2mm HM 8column connector

1 INTRODUCTION

1.1 Purpose

Test was performed on TE 2mm HM 8column male and female connectors to determine its conformance to the product spec 108-60123.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of 2mm HM 8column conn

1.3 Conclusion

TE 2mm HM 8column male and female connectors listed in paragraph 1.5 meet the electrical, mechanical and environmental performance requirements of Product Specification 108-60123.

1.4 Product Description

These connectors are two-piece devices to interconnect 2 printed circuit boards.

1.5 Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part number were used for test. 3 pcs sample were tested in each test group.

Sample PN	Description
2336514-1	2mm HM 8columns male connector
2336682-1	2mm HM 8columns female connector

1.6 Environment Conditions.

Unless otherwise stated. The following environmental condition prevailed during testing.

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

1.7 **Test Requirements and Procedures Summary**

Test Items	Requirements	Procedures
Examination of product	Meets requirements of product drawing.	EIA-364-18 Visual inspection.
ELECTRICAL		
Contact resistance (LLCR)	20milliohm max per contact, ΔR < 5 milliohms per contact final.	IEC60512-2-2a. Subject specimens to 100 mA maximum and 20 millivolts maximum open circuit voltage.
Insulation Resistance	10,000 megaohm minimum. 1,000 megaohm minimum final.	IEC60512-2-3a. Test between any adjacent contacts at 100 volts DC of mated specimens. Duration: 1 minute
Voltage Proof	1 minute hold with no breakdown and flashover	IEC60512-2-4a. Method B. 750VAC r.m.s Test between adjacent contacts of mated specimens.
Electrical load and temperature	1.0A at 70℃, 1000h Max. temperature 125℃	IEC60512-5-9b. All contacts loaded
Contact disturbance	Max. disturbance 1 microsecond	IEC60512-2-2e. 6 contacts/connector Mated
MECHANICAL		
Test Items	**Requirements**	**Procedures**
Vibration	No physical damage No discontinuity > 1 µs	IEC60512-4-6d. 10 sweepings in each direction 10-500Hz, Amplitude 0,35 mm or a= 50 m/s2 Mated, 2h in three axes.
Physical shock.	No physical damage No discontinuity > 1 µs	IEC60512-4-6c Acceleration 490 m/s2 duration of impact 11 ms 5 shocks in 2 directions in 3 axes
Gauge retention force	Gauge shall be retained	IEC60512-8-16e
Engagement / separation force	Engagement max 0,75N / contact Separation min. 0,15N / contact	IEC60512-7-13a Speed 10 mm/s. max. rest min. 30 s.

Contact retention in insert	Axial displacement max. 0,1 mm	IEC60512-8-15a 5N in mating and unmating direction.
Mechanical operations	125 cycles (total number of operations 2x125)	IEC60512-5-9a
Static load, traverse	No displacement of the connector on the pc board likely to impair normal operation.	IEC60512-5-8a Unmated see fig 5 F1 = 50N F2 = 40N F3 = 25N
ENVIRONMENTAL		
Test Items	**Requirements**	**Procedures**
Rapid change of temperature	Measure Insulation Resistance and Voltage Proof	IEC60512-6-11d -55°C / +125°C 5 cycles 30 min. / temp Mated
Dry heat	Measure Insulation Resistance	IEC60512-6-11l 125°C 16h Mated
Damp heat cycle	Measure Insulation Resistance, Contact resistance and Voltage Proof	IEC60512- 6-11m 40°C upper temperature
Cold	No physical damage	IEC60512- 6-11j -55°C 2h
Damp heat steady state	Measure Insulation Resistance, Contact resistance and Voltage Proof	IEC60512- 6-11m 40°C 93% RH 21 days
Corrosion industrial atmosphere	Measure Contact resistance	IEC 60068-2-60 (Kc) 50% Mated 4 days 500 ± 100 mm3 / m3 SO2 100 ± 20 mm3 / m3 H2S

Figure 1

1.8 **Qualification Test Sequence**

Test or Examination	Test Group			
	1	2	3	4
	Test Sequence (a)			
Visual Examination	1,5,7,10,15,19,21,27	1,5,12,18	1,8	1,8
Contact resistance (LLCR)	3,8,11,24	3,6,10,13	2,5	2,5
Insulation Resistance	13,17,23	7,14	4	6
Voltage proof	14,25	8,15	6	7
Electrical load and temperature				4
Vibration	6			
Physical shock.	9			
Gauge retention force		2,16		
Engagement / separation force	2,26		7	
Contact retention in insert	4			
Mechanical operations		4,11		3
Static load, traverse		17		
Rapid change of temperature	12			
Dry heat	16			
Damp heat cycle 1st cycle	18			
Damp heat cycle 5 cycles	22			
Cold	20			
Damp heat steady state			3	
Corrosion industrial atmosphere		9		
Sample size	3pcs	3pcs	3pcs	3pcs

NOTE:

(a) Numbers indicate sequence in which tests are performed.

