MICTOR SB (True SMT) Connector

1. INTRODUCTION

1.1. Purpose

Testing was performed on Tyco Electronics MICTOR SB connectors to determine their conformance to the requirements of Product Specification 108-2139, Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of Tyco Electronics MICTOR SB connectors. Testing was performed at the Engineering Assurance Product Testing Laboratory between 18Jul05 and 15Oct05. The test file number for this testing is CTLB042234-013. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The Tyco Electronics MICTOR SB connectors listed in paragraph 1.5 conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-2168, Revision A.

1.4. Product Description

The MICTOR SB connectors are microstrip style connectors consisting of two rows of signal contacts divided by a center power ground plane. They are similar to MICTOR, but utilizing single beam signal contacts instead of dual beam contacts. Unlike MICTOR, MICTOR SB has surface mount ground bus leads instead of thru-hole leads.

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
1	7	1658012-5	MICTOR SB 200 position receptacle
	7	1658013-5	MICTOR SB 200 position 5.0 mm plug
2	3	1658012-5	MICTOR SB 200 position receptacle
	3	1658013-5	MICTOR SB 200 position 5.0 mm plug
3,4	5 each	1658012-5	MICTOR SB 200 position receptacle
	5 each	1658013-5	MICTOR SB 200 position 5.0 mm plug

NOTE *All specimens consisted of 5 modules, each containing 40 signal contacts and 1 ground contact.*

Figure 1

* Trademark
| Indicates change

1.6. Environmental Conditions

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

- Temperature: 15 to 35˚C
- Relative Humidity: 25 to 75%

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Initial examination of product	1	1	1	1
Low level contact resistance	3,7	2,4		
Insulation resistance			2,6	
Withstanding voltage			3,7	
Solderability, dip test				2
Vibration, random	5			
Mechanical shock, half-sine	6			
Durability	4			
Mating force	2			
Unmating force	8			
Thermal shock			4	
Humidity-temperature cycling			5	
Temperature life		3(c)		
Final examination of product	9	5	8	3

NOTE
(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 3 durability cycles.

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. A Certificate of Conformance was issued by Product Assurance. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Low Level Contact Resistance - Test Groups 1 and 2

Low level contact resistance measurements had a change in resistance (ΔR) of less than 15 milliohms for signal contacts and 5 milliohms for ground contacts after testing.

Test Conditions	Actual Resistance			Change In Resistance		
	Min	Max	Mean	Min ΔR	Max ΔR	Mean ΔR
Test Group 1, Signal Contacts (N = 600)						
Initial	20.133	23.877	21.978	---	---	---
Final	21.133	24.765	22.728	-0.649	2.888	0.822
Test Group 1, Ground Contacts (N = 15)						
Initial	0.318	0.399	0.342	---	---	---
Final	0.342	0.417	0.370	0.002	0.072	0.028
Test Group 2, Signal Contacts (N = 600)						
Initial	20.258	25.527	22.187	---	---	---
Final	20.263	29.547	22.216	-2.379	5.681	0.030
Test Group 2, Ground Contacts (N = 15)						
Initial	0.284	0.316	0.299	---	---	---
Final	0.305	0.351	0.321	0.000	0.052	0.022

NOTE *All Values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 3

All insulation resistance measurements were greater than 5000 megohms (5.0×10^9 ohms) initially and 1000 megohms (1.0×10^9 ohms) finally.

Test Conditions	Insulation Resistance		
	Min	Max	Mean
Test Group 3, Adjacent Signal Contacts N = 5			
Initial	3.2×10^{12}	2.0×10^{14}	1.1×10^{14}
Final	2.0×10^{13}	6.0×10^{13}	3.6×10^{13}
Test Group 3, Signal Contacts To Ground N = 5			
Initial	2.0×10^{12}	1.6×10^{14}	6.3×10^{13}
Final	2.0×10^{13}	5.0×10^{13}	3.4×10^{13}

NOTE *All values in ohms.*

Figure 4

2.4. Withstanding Voltage - Test Group 3

No dielectric breakdown, flashover or leakage greater than 0.5 milliampere occurred.

2.5. Solderability - Test Group 4

All contact leads had a minimum of 95% solder coverage.

2.6. Vibration, Random - Test Group 1

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

2.7. Mechanical Shock, Half-Sine - Test Group 1

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

2.8. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the specimens 100 times.

2.9. Mating Force - Test Group 1

All mating force measurements were less than 22.2 N [80 ozf] per module.

2.10. Unmating Force - Test Group 1

All unmating force measurements were greater than 5.6 N [20 ozf] per module.

2.11. Thermal Shock - Test Group 4

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

2.12. Humidity-temperature Cycling - Test Group 4

No evidence of physical damage was visible as a result of exposure to humidity-temperature cycling.

2.13. Temperature Life - Test Group 2

No evidence of physical damage was visible as a result of exposure to temperature life.

2.14. 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 Certification of Conformance was issued certifying that all Tyco Electronics specimens in this test package have been 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

Termination resistance measurements at low level current 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. A total of 200 signal contacts and 5 grounds contacts were measured on each specimen.

