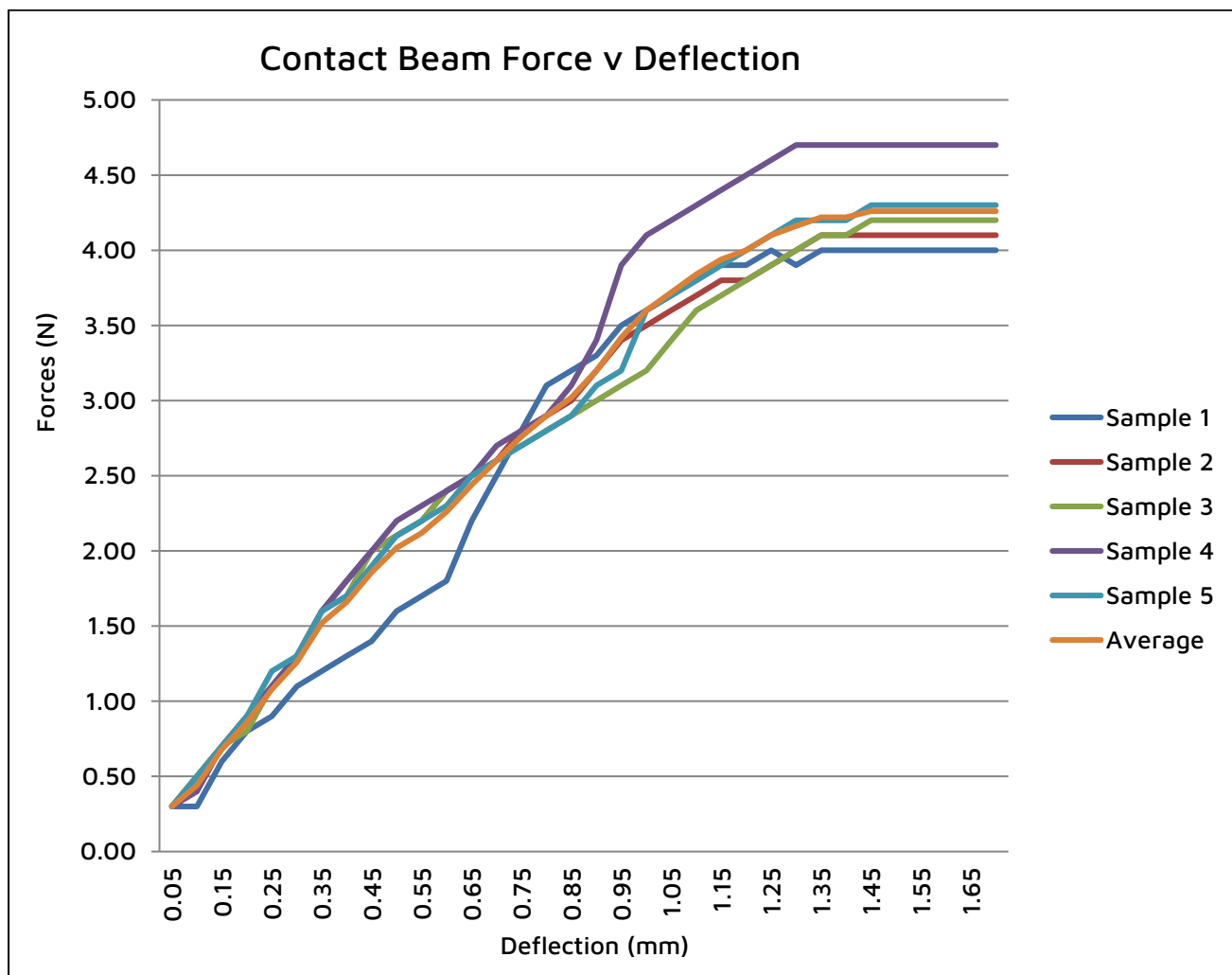
2.3. Test Method and Results

2.3.1. Deflection Forces

Methodology: The contact beam was supported so that the normal force required to deflect one contact beam could be measured at specific deflections.

Results:

Deflection (mm)	Forces (N)					Average
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	
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



2.3.2. Insertion & Withdrawal Forces

Methodology: Four different size pins were used for insertion and withdrawal testing; ten samples of each pin. Ten cycles of insertion and withdrawal were performed.

Results: Table shows the average forces in N from the ten samples.

No. of Cycles	Ø1.50mm		Ø1.00mm		0.64mm square		Ø0.50mm	
	Insertion	Withdrawal	Insertion	Withdrawal	Withdrawal	Withdrawal	Insertion	Withdrawal
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

2.3.3. Current vs. Temperature Rise

Methodology: Five samples were monitored for temperature rise with an applied current of up to 6A without a mating pin.

Results:

Current (A)	Temperature Rise (°C)					
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average
1	1.02	0.95	1.10	1.15	0.90	1.02
2	3.75	4.05	4.00	4.90	4.03	4.15
3	8.48	8.56	8.82	9.70	8.53	8.82
4	14.38	14.90	15.36	16.49	14.61	15.15
5	23.06	23.46	22.94	25.58	22.98	23.60
6	33.34	32.98	32.99	36.51	33.22	33.81

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

Results:

Current (A)	Temperature Rise (°C)			
	Sample 1	Sample 2	Sample 3	Average
1	1.66	1.16	1.24	1.35
2	4.99	4.22	4.35	4.52
3	10.35	8.80	9.37	9.51
4	16.76	16.10	15.15	16.00
5	25.55	24.86	24.16	24.86

2.3.4. Contact Resistance.

Methodology: 5 samples were mated with a Ø1.00mm pin, and 5 samples with a Ø1.50mm pin. Contact resistance was measured after 1, 50 and 100 cycles.

Results:

No. of Cycles	Average Contact Resistance (mΩ)	
	Ø1.50mm mating pin	Ø1.00mm mating pin
1	2mΩ	2mΩ
50	1mΩ	2mΩ
100	2mΩ	2mΩ