Connector, Shielded, Miniature Circular DIN, PCB Mounted

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* Mini DIN Printed Circuit Board (PCB) Mounted Connector to determine its
| conformance to the requirements of AMP Product Specification 108-1225 Rev. D.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Mini DIN PCB Mounted Connector manufactured by Global Personal Computer Business group. The testing was performed between September 10, 1996 and October 11, 1996.

1.3. Conclusion

The Mini DIN PCB Mounted Connector, listed in paragraph 1.5., meet the electrical, mechanical, and
| environmental performance requirements of AMP Product Specification 108-1225 Rev D.

1.4. Product Description

The miniature circular DIN Connectors are printed circuit board, through-hole shielded receptacles and cable mounted plug used for I/O interconnects. It consists of only one dimensional envelope, which encompasses low pin count from 3 to 8 position, and contains an integral keying feature.

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 Nbr	Description
1,2,3,4	5 ea.	749179-1	8 Pos Recp. Rt. Angle PCB Mount 30μ Au
5	5	750073-1	8 Pos Recp. w/front ground 30μAu
1,2,3,4,5	5 ea.	84165-2	8 Pos Plug shell
1,2,3,4,5	5 ea.	84168-1	8 Pos Plug housing
1,2,3,4,5	175	84141-4	Plug contacts 15μAu
4	5	786843-1	6 Pos Recp. Rt. Angle PCB Mount 150μSn
4	5	750206-5	6 Pos Plug 30μAu
| 6	10	749179-3	8 Pos Rt. Angle Mini DIN receptacle

* Trademark
| Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Groups					
	1	2	3	4	5	6
	Test Sequence					
Examination of Product	1,9	1,5	1,5	1,8	1,5	1,3
Termination Resistance, Dry Circuit	3,7	2,4	2,4			
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
Transfer Impedance					2,4	
Solderability						2
Vibration	5					
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Durability	4					
Thermal Shock				4		
Humidity-Temperature Cycling				5		
Mixed Flowing Gas			3			
Temperature Life		3			3	

NOTE *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 current production lots. They were inspected and accepted by the Product Assurance Department of the Capital Goods Business Unit.

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

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, were less than 20 milliohms initially and 30 milliohms after testing.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	35	Initial	6.29	9.08	7.293
		After Mechanical	6.47	10.92	7.982
2	35	Initial	6.15	8.65	7.320
		After Temp Life	6.51	10.70	8.025
3	35	Initial	6.31	9.80	7.321
		After Mixed Gas	6.32	10.38	7.623

All values in milliohms

Form 404-34 20Nov96

2.3. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4. Insulation Resistance - Group 5

All insulation resistance measurements were greater than 1,000 megohms.

2.5. Transfer Impedance - Group 5

The transfer impedance was better than -18dB ohm at 30 MHz and better than -5dB at 160 MHz.

2.6. Solderability - Group 6

The solder tails of the contacts and the shield hold-downs met the requirements of AMP Specification 109-11-1, Revision L.

2.7. Vibration - Group 1

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

2.8. Physical Shock - Group 1

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

2.9. Mating Force - Group 1

All mating force measurements were less than 9.0 pounds.

2.10. Unmating Force - Group 1

All unmating force measurements were greater than 2.0 pounds.

2.11. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 500 times.

2.12. Thermal Shock - Group 4

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

2.13. Humidity-Temperature Cycling - Group 5

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

2.14. Mixed Flowing Gas - Group 3

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

2.15. Temperature Life - Group 2

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

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 4 terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

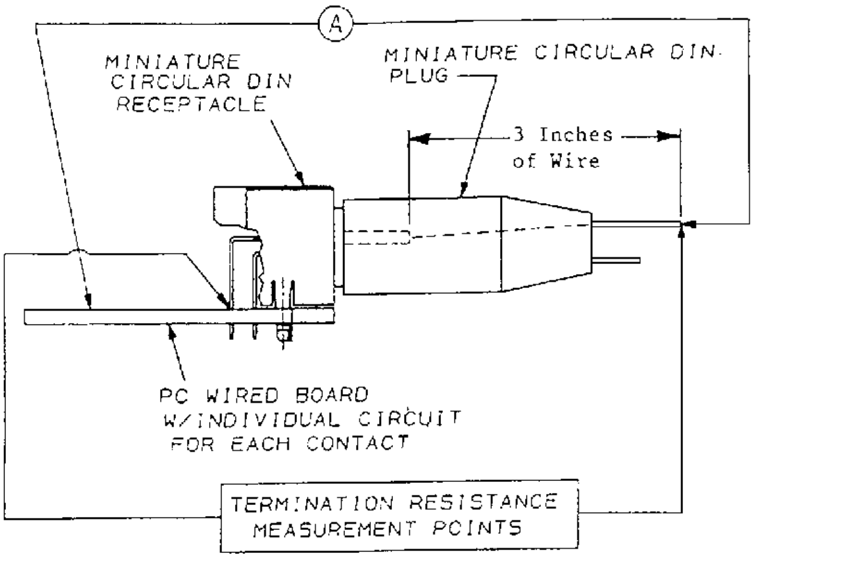

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 500 volts AC was applied between the adjacent contacts. This potential was applied for 1 minute and then returned to zero.

