Connector, Shielded, Miniature Circular DIN, PCB Mounted

1. INTRODUCTION

1.1. Purpose

Testing was performed on Tyco Electronics Mini DIN Printed Circuit Board (PCB) Mounted Connector to determine its conformance to the requirements of Product Specification 108-1225 Revision E.

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 10Sep96 and 11Oct96.

1.3. Conclusion

The Mini DIN PCB Mounted Connector, listed in paragraph 1.5., meets the electrical, mechanical, and environmental performance requirements of Product Specification 108-1225 Revision E.

1.4. Product Description

The miniature circular DIN Connectors are PCB, 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

Test samples 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 each	749179-1	8 position receptacle right angle PCB mount 30 µin Au
5	5	750073-1	8 position receptacle with front ground 30 µin Au
1,2,3,4,5	5 each	84165-2	8 position plug shell
1,2,3,4,5	5 each	84168-1	8 position plug housing
1,2,3,4,5	175	84141-4	Plug contacts 15 µin Au
4	5	786843-1	6 position receptacle right angle PCB mount 150 µin Sn
4	5	750206-5	6 position plug 30 µin Au
6	10	749179-3	8 position right angle Mini DIN receptacle

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product	1,9	1,5	1,5	1,8	1,5	1,3
Termination resistance	3,7	2,4	2,4			
Insulation resistance				2,6		
Dielectric withstanding voltage				3,7		
Transfer impedance					2,4(d)	
Solderability						2
Vibration	5					
Physical shock	6					
Durability	4					
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity/temperature cycling				5		
Temperature life		3(c)			3(e)	
Mixed flowing gas			3(c)			

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	Number 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 temperature life	6.51	10.70	8.025
3	35	Initial	6.31	9.80	7.321
		After mixed flowing gas	6.32	10.38	7.623

NOTE *All values in milliohms.*

2.3. Insulation Resistance - Group 4

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

2.4. Dielectric Withstanding Voltage - Group 4

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

2.5. Transfer Impedance - Group 5

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

2.6. Solderability - Group 6

The solder tails of the contacts and the shield hold-downs met the requirements of Test 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. Durability - Group 1

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

2.10. Mating Force - Group 1

All mating force measurements were less than 9.0 pounds.

2.11. Unmating Force - Group 1

All unmating force measurements were greater than 2.0 pounds.

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 4

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. Temperature Life - Groups 2 and 5

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

2.15. 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.

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, Dry Circuit

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.

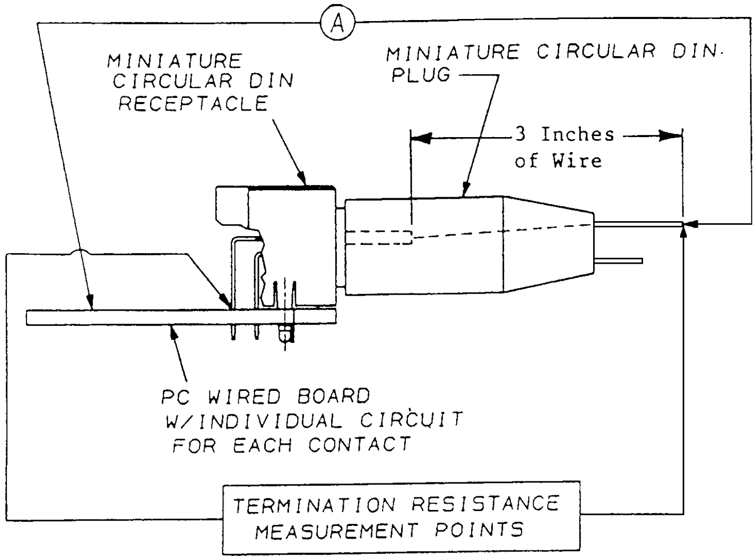

Figure 1
Typical Termination Resistance Measurement Points

3.3. 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 500 volts AC was applied between the adjacent contacts. This potential was applied for 1 minute and then returned to zero.

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 Material 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 per 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

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. Durability

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

3.10. 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 per minute.

3.11. 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 per minute.

3.12. Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes with each cycle consisting of 30 minutes at -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 (Figure 2).

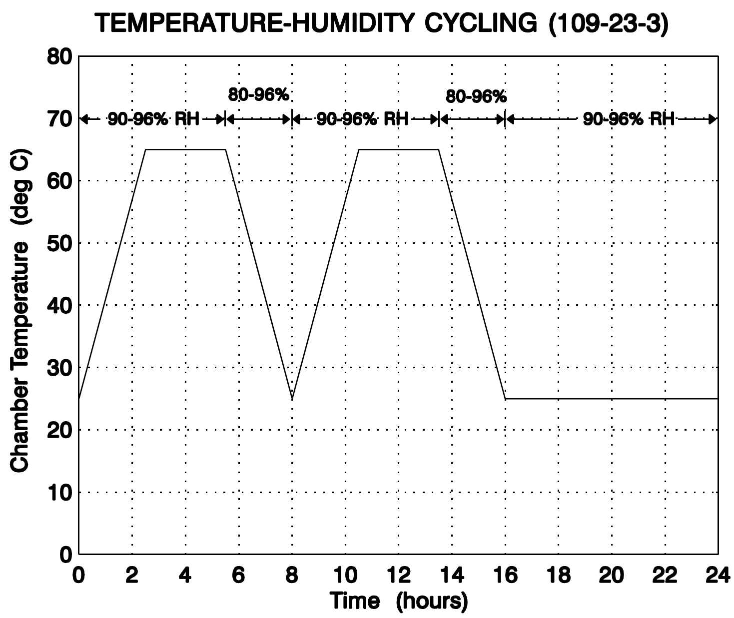

Figure 2
Typical Humidity/temperature Cycling Cycle

3.14. Temperature Life

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

3.15. 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.

4. VALIDATION

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