TEST REPORT

1.65H 1.6 Pitch,1 Piece BtoB Connector

1. Purpose:

This is qualification test. The purpose of this test is to evaluate the performance of 1.65H 1.6P B to B.

Testing was performed on below products to determine it compliance with the requirements of product specification 108-115039.

2. Scope:

This is test report for 1.6H 1.6pitch BtoB connector. Testing was performed at TE Connectivity Shanghai Electrical Components Test Laboratory between Apr-mid, 2012 and May-mid, 2012.

3. Conclusion:

The product met the electrical, mechanical, and environmental performance requirements of TE product specification 108-115039.

4. Test samples:

Samples were taken randomly from current production. The following part numbers were used for test:

Description	Product Part No.
10 Pins,1.6 Pitch,1 Piece BtoB Connector	2199035-1
4 Pins,1.6 Pitch,1 Piece BtoB Connector	2199075-1

5. Test Method

5.1 Examination of Product

Visual, dimensional and functional per applicable inspection plan.

Requirements: Meets requirements of product drawing

Test Method: In accordance with IEC 60512-1-1and IEC 60512-1-2.

5.2 Terminal Resistance (Low Level)

Measure at nominal working position (20 mV, 100 mA max.). Simple sketch shows the testing method. Four-wire measurement method.

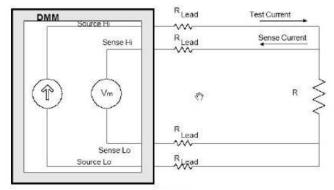


Figure 2 Termination Resistance Measurement Points

Requirements: $50m\Omega$ Max. (Initial), $100m\Omega$ Max. (Final)

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Test Method: IEC 60512-2-1

5.3 Insulation resistance

Unmated connector with 100V DC between adjacent contacts for 1 min.

Requirements: 100 M Ω Min. Test Method: IEC 60512-3-1

5.4 Dielectric strength

Unmated connector with 400 V AC between adjacent contacts for 1 min. Leakage current 0.5mA

Requirements: No breakdown.
Test Method: IEC 60512-3-1

5.5 Temperature Rise

Measured at maximum rated current with series all contacts.

Current: 0.3A

Requirement: 1. 30°C Max.; 2. No mechanical damage

Test method: IEC 60512-5-2

5.6 Normal Force

First press to housing surface, then measure on second cycle. Max. value is read on up going curve and min. value is read on down going curve of force-deflection curve.

Requirements: 10.2N Min. :Compressed to 1.9mm to PWB surface;

20.8N Max.: Compressed to housing surface.

5.7 Terminal Retention Force

Draw out a contact on the solder tail, away from the housing max 5 mm / min.

Requirements: 0.5N Min.

5.8 Vibration, Random

 $Frequency: 10 - 100 \; Hz; \; 3 \; m2/s3 \\ (0.0132 \; g2/Hz) \; ; \\ 100 - 500 \; Hz; \; -3 \\ dB/Oct. \; for: \; 3 \; x \; 60 \; min \; (X-\; Y-\; and \; Zaxis) \; in \; (X-\; Y-\; Additional Contents of the c$

minimum deflection position.

Requirements: 1)Discontinuity max 1 us 2)Resistance 100mOhm max. 3)No mechanical damage

Test method: IEC60068-2-64

5.9 Mechanical shock

Pulse shape half sine, peak acceleration 50 G, pulse 11 ms, 3 shocks in both directions in XYZ axis (18 shocks).

Requirements: 1 Discontinuity max 1 us 2 Resistance 100mOhm max. 3 No mechanical damage

Test method: IEC60068-2-27Ea

5.10 Durability (a)

Mate contact up to 10 cycles to housing surface at the speed of max 20 times / min including pause between mate / unmate.

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Requirements: 1No mechanical damage

2 Resistance 100mOhm max.

3Normal Force:

--0.2N Min. : Compressed to 1.9mm to PWB surface;

--0.8N Max.: Compressed to housing surface.

5.11 Durability (b)

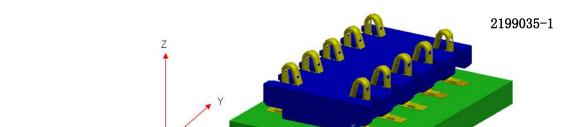
Mate contact up to 10000 cycles to nominal working height (1.65+/-0.10 to PWB surface) at the speed of max 20 times / min including pause between mate / unmate.

