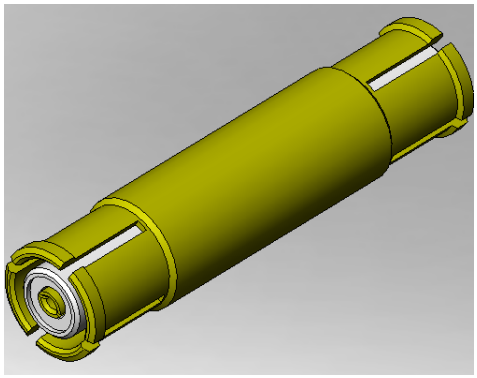
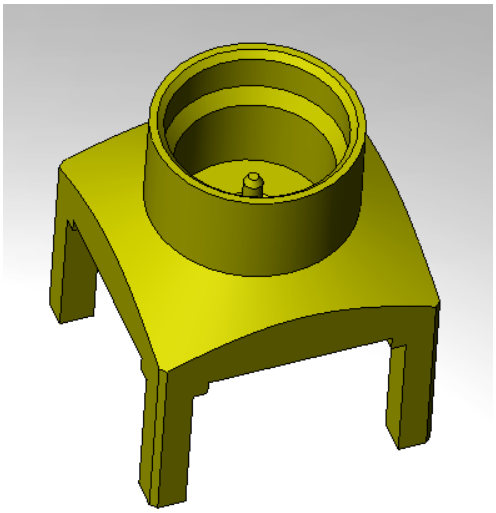
Project Number: Design Qualification Test Report	Tracking Code: 164934Report_Rev_2			
Requested by: John Liao	Date: 10/23/2018		Product Rev: 0	
Part #: SMP-J-B-GF-ST-1450\ SMP-P(F/L/S/C)-P-GF-ST-TH2		Lot #: N/A	Tech: Peter Chen	Eng: Vico Zhao
Part description: SMP-J/SMP-P				Qty to test: 32
Test Start: 11/15/2011	Test Completed: 11/20/2011			





Design Qualification Test Report

SMP-J/SMP-P

SMP-J-B-GF-ST-1450\ SMP-P(F/L/S/C)-P-GF-ST-TH2

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
5/11/2012	**1**	**Initial Issue**	**PC**
10/23/2018	**2**	**Update the mating-unmating force**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Design Qualification Test, Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
4) The automated procedure is used with aqueous compatible soldering materials.
5) Any additional preparation will be noted in the individual test sequences.
6) Solder Information: Lead free
7) Re-Flow Time/Temp: See accompanying profile.
8) Samtec Test PCBs used: PCB-103210-TST-01A

FLOWCHARTS

Durability/Mating/Unmating/Gaps

TEST STEP	GROUP B1 8 Boards SMP-PC-P-GF-ST-TH2	GROUP B2 8 Boards SMP-PF-P-GF-ST-TH2
01	Contact Gaps	Contact Gaps
02	Forces - Mating / Unmating	Forces - Mating / Unmating
03	25 Cycles	25 Cycles
04	Forces - Mating / Unmating	Forces - Mating / Unmating
05	25 Cycles (50 Total)	25 Cycles (50 Total)
06	Forces - Mating / Unmating	Forces - Mating / Unmating
07	25 Cycles (75 Total)	25 Cycles (75 Total)
08	Forces - Mating / Unmating	Forces - Mating / Unmating
09	25 Cycles (100 Total)	25 Cycles (100 Total)
10	Forces - Mating / Unmating	Forces - Mating / Unmating
11	Clean w/Compressed Air	Clean w/Compressed Air
12	Contact Gaps	Contact Gaps

TEST STEP	GROUP B3 8 Boards SMP-PL-P-GF-ST-TH2	GROUP B4 8 Boards SMP-PS-P-GF-ST-TH2
01	Contact Gaps	Contact Gaps
02	Forces - Mating / Unmating	Forces - Mating / Unmating
03	25 Cycles	25 Cycles
04	Forces - Mating / Unmating	Forces - Mating / Unmating
05	25 Cycles (50 Total)	25 Cycles (50 Total)
06	Forces - Mating / Unmating	Forces - Mating / Unmating
07	25 Cycles (75 Total)	25 Cycles (75 Total)
08	Forces - Mating / Unmating	Forces - Mating / Unmating
09	25 Cycles (100 Total)	25 Cycles (100 Total)
10	Forces - Mating / Unmating	Forces - Mating / Unmating
11	Clean w/Compressed Air	Clean w/Compressed Air
12	Contact Gaps	Contact Gaps

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

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ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

CONTACT GAPS:

1) Gaps above the surrounding plastic surface were measured before and after stressing the contacts (e.g. thermal aging, mechanical cycling, etc.).
2) Typically, all contacts on the connector are measured.

