

Z-PACK Slim UHD Connector System (performance level 2)

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. TE Connectivity makes no representation on warranty, express or implied, that the product will comply with these requirements. Further, TE Connectivity reserves the right to change these requirements based on the results of additional testing and evaluation. Contact TE Connectivity Engineering for further information, if necessary.

1. SCOPE

1.1 Content

This specification covers performance, test and quality requirements for TE Z-PACK Slim UHD Connector System. This connector system interconnect two printed circuit boards. Male as well as Female connectors are connected to the printed circuit board with plated thru-hole compliant press-fit leads. Z-PACK Slim UHD Connector Systems include Common Speed as well as High Speed Connectors.

1.2 Qualification

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using 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 in this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 Tyco Electronics Documents

114-19106	Application Specification
501-19122	Qualification Test Report (Z-PACK Slim UHD High Speed Connector System)
501-19XXX	Qualification Test Report (Z-PACK Slim UHD Common Speed Connector System)
501-19XXX	Signal Integrity Test Report (Z-PACK Slim UHD Connector System)
501-19XXX	Qualification Test Report EoN pc-board press-fit connection
109-197	AMP Test Specifications vs. EIA and IEC Test Methods

2.2 Other Documents

IEC 60512	Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068	Basic environmental testing procedures.

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DATE 13 Feb 12

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3. REQUIREMENTS

3.1 Design and Construction

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

3.2 Materials and Finish

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

3.3 Ratings

- | | | |
|----|----------------------------|----------------------------------|
| A. | Working Voltage: | 30 Vdc max |
| B. | Current carrying capacity: | 0.5 A per contact (fully loaded) |
| C. | Operating Temperature: | -55 °C to 105 °C |
| D. | Durability: | 250 cycles |

3.4 Performance and Test Description

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in Paragraph 3.6.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and are performed with connectors in fully mated condition.

VISUAL			
Para	Test Description	Requirements	Procedure / Severity
3.4.1	Visual examination	Initial: Meets requirements of product drawing and applicable instructions on customer drawing and application specification. Final: No functional physical changes.	IEC 60512-1-1 Visual, dimensional and functional per applicable inspection plan. Magnification 10x
ELECTRICAL			
Para	Test Description	Requirements	Procedure / Severity
3.4.2	Termination resistance (LLCR)	80 mΩ max. (Initial) ΔR 10 mΩ max. (Final individual) ΔR 5 mΩ max. (Final average)	IEC 60512-2-1 Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured. Measuring points shall be as indicated in figure 1. (see also para 3.5.1)
3.4.3	Insulation resistance	10.000 MΩ min.	IEC 60512-3-1 Test voltage 100V DC or AC peak. Duration: 1 minute. Measure between adjacent contacts.
3.4.4	Voltage proof	No break-down or flash-over.	IEC 60512-4-1 Test voltage: 500 VAC. Duration 1 minute. Test between adjacent contacts.
3.4.5	Current loading, cyclic	See para 3.4.2	IEC 60512-9-5 Test current: 0.5 A Cycle 45 min. "on" / 15 min. "off" Number of cycles: 20 Test shall be conducted with all contacts in series.
3.4.6	Temperature rise	ΔT 30°C max.	IEC 60512-5-1 Test shall be conducted with all contacts in series. (= all charged) Test current: at rated current. Duration: 1 hour Ambient conditions still air at 25°C.

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MECHANICAL			
Para	Test Description	Requirements	Procedure / Severity
3.4.7	Mating force	n x 0.45 N max. (n = number of positions)	IEC 60512-7-13b Measure force to mate connector pair. Connectors shall align. Speed: 10 mm/s.
3.4.8	Unmating force	n x 0.1 N max. (n = number of positions)	IEC 60512-7-13b Measure force to un-mate connector pair. Connectors shall align. Speed: 10 mm/s.
3.4.9	Mechanical operation	<ul style="list-style-type: none"> No functional damage No discontinuity > 1 μs Termination resistance acc para 3.4.2 	IEC 60512-9-1 Mate and unmate connector pair. Connectors shall align. Operation cycles: 250. Rate: 500 cycles/hour. Speed: 10 mm/s
3.4.10	Vibration sinusoidal	<ul style="list-style-type: none"> No physical damage No discontinuity > 1 μs Termination resistance acc para 3.4.2 	IEC 60512-6-4 10-500 Hz sweeping, 1 oct./min., Amplitude: 0,35 mm max. Acceleration: 50 m/s ² max. Duration: 15 minutes in each of 3 mutual perpendicular axis.
3.4.11	Shock	<ul style="list-style-type: none"> No physical damage Contact discontinuity 1 μs max. Termination resistance acc para 3.4.2 	IEC 60512-6-3 See para 3.5.2. Pulse shape: half sine. Peak acceleration: 490 m/s ² . Duration of pulse: 11 ms. Apply 3 shocks in each direction of 3 mutual perpendicular axes (18 shocks).
3.4.12	Minute disturbance	Contact discontinuity 1 μ s max.	IEC 60512-2-2e Withdraw and insert a distance of approximately 0.1 mm.
3.4.13	Retention force	<ul style="list-style-type: none"> 15 N/column average min. (male) 30 N/column average min. (female). 	IEC 60512-5-8b (male) or IEC 60512-5-8a (female). See para 3.5.3. Force to unseat connector 0.25 mm from board. Speed: 0.5 mm/s.

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ENVIRONMENTAL			
Para	Test Description	Requirements	Procedure / Severity
3.4.14	Cold	No physical damage. Termination resistance acc para 3.4.2.	IEC 60068-2-1 test Ab Temperature -55°C Duration 96 hrs Recovery: 2 hours at ambient atmosphere.
3.4.15	Dry heat	No physical damage. Termination resistance acc para 3.4.2.	IEC 60512-11-9 Temperature: 105°C Duration: 96 hrs Recovery: 2 hours at ambient atmosphere.
3.4.16	Rapid change of temperature	No physical damage. Termination resistance acc para 3.4.2.	IEC 60512-11-4 Temperature change: -55° to +105°C Variation speed: ±5°C/minute Number of cycles: 25
3.4.17	Damp heat, cyclic	No physical damage. Termination resistance acc para 3.4.2. Insulation resistance acc para 3.4.3.	IEC 60512-11-12 25/55°C 12 hrs / 12 hrs (= 1 cycle) RH 90-100% . Number of cycles: 6 Transition time: 3 hours Recovery: 2 hours at 25°C, RH 75%
3.4.18	Damp heat, steady state	No physical damage. Termination resistance acc para 3.4.2. Insulation resistance acc para 3.4.3.	IEC 60512-11-3 Temperature 40°C, RH 95%, duration 21 days
3.4.19	Mixed flowing gas	Termination resistance acc para 3.4.2.	IEC 60512-11-7 Method 1 Exposure time: 96 hours to environment with: <ul style="list-style-type: none"> Gas mixture: H₂S 0.1 ppm SO₂ 0.5 ppm RH 75% Temperature 25 ±2°C Recovery: 1 hour at ambient atmosphere.

3.5 Additional Test and Measuring Details

3.5.1 Contact resistance

Contact resistance shall be measured as indicated in figure 1.
 Contact path bulk of connected parts is not included in the requirement.

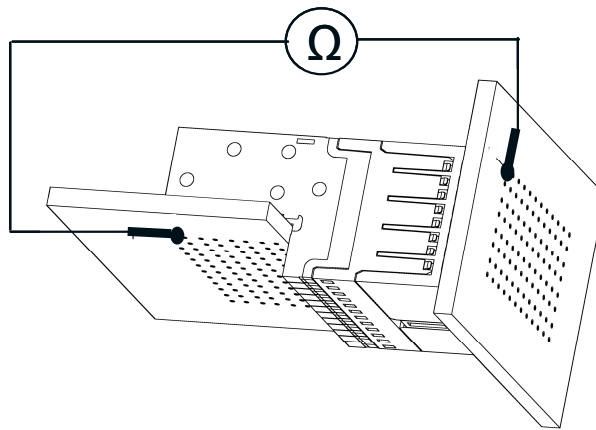


Figure 1. Contact resistance measurement.