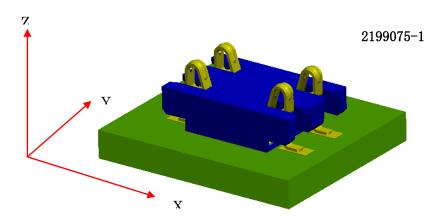
Requirements: Normal Force 10.2N Min. :Compressed to 1.9mm to PWB surface;

20.8N Max.: Compressed to housing surface.

5.12 Connector Peel Strength

A load in max 5 mm/min applied to the whole side of the connector on PWB. All four directions(X,Y) along PWB. Requirements: Load 1N/Contact





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5.13Thermal Shock

25cycle of Ta=-40°C for 0.5hour then change to 25°C max. 5min then Tb=+85°C for 0.5hour, then cool to ambient.

Recovery 2hour at ambient atmosphere.

Requirements: LLCR 100mΩ Max. (Final)

Test Method: IEC60068-2-14Na

5.14 Damp Heat Cyclic

18 cycles of 24 h in operational mode, mated condition, RH 90-100%, 25 -> 55 °C in 3 h, then maintain for 9 h, then 55 -> 25 °C in 3 h, maintain for 9 h. Recovery at 25 °C RH75% for 2h.

Measure resistance without opening the mating.

Requirements: LLCR 100mΩ Max. (Final)

Test Method: IEC60068-2-30Db

5.15 Condensing Humidity Cyclic

96 h in operational mode, mated condition, RH 90%, 60°C for 30 min -> then 60 to 10 °C in 25min, then maintain for 30 min , then 10 to 60°C in 20 min. This cycle profile is continued for 4days. Recovery at 25°C RH 75% for 2h. Measure resistance without opening the mating.

Requirements: LLCR $100m\Omega$ Max. (Final)

5.16 Dry Cold

At -40°C for 96 h, recovery 2 h at ambient atmosphere.

Requirements: LLCR 100mΩ Max. (Final)

Test Method: IEC60068-2-1Ab

5.17 Dry Heat

At 85°C for 96 h, recovery 2 h at ambient atmosphere.

Requirements: LLCR 100mΩ Max. (Final)

Test Method: IEC60068-2-2Bb

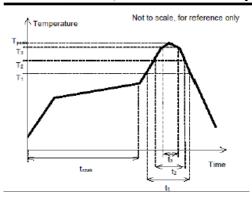
5.18 Resistance to soldering Reflow Heat

Test with reflow profile for soldering heat resistance described in Figure 1. Though oven 3 times, first top side up, then twice up side down.

Requirements: No mechanical damage, no loosening of solder joint.

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Pb-free reflow profile requirements for soldering heat resistance							
Parameter	Reference	Specification					
Average temperature gradient in preheating		2.5°C/s					
Soak time	t _{soak}	2-3 minutes					
Time above 217°C	t ₁	Max 60 s					
Time above 230°C	t ₂	Max 50 s					
Time above 250°C	t ₃	Max 10 s					
Peak temperature in reflow	Tpeak	255°C (-0/+5°C)					
Temperature gradient in cooling		Max -5°C/s					

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

Temperature:15°C to 35°C Relative Humidity: 25% to 75%

7. Test Sequence

	Test Group								
Test Examination	Α	В	С	D	Е	F	G		
	Test Sequence								
LLCR	1,4,6	1,9		1,4					
Insulation Resistance		2,10							
Dielectric strength		3,11							
Temperature rise vs. current.					2				
Normal Force		4,6	1,3						
Terminal retention force						1			
Random vibration	2								
Mechanical shock	3								
Durability.(a)		5							
Durability.(b)			2						
Connector Peel Strength							1		
Thermal Shock		7							
Damp Heat Cyclic	5								
Condensing Humidity Cyclic		8							
Dry Cold				2					
Dry Heat				3					
Resistance to soldering Reflow heat					1				

8. Test Result

Group Test Item	N	Conditi on	Test Result			Require	Judgme	
	IN		Max	Min	Ave	ment	nt	
А	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass

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PRODUCT SPECIFICATION

108-115039

connectivity		ODUCI	SPECIFIC	AHUN		100	<u> 8-115039</u>
LLCR	5	Initial	18.27 mΩ	15.88 mΩ	16.77 mΩ	<50mΩ	Pass
Random Vibration	5	Final				No abnormal ities	Pass
Mechanical Shock	5	Final					Pass
LLCR	5	Final	22.25 mΩ	16.33 mΩ	17.52 mΩ	<100mΩ	Pass
Damp Heat Cyclic	5	Final	No physica	l damage occ	curred	No abnormal ities	Pass
LLCR	5	Final	20.21 mΩ	15.73 mΩ	16.30 mΩ	<100mΩ	Pass
Examination of Product	5	Final	No physica	l damage occ	curred	No abnormal ities	Pass
Examination of Product	5	Initial	No physica	1	curred	No abnormal ities	Pass
LLCR	5	Initial	18.22 mΩ	14.87 mΩ	16.80 mΩ	<50mΩ	Pass
Insulation Resistance	5	Initial	3.9E+12Ω	1.3E+12Ω	3.5E+12Ω	>100MΩ	Pass
Dielectric Strength	5	Initial	No breakdown			No abnormal ities	Pass
Normal Force at 1.9mm to PWB	5	Initial	0.22N	0.22N	0.22N	>0.2N	Pass
Normal Force at Housing Surface	5	Initial	0.79N	0.78N	0.79N	<0.8N	Pass
Durability.(a)	5	Final	No physical damage occurred			No abnormal ities	Pass
Normal Force at 1.9mm to PWB	5	Final	0.22 N	0.22 N	0.22 N	>0.2N	Pass
Normal Force at Housing Surface	5	Final	0.78 N	0.78 N	0.78 N	<0.8N	Pass
Thermal Shock		Final	No physical damage occurred			No abnormal ities	Pass
Condensation Humidity Cyclic		Final	No physica	l damage occ	No abnormal ities	Pass	
LLCR	5	Final	20.50 mΩ	16.88 mΩ	19.31 mΩ	<100mΩ	Pass
Insulation Resistance	5	Final	2.9E+12Ω	1.1E+12Ω	1.9E+12Ω	>100MΩ	Pass
Dielectric Strength	5	Final	No breakdown			No abnormal ities	Pass
Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
Examination of Product	5	Initial	No physica	l damage occ	curred	No abnormal ities	Pass
Normal Force at 1.9mm to PWB	5	Initial	0.24 N	0.22 N	0.23 N	>0.2N	Pass
Normal Force at Housing Surface	5	Initial	0.79 N	0.78 N	0.79 N	<0.8N	Pass
Durability.(b)	5	Final	No physical damage occurred			No abnormal ities	Pass
Normal Force at 1.9mm to PWB	5	Final	0.22 N	0.21 N	0.21 N	>0.2N	Pass
	LLCR Random Vibration Mechanical Shock LLCR Damp Heat Cyclic LLCR Examination of Product Examination of Product LLCR Insulation Resistance Dielectric Strength Normal Force at 1.9mm to PWB Normal Force at 1.9mm to PWB Normal Force at Housing Surface Thermal Shock Condensation Humidity Cyclic LLCR Insulation Resistance Dielectric Strength Surface Thermal Shock Condensation Humidity Cyclic LLCR Insulation Resistance Dielectric Strength Examination of Product Examination of Product Normal Force at 1.9mm to PWB Normal Force at 1.9mm to PWB	Random Vibration 5 Mechanical Shock 5 LLCR 5 Damp Heat Cyclic 5 LLCR 5 Examination of Product 5 Examination of Product 5 LLCR 5 Insulation Resistance 5 Dielectric Strength 5 Normal Force at 1.9mm to PWB 5 Normal Force at Housing Surface 5 Durability.(a) 5 Normal Force at Housing Surface 5 Thermal Shock 5 LLCR 5 Insulation Resistance 5 Examination of Product 5 Examination of Product 5 Examination of Product 5 Thermal Shock 5 Examination Humidity Cyclic 5 LLCR 5 Insulation Resistance 5 Examination of Product 5 Examination of Product 5 Normal Force at 1.9mm to PWB 5 Normal Force at 1.9mm to PWB 5 Dielectric Strength 5 Examination of Product 5 Normal Force at 1.9mm to PWB 5 Normal Force at Housing Surface 5 Durability.(b) 5	LLCR5InitialRandom Vibration5FinalMechanical Shock5FinalLLCR5FinalDamp Heat Cyclic5FinalLLCR5FinalExamination of Product5FinalExamination of Product5InitialLLCR5InitialInsulation Resistance5InitialDielectric Strength5InitialNormal Force at 1.9mm to PWB5InitialNormal Force at Housing Surface5FinalNormal Force at Housing Surface5FinalThermal ShockFinalCondensation Humidity CyclicFinalLLCR5FinalInsulation Resistance5FinalDielectric Strength5FinalExamination of Product5FinalExamination of Product5InitialNormal Force at 1.9mm to PWB5InitialNormal Force at 1.9mm to PWB5InitialNormal Force at Housing Surface5InitialNormal Force at Housing Surface5InitialDurability.(b)5Final	LLCR 5 Initial 18.27 mΩ Random Vibration 5 Final No disconting or longer disconting disconting or longer disconting or longer disconting di	LLCR 5 Initial 18.27 mΩ 15.88 mΩ Random Vibration 5 Final No discontinuities of 1 m or longer duration occur. Mechanical Shock 5 Final No discontinuities of 1 m or longer duration occur. LLCR 5 Final No physical damage occ. LLCR 5 Final No physical damage occ. Examination of Product 5 Final No physical damage occ. Examination of Product 5 Final No physical damage occ. Examination of Product 5 Initial No physical damage occ. Examination of Product 5 Initial No physical damage occ. LCR 5 Initial No physical damage occ. LLCR 5 Initial 0.22 N 0.22 N Normal Force at 1.9mm to PWB 5 Initial 0.79 N 0.78 N Durability.(a) 5 Final 0.22 N 0.22 N Normal Force at 1.9mm to PWB 5 Final No physical damage occ. LLCR 5	LLCR 5 Initial 18.27 mΩ 15.88 mΩ 16.77 mΩ Random Vibration 5 Final No discontinuities of 1 microsecond or longer duration occurred Mechanical Shock 5 Final No discontinuities of 1 microsecond or longer duration occurred LLCR 5 Final 22.25 mΩ 16.33 mΩ 17.52 mΩ Damp Heat Cyclic 5 Final No physical damage occurred LLCR 5 Final No physical damage occurred Examination of Product 5 Final No physical damage occurred Examination of Product 5 Initial No physical damage occurred Examination of Product 5 Initial 18.22 mΩ 14.87 mΩ 16.80 mΩ Insulation Resistance 5 Initial 3.9E+12Ω 1.3E+12Ω 3.5E+12Ω Dielectric Strength 5 Initial 0.22 N 0.22N 0.22N Normal Force at Housing Surface 5 Initial 0.79N 0.78N 0.78 N Normal Force at Housing Surface 5 Fi	LCCR 5 Initial 18.27 mΩ 15.88 mΩ 16.77 mΩ <50mΩ Random Vibration 5 Final No discontilities of 1 microsecond occurred π No abnormal ities Mechanical Shock 5 Final No discontilities of 1 microsecond or longer duration occurred No abnormal ities LLCR 5 Final No physical damage occurred 400mΩ Damp Heat Cyclic 5 Final No physical damage occurred 16.30 mΩ 4100mΩ LLCR 5 Final No physical damage occurred 4100mΩ No abnormal ities Examination of Product 5 Final No physical damage occurred 4100mΩ No abnormal ities LLCR 5 Initial No physical damage occurred 50mΩ 450mΩ Examination of Product 5 Initial No physical damage occurred 50mΩ 450mΩ LLCR 5 Initial No physical damage occurred 50mΩ 50mΩ Insulation Resistance 5 Initial 0.22 m 0.22 m 0.22 m 0.

