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## One Piece BtoB Connector

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### 1. SCOPE

#### 1.1. Content

This specification covers performance, tests and quality requirements for one piece BtoB connector. Applicable product descriptions and part numbers are as shown in product drawing.

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

### 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

TE Connectivity Documents:

109-197: Test Specification (AMP Test Specifications vs. EIA and IEC Test Methods)

501-115037: Test Report

### 3. REQUIREMENTS

#### 3.1 Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

#### 3.2 Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

#### 3.4 Ratings

A. Voltage: 30 volts AC

B. Current: 0.3 A Max.

C. Temperature: -55 to 85°C

#### 3.5 Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements.

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

### 3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of the product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan. In accordance with IEC 60512-1-1 and IEC 60512-1-2.

#### ELECTRICAL

Low Level Contact Resistance (LLCR).	50 mΩ Max(initial)	IEC 60512-2-1 Measure at nominal working position (20 mV, 100 mA max.) Simple sketch showing the testing method have to be added in test report template. Four-wire measurement method must be used. See Figure 2.
Insulation resistance.	100 MΩ Min.	IEC 60512-3-1 Unmated connector with 100 V DC between adjacent contact for 1 min.
Dielectric strength	No breakdown.	IEC 60512-3-1 Unmated connector with 400 V AC between adjacent contact for 1 min.
Temperature rise	① 30°C Max. ② No mechanical damage,	IEC 60512-5-2 Measured at maximum rated current with series all contacts.

#### MECHANICAL

Normal Force	① 0.2N Min. :Compressed to 1.9mm to PWB surface; ② 0.8N Max.: Compressed to housing surface.	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.
Terminal retention force	0.5N Min.	Draw out a contact on the solder tail, away from the housing max 5 mm / min.
Random vibration.	① Discontinuity max 1 us ② Resistance 100mΩ max. ③ No mechanical damage,	IEC60068-2-64 Frequency: 10 - 100 Hz; 3 m2/s3(0.0132 g2/Hz) ;100 - 500 Hz; -3dB/Oct. for: 3 x 60 min (X- Y- and Zaxis) in minimum deflection position.
Mechanical shock.	① Discontinuity max 1 us ② Resistance 100mΩ max. ③ No mechanical damage,	IEC60068-2-27Ea Pulse shape half sine, peak acceleration 50 G, pulse 11 ms, 3 shocks in both directions in XYZ axis (18 shocks).
Durability (a).	① No mechanical damage ② Resistance 100mΩ max. ③ Normal Force --0.2N Min. :Compressed to 1.9mm to PWB surface; --0.8N Max.: Compressed to housing surface.	Mate contact up to 10 cycles to housing surface at the speed of max 20 times / min including pause between mate / unmate.

Test Description	Requirement	Procedure
Durability (b).	Normal Force ① 0.2N Min. :Compressed to 1.9mm to PWB surface; ② 0.8N Max.: Compressed to housing surface.	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.
Connector peel strength	Load 1 N / contact	A load in max 5 mm/min applied to the whole side of the connector on PWB. All four directions (X, Y) along PWB. See figure 3.

