1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of the 0.35mm pitch stack height 1.0mm HRS-101series Board to Board product.

2.0 SCOPE

This specification is applicable to the termination characteristics of the 0.35mm pitch stack height 1.0mm Board to Board family of products which provides electrical connections between parallel mounted boards.

3.0 GENERAL

3.1 Operating Voltage Rating = A.C.50, D.C.50V
3.2 Operating Current Rating = Signal 0.3A (Per pin) / Power 3A (Per Pin)
3.3 Operating Temperature Range = -40 °C to 85 °C (1)
Note 1: includes the terminal temperature rise when powered

4.0 DEFINITIONS

4.1 Specifications
4.1.1 Engineering drawings
HRS-101P014FB110 for Plug connector
HRS-101R014FB110 for Receptacle connector
4.2 National or International Standards
4.2.1 Flammability: UL94V-0 or similar applicable specification
4.2.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.
4.2.3 MIL-STD-1344A: Test Methods for electrical connectors
4.2.4 MIL-G-45204: Gold Plating (electrodeposited)

5.0 REQUIREMENTS

5.1 Qualification
Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.
5.2 Material
The material for each component shall be as specified herein.
5.2.1 Insulator: High Temperature Thermoplastic, UL94V-0 flammability rated
5.2.2 Contact: Copper Alloy
5.2.3 Fixing Tab: Copper Alloy
5.3 Finish
The finish for applicable components shall be as specified herein.
5.3.1 Contact finish:
Contact area: Au Flash Plating
Soldering area: Au Flash Plating
Under-plating: Nickel Plating
5.3.2 Fixing Tab Finish
Contact area: Au Flash Plating
Soldering area: Au Flash Plating
Under-plating: Nickel Plating
5.4 Design and Construction
Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing.
There shall be no cracks, burrs, or other physical defects that may impair performance.

本制品不含 SS-00259 和 RoHS 禁止使用的环境物质
THIS PRODUCT ALL MATERIAL MUST BE COMPLY WITH SS-00259 OR RoHS

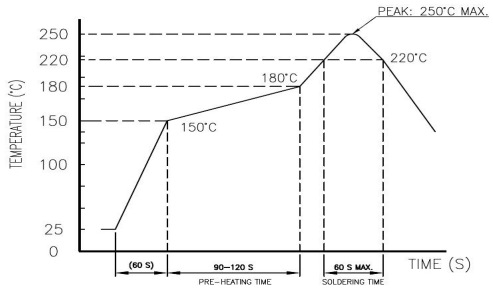
6.0 Physical and Electrical Characteristics

Test Description	Procedure	Requirements
• **Examination of product**	**EIA 364-18** Visual, dimensional and functional compliance.	Meets requirements of product drawing. No physical damage.
• **Low Level Contact Resistance**	**EIA 364-06A** Mating connector, apply a maximum voltage of 20 mV and current of 10mA.	Signal Pin : 80mΩMax.(Initial) /ΔR=20mΩMax. Power Pin: 30mΩMax.(Initial) /ΔR=10mΩMax.
• **Insulation Resistance**	**EIA 364-21** Apply 250V DC between adjacent contacts and measure its resistance within 1 minute.	Initial:100MΩmin. After: 50MΩmin.
• **Dielectric Withstanding Voltage**	**EIA 364-20** Apply AC 250V (r.m.s) between adjacent contact measure its resistance within 1 minute.	No flashover, spark over nor dielectric breakdown.
• **Temperature Rise**	**EIA 364-70B** Conditions 1 Method1 Apply specified current to contacts connected in series. Measure change of temperature on contact using thermocouples.	Temperature rise value: 30° C (Max.)

7.0 Mechanical Characteristics

Test Description	Procedure	Requirements
• **Mating Force**	**EIA 364-13** Measure force necessary to mate between the counterpart connectors. Testing speed: 25±3mm / minute.	Refer to appendix table 1.
• **Un-mating Force**	**EIA 364-13** Measure force necessary to mate between the counterpart connectors. Testing speed: 25±3mm / minute.	Refer to appendix table 1.
• **Contact Retention**	**EIA 364-05** Measure the contact retention with tensile strength tester. Testing speed: 25±3mm / minute.	0.15N (Min.)
• **Durability**	**EIA 364-09** Mate applicable header or socket, insert and withdrawal at the speed rate of 5±1 mm/min. up to 30 times.	Contact resistance. Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Vibration**	**EIA 364-28** Frequency: 10-55-10 Hz / minute. Amplitude: 1.52mm. Direction: Each of X, Y, Z-axis directions. *Each axis shall be at right angles to others.Period: 2 hours for each direction.	1. No electrical discontinuity more than 1 μs. 2. No damage,loose part or crack. 3. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Mechanical shock**	**EIA 364-27** Shock conditions: 3 mutually perpendicular axis, passing DC 1mA current during the test. (Total of 18 shocks) Peak value:490(m/s2) / (50g's) Duration: 11ms	1. No electrical discontinuity more than 1 μs. 2. No damage,loose part or crack. 3. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.

