

PRODUCT SPECIFICATION

108-51067

SERIAL ATTACHED SCSI (SAS) CONNECTOR

1.0 SCOPE

This specification covers the requirements for product performance, test methods and quality assurance provisions of Serial Attached SCSI (SAS) Connector Set consisting of matching Plugs and Receptacles.

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 Tyco Electronics Specifications

- A. 109-5000 Test Specification, General Requirements for Test Methods
- B. 501-51049 Qualification Test Report (SMT)
501-51050 Qualification Test Report (Hybrid)
501-51051 Qualification Test Report (Press Fit)

2.2 Commercial Standards and Specifications

- A. EIA-364 Electronic Industries Association

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|  | SPEC: SERIAL ATTACHED SCSI (SAS) CONNECTOR | | 108 – 51067 |
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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

A. Contact

Material: Receptacle Contact - Copper Alloy

Plug Contact - Brass

Finish: 0.76um min Gold plating on mating area, 2.54um min Matte Tin plating on solder area, over 1.27um min Nickel plating on entire contact

B. Housing: High Temperature Thermoplastics, Glass Filled, UL 94V-0

3.3 Ratings

Voltage: 30VDC

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 Pressure: 650 to 800mm Hg

3.4.2 Test Specimens

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

Unless otherwise specified, no sample shall be used.

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. |
| Electrical Requirements | | | |
| 3.5.2 | Low Level Contact Resistance | 30 mΩ max initial. 10 mΩ max change from initial. | EIA 364-23. Subject a voltage of 20 mV max open circuit at a current of 100 mA max on mated connector assemblies. |
| 3.5.3 | Insulation Resistance | 1000 MΩ min. | EIA 364-21 Subject a voltage of 500 VDC for 1 minute between adjacent contacts of mated connector assemblies. |
| 3.5.4 | Dielectric Withstanding Voltage | No breakdown or flashover. | EIA 364-20 Method B. Subject a voltage of 500 VAC for 1 minute between adjacent contacts of mated connector assemblies. |
| 3.5.5 | Temperature Rise (applicable to Power section, P1 to P15 only) | Temperature rise shall not exceed 30 °C after 96 hours (45 minutes ON and 15 minutes OFF per hour) | Wire contact P1, P2, P8 & P9 in parallel for power. Wire contact P4, P5, P6, P10 & P12 in parallel for return. Apply 6 A total DC current to parallel contacts P1, P2, P8 & P9 and return from parallel contact P4, P5, P6, P10 & P12. |
| 3.5.6 | Solderability | Solderable area shall have a solder coverage of 95% min. | Tyco 109-11-11 Solder Temp: 245±2°C Immersion Duration: 5s Max |
| 3.5.7 | Resistance to Soldering Heat | Housing shall be free from blisters, deformation, warpage or melting. | Tyco 109-201, Condition B Pre-Heat: 150°C ~ 200°C: 60s min. Heat within 5°C of Peak: 30s max Peak Temp: 260°C max |

| Mechanical Requirements | | | |
|-------------------------|---------------------------------|---|--|
| 3.5.8 | Mating Force | 25 N max. Initial and after durability | EIA 364-13. Mate connector assemblies at a rate of 12 mm per minute. |
| 3.5.9 | Un-mating Force | Backplane: 5 N min. Initial and after durability | EIA 364-13 Un-mate connector assemblies at a rate of 12 mm per minute. |
| 3.5.10 | Durability (preconditioning) | See note (a). | EIA 364-09 Manually mate and un-mate connector assemblies for 50 cycles at a maximum rate of 500 cycles/hour. Inspect for damage every 10 cycles. No lubrication to be used. |
| 3.5.11 | Durability | See note (a). | EIA 364-09 Mate and un-mate connector assemblies for 500 cycles at a maximum rate of 200 cycles/hour. |
| 3.5.12 | Vibration | Discontinuity should not exceed 1 microsecond. See note (a). | EIA 364-28, Condition VII, Level D. Subject mated connector assemblies to 3.10G's rms between 20-500Hz. 1 hour in each of 3 mutually perpendicular planes. Rigidly fix both mating halves to eliminate relative motion between the contacts. |
| 3.5.13 | Physical Shock | Discontinuity should not exceed 1 microsecond. | EIA 364-27, Condition A. Subject mated connector assemblies at 50G's with ½ sine wave (11 milliseconds) shocks in x, y & z axis (total 18 shocks) |
| 3.5.14 | Reseating | See note (a). | Subject connectors to 3 manual mate/un-mate cycles. No lubrication to be used. |

