Slim line SAS Receptacle Connector

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) Slim line SAS Receptacle Connector to determine their conformance to the requirements of Product Specification 108-60131 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Slim line SAS Receptacle Connector.

1.3. Conclusion

The Slim line SAS Receptacle Connector listed in paragraph 1.5, conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-60131 Revision A.

1.4. Product Description

TE Connectivity (TE) Slim line SAS Receptacle Connector are designed to meet requirements for applications such as networking, computer, and telecommunications equipment.

1.5. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
A,B,C,D,E,F,G ,H,I,J,K,L,M,N	70	2356318-1 2356320-1	Slim line SAS X8 Vertical Type Receptacle Slim line SAS X8 R/A Type Receptacle

Figure 1

1.6. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: -40 to 85°C
- Relative Humidity: 30 to 75%

1.7. Qualification Test Sequence

Test or Examination	A	B	C	D	E	F	G	H	I	J	K	L
	Test Sequence (a)											
Examination of Product	1,8	1,10	1,10	1,12	1,10	1,9	1,10	1,7	1,3	1,3	1,3	1,8
Low Level Contact Resistance	2,5,7	2,5,7,9	2,5,7,9	2,5,7,9, 11	2,5,7,9	2,4,6,8	2,8					2,5,7
Dielectric withstanding Voltage							9	3,6				
Insulation Resistance								2,5				
Temperature Rising									2			
Mating Force							3,6					
Unmating Force							4,7					
Durability							5					
Durability(Preconditioning)	3	3	3	3	3	3						3
Vibration			6									
Mechanical Shock			8									
Reseating	6	8		10	8	7						6
Solder ability										2		
Resistance to Reflow Soldering Heat											2	
Thermal Shock		4										
Humidity & Temperature Cycling		6										
Humidity								4				
Temperature Life	4											
Temperature Life (Precondition)			4	4	4							
Thermal Cycling					6							
Cold Test												4
Thermal Disturbance				8		5						
Mixed Flowing Gas				6								

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. They were inspected and accepted by the Quality Assurance Department.

2.2. Low Level Contact Resistance - Test Groups A, B, C, D, E, F, G and L

All contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage had a change in resistance (ΔR) of less than 20 milliohms after testing.

2.3. Withstanding Voltage - Test Group G and H

No disruptive discharge, no leakage current in excess of 5mA for 1 minutes hold.

2.4. Insulation Resistance - Test Group H

All insulation resistance measurements were greater than 1000 megohms.

2.5. Temperature Rising - Test Group I

30℃ Max. Under loaded rating current

2.6. Mating Force - Test Group G

All mating force measurements were less than 55.5 N.

2.7. Un-mating Force - Test Group G

All un-mating force measurements were less than 24 N.

2.8. Durability - Test Group G

No physical damage occurred as a result of mating and un-mating the specimens 250 cycles.

2.9. Durability (Precondition). - Test Group A, B, C, D, E, F, L

No physical damage occurred as a result of mating and un-mating the specimens 50 cycles.

2.10. Vibration - Test Group C

No discontinuities longer than 1 microsecond were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on the specimens were visible.

2.11. Mechanical shock - Test Group C

No discontinuities longer than 1 microsecond were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.12. Reseating - Test Group A, B, D, E, F, L

No physical damage occurred as a result of reseating 3 cycles.

2.13. Solderability - Test Group J

All of test specimens got more than 95% coverage.

2.14. Resistance to Reflow Soldering Heat - Test Group K

No evidence of physical damage was visible as a result of resistance to reflow soldering heat.

2.15. Thermal Shock - Test Groups B

No evidence of physical damage was visible as a result of thermal shock testing.

2.16. Humidity/temperature Cycling - Test Groups B

No evidence of physical damage was visible as a result of humidity/temperature cycling.

2.17. Humidity - Test Groups H

No evidence of physical damage was visible as a result of humidity.

2.18. Temperature life - Test Groups A

No evidence of physical damage was visible as a result of Temperature life testing.