MATING/UNMATING:

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
2) The full insertion position was to within 0.003” to 0.004” of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

RESULTS

Mating /unmating force

Mating&Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PC-P-GF-ST-TH2):

- **Initial**
  - **Mating**
    - **Min ---------- 1.45 Lbs**
    - **Max---------- 1.95 Lbs**
  - **Unmating**
    - **Min ---------- 0.98 Lbs**
    - **Max---------- 1.32 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 1.39 Lbs**
    - **Max---------- 1.58 Lbs**
  - **Unmating**
    - **Min ---------- 0.87 Lbs**
    - **Max---------- 1.25 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 1.29 Lbs**
    - **Max---------- 1.58 Lbs**
  - **Unmating**
    - **Min ---------- 0.89 Lbs**
    - **Max---------- 1.20 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 1.28 Lbs**
    - **Max---------- 1.55 Lbs**
  - **Unmating**
    - **Min ---------- 0.85 Lbs**
    - **Max---------- 1.15 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 1.25 Lbs**
    - **Max---------- 1.50 Lbs**
  - **Unmating**
    - **Min ---------- 0.80 Lbs**
    - **Max---------- 1.10 Lbs**

RESULTS Continued

Mating&Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PF-P-GF-ST-TH2):

- **Initial**
  - **Mating**
    - **Min ---------- 5.23 Lbs**
    - **Max---------- 7.16 Lbs**
  - **Unmating**
    - **Min ---------- 5.30 Lbs**
    - **Max---------- 6.24 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 3.86 Lbs**
    - **Max---------- 4.85 Lbs**
  - **Unmating**
    - **Min ---------- 5.08 Lbs**
    - **Max---------- 6.16 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 3.96 Lbs**
    - **Max---------- 4.85 Lbs**
  - **Unmating**
    - **Min ---------- 5.08 Lbs**
    - **Max---------- 6.13 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 4.09 Lbs**
    - **Max---------- 4.98 Lbs**
  - **Unmating**
    - **Min ---------- 4.97 Lbs**
    - **Max---------- 6.04 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 4.07 Lbs**
    - **Max---------- 4.91 Lbs**
  - **Unmating**
    - **Min ---------- 4.96 Lbs**
    - **Max---------- 5.97 Lbs**

RESULTS Continued

Mating&Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PL-P-GF-ST-TH2):

- **Initial**
  - **Mating**
    - **Min ---------- 3.11 Lbs**
    - **Max---------- 4.03 Lbs**
  - **Unmating**
    - **Min ---------- 2.44 Lbs**
    - **Max---------- 3.06 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 3.00 Lbs**
    - **Max---------- 3.72 Lbs**
  - **Unmating**
    - **Min ---------- 2.35 Lbs**
    - **Max---------- 2.95 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 2.97 Lbs**
    - **Max---------- 3.70 Lbs**
  - **Unmating**
    - **Min ---------- 2.31 Lbs**
    - **Max---------- 2.80 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 2.95 Lbs**
    - **Max---------- 3.59 Lbs**
  - **Unmating**
    - **Min ---------- 2.17 Lbs**
    - **Max---------- 2.53 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 2.86 Lbs**
    - **Max---------- 3.39 Lbs**
  - **Unmating**
    - **Min ---------- 1.98 Lbs**
    - **Max---------- 2.33 Lbs**

RESULTS Continued

Mating&Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PS-P-GF-ST-TH2):

- **Initial**
  - **Mating**
    - **Min ---------- 1.34 Lbs**
    - **Max---------- 1.84 Lbs**
  - **Unmating**
    - **Min ---------- 0.87 Lbs**
    - **Max---------- 1.21 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 1.28 Lbs**
    - **Max---------- 1.47 Lbs**
  - **Unmating**
    - **Min ---------- 0.76 Lbs**
    - **Max---------- 1.14 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 1.18 Lbs**
    - **Max---------- 1.47 Lbs**
  - **Unmating**
    - **Min ---------- 0.78 Lbs**
    - **Max---------- 1.09 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 1.17 Lbs**
    - **Max---------- 1.44 Lbs**
  - **Unmating**
    - **Min ---------- 0.74 Lbs**
    - **Max---------- 1.04 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 1.14 Lbs**
    - **Max---------- 1.39 Lbs**
  - **Unmating**
    - **Min ---------- 0.69 Lbs**
    - **Max---------- 0.99 Lbs**

DATA SUMMARIES Continued

MATING/UNMATING FORCE:

Mating/Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PC-P-GF-ST-TH2):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	6.45	1.45	4.36	0.98	6.18	1.39	3.87	0.87
Maximum	8.67	1.95	5.87	1.32	7.03	1.58	5.56	1.25
Average	7.65	**1.72**	4.97	**1.12**	6.76	**1.52**	4.59	**1.03**
St Dev	0.74	0.17	0.54	0.12	0.30	0.07	0.54	0.12
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.74	1.29	3.96	0.89	5.69	1.28	3.78	0.85
Maximum	7.03	1.58	5.34	1.20	6.89	1.55	5.12	1.15
Average	6.42	**1.44**	4.51	**1.01**	6.27	**1.41**	4.33	**0.97**
St Dev	0.42	0.09	0.46	0.10	0.42	0.10	0.41	0.09
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.56	1.25	3.56	0.80
Maximum	6.67	1.50	4.89	1.10
Average	6.03	**1.36**	4.15	**0.93**
St Dev	0.38	0.09	0.38	0.09
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PF-P-GF-ST-TH2):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	23.26	5.23	23.57	5.30	17.17	3.86	22.60	5.08
Maximum	31.85	7.16	27.76	6.24	21.57	4.85	27.40	6.16
Average	26.38	**5.93**	25.29	**5.69**	19.78	**4.45**	24.94	**5.61**
St Dev	2.83	0.64	1.48	0.33	1.55	0.35	1.78	0.40
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.61	3.96	22.60	5.08	18.19	4.09	22.11	4.97
Maximum	21.57	4.85	27.27	6.13	22.15	4.98	26.87	6.04
Average	19.65	**4.42**	24.73	**5.56**	19.83	**4.46**	24.46	**5.50**
St Dev	1.48	0.33	1.57	0.35	1.37	0.31	1.57	0.35
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	18.10	4.07	22.06	4.96
Maximum	21.84	4.91	26.55	5.97
Average	19.73	**4.44**	23.98	**5.39**
St Dev	1.31	0.29	1.62	0.36
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PL-P-GF-ST-TH2):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	13.83	3.11	10.85	2.44	13.34	3.00	10.45	2.35
Maximum	17.92	4.03	13.60	3.06	16.54	3.72	13.12	2.95
Average	15.67	**3.52**	12.28	**2.76**	15.03	**3.38**	11.71	**2.63**
St Dev	1.27	0.29	1.02	0.23	1.07	0.24	0.94	0.21
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	13.20	2.97	10.27	2.31	13.12	2.95	9.65	2.17
Maximum	16.45	3.70	12.45	2.80	15.96	3.59	11.25	2.53
Average	14.91	**3.35**	11.20	**2.52**	14.59	**3.28**	10.45	**2.35**
St Dev	1.05	0.24	0.80	0.18	1.01	0.23	0.51	0.11
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	12.71	2.86	8.80	1.98
Maximum	15.07	3.39	10.36	2.33
Average	14.02	**3.15**	9.73	**2.19**
St Dev	0.82	0.18	0.61	0.14
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating durability (SMP-J-B-GF-ST-1450\ SMP-PS-P-GF-ST-TH2):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.94	1.34	3.85	0.87	5.67	1.28	3.36	0.76
Maximum	8.17	1.84	5.36	1.21	6.52	1.47	5.05	1.14
Average	7.14	**1.60**	4.46	**1.00**	6.25	**1.40**	4.08	**0.92**
St Dev	0.74	0.17	0.54	0.12	0.30	0.07	0.54	0.12
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.23	1.18	3.45	0.78	5.19	1.17	3.27	0.74
Maximum	6.52	1.47	4.83	1.09	6.39	1.44	4.61	1.04
Average	5.91	**1.33**	4.00	**0.90**	5.76	**1.30**	3.82	**0.86**
St Dev	0.42	0.09	0.46	0.10	0.42	0.10	0.41	0.09
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.05	1.14	3.05	0.69
Maximum	6.16	1.39	4.38	0.99
Average	5.52	**1.24**	3.65	**0.82**
St Dev	0.38	0.09	0.38	0.09
Count	8	8	8	8

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2012-4-28, Next Cal: 2013-4-27

Equipment #: HZ-OGP-01
Description: Video measurement system
Manufacturer: OGP
Model: SMARTSCOPE FLASH 200
Serial #: SVW2003632
Accuracy: Last Cal: 2012-6-10, Next Cal: 2013-6-9