3.5.2 Test frames

Test-frames shall provide mechanical stability of the connector in relation to its mating part and shall cover the requirements specified in the Tyco Electronics application specification.

During Vibration, an electrical circuit is checking that no electrical contact interruptions occur that exceed the requirement.

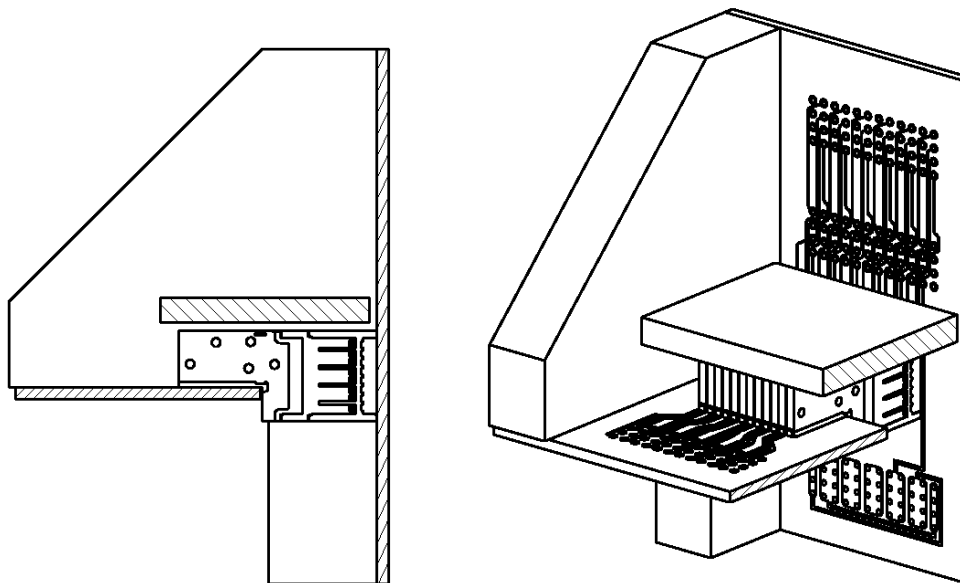


Figure 2. Vibration and Physical shock mounting feature example (right angle application shown)

3.5.3 Retention force

For testing the mechanical connection to the board, forces shall be applied as indicated in figure 3.

