
Micro SATA Connector, Plug & Receptacle

Product Specification: 108-51089 Rev. B

Test Request No.: T07 – 056 & T09 - 003

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Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on Micro SATA Connector, so as to determine its conformance to the requirements of Product Specification 108-51089 Rev B.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of, Micro SATA Connector manufactured by Tyco Electronics (S) Pte Ltd.

1.3 Conclusion

The Micro SATA Connector meets all the electrical, mechanical and environmental requirements of Product Specification 108-51089 Rev B.

1.4 Product Description

The Micro SATA Connector, housing material is made of High Temperature Thermoplastics, Glass filled, UL94V-0. The contacts are made of Copper Alloy. Contacts finish were Matte Tin or Gold on solder area, over Nickel on entire contact.

1.5 Test Samples

The test samples used for the qualification were randomly selected from production and the conditions of the parts used for each test were summarized in the table below:

Description	Part No.
Micro SATA Receptacle	x-1735439-x
	x-1735472-x
	x-1735492-x
	x-1735581-x
	x-1735710-x
Micro SATA Plug	x-1735443-x
	x-1735452-x
	x-1735490-x

1.6 Qualification Test Sequence

Test	Test Group						
	1	2	3	4	5	6	7
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				3,7			
Current rating			7				
Solder ability							2
Solder Heat resistivity						3	
Mating force		2					
Un-mating force		8					
Durability	3	4(b)			2(b)		
Vibration (Random)		5					
Physical shock		6					
Reseating (Manually plug/unplug 3 times)			5		5		
Humidity				5			
Temperature life			3				
Thermal shock				4			
Mixed flowing gas					3		
Sample size	7	7	7	7	7	7	7

Note:

- (a) Numbers indicate sequence in which the tests are performed.
- (b) Pre-conditioning, 20 cycles for the 50-durability cycle requirement, 50 cycles for the 500-durability cycle requirement. The mating and un-mating cycle is at the maximum rate of 200 cycles per hour.

2. Summary of Testing

2.1 Examination of Product – All Groups

All samples were visually inspected under the scope and found to be free from any physical damages such as cracks, change of colour, corrosion etc.

2.2 Termination Resistance - Test Group 1, 2, 3, 5 & 6

All samples meet the requirement of 30 mΩ (maximum) initial Low level contact resistance. All samples meet the requirement of ΔR 15 mΩ (maximum) after test / environmental conditions.

All Termination Resistance Measurement in mΩ

Test Group (TG)	1 (Durability)	
Test Condition	Initial	After
Sample size	7	7
No. of measurement	112	112
Overall average	19.55	19.65
Overall minimum	17.22	17.58
Overall maximum	21.64	21.91
Overall Stdev	0.92	0.95
ΔR (max)	-	1.70

Test Group (TG)	2 (Vibration & Physical shock)	
Test Condition	Initial	After
Sample size	7	7
No. of measurement	112	112
Overall average	19.61	19.83
Overall minimum	17.91	17.77
Overall maximum	21.84	22.86
Overall Stdev	0.90	1.06
ΔR (max)	-	2.69

Test Group (TG)	3 (Temperature life)		
Test Condition	Initial	After Temperature life	After Reseating
Sample size	7	7	7
No. of measurement	112	112	112
Overall average	19.74	19.95	19.81
Overall minimum	17.69	16.72	16.64
Overall maximum	21.47	22.76	21.85
Overall Stdev	0.81	1.05	0.97
ΔR (max)	-	3.83	3.89

Test Group (TG)	5 (Mixed Flowing Gas)		
Test Condition	Un-mate for 7 days, mated for additional 7 days		
	Initial	After Mixed Flowing gas	After Reseating
Sample size	7	7	7
No. of measurement	112	112	112
Overall average	20.05	22.31	21.36
Overall minimum	17.52	18.96	18.68
Overall maximum	21.93	26.98	26.60
Overall Stdev	0.80	1.95	1.66
ΔR (max)	-	7.43	7.21

Test Group (TG)	5 (Mixed Flowing Gas)		
Test Condition	Fully Mated for 14 days		
	Initial	After Mixed Flowing gas	After Reseating
Sample size	7	7	7
No. of measurement	112	112	112
Overall average	19.71	20.70	20.20
Overall minimum	17.60	19.08	17.97
Overall maximum	21.63	25.27	23.06
Overall Stdev	0.78	1.06	1.01
ΔR (max)	-	5.89	3.52

Test Group (TG)	6 (Soldering Heat Resistivity)	
Test Condition	Initial	After
Sample size	7	7
No. of measurement	112	112
Overall average	19.68	20.74
Overall minimum	17.85	17.78
Overall maximum	21.79	23.39
Overall Stdev	0.86	1.18
ΔR (max)	-	4.18

2.3 Dielectric Withstanding Voltage – Test Group 4

No dielectric breakdown or flashover or leakage of current greater than 5mA occurred when a test voltage of 500 VAC was applied between adjacent contacts of unmated connector before and after environmental tests.

2.4 Insulation Resistance – Test Group 4

All insulation resistance readings between adjacent contacts were greater than 1000 MΩ.

Sample ID	Plug	Receptacle	Plug & Receptacle
Sample Condition	Un-mated	Un-mated	Mated
Test condition	Initial		
Sample size	8	8	8
No. of measurement	104	104	104
Overall average	1.29E+14	1.34E+14	1.48E+14
Overall minimum	1.41E+13	2.62E+13	1.79E+13
Overall maximum	4.45E+14	4.58E+14	4.54E+14

Sample ID	Plug	Receptacle	Plug & Receptacle
Sample Condition	Un-mated	Un-mated	Mated
Test condition	After Thermal shock & Humidity		
Sample size	8	8	8
No. of measurement	104	104	104
Overall average	1.35E+14	1.28E+14	1.25E+14
Overall minimum	1.90E+12	3.01E+12	6.12E+12
Overall maximum	5.04E+14	5.66E+14	5.10E+14

2.5 Vibration & Physical Shock - Test Group 2

No Sample failed the electrical discontinuity.

2.6 Current Rating – Test Group 3

Temperature rise meets the requirement of less than 30°C.

Units in °C

Sample size	7
No. of measurement	28
Overall average	9.81
Overall minimum	8.42
Overall maximum	11.14
Overall Stdev	0.75

2.7 Mating & Un-mating force – Test Group 2

The Mating force meets the requirement of 2.0kgf (Max).

The Un-mating force meets the requirement of 0.25Kgf (Min), after 500 cycles.

Test condition	Mating	Un-mating
	1 st Cycle	After Durability, Vibration & Physical shock
Sample size	7	7
No. of measurement	7	7
Overall average	0.535	0.368
Overall minimum	0.487	0.337
Overall maximum	0.603	0.478
Overall Stdev	0.044	0.052

2.8 Solder Ability – Test Group 7

All contact leads showed more than 95% solder coverage with no voids and pins hole observed.

2.9 Resistance to Soldering Heat – Test Group 6

No physical damage was observed after reflow method.

2.10 Durability – Test Group 1, 2 & 5

No physical damage was observed after durability.

3 Test Methods

3.1 Examination of Products

Samples were physically examined under the microscope before and after each test conditions for any physical damage or abnormalities on housing and contacts.

3.2 Contact/Termination Resistance

Measurements shall be made on mated connector, at a voltage of 20mv max open circuit at a current of 100mA.

3.3 Dielectric Withstanding Voltage

A test potential of 500 VAC was applied between adjacent contacts of mated & unmated connector. This potential was held for 1 minute with a current leakage not greater than 5mA. (EIA-364-20, Method B)

3.4 Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated & unmated connector, using a test voltage of 500 VDC. (EIA-364-21)

3.5 Current Rating

With connector mounted on PCB, wire contact P1 & P6 in parallel for power and wire contact P3 & P4 in parallel for return. Apply 3A total DC current to parallel contacts P1 & P6 and return from parallel contact P3 & P4.

3.6 Solder Ability

Test solder able portion of contact in accordance to 109-11-11, method A.

3.7 Resistance to Soldering Heat

Test connector per EIA-364-56B, procedure 6, level 4.

3.8 Mating force

Mate connector assemblies at a rate of 12.5mm per minute max per EIA-364-13.

3.9 Un-mating force

Un-mate connector assemblies at a rate of 12.5mm per minute max per EIA-364-13.

3.10 Durability

Mate and Un-mate connector assemblies at a rate of 200 cycles per hour max for 500 cycles.
(EIA-364-09)

3.11 Vibration (Random)

Subject mated connector assemblies to 5.35 g's RMS, 30 minutes in 3 perpendicular planes per EIA-364-28, Condition V, Letter A.

3.12 Physical Shock

Subject mated connector to following conditions. 3 shocks shall be applied along 3 mutually perpendicular planes. (EIA-364-27, Condition H)

Test pulse: Half-Sine shock

Peak value: 30G

Duration: 11 milliseconds

Total: 18 shocks

3.13 Humidity

Subject mated connector assemblies to relative humidity of 90~95%RH, temperature of 40°C for 96 hours. (EIA-364-31, Method II, Condition A)

3.14 Temperature Life

Subject mated connector assemblies to 85°C for 500 hours. (EIA-364-17, Method A, Condition III)

3.15 Thermal Shock

Subjected mated connector assemblies to temperature -55°C & +85°C for 10 cycles.
(EIA-364-32, Condition I)

3.16 Mixed Flowing Gas

Expose half of samples Un-mated 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.