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PRODUCT SPECIFICATION

108-115039

connectivity			PRODUCT SPECIFICATION					<u>8-115039</u>
	Normal Force at Housing Surface	5	Final	0.78 N	0.78 N	0.78 N	<0.8N	Pass
	Examination of Product	5	Final	No physical	damage occ	curred	No abnormal ities	Pass
	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
	LLCR	5	Initial	19.76 mΩ	15.90 mΩ	16.90 mΩ	<50mΩ	Pass
D	Dry Cold	5	Final	No physical damage occurred			No abnormal ities	Pass
	Heat Cold	5	Final	No physical	damage occ	No abnormal ities	Pass	
	LLCR	5	Final	23.13 mΩ	15.15 mΩ	18.08 mΩ	<100mΩ	Pass
	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
	Examination of Product	5	Initial	No physical damage occurred			No abnormal ities	Pass
E	Resistance to Soldering R Heat	5	Final	No physical damage occurred			No abnormal ities	Pass
	Temperature Rise vs. Current	5	Final	1.55°C	1.25°C	1.43°C	<30°C	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
_	Examination of Product	5	Initial	No physical	l damage occ	curred	No abnormal ities	Pass
F	Terminal Retention Force	5	Final	1.34N	0.97N	1.16N	>0.5N	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormal ities	Pass
G	Examination of Product	2	Initial	No physical damage occurred			No abnormal ities	Pass
	Connector Peel Strength	2	Final	No physical damage occurred			No abnormal ities	Pass
	Examination of Product	2 0	Final	No physical damage occurred			No abnormal ities	Pass

END

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