8.0 Environmental Characteristics

Test Description	Procedure	Requirements
• **Heat Resistance**	**EIA 364-17** Mated connector shall be placed in an over for 96 hours at +85±2 °C.	1. No damage. 2. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Cold resistance**	**EIA 364-59** Mated connector shall be placed in an over for 96 hours at -40±3°C.	1. No damage. 2. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Humidity**	**EIA 364-31** Mated connector shall be placed in a humidity chamber on the following conditions. Temperature: 60±2°C. Relative Humidity: 90-95%. Period: 96 hours.	1. No damage. 2. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax. 3. Insulation Resistance: 50MΩ min. 4. Dielectric Withstanding Voltage: 250V, 1 minute, No breakdown.
• **Resistance to Solder Heat**	1. Hand soldering iron method Solder time: 3 sec max. Solder temperature: 340±10°C. On terminal tip/Fixing Tab tip. 2. Reflow soldering Pre-heat: 150~180°C, 90~120 sec. Solder: 220°C min., 60 sec. Max. Peak temp.: 250 +5/-10°C., 10 sec. Max. 2 times	No loose contacts nor deformation. When you use N2 reflow, please consult with us beforehand. Depending on condition, evaluation and verification shall be conducted by us.
		
• **Temperature Cycling**	**EIA 364-32** Mated connector shall be set to temperature cycling for 5 cycles of which 1 cycle consist of as below: Step / Temp. (℃) / Time (min.) 1 / -55±3 / 30 2 / 25 / 5 MAX. 3 / 85±2 / 30 4 / 25 / 5 MAX.	1. No damage. 2. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Salt Spray**	**EIA 364-26** Mated connector shall be placed on a salt spray chamber on the following conditions. Salt Solution Density: 5±1%. Temperature: 35±2°C. Period: 48±4 hours.	1. No detrimental corrosion allowed in contact area and base metal exposed. 2. Contact Resistance: Signal pin: ΔR=20mΩMax. Power pin: ΔR=10mΩMax.
• **Solder ability**	**EIA-364-52** Subject contacts to Solderability testing, temperature of 245±5°C, for 5±0.5 sec.	More than 95% of immersed gold plating area must show no voids, no pin holes.

9.0 QUALITY ASSURANCE PROVISIONS

9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ANSI Z-540 and ISO 9000.

9.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

a.Temperature: 25 +/- 5 deg °C

b.Relative Humidity: 30% to 60%

c.Barometric Pressure: Local ambient

9.3 Sample Quantity And Description

a. Refer to Section 9.7

9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision, verification of plating composition and thickness, etc.

9.6 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix.

a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.

b. A significant change is made to the manufacturing process which impacts the product form, fit or function.

c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

9.7 Qualification Test Table

	Test Group												
Test or Examination	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Examination of product	1,3	1,9	1	1,5	1,5	1,5	1,5	1,5	1,7	1,5	1,5	1,3	1,3
Low level contact resistance		2,8		2,4	2,4	2,4	2,4	2,4		2,4	2,4		
Insulation resistance									2,5				
Dielectric withstanding voltage									3,6				
Temperature Rise	2												
Mating Force		3,6											
Un-mating Force		4,7											
Contact Retention			2										
Durability		5											
Vibration				3									
Mechanical shock					3								
Heat Resistance						3							
Cold resistance							3						
Humidity								3	4				
Temperature Cycling										3			
Salt Spray											3		
Solder ability												2	
Resistance to Solder Heat													2
Sample size	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***

APPENDIX

Table 1. Mating / Un-mating force

No. of contacts	Mating force (MAX.)		Un-mating force (MIN.)	
	1st	30th	1st	30th
6	15.0		1.90	
10	17.5		2.50	
12	20.0		3.00	
14	22.3		3.49	
20	30.0		4.40	

( ) ; Reference Spec

REVISION RECORD

REV	PAGES	DESCRIPTION	EC #	DATE
A	All	Drafted		07/10/2019