| Environmental Requirements | | | |
|----------------------------|-------------------------------|---------------|---|
| 3.5.15 | Cyclic Temperature & Humidity | See note (a). | EIA 364-31. Subject mated connector assemblies to 60 cycles (480 hours) at 25°C ~ 65°C with 90~95% relative humidity. Each cycle should last 8 hours. 2 hours dwell at low temp, 2 hours ramp from low to high, 2 hours dwell at high temp, 2 hours ramp from high to low. |
| 3.5.16 | Temperature Life | See note (a). | EIA 364-17, Method A. Subject mated connector assemblies to 105 °C for 300 hours |
| 3.5.17 | Thermal Shock | See note (a). | EIA 364-32, Condition I. Subject mated connector assemblies to 10 cycles between -55 °C and 85 °C, 30 minute dwell at each temperature extreme |
| 3.5.18 | Mixed Flowing Gas | See note (a). | EIA 364-65, Class 2A. Expose ½ of the unmated samples for 10 days and then mated for 4 additional days. The other half of the samples are exposed mated for full 14 day test period. |
| 3.5.19 | Thermal Disturbance | See note (a). | Subject mated connector assemblies to 10 cycles between 15±3°C and 85±3°C, minimum of 2°C ramp per minute. Dwell time should insure that the contacts reach the extremes, no less than 5 minutes. |

| Environmental Requirements (continue) | | | |
|---------------------------------------|-----------------|---------------|---|
| 3.5.20 | Thermal Cycling | See note (a). | Subject mated connector assemblies to 500 cycles between $15\pm3^{\circ}\text{C}$ and $85\pm3^{\circ}\text{C}$, minimum of 2°C ramp per minute. Dwell time should insure that the contacts reach the extremes, no less than 5 minutes. |
| 3.5.21 | Dust | See note (a). | EIA 364-91 Subject un-mated connectors to dust composition 1 (benign). |

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 |
| | Test Sequence (a) | | | | | |
| Examination of Product | 1,8 | 1,10 | 1,8 | 1,12 | 1,10 | 1,7,10 |
| Low Level Contact Resistance | 2,4,7 | 2,5,7,9 | 2,5,7 | 2,5,7,9,11 | 2,5,7,9 | 2,5,7,9 |
| Durability (preconditioning) | 3 | 3 | 3 | 3 | 3 | 3 |
| Vibration | | | 6 | | | |
| Reseating | 6 | 8 | | 10 | 8 | 8 |
| Cyclic Temperature & Humidity | | 6 | | | | |
| Temperature Life | 5 | | 4 | 4 | 4 | |
| Thermal Shock | | 4 | | | | |
| Mixed Flowing Gas | | | | 6 | | |
| Thermal Disturbance | | | | 8 | | 6 |
| Thermal Cycling | | | | | 6 | |
| Dust | | | | | | 4 |

Figure 2

| | | | |
|----------------------------------|-------------------------|-----------|-----------------|
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| Test Item | Test Group | | | | | |
|---------------------------------|-------------------|-----|-----|-----|-----|-----|
| | 7 | 8 | 9 | 10 | 11 | 12 |
| | Test Sequence (a) | | | | | |
| Examination of Product | 1,9 | 1,4 | 1,3 | 1,5 | 1,5 | 1,3 |
| Low Level Contact Resistance | 2,8 | | | 2,4 | 2,4 | |
| Insulation resistance | | 2 | | | | |
| Dielectric Withstanding Voltage | | 3 | | | | |
| Temperature Rise | | | 2 | | | |
| Solderability | | | | | | 2 |
| Resistance to Soldering Heat | | | | | 3 | |
| Mating Force | 3,6 | | | | | |
| Durability | 5 | | | | | |
| Un-mating force | 4,7 | | | | | |
| Physical Shock | | | | 3 | | |

Figure 2 (continue)

Note:

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

(b) 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.