



1MM Dual Row External Locking HPI

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) to determine its conformance to the requirements of 1MM Dual Row External Locking HPI connectors.

1.2. Scope

This report covers electrical, mechanical, and environmental performance of 1MM Dual Row External Locking HPI Connectors. The test file number for this test is 501-162489.

1.3. Conclusion

All part numbers listed in paragraph 1.5 conformed to the electrical, mechanical, and environmental performance requirements of 108-162470.

1.4. Product Description

1MM Dual Row External Locking HPI

1.5. Test Specimens

The test specimens were representative of normal production lots, and the following part numbers were used for testing (see Figure 1).

Test Group	Quantity	Part Number	Description
A B C D E F G H I	Refer to test result.	2538949-1, 1-2538949-4, 2538950-1, 1-2538950-4	1MM Dual Row HPI connect set

Figure 1

1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)								
	A	B	C	D	E	F	G	H	I
	TEST SEQUENCE (b)								
Examination of Product	1,3	1,3	1,3	1,5	1,9	1,9	1,5	1,3	1,3
Contact resistance				2,4	2,6	2,6	2,4		
Insulation resistance					3,7	3,7			
Dielectric withstanding voltage					4,8	4,8			
Insertion force & withdrawal force	2								
Contact retention force		2							
Post retention force			2						
Vibration				3					
Thermal shock					5				
Humidity						5			
Salt spray							3		
Solderability								2	

Resistance to soldering heat									2
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**NOTE**

- (a) See Paragraph 1.5.
 (b) Numbers indicate sequence which tests were performed.

Figure 2**1.7. Environmental Conditions**

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C
 Relative Humidity: 20% to 80%

2. SUMMARY OF TESTING**2.1.**

Test Group		Number of Data Points	Requirement	Result			Observation
				Min	Max	Mean	
A	Examination of Product	6	No breaks, cracks, and deform should be found				PASS
	Mating force (2X6)		5.0Kgf Max	3.95	4.22	4.05	PASS
	Un-mating force (2X6)		0.4Kgf Min	2.75	2.92	2.88	PASS
	Examination of Product		No breaks, cracks, and deform should be found				PASS
B	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact retention force		0.7 kgf (min.)	0.94	1.22	1.15	
	Examination of Product		No breaks, cracks, and deform should be found				
C	Examination of Product	5	No breaks, cracks, and deform should be found				
	Post retention force		0.3 kgf (min.)	0.89	1.04	0.95	
	Examination of Product		No breaks, cracks, and deform should be found				
D	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact Resistance		Initial: 20 mΩ (max.)	14.04	15.06	14.72	
	Vibration		No electrical discontinuity & no physical damage occurred				
	Contact Resistance		Final: 30 mΩ (max.)				
	Examination of Product		No breaks, cracks, and deform should be found				
E	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact Resistance		Initial: 20 mΩ (max.)	13.92	14.96	14.53	

	Insulation resistance		Initial: 100 MΩ (min.)	15630	46550	38540	
	Dielectric withstanding voltage		No breakdown nor flashover				
	Thermal shock		No physical damage occurred				
	Contact Resistance		After environmental test: 30 mΩ (max.)	15.85	16.77	16.22	
	Insulation resistance		After thermal shock test: 50 MΩ (min.)	24330	48550	44220	
	Dielectric withstanding voltage		No breakdown nor flashover				
	Examination of Product		No breaks, cracks, and deform should be found				
F	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact Resistance		Initial: 20 mΩ (max.)	14.32	15.65	14.64	
	Insulation resistance		Initial: 100 MΩ (min.)	17540	44340	42150	
	Dielectric withstanding voltage		No breakdown nor flashover				
	Humidity		No physical damage occurred				
	Contact Resistance		After environmental test: 30 mΩ (max.)	14.76	17.67	15.23	
	Insulation resistance		After thermal shock test: 50 MΩ (min.)	25240	46730	43260	
	Dielectric withstanding voltage		No breakdown nor flashover				
	Examination of Product		No breaks, cracks, and deform should be found				
G	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact Resistance		Initial: 20 mΩ (max.)	13.45	16.16	15.64	
	Salt spray		No physical damage occurred				
	Contact Resistance		After environmental test: 30 mΩ (max.)	15.65	18.45	16.36	
	Examination of Product		No breaks, cracks, and deform should be found				
H	Examination of Product	5	No breaks, cracks, and deform should be found				
	Contact resistance		Initial: 20 mΩ (max.)				
	Salt spray		No physical damage				

	Contact resistance		After environmental test: 30 mΩ (max.)				
	Examination of Product		No breaks, cracks, and deform should be found				
I	Examination of Product	5	No breaks, cracks, and deform should be found				
	Solderability		No voids and pin holes				
	Examination of Product		No breaks, cracks, and deform should be found				

Figure 3

3. TEST METHODS

Test Description	Requirement	Procedure			
Examination of Product	Product shall be conforming to the requirements of applicable product drawing and applicable Specification	Condition/Method: Visual inspection Standard: No breaks, crack, and deform should be found.			
Electrical					
Contact Resistance	Initial: 20 mΩ (max.) After environmental test: 30 mΩ (max.)	Mate connectors: apply a maximum voltage of Initial: 10 mΩ (max.)20 mV and a current of 100 mA. According to EIA-364-23.			
Dielectric Withstanding Voltage	There shall be no breakdown nor flashover.	Test method: Initially AC 500V (rms) and after humidity and thermal shock tests AC 250V (rms) shall be applied between outer surface of housing and terminal and between adjacent terminals for one minute. According to EIA-364-20.			
Insulation Resistance	Initial: 100 MΩ (min.) After humidity test: 50 MΩ (min.) After thermal shock test: 50 MΩ (min.)	Test method: DC500V shall be applied between outer surface of housing and terminal and between adjacent terminals to measure insulation resistance. According to EIA-364-21.			
Mechanical					
Insertion & withdrawal force	Pos	Initial		At 30th	The product is clamped on a plugging force machine and inserted and unplugged 30 times at a rate of 25.4mm/min
		Mating Force Max.	Unmating Force Min.	Unmating Force Min.	
	2X4				
	2X5	4kgf	0.40kgf	0.35kgf	
	2X6	5kgf	0.50kgf	0.40kgf	
	2X8	5kgf	0.70kgf	0.60kgf	
	2X9	5kgf	0.70kgf	0.70kgf	
	2X10	5kgf	0.80kgf	0.80kgf	
	2X12	6.5kgf	0.80kgf	0.80kgf	
	2X15	8kgf	1.20kgf	1.20kgf	
	2X25	12.0kgf	1.50kgf	1.50kgf	

Contact retention force	0.7 kgf (min.)	Crimped terminal shall be mounted in a housing and pulled in an alignment. The load to pull the terminal out of the housing shall be measured.
Post retention force	0.3 kgf (min.)	The end of a post shall be pushed in a perpendicular to wafer. The load to make the post start moving shall be measured.
Vibration	Contact resistance shall be 30 milliohms (max.) after the test. There shall be no current discontinuity longer than 1 microsecond during the test.	Mated connectors should be mounted on a PCB and subjected to a vibration test of the following conditions. During the test, current continuity shall be checked. After the test, contact resistance shall be measured. (MIL-STD-202, test method 201) Frequency: 10~55~10 Hz/min. Amplitude: 1.5 mm Direction: 1. Axis of up and down 2. Axis of right and left 3. Axis of front and back
Environmental		
Thermal shock	Contact resistance shall be 30 milliohms (max.) after the test. Insulation resistance shall be 50 megohms (min.) after the test. There shall be no breakdown nor flashover on dielectric withstanding voltage test.	1 cycle consists of: -55 °C for 30 minutes +85 °C for 30 minutes Times of cycles: 25 cycles
Humidity		Temperature: 40±2 °C Humidity: 90% ~ 95% (RH) Period: 240 hours continuously
Salt Spray	Contact resistance shall be 30 milliohms (max.) after the test.	After the test, specimen shall be washed with running water and dried naturally before the measurement of contact resistance. Temperature: 40±2 °C Humidity: 90% ~ 95% (RH) Brine concentration: 5±1% Period: 24 hours
Solderability	Minimum 95% of solder dipping section shall be covered with solder No adhering tin, blackening and other abnormal load,	Fluxed soldering section of shrouded header shall be dipped in solder of the following conditions. Solder temperature: 245±5 °C Immersion period: 3-5 seconds
Resistance to soldering heat	There shall be no deformation nor damage which may affect the performance	Specimen shall be mounted on a PCB and subjected to resistance to soldering heat test of the following conditions. Solder temperature: 260±5 °C Immersion period: 3-5 seconds

Reflow soldering temperature profile:

