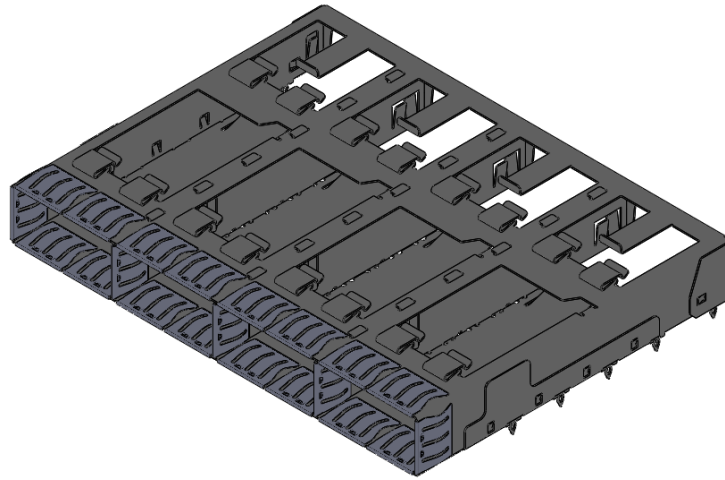




Project Number: Design Qualification Test Report	Tracking Code: 1550397_Report_Rev_1
Requested by: Roy Luo	Date: 8/31/2018
Part #: QSFPC-1-4-S-F	Tech: Peter Chen
Part description: QFSPC	Qty to test: 14
Test Start: 05/15/2018	Test Completed: 05/23/2018



DESIGN QUALIFICATION TEST REPORT

QFSPC
QSFPC-1-4-S-F

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
07/04/2018	1	Initial Issue	PC

CERTIFICATION

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

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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) Samtec Test PCBs used: PCB-109125-TST/ PCB-109126-TST.

FLOWCHARTS**Compliant Pin Buckling**

Group 1
QSFPC-1-4-S-F

20
HASL .039" PTH 20 Assemblies

Step	Description
1.	Contact Gaps
2.	Measure PTH Diameter
3.	Presses Connectors
4.	Visual Connector Inspection
5.	Cross Section Connectors

Group 2
QSFPC-1-4-S-F

20
HASL .043" PTH 20 Assemblies

Step	Description
1.	Contact Gaps
2.	Measure PTH Diameter
3.	Presses Connectors
4.	Visual Connector Inspection
5.	Cross Section Connectors

Insertion/Retention(whole Part)

Group 1
QSFPC-1-4-S-F

5
HASL .039"PTH (CAGE)

Step	Description
1.	Insertion Force
2.	Retention Force
<i>Note: EIA-364-29</i>	

Group 2
QSFPC-1-4-S-F

5
HASL .043"PTH (CAGE)

Step	Description
1.	Insertion Force
2.	Retention Force
<i>Note: EIA-364-29</i>	

Group 3
QSFPC-1-4-S-F

5
ENIG .039"PTH (CAGE)

Step	Description
1.	Insertion Force
2.	Retention Force
<i>Note: EIA-364-29</i>	

Group 4
QSFPC-1-4-S-F

5
ENIG .043"PTH (CAGE)

Step	Description
1.	Insertion Force
2.	Retention Force
<i>Note: EIA-364-29</i>	

FLOWCHARTS Continued**Insertion/Retention /Hole Conditioning**

<u>Group 1</u> QSFPC-1-4-S-F		<u>Group 2</u> QSFPC-1-4-S-F		<u>Group 3</u> QSFPC-1-4-S-F		<u>Group 4</u> QSFPC-1-4-S-F	
30 HASL .039" PTH (Cage)		30 HASL .043" PTH (Cage)		30 ENIG .039" PTH (Cage)		30 ENIG .043" PTH (Cage)	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 1</i>	1.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 1</i>	1.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 1</i>	1.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 1</i>
2.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA-364-29</i>	2.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA-364-29</i>	2.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA-364-29</i>	2.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA-364-29</i>
3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
4.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 3</i>	4.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 3</i>	4.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 3</i>	4.	Insertion Force Rate= 2.54 mm/min <i>Note: Pin 3</i>
5.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA-364-29</i>	5.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA-364-29</i>	5.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA-364-29</i>	5.	Retention Force Rate= 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA-364-29</i>
6.	Hole Ingetrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Ingetrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Ingetrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Ingetrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>

ATTRIBUTE DEFINITIONS

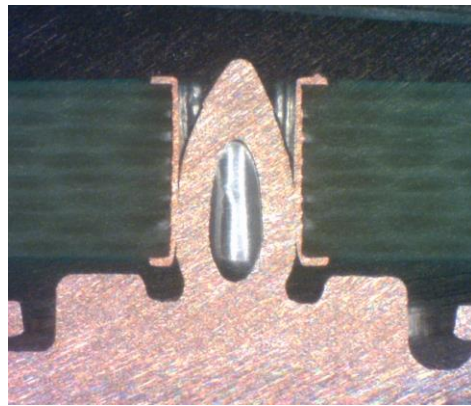
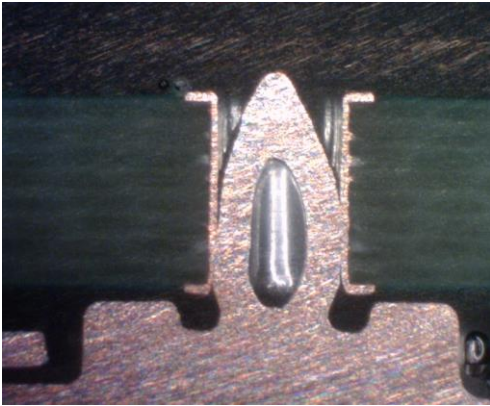
The following is a brief, simplified description of attributes.

MATING/UNMATING:

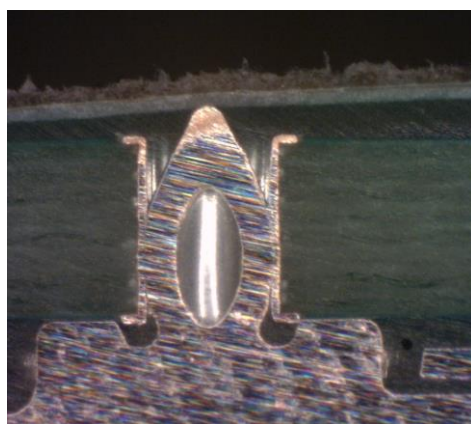
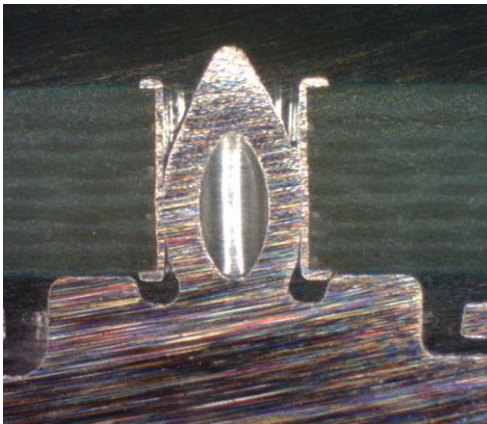
- 1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
- 2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
- 3) One of the mating parts is secured to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

Compliant Pin Bucking Picture

HASL-0.039"



HASL-0.043"



RESULTS**Insertion & Retention force (Whole Part)****HASL-0.039"**

- **Initial**
 - **Mating**
 - **Min** ----- 430.58 Lbs
 - **Max** ----- 550.58 Lbs
 - **Unmating**
 - **Min** ----- 45.66 Lbs
 - **Max** ----- 52.14 Lbs

HASL-0.043"

- **Initial**
 - **Mating**
 - **Min** ----- 226.80 Lbs
 - **Max** ----- 285.78 Lbs
 - **Unmating**
 - **Min** ----- 50.99 Lbs
 - **Max** ----- 64.25 Lbs

ENIG-0.039"

- **Initial**
 - **Mating**
 - **Min** ----- 247.54 Lbs
 - **Max** ----- 307.54 Lbs
 - **Unmating**
 - **Min** ----- 38.88 Lbs
 - **Max** ----- 43.96 Lbs

ENIG-0.043"

- **Initial**
 - **Mating**
 - **Min** ----- 95.00 Lbs
 - **Max** ----- 125.30 Lbs
 - **Unmating**
 - **Min** ----- 40.89 Lbs
 - **Max** ----- 45.80 Lbs

