AMP*

QUALIFICATION TEST REPORT

Micro-Pitch Connector

501-90 Rev. 0

Product Specification:	108-1223, Rev. 0
CTL No.:	CTL0341-004
Date:	May 18, 1989
Classification:	Unrestricted
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Table of Contents

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report
Micro-Pitch Connector

1. Introduction

1.1 Purpose

Testing was performed on AMP's Micro-Pitch Connector to determine if it meets the requirements of AMP Product Specification 108-1223 Rev. 0.

1.2 Scope

This report covers the electrical, mechanical and environmental performance of the Micro-Pitch Connector manufactured by the Micro Electronics Products Division of the Integrated Circuit Connector Group. The testing was performed between February 27, 1989 and May 12, 1989.

1.3 Conclusion

The Micro-Pitch Connector meets the electrical, mechanical and environmental performance requirements of AMP Product Specification 108-1223, Rev. 0.

1.4 Product Description

The Micro-Pitch socket is a 2 piece connector providing a method of handling and socketing the standard "JEDEC" (MO-069) plastic quad flat pack (PQFP). Phosphor bronze contacts are plated, tin/lead over nickel, and fully protected on .025 inch centerlines, in a liquid crystal polymer housing. A polyphenylene sulfide cover holds the PQFP securely in place via 4 corner latches. During insertion, contacts wipe on the inside of the PQFP gullwing leads, which assures reliable electrical contact.

1.5 Test Samples

The samples were taken randomly from current production, and the following samples were used for test:

Test Group	Quantity	Part Number	Description
1 to 6	12	821949-5	Housing Sub-assembly
1 to 6	12	821942-1	Cover

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,8	1,6	1,6	1,5	1,9	1,5
Termination Resistance, Dry Circuit	3,7	2,5	2,5			2,4
Dielectric Withstanding Voltage					3,7	
Insulation Resistance					2,6	
Capacitance				2		
Vibration	5					
Physical Shock	6					
Mating Force	2					
Contact Retention					8	
Durability	4	3	3			
Solderability				3		
Thermal Shock					4	3
Humidity-Temperature Cycling			4		5	
Temperature Life		4				
Resistance to Soldering Heat				4		

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal production lots. They were inspected and accepted by the Product Assurance Department of the Integrated Circuit Connector Group.

2.2 Termination Resistance, Dry Circuit - Groups 1, 2, 3, 6

All termination resistance measurements, taken at 100 milliamperes dc and 50 millivolts open circuit voltage, were less than the specification requirement of 20 milliohms maximum initial and 10 milliohms maximum change after testing.

Group	Condition	No. of Contacts	Initial Max.	Final Max.	Final Mean
1	After Mechanical Testing	50	16.28	+0.720	+0.360
2	After Temperature Life	56	15.90	+5.500	+1.200
3	After Humidity-Temp Cyc	56	15.70	+1.000	+0.680
6	After Thermal Shock	56	16.20	+0.300	+0.121

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 5

There was no dielectric breakdown or flashover when a test voltage of 750 vac was applied for one minute between adjacent contacts.

2.4 Insulation Resistance - Group 5

All insulation resistance measurements were greater than the specification requirement of 5000 megohms minimum.

2.5 Capacitance - Group 4

All capacitance measurements were less than the specification requirement of 1.0 picofarads.

2.6 Vibration - Group 1

During vibration testing, there were no discontinuities of the contacts greater than one microsecond. Following vibration, there were no cracks, breaks or loose parts on the connector assemblies.

2.7 Physical Shock - Group 1

During physical shock testing, there were no discontinuities of the contacts greater than one microsecond. Following physical shock testing, there were no cracks, breaks or loose parts on the connector assemblies.

2.8 Mating Force - Group 2

All mating force measurements were calculated to be less than the specification requirement of 0.50 pounds per contact.

2.9 Contact Retention - Group 5

There was no physical damage to the contacts, and no contacts dislodged from the housings as a result of applying 12 ounces axial load to the contacts.

2.10 Durability - Groups 1, 2, 3

There was no physical damage to the samples as a result of mating and unmating the connector assemblies 15 times.