Figure 2

2 SUMMARY OF TESTING

2.1 2mm HM male and female connectors meet the electrical, mechanical and environmental performance requirements of Product Specification 108-60123.

2.2 Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.3 Test Results

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
1	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Engagement force	initial	14.9	16.2	15.5	N	30N Max.	Meet spec
	Separation force	initial	10.2	11.8	10.9	N	6N Min.	Meet spec
	LLCR	initial	7.9	13.6	10.3	mΩ	20 mΩ Max.	Meet spec
	Male contact retention in mating direction	initial	>5N. The axial displacement is less than 0.1mm			N	5N	Meet spec
	Male contact retention in unmating direction	initial	>5N. The axial displacement is less than 0.1mm			N	5N	Meet spec
	Female contact retention in unmating direction	initial	>5N. The axial displacement is less than 0.1mm			N	5N	Meet spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Vibration	final	No discontinuities were detected No physical damage			µs	No discontinuity > 1 µs	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR (ΔR)	final	-1.60	2.88	0.21	mΩ	5 mΩ max.	Meet spec
	Physical shock.	final	No discontinuities were detected No physical damage			µs	No discontinuity > 0.1 µs	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR (ΔR)	final	-1.65	2.68	0.01	mΩ	5 mΩ max.	Meet spec
	Rapid change of temperature	final	No physical damage			N/A	No abnormalities	Meet Spec
	Insulation Resistance	final	1.4	11.6	3.7	10^{10}Ω	10^{10}Ω Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Dry heat	final	No physical damage			N/A	No abnormalities	Meet Spec
	Insulation Resistance	final	1.3	17.6	4.6	10^{10}Ω	10^{9}Ω Min.	Meet Spec
	Damp heat cyclic 1st cycle	final	No physical damage			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
	Cold	final	No physical damage			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Damp heat cyclic 5 cycles		No physical damage			N/A	No abnormalities	Meet Spec
	Insulation Resistance	final	1.2	8.4	3.0	$10^{10}\Omega$	$10^{9}\Omega$ Min.	Meet Spec
	LLCR (ΔR)	final	-1.15	4.23	0.78	mΩ	5 mΩ max.	Meet spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Engagement force	initial	9.3	11.8	10.2	N	30N Max.	Meet spec
	Separation force	initial	7.4	8.8	8.0	N	6N Min.	Meet spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
2	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Gauge retention force	initial	Gauge was retained			N/A	Gauge shall be retained	Meet spec
	LLCR	initial	8.1	14.3	10.4	mΩ	20 mΩ Max.	Meet spec
	Mechanical operations	initial	No physical damage			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR (ΔR)	final	-1.98	0.97	-0.11	mΩ	5 mΩ max.	Meet spec
	Insulation Resistance	final	1.2	11.6	4.4	$10^{10}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Corrosion industrial atmosphere		No physical damage			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-2.23	0.73	0.00	mΩ	5 mΩ max.	Meet spec
	Mechanical operations	final	No physical damage			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR (ΔR)	final	-2.17	0.91	0.09	mΩ	5 mΩ max.	Meet spec
	Insulation Resistance	final	1.1	8.4	3.0	$10^{10}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Gauge retention force	final	Gauge was retained			N/A	Gauge shall be retained	Meet spec
	Static load traverse	final	No displacement of the connector on the PCB			N/A	No displacement of the connector on the PCB	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
3	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR	initial	8.2	12.7	10.4	mΩ	30 mΩ Max.	Meet spec
	Damp heat steady state	initial	No physical damage			N/A	No abnormalities	Meet Spec
	Insulation Resistance	final	1.2	22.3	6.6	10^{10}Ω	10^{9}Ω Min.	Meet Spec
	LLCR (ΔR)	final	-0.29	0.89	0.32	mΩ	5 mΩ max.	Meet spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Engagement force	final	13.0	14.5	13.8	N	30N Max.	Meet spec
	Separation force	final	7.9	9.0	8.6	N	6N Min.	Meet spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
4	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	LLCR	initial	8.1	12.9	10.4	mΩ	30 mΩ Max.	Meet spec
	Mechanical operations	initial	No physical damage			N/A	No abnormalities	Meet Spec
	Electrical load and temperature	final	76.2	77.3	76.7	℃	125℃ Max.	Meet Spec
	LLCR (ΔR)	final	-0.71	3.51	0.32	mΩ	5 mΩ max.	Meet spec
	Insulation Resistance	final	1.2	5.9	2.6	10^{10}Ω	10^{9}Ω Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec