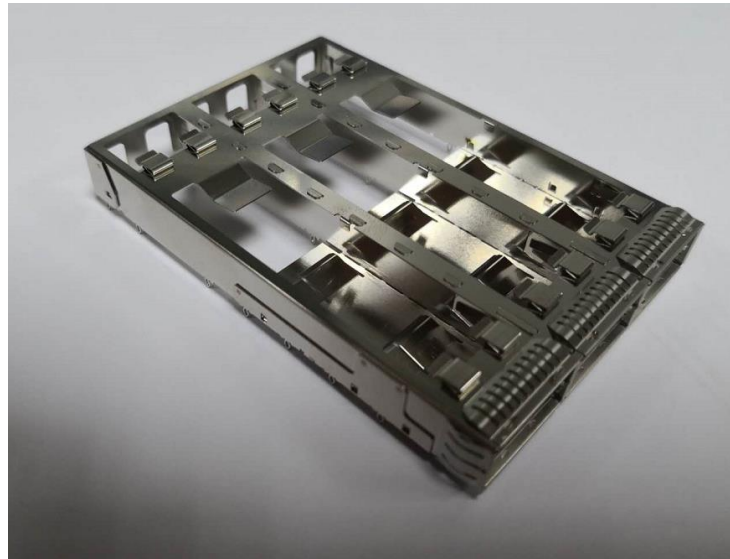




Project Number: Design Qualification Test Report	Tracking Code: 1996489_Report_Rev_1
Requested by: Michael Menkhaus	Date: 6/11/2019
Part #: QSFPC-DD-1-3-S-F	Tech: Peter Chen
Part description: QFSPC	Qty to test: 20
Test Start: 04/20/2019	Test Completed: 05/10/2019



DESIGN QUALIFICATION TEST REPORT

QFSPC
QSFPC-DD-1-3-S-F

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
6/11/2019	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-109532-TST/ PCB-109040-TST.

FLOWCHARTS

Compliant Pin Buckling

Note: Use Starrett press in the test lab for all pressing into boards.

Group 1
QSFPC-DD-1-3-S-F

20 Assemblies
HASL 0.039" PTH

Step	Description
1.	Measure PTH Diameter <i>Note: Measure PTH diameters on 1 piece of HASL 0.039" PCB.</i>
2.	Press Connectors <i>Note: Press 20 pieces of QSFPC-1-3-S-F into HASL 0.039" PCBs using Starrett press in the test lab and SK-14068-02-03.</i>
3.	Visual Inspection <i>Note: Check cage straightness and press fit pin collapsing.</i>
4.	Cross Section Connectors <i>Note: Cross section 1 connector and take pictures of each press fit pin in the PTH.</i>

Group 2
QSFPC-DD-1-3-S-F

20 Assemblies
HASL 0.043" PTH

Step	Description
1.	Measure PTH Diameter <i>Note: Measure PTH diameters on 1 piece of HASL 0.043" PCB.</i>
2.	Press Connectors <i>Note: Press 20 pieces of QSFPC-1-3-S-F into HASL 0.043" PCBs using Starrett press in the test lab and SK-14068-02-03.</i>
3.	Visual Inspection <i>Note: Check cage straightness and press fit pin collapsing.</i>
4.	Cross Section Connectors <i>Note: Cross section 1 connector and take pictures of each press fit pin in the PTH.</i>

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

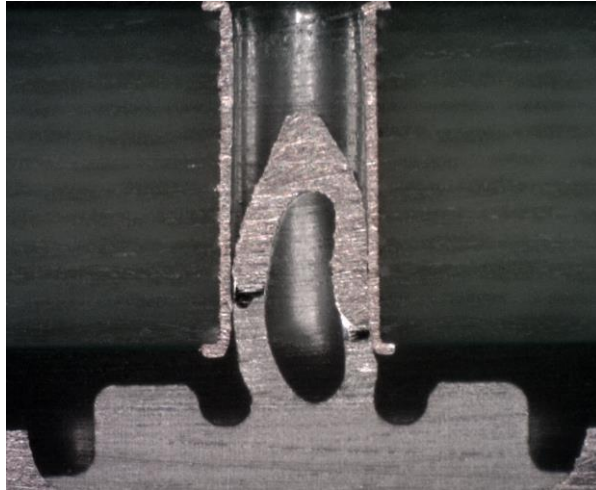
<u>Group 1</u> QSFPC-DD-1-3-S-F		<u>Group 2</u> QSFPC-DD-1-3-S-F		<u>Group 3</u> QSFPC-DD-1-3-S-F		<u>Group 4</u> QSFPC-DD-1-3-S-F	
30 Contacts Minimum HASL 0.039" PTH		30 Contacts Minimum HASL 0.043" PTH		30 Contacts Minimum ENIG 0.039" PTH		30 Contacts Minimum ENIG 0.043" PTH	
<i>Note: Use Starrett press for each insertion/extraction.</i>		<i>Note: Use Starrett press for each insertion/extraction.</i>		<i>Note: Use Starrett press for each insertion/extraction.</i>		<i>Note: Use Starrett press for each insertion/extraction.</i>	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.039" HASL PTH. Note: Pin 1</i>	1.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.043" HASL PTH. Note: Pin 1</i>	1.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.039" ENIG PTH. Note: Pin 1</i>	1.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.043" ENIG PTH. Note: Pin 1</i>
2.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.039" HASL PTH. Note: Pin 1 Note: EIA-364-29</i>	2.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.043" HASL PTH. Note: Pin 1 Note: EIA-364-29</i>	2.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.039" ENIG PTH. Note: Pin 1 Note: EIA-364-29</i>	2.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.043" ENIG PTH. Note: Pin 1 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 <i>Note: Measure insertion force for 1 pin into 0.039" HASL PTH. Note: Pin 3</i>	4.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.043" HASL PTH. Note: Pin 3</i>	4.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.039" ENIG PTH. Note: Pin 3</i>	4.	Insertion Force <i>Note: Measure insertion force for 1 pin into 0.043" ENIG PTH. Note: Pin 3</i>
5.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.039" HASL PTH. Note: Pin 3 Note: EIA-364-29</i>	5.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.043" HASL PTH. Note: Pin 3 Note: EIA-364-29</i>	5.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.039" ENIG PTH. Note: Pin 3 Note: EIA-364-29</i>	5.	Retention Force <i>Note: Measure extraction force for 1 pin out of 0.043" ENIG PTH. Note: Pin 3 Note: EIA-364-29</i>
6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>	6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA-364-96</i>

ATTRIBUTE DEFINITIONS

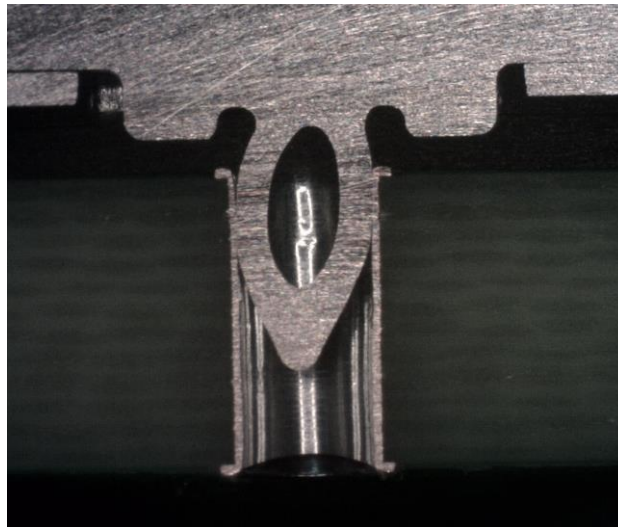
The following is a brief, simplified description of attributes.

Compliant Pin Bucking Picture

HASL-0.039"



HASL-0.043"



RESULTS**Compliant Pin Insertion/Retention Force****HASL-0.039"**

- **Initial**
 - **Mating**
 - **Min** ----- 5.73 Lbs
 - **Max** ----- 8.21 Lbs
 - **Unmating**
 - **Min** ----- 1.50 Lbs
 - **Max** ----- 2.22 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 4.50 Lbs
 - **Max** ----- 6.53 Lbs
 - **Unmating**
 - **Min** ----- 0.98 Lbs
 - **Max** ----- 1.66 Lbs

HASL-0.043"

- **Initial**
 - **Mating**
 - **Min** ----- 4.27 Lbs
 - **Max** ----- 6.88 Lbs
 - **Unmating**
 - **Min** ----- 1.68 Lbs
 - **Max** ----- 2.82 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 4.13 Lbs
 - **Max** ----- 5.84 Lbs
 - **Unmating**
 - **Min** ----- 1.28 Lbs
 - **Max** ----- 1.92 Lbs

ENIG-0.039"

- **Initial**
 - **Mating**
 - **Min** ----- 4.53 Lbs
 - **Max** ----- 8.17 Lbs
 - **Unmating**
 - **Min** ----- 1.20 Lbs
 - **Max** ----- 1.67 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 3.00 Lbs
 - **Max** ----- 4.99 Lbs
 - **Unmating**
 - **Min** ----- 0.67 Lbs
 - **Max** ----- 1.35 Lbs

RESULTS Continued**ENIG-0.043"**

- **Initial**
 - **Mating**
 - **Min** ----- 3.27 Lbs
 - **Max** ----- 5.90 Lbs
 - **Unmating**
 - **Min** ----- 0.91 Lbs
 - **Max** ----- 1.68 Lbs
- **After 3 Cycles**
 - **Mating**
 - **Min** ----- 2.45 Lbs
 - **Max** ----- 3.78 Lbs
 - **Unmating**
 - **Min** ----- 0.58 Lbs
 - **Max** ----- 1.24 Lbs

DATA SUMMARIES**Compliant Pin Insertion/Retention force:****HASL 0.039" PTH**

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	5.73	Minimum	4.50
Maximum	8.21	Maximum	6.53
Average	6.70	Average	5.20
St. Dev.	0.57	St. Dev.	0.47
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.50	Minimum	0.98
Maximum	2.22	Maximum	1.66
Average	1.78	Average	1.36
St. Dev.	0.16	St. Dev.	0.16

HASL 0.043" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	4.27	Minimum	4.13
Maximum	6.88	Maximum	5.84
Average	5.65	Average	5.00
St. Dev.	0.70	St. Dev.	0.54
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.64	Minimum	1.28
Maximum	2.82	Maximum	1.92
Average	2.11	Average	1.63
St. Dev.	0.29	St. Dev.	0.14

DATA SUMMARIES Continued**ENIG 0.039" PTH**

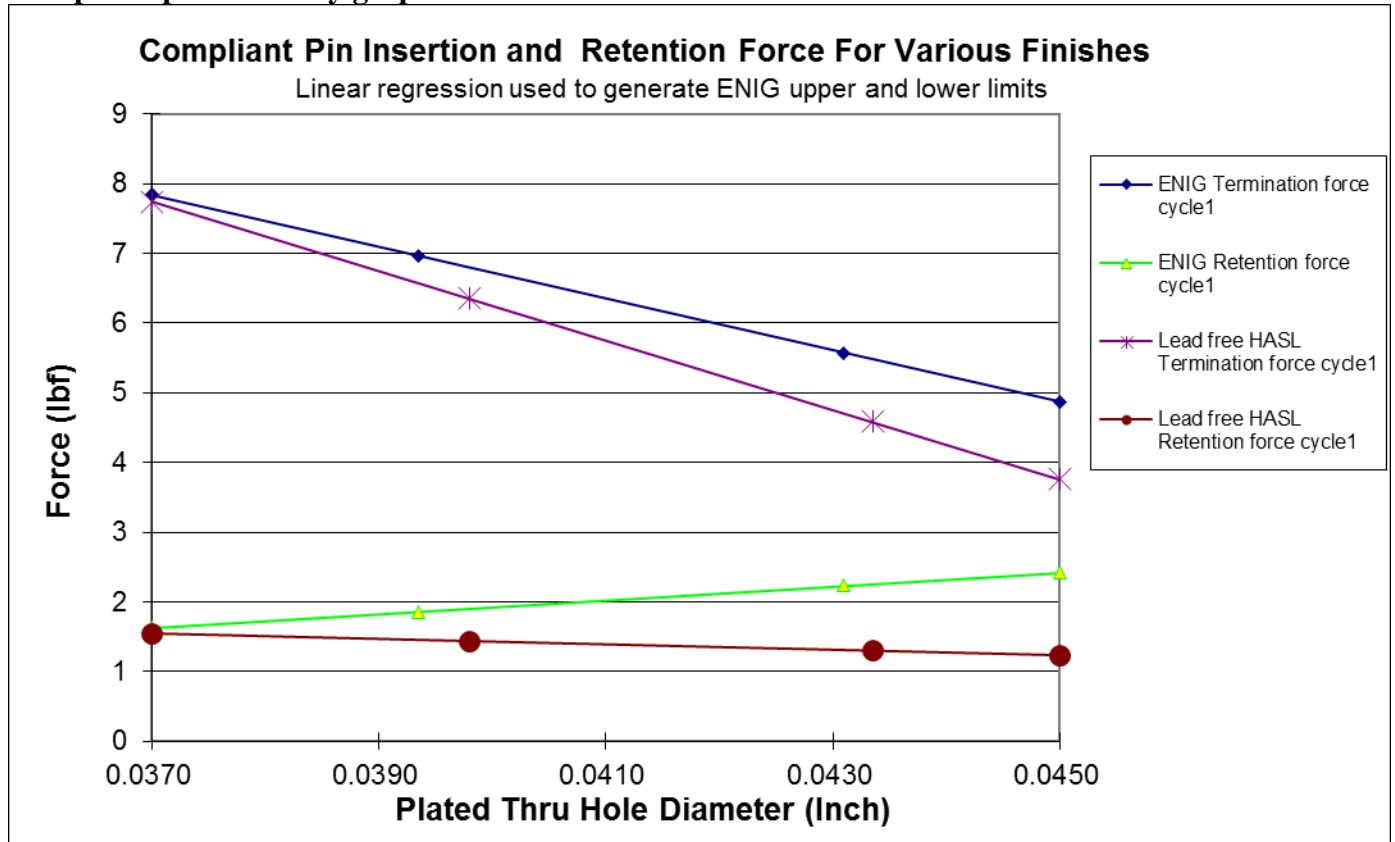
Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	4.53	Minimum	3.00
Maximum	8.17	Maximum	4.99
Average	5.44	Average	3.62
St. Dev.	0.77	St. Dev.	0.47
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.20	Minimum	0.67
Maximum	1.67	Maximum	1.35
Average	1.45	Average	1.00
St. Dev.	0.15	St. Dev.	0.18

ENIG 0.043" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	3.27	Minimum	2.45
Maximum	5.90	Maximum	3.78
Average	3.70	Average	3.20
St. Dev.	0.58	St. Dev.	0.34
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.91	Minimum	0.58
Maximum	1.68	Maximum	1.24
Average	1.29	Average	0.90
St. Dev.	0.21	St. Dev.	0.15

DATA SUMMARIES Continued

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: 2019-4-28, Next Cal: 2020-4-27