RESULTS Continued**Compliant pin Insertion/Withdrawal Forces****HASL-0.039"**

- **Initial**
 - **Mating**
 - **Min** ----- 9.42 Lbs
 - **Max** ----- 12.69 Lbs
 - **Unmating**
 - **Min** ----- 2.71 Lbs
 - **Max** ----- 4.31 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 7.39 Lbs
 - **Max** ----- 10.75 Lbs
 - **Unmating**
 - **Min** ----- 2.14 Lbs
 - **Max** ----- 3.70 Lbs

HASL-0.043"

- **Initial**
 - **Mating**
 - **Min** ----- 4.92 Lbs
 - **Max** ----- 8.22 Lbs
 - **Unmating**
 - **Min** ----- 2.38 Lbs
 - **Max** ----- 4.20 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 4.06 Lbs
 - **Max** ----- 6.55 Lbs
 - **Unmating**
 - **Min** ----- 2.05 Lbs
 - **Max** ----- 3.22 Lbs

RESULTS Continued**ENIG-0.039"**

- **Initial**
 - **Mating**
 - **Min** ----- 8.10 Lbs
 - **Max** ----- 9.80 Lbs
 - **Unmating**
 - **Min** ----- 1.51 Lbs
 - **Max** ----- 2.15 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 6.47 Lbs
 - **Max** ----- 8.83 Lbs
 - **Unmating**
 - **Min** ----- 1.14 Lbs
 - **Max** ----- 1.78 Lbs

ENIG-0.043"

- **Initial**
 - **Mating**
 - **Min** ----- 4.69 Lbs
 - **Max** ----- 6.60 Lbs
 - **Unmating**
 - **Min** ----- 1.81 Lbs
 - **Max** ----- 2.77 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 4.11 Lbs
 - **Max** ----- 4.81 Lbs
 - **Unmating**
 - **Min** ----- 1.26 Lbs
 - **Max** ----- 2.04 Lbs

DATA SUMMARIES**Insertion & Retention force (Whole Part)**

	HASL 0.043"				HASL 0.039"			
	Retention		withdrawal		Retention		withdrawal	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	848.01	190.65	226.80	50.99	1915.22	430.58	203.10	45.66
Maximum	1154.92	259.65	285.78	64.25	2448.98	550.58	231.92	52.14
Average	1039.76	233.76	248.36	55.84	2202.61	495.19	215.29	48.40
St Dev	119.05	26.76	23.74	5.34	251.89	56.63	12.99	2.92
Count	5	5	5	5	5	5	5	5
	ENIG 0.043"				ENIG 0.039"			
	Retention		withdrawal		Retention		withdrawal	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	422.56	95.00	181.88	40.89	1101.06	247.54	172.94	38.88
Maximum	557.33	125.30	203.72	45.80	1367.94	307.54	195.53	43.96
Average	494.95	111.27	194.31	43.68	1232.93	277.19	180.22	40.52
St Dev	49.09	11.04	8.87	1.99	100.12	22.51	9.18	2.06
Count	5	5	5	5	5	5	5	5

DATA SUMMARIES Continued**Compliant Pin Insertion/Retention force:****HASL 0.039" PTH (Cage)**

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	9.42	Minimum	7.39
Maximum	12.69	Maximum	10.75
Average	10.78	Average	9.28
St. Dev.	0.97	St. Dev.	0.83
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	2.71	Minimum	2.14
Maximum	4.31	Maximum	3.70
Average	3.26	Average	2.77
St. Dev.	0.35	St. Dev.	0.35

HASL 0.043" PTH (Cage)

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	4.92	Minimum	4.06
Maximum	8.22	Maximum	6.55
Average	6.37	Average	5.49
St. Dev.	0.80	St. Dev.	0.51
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	2.38	Minimum	2.05
Maximum	4.20	Maximum	3.22
Average	3.13	Average	2.78
St. Dev.	0.48	St. Dev.	0.28

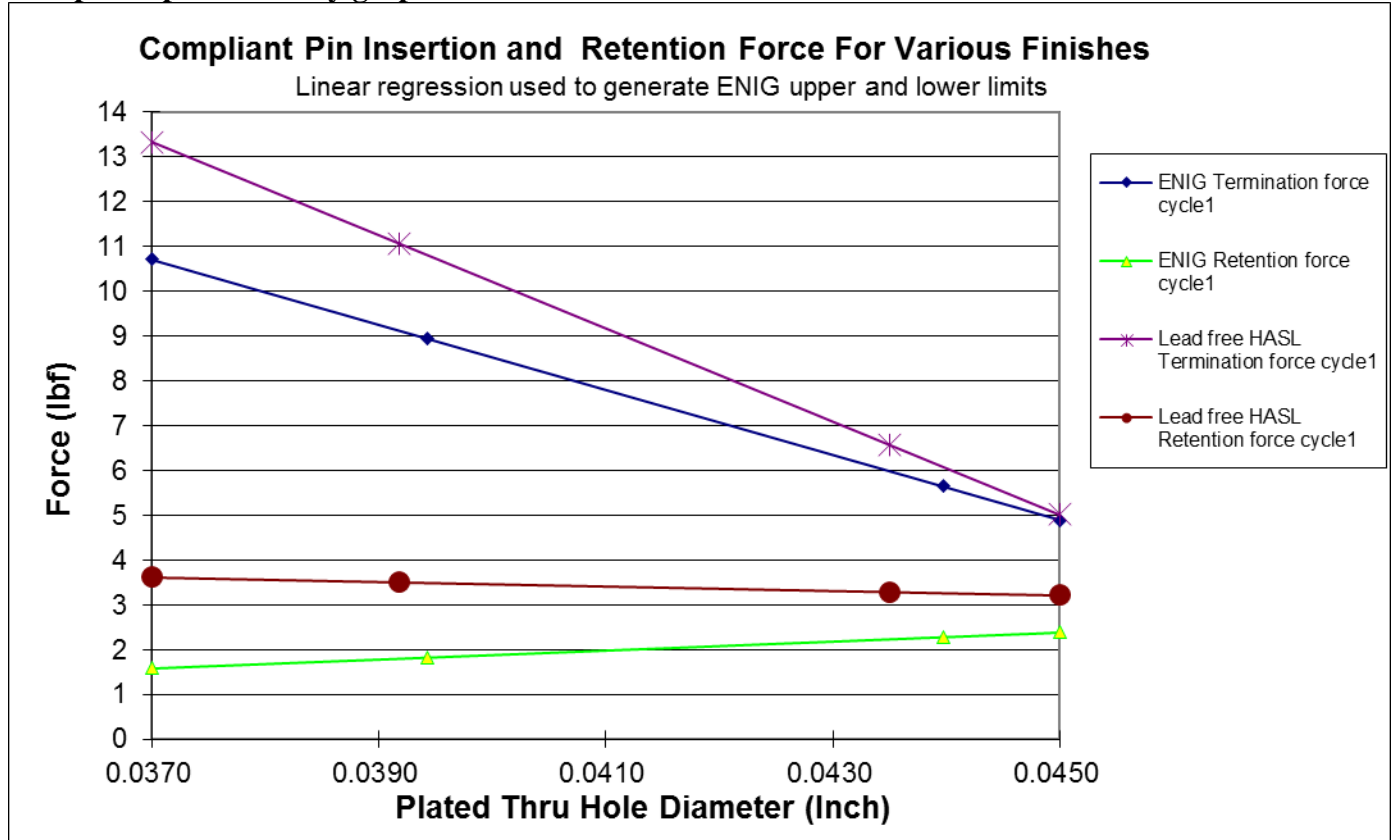
DATA SUMMARIES Continued**ENIG 0.039" PTH (Cage)**

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	8.10	Minimum	6.47
Maximum	9.80	Maximum	8.83
Average	9.04	Average	7.47
St. Dev.	0.49	St. Dev.	0.56
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.51	Minimum	1.14
Maximum	2.15	Maximum	1.78
Average	1.85	Average	1.51
St. Dev.	0.13	St. Dev.	0.14

ENIG 0.043" PTH (Cage)

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	4.69	Minimum	4.11
Maximum	6.60	Maximum	4.81
Average	5.24	Average	4.38
St. Dev.	0.43	St. Dev.	0.17
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.81	Minimum	1.26
Maximum	2.77	Maximum	2.04
Average	2.28	Average	1.64
St. Dev.	0.20	St. Dev.	0.17

Compliant pin summary graph



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: 2018-4-28, Next Cal: 2019-4-27