2.11 Solderability - Group 4

All contacts examined had a minimum of 95% solder coverage.

2.12 Thermal Shock - Groups 5, 6

There was no evidence of physical damage to either the contacts or the connector as a result of thermal shock.

2.13 Humidity-Temperature Cycling - Groups 3, 5

There was no evidence of physical damage to either the contacts or the connector as a result of exposure to temperature-humidity cycling extremes.

2.14 Temperature Life - Group 2

There was no evidence of physical damage to either the contacts or the connector as a result of exposure to a temperature of 105°c for 96 hours.

2.15 Resistance to Soldering Heat - Group 4

After performing a Resistance to Soldering Heat test, there was no evidence of physical damage.

3. Test Methods

3.1 Examination of Product

The product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance, Low Level

Termination resistance measurements at low level current were made, using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes dc, with an open circuit voltage of 50 millivolts dc.

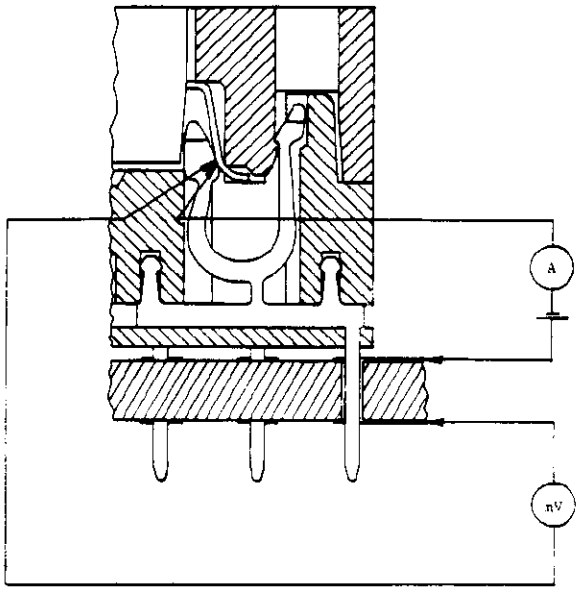

Figure 1
Resistance Measurement Points, Typical

3.3 Dielectric Withstanding Voltage

A test potential of 750vac was applied between the adjacent contacts. This potential was applied for one minute. The voltage was then returned to zero. The leakage current was less than 5.0 milliampere.

3.4 Insulation Resistance

Insulation Resistance was measured between adjacent contacts, using a test voltage of 500 volts dc. This voltage was applied for one minute before the the resistance was measured.

3.5 Capacitance

Capacitance was measured between adjacent contacts using a test frequency of 1.00 MHz.

3.6 Vibration, Sine

Connector assemblies were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied logarithmically between the limits of 10 and 2000 Hz, and returned to 10 Hz in 10 minutes. This cycle was performed 24 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7 Physical Shock

Connector assemblies were subjected to a physical shock test, having a sawtooth waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The assemblies were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.8 Mating Force

The force required to mate connector assembly with locking latches was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.9 Contact Retention

An axial load of 12 ounces was applied to each contact and held for 60 seconds. The force was applied in a direction so as to cause removal of the contacts from the housing.

3.10 Durability

Connectors assemblies were mated and unmated 15 times, using the connectors insertion/extraction hand tool.

3.11 Solderability

With a solder bath at 245°C, using 60/40 solder and a mildly active rosin, each sample was immersed in the bath for 5 to 10 seconds. Samples were removed at the rate of 1 inch per minute. Samples were visually examined, and a coverage judgment was made.

3.12 Thermal Shock

Connector assemblies were subjected to twenty five cycles of temperature extremes. The temperature extremes were -55°C and 105°C. Each cycle consisted of 30 minutes at each temperature. The transition between temperatures was less than one minute.

3.13 Humidity-Temperature Cycling

Mated Connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours, and consisted of cycling the temperature between 25°C and 65°C twice, while the relative humidity was held at 95%.

3.14 Temperature Life

Mated samples were subjected to 96 hours at an elevated temperature of 105°C.

3.15 Resistance to Soldering Heat

With a solder bath at 260°C, samples were immersed in the bath for 10 seconds.

4. Validation

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