



QUALIFICATION TEST REPORT

SOCKET HIGH PRESSURE,
CHIP CARRIER

501-003

Rev. C

Product Specification:	108-38000 Rev. E
CTL No.:	CTL0294-007-019
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Corporate Test Laboratory Harrisburg, Pennsylvania

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CORPORATE TEST LABORATORY

Qualification Test Report Socket High Pressure, Chip Carrier.

1. Introduction

1.1 Purpose

Testing was performed on AMP* HPT PLCC Socket to determine its conformance to the requirements of AMP Product Specification 108-38000 Rev. E.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the HPT PLCC Socket manufactured by the Integrated Circuit Connector Division. The testing was performed between December 12, 1992 and February 24, 1993.

1.3 Conclusion

The HPT PLCC Socket meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-38000 Rev. E.

* Trademark

1.4 Product Description

The High Pressure Tin (HPT) Chip Carrier Socket is designed to accept JEDEC PLCC packages in square and rectangular configurations.

The contacts are Phosphor bronze with 150 microinch minimum tin/lead over 40 microinch minimum nickel. The housing is Polyphenylene sulfide (PPS), glass-filled, UL 94V-0 rated, 220°C.

1.5 Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,2,3,4,5	4 ea.	821574-1	68 Pos. Socket
6	10	821574-1	68 Pos. Socket

1.6 Qualification Test Sequence

Test or Examination	Test Groups					
	1	2	3	4	5	6
Examination of Product	1,9	1,5	1,5	1,8	1,4	1,3
Termination Resistance	3,7	2,4	2,4			
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
Capacitance					2	
Vibration	5					
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Durability	4					
Solderability						3
Thermal Shock				4		
Humidity/Temperature Cycling			3	5		
Temperature Life		3				
Solvent Resistance						2

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 Division.

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

All termination resistance measurements, taken at 100 milliamperes dc. and 50 millivolts open circuit voltage, were less than the specification requirement of 12 milliohms initially, and had a change of less than 3 milliohms for final measurements.

Test Group	No. of Samples	Condition	Min.	Max.	Mean
1	272	Initial	4.55	7.33	5.871
		After Mechanical (ΔR)	-0.84	+2.26	+0.102
2	272	Initial	4.56	6.95	5.746
		After Temp Life (ΔR)	-0.78	+1.65	+0.121
3	272	Initial	4.58	7.91	5.980
		After Humidity (ΔR)	-1.98	+1.35	-0.314

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 4

There was no dielectric breakdown or flashover between adjacent contacts, when a test voltage of 600 VAC was applied for one minute.

2.4 Insulation Resistance - Group 4

All insulation resistance measurements were greater than the specification requirement of 10,000 megohms.

2.5 Capacitance - Group 4

All capacitance measurements were less than the 1.0 picofarad specification maximum.

2.6 Vibration - Group 1

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

2.7 Physical Shock - Group 1

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

2.8 Mating Force - Group 1

All mating forces were less than the specification requirement of 15 ounces per contact.

2.9 Unmating Force - Group 1

All unmating forces were greater than the specification requirement of 0.3 ounces per contact.

2.10 Solderability - Group 4

The contact leads met the requirement of 95% minimum solder coverage.

2.11 Durability - Group 1

There was no physical damage to the samples as a result of inserting and removing a dummy IC 25 times.

2.12 Thermal Shock - Group 3

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 - Group 3

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

2.14 Solvent Resistance - Group 5

There was no evidence of physical damage to either the contacts or the connector as a result of exposure to various solvents.

2.15 Temperature Life - Group 6

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

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.

