Socket, 144 Position Surface Mount 8 Byte SO DIMM

1. INTRODUCTION

1.1. Purpose

| Testing was performed on the Tyco Electronics Small Outline (SO) Dual In-line Memory Module (DIMM) Socket to determine its conformance to the requirements of Product Specification 108-1739 Revision B.

1.2. Scope

| This report covers the electrical, mechanical, and environmental performance of the SO DIMM Socket. Testing was performed between 12May97 and 06Jun97, and between 23Aug01 and 08Oct01. The test file numbers for this testing are CTL 4320-001 and CTL B020289-001. This documentation is on file at and available from the Engineering Assurance Product Test Laboratory.

1.3. Conclusion

| The SO DIMM Socket, listed in paragraph 1.5., meets the electrical, mechanical, and environmental performance requirements of Product Specification 108-1739 Revision B.

1.4. Product Description

| The Tyco Electronics 144 position surface mount 8 byte SO DIMM socket is used to connect a SO DIMM module to a motherboard. The contacts are phosphor bronze, gold plated on the contact interface and tin-lead plating on the soldertail, all over nickel plating. The housing material is glass filled insulating polymer, UL94V-0.

| 1.5. Test Specimens

| Test specimens were randomly selected from normal current production lots. The following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,2,3,4,5	5 each	390112-1	144 position SO DIMM
1,2,3,4	5 each	1368063-1	144 position SO DIMM, 22.5 degree
5	1	1368063-1	144 position SO DIMM, 22.5 degree

| Figure 1

| 1.6. Environmental Conditions

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

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

* Trademark
| Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Groups (a)				
	1	2	3	4	5
	Test Sequence (b)				
Initial examination of product	1	1	1	1	1
Termination resistance, dry circuit	2,6	2,4	2,4		
Insulation resistance				2,6	
Dielectric withstand voltage				3,7	
Solderability					2
Vibration, random	4				
Mechanical shock	5				
Durability	3				
Thermal shock				4	
Humidity-temperature cycling				5	
Mixed flowing gas			3(c)		
Temperature life		3(c)			
Final examination of product	7	5	5	8	3

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests were performed.
(c) Precondition with 5 cycles of durability.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Groups

All specimens submitted for testing were randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance, Dry Circuit - Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts open circuit voltage were less than 30 milliohms initially and a maximum increase in resistance (ΔR) of 10 milliohms.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	60	Initial	16.24	22.89	18.002
		After mechanical ΔR	-6.27	1.84	-0.812
2	60	Initial	15.54	20.69	17.090
		After temperature life ΔR	-1.47	6.88	1.069
3	60	Initial	16.07	21.19	17.058
		After mixed flowing gas ΔR	-3.88	0.90	-0.303
1 (22.5 degree)	575	Initial	17.368	24.310	20.7668
		After Mechanical ΔR	-1.876	1.529	-0.1880
2 (22.5 degree)	575	Initial	16.924	23.431	20.3206
		After temperature life ΔR	-1.583	3.118	-0.0636
3 (22.5 degree)	575	Initial	17.003	23.848	20.3220
		After mixed flowing gas ΔR	-0.6175	6.7795	0.2821

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 10000 megohms.

2.4. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred.

2.5. Solderability - Group 5

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

2.6. Vibration, Random - Group 1

No discontinuities were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.7. Mechanical Shock - Group 1

No discontinuities were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8. Durability - Group 1

No physical damage occurred as a result of mating and unmating the connector 25 times.

2.9. Thermal Shock - Group 4

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

2.10. Humidity-temperature Cycling - Group 4

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

2.11. Mixed Flowing Gas - Group 3

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

2.12. Temperature Life - Group 2

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

2.13. Final Examination of Product - All 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

Specimens were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes maximum with a 20 millivolt open circuit voltage.

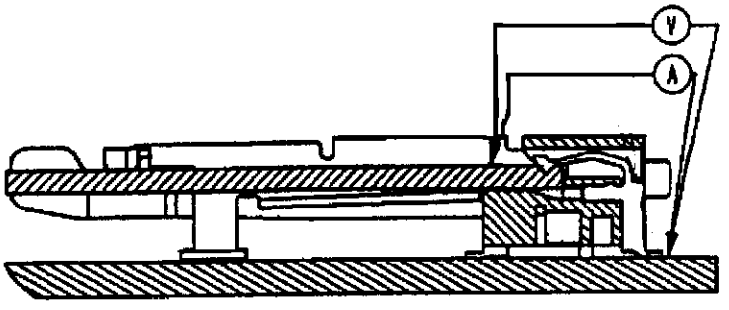

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 1000 volts AC was applied between the adjacent contacts. This potential was applied for 1 minute and then returned to zero.

3.5. Solderability

Connector assembly contact solder tails were subjected to a solderability test. Solder paste with a composition of 63 Sn/37 Pb RMA, Visc./KCPS 1000 ± 10%, with a mesh of -325/+500 was placed on the stencil with a pad geometry opening and thickness appropriate for the specimen. The solder paste was printed onto a ceramic substrate. The screen was removed and the specimen placed on the solder paste. The specimen and the ceramic plate were conveyed through an infrared oven. The specimens were exposed to between 150 and 170°C for 60 seconds and to between 215 and 230°C for 60 seconds. The specimens were allowed to cool and then immersed in isopropyl alcohol and placed in an ultrasonic cleaner for 5 minutes.

3.6. Vibration, Random

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 was 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. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Mechanical Shock

Mated specimens were subjected to a mechanical shock test having a half-sine waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Durability

Specimens were mated and unmated 25 times at a rate of 600 cycles per hour.

3.9. Thermal Shock

Unmated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 105°C. The transition between temperatures was less than 1 minute.

3.10. Humidity-temperature Cycling

Unmated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while maintaining high humidity (Figure 5).

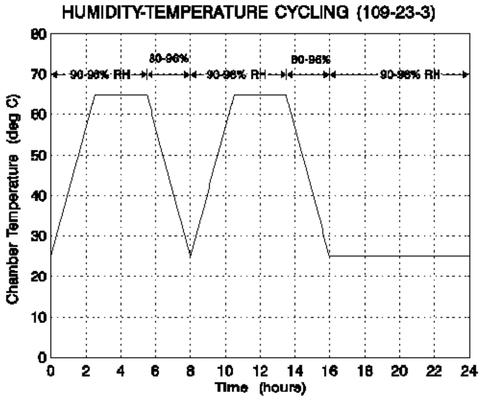

Figure 5
Typical Humidity-Temperature Cycling Profile

3.11. Mixed Flowing Gas, Class II and Class IIA

A. Mated specimens were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb. Specimens were preconditioned with 5 cycles of durability.

B. Mated 22.5 degree specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA exposure is defined as a temperature of 30°C 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. Specimens were preconditioned with 5 cycles of durability.

3.12. Temperature Life

Mated specimens were exposed to a temperature of 105°C for 315 hours. Specimens were preconditioned with 5 cycles of durability.

3.13. Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.