
Slimline Serial ATA (SATA) Connector

1.0 SCOPE

This specification covers the requirements for product performance, test methods and quality assurance provisions of Slimline Serial ATA (SATA) Connector consisting of 7 contacts of 1.27mm pitch and 6 contacts of 1.00mm pitch.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. 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.

2.1 TE Specifications

109-5000	:	Test Specification, General Requirements for Test Methods
501-51068	:	Qualification Test Report

2.2 Commercial Standards and specifications

EIA	:	Electronic Industries Association
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3.0 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**3.2.1 Plug Connector****A. Contact**

Material	:	Brass strip
Finish	:	Gold plating at mating area. Gold plating at solder area. All over nickel underplate.

B. Solder Peg

Material	:	Brass strip
Finish	:	Tin plating all over nickel underplate.

C. Housing

Material	:	High Temperature Thermoplastics, Glass Filled
Flame Class	:	UL94 V-0
Rating	:	

3.2.2 Receptacle Connector

- A. Contact
Material : Phosphor bronze strip
Finish : Gold plating at mating area.
Tin plating a solder area.
All over nickel underplate.
- B. Board Lock
Material : Brass strip
Finish : Tin plating all over nickel underplate.
- C. Housing
Material : High Temperature Thermoplastics, Glass Filled
Flame Class : UL94 V-0
Rating

3.3 Ratings

- A. Signal and Power Contacts
Voltage : 200V AC
Current : 1.5A max per contact
Temperature : -40°C to 85°C (inclusive of temperature rise)

3.4 Performance Requirements and test Descriptions

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.4.1 Test Environment

All tests shall be performed in the environmental conditions listed below, unless otherwise specified.

- Temperature : 15°C to 35°C
Humidity : 20% to 80% RH
Atmospheric : 650 to 800mm Hg
Pressure

3.4.2 Test Specimens

The test specimen used for tests shall be conforming to the applicable product drawing(s).

Unless otherwise specified, no sample shall be used.
The tests conducted are for the header only.

3.5 Test Requirements and Procedures Summary

Para	Test Items	Requirements	Procedures
3.5.1	Examination of Product	Meets requirements of product drawing.	Visually, dimensionally and functionally inspected per applicable inspection plan per EIA-364-18.
Electrical Requirements			
3.5.2	Insulation Resistance	1000MΩ min.	Subject a voltage of 500V DC for 1 minute between adjacent contacts per EIA 364-21.
3.5.3	Dielectric Withstanding Voltage	No breakdown or flashover.	Subject a voltage of 500V AC for 1 minute between adjacent contacts per EIA 364-20 Method B. Leakage current shall not exceed 5mA.

3.5.4	Low Level Contact Resistance	30mΩ max. initial. ΔR = 15mΩ max. final	Subject a voltage of 20mV max open circuit at a current of 100mA max on mated connector assemblies per EIA 364-23.
3.5.5	Temperature Rise (apply only to 6 positions)	Temperature rise shall not exceed 30 °C after 96 hours (45 minutes ON and 15 minutes OFF per hour)	Wire contact P2 & P3 in parallel for power. Wire contact P5 & P6 in parallel for return. Apply 3A total DC current to parallel contacts P2 & P3 and return from parallel contact P5 & P6.
3.5.6	Solderability	Solderable area shall have a solder coverage of 95% min.	Test solderable portion of contact per TE 109-11-11. Solder composition of 95.5 (Tin)/3.9 (Silver)/0.6 (Copper). Solder bath temperature is set at 245 ±5°C. Immersion time is between 5 and 10 sec.
3.5.7	Soldering Heat Resistivity	See note (a)	Test connector per EIA 364-56, Procedure 1 (Hand Soldering) and Procedure 6 (Reflow). a) For Hand Soldering, temperature is 360 ±10°C at between 4 and 5 sec. b) For Reflow profile, see Figure 3. Reflow count is 3 times.
Mechanical Requirements			
3.5.8	Mating Force	Backplane Connector: 20N max.	Mate connector assemblies at a rate of 12.5mm per minute per EIA 364-13.
		Cabled Connector (with Latch): 45N max.	
3.5.9	Unmating Force	Backplane Connector: 2.5N min. after 500 cycles	Unmate connector assemblies at a rate of 12.5mm per minute per EIA 364-13.
		Cabled Connector (with Latch): No damage	Apply a static 25N unmating test load per EIA 364-13.
3.5.10	Durability	See note (a).	Mate and unmate connector assemblies at a rate of 12.5mm per minute for 500 cycles per EIA 364-09.
3.5.11	Vibration (Random)	Discontinuity should not exceed 1 microsecond.	Vibrate mated connector assemblies per EIA 364-28, Condition V Test Letter A. Subject mated connectors to 5.35 g's RMS. 30 minutes in each of three mutually perpendicular planes. Frequency range is between 50Hz and 2000Hz.
3.5.12	Physical Shock	Discontinuity should not exceed 1 microsecond.	Subject mated connector assemblies at 30 g's with ½ sine wave (11ms) shock in x, y & z axis (total 18 shocks) per EIA 364-27, Condition H.

Environmental Requirements			
3.5.13	Humidity	See note (a).	Subject mated connector assemblies to 96 hours at 40°C with 90–95% relative humidity per EIA 364-31, Method II, Condition A.
3.5.14	Temperature Life	See note (a).	Subject mated connector assemblies to 85°C for 500 hours per EIA 364-17, Method A, Condition III.
3.5.15	Thermal Shock	See note (a).	Subject mated connector assemblies to 10 cycles between -55°C and 85°C per EIA 364-32, Condition I.
3.5.16	Mixed Flowing Gas	See note (a).	Expose half of samples unmated for 7 days then mated for 7 additional days and expose other half of samples mated for 14 days per EIA 364-65, Class 2A.

Note:

(a) Shall meet visual requirements, show no physical damage, and shall meet requirements of additional tests as specified in the Test Sequence in Figure 2.

Figure 1

3.6 Product Qualification Test Sequence

Test Item	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Examination of Product	1,5	1,9	1,8	1,8	1,7	1,5	1,3
Low Level Contact Resistance	2,4	3,7	2,4,6		4,6	2,4	
Insulation resistance				2,6			
Dielectric Withstanding Voltage				3,7			
Temperature Rise			7				
Solderability							2
Soldering Heat Resistivity						3	
Mating Force		2					
Unmating force		8					
Durability	3	4(b)			2(b)		
Vibration (Random)		5					
Physical Shock		6					
Reseating (manually plug/unplug 3 time)			5		5		
Humidity				5			
Temperature Life			3				
Thermal Shock				4			
Mixed Flowing Gas					3		

Note:

(a) Numbers indicate sequence in which the tests are performed.

- (b) Preconditioning, 20 cycles for the 50-durability cycle requirement, 50 cycles for the 500-durability cycle requirement. The mating and unmating cycle is at the maximum rate of 200 cycles per hour.

Figure 2

4.0 QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

- A. Sample Selection
Samples shall be selected at random from current production. The number of test points will correspond to the number of positions on the connector.
- B. Test Sequence
Qualification inspection shall be verified by testing samples as specified in Figure 1 and 2.
- C. Test sequence shall be serialised for tractability.

4.2 Re-Qualification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product quality assurance shall co-ordinate re-qualification testing, consisting of all or part of the original testing sequence as determined by development/ product, quality and reliability engineers.

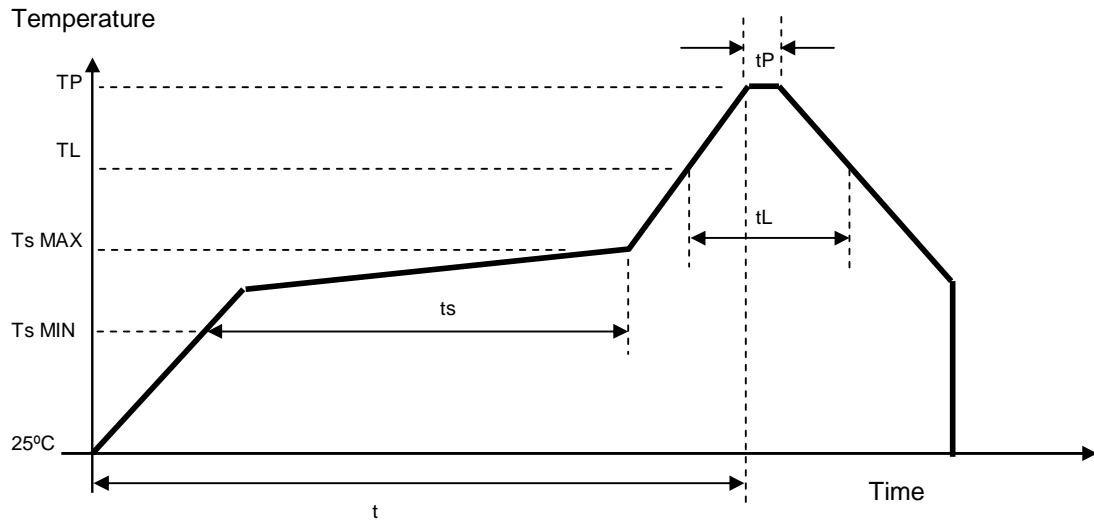
4.3 Acceptance

Acceptance is based upon verification that product meets requirements of Figure 1 and 2. Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

4.4 Quality Conformance Inspection

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

Recommended reflow profile per JEDEC J STD-020C



Profile feature

Average Ramp Up Rate (Ts MAX to Tp)	3°C/second MAX
Pre-Heat	
Ts MIN	150°C
Ts MAX	200°C
Time ts	70 to 180 seconds
Time Maintained Above	
TL	217°C
tL	70 to 150 seconds
Peak	
Tp	260°C
tp	20 to 40 seconds
Ramp Down Rate	6°C/minute
Time 25°C To Peak	8 minutes MAX

Figure 3