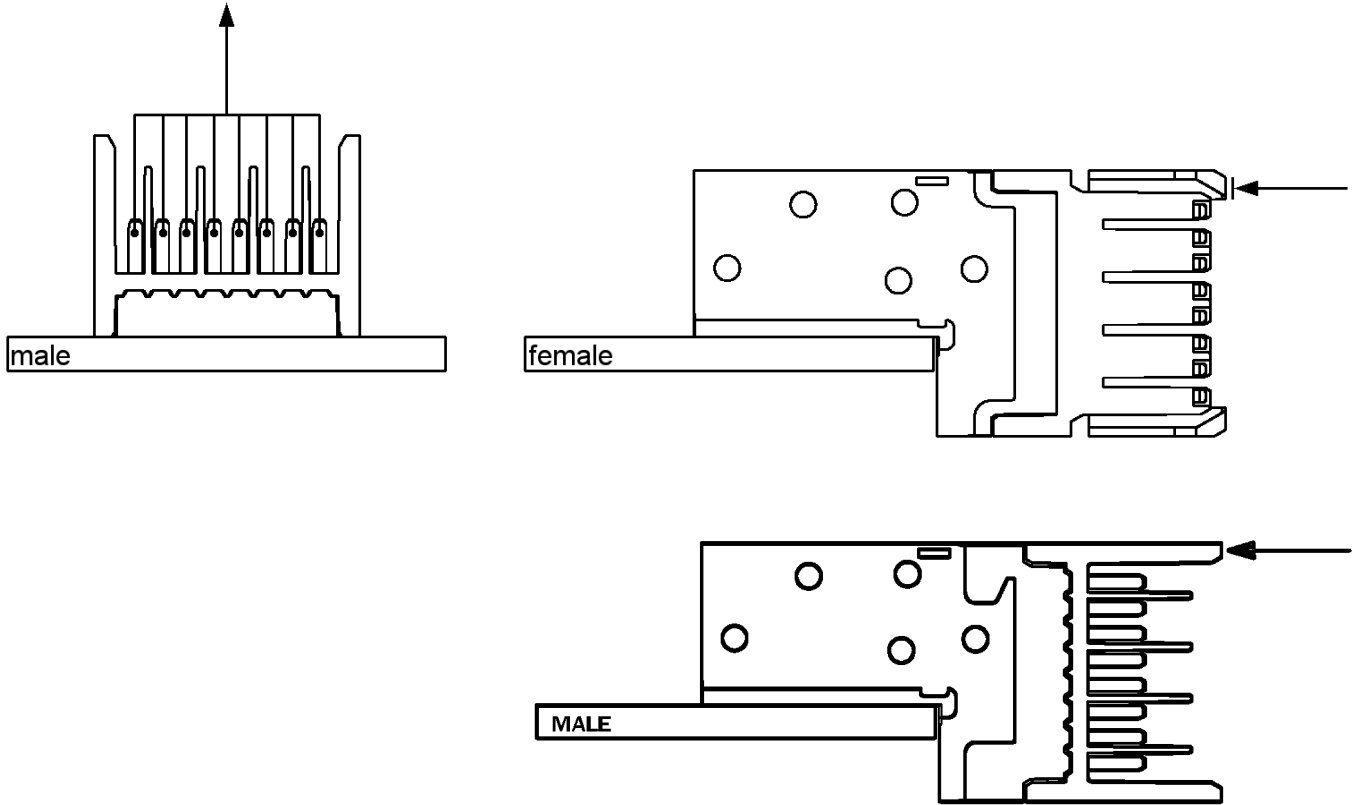


Figure 3. Retention force measurement.

3.6 Product Qualification and Requalification Test Sequence

Test or examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,15	1,15	1,13	1,11
Termination resistance	2,6,9,12,14	2,4,6,8,10,12	2,4,6,8,10	2,4,6,8,10
Insulation resistance		13	11	
Voltage proof		14	12	
Current loading, cyclic			5	
Temperature rise			3	
Mating force	3,7			
Unmating force	4,8			
Mechanical operation (Durability)	5	3		3(c),9(c)
Vibration sinusoidal	10			
Shock	11			
Minute disturbance	13			7
Retention force			7	
Cold		9		
Dry heat		7		
Rapid change of temperature		5		
Damp heat, cyclic		11		
Damp heat, steady state			9	
Mixed flowing gas				5

- (a) See para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Perform 50% of the durability cycles before, and 50% of the durability cycles after the mixed flowing gas testing.

Connector-pair description	Number of test sample pairs in test groups			
	1	2	3	4
Vert. Male + RA Female HS	5	5	5	5
Vert. Male + RA Female CS	5	5	5	5
RA Male + RA Female HS	5	5	5	5
RA Male + RA Female CS	5	5	5	5

Abbreviations: Vert = Vertical, RA = Right Angle, HS = High Speed, CS = Common Speed

4. **QUALITY ASSURANCE PROVISIONS**

4.1 **Qualification testing**

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

Unless otherwise specified, all test-groups shall consist of a minimum of 5 connectors of which all contacts shall be tested.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in paragraph 3.6.

4.2 **Requalification testing**

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

4.3 **Acceptance**

Acceptance is based upon verification that product meets requirements of paragraph 3.4. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmittal.

4.4 **Quality conformance inspection**

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