

Qualification Test Report

Miniature Hermaphroditic B-B Connector

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1. INTRODUCTION

1.1 Purpose

Testing was performed on Miniature Hermaphroditic B-B Connector to determine its conformance to the requirements of Design Objective 108-106050, Rev A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of Miniature Hermaphroditic B-B Connector.

1.3 Product Description

Part No.	Name	Remarks
1971567-1	assembly	2P
1971567-2	assembly	4P
1971567-3	assembly	6P
1971564-1	socket contact	
1971563-1	pin contact	

Fig. 1

1.4 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C
Relative Humidity 45% to 75%

1.4 Qualification Test Sequence

Test of examination	Test group(a)				
	1	2	3	4	5
	Test Sequence(b)				
Initial examination of product	1	1	1	1	1
LLCR	3,7	3,8	2,9		2,4
Insulation resistance			3,7		
Withstanding Voltage			4,8		
Temperature rise vs. current		4,9(c)			
Resistance to reflow soldering heat				2	
Random vibration	5	7			
Mechanical shock	6				
Durability	4				
Mating force	2	2			
Unmating force	8	10			
Thermal shock			5		
humidity -temperature cycling		5	6		
Temperature life		6			
NH3 GAS					3
Final examination of product	9	11	10	3	5

NOTE

- (a) See paragraph 4.1.A
- (b) Numbers indicate sequence in which tests are performed.
- (c) Five specimens of each position (2, 4 and 6) shall be used for initial temperature rise, while the other 5 specimens from each position will run through the entire test sequence.
- (d) Mate 5 specimens of each position (2, 4 and 6) in the horizontal direction.
- (e) Unmate 5 specimens of each position (2, 4 and 6) in the horizontal direction.

Figure 2

2. TEST CONTENT

No	2.1
Test Item	Initial examination of product
Requirement	Meets requirements of product drawing.
Procedures	EIA-364-18. Visual and dimensional inspection per product drawing
No	2.2
Test Item	Final examination of product
Requirement	Meet Visual requirement.
Procedures	EIA-364-18. Visual inspection
Electrical	
No	2.3
Test Item	Low level contact resistance
Requirement	20mΩ Max. (Initial) 20 mΩ Max. (Final)
Procedures	Subject specimens to 20mV Max. open circuit at 10mA. Take the resistance of the wire only away from measurement. Fig 3. TE Spec. 109-5311-1
No	2.4
Test Item	Insulation resistance
Requirement	1000 MΩ Min.
Procedures	EIA364-21 Subject specimens to 500VDC, 2 minute hold. Test between adjacent contacts.
No	2.5
Test Item	Withstanding Voltage
Requirement	1 minute hold with no breakdown or flashover,
Procedures	EIA364-20, Condition 1. 1600 V AC at sea level. Test between adjacent contacts
No	2.6
Test Item	Temperature rise vs current
Requirement	30° C maximum temperature rise at specified current
Procedures	EIA364-70, Method 1. Stabilize at a single current level until 3 Readings at 5 minute intervals are within 1 ° C. Energize 100% of the circuit.
Mechanical	
No	2.7
Test Item	Resistance to reflow soldering heat
Requirement	Housing shall be free for deformation and fusion. See note.
Procedures	AMP Spec 109-201, Condition B.
No	2.8
Test Item	Random vibration
Requirement	No electrical discontinuity greater than 1 μsec. shall occur.
Procedures	EIA-364-28, Test Condition VII, Condition Letter D. Subject mated specimens to 3.10G's rms between 20–500HZ. Fifteen minutes in each of 3 mutually perpendicular planes.
No	2.9
Test Item	Physical Shock
Requirement	No electrical discontinuity greater than 1 μsec. shall occur.

Procedures	EIA-364-27, Condition H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
No	2.10
Test Item	Durability
Requirement	See note
Procedures	EIA-364-9. Mate and unmated specimens for 10 cycles at a maximum rate of 500 cycles per hour.
No	2.11
Test Item	Mating force
Requirement	6N Max. per contact
Procedures	EIA-364-13 Measure force necessary to mate specimens at a maximum rate of 12.7mm per minute
No	2.12
Test Item	Unmating force
Requirement	0.7N Min. per contact
Procedures	EIA-364-13 Measure force necessary to unmate specimens at a maximum rate of 12.7mm per minute
Environmental	
No	2.13
Test Item	Thermal shock
Requirement	See Note
Procedures	EIA-364-32, Test Condition VII. Subject specimens to 25 cycles between -40 and 105 °C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
No	2.14
Test Item	Humidity -temperature cycling
Requirement	See Note
Procedures	EIA-364-31, Method III. Subject specimens to 10 cycles (10 days) between 25 and 65 °C at 80 to 100% RH.
No	2.15
Test Item	Temperature life
Requirement	See Note
Procedures	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105 °C for 548 hours.
No	2.16
Test Item	NH3 GAS
Requirement	No corrosion influence performance
Procedures	Mated connector and put in to atmosphere that rated 25 ml/l 3% NH3 for 7 Hrs

Note: Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as Specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.