2.19. Temperature life (precondition) - Test Groups C, D, E

No evidence of physical damage was visible as a result of Temperature life (precondition) testing.

2.20. Thermal Cycling- Test Group E
No evidence of physical damage was visible as a result of thermal disturbance.

2.21. Cold test- Test Group L
No evidence of physical damage was visible as a result of cold test .

2.22. Thermal disturbance - Test Group D, F

No evidence of physical damage was visible as a result of thermal disturbance

2.23. Mixed Flowing Gas - Test Group D

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

2.27 Final Examination of Product - All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product

A Certificate of Conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. Low Level Contact Resistance

Low level contact resistance measurements were made using a 4 terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

3.3. Withstanding Voltage

A test potential of 300 volts DC RMS was applied between adjacent contacts for 1 minute. The test voltage was raised from zero to the specified value as uniformly as possible, at a rate of approximately 500 volts (AC or DC) per second

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated specimens that were not electrically connected. A test voltage of 100 volts DC was applied for 2 minutes before the resistance was measured.

3.5. Temperature Rising

Contact series-wired, apply test current of loaded rating current to the circuit, and measure the temperature rising by probing on soldered areas of contacts, after the temperature becomes stabilized deduct ambient temperature from the measured value.

3.6. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm per minute.

3.7. Un-mating Force

The force required to un-mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm per minute.

3.8. Durability

Specimens were mated and unmated 250 times at a maximum speed of 25.4 mm per minute.

3.9. Durability (Preconditioning).

Specimens were mated and unmated 50 times at a maximum speed of 25.4 mm per minute.

3.10. Vibration

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 20 and 500 Hz. The spectrum remained flat at 0.02 G^2/Hz from 20 to 500 Hz. The root-mean square amplitude of the excitation was 3.10 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.11. Mechanical shock
Mated specimens were subjected to a mechanical shock test having a half-sine waveform of 50 gravity units (g peack) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular or greater using a current of 100 milliamperes DC.

3.12. Reseating

Specimens were mated and unmated 3 times by hand.

3.13. Solderability.

Steam Aging Preconditioning：1. Intended for non-tin and non-tin-alloy lead finishes for 93+3/-5℃、1hrs. 2. Intended for tin and tin-alloy lead finishes for 93+3/-5℃、8hrs. <JESD22-B102, Condition C>
Solder pot temperature: 245±5℃, 5sMax.

3.14. Resistance to reflow soldering heat.

TEC-109-201 Method-A, Condition-B. Subject SMD connector to 3x reflow curve 260°C peak.

3.15. Thermal Shock

10 cycles between -40°C and 85°C with 30 minutes in each temperature extreme. Max. rate of temperature change 5°C/min.

3.16. Humidity/temperature Cycling

Mated specimens were exposed between 25º ± 3ºC at 80% RH and 65 º± 3 ºC at 50% RH for 60 cycles. Ramp times should be 2 hour and dwell should be 2 hours.

3.17. Humidity

Mated specimens were exposed at 40º ± 2ºC at 90%~96% RH for 96 hour.

3.18. Temperature life

Mated specimens were exposed to a temperature of 105±2°C for 300 hours.

3.19. Temperature life (Preconditioning)

Mated specimens were exposed to a temperature of 105±2°C for 72 hours.

3.20. Thermal cycling

Cycle connectors 500 times between 15º± 3ºC and 85 º± 3 ºC. Ramps should be a minimum of 2°C per minute and dwell times should insure that the contacts reach the temperature extremes for a minimum of 5 minutes.

3.21. Cold Test

Mated Connector -40℃, 96 hours, (EIA-364-17 Method A.)

3.22. Thermal Disturbance

10 cycles between 15C+/- 3℃ to 85 +/- 3℃. Min. rate of temperature change 1°C/min.

3.23. Mixed Flowing Gas

Mated specimens were exposed for 10 days to a mixed flowing gas Class IIA exposure. Class IIA exposure is defined as a temperature of 30℃ and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, H_2S at 10 ppb and SO_2 at 100 ppb.

3.24. Final Examination of Product

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.