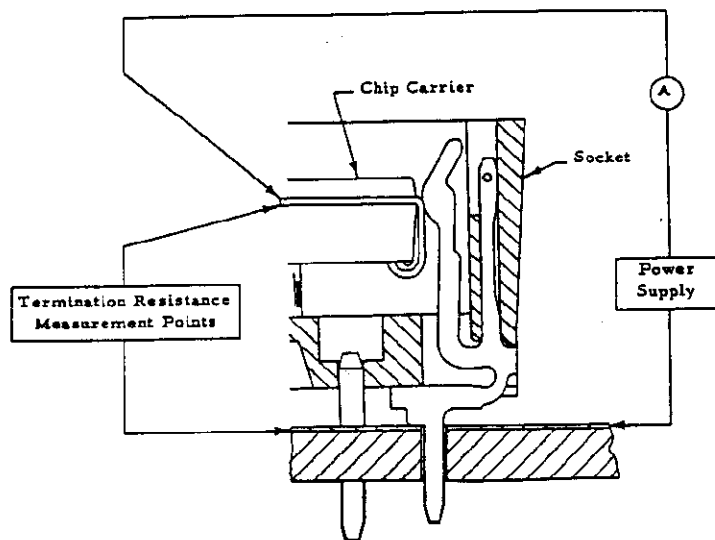


Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 600 Vac was applied between the adjacent contacts of unmated sockets. This potential was applied for one minute and then returned to zero.

3.4 Insulation Resistance

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

3.5 Capacitance

The capacitance was measured between the adjacent contacts of unmated sockets. A test frequency of one megahertz was applied between the adjacent circuits.

3.6 Vibration, Sine

Sockets mated with dummy IC modules 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 20 minutes. This cycle was performed 12 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

Sockets mated with dummy IC modules were subjected to a physical shock test having a half sine waveform of 100 gravity units (g peak) and a duration of 6 milliseconds. One shock in each direction were applied along the three mutually perpendicular planes, for a total of 6 shocks. The connectors 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 a dummy IC modules with a socket was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.9 Unmating Force

The force required to remove a dummy IC modules from a socket was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.10 Solderability

The connector assembly contact solder tails were subjected to a solderability test. The solder tails were immersed in activated flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were immersed in the molten solder at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245°C.

3.11 Durability

Dummy IC's were inserted and removed 25 times at a rate of 0.5 inch/minute.

3.12 Thermal Shock

Sockets mated with dummy IC modules were subjected to 25 cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 125°C. The transition between temperatures was less than two minute.

3.13 Humidity-Temperature Cycling

Sockets mated with dummy IC modules 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%. Samples were preconditioned with 5 cycles of durability.

3.14 Solvent Resistance

Eight sockets were subjected to the fluid immersion test. Two samples each were immersed in the following liquids:

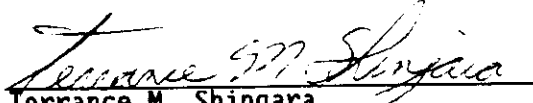
- (1) One part isopropyl alcohol (per TT-I-735, Grade A) and three parts mineral spirits (per TT-T-291, Grade A) - Immersion time was 5 minutes at 25°C, with 24 hours drying. The test was done 5 times.
- (2) 1-1-1 Trichloroethane - Immersion time was 5 minutes at 25°C, with 24 hours drying. The test was done 5 times.
- (3) Freon TMC - Immersion time was 5 minutes at 25°C, with 24 hours drying. The test was done 5 times.
- (4) One part by volume of monoethanolamine, one part by volume propylene glycol monomethyl ether, and 42 parts by volume of deionized water. Immersion temperature was between 63°C and 70°C.

3.15 Temperature Life

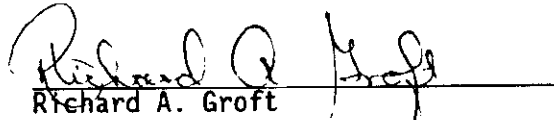
Sockets mated with dummy IC modules were exposed to a temperature of 125°C for 1000 hours. Samples were preconditioned with 5 cycles of durability.

4. Validation

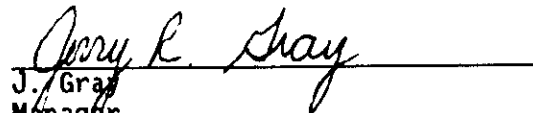
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