3.3. Insulation Resistance

Insulation resistance was measured between 6 randomly selected adjacent signal contacts on each mated but unmounted specimen, and then between all previously tested signal contacts and the ground contacts. A test voltage of 500 volts DC was applied for 2 minutes or meter stabilization before the resistance was recorded.

3.4. Dielectric Withstanding Voltage

A test potential of 675 volts AC was applied between the same contacts used for insulation resistance testing. This potential was applied at a rate of 500 volts per second, held for 1 minute, and then returned to zero. The leakage current was monitored for a maximum of 0.5 milliampere.

3.5. Solderability

Prior to testing, specimens were prepared by removing the locating studs to enable the specimens to sit flush on the ceramic substrate. A solder paste with a composition of 63 Sn/37 Pb RMA, Visc./KCPS 1000 10%, with a mesh of -325 +500 was then placed onto a stencil with pad geometry, opening, and thickness that was appropriate for the specimens being tested. The stencil was supplied with the specimens. The solder paste was printed onto a 4.5 X 4.5 X .0395 inch ceramic substrate. The screen was removed and the specimens were placed onto the solder paste print using appropriate magnification. Care was taken to ensure that the specimens were not contaminated in any way and were tested in the "as received" condition. The specimens and ceramic substrates were placed on a conveyor belt through an infrared oven. The specimens were exposed for 60 seconds between temperatures of 150 and 170˚C and for 60 seconds between 215 and 230˚C. The temperature on the ceramic substrate, at a point close to the specimen, was monitored to enable temperature profiling shown in Figure 5.

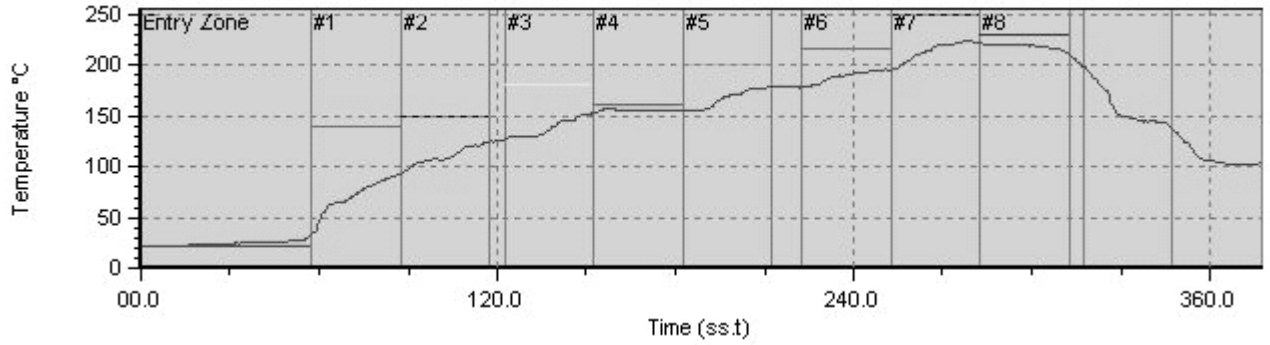

Figure 5

3.6. Vibration, Random

Parameters of this test condition are specified by a random vibration spectrum with excitation frequency bounds of 50 and 2000 Hz. The power spectral density (PSD) at 50 Hz is 0.01 G^2/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 0.04 G^2/Hz at 100 Hz. The spectrum is flat at 0.04 G^2/Hz from 100 Hz to 1000 Hz. The spectrum slopes down at 6 dB per octave to a PSD of 0.01 G^2/Hz at the upper bound frequency of 2000 Hz. The root-mean square amplitude of the excitation was 7.56 GRMS. The specimens were subjected to this test for 1 hour in each of the 3 mutually perpendicular axes, for a total test time of 3 hours. Test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.7. Mechanical Shock, Half-Sine

Parameters of this test condition are a half-sine waveform with an acceleration amplitude of 50 gravity units (g's peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular axes for a total of 18 shocks. Test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.8. Durability

Specimens were manually mated and unmated for 100 cycles at a rate not exceeding 500 cycles per hour.

3.9. Mating Force

Specimens were mated at a maximum rate of 12.7 mm [.5 in] per minute. Peak mating force was recorded.

3.10. Unmating Force

Specimens were unmated at a maximum rate 12.7 mm [0.5 in] per minute. Peak unmating force was recorded.

3.11. Thermal Shock

Specimens were placed in a thermal shock chamber and subjected to 5 cycles between -65 and 125˚C. Exposure time at each temperature extreme was 0.5 hour and the transfer time was less than 1 minute.

3.12. Humidity-temperature Cycling

Specimens were subjected to 10, 24 hour cycles of humidity-temperature cycling between 25 and 65˚C at 95% relative humidity.

3.13. Temperature Life

Specimens were preconditioned with 3 durability cycles. Specimens were then exposed to a dry heat temperature of 105˚C for 300 hours.

3.14. Final Examination of Product

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