3.4. 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.

3.5. Transfer Impedance

The shielding of a panel to cable, mated connector was measured from 0 to 500 MHz. This measurement represents 1 mated pair without any cable or fixturing contributions. The results are in ohms, which is the ratio of voltage leaked measured on the outside, to the current driving the inside of the sample. The results were converted to dB with respect to 1 ohm.

| 3.6. Solderability

| Solderability of Metallic Surfaces per AMP Specification 109-11-1, Revision L. Solder composition: Type S, Sn
| 63 (62.5 - 63.5%, remainder lead) per AMP Specification 100-240. Flux: Type R, Kester 145, nonactivated
| rosin flux. Ambient temperature: 74°F. Relative humidity: 28%.

| The thermostatically controlled solder bath (approximately 150 pound capacity) was maintained at 473 ± 9°F.
| Dross was completely removed from the surface of the molten solder immediately before dipping. The
| specimen was immersed in flux for 10 seconds, removed from the flux and allowed to drain for 20 seconds. It
| was dipped and held in the solder bath for 5 seconds, immersion and emersion rates were approximately 1
| inch/second. The flux residue was removed in a 5 minute ultrasonic isopropyl alcohol bath. Examination was
| done under a microscope at 10X magnification.

3.7. Vibration, Random

Mated connectors were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 Hz. The power spectral density at 50 Hz was 0.050 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.20 G^2/Hz at 100 Hz. The spectrum was flat at 0.20 G^2/Hz from 100 to 1000 Hz. The spectrum sloped down at 6 dB per octave to the upper bound frequency of 2000 Hz, at which the PSD was 0.050 G^2/Hz. The root-mean square amplitude of the excitation was 16.91 GRMS. Connectors were vibrated for 20 minutes in each of 3 mutually perpendicular planes, for a total vibration time of 60 minutes. Connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.8. Physical Shock

Mated connectors were subjected to a physical shock test, having a half-sine waveform of 50 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. The connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9. Mating Force

The force required to mate individual connectors was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 0.5 inch/minute.

3.10. Unmating Force

The force required to unmate individual connectors was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 0.5 inch/minute.

3.11. Durability

Connectors were mated and unmated 500 times at a rate not exceeding 200 cycles per hour.

3.12. Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55 and 105°C. The transition between temperatures was less than 1 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 and 65°C twice while maintaining high humidity. See figure 2.

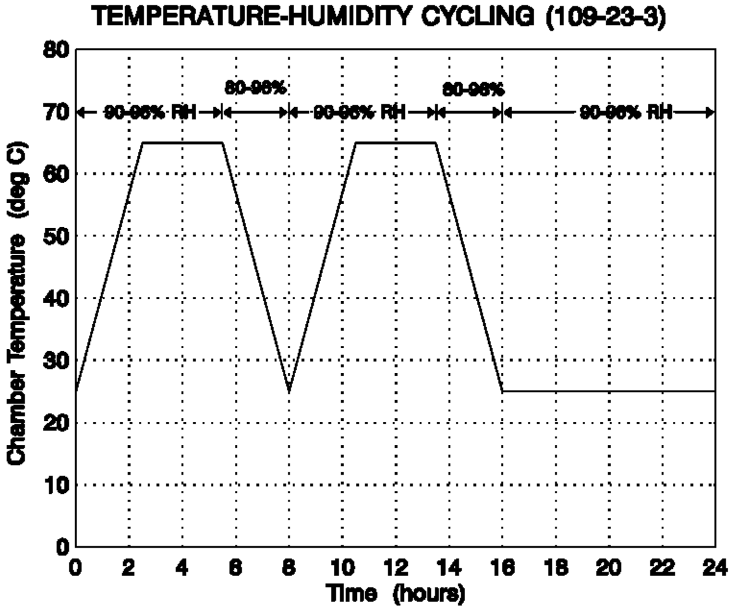

Figure 2
Typical Humidity-Temperature Cycling Cycle

3.14. Mixed Flowing Gas, Class II

Mated connectors 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. Samples were preconditioned with 10 cycles of durability.

3.15. Temperature Life

Mated samples were exposed to a temperature of 105°C for 500 hours. Samples were preconditioned with 10 cycles of durability.

4. VALIDATION

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