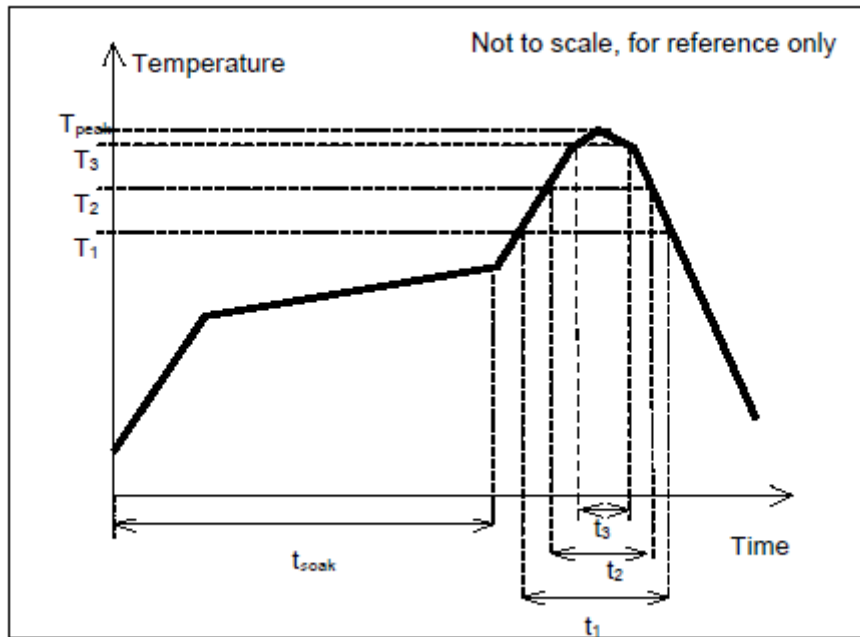
## ENVIRONMENTAL

Thermal shock.	Resistance 100mOhm max.	IEC 60068-2-14Na 25 cycle of Ta= -40 C for 0.5 h then change to 25 C max. 5 min then Tb= +85 C for 0.5 h, then cool to ambient. Recovery 2 h at ambient atmosphere.
Damp Heat Cyclic	Resistance 100mOhm max.	IEC 60068-2-30Db 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.
Condensing humidity cyclic	Resistance 100mOhm max.	96 h in operational mode, mated condition, RH 90%, 60 C for 30 min -> then 60 to 10 C in 25 min, then maintain for 30 min , then 10 to 60 C in 20 min. This cycle profile is continued for 4 days. Recovery at 25 C RH 75% for 2h. Measure resistance without opening the mating.
Dry Cold	Resistance 100mOhm max.	IEC60068-2-1 Ab At -40 C for 96 h, recovery 2 h at ambient atmosphere.
Dry Heat	Resistance 100mOhm max.	IEC 60068-2-2 Bb At +85 C for 96 h, recovery 2 h at ambient atmosphere.
Resistance to soldering Reflow heat	No mechanical damage, no loosening of solder joint.	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.

The meaning of text “No mechanical damage”:

- no dimension change (over specification)
- no significant corrosion at contact area
- no adhesion problem of plating
- no blistering of plating
- no flaking of plating
- no loosen parts
- no cracks on any parts

\*IR reflow requirements:



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	$T_{peak}$	255°C (-0/+5°C)
Temperature gradient in cooling		Max -5°C/s

Note: the temperature mentioned in the above is measured on the top of EUT

Figure 1

### 3.6. Product Qualification and Requalification Test Sequence

Description	A	B	C	D	E	F	G
Low Level Contact Resistance (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		
Sample size	5pcs	5pcs	5pcs	5pcs	5pcs	5pcs	5pcs

## 4. Quality Assurance Provisions

### 4.1. Qualification Testing

#### A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

#### B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified.

### 4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

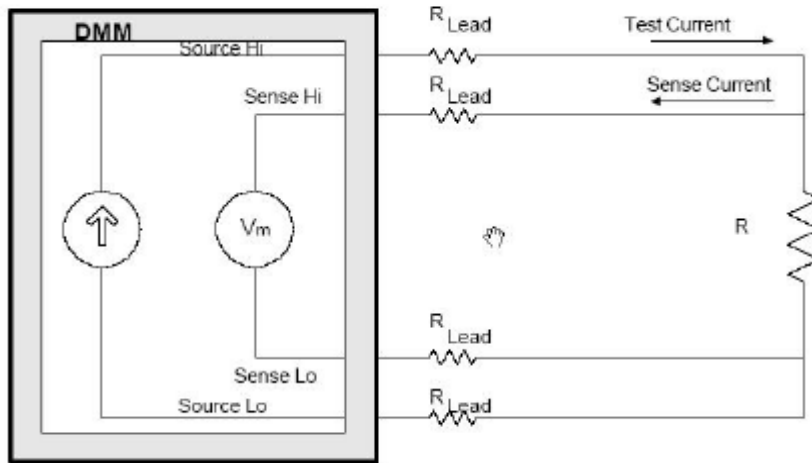
### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs,

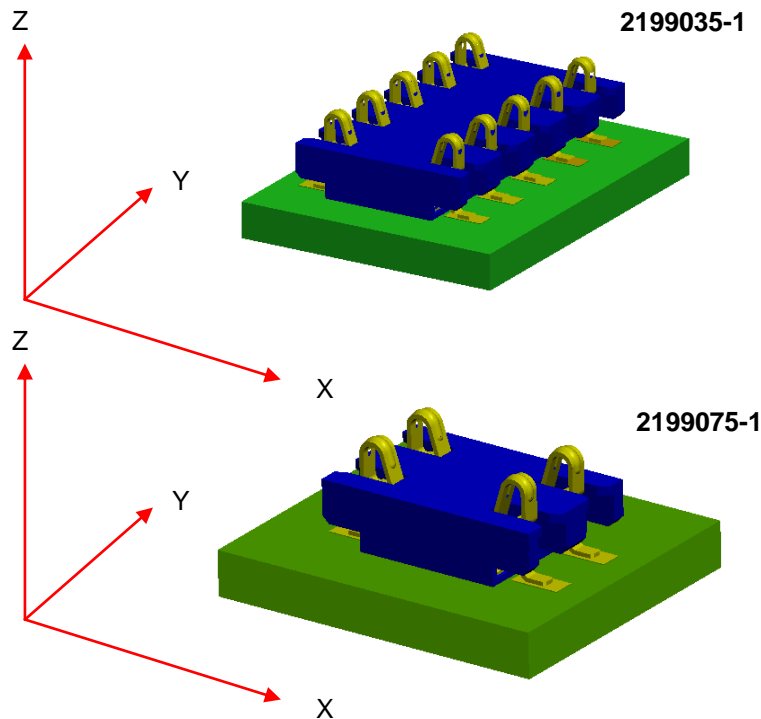
corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

**4.4. Quality Conformance Inspection**

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification



**Figure 2 Termination Resistance Measurement Points**



**Figure 3**

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The applicable product descriptions and part numbers are as shown in Appendix. 1

Product No.	Description
2199035-1	1 piece BtB connector (10pos)
2199075-1	1 piece BtB connector (4pos)

**Appendix.1**