3. TEST RESULT

3-1. Test Group1

3-1-1. Termination Resistance (Low Level)

UNIT:mΩ

	2P	
	Initial	Final
Number of sample	10	10
Max.	2.027	1.896
Min.	1.348	1.487
Ave.	1.658	1.676
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	4P	
	Initial	Final
Number of sample	10	10
Max.	3.622	7.227
Min.	1.416	1.533
Ave.	1.954	2.250
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	6P	
	Initial	Final
Number of sample	10	10
Max.	2.625	3.121
Min.	1.013	1.432
Ave.	1.714	1.851
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-1-2.Mating Force& Unmating Force

UNIT: N

	2P	
	Mating	Unmating
Number of sample	10	10
Max.	5.41	6.16
Min.	4.33	4.47
Ave.	4.92	5.50
Specification	12N MAX	1.4N MIN
Judgment	Acceptable	Acceptable

	4P	
	Mating	Unmating
Number of sample	10	10
Max.	12.00	13.08
Min.	8.90	7.87

Ave.	10.23	10.50
Specification	24N MAX	2.8N MIN
Judgment	Acceptable	Acceptable

	6P	
	Mating	Unmating
Number of sample	10	10
Max.	16.45	19.28
Min.	10.58	13.74
Ave.	14.11	15.46
Specification	36N MAX	4.2N MIN
Judgment	Acceptable	Acceptable

3-1-3. Vibration (Low Frequency) & Physical Shock

No electrical discontinuity greater than 1 μ sec shall occur.

3-2. Test Group 2

3-2-1. Termination Resistance (Low Level)

UNIT:m Ω

	2P	
	Initial	Final
Number of sample	10	10
Max.	1.581	5.852
Min.	1.246	1.658
Ave.	1.393	2.283
Specification	20m Ω MAX	20m Ω MAX
Judgment	Acceptable	Acceptable

	4P	
	Initial	Final
Number of sample	10	10
Max.	2.010	8.044
Min.	1.684	1.635
Ave.	1.834	2.985
Specification	20m Ω MAX	20m Ω MAX
Judgment	Acceptable	Acceptable

	6P	
	Initial	Final
Number of sample	10	10
Max.	1.786	8.510
Min.	1.324	1.602
Ave.	1.513	2.903
Specification	20m Ω MAX	20m Ω MAX
Judgment	Acceptable	Acceptable

3-2-2. Temperature Rising
 Test current: 3(A)

UNIT: °C

	2P	
	Initial	Final
Number of sample	10	10
Max.	17.18	23.70
Min.	13.49	12.00
Ave.	15.07	18.85
Specification	30 Max	30 Max
Judgment	Acceptable	Acceptable

	4P	
	Initial	Final
Number of sample	10	10
Max.	21.35	24.90
Min.	8.46	17.50
Ave.	16.73	21.89
Specification	30 Max	30 Max
Judgment	Acceptable	Acceptable

	6P	
	Initial	Final
Number of sample	10	10
Max.	22.31	23.50
Min.	16.98	19.80
Ave.	19.71	21.62
Specification	30 Max	30 Max
Judgment	Acceptable	Acceptable

3-2-3. Vibration (Low Frequency)

No electrical discontinuity greater than 1 μsec shall occur.

3-2-4. Mating Force& Unmating Force

UNIT: N

	2P	
	Mating	Unmating
Number of sample	10	10
Max.	5.15	5.56
Min.	4.23	4.18
Ave.	4.71	4.64
Specification	12N MAX	1.4N MIN
Judgment	Acceptable	Acceptable

	4P	
	Mating	Unmating

Number of sample	10	10
Max.	12.44	10.89
Min.	7.99	8.41
Ave.	10.00	9.92
Specification	24N MAX	2.8N MIN
Judgment	Acceptable	Acceptable

	6P	
	Mating	Unmating
Number of sample	10	10
Max.	15.37	15.44
Min.	7.72	6.59
Ave.	12.84	12.11
Specification	36N MAX	4.2N MIN
Judgment	Acceptable	Acceptable

3-3. Test Group 3

3-3-1. Insulation Resistance

 UNIT: Ω

	2P	
	Initial	final
Number of sample	10 sets	10 sets
Result	1.0×10^{12} Min.	1.0×10^{11} Min.
Specification	1.0×10^9 Min.	1.0×10^9 Min.
Judgment	Acceptable	Acceptable

	4P	
	Initial	final
Number of sample	10 sets	10 sets
Result	1.0×10^{12} Min.	1.0×10^{11} Min.
Specification	1.0×10^9 Min.	1.0×10^9 Min.
Judgment	Acceptable	Acceptable

	6P	
	Initial	final
Number of sample	10 sets	10 sets
Result	1.0×10^{12} Min.	1.0×10^{11} Min.
Specification	1.0×10^9 Min.	1.0×10^9 Min.
Judgment	Acceptable	Acceptable

3-3-2. Withstanding Voltage

No breakdown or flashover

3-3-3. Termination Resistance (Low Level)

 UNIT: $m\Omega$

	2P	
	Initial	Final
Number of sample	10	10
Max.	1.801	2.872
Min.	1.417	1.569
Ave.	1.541	1.939
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	4P	
	Initial	Final
Number of sample	10	10
Max.	1.991	13.810
Min.	1.206	1.534
Ave.	1.605	3.625
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	6P	
	Initial	Final
Number of sample	10	10
Max.	1.941	7.244
Min.	1.294	1.319
Ave.	1.493	3.405
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-4. Test Group 4

Housing is free for deformation and fusion.

3-5. Test Group 5

3-5-1. Termination Resistance (Low Level)

UNIT:mΩ

	2P	
	Initial	Final
Number of sample	10	10
Max.	1.905	2.184
Min.	1.433	1.425
Ave.	1.630	1.761
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	4P	
	Initial	Final
Number of sample	10	10
Max.	3.312	3.189

Min.	1.249	1.549
Ave.	1.893	2.093
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

	6P	
	Initial	Final
Number of sample	10	10
Max.	2.645	5.615
Min.	1.324	1.536
Ave.	1.794	2.378
Specification	20mΩ MAX	20mΩ MAX
Judgment	Acceptable	Acceptable

3-5-1. Termination Resistance (Low Level)

No corrosion influence performance

4. CONCLUSION

Miniature Hermaphroditic B-B Connector conformed to the electrical, mechanical, and environmental performance requirements of Design Objective 108-106050, Rev A